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HEALTH STATUS OF POLISH POPULATION AND ITS DETERMINANTS 2022

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National Institute of Public Health NIH
– National Research Institute

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FROM THE EDITORS

The cyclical report on the Health Situation of the Polish Population, presented by the National Institute of Public Health NIH – National Research Institute, is published during a period of slight respite from the ongoing 2020-2021 COVID-19 pandemic. However, it seems that we will have to slowly get used to the constant presence of the SARS-CoV-2 virus in our country's and the world's population, just as we have become used to the presence of the influenza virus (Influenza virus).

Nevertheless, the damage COVID-19 has done to the health of the world's population will be made up for over several years to come. It should be noted that the Polish National Health Programme (NHP) 2021-2025 already signalled this problem at the beginning of 2020, stating that "When implementing the NHP, it is necessary to take into account the impact of the health effects caused by the COVID-19 epidemic on the health of the population. The disease contributed to the greatest health crisis in the Republic of Poland after the end of the Second World War". It was also pointed out that, due to the ageing of the population, "The COVID-19 epidemic, overlapping with the epidemic of chronic non-communicable diseases, creates a negative synergistic effect".

The editors of the report presented here have taken all these current considerations into account and have asked the authors of the individual chapters to assess the impact of the pandemic in as much depth as possible in their thematic area of health issues. This proved impossible only in the chapter devoted to the Global Burden of Diseases due to the postponed dates of publishing the latest GBD data.

As with previous reports, the population health picture now presented is based on data available at the time of writing, relating to the pandemic period, primarily from routine information systems. Most of these systems operate within the framework of the Public Statistics Research Programme approved, each year, by the Prime Minister. The Social Insurance Institution information system, which for a number of years has allowed the preparation of a chapter on sickness absence, is also a source of important data. In addition, the report draws on data from internationally recognised databases, in particular Eurostat, the OECD and WHO databases.

The current report, like the previous one, also uses relevant data from other sources. These include a survey of a representative random sample of the adult population of Poland, conducted by the National Institute of Public Health NIH – National Research Institute in both 2022 and 2018, the results of which are presented in the chapter on subjective assessment of health and satisfaction of health needs before and during the COVID-19 pandemic. A separate chapter is devoted to the COVID-19 pandemic itself, discussing its course based on data from dedicated information systems and dedicated epidemiological studies.

As part of the presentation of selected problems related to the health of Polish population, the present Report discusses in depth, for the third time, problems related to the diet and nutritional status of Poles, using our own survey as well as data from Statistics Poland.

The current edition of the report uses the population health approach of the Global Burden of Disease methodology to identify the most important population health problems and needs of Poland and individual provinces based on the current survey results made available by the Institute for Health Metrics and Evaluation, Global Burden of Disease 2019 results.

Extremely valuable are the assessments, developed by specialist teams, of the impact of the COVID-19 pandemic on oncology care and the treatment of cardiovascular conditions in Poland. It is the issues discussed in these chapters that may become increasingly important in the context of so-called health debt.

The already traditional chapters also contain new approaches and new content. For example, the chapter on life expectancy and mortality presents the results of analyses of changes in mortality and life expectancy trends in various sub-populations of the Polish population caused by the COVID-19 pandemic. In the chapter on hospitalised morbidity, particular attention was paid to changes in hospital discharges structures in terms of the impact of the pandemic and the hospitalisation of COVID-19 patients.

Looking at the report as a whole, it is important to note that, from the point of view of assessing the effects of the activities carried out under the current National Health Programme, whose strategic goal is to "extend healthy life expectancy, improve the health and related quality of life of the population and reduce social inequalities in health", as well as its future versions, the current health information systems contain little information on the socio-economic status of individuals and it is currently practically impossible to combine data from different systems, especially from outside the health sector. An additional problem with the strategic objective of increasing the number of years lived in good health is the significant reduction in life expectancy. In this context, the key question becomes how quickly the health crisis caused by the pandemic will be overcome, but it is not the only one, as the stalling of the improvement in the health of the Polish population was already marked earlier.

The report we present now is twentieth in the series initiated by the National Institute of Hygiene in 1977. The authors and editors are aware that this is not an exhaustive study of the vast subject of community health and that each chapter deserves a separate report (detailed studies on the problems of infectious diseases, mental illnesses, cancer, and occupational diseases are being prepared by the respective institutes of the Ministry of Health). However, we think that it is a simple, synthetic analysis showing the dynamics of health problems in the country and their international context that is needed for rational health policy. We hope that the presented report will serve well all individuals and organisations working in the field of public health, as well as all those striving to improve the health of the Polish population.

Finally, the editors invite readers to visit the National Institute of Public Health NIH – National Research Institute website to download the electronic copy (pdf) of this report as well as its English version, earlier versions and other interesting materials on the health of the Polish population. We particularly recommend visiting the Knowledge Base (http://bazawiedzy.pzh.gov.pl/atlas) on health inequalities, and the updated interactive map on the health of the Polish population presented down to the poviat level with the possibility to print short reports for these administrative units.

ABBREVIATIONS LIST

AIDS	the Acquired Immunodeficiency Syndrome
AOTMiT	the Agency for Health Technology Assessment and Tarifficatio
AOS	specialized care
APC	Anual Percent Change
ATOC	alcohol treatment outpatient clinics
BAEL	Labour Force Survey
CAPI	Computer Assisted Personal Interviews
BMI	Body Mass Index
CABG	coronary artery bypass graft
COVID-19	Corona-Virus-Disease-2019
CSIOZ	the Healthcare Information Systems Centre, now e-Health Centre
CVDs	cardiovascular diseases
COPD	chronic obstructive pulmonary disease
DAA	Direct-acting antivirals
DALY	Disability Adjusted Life Years
DiLO Card	the Oncology Diagnostics and Treatment Card
DRG	Diagnostis Related Groups
DVG	Digitale-Versorgung-Gesetz
ECDC	the European Centre for Disease Prevention and Control
EEA	the European Environment Agency
EHIS	the European Health Interview Survey
ESP2013	the European Standard Population
EU-SILC	the European Union Statistics on Income and Living Conditions

GBD	the Global Burden of Disease
GUS	the Statistics Poland
HAV	Hepatitis A Virus
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
HLY	Healthy Life Years
ICD–10	the International Statistical Classification of Diseases and Related Health Problems
IHME	the Institute for Health Metrics and Evaluation
Karta DiLO	diagnosis and oncological treatment card
KGP	the National Police Headquarters
KOS zawał	Managed care for acute myocardial infarction survivors – MACAMIS
KRN	the National Cancer Register
LDL	low-density lipoprotein
MDR-TB	multi-drug-resistant tuberculosis
MHOC	Mental Health Outreach Clinic
MSM	men who have sex with men
NFZ	the National Health Fund
NIPH NIH – NRI	the National Institute of Public Health the National Institute of Public Health NIH - National Research Institute (formerly NIPH – NIH)
NOP	adverse event following immunization AEFI
NSTEMI	nonST-elevation myocardial infarction
OBSER-CO	the National COVID-19 Seroepidemiological Study
OECD	the Organisation for Economic Cooperation and Development
OOP	out of pocket expenses
PAN	the Polish Academy of Sciences
PCI	percutaneous coronary interventions
PKB	gross domestic product
POZ	primary care

PPS	purchasing power standard
PSSE	the Poviat Sanitary-Epidemiological Station
PSO	preventive vaccination programme
p.p.	percentage point
PTO	the Polish Society of Ophthalmology
PWID	people who inject drugs
PYLL	Potential Years of Life Lost
PYLL75	Potential Years of Life Lost for the reference age 75
SATOC	substance abuse treatment outpatient clinics
SDI	Social Development Index
SCOP	the Association of Polish Ophthalmic Surgeons
SILICARD	Silesian Cardiovascular Database
UE	the European Union
UE28	28 Member States of the European Union
WHO	the World Health Organization
WHO HFA DB	the WHO European Health for All Database
WSM	women having sex only with men
YLD	Years of Life with Disability
YLL	Years of Life Lost
ZUS	the Social Insurance Institution

1. IMPORTANT FACTS

1.1. SELECTED ASPECTS OF THE DEMOGRAPHIC AND SOCIAL SITUATION

The demographic and social situation in Poland can still be considered relatively favourable from a public health perspective. Poland's population is younger on average than that of most European Union countries (EU27), but according to Eurostat forecasts, this difference in Poland's favour will gradually disappear and by the middle of this century both the median age and the proportion of people aged 65 and more will be significantly higher in Poland than the average for EU countries.

The education level of the population is very much improving. The percentage of women with tertiary education is currently higher in Poland than the average for EU countries. However, for men, despite the favourable changes, it is still lower than in most EU countries.

The decreasing income disparity, which in Poland in recent years is at a level lower than the average for the EU countries is a favourable process. The risk of poverty or social exclusion in our country is currently at a lower level than the EU average. The greatest improvement is observed for children and young people under 18, while there is no improvement for the eldest people aged 65 and more, but also in this group the percentage of people at risk is lower than the average for EU countries.

The level of total unemployment as well as long-term unemployment in Poland is one of the lowest in the EU. The provinces with the worst unemployment situation are Warmińsko-mazurskie, Podkarpackie and Świętokrzyskie. The fact that there are significantly fewer opportunities for part-time work in Poland compared to the EU and

OECD countries in general, which is particularly pronounced among women, should be regarded as unfavourable.

The housing conditions of Poles are in some respects worse than the average in the EU countries, and this is particularly evident regarding housing density. By contrast, Poles are less likely than the EU population to live in poor quality housing.

The latest 2022 Human Development Index (HDI) of 0.880 places Poland among the countries with the highest values in the European Union at 20th place and 36th in the world. Assessing the situation compared to 2019, our country maintains its position in the EU while globally it has moved down 4 positions.

The latest 2022 Human Development Index (HDI) of 0.880 places Poland among the countries with the highest values in the European Union at 20th place and 32nd in the world.

1.2. LIFE EXPECTANCY AND MORTALITY OF THE POLISH POPULATION

Analysis of life expectancy and mortality data for the Polish population in 2020 and 2021 indicates that there was a fundamental deterioration in the health of Poles, particularly the older people, during the years of the COVID-19 pandemic.

In 2021, life expectancy for men was 71.75 years, 2.3 years shorter than in the pre-pandemic year 2019 and for men aged 65 years, 1.9 years shorter. Life expectancy for women was 79.68 years, 2.1 years shorter than in 2019 (at age 65, it was reduced by 1.7 years). Men were more affected in the first year of the pandemic (life expectancy reduced by 1.46 years) than in the second (a further reduction of 0.86 years) while women were similarly affected in both years (life expectancy reduced by 1.04 and 1.03 years respectively).

The impact of the pandemic on the reduction in life expectancy for urban and rural residents was greater among urban residents in both years, while for women it was greater among rural residents in 2020 and similar in both populations in 2021. The shorter life expectancy of urban residents in 2020 was clearly related to city size – the larger the city, the shorter it was. The reduction in life expectancy caused by the pandemic showed a significant interregional and inter-county variation.

The life expectancy of Polish men and women changed more during the pandemic than in most EU countries. The shortening was greater than the average for EU countries by 1.1 years for all men and by 1 year for those aged 65, while for women it was shorter by 1 year and 1.1 years, respectively. The greater reduction in life expectancy of the Polish population than that of the EU population as a whole because of the COVID-19 pandemic has further widened our unfavourable deficit in this basic indicator of population health in relation to the EU countries as a whole.

Women's life expectancy in poviats (counties) depended little on the deprivation index value, but the reduction in female life expectancy during the pandemic period was greatest in counties with the highest deprivation levels and lowest in counties where the deprivation index was lowest (deciles 1–3). In contrast, for men, the difference in life expectancy is more clearly related than for women to the level of deprivation of the counties, while no such relationship is observed for the reduction in life expectancy associated with the pandemic period.

A constant, although already much smaller than in 2020–2021, excess of deaths is present in Poland and other EU countries until now (August 2022). In Poland, the excess of deaths since mid-April 2022 has been caused to a small extent by COVID-19 deaths, which is a clear argument for the existence of a so-called "health debt". The excess of deaths has occurred only in the elderly aged 65 and over since second half of February, indicating that the health debt is most marked in this population through increased mortality.

In 2021, Poland's total population and those aged 75 and over were the most likely to die from heart disease. The second most common disease responsible for the deaths of Poles in 2021 was COVID-19, which was the most common cause of death among those aged 25–74 years and was in second place among the oldest 75 years and over. The third cause was cerebrovascular disease, the fourth atherosclerosis and the fifth tracheal, bronchial and lung cancer.

COVID-19 was the underlying cause of 41451 deaths (108.1 per 100,000) in 2020 and 92780 deaths (243.1 per 100,000) in 2021. COVID-19 death rates increased greatly with age and were higher in men than women. Half of the deceased were older than 80 years for women and 74 (2020) and 72 (2021) for men. Mortality from COVID-19 of urban and rural residents was at similar levels. In contrast, COVID-19 deaths played almost twice the role in mortality for men with higher education than primary education (considering the proportion of deaths from COVID-19 in all deaths in each sub-population). Such a situation does not exist among women.

During the pandemic period, there was a significant excess of mortality from diabetes, nervous system diseases, heart diseases, causes directly related to alcohol consumption. As the data presented in the report shows, this may have been due to objective and subjective impediments to accessing treatment. Undoubtedly, these health issues will require more attention in the months ahead. The lower-than-expected mortality from malignant tumour is undoubtedly misleading being more the result of COVID-19 being adjudicated as the cause of death for those with concurrent cancer and COVID-19.

The nationwide standardised death rate from suicide remained stable in 2019, 2020 and 2021, which, in the context of the pandemic, should be considered a very positive thing.

There is a large interregional variation in changes in mortality during the pandemic period for most causes of death.

Mortality in people under 75 years of age due to preventable or amenable causes is an important element in assessing the performance of the health system. The mortality of the Polish population due to all preventable causes was higher in 2020 and 2021 than could be expected from the earlier trend in death rates due to these causes. This excess was larger for amenable than preventable causes.

1.3. HOSPITALISED MORBIDITY IN POLAND – TREND CHANGES DURING THE COVID-19 PANDEMIC

In the first year of the COVID-19 pandemic (2020), there was an unprecedented reduction in hospitalisation rates among the residents of Poland; in the second year of the pandemic (2021), the catch-up in hospitalisation shortfalls (the so-called "health debt") varied in magnitude, so that for some diagnoses, hospitalisation rates exceeded those of 2019.

In 2019, hospitalisation in general hospitals was provided in Poland to: 8 478 000 people and in 2020 6 482 000 people, or 31% less, due to the COVID-19 pandemic and the reorganisation of the operation of hospitals by, among other things, converting some of them to so-called "dedicated hospitals". There were also fewer patients admitted to hospital in 2021 than in 2019–7 872 thousand or 7% less, but more than in 2020 (by 21%). This did not compensate for the "health debt" created by the COVID-19 pandemic, which also caused some patients to resign from planned hospitalization.

If absolute numbers are considered, women were hospitalised more often than men, but after age-adjusting of hospitalised morbidity rates, men are more likely to be hospitalised for most of the main health causes. Of the 28 causes analysed, only six had higher rates for women than for men. This applies to diseases in the group of endocrine disorders and genitourinary diseases.

Fewer people were hospitalised in 2020 than in 2019 in all diagnosis groups analysed. The largest decreases in rates were observed for infectious diseases (excluding COVID-19), chronic lower respiratory diseases, hypertensive disease, nervous system diseases and cardiovascular diseases in general. In contrast, the smallest decreases in rates were found for myocardial infarction and cerebrovascular disease, hospital stays related to pregnancy and childbirth and for tumour overall.

For almost all diagnoses analysed, the decreases in hospitalisation rates in 2020 compared to 2019 were higher in rural residents than in urban residents.

In only five of the 27 EU countries is the average length of hospitalisation longer than in Poland (2019 data). In Poland, during the 2020–2021 pandemic years, the downward trend of length of hospital stay continued for most causes of hospitalisation.

Hospital mortality in Poland in the 2020 and 2021 pandemic years was higher than in 2019 and in 2020 it increased more than a year later. An increase in hospital mortality in the first year of the pandemic is observed for almost all disease groups. With fewer hospital admissions, this may be due to a higher proportion of more severe cases. In the second year of the pandemic (2021), in-hospital mortality for many disease entity groups was already lower than in 2020. Total hospital mortality was higher among males than females in each year during the 2019–2021 period, a difference that was slightly smaller in the pre-pandemic period. The highest mortality rates are found among those treated for cardiovascular diseases, respiratory diseases and infectious diseases.

According to the Nationwide General Hospital Morbidity Study, during the COVID-19 pandemic, 91589 people were hospitalised for COVID-19 (main diagnosis) in hospitals in Poland and 289178 in 2021. In addition, 40,000 people were hospitalised in 2021 who had a diagnosis of U07.1 (COVID-19, virus identified) or U07.2 (COVID-19, virus not identified) entered as a co-morbid diagnosis.

Most people treated for COVID-19 were older, but one in five were under the age of 50.

Hospital mortality for COVID-19 was less than 10% up to the age of 50 years but in the older people in both 2020 and 2021 it increased very rapidly reaching 50% in men aged 85 years and more. In people over 50 years of age, in-hospital mortality due to COVID-19 was significantly higher among men than women. Overall, in-hospital mortality for men hospitalised with COVID-19 was in the subsequent years of the pandemic 24% and 23% and for women 19%.

The hospitalisation rates of urban and rural residents for COVID-19 in 2020 and 2021 were similar, but urban residents were more likely to be hospitalised in both the first and second years of the pandemic before the age of 70 and rural residents aged 70 and older. The length of hospitalisation for urban and rural residents was similar at 10 days and hospital mortality was 22%.

Despite an overall sustained reduction in hospitalisation rates also in the second year of the COVID-19 pandemic, for some diagnoses – ICD-10 e.g., glaucoma or visual impairment, an increase in hospitalisation is observed compared to the pre-pandemic 2019.

1.4. CARDIOVASCULAR DISEASES DURING THE COVID-19 PANDEMIC IN POLAND

The first year of the COVID-19 pandemic (2020) was characterised by a significant deterioration in cardiovascular care. The deterioration of care for patients with medical conditions has affected both inpatient and outpatient care.

In the first year of the COVID-19 pandemic, there was a significant reduction in the numbers of:

- hospitalisations due to cardiovascular diseases,
- outpatient counselling, and during the critical months of the pandemic, phone consultation was prevalent,
- procedures performed in invasive cardiology, electrophysiology, and cardiac surgery.

The decrease in the number of hospitalizations for cardiovascular diseases varied according to the severity of COVID-19 and showed some regional differences

Coronary heart disease:

- there has been a reduction in the number of hospitalisations for myocardial infarction,
- there has been a reduction in the number of coronary arteries and angioplasties performed in myocardial infarction, with a decrease particularly in NSTEMI,
- hospital mortality in patients with myocardial infarction has significantly increased.

Heart failure:

- the number of hospitalisations for heart failure has decreased, as has the number of hospitalisations of patients with already diagnosed heart failure,
- mortality among patients diagnosed with heart failure has increased.

Other cardiovascular diseases:

- there has been a decrease in the number of hospitalisations for: atrial fibrillation, aortic stenosis, pulmonary embolism and stroke.

The significant deterioration in the care of patients with cardiovascular diseases observed in the first year of the COVID-19 pandemic led, on the one hand, to excess deaths in that year as well as in 2021, which could already be due to a “health debt” that will also have to be “settled” in the years following the end of the pandemic. This problem may occur to varying degrees in different regions of the country.

In the first year of the pandemic, the level of CVD mortality nationwide increased by 8.8% over the expected level and by 12.6% in the following year. Noteworthy is the large regional variation in excess deaths, especially in the second year of the pandemic, when the percentage of excess deaths in the Lubuskie and Dolnośląskie voivodships was 82.5% and 53.7%, respectively, while in the Świętokrzyskie, Wielkopolskie and Zachodniopomorskie voivodships the mortality level was even lower than expected.

1.5. IMPACT OF THE COVID-19 PANDEMIC ON SECONDARY TUMOUR PREVENTION IN POLAND

During the pandemic, there was a significant decrease in indicators related to the diagnosis of malignant tumours in Poland (number of case conferences in the DiLO system, number of first-time hospitalisations, number of first-time contacts). Delayed diagnoses generate a health debt that may lead to a higher proportion of diagnoses at an advanced stage of tumour in the future.

The number of deaths from tumour causes decreased during the pandemic years. At the same time, there was a significant increase in mortality among tumour patients, mainly related to COVID-19. Significant excess mortality in the population aged 50 years and over in 2021 in Poland may paradoxically reduce the number of oncology patients in the coming years.

A return to the pre-pandemic state in terms of participation in screening will not be possible without real action tailored to specific audiences, including the reinstatement of invitations in a modified form. There is also research confirming that the most effective way to encourage participation in screening is through direct contact with a doctor, or other health system professional, dealing with the subject[1].

The COVID-19 epidemic confirmed that, to a large extent, the problem of low participation in screening in Poland is related to attitudes and beliefs about screening, the level of knowledge about screening, rather than the capacity of the system or lack of access to screening (screening data vs. number of DiLO cards issued in 2020).

The health debt, when preventive colonoscopies are not performed or delayed during the pandemic, is now further exacerbated by the suspension of the early detection programme for colorectal cancer. Its relaunch now appears to be one of the most urgent needs for secondary prevention of malignant tumours.

1.6. MENTAL AND BEHAVIOURAL DISORDERS WITH A FOCUS ON THE IMPACT OF THE COVID-19 PANDEMIC ON MENTAL HEALTH

The number of outpatient mental health care patients treated in total is over one million six hundred thousand people. The number of patients treated in the period 2017–2020 showed little change, although some increase can be observed, including those treated for the first time. The trends of women being treated more than one-fifth

[1] Koczkodaj P, Camacho F, Batten GP, Anderson RT. Are Wellness Visits a Possible and Effective Cure for the Increasing Cancer Burden in Poland? Example of Women's Preventive Services in the U.S. Cancers (Basel). 2022 Sep 1;14(17):4296. doi: 10.3390/tumours14174296. PMID: 36077829; PMCID: PMC9454863.

more often than men and as much as 50 percent more often in mental health clinics alone, and of urban residents being treated far more often than rural residents, have continued for many years. In outpatient mental health care in 2020, the surplus was as high as 128%, and this difference indicates that the health needs of urban and rural populations are not being met equally.

The most common health problems among people treated in outpatient mental health care have invariably been stress-related neurotic and somatoform disorders and mood (affective) disorders for several years.

Between 2011 and 2020, the number of Polish residents treated in 24-hour mental health care units is increasing, the exception being 2020, when admissions were reduced due to the pandemic. In 2020, 142,000 people were treated for mental disorders, men were treated as much as 103% more often than women (502.9/100,000 and 247.8/100,000 respectively), urban residents were treated more often than rural residents by 28% (412.9/100,000 and 298.79/100,000 respectively). The gap was much smaller than for outpatient treatment but has nearly doubled in the last ten years.

By far the most common diagnosis among those treated in 24-hour wards was mental disorders caused by alcohol use, with 177.2/100,000 inhabitants in 2020 and 96.8/100,000 inhabitants treated for the first time. The number treated in the first year of the pandemic was about a third lower than the year before. Particularly large numbers of residents are treated in Podlaskie, Świętokrzyskie and Warmińsko-mazurskie voivodships, as was the case three years ago.

Based on Police Headquarter data, it can be determined that the number of suicides in the last four years in Poland has been stable, oscillating around the figure of 5,200 per year. The highest suicide rates (around 900 suicides per year each) were reported in four age groups: among 30-year-olds, 40-year-olds, 50-year-olds and 60-year-olds, a broad spectrum of working adults. The number of suicides by sex has also not changed significantly. The ratio of men to women committing suicide between 2017–2020 ranged between 6.2 to 1 and 5.5 to 1. The number of non-fatal suicide attempts recorded by the police has increased slightly in the last four years. It is uncertain whether this is the result of changes in the behaviour of the Polish population, or whether better detection by the police or greater "reporting" of suicide attempts by citizens is the decisive factor. Our analyses indicate that the pandemic period did not have a major impact on suicide statistics and suicide attempts in Poland.

1.7. EPIDEMIOLOGICAL SITUATION OF SELECTED INFECTIOUS DISEASES IN POLAND

When interpreting data on the incidence of infectious diseases in Poland in 2020–2021 collected by epidemiological surveillance, underestimation of the number of cases should be considered. The degree of this underestimation can vary for different diseases, depending on their course and the risk they posed.

The downward trend in the vaccination status of children and adolescents that has been observed for several years continues, but the vaccination rate is still favourable and prevents epidemic increases in the diseases that we combat with vaccination.

The decision to postpone the vaccination of the Preventive Vaccination Schedule for one month during the initial period of the pandemic, in view of the assessment of the vaccination situation in 2020, did not significantly affect the vaccination status of children and adolescents.

Despite the continued increase in the number of vaccination evaders, a favourable trend of slowing down the growth rate of non-vaccinators was observed. There is an ongoing need for educational activities on the benefits of so-called "mandatory" and recommended vaccinations, targeting different audiences.

The pandemic has adversely affected the ability to achieve the goals of combating chronic infectious diseases, particularly HIV, HCV, and HBV infections. According to international consensus, one of the pillars of combating these diseases is early detection and treatment of infected individuals. During the pandemic period, especially in 2020, testing for the aforementioned infections was significantly reduced, resulting in a 50% decrease in HIV diagnoses, a 3-fold decrease in chronic HBV diagnoses and a 3.5-fold decrease in HCV diagnoses. This is a particularly worrying state given that the situation was already in need of improvement before the pandemic. More so now that wider access to testing, the promotion of testing for HIV, HCV and the integration of testing (offering a package of tests) for these diseases and other sexually transmitted diseases remains a priority issue.

When it comes to the diagnosis and treatment of HCV, HIV and other STIs, it is important to take measures to include marginalised populations, such as injecting narcotics users, homeless people, or illegal immigrants, in the health care system. To this end, the diagnostic process needs to be simplified, using rapid tests, and testing outside of healthcare facilities by trained non-healthcare professionals.

The large decreases in foodborne disease incidence rates observed in the first year of the pandemic already started to return to the values recorded in the years before the pandemic in the following year.

Significant differences in recorded incidence rates of sexually transmitted diseases indicate gaps in the system of diagnosis and/or reporting of these diseases in most regions. Measures will need to be taken to improve access to diagnostics, as well as to develop acceptable ways of surveillance of sexually transmitted infections in Poland.

Accurate recognition of the epidemiological situation of influenza, and thus the planning and implementation of a rational policy for the prevention of this disease on a national scale, requires a modification of the current influenza surveillance system to ensure that infections caused by influenza viruses and SARS-COV-2 are distinguished in general surveillance and that the way in which surveillance is carried out in the various regions is standardised.

Given the enormous economic and social costs of influenza incurred each year, efforts should be stepped up to significantly increase the proportion of people in Poland vaccinated against the disease.

1.8. DEVELOPMENT OF THE COVID-19 PANDEMIC IN POLAND

Available data confirm the high incidence of COVID-19 in Poland. Following the Omicron variant wave more than 90 percent of people had been in contact with the SARS-CoV-2 virus or had been vaccinated. Although vaccination does not completely protect against infection, serological markers of past infection in Round IV of the COVID-19 Seroepidemiological Study (OBSER-CO study) were significantly more frequent in unvaccinated individuals (87.6% vs 49.5%).

The high incidence in Poland confirmed by seroprevalence studies corresponds to a high mortality rate, which in Poland significantly exceeded the median in the EU/EEA countries. At the peak of the alpha variant wave in early 2021, mortality was 2.4

times higher than the EU/EEA median, and at the peak of the delta virus wave, mortality was 3.4 times higher.

The level of testing in Poland per population remained much lower than the median in the EU/EEA countries. In addition, the significantly higher percentage of positive results indicates that the level of testing was due more to accepted principles and availability than to fewer cases. Therefore, comparisons between countries based on registered maturity alone should be treated with caution.

Due to the heterogeneity of the testing system, data on registered cases do not provide reliable information on the geographical variation of the epidemiological situation. Ongoing surveillance of the situation requires systematic sentinel tests, seroprevalence studies and environmental surveillance, such as sewage testing.

1.9. INCIDENCE OF ACCIDENTS AND THEIR HEALTH CONSEQUENCES – POTENTIAL IMPACT OF CHANGES IN THE LIFESTYLE OF THE POLISH POPULATION DURING THE PANDEMIC PERIOD

In 2020, the accident mortality rate was at the 5-year average before the epidemic. In 2021, however, there was an increase in mortality rates. This increase was mainly due to a marked increase in mortality among those over 65 years of age. The mortality level of people in the middle age group, aged 25–64, did not change much, while the mortality of the youngest people, aged 0–25, decreased.

The mortality rate due to road traffic accidents per 100 000 population fell during the two years of the pandemic from 7.7 in 2019 to 5.9 in 2021, while in the EU the rate in question fell from 5.1 to 4.4 on average.

In 2020 and 2021, there have been slight modifications in road behaviour relative to previous years. A reduction in the number of incidents of pedestrians being run over can be cited as a positive development, while a slight increase in accidents caused by a failure to adapt speed to roadway conditions and an increase in the proportion of accidents involving intoxicated road users was a cause for concern. Another negative development is the increase in accident severity in 2020 and 2021 compared to pre-pandemic years.

A continuation of the positive downward trend in terms of drowning mortality was observed in 2020 and 2021. The improvement was very marked in the younger age groups. No specific changes in water safety behaviour were observed that could be linked to lifestyle changes during the pandemic. One exception in this case is the slight increase from previous years in the percentage of intoxicated drowning victims in 2020.

1.10. SELECTED ASPECTS OF SICKNESS ABSENCE

For many years, there has been a predominance of own sickness certificates issued to women insured with the Social Insurance Institution, with a percentage of approximately 55% of all certificates issued. This also means a higher rate of sickness absence for women. In 2021, women's absence certified by a medical certificate amounted to 137.1 million days, accounting for 57.1% of the total number of days of absence. Accumulated sickness absence per year in 2021 for women of 39.5 days was six days higher than the average accumulated absence for men (33.5 days).

In the analysis of sickness absence, an important element is the absence of women whose incapacity to work falls during pregnancy, which has a significant impact on both overall absence and the absence of the female population. Pregnant women's sickness absence as a proportion of total absence was 17.4 percent in 2021, while pregnant women's sickness absence as a proportion of sickness absence for this sex was 30.5 percent. One in 10 certificates was issued for incapacity occurring during pregnancy.

The most frequent sickness absence concerns insured persons in the age group of 30 to 34 years. In 2021, the percentage was 14.6% of the number of days of absence. In the case of male absence, 13.5% of the number of days concerned insured persons with an age between 60 and 64 and between 35 and 39 with 12.0%. For women, 17.9 percent of absence concerned insured persons aged between 30 and 34 years.

The longest sickness absence in men was caused by the following disease entities:

- spinal root and plexus disorders (G54) – 6.3% of the total number of days of sickness absenteeism for men,
- dorsalgia (back pain) (M54) – 4.2%,
- acute upper respiratory infection of multiple and unspecified site (J06) – 4.4%.

In the female population, for years, the longest sickness absence has been caused by maternal care for conditions predominantly related to pregnancy (O26) – 24.7% of the total number of days of sickness absence for women. These are followed by:

- reaction to severe stress, and adjustment disorders (F43) – 4.1%,
- acute upper respiratory infections of multiple and unspecified sites (J06) – 4.0%.

The sickness absence data reflect the successive stages (waves) of the development of the COVID-19 epidemic. In 2021, 528.3 thousand medical certificates issued for the COVID-19 entity were recorded, for a total of 4 244.8 thousand days of sickness absence. Compared to last year (period III-XII 2020), there was a decrease in both the number of sickness certificates, down by 17.8%, and the number of days of sickness absenteeism, down by 16.3%.

The highest number of COVID-19 own sickness certificates was issued in March 2021, totalling at 123 thousand certificates, representing 23.4% of all COVID-19 certificates issued in 2021 and nearly 3 times the number of certificates issued in the previous month. Another wave of increased sickness absence was recorded in November and December, with a total of 28.0% of sickness certificates and 25.2% of absence days.

There was a significant increase in hospital sickness absence compared to 2020. This is due to the fact that absence due to COVID-19 cases has more than doubled. Incapacity due to COVID-19 accounted for 7.1% of the number of days in hospital (in 2020, this was 3.9%). It should also be noted that in COVID-19 absence, hospital stays accounted for nearly 10% of the total number of hospital absence days (in 2020, this was 3.7%).

Sickness absence is a significant financial challenge. In 2021, expenditure on sickness absence financed from the Social Insurance Fund (FUS) and from the workplace fund amounted to PLN 24.5 billion and was 7.0% higher than in the previous year.

1.11. SUBJECTIVE ASSESSMENT OF HEALTH AND LEVEL OF HEALTH NEEDS SATISFACTION BEFORE AND DURING THE COVID-19 PANDEMIC

In 2022, an overwhelming proportion of adults, both men and women, rate their health well. The proportion of good/very good assessments remains at a similar level (and even increases for women) compared to the results of the survey carried out before the COVID-19 pandemic. This is a trend in line with the results of the EU-SILC European Survey of Living Conditions.

Despite the predominance of good health assessments in the population, certain subpopulations showed an increase in the proportion of responses suggesting subjective deterioration in health (e.g., women over 75), and a shift from the highest (very good) to slightly lower (good) assessments is evident for men.

In a comparative analysis of health condition before the pandemic and during its final stage, the middle-aged and older people group, which appears to be currently less burdened by health problems, is noted.

When asked about the perceived change compared to the time before the pandemic, 14.4 percent of men and 15.1 percent of women (after standardising the data for age) report that their health has worsened since then. Notably, among these individuals, approximately 40% of men and 35% of women associate deterioration directly or indirectly with the effect of the COVID-19 pandemic – i.e., due to infection with the virus or reduced access to medical services or lifestyle changes during the pandemic. This proportion translates into a total of approximately 1.7 million adults in Poland.

Deterioration of health due to the pandemic is more frequently declared by women from smaller towns and rural areas; among men, such indications are higher in large cities and among those with primary and higher education.

Persons of both sexes indicating post-pandemic deterioration in health are, declaratively, significantly more likely than the population on average to be burdened with chronic diseases (76.7% of men and 85.0% of women in the population of persons declaring deterioration in health versus approximately 25% in both sexes in the rest of the population). These people have a higher BMI and are also significantly more likely to report symptoms of depression.

Approximately ¾ of respondents of both sexes stayed at home for long periods of time because of the restrictions imposed and concerns about their own health. Of these, large groups report that they have experienced a resulting deterioration in health – 16.0% of women compared to 10.3% of men noted a deterioration in physical health and 23.2% of women compared to 17.0% of men a deterioration in mental health.

The results of the surveys show an improvement in access to healthcare, with a decrease in the percentage of people who could not afford a particular type of care. Improvements are occurring among both men and women, in most sub-populations defined by socio-demographic characteristics, with a particular increase among the oldest group.

People aged 75 and over were significantly less likely than in the 2018 survey to have experienced problems in accessing healthcare in the past 12 months due to long waiting times (-7.9 p.p. among men and -11.4 p.p. among women, i.e., now 28.6% and 29.7% respectively) or due to distance/transportation problems (-6.2 p.p. among men and -10.7 p.p. among women, to 11% and 10.4% respectively, a statistically significant difference). The trend continues after the standardisation of the demographic structure of the 2018 data.

Clearly burdened by problems of access to health care is the group of people who declare a deterioration in their health over the last 3 years and who link this deterioration to the effect of the COVID-19 pandemic (directly or indirectly). Compared to the rest of the adult population, those people (irrespective of sex) are significantly more likely to talk about problems resulting from long waits for appointments – 37.4 p.p. more often among men and 32.9 p.p. more often among women. In addition, women were significantly more likely to experience delays related to distance or transport problems (+19.3 p.p. compared to women in the other population).

In the population linking the deterioration to the COVID-19 pandemic, it is far more common for respondents to declare that it happened that they could not afford the listed types of healthcare in the last 12 months. For men, statistically significant differences were reported for medical care, diagnostic tests (both 11 p.p. and more) and the ability to buy prescription drugs (13.6 p.p. more often). In the women's group, statistically significant differences relate to diagnostic examinations (13 p.p. difference), dental care (21.5 p.p. difference) and the ability to purchase prescription drugs (10.6 p.p. difference).

Giving up, limiting or interrupting treatment or rehabilitation because of the COVID-19 pandemic affected 10% of men and women who needed this type of care. 15.5 percent of men and 21.1 percent of women (significantly more) of those who needed it delayed going to the doctor, hospital or for tests, waiting until it was safer. Older people were particularly affected, more noticeably in the male subpopulation than in the female subpopulation.

The percentage of people giving up or interrupting the treatment/rehabilitation process, as well as delaying going to medical facilities, increases among men as the degree of attained education decreases (the effect diminishes when the data are standardised with respect to age) as well as economic conditions. In contrast, the percentage of women declaring that they are delaying visits increases with the size of their city of residence.

Despite the declared more frequent needs, the group linking deterioration in health to the COVID-19 pandemic was far more likely to abandon, reduce or discontinue treatment/rehabilitation (among those receiving the care in question, this was 35.4 percent of men and 41.2 percent of women vs. about 8 percent for both sexes in the other population). They were also significantly more likely to delay going to appointments, hospitals, or tests (45.2% of men and 60.2% of women vs. 13–18% in the remaining population).

A comparison of the results of the two editions of the survey showed an increase in the frequency of declarations of any vaccination uptake (of course other than for COVID-19) by older people. On the other hand, there has been a decrease in the number of elder people who have opted for preventive laboratory tests in the last three years. Interestingly, the main reason cited for not performing such tests is the subjective feeling that one is healthy.

In large (from 100,000 and 500,000 residents) cities, there was a significant decrease in the proportion of people who underwent colonoscopy, both among men and women (a decrease of approximately 7–6% to 1.9% in men and 2.8% in women in this subpopulation). In addition, although not a statistically significant difference, the number (by about 4 p.p.) of women who have had a cytology or mammogram has decreased (51% and 31.2% respectively).

Compared to the previous survey conducted before the COVID-19 pandemic, there was an increase in the number of people who do not use private health services. This is mainly due to fewer people paying for individual services out of pocket.

It is noteworthy that the reported waiting times for Primary Health Care services (waiting for appointments / phone consultation / prescriptions) were well rated. In the general population, those surveyed most often felt that the waiting time for a face-to-face appointment with a Primary Health Care GP in the period before and during the pandemic did not change (46–45% of men and women), however, there is a relatively large group, 25% of men and 27% of women who claim that this time has increased (slightly or significantly).

The decrease in the frequency of use of individual private services, in favour of an increase in the percentage of people not using private care at all, occurs significantly frequently among people with primary and secondary education and among rural residents than among the other people. The use of private benefits, on the other hand, increased in large cities, 100,000–500,000 population. People whose health deteriorated because of the COVID-19 pandemic are particularly likely to use both subscriptions and individual private benefits.

The data collected in the two editions of the survey indicate that shorter waiting times for services are no longer an advantage of private forms of healthcare. Although, as in 2018, this is the argument mentioned most frequently, it was mentioned by significantly fewer respondents – now by 46% of men and 47.6% of women (down 8.4 and 9.2 p.p. respectively). Interestingly, this phenomenon does not apply to respondents from the largest cities.

Approximately one third of people over 60 declaring a deterioration in their health over the past three years, place the cause of this change directly or indirectly on the COVID-19 pandemic. This includes COVID-19 virus infection (15.2% of men and 16.7% of women), limited access to medical services during the pandemic (21.4% of men and 14.2% of women) or lifestyle changes, cessation of physical activity during the pandemic (10% of men and 11.2% of women).

The change in the level of self-assessed health status after the pandemic in most of the subpopulations studied is non-obvious and non-intuitive. The hypotheses that can be considered are as follows:

- excess deaths during the pandemic were mostly in the elderly and/or those burdened by disease. The reduction in the number of such people has had the effect of increasing the relative proportion of "healthier" people in the population,
- the fact that the sense of threat of a pandemic has receded and that anti-epidemic restrictions have been lifted in practice has led to a reduction in social stress and an improvement in the emotional state of many people, which has raised their self-assessment of their health.

A large subpopulation of people who indicate a deterioration in health because of the pandemic rate the performance of the health care system, including the availability of services and the need for co-payments, significantly worse (than the rest of the population). This group, more often than those who reported no deterioration in health after the pandemic, indicated difficulties in accessing services during the pandemic – both for organisational reasons and due to fears of infection.

There is a large subpopulation of people who indicate deterioration in health as a result of the pandemic. These people seem to require dedicated support programmes by the public health system.

Declining interest and/or accessibility to preventive health care is a bad sign for public health and requires rapid corrective action.

Consideration should be given to conducting such surveys annually on a representative sample of the Polish population in order to identify changes in attitudes towards one's own health and the health care system, with particular emphasis on the issue of preventive measures taken.

1.12. PREVALENCE OF BEHAVIOURAL HEALTH RISK FACTORS AND ITS CHANGES DURING THE COVID-19 PANDEMIC

The results of the surveys in 2018 and 2022 presented below refer to the population aged 20 and more. In 2022, the percentage of regular smokers of tobacco or electronic cigarettes was 29.8% of men and 17.6% of women respectively – values lower than in 2018 by 6 p.p. and 2.9 p.p. It is difficult to identify age-related downward trends, but a positive change among people with basic vocational education – traditionally presenting worse health attitudes – is noteworthy.

Alcohol consumption in 2021 remained almost unchanged compared to 2018 at 9.7 litres of pure alcohol per person. Between 2018 and 2021, the share of spirits in total consumption increased (from 34.6% in 2018 to 39.2% in 2021) and the share of beer decreased (from 57.9% in 2018 to 52.5% in 2021). Our surveys results showed a positive trend with a decrease in the percentage of people whose answers would indicate risky drinking (from 21.3% in 2018 to 16.7% in 2022 for men and from 6.0% to 4.3% for women).

In 2022, the prevalence of overweight (BMI ≥ 25) among the Polish population aged 20 years or more was 62% for men and 43% for women, while obesity was 16% and 12%

respectively. For both sexes, the prevalence of overweight and obesity increases with age, peaking between 75 and 84 years. These problems are much more common among men, except for the 75–84 age group, when obesity affects more than a quarter of Polish women, which clearly exceeds the percentage observed among men (19%). Among women, the risk of being overweight, as well as obesity, strongly depends on the level of education – for those with higher education, the risk is approximately two times lower than for those with basic vocational or lower education. Among men, these patterns do not occur. As a result, the biggest differences in the prevalence of these problems between people of both sexes are among Poles with a university education – among them, overweight in men is twice as common as in women (62% vs 31%) and obesity almost three times as common (19% vs 7%). The problem of overweight is more likely to affect people of lower economic status who have, at least periodically, difficulty paying their daily bills. Women living in rural areas and men in urban areas are more likely to fail to maintain a normal body weight.

Compared to the period before the COVID-19 pandemic, the proportion of overweight men (after adjustment for change in age structure) increased by almost 3 p.p., while women only increased by 0.5 p.p. For both sexes, the increase was strongest in the oldest age groups, i.e., 75–84 years (by 19 p.p. among men and 9 p.p. among women) and 85+ (8 p.p. each). The greatest increase in the prevalence of overweight was observed in men with higher education (by 7 p.p.) and women with lower secondary education or less (by 3 p.p.), the categories with the greatest reduction in physical activity. The prevalence of obesity among men increased by 3 p.p., (most strongly among those with higher education – by 7 p.p. and among urban residents – by 6 p.p.), while among women it remained virtually unchanged. The decrease in obesity prevalence was mainly observed among the most vulnerable population groups – those aged over 85 years (down 4 p.p.), women with primary or lower secondary education (down 5 p.p.) and those with financial difficulties (down 1 p.p.), which may be linked to an increased risk of death for obese people in these population categories.

Compared to the inhabitants of most EU countries, Poles are not very physically active. As many as 64% of Poles (62% of men and 65% of women) aged 20 or over do not engage in any form of recreational physical activity. Overall, females engage in such activities less frequently than men, however, Polish women aged 40–59 are clearly more active (percentages of non-practising recreational activities are 58% vs 66% respectively). The frequency of physical activity consistently decreases with age. Well-educated and better-off Poles are much more likely to exercise, and in the case of men, also urban residents.

Compared to 2018, the percentage of Poles not engaging in recreational physical activity, both men and women, increased by nearly 4 p.p. This increase was observed for almost all age categories and education levels analysed. The exception is the decrease in the percentage of non-exercising women aged 40–59 years by almost 2 p.p. (the prevalence of overweight and obesity also decreased in this group). The greatest reduction in activity was observed among Polish women with lower secondary education or less (the proportion of non-exercisers increased by 14 p.p.) and both sexes with higher education (an increase in the proportion of non-exercising men by 11 p.p. and women by 8 p.p. The proportion of inactive people increased more among urban than rural residents. The decrease in physical activity for Poles with financial difficulties was much greater than for the better-off (by 7 p.p. vs. 3 p.p.).

1.13. SELECTED ASPECTS OF THE DIET OF POLES, WITH REFERENCE TO THE COVID-19 PANDEMIC PERIOD

Household budget surveys of the Statistics Poland show that there was little change in the consumption of food items during the pandemic. Consumption of fats, primarily butter, and in addition sugar and confectionery increased. A positive development was an increase, albeit small, in the consumption of fruit and vegetables, as well as milk and cheese. These changes affected the energy value of the diet, which increased slightly, mainly due to a higher fat intake.

The consumption of fats, mainly butter, as well as sugar, confectionery and milk and cheese increased in households. There was no increase in the consumption of fruit and vegetables.

Literature studies indicate changes in eating behaviour during a pandemic. Some eating habits during the pandemic may have been detrimental to the health of Poles. Many people have increased their intake of certain foods, including sweets, alcohol, among others, resulting in weight gain. Members of the Human Nutrition Committee of the Polish Academy of Sciences indicated that this could pose a major threat to public health in Poland. However, some of the changes were viewed positively, including increased consumption of fruit and vegetables, dairy products, and whole-grain cereal products.

A comparison of selected aspects of the dietary behaviour of Poles before the pandemic (2018) and in 2022, based on two surveys of population aged 20 years and over, carried out by the NIPH NIH – NRI shows that the frequency of consumption of fruit and vegetables has increased, while the frequency of consumption of sweetened beverages has decreased. The proportion of people consuming wholemeal and light rye bread has increased. At the same time, however, fast food and sweets were consumed more frequently.

Given that many unfavourable aspects of Poles' diets, including insufficient intake of vegetables and fruit, fish, and a high proportion of animal fats, red and processed meat and sweets in the diet, were observed both before the pandemic and in the following years, it is extremely important to take comprehensive action to change this situation. They should be aimed primarily at changing the nutritional attitudes of Poles, as a significant proportion of them do not use any sources of knowledge on rational nutrition, do not apply this knowledge in practice and do not even see the need to eat healthily.

1.14. IDENTIFICATION OF THE MOST IMPORTANT HEALTH PROBLEMS AND NEEDS OF THE POPULATION OF POLAND AND ITS REGIONS BASED ON THE CURRENT RESULTS OF THE GLOBAL BURDEN OF DISEASE (GBD) SURVEY

The leading public health risks for Poles are cardiovascular diseases and tumours, which are responsible for more than 90% of health loss in the form of premature population deaths (YLL). More than half of the disease burden due to accidents, neurological disorders and diabetes and kidney disease is due to living with reduced disability (YLD).

The level of health loss in Poland varied according to gender and province of residence. In 2019, the value of disability-adjusted life years lost due to all causes in men in Poland was 37 114.2 DALY/100,000 men. The highest regional level of the total burden of disease was recorded in the Łódzkie voivodship 43 368.7 DALY/100,000, while the lowest, lower by 24%, in the Podkarpackie voivodship 33 124.6 DALY/100,000. In women, the total burden was 22% lower than in men and amounted to 29 002.5 DALY/100,000. Regional variations were similar and the lowest rate in the Podkarpackie (26 361.1) and Małopolskie (26 516.8) voivodships was about 22% lower than in the Łódzkie voivodship (33 623.1 DALY/100,000).

Analysing the health situation of the burden of disease with the SDI socio-demographic index can be helpful in assessing health disparities between regions and tracking their progress in improving population health. The SDI index for Poland was calculated at 0.80; with the locally highest value for the Mazowieckie voivodship SDI = 0.84 and the lowest for the Warmińsko-mazurskie voivodship SDI=0.77. An analysis of the dynamics of burden declines (30-year and 10-year) due to all causes and CVD placed Poland among the countries with the greatest reduction in DALY. However, the situation was not so positive when it came to changes in the burden of tumours – Poland ranked at the bottom of the list of countries, with the Świętokrzyskie voivodship even showing a 0.1% increase in the DALY/100,000 rate between 1990 and 2019.

The most important health problems in men overall were ischaemic heart disease, followed by tracheal, bronchial and lung cancer and lower back pain. In women, these were, in turn, ischaemic heart disease, lower back pain and ischaemic stroke. In the under-5 age group in both sexes, the highest health burden was caused by the effects of preterm birth, congenital heart defects and other birth defects. The loss of health in boys aged 5–14 years was mainly due to the consequences of behavioural disorders, asthma and dietary iron deficiency, while in girls it was due to lower back pain, migraine and behavioural disorders. In the 15–49 age group, the highest health burden was due to self-harm by other means, alcohol use disorders and lower back pain (in men) and lower back pain, migraine and alcohol use disorders (in women). The most important health problems in men aged 50–69 years were ischaemic heart disease, tracheal, bronchial and lung cancer and type 2 diabetes, and in women, tracheal, bronchial and lung cancer, ischaemic heart disease and lower back pain. In the oldest age group (70 years and more), men's health loss was primarily due to the burden of ischaemic heart disease, tracheal, bronchial and lung cancer and ischaemic stroke, while women's health loss was due to the burden of ischaemic heart disease, ischaemic stroke and Alzheimer's disease and other dementias. The burden of the most important health problems showed regional variation in all age groups considered, except for men and women aged 5–14 and women aged 15–49.

In Polish men, the main risk factors responsible for the disease burden were smoking (contributing 6.03% to the total burden), alcohol use (4.53%) and high systolic blood pressure (4.11%). In women, the main risk factors were high BMI (contribution to the total burden 4.99%), smoking (4.90%) and high systolic blood pressure (4.17%). For both sexes, the proportion of risk factors in each province showed variation.

In men under 40 years of age, the most important risk factors responsible for the total disease burden included alcohol use, high BMI, and low birth weight. In the 40–64 age group, these were mainly smoking, alcohol use and high BMI, while in the 65 and more age group, the main risk factors were smoking, high systolic blood pressure and fasting glucose levels. In women under 40 years of age, the most important risk factors responsible for the total disease burden included alcohol use, low birth weight and short gestational age for birth weight. In the 40–64 age group, these were mainly smoking, high BMI and fasting glucose levels, while in the 65 and more age group, the most important risk factors were high systolic blood pressure, fasting glucose levels and high BMI.

1.15. IMPACT OF COVID-19 ON THE EFFECT OF CHANGING THE WAY OPHTHALMIC SERVICES ARE FUNDED

Use of the DRG system to stimulate changes in the structure of adult ophthalmology services in Poland has had the expected effect, although still not as much as anticipated. It is likely that one of the reasons may have been the restrictions on access to healthcare facilities and the postponement of planned treatments by the patients themselves as well, which was related to the ongoing COVID-19 pandemic, although this was mainly relevant to the volume of services provided. This problem, moreover, did not only concern ophthalmology, but also other elective services, especially those provided on an outpatient or same-day basis. The impact of the pandemic on changes in the structure of the services provided or the mode of delivery was not perceived to be significant compared to the induced changes in the organisation of service provision. There has also been no change in the number of providers performing ophthalmic procedures under contract with the

National Health Fund. It is to be hoped that periodic, "pandemic" reductions in the number of procedures performed will be quickly recovered in subsequent quarters, resulting not only in an improvement in availability, but also in the quality of services provided.

The public payer regularly monitors changes in the structure of services provided on a national scale and publishes regular reports providing information on the situation in Section B (see the "Active Monitoring" project on the National Health Fund website and the "Healthy Data" platform). This allows providers to assess their "market position" relative to other providers operating in the area (currently on a six-monthly basis), which can help to change their behaviour. At the same time, patients will be able to assess the provider not only based on the so-called word of mouth, but also based on data collected in the system.

In the authors' opinion, further close cooperation between the National Health Fund and the ophthalmologists' community, especially national specialists, is necessary to evaluate the changes introduced and to effectively implement further organisational and financial solutions to improve the availability and quality of diagnostics and treatment of eye diseases.

1.16. IMPACT OF COVID-19 PANDEMIC ON HEALTH FINANCING MECHANISMS IN THE CONTEXT OF CHANGES IN THE STRUCTURE OF HEALTH NEEDS

The COVID-19 pandemic has contributed to a change in the structure of health care financing. It has also led to changes in the structure of service provision – a reduction in planned hospitalisations, outpatient advice in favour of the creation of temporary hospitals dedicated to the treatment of COVID-19 patients.

The structure of healthcare funding from the NHF budget has clearly changed. Between 2021 and 2022, the budget for hospital care has decreased by around 10%.

In particular, the decrease in funding can be seen in the areas of geriatrics, palliative, hospice, and long-term care. Geriatric services accounted for 0.14% of the cost of all services in 2020, and the largest decrease was in hospital treatment – during the pandemic, geriatric care accounted for 0.27% of total hospital costs.

The largest patient group in long-term care is the elderly. The healthcare system needs to prepare for an increased demand for care that considers the age structure of the population and the profile of chronic diseases.

The estimated increase in current health expenditure in 2020 relative to 2019 was 12%. In 2020, the budget for inpatient treatment was 5.5 billion, decreasing to 3.7 billion in 2021. Current private spending on healthcare also increased in 2020 to PLN 44.2 billion.

In 2020, there was a decrease in cancer diagnoses of around 20%. The reduction in the number of new colorectal cancer diagnoses in 2021 was 13.5%. There was a 14% decrease in lung cancer diagnoses and an 11% decrease in breast cancer diagnoses.

As a result of the 2020 pandemic, there was an increase in sickness absenteeism related to mental and behavioural disorders by approximately 37% in the number of days (compared to 2019).

Appropriate measures should be taken to prevent the negative long-term effects of a pandemic primarily in terms of the availability of screening and other preventive services.

2. SELECTED ASPECTS OF THE DEMOGRAPHIC AND SOCIAL SITUATION

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Poland's population has been declining after 2011, with 38,036.1 thousand people in 2021. Compared to the results of the 2011 National Population and Housing Census, the population has decreased by approximately 476,000, or 1.2%, in 2021. The foreign migration balance was negative until 2014, reached a record positive value of 6.1 in 2016, and had a positive value of 1.9 thousand in the first half of 2021. Also, the birth rate (the difference between the number of births and the number of deaths) had been negative in urban areas since 2011 and was also negative in rural areas in 2015 and 2020 (Fig. 2.1). Nationwide, negative population growth occurred from 2013 to 2021 inclusive. Of the 27 EU countries, 16 had negative population growth in 2021 and the EU overall, and 9 countries had declining populations[1]. According to Eurostat, the Polish population currently accounts for 8.5% of the total EU population, placing our country in fifth place in terms of population size.

[1] https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

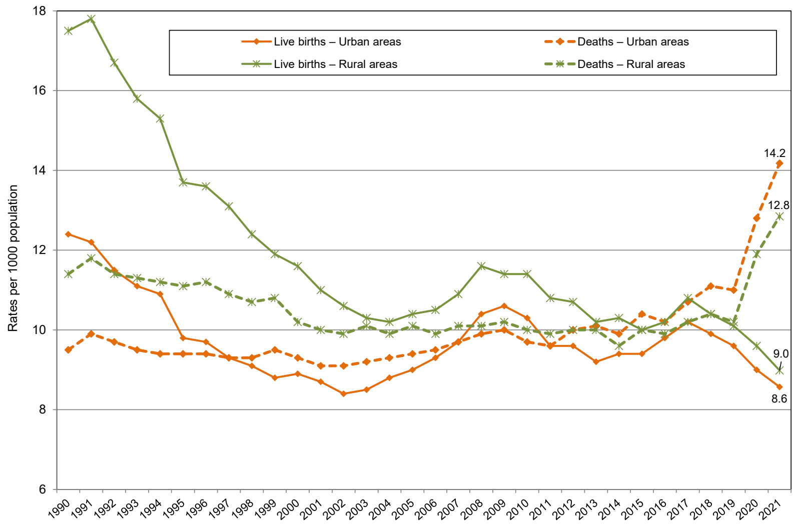

Fig. 2.1. Natural population movement in urban and rural Poland 1990–2021 (Statistics Poland data)

A comparison of the 2011 and 2021 Censuses shows that the number of women decreased by 220,800 (i. e. 1.1 percent) and the number of men by 255,000 (i. e. 1.4 percent). The proportions by sex did not change substantially in the inter-census period. Women make up more than half of the population (51.8%) and there are 107 women for every 100 men (Table 2.1). This over-representation of women over men does not appear until the age of 50–54 and increases very rapidly in increasingly older age groups. At the age of 65 and more, there are already 154 women for every 100 men, while at the older age of 85 and more, there are as many as 260 women for every 100 men (they account for 72.3% of Poland's total population of this age). Under 48 years of age, there is a steady male-female advantage (among newborns, boys are in the majority in 2021 at 51.4%), which is gradually decreasing primarily as a result of higher premature mortality among men compared to women.

Table 2.1. Population of Poland by sex, type of residence and selected age groups, 2011–2021 (as at 31 December)

Year	Total	Males	Females	Cities	Rural area	Number of women per 100 men	Population (%)		
	figures in thousands						under 20 years	65 years and more	in cities
2011	38538	18655	19884	23386	15153	107	21.1	13.8	60.7
2012	38533	18649	19884	23336	15197	107	20.8	14.2	60.6
2013	38496	18630	19866	23258	15238	107	20.5	14.7	60.4
2014	38479	18620	19859	23216	15262	107	20.3	15.3	60.3
2015	38437	18598	19839	23166	15271	107	20.1	15.8	60.3
2016	38433	18593	19840	23129	15304	107	20.0	16.4	60.2
2017	38434	18593	19840	23109	15324	107	20.0	17.0	60.1
2018	38411	18582	19829	23067	15344	107	20.0	17.5	60.1
2019	38383	18567	19816	23033	15350	107	20.0	18.1	60.0
2020	38265	18551	19801	22905	15359	107	20.1	18.6	59.9
2021	38080	18406	19674	22758	15323	107	20.0	19.0	59.7

Source: Statistics Poland data

The percentage of children and young people under the age of 20 has been slowly but steadily declining since the second half of the 1980s and in 2021 this group accounted for 20.0% of the total population and children aged 0–14 years for 15.3%. At the same time, the proportion of people aged 65 and more gradually increased, and in 2021 they accounted for 19.0% of the total Polish population (Table 2.1). The proportion of older people, aged 65 and more, is higher among urban than rural residents: in 2021, the respective percentages were 21.0% and 16.5%.

Poland's population is younger on average than most countries in the European Union (EU27). According to data from the European Union statistical office Eurostat, as of 1 January 2020 the median age of the population in the EU as a whole was 43.9 years and in Poland 41.3 years, while the proportion of people aged 65 and more was 20.6% and 19.9% respectively (only the populations of Cyprus, Ireland, Luxembourg and Slovakia are younger than the Polish population according to these indicators) and by median also slightly in Sweden and the UK. As can be seen from the forecasts prepared by Eurostat, this difference favourable for Poland will gradually decrease and by the middle of this century both the median age and the percentage of people aged 65 and more in Poland will be higher than the average for the EU27 countries (Table 2.2). It is worth noting that, in Poland, the proportion of the oldest people, i. e. those aged 80 and more, will increase most rapidly between 2030 and 2040, while the whole group aged 65 and more will increase most rapidly by 2030, which means that this immediate significant increase in the proportion of older people will mainly affect those aged under 80. The ongoing changes in the age structure of the population and the problem of an ageing population are reflected in important demographic and social indicators. One of these is the so-called potential support indicator, which shows how many people of active age there are per older person. As Figure 1.2 shows, in the next decades we will observe a dramatic decrease in the size of this indicator both in Poland and in Europe as a whole, but in Poland this change will be more intense and probably more noticeable. The process of changes in the age structure and ageing of the Polish population is well illustrated by the changes visible in the age pyramid of the Polish population and the significant increase in the population in the oldest age groups (Fig. 2.3).

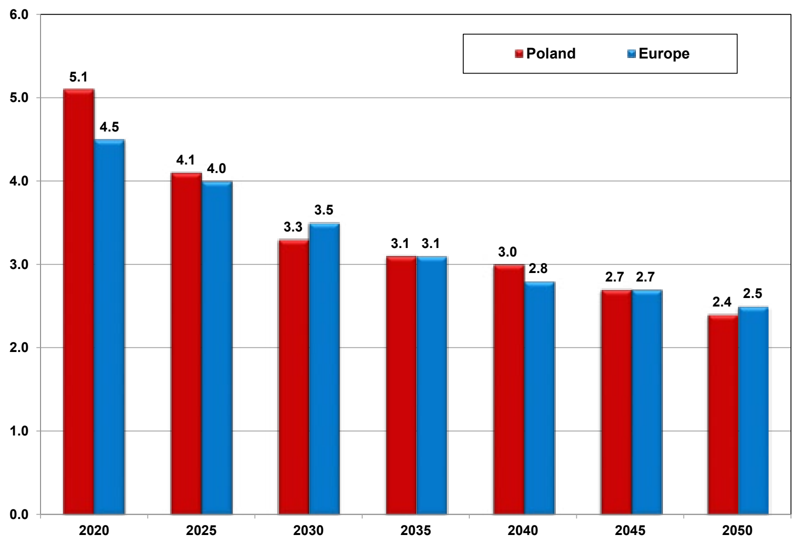

Fig. 2.2. Potential support ratio (number of people aged 25–69 / number of people aged 70 and more) in Poland and the average in Europe in 2020 and projected for 2020–2050 (UN, World Population Prospects: The 2019 Revision)

Table 2.2. Projected median age and proportion of people aged 65 and more and 80 years old and more in Poland and selected countries in 2020–2050 (Eurostat data, EUROPOP2019)

Country	2020	2030	2040	2050
Median age of population				
EU27	43.9	46.1	47.7	48.2
Austria	43.4	44.9	46.6	47.4
Czech Republic	42.9	45.6	47.4	46.6
Ireland	38	40.5	42.2	43.7
Germany	45.9	46.1	47.2	47.2
Poland	41.3	45.5	49.1	50.9
Hungary	43.3	45.6	47	47.8
Percentage of population aged 65 and more				
EU27	20.6	24.2	27.6	29.5
Austria	19	23	26.4	27.7
Czech Republic	19.9	22	24.8	28.2
Ireland	14.4	17.6	21	24.7
Germany	21.8	25.4	27.9	28
Poland	19.9	21.6	24.3	27.7
Hungary	18.2	22.7	25.3	30.1
Percentage of population aged 80 and more				
EU27	5.9	7.2	9.2	11.3
Austria	5.3	6.7	8.2	11.1
Czech Republic	4.1	6.4	8	8.6
Ireland	3.4	4.8	6.4	8
Germany	6.8	7.3	9.1	11.9
Poland	4.5	5.8	7.8	8.5
Hungary	4.4	5.7	9.2	9.7

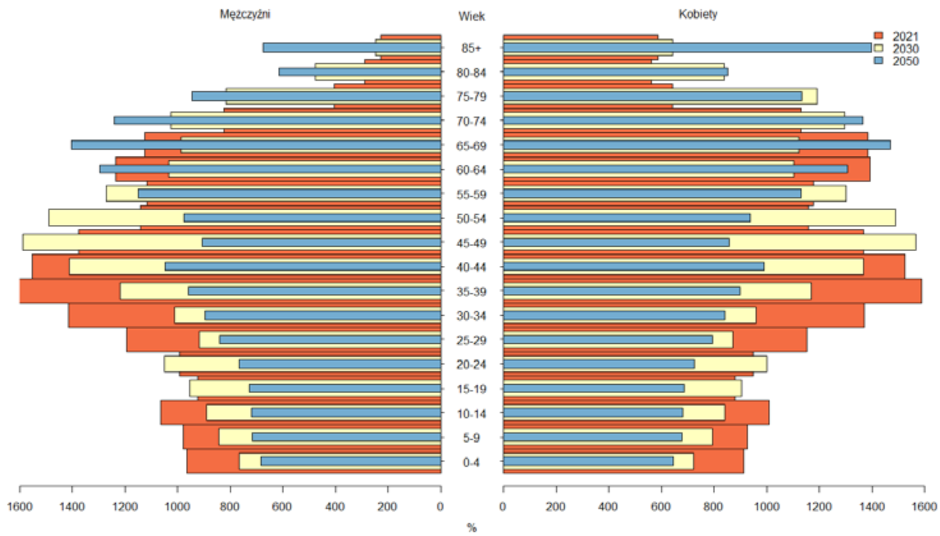

Fig. 2.3. Population of Poland by sex and age in 2021 and projected for 2030 and 2050 (Eurostat EUROSOFT 2021 data)

From a regional perspective, the highest percentage of people aged 65 and more living in cities is found in the Łódzkie and Świętokrzyskie provinces, while the lowest is found in the Warmińsko-Mazurskie province. The trend observed over the years among urban dwellers does not apply to rural dwellers: the relatively largest number of older people lives in Świętokrzyskie province (18.5%) and the smallest in Pomorskie province (12.9%) (Fig. 2.4).

The ageing of Poland's population is accelerating. This is indicated by changes in the proportion of the population in the post-working age group (women 60 and more, men 65 and more). Between 2000 and 2021, the size of this community increased by almost 2.9 million to 8.5 million, and its percentage increased from less than 15% to more than 22% during this period.

In 2021, in urban areas, the proportion of the population in the post-working age group increased to almost 25% and in rural areas to over 19%. For this age group, the difference in the share in the overall urban and rural populations is as high as 5.1 p.p. Slightly smaller is the regional variation – the "oldest" in 2021 was Łódzkie province, with more than 25% of people in post-production age, and the lowest percentage of people in post-production age (20.7–21%) was recorded in Małopolskie, Pomorskie and Wielkopolskie provinces[2].

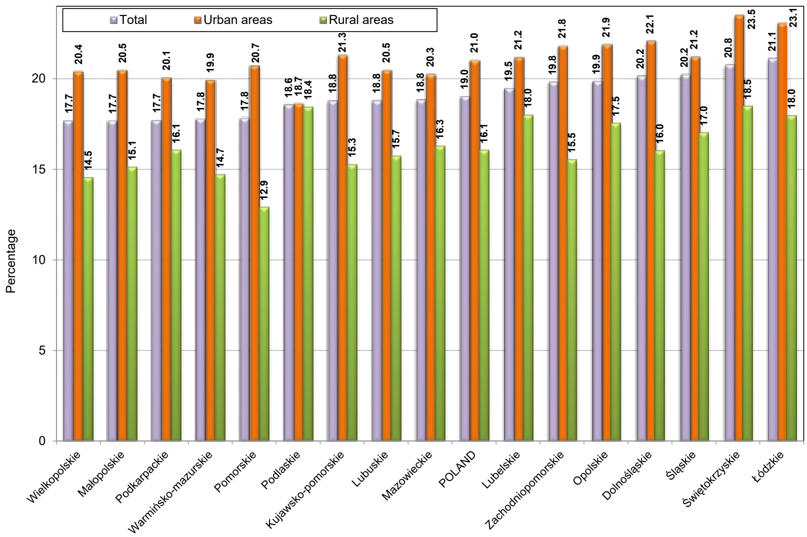

Fig. 2.4. Percentage of people aged 65 and more in urban and rural areas by province in 2021 (Statistics Poland data)

The percentage of people living in urban areas has been on a downward trend since 2000 and is 59.7% in 2021. According to a Statistics Poland forecast, this percentage will slowly but steadily decrease. Currently, the most urbanised province is the Śląskie province, where 77.6% of the population lived in cities in 2021, while the Podkarpackie Province had an urban population smaller by almost a half: 41.4%.

The number of live births after 2018 has been decreasing both in absolute terms and in relation to the population (Table 2.3). The decline in the birth rate is mainly observed in cities. All data in Table 1.3 are based on the definitions of live birth and fetal death in force in Poland since 1 July 1994, which are in line with World Health Organisation

[2] https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-stan-i-struktura-oraz-ruch-naturalny-w-przekroju-terytorialnym-w-2021-r-stan-w-dniu-31-grudnia,6,31.html#

recommendations. According to these definitions, so-called non-viable neonatal births with signs of life should be classified as live births, while so-called non-viable neonatal births without signs of life should be classified as foetal deaths, i. e. stillbirths.

Table 2.3. Births in Poland in selected years 2009–2021 (Statistics Poland data)

Year	Live births			Stillbirths	
	number (in thousands)	per 1000 population	Extra-marital as % of live births	Number	% of total births
2009	417.6	11.0	20.2	1748	0.42
2010	413.3	10.7	20.6	1730	0.42
2011	388.4	10.1	21.2	1653	0.42
2012	386.3	10.0	22.3	1601	0.41
2013	369.6	9.6	23.4	1386	0.37
2014	375.2	9.7	24.2	1341	0.36
2015	369.3	9.6	24.6	1075	0.29
2016	382.3	9.9	25.0	1147	0.30
2017	402.0	10.5	24.1	1101	0.27
2018	388.2	10.1	26.4	1277	0.33
2019	375.0	9.8	25.4	1238	0.33
2020	355.4	9.6	26.4	1270	0.27
2021	332.7	8.7	24.0	1220	0.37

Source: Statistics Poland data

One in four children born in Poland is born outside of a formal marriage. It is worth noting that the proportion of such births in 2021 was lower than the year before (Table 2.3). There is a large inter-provincial variation in the size of this percentage as well as its changes over time. In 2019–2021, the percentage of illegitimate births was by far the highest in the Zachodniopomorskie and Lubuskie provinces. On the other hand, the frequency of extra-marital births is three times lower in the Podkarpackie and Małopolskie provinces (Fig. 2.5a). As we have already pointed out in previous Reports, the percentage of extra-marital births is generally – with the exception of the Podkarpackie and Świętokrzyskie provinces – higher in cities than in rural areas.

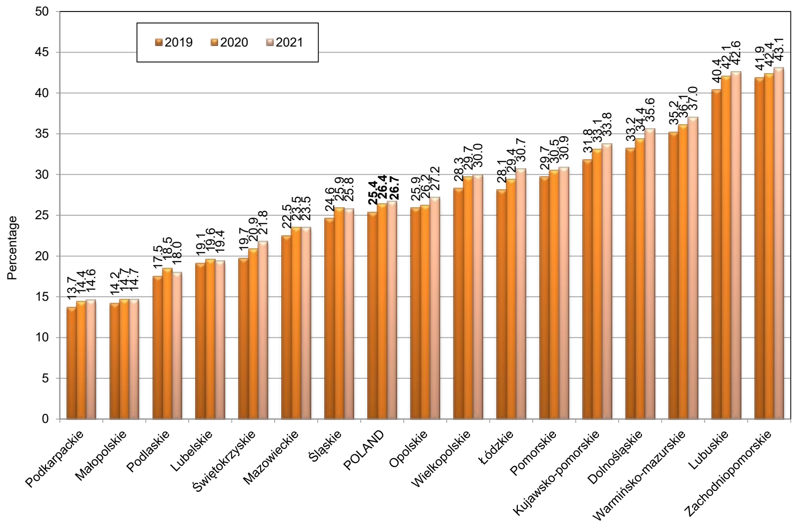

Fig. 2.5a. Percentage of non-marital births among live births by province in years 2019, 2020 and 2021 (Statistics Poland data)

According to Eurostat data, the percentage of extra-marital births in Poland is low compared to the twenty-seven EU countries, as the frequency of such births is lower only in Greece, Croatia and Liechtenstein (Fig. 2.5b). In eight countries, such births account for more than half of all births. Overall, across all EU countries, an average of 42% of children are born out of wedlock.

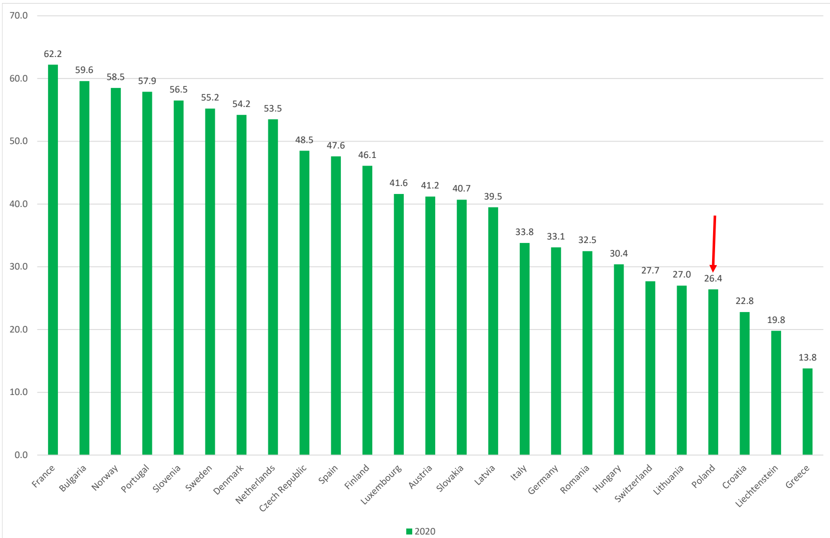

Fig. 2.5b. Proportion of non-marital births among live births in EU countries in 2020 (Eurostat data)

In 2021, 5.7 percent of live births were so-called low birth weight births, i. e. newborns whose weight at birth was less than 2500 g (Table 2.4). After 2014, there is a slight downward trend in the frequency of these births. Low birth weight babies in Poland are born less often than average in the European Union countries (according to WHO estimates in 2018, the percentage for the EU28 was 6.1%, WHO HFA DB).

Table 2.4. Live births by weight at birth in selected years 2011–2021 (Statistics Poland data)

Year	Live births				
	total	less than 2500 g		2500 g and more	
		number	percentage1	number	percentage1
2011	388416	21793	5.6	366617	94.4
2012	386257	21835	5.7	364419	94.3
2013	369576	22019	6.0	347553	94.0
2014	375160	22211	5.9	352940	94.1
2015	369308	21351	5.8	346611	94.2
2016	382257	22314	5.8	359929	94.2
2017	401982	23062	5.7	378877	94.3
2018	388178	21451	5.5	366686	94.5
2019	374954	21174	5.6	353724	94.4
2020	355309	374898	5.4	336120	94.6
2021	331511	18761	5.7	312631	94.3

1 – Only live births with an established infant weight at birth are included

Source: Statistics Poland data

The interprovincial variation in the percentage of low-birth-weight babies has been increasing slightly in recent years. In the period 2016–2021, the least favourable situation was in the Śląskie and Zachodniopomorskie provinces, and the most favourable in Podlaskie province, where it is improving steadily (Fig. 2.6). In the majority of provinces, the proportion of low-weight births is declining, with a slight increase in the proportion between 2020 and 2021 in three provinces: Małopolskie, Warmińsko-Mazurskie and Podlaskie.

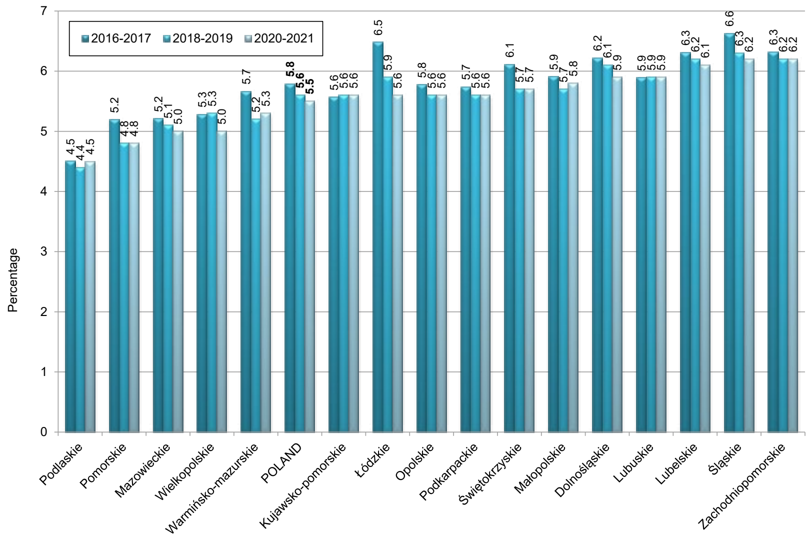

Fig. 2.6. Percentage of low-birth-weight live births (below 2500 g) by province, 2016–2017, 2018–2019 and 2020–2021 (Statistics Poland data)

Socio-economic status has a recognised, extremely important impact on health condition. The socio-economic structure of Poland's population compared to the rest of the European Union is less favourable, albeit with some exceptions. Among the most important determinants of social status is the level of education.

Although the percentage of people with higher education has increased very significantly in Poland in recent years, it is still lower among men than in most EU countries, while the percentage of women is higher than the EU27 average (Fig. 2.7). Eurostat data also shows that the percentage of 18–24-year-olds with at most lower secondary education and not continuing their education, as a proportion of the total population of this age, is one of the lowest among EU countries in Poland and was 5.5% in 2019, while the EU27 average was 11.0%[3].

[3] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=edat_lfse_15&lang=en

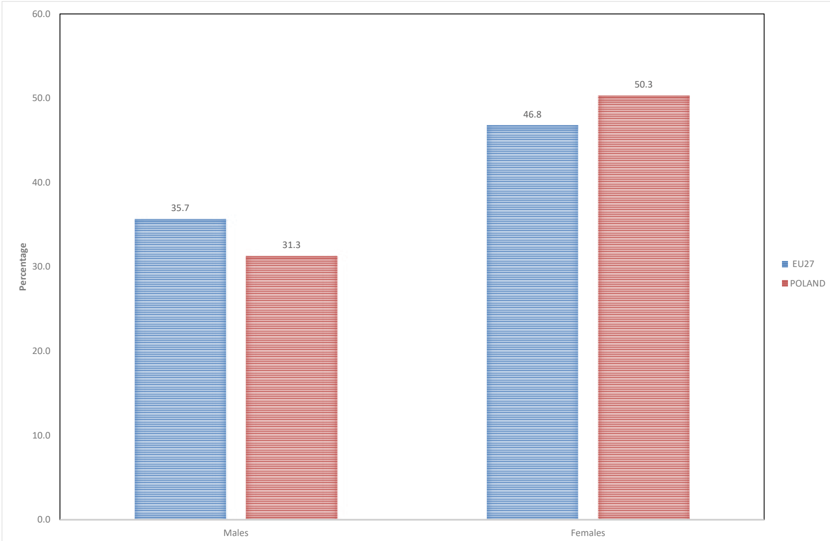

Fig. 2.7. Percentage of men and women aged 25–64 by completed higher education in Poland and EU countries, 2021 (Eurostat data, EU-LFS survey)

Although the economic situation in Poland is improving and Gross Domestic Product (GDP) growth is faster than the average for the European Union as a whole (in 2021. 6.8% vs. 5.4 percent) and the vast majority of EU countries, the value of GDP per capita (in PPS) is still one of the lowest in the EU – in 2021 it was 26.7 percent below the EU27 average[4]. By contrast, the situation is worse in Bulgaria, Greece, Croatia, Portugal, Hungary, Romania and Latvia.

The phenomenon of decreasing income disparity should be considered favourable in our country, which is illustrated by the quintile share ratio – while the income of the 20% of people with the highest level of income was in 2014 4.91 times higher than that of the 20% of people with the lowest income, with the average for the EU27 equal to 5.22, in 2019 the respective values were 4.37 and 5.05, and in 2021 the ratio for Poland decreased to 4.02, while the average for the EU countries was 4.97 (Eurostat data[5]). Similar changes in the income disparity of the Polish population compared to other EU

4 http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00114&plugin=1.

5 http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di11&lang=en

countries are also shown by the Gini index. In the corresponding years, the index for Poland was 30.8, 28.5 and 26.8 while the average for the EU countries was 30.9, 30.2, 30.1[6]. The issue of the size of the income disparity is important because it can negatively affect the health of the population, especially the less wealthy part of it[7].

The progressive decline in the extent of economic poverty in our country, estimated on the basis of household income and expenditure by 2021, should be regarded as extremely important from a public health perspective. At risk of poverty are, according to the definition adopted by EU countries, people living in households whose disposable income is below a poverty line set at 60% of the median income in a given country, taking into account a comparability scale with social transfers factored in. Those at risk of social exclusion are those in households with severe material deprivation (inability to meet at least 4 out of 9 recognised needs for financial reasons) or those in households with very low work intensity. Eurostat data show that in Poland this index is currently lower than the average for the EU27 countries (Fig. 2.8a), and that in 17 EU countries the risk of poverty or social exclusion is more common than in Poland. A positive difference with other EU countries is observed among children and adolescents under 16 years of age (worse situation than in Poland is in 21 countries), while there is no improvement among the oldest people aged 65 and more. However, also in this group, the percentage of people at risk is below the EU countries average.

The risk of poverty and social exclusion of children is very strongly linked to the level of education of parents both in Poland and the European Union in general. After 2015 (and substantially after 2016), there was a big improvement in Poland in this respect, but the variation is still large (Fig. 2.8b). It is worth noting, however, that while as recently as 2015, children of parents with less than higher education in Poland were more at risk of poverty or social exclusion than on average in the EU countries, this was no longer the case in subsequent years.

6 http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12&lang=en

7 Wilkinson R. and Pickett K. Income inequality and population health: a review and explanation of the evidence. Social Science & Medicine 2006; 62:1768–84. Babones SJ. Income inequality and population health: Correlation and causality. Social Science & Medicine 66 (2008) 1614–1626

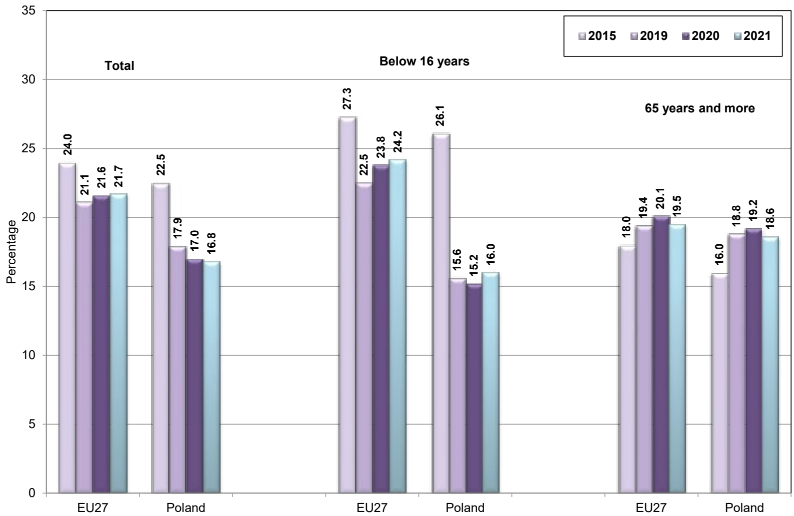

Fig. 2.8a. Percentage of population at risk of poverty or social exclusion, total and in the age group of 16 years and below in Poland and EU countries, 2015, 2019, 2020, 2021 (Eurostat data, EU-SILC survey)

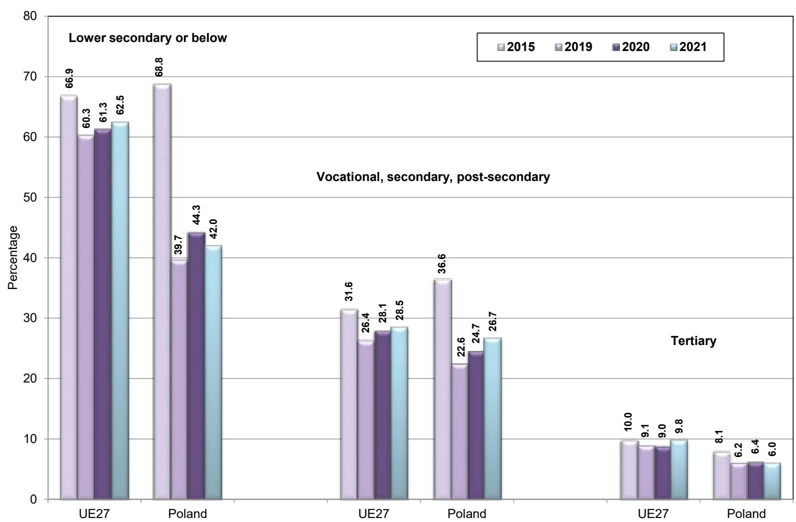

Fig. 2.8b. Percentage of children and young people under 18 at risk of poverty or social exclusion by parent educational attainment in Poland and EU28 average 2015, 2019, 2020, 2021 (Eurostat data, EU-SILC survey)

Figures 2.9a and 2.9b show the incidence of extreme poverty in Poland in two cross-sections that are important for analyses of variations in the health condition of the population, i.e. by the nature of the place of residence (rural areas, towns of various sizes) and by education of the head of household. The extreme poverty line is set on the basis of the subsistence minimum estimated by the Institute of Labour and Social Affairs for a one-person working household. The subsistence minimum takes into account only those needs whose satisfaction cannot be postponed, and consumption below this level makes life more difficult and poses a threat to human psycho-physical development[8].

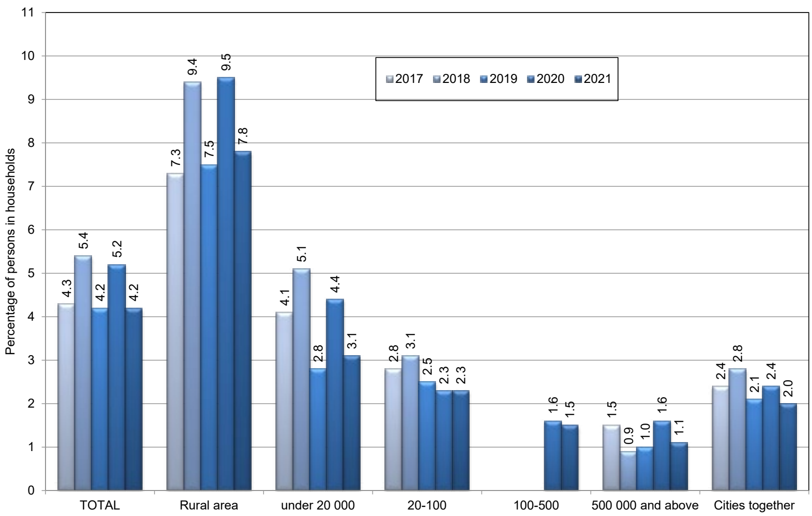

Fig. 2.9a. Extreme poverty incidence rates by class of place of residence 2017–2021 (Statistics Poland data)

The national extreme poverty range observed between 2017 and 2021 tends to fluctuate between 4.2% and 5.4%. There is a clear excess of extreme poverty among rural residents compared to urban residents. Urban residents are significantly more likely to have their basic subsistence needs protected compared to rural residents in general. The

8 Statistics Poland Annex to the signature study "The extent of economic poverty in Poland in 2021"

most secure environment for the necessities of life are large cities of 200 000–500 000, as extreme poverty is rather sporadic there.

There is a clear relationship between education of the head of household and the household's risk of extreme poverty (Fig. 2.9b). The proportion of people in households at risk of extreme poverty decreases dramatically as the level of education increases. This differentiation is permanent. In 2020, the level increased compared to 2019 but this was a one-year change. Interpretation of changes occurring during the pandemic years should be cautious due to the fact that, as Statistics Poland reports[9] in both 2020 and 2021, due to the pandemic and the introduction of various restrictions aimed at reducing coronavirus transmission by limiting person-to-person contact, the household budget survey has seen a change in the previous method of collecting information from respondents from a face-to-face interview to a telephone interview.

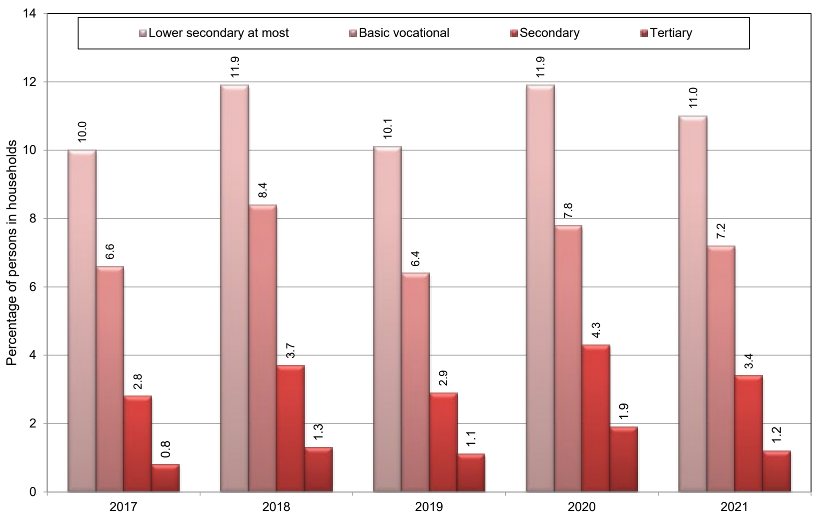

Fig. 2.9b. Extreme poverty incidence rates by education of the head of household 2017–2021 (Statistics Poland data)

9 Op.cit.

According to the Labour Force Survey (LFS) in these countries, in 2019, the unemployment rate in Poland for the 15–74 population was 3.3% while the EU28 average was 6.3% (Fig. 2.10). In addition, the fact that Poland has a lower long-term unemployment rate, i. e. over 12 months, which in 2019 was only 0.7% in relation to the active population while the EU28 average was 2.5%, is very positive. Only in the Czech Republic and Germany it was lower than in Poland.

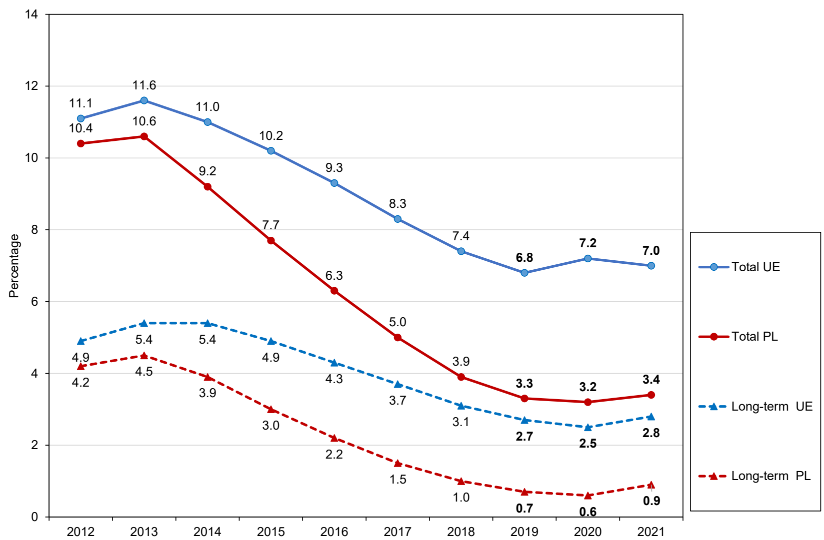

Fig. 2.10. The unemployment and long-term unemployment rate among persons 15–74 years old in Poland and EU countries in the second quarter of 2022 (Eurostat data, Labour Force Survey)

The risk of total unemployment and long-term unemployment varies significantly between the provinces. Due to the low reliability of estimates of the level of long-term unemployment in the provinces, the comparison was made using the registered unemployment rate. In 2021, the best situation in terms of the level of total unemployment and long-term unemployment was in the Wielkopolskie province, while the highest total rate of risk of unemployment is observed in the Warmińsko-Mazurskie province and long-term unemployment in the Podkarpackie province (Fig. 2.11).

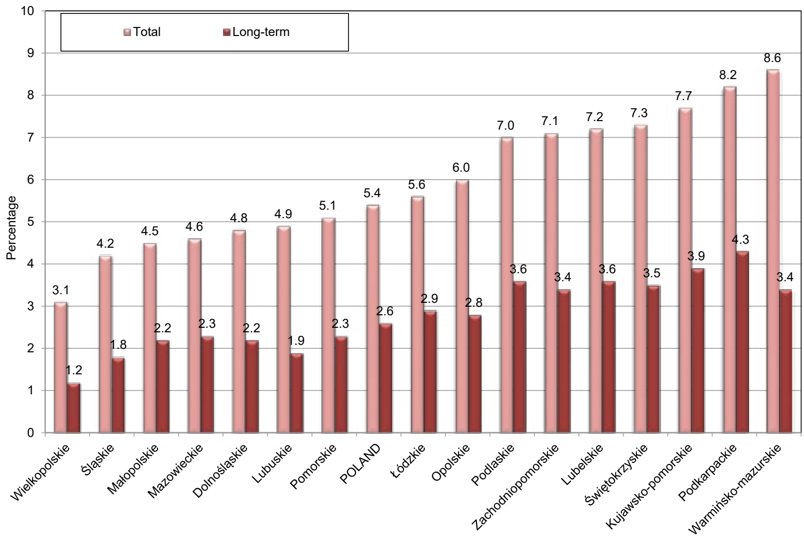

Fig. 2.11. Total and long-term registered unemployment rate by province in 2021 (Statistics Poland data)

An important aspect of employment from a social as well as a public health point of view is the possibility of part-time work, which allows for better fulfilment of family responsibilities, which also concern health, for example those related to child or elderly care. In Poland, the situation has for years clearly diverged unfavourably from the average in OECD and EU countries – employees, both men and especially women, are much less likely to be employed part-time. In 2021, in Poland, the percentage of such employed men in relation to the total number of employed persons aged 20–64 was 3.1% and in the EU27 7.6%, while for women the corresponding percentages were 7.4% and 28.3%[10]. This situation must be considered unfavourable, especially if it is assumed that it is not the result of voluntary choices.

Poles' housing conditions are in some respects worse than the average in the EU countries. This is particularly evident in relation to housing density. According to the Eurostat definition, a person is presumed to be living in an overcrowded dwelling if the dwelling does not meet any of the following conditions: (a) it has at least one

[10] https://appsso.eurostat.ec.europa.eu/nui/show.do

room, (b) each married couple has at least one room, (c) each single person aged 18 and over has at least one room, (d) two children aged 12–17 of the same sex have at least one room, (e) each of children aged 12–17 who do not belong to the previous categories have at least one room, (f) each pair of children under 12 has its own room. As can be seen in Fig. 1.13 with this definition, 39.2% of Poland's population lives in overcrowded dwellings, while for the whole of EU the average is only 15.5%. Currently, the situation is worse in only four countries. The data does not include single-person households. Housing density is highly dependent on income, so people at risk of poverty, i. e. living in households whose disposable income is below 60% of the national median income on a comparability scale, are much more likely to live in overcrowded housing than the general population. It should be noted that this unfavourable gap is smaller in Poland and CEE countries than the average for EU countries (Fig. 2.12).

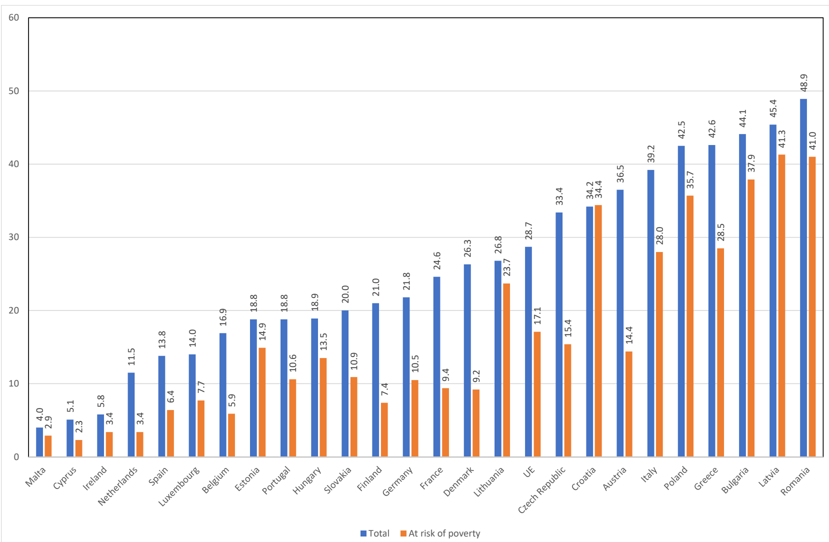

Fig. 2.12. Percent of people living in higher density housing in Poland and EU countries among total population and population at risk of poverty, 2021 (Eurostat data, EU-SILC survey)

On the other hand, if we consider the assessment of housing conditions in terms of the quality of the dwelling and the presence of any of the features of its poor quality, which include: leaking roof, dampness on walls, floors, foundation, rotting windows or floors, the situation in Poland is better than the average for the EU27 countries (Fig. 2.13). People at risk of poverty are more likely to live in poor conditions than the general population, but also for this group, the situation in Poland is currently better than the EU27 average and, moreover, this disadvantage for people at risk of poverty is smaller in Poland than the EU average.

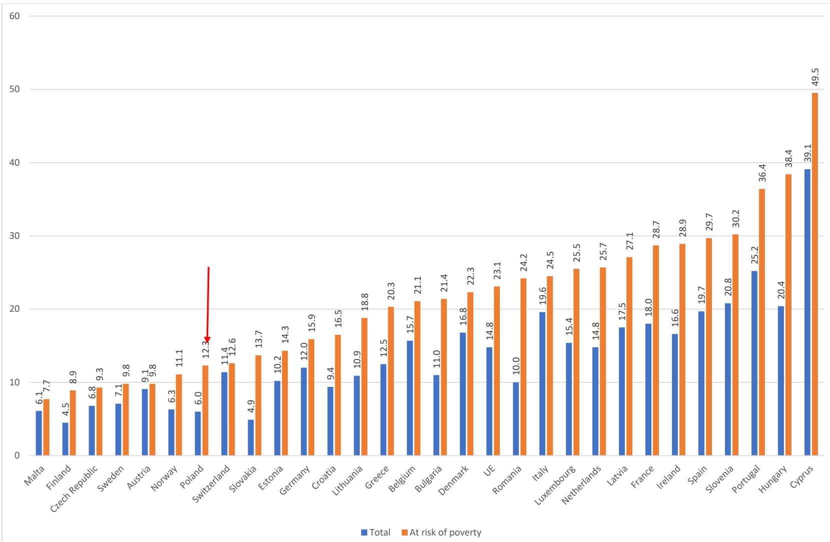

Fig. 2.13. Percentage of total population and population at risk of poverty living in poor quality housing in EU27 countries in 2021 (Eurostat data, EU-SILC survey)

It should be emphasised that, apart from the problem of housing density, which is definitely higher than in the EU, the situation in the remaining analysed areas is better in Poland than the average for the European Union countries.

One summary measure of the overall social situation of countries is the synthetic Human Development Index (HDI), which was proposed by the UN for international comparisons. It is a measure based on the average of indexes covering three basic spheres of life. These are the sphere of health (assessed by the life expectancy index), education (indexes of the average number of years of schooling for those aged 25 and over, and the expected number of years of schooling for children starting school), and wealth, i. e. income (or more specifically its logarithm) per capita at purchasing power parity (PPP)

(Gross National Income). The design of the indexes sets targets in each of the spheres listed. According to the latest UN data for 2022[11], Poland ranks among the countries with the highest HDI index: 20th in the European Union and 36th in the world.

The characteristics of the socio-economic situation of our country's society presented above allow us to conclude that actions aimed at improving it and reducing the gap, which in some areas separates Polish society from the societies of more developed EU countries, should also contribute to favourable long-term changes in the state of health of the Polish population, which is in line with the concept of the new public health.

SUMMARY

1. Poland's population has been declining since 2009, and at the end of 2021 it was 38,036.1 thousand people, which is 8.5% of the total population of the EU27 and places our country in fifth place among EU countries. In 2021, the population growth rate in Poland had a negative value in urban and rural areas.
2. Women make up more than half of the total population (51.8%). This over-representation of women over men does not appear until the age of 50–54 and increases very rapidly in increasingly older age groups. At the age of 65 and more, there are already 154 women for every 100 men, while at the older age of 85 and more, there are as many as 260 women for every 100 men.
3. Poland's population is younger on average than that of the majority of European Union countries (EU27), but according to Eurostat forecasts, this difference in Poland's favour will gradually disappear and by the middle of this century both the median age and the proportion of people aged 65 and more will be significantly higher in Poland than the average for EU countries.
4. The proportion of children born out of wedlock is increasing and currently one in four children is born out of wedlock. In the Zachodniopomorskie and Lubuskie provinces, the percentage is higher than 40%. Compared to other

[11] https://worldpopulationreview.com/country-rankings/hdi-by-country

European countries, the proportion of illegitimate births in Poland is relatively low; only five EU countries have a lower proportion of this group of newborns than our country.

5. In Poland, there is a slight downward trend in the incidence of low birthweight births, and births below 2,500 g occur less frequently than on average in the European Union countries.
6. Although the percentage of people with higher education has been clearly increasing in Poland for a number of years, among men aged 25–64 it is still lower than in most EU countries however, while among women the percentage of people with higher education is higher than the EU27 average.
7. The decreasing income disparity, which in Poland in recent years is at a level lower than the average for the EU countries is a favourable process. The risk of poverty or social exclusion in our country is currently at a lower level than the EU average. The greatest improvement is observed for children and young people under 18, while there is no improvement for the eldest people aged 65 and more, but also in this group the percentage of people at risk is lower than the average for EU countries.
8. The level of total unemployment as well as long-term unemployment in Poland is one of the lowest in the EU. The provinces with the worst unemployment situation are Warmińsko-Mazurskie, Podkarpackie and Świętokrzyskie. The fact that there are significantly fewer opportunities for part-time work in Poland compared to the EU and OECD countries in general, which is particularly pronounced among women, should be regarded as unfavourable.
9. The housing conditions of Poles are in some aspects worse than the average in the EU countries, and this is particularly evident with regard to housing density. By contrast, Poles are less likely than the EU population as a whole to live in poor quality housing.
10. The latest 2022 Human Development Index (HDI) of 0.880 places Poland among the countries with the highest values in the European Union at 20th place and 32nd in the world.

3. LIFE EXPECTANCY AND MORTALITY OF THE POLISH POPULATION

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Daniel Rabczenko, Paweł Goryński, Aneta Trochonowicz,
Tomasz Madej, Tomasz Zdrojewski

The pandemic caused by the SARS-CoV-2 virus led to huge losses in the health of the population and contributed directly and indirectly to the large increase in mortality and consequent reduction in the life expectancy of the Polish population. The higher number of deaths was related to both COVID-19 incidence as well as to the overburdened health system, disruption in its operation but also avoidance of its use by patients. The increase in certain unhealthy behaviours of the population also contributed to it.

The analysis of mortality in Poland presented below is largely based on individual data from the register of deaths of Polish residents maintained by Statistics Poland. This register, with some necessary restrictions, is made available to the National Institute of Public Health NIH – National Research Institute in order to carry out analyses of the health of the Polish population in accordance with its statutes. Most of the presented results are the authors' own calculations based on data from this database as well as the WHO death database[1]; indicators published by Statistics Poland and available in international databases, above all Eurostat[2], were also used, which is always indicated in the text.

[1] https://www.who.int/healthinfo/statistics/mortality_rawdata/en/

[2] http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

For our own calculations of life expectancy, the classical Chiang method was used[3] and decomposition of life expectancy by cause of death and age was carried out according to the Ariaga method[4]. The analysis of time trends in mortality rates and life expectancy for Poland and the European Union countries was performed using jointpoint models (linear model) and the Joinpoint Regression Program, (*Version 4.8.0.1 April 22, 2020; National Cancer Institute, USA*). In the analysis of trends in mortality rates, jointpoint regression was used (logarithmic model and estimation of the relative rate of change of rates, which allows a better comparison of the dynamics of change in Poland and other countries as well as between sex groups).

3.1. Changes over time and variation in life expectancy of the Polish population

According to the latest figures from Statistics Poland, in 2021 life expectancy for men was 71.75 years and for women it was 7.93 years longer at 79.68 years. Analysis of long-term trends shows a worrying situation already in the last years before the pandemic (Fig. 3.1).

[3] Chiang C. L. "The Life Table and its Applications", Robert E. Krieger Publishing Company, Inc., Malabar, Florida, 1984

[4] Arriaga E. E. "Measuring and Explaining the Change in Life Expectancies", Demography, Vol. 21, No. 1 (Feb., 1984), pp. 83–96

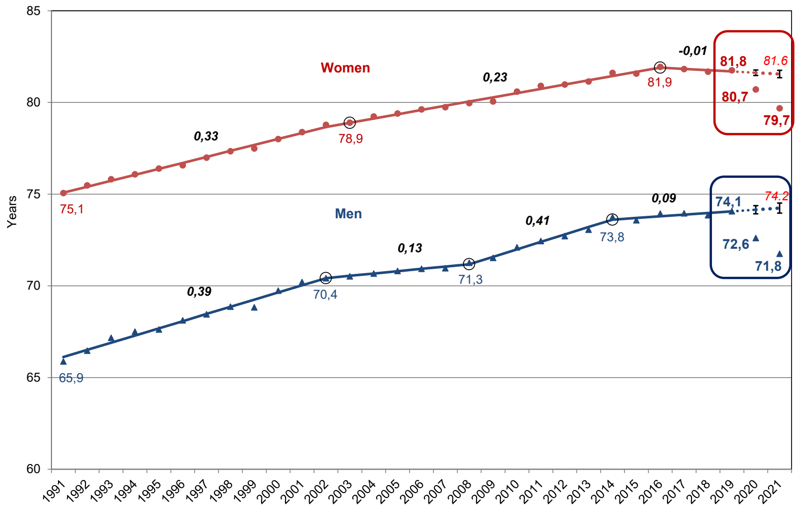

Fig. 3.1. Life expectancy of men and women at birth during1991–2021, its trends and average annual rate of change between 1991 and 2019; for 2020 and 2021 actual values and expected values based on previous trend *(Statistics Poland data and authors' own calculations)*

Between 2014 and 2019, life expectancy increase for men slowed down again substantially (the earlier one was between 2002 and 2008) while life expectancy for women had a slight downward trend between 2016 and 2019. The COVID-19 pandemic caused an unprecedented reduction in the life expectancy of the Polish population in 2020 and 2021. Compared to the value immediately before the pandemic, i.e., in 2019, life expectancy in 2021 was 2.3 years shorter in men (1.9 at age 65) and 2.1 years shorter in women (1.7 at age 65). If, for men, the fact that life expectancy has trended upwards in the preceding years were taken into account, the decline in observed life expectancy in 2022 compared to the value expected based on the trend to date would increase to 2.5 years.

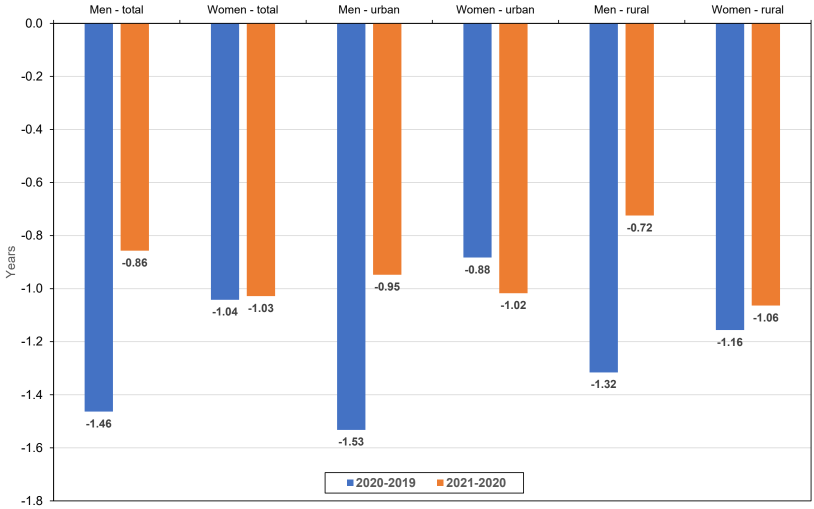

Fig. 3.2. Change in life expectancy at birth in 2019–2020 and 2020–2021 by sex and place of residence urban/rural *(based on Statistics Poland data)*

The impact of the pandemic on reduction of life expectancy for men and women was not equal. Men were more affected in the first year of the pandemic (life expectancy reduced by 1.46 years) than in the second (a further reduction of 0.86 years) while women were similarly affected in both years (life expectancy reduced by 1.04 and 1.03 years respectively). Thus, the first year of the pandemic had more of an impact on men's health and the second year on women's health (at least in terms of such an important health indicator as life expectancy). In contrast, the impact of the pandemic on the reduction in life expectancy for urban and rural residents was greater among urban residents in both years, while for women it was greater among rural residents in 2020 and similar in both populations in 2021 (Fig. 3.2).

Impact of the pandemic on the reduction of life expectancy is greater in older people but is also significant in the younger population. To estimate life expectancy in the younger age group, we calculated the temporary/partial life expectancy of men and women in the age range 0–75 years (e_{0-75}). The calculated value shows how many years of life, on average, a newborn infant can expect to live in the life span up to 75 years with the mortality rate as it was in the year of the study. Theoretically, if there were no premature deaths, i.e., under the age of 75, the partial life expectancy would be 75 years.

For people aged 75, Statistics Poland's estimate of further life expectancy for people of this age (e_{75}) was used. Figures 3.3a and 3.3b show the values of both parameters for men and women from 2003 to 2021. Life expectancy in the age range 0–75 years in 2021 was shorter than in 2019 by 0.9 years for men and by 0.5 years for women. In contrast, the further life expectancy of those aged 75 years was reduced over the same two-year period by 1.5 years and 1.3 years for men and women, respectively.

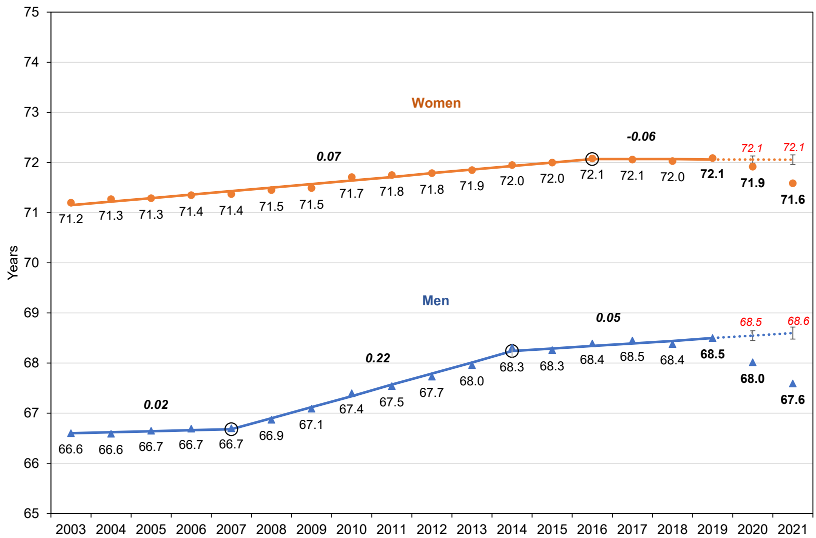

Fig. 3.3a. Partial life expectancy of males and females at births in the age range 0–75 years during 2003–2021, its trends and average annual rate of change between 2003 and 2019; for 2020 and 2021 actual values and expected values based on previous trend *(authors' own calculations)*

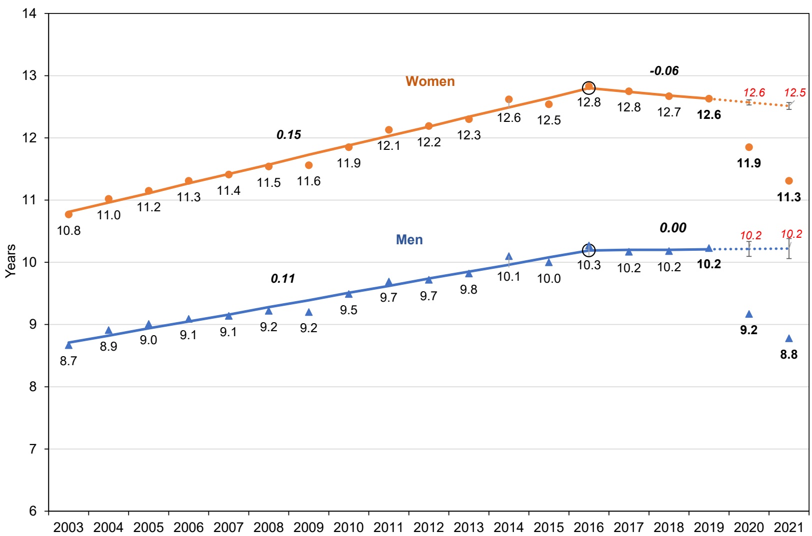

Fig. 3.3b. Life expectancy of men and women at age 75 years during 2003–2021, its trends and average annual rate of change between 2003 and 2019; for 2020 and 2021 actual values and expected values based on previous trend *(Statistics Poland data and authors' own calculations)*

The significance of the increase in mortality in each 5-year age group for the decline in life expectancy (in months) or men and women in Poland in 2020 relative to 2019 and in 2021 relative to 2020 is shown in Figures 3.4a and 3.4b. It is noteworthy that in men, the increase in mortality in the age groups 40 to 74 years contributed more than in women to the reduction in life expectancy, while in women, the increase in mortality in the oldest age groups of 75 years and more played a greater role than in men.

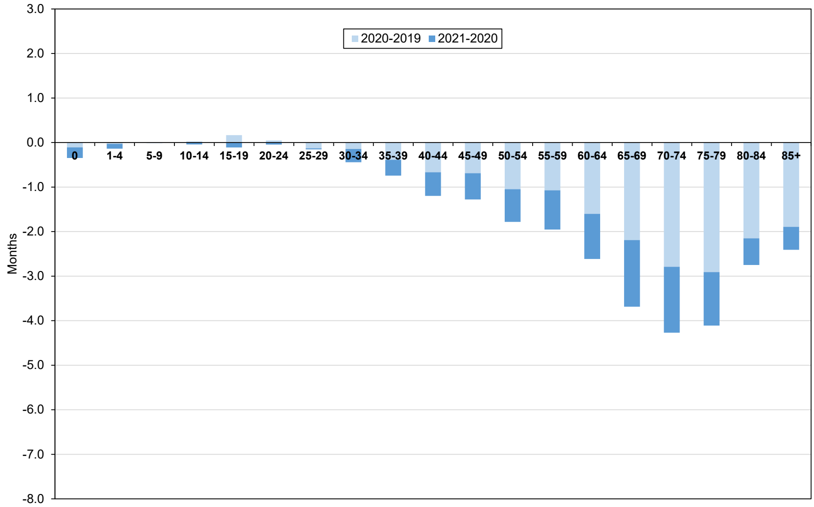

Fig. 3.4a. Contribution of the change in age-specific mortality to the change in life expectancy (in months) in 2020 compared to 2019 and in 2021 compared to 2020 in Poland, MEN *(authors' own calculations availing WHO Mortality Data Base)*

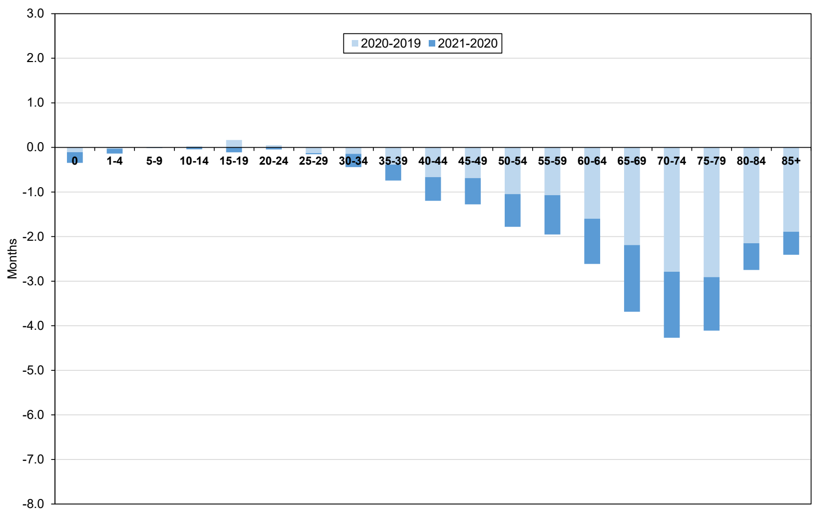

Fig. 3.4b. Contribution of the change in age-specific mortality to the change in life expectancy (in months) in 2020 compared to 2019 and in 2021 compared to 2020 in Poland, WOMEN *(authors' own calculations availing WHO Mortality Data Base)*

For many years, Poland has been experiencing the unfavourable phenomenon of a high over-mortality of men in relation to women and, consequently, a significantly shorter life expectancy of men irrespective of their age. Unfortunately, the first year of the pandemic further exacerbated this situation due to a greater reduction in life expectancy for men than for women (Fig. 3.5).

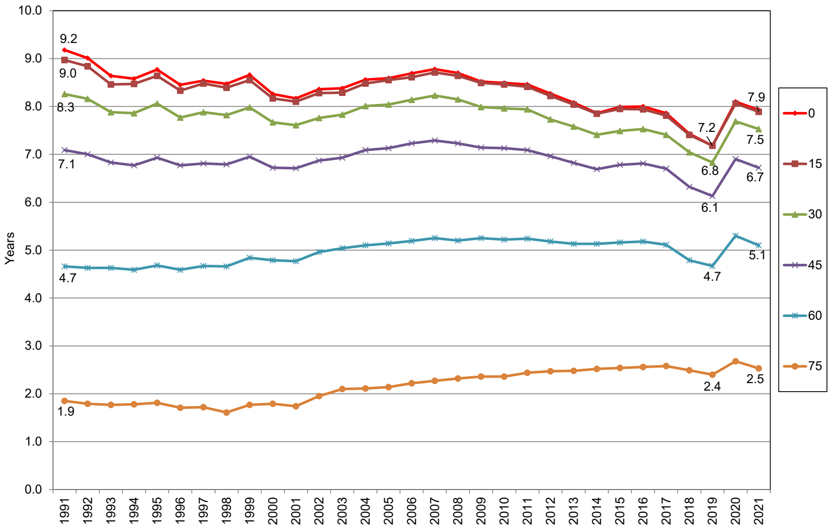

Fig. 3.5. Differences in life expectancy of men and women by age during 1991–2021 *(based on Statistics Poland data)*

We estimate that while in 2019, the most recent year before the pandemic, 68.3 percent of the difference in life expectancy between men and women was due to higher mortality among men aged 40–74 years; by 2021 this percentage had increased to 70.4 percent.

The life expectancy of the Polish population varies depending on whether they live in the countryside or in small or large towns and the variation, albeit not very large, is fairly persistent. In the least favourable health situation are the inhabitants of the smallest towns with a population of less than 5 000, whose life expectancy is the shortest, while the inhabitants of the largest cities with a population of more than 500 000 live the longest. The variation in life expectancy associated with such a defined place of residence is greater for men than for women (Table 3.1). Life expectancy for men in total urban and rural areas increased slowly and at the same rate of 0.06 years of life/year between 2014 and 2019. In contrast, the reduction in life expectancy caused by the pandemic relative to the value expected based on trends in the preceding years was greater in urban areas, resulting in a reduction in the excess of life expectancy of urban residents relative to rural residents. It is worth noting that while in the first year of the pandemic (2020), the reduction in life expectancy was clearly related to city size (highest in the smallest towns and lowest in the largest cities), in 2021, such a relationship was no longer practically present. Nevertheless, at present (2021), men in the smallest towns live on average around 2.6 years shorter than those living in the largest cities.

Table 3.1. Life expectancy of men and women at birth (Lex) living in rural areas and in urban areas by population in 2018–2019, its annual rate of change in the last period (years/year), observed value (Lex obs) in 2020 and 2021, expected value based on previous trend (Lex exp), shortening of lifespan (years) in relation to the expected value (authors' own calculations and Statistics Poland data)

Place of residence	Lex 2018–2019 (number of years)	Average annual change (latest period to 2019)	2020			2021		
			Lex obs (1)	Lex exp (2)	(1)-(2)	Lex exp (3)	Lex exp (4)	(3)-(4)
Men								
Rural area	73.3	0.06 (2014)	72.1	73.4	**-1.36**	71.4	73.5	**-2.14**
Urban area	74.4	0.06 (2014)	72.9	74.5	**-1.57**	72.0	74.6	**-2.57**
Cities < 5 000	72.9	0.13 (2011)	71.1	73.2	**-2.12**	70.6	73.4	**-2.77**
5–20 000	73.8	0.07 (2013)	72.1	73.9	**-1.83**	71.4	73.9	**-2.51**
20–100 000	74.2	0.07 (2014)	72.6	74.3	**-1.71**	71.6	74.4	**-2.77**
100–500 000	74.6	0.03 (2015)	73.2	74.7	**-1.45**	72.1	74.7	**-2.61**
Cities >500 000	75.7	0.04 (2015)	74.4	75.7	**-1.30**	73.2	75.8	**-2.58**
Women								
Rural area	81.7	-0.03 (2015)	80.6	81.7*	**-1.09**	79.6	81.7*	**-2.15**
Urban area	81.7	-0.04 (2015)	80.8	81.7*	**-0.88**	79.8	81.7*	**-1.90**
Cities < 5 000	81.1	-0.04 (2013)	79.7	81.1*	**-1.41**	78.8	81.1*	**-2.26**
5–20 000	81.6	0.05 (2011)	80.5	81.7	**-1.29**	79.4	81.8	**-2.38**
20–100 000	81.7	-0.06 (2016)	80.6	81.7*	**-1.08**	79.4	81.7*	**-2.29**
100–500 000	81.9	-0.08 (2015)	81.0	81.9*	**-0.84**	79.8	81.9*	**-2.07**
Cities >500 000	82.7	0.09 (2015)	81.7	82.9	**-1.21**	80.7	83.0	**-2.22**

Life expectancy for women in urban areas overall and in rural areas declined at a similar slow rate between 2015 and 2019 (0.03 and 0.04 years of life/year), while its spike during the pandemic period compared to 2018–2019 was slightly greater in rural areas than in urban areas overall. As in the case of men, the shortened life expectancy of female urban residents only in 2020 was clearly related to the size of the city of residence. The decline in female life expectancy in the last years before the pandemic did not affect residents of the largest cities with a population of more than 500 000 and cities with 5 000–20 000 inhabitants. Currently (2021), women in the smallest cities live on average around 1.9 years less than those living in the largest cities.

In the years leading up to the COVID-19 pandemic, male life expectancy had a slowly increasing trend in majority of voivodships (Table 3.2a). The shortening of this value in relation to that expected based on the previous trend in 2020 was by far the largest in the Świętokrzyskie voivodship – by 2.3 years, and the smallest in the Lubuskie voivodship – by 1.2 years. In contrast, after two years of the pandemic in 2021, male life expectancy was shortened the most in Podlaskie voivodship, by 3.6 years, and the least in Małopolskie voivodship, by 2.0 years. Thus, the loss of life expectancy due to the pandemic showed a large interprovincial variation with no clear association with the medical condition of the inhabitants of the voivodship, as measured by life expectancy in 2019 (weak positive correlation r=0.15) and similarly the magnitude of the loss in the first year of the pandemic did not have a large impact on the situation in 2021 (weak negative correlation r=-0.26).

Table 3.2a. Male life expectancy at birth (Lex) by voivodship of residence in 2019, its annual rate of change over the recent period (years/year), observed value (Lex obs) in 2020 and 2021, expected value based on previous trend (Lex exp), shortened lifespan (years) relative to expected value (Statistics Poland data and authors' own calculations)

Voivodship	Lex 2019 (number of years)	Average annual change (latest period to 2019)	2020			2021		
			Lex obs (1)	Lex exp (2)	(1)-(2)	Lex obs (3)	Lex exp (4)	(3)-(4)
Dolnośląskie	73.5	-0.04 (2016)	72.1	73.5*	**-1.31**	71.4	73.5*	**-2.08**
Kujawsko-pomorskie	73.7	-0.00 (2015)	72.4	73.7*	**-1.29**	71.3	73.7*	**-2.42**
Lubelskie	73.9	0.12 (2014)	72.3	73.9	**-1.66**	71.3	74.0	**-2.73**
Lubuskie	72.9	0.01 (2014)	71.8	73.1	**-1.22**	70.5	73.1	**-2.56**
Łódzkie	72.5	0.32 (2006)	71.1	73.0	**-1.92**	70.6	73.3	**-2.72**
Małopolskie	75.3	0.05 (2014)	73.8	75.4	**-1.60**	73.5	75.5	**-2.01**
Mazowieckie	74.3	0.07 (2014)	72.8	74.3	**-1.51**	71.6	74.3	**-2.70**
Opolskie	74.5	0.22 (1999)	73.0	75.0	**-2.07**	72.4	75.3	**-2.89**
Podkarpackie	75.4	-0.11 (2017)	73.7	75.4*	**-1.66**	72.7	75.4*	**-2.63**
Podlaskie	74.3	0.24 (1999)	73.1	74.9	**-1.83**	71.5	75.1	**-3.61**
Pomorskie	74.8	0.10 (2014)	73.3	74.9	**-1.59**	72.7	75.0	**-2.32**
Śląskie	73.8	0.15 (2014)	72.3	73.9	**-1.57**	71.3	74.1	**-2.80**
Świętokrzyskie	73.8	0.22 (1999)	72.0	74.3	**-2.32**	71.6	74.5	**-2.86**
Warmińsko-mazurskie	73.0	0.23 (1999)	72.0	73.5	**-1.49**	70.8	73.7	**-2.98**
Wielkopolskie	74.3	0.06 (2014)	72.8	74.3	**-1.45**	72.1	74.3	**-2.24**
Zachodniopomorskie	73.6	0.04 (2014)	72.1	73.7	**-1.55**	71.5	73.7	**-2.18**

Table 3.2b. Female life expectancy at birth (Lex) by voivodship of residence in 2019, its annual rate of change over the recent period (years/year), observed value (Lex obs) in 2020 and 2021, expected value based on previous trend (Lex exp), shortened lifespan (years) relative to expected value (Statistics Poland data and authors' own calculations)

Voivodship	Lex 2019	Average annual change (latest period to 2019)	2020			2021		
			Lex obs (1)	Lex exp (2)	(1)-(2)	Lex obs (3)	Lex exp (4)	(3)-(4)
Dolnośląskie	81.3	0.06 (2013)	80.6	81.4	**-0.80**	79.5	81.5	**-1.93**
Kujawsko-pomorskie	81.0	-0.08 (2015)	80.4	81.0*	**-0.67**	78.9	81.0*	**-2.15**
Lubelskie	82.4	-0.07 (2016)	81.1	82.4*	**-1.27**	79.5	82.4*	**-2.92**
Lubuskie	81.0	-0.10 (2016)	80.0	81.0*	**-0.95**	79.0	81.0*	**-1.97**
Łódzkie	81.0	0.19 (2002)	79.6	81.4	**-1.73**	79.0	81.6	**-2.52**
Małopolskie	82.7	-0.01 (2016)	81.6	82.7*	**-1.12**	81.0	82.7*	**-1.72**
Mazowieckie	82.1	-0.07 (2016)	80.9	82.1*	**-1.23**	80.0	82.1*	**-2.08**
Opolskie	82.0	0.18 (2002)	81.0	82.3	**-1.29**	80.4	82.4	**-2.08**
Podkarpackie	83.2	0.12 (2014)	81.8	83.4	**-1.60**	80.6	83.5	**-2.86**
Podlaskie	83.1	0.05 (2014)	81.9	83.0	**-1.12**	80.5	83.1	**-2.61**
Pomorskie	81.8	0.12 (2011)	81.2	82.1	**-0.87**	80.1	82.2	**-2.08**
Śląskie	80.8	0.19 (2002)	80.0	81.3	**-1.40**	78.9	81.5	**-2.68**
Świętokrzyskie	82.2	0.03 (2015)	80.9	82.2	**-1.36**	80.0	82.2	**-2.26**
Warmińsko-mazurskie	81.2	0.05 (2014)	80.6	81.4	**-0.87**	79.4	81.5	**-2.08**
Wielkopolskie	81.5	0.11 (2011)	80.5	81.7	**-1.22**	79.6	81.8	**-2.22**
Zachodniopomorskie	81.2	-0.09 (2016)	80.6	81.2*	**-0.55**	79.2	81.2*	**-2.02**

However, in the case of women, the shortening of life expectancy in relation to the value expected on the basis of the previous trend in 2020 was the greatest in the Łódzkie voivodship – by 1.7 years, and the least in the Zachodniopomorskie voivodship – by 0.6 years (Table 3.2b). After two years of the pandemic in 2021, life expectancy for women was shortened the most in the Lubelskie and Podkarpackie voivodships, by 2.9 years, and the least, as for men, in the Małopolskie voivodship, by 1.7 years. As with men, the reduction in female life expectancy due to the pandemic showed significant interregional variation with no clear association with the medical condition of female residents of the voivodship, as measured by life expectancy in 2019 (weak negative correlation r=-0.30) and similarly the amount of reduction in the first year of the pandemic had a negative but not very strong effect in 2021 (r=-0.38).

The impact of the pandemic on reduced life expectancy for men and women was not the same across voivodships. On the one hand, both men and women were least affected in the Małopolskie voivodship, and on the other hand, women were most affected in the Lubelskie and Podkarpackie voivodships, while men in these voivodships suffered at a rather average level and less than women.

The reduction in the life expectancy of urban men was greater than that of rural men in all voivodships except Śląskie and Podkarpackie voivodships (Fig. 3.6a). In the Lubuskie and Łódzkie voivodships, the life expectancy of urban men was more than one and a half years longer (1.8 and 1.65) than that of those living in the rural area. The shortening of female life expectancy was greater for rural than for urban residents nationwide and in 11 voivodships (the greatest difference in the Kujawsko-pomorskie and Podlaskie voivodships: 0.61 years), while in the Zachodniopomorskie voivodship and to a slightly lesser extent in the Podkarpackie and Dolnośląskie voivodships, rural residents were clearly better off than urban residents (Fig. 3.6b).

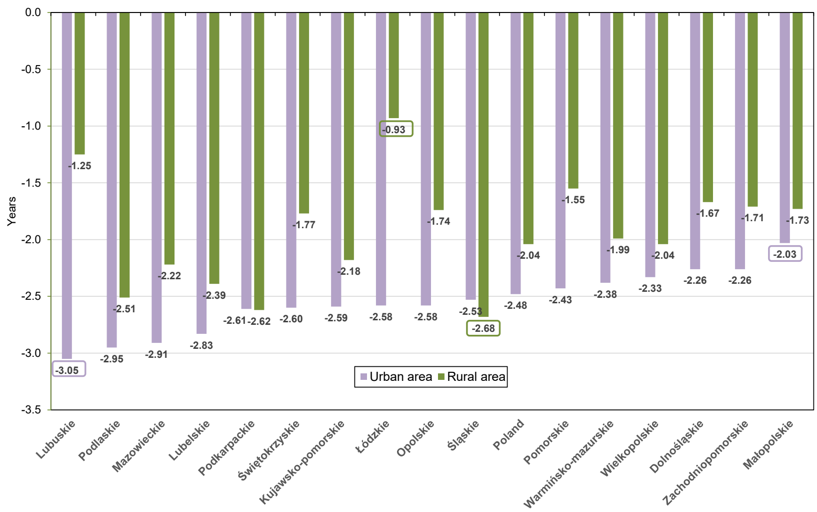

Fig. 3.6a. Shortening of life expectancy of men at birth in urban and rural areas in 2019–2021 by voivodship *(based on Statistics Poland data)*

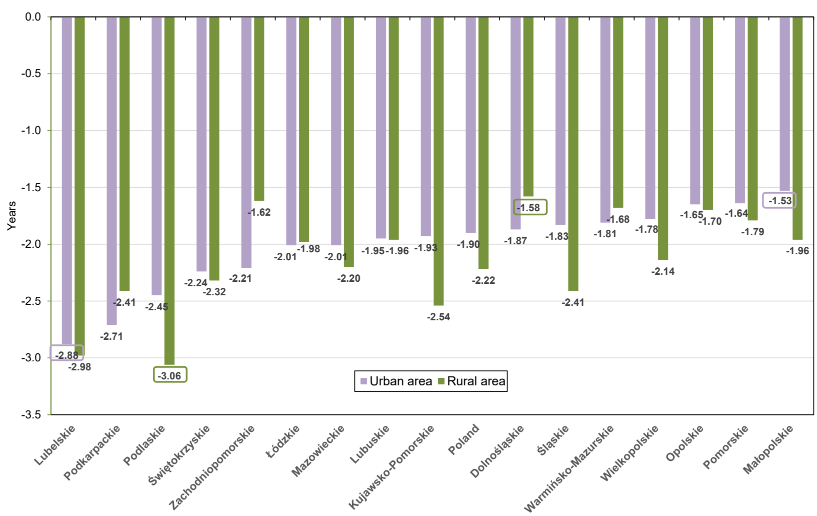

Fig. 3.6b. Shortening of life expectancy of females at birth in urban and rural areas in 2019–2021 by voivodship *(based on Statistics Poland data)*

There is a greater variation in the life expectancy of poviat (county) residents and its changes during the pandemic period than for voivodship residents. In general, it can be concluded that the majority of poviats where men live the longest are concentrated in southern and central-western Poland, while women live the longest in counties in the southern and eastern parts of the country, except for counties in the north-eastern part of Lubelskie voivodship (Fig. 3.7a and 3.7b).

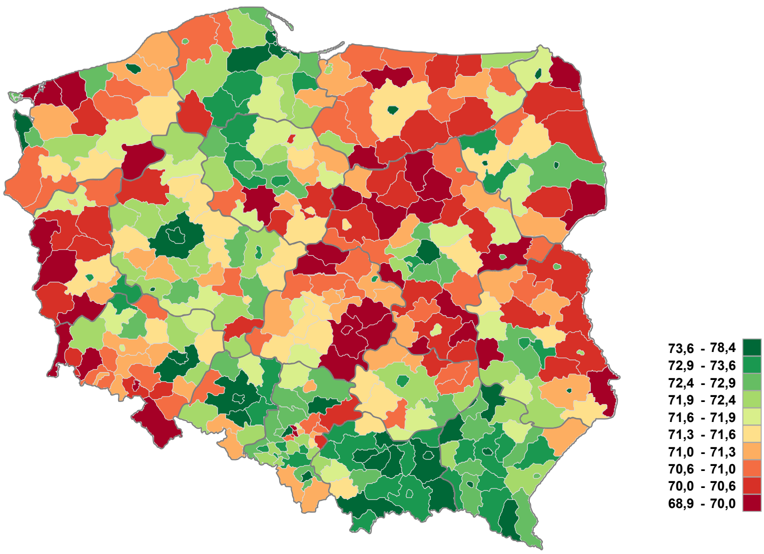

Fig. 3.7a. Males life expectancy in 2020–2021 by poviats *(authors' own calculations)*

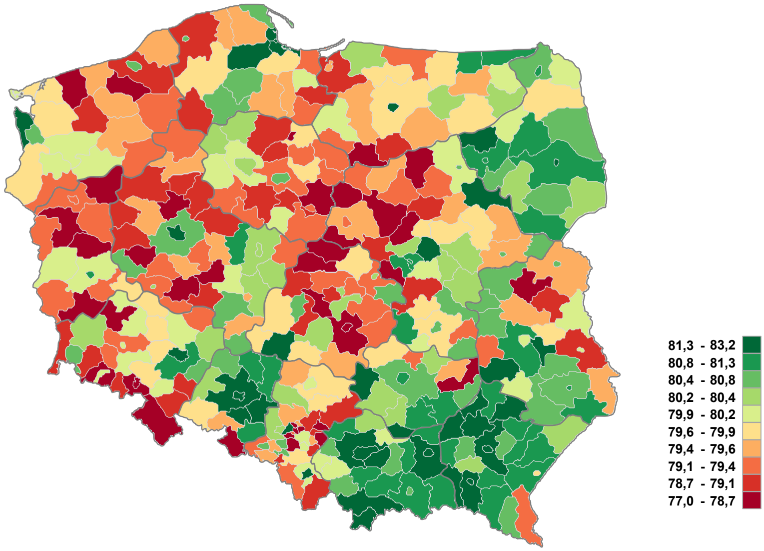

Fig. 3.7b. Females life expectancy in 2020–2021 by poviats *(authors' own calculations)*

In the two-year period of the 2020–2021 pandemic, among men, the longest life expectancy could be expected for residents of the city of Sopot, 78.4 years, while the shortest for residents of Makowski county (Mazowieckie voivodship), 68.9 years, so the difference between these extreme counties is approximately 9.5 years (Table 3.3a). This represents an increase in variation compared to the period before the 2017–2019 pandemic when life expectancy for men in Sopot was longer than in Kutno county by 7.6 years[5]. During the pandemic period, life expectancy for men in Sopot remained virtually unchanged while for men in Makowski county it decreased by 3.1 years.

In the case of women, the differences are slightly smaller than in the case of men, as on average the female residents of Sopot also live the longest – 83.2 years, while the female residents of Chorzów live the shortest – 77.0 years, i.e., a difference of approximately 6.4 years (Table 3.3b). It is noteworthy that the reduction in life expectancy of females during the pandemic period in both cities was very similar – 1.45 and 1.60 years respectively. The above differences in life expectancy relate to the extreme counties, while the

5 B. Wojtyniak, J. Stokwiszewski, P. Goryński i wsp. „Life expectancy and mortality of the Polish population", in B. Wojtyniak, P. Goryński ed. Sytuacja zdrowotna ludności Polski i jej uwarunkowania, 2020, NIZP-PZH 2020

difference between the first and tenth decile and therefore the boundary for the 10% of counties with the shortest life expectancy and the 10% of counties with the longest life expectancy is 3.54 years (70.04 vs 73.58) for men and 2.65 years (78.68 vs 81.33) for women. It can be considered that these differences are not very large and are even slightly smaller than in the 2017–2019 period when they were 3.70 and 2.88 years respectively[6].

Table 3.3a. Twenty-five poviats counties with the longest and shortest male life expectancy in 2020–2021 *(authors' own calculations)*

TERRYT	Poviats with the longest life expectancy	Life expectancy	Change in life expectancy	TERRYT	Poviats with the shortest life expectancy	Life expectancy	Change in life expectancy
2264	city of Sopot	78.4	0.09	**1411**	makowski	68.9	-3.14
3211	policki	75.7	0.18	**1062**	city of Piotrków Trybunalski	69.0	-2.07
2262	city of Gdynia	75.3	-1.65	**0612**	opolski	69.2	-2.52
1261	city of Kraków	75.1	-1.68	**0225**	zgorzelecki	69.3	-2.29
1661	city of Opole	75.0	-2.42	**0212**	lwówecki	69.3	-1.90
1863	city of Rzeszów	74.6	-3.39	**2009**	sejneński	69.3	-4.01
1811	mielecki	74.5	-1.30	**1438**	żyrardowski	69.3	-2.13
1821	leski	74.4	-1.72	**1004**	łęczycki	69.4	-2.28
1864	city of Tarnobrzeg	74.4	-1.36	**3205**	gryficki	69.4	-2.56
1263	city of Tarnów	74.4	-2.74	**1007**	opoczyński	69.5	-2.29
1465	city of Warsaw	74.3	-2.20	**2462**	city of Bytom	69.5	-2.74
1861	city of Krosno	74.2	-2.82	**1424**	pułtuski	69.5	-2.31
2461	city of Biel-sko-Biała	74.2	-1.49	**2463**	city of Chorzów	69.5	-1.65
3064	city of Poznań	74.1	-2.02	**1426**	siedlecki	69.5	-3.05
2862	city of Olsztyn	74.0	-1.73	**2803**	działdowski	69.5	-2.03
1214	proszowicki	74.0	0.79	**1407**	kozienicki	69.6	-2.81
2261	city of Gdańsk	74.0	-1.47	**2809**	lidzbarski	69.6	-3.14
1605	krapkowicki	74.0	-1.80	**1010**	piotrkowski	69.7	-2.05
1211	nowotarski	74.0	-1.46	**0810**	żagański	69.7	-1.80
1609	opolski	74.0	-2.14	**1436**	zwoleński	69.7	-1.87
1219	wielicki	74.0	-1.41	**1002**	kutnowski	69.7	-0.98
2061	city of Białystok	73.9	-2.68	**1422**	przasnyski	69.7	-2.93
1216	tarnowski	73.9	-1.66	**3207**	kamieński	69.8	-4.27
3261	city of Koszalin	73.9	-2.43	**1427**	sierpecki	69.8	-2.01
1201	bocheński	73.8	-2.61	**0805**	słubicki	69.8	-2.38

6 op. cit. p. 78

Table 3.3b. Twenty-five poviats with the longest and shortest female life expectancy in 2020–2021 *(authors' own calculations)*

TERYT	Counties with the longest life expectancy	Life expectancy	Change in life expectancy	TERYT	Counties with the shortest life expectancy	Life expectancy	Change in life expectancy
2264	city of Sopot	83.2	-1.45	**2463**	city of Chorzów	77.0	-1.60
2262	city of Gdynia	82.9	-0.47	**1427**	sierpecki	77.5	-2.67
2862	city of Olsztyn	82.3	-1.46	**1002**	kutnowski	77.6	-2.11
1863	city of Rzeszów	82.2	-2.11	**2472**	city of Ruda Śląska	77.7	-1.80
2061	city of Białystok	82.2	-1.89	**0408**	lipnowski	77.7	-1.85
1661	city of Opole	82.0	-1.24	**1438**	żyrardowski	77.8	-1.93
1217	tatrzański	82.0	-1.30	**2462**	city of Bytom	77.8	-2.43
2603	kazimierski	82.0	-1.18	**3201**	białogardzki	77.9	-2.99
1261	city of Kraków	82.0	-1.34	**2803**	działdowski	77.9	-1.74
1605	krapkowicki	82.0	0.03	**0615**	radzyński	78.0	-3.02
3211	policki	81.9	-0.64	**1602**	głubczycki	78.0	-2.49
2204	gdański	81.9	-0.89	**3205**	gryficki	78.0	-2.48
1806	kolbuszowski	81.8	-2.03	**0216**	polkowicki	78.0	-2.62
0264	city of Wrocław	81.8	-1.12	**2474**	city of Siemianowice Śląskie	78.1	-2.24
1811	mielecki	81.7	-2.41	**1062**	city of Piotrków Trybunalski	78.1	-1.83
1609	opolski	81.7	-1.79	**0265**	city of Wałbrzych	78.1	-1.68
1861	city of Krosno	81.7	-2.15	**0221**	wałbrzyski	78.1	-1.83
1816	rzeszowski	81.7	-1.67	**0810**	żagański	78.2	-1.54
1416	ostrowski	81.6	-1.69	**2606**	opatowski	78.3	-2.60
1211	nowotarski	81.6	-2.04	**3005**	grodziski	78.4	-1.95
1206	krakowski	81.6	-0.89	**0807**	sulęciński	78.4	-2.36
3064	city of Poznań	81.6	-1.28	**1420**	płoński	78.4	-2.45
1465	city of Warsaw	81.5	-1.67	**0808**	świebodziński	78.4	-1.89
2006	kolneński	81.5	-0.62	**0208**	kłodzki	78.5	-1.78
0607	kraśnicki	81.5	-1.60	**2465**	city of Dąbrowa Górnicza	78.5	-1.84

The change in male life expectancy during the pandemic period in individual counties ranged from a reduction of 4.27 years in Kamieński county (Zachodniopomorskie) to an increase of 0.79 years in Proszowicki county (Małopolskie) (Fig. 3.8a and Fig. 3.9a).

There was variation in the magnitude of the change in male life expectancy across counties in each voivodship. However, there is an apparent concentration of counties with higher life expectancy shortening in the south-eastern part of Poland. In the Podkarpackie voivodship, as many as eight counties were among the 10% of counties nationwide where this shortening was greatest. Overall, male life expectancy was not reduced in nine counties in nine voivodships.

The change in women's life expectancy during the pandemic period in individual counties ranged from a reduction of 3.95 years in Grajewo county (Podlaskie) to an increase of 0.45 years in Świnoujście (Zachodniopomorskie) (Fig. 3.8b and Fig. 3.9b). The variation in the magnitude of the change in women's life expectancy in the counties was present in each voivodship. However, as in the case of men, a certain concentration of counties with higher life expectancy shortening in the south-eastern and eastern parts of Poland is apparent. As many as 10 counties in the Podkarpackie voivodship and five in the Lubelskie voivodship were among the 10% of counties nationwide where this shortening was greatest. Overall, female life expectancy was not reduced in nine counties in nine voivodships.

As shown in Figures 3.9a and 3.9b, changes in the life expectancy of county residents, both male and female, caused by the pandemic were not very strongly correlated with the life expectancy of residents before the pandemic, and the negative nature of this relationship is noteworthy. In counties where residents were living longer, which can be seen as their better overall health, the reduction in life expectancy was greater on average.

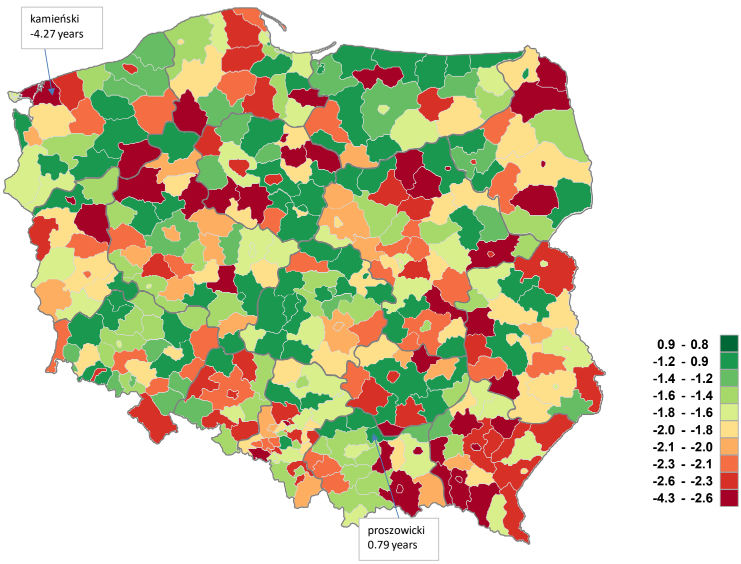

Fig. 3.8a. Difference in male life expectancy in 2020–2021 compared to 2017–2019 by poviats *(authors' own calculations)*

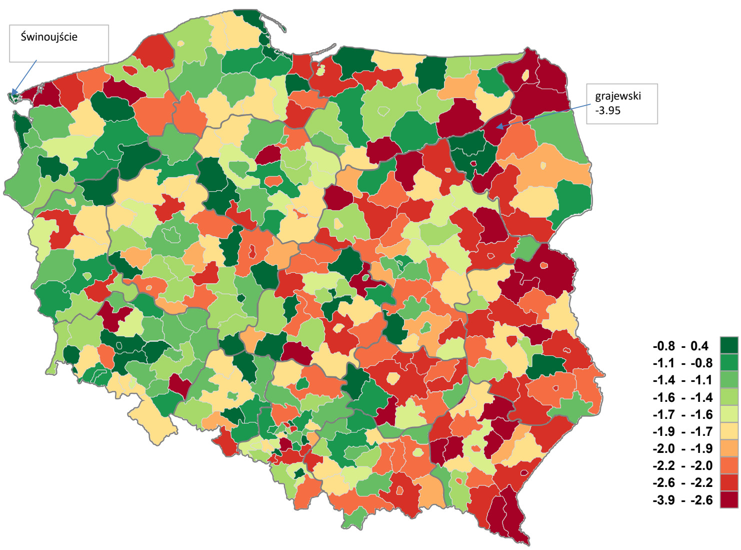

Fig. 3.8b. Difference in female life expectancy in 2020–2021 compared to 2017–2019 by poviat of residence *(authors' own calculations)*

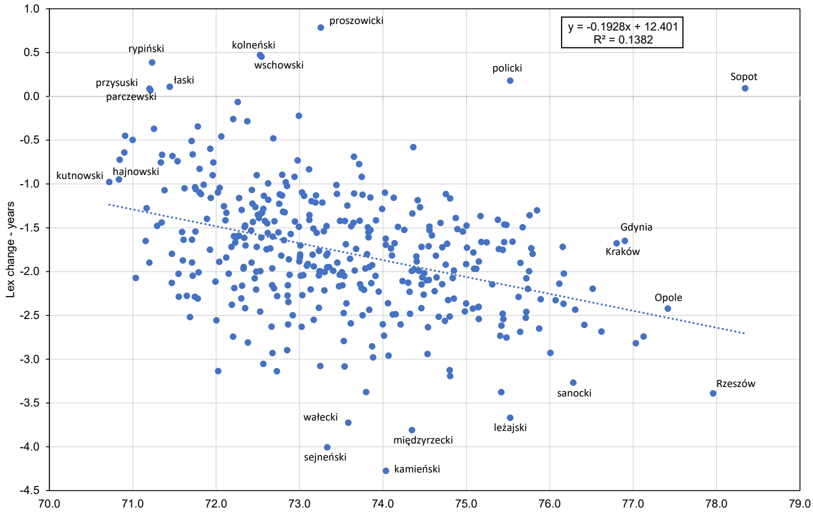

Fig. 3.9a. Change in male life expectancy (Lex change) between 2017–2019 and 2020–2021 in relation to 2017–2019 life expectancy (Lex 2017–2019) by poviat of residence *(authors' own calculations)*

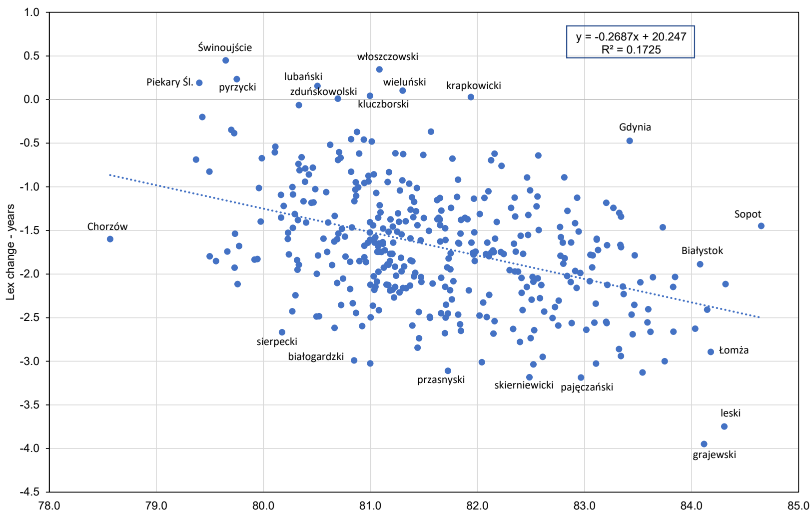

Fig. 3.9b. Change in female life expectancy (Lex change) between 2017–2019 and 2020–2021 in relation to 2017–2019 life expectancy (Lex 2017–2019) by poviat of residence *(authors' own calculations)*

From the point of view of assessing social inequalities in the health of Poland's population, an important question is whether and to what extent the variation in the medical condition of county residents may be due to differences in their socio-economic situation. The relationship of population life expectancy and its changes in recent years, including during the pandemic period, with the level of deprivation in the counties is shown in Figures 3.10a and 3.10b. Women's life expectancy in counties depended very little on the deprivation index value but the reduction in life expectancy during the pandemic period was greatest in counties with the highest deprivation levels (deciles 9 and 10) and lowest in counties where the deprivation index was lowest (deciles 1–3)[7]. In contrast, for men, the difference in life expectancy is more clearly related than for women to the level of deprivation of the counties, while no such relationship is observed for the reduction in life expectancy associated with the pandemic period.

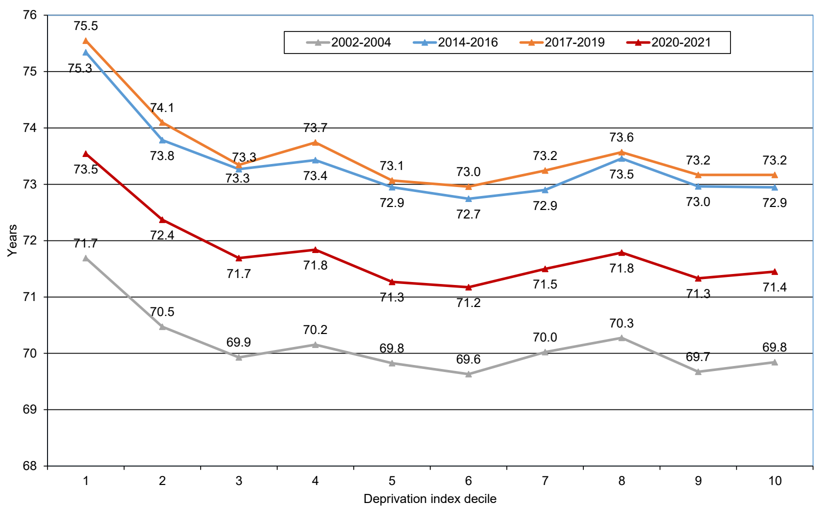

Fig. 3.10a. Male life expectancy in 2002–2004, 2014–2016 2017–2019 and 2020–2021 by deprivation index decile (2013) in the poviat (authors' own calculations)

[7] A description of the deprivation index was presented in our earlier 2018 Report.

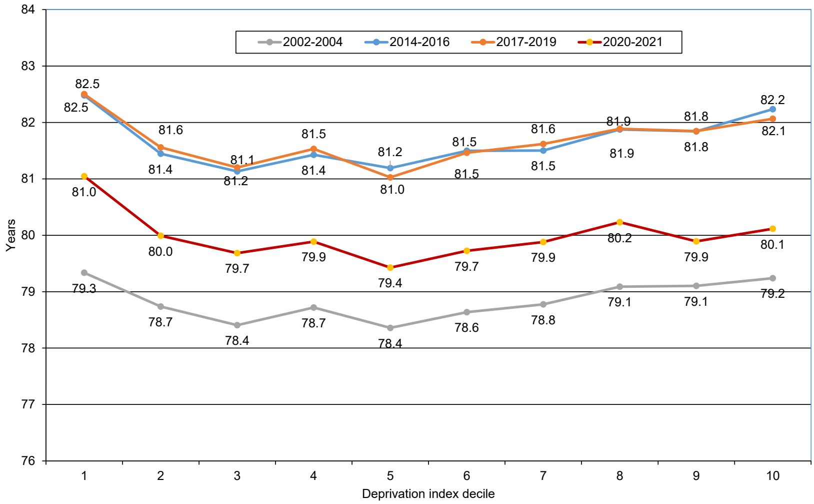

Fig. 3.10b. Female life expectancy in 2002–2004, 2014–2016 2017–2019 and 2020–2021 by deprivation index decile (2013) in the poviat (authors' own calculations)

3.2. Life expectancy in Poland compared to other EU countries8

According to preliminary estimates by Eurostat, men in Poland currently (2021) live approximately 5.5 years less than the life expectancy of EU residents, with a difference of 10.2 years from the longest-living Swiss population in Europe and 9.7 years from the longest-living Swedish population in the EU (Fig. 3.11a). On average, people in Bulgaria (68.1) and Latvia (68.6) have the shortest life expectancy in EU countries. Men aged 65 currently live approximately 3.2 years less than the average EU population of this age, with a difference of 6.4 years to the longest-living Icelandic population in Europe and 5.6 years to the longest-living Maltese population in the EU (Fig. 3.11b). The reduction in life expectancy during the pandemic for men overall as well as at 65 years of age was

[8] It is important to note that the method of life expectancy calculation used by Eurostat is slightly different from that used by Statistics Poland and therefore the estimates for Poland provided by these institutions may differ slightly. Any differences are usually in the order of 0.1–0.2 years.

greater than in most EU countries and from the average for EU countries by 1.1 years and 1.0 year respectively.

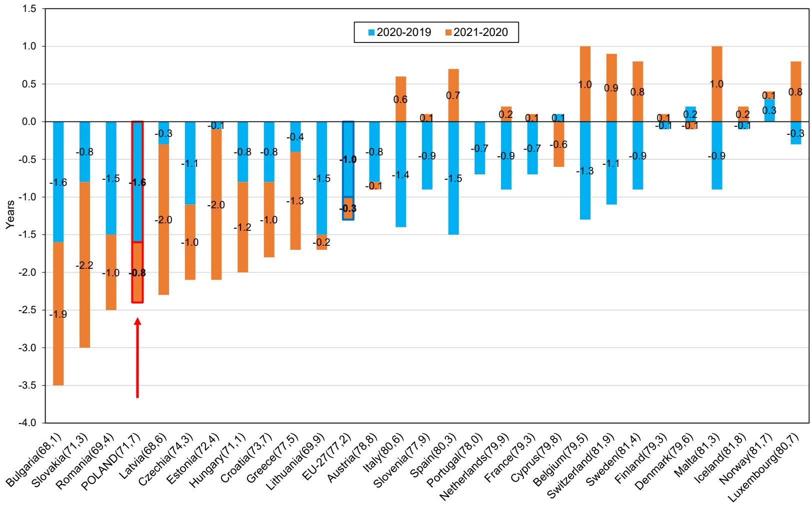

Fig. 3.11a. Life expectancy of MEN in Poland and selected European countries in 2021 and its change in 2019–2020 and 2020–2021, *(Eurostat database, preliminary data)*

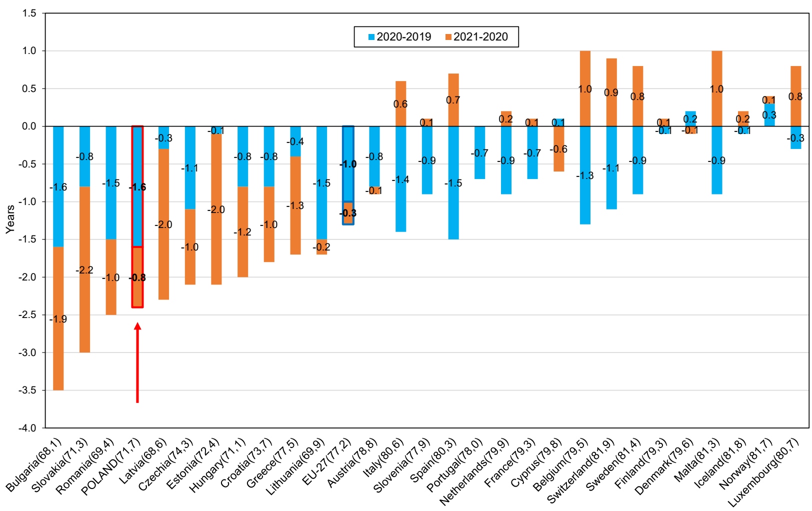

Fig. 3.11b. Life expectancy of MEN aged 65 in Poland and selected European countries in 2021 and its change in 2019–2020 and 2020–2021, *(Eurostat database, preliminary data)*

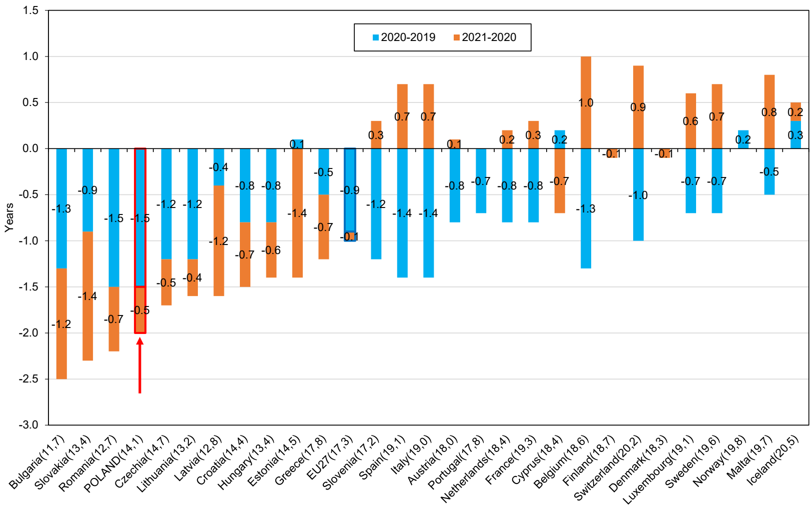

Fig. 3.12a. Life expectancy of WOMEN in Poland and selected European countries in 2021 and its change in 2019–2020 and 2020–2021, *(Eurostat database, preliminary data)*

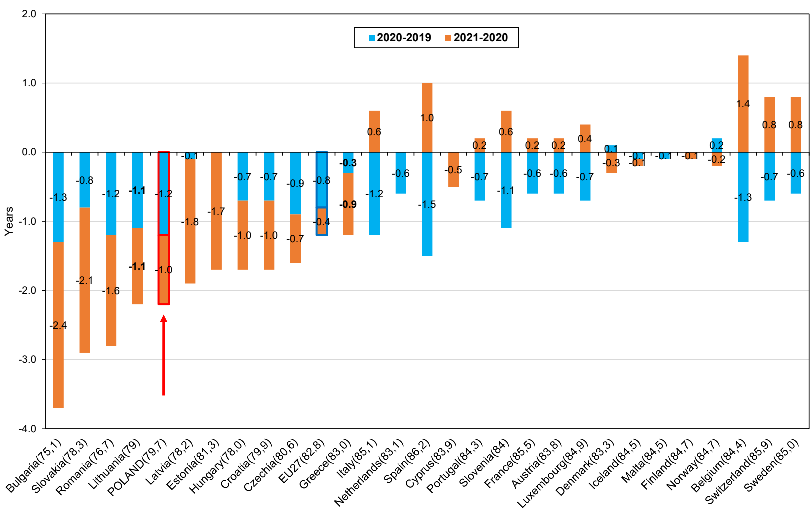

Fig. 3.12b. Life expectancy of WOMEN aged 65 in Poland and selected European countries in 2021 and its change in 2019–2020 and 2020–2021, *(Eurostat database, preliminary data)*

In the case of women, the differences are smaller and Polish women currently (2021) live on average about 3.1 years less than life expectancy for the EU population as a whole and about 6.5 years less than women in Spain, who live the longest (Fig. 3.12a). On average, female residents of Bulgaria (75.1 years) and Romania (76.7 years) live the shortest lives in the EU countries. Women aged 65 currently live approximately 2.5 years less than EU residents of that age, with a difference of 5.1 years from the longest-living Spanish women in Europe (Fig. 3.12b). The reduction in life expectancy during the pandemic for women overall as well as at 65 years of age was greater than in most EU countries and from the average for EU countries by 1.0 years and 1.1 years respectively.

The observed greater reduction in the life expectancy of the Polish population than that of the EU population as a whole as a result of the COVID-19 pandemic has further widened the unfavourable gap in this basic indicator of population health for us in relation to the EU countries as a whole.

Life expectancy is one of the basic and most widely used simple synthetic measures for the overall assessment of population health. However, its limitations are apparent since it does not show in what health people live their lives. For this reason, a composite measure of Health Expectancy or Healthy Life Years – HLY is also used, in the calculation of which the entire life span is divided into healthy and non-healthy time. Different measures can be adopted as a lack of health, but the long-term presence of reduced function due to a health condition, the presence of certain chronic diseases, a poor self-assessment of medical condition are commonly accepted. Estimates of healthy life expectancy for European Union countries provided by Eurostat are based on the so-called GALI (Global Activity Limitation Indicator). The question on limited ability is asked as part of the European survey of living conditions of the population (EU-SILC), which in Poland has been conducted by Statistics Poland on a random sample of the population since 2005. However, it should be emphasised that the content of the question has undergone certain modifications, which makes it impossible to assess the change in the indicator over all these years. From 2009 onwards, the question is: "Have you had a reduced ability to perform activities that people normally do, lasting 6 months or longer, due to health problems?". It is therefore possible to assess how the health life expectancy of Poles is changing against the average situation in EU countries between 2009 and 2018.

The overall health situation of the Polish population is somewhat less unfavourable compared to the European Union population, if the calculation of life expectancy also takes into account the fact that only part of it is lived in good health. According to the latest Eurostat estimates, the HLY of Polish women in 2020, 64.3 years (79.6% of total life expectancy), has not been reduced compared to 2019,[9] it is only 0.2 years shorter than the average for EU countries (Fig. 3.13a). In contrast, Polish men live a healthy average of 60.3 years (83.3% of total life expectancy) and therefore 3.2 years shorter than the average value for EU countries, and unlike women, men's HLY in 2020 has shortened compared to 2019 by 0.6 years. The sex gap in healthy life expectancy in Poland, 4.0 years, is one of the largest in the EU countries (4.2 years in Bulgaria, 4.1 years in Estonia).

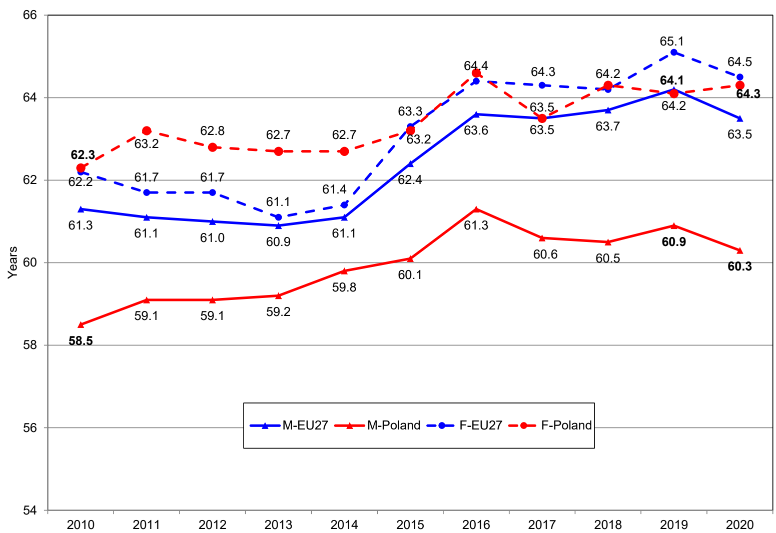

Fig. 3.13a. Average healthy (disability-free) life expectancy of men (M) and women (F) aged 0 in Poland and the EU average, 2010–2020 *(Eurostat data)*

9 The EU-SILC survey was conducted nationwide from 18 September to 4 December 2020 (Income and living conditions of the Polish population – EU-SILC 2020 survey report, Statistics Poland Warsaw 2022).

The healthy life expectancy of older people – aged 65 years (HLY65), men and women expressed both in absolute terms and as a percentage of total life expectancy is shorter in Poland than the EU average (Fig. 3.13b and 3.13c). In both Poland and the EU countries overall, the absolute value of HLY65 in 2020 was lower than in 2019. Undoubtedly, the pandemic period has affected the health of the older people more than the general population.

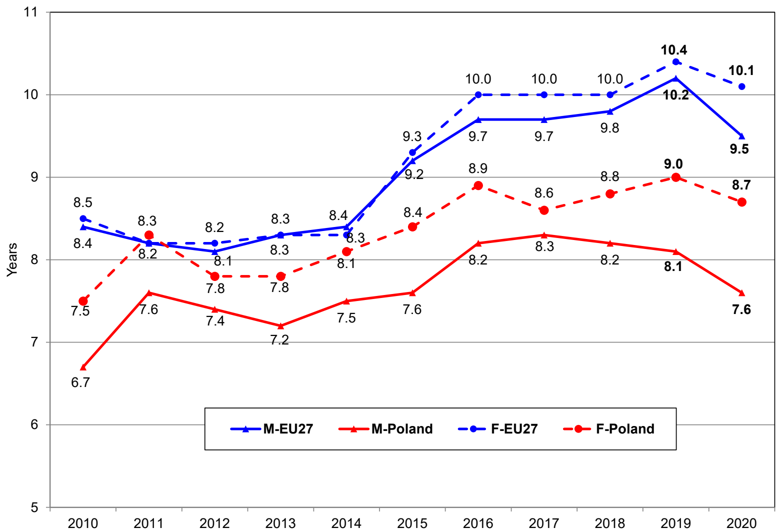

Fig. 3.13b. Average healthy (disability-free) life expectancy of men (M) and women (F) aged 65 in Poland and the EU average, 2010–2020 *(Eurostat data)*

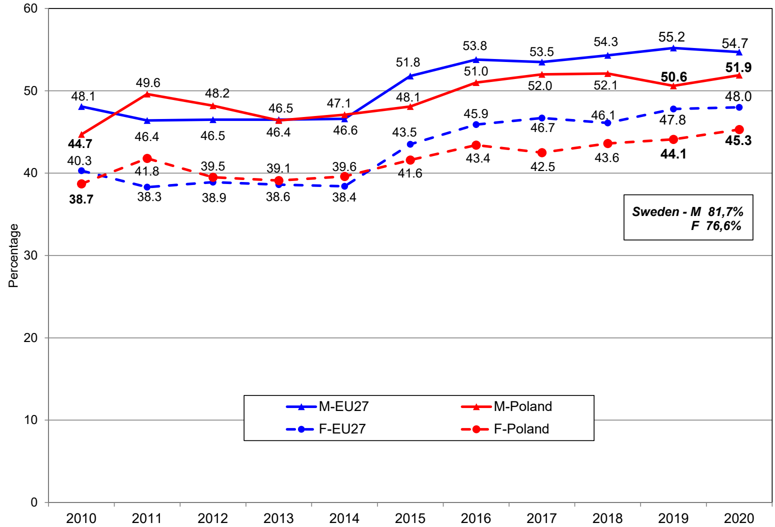

Fig. 3.13c. Average healthy (disability-free) life expectancy of men (M) and women (F) aged 65 as a proportion of their total life expectancy in Poland and the EU average, 2010–2020 *(Eurostat data)*

3.3. All-cause mortality

To reliably estimate the impact of the COVID-19 pandemic on excess population deaths it is necessary to analyse total mortality[10, 11, 12]. Accurately attributing death to SARS-CoV-2 infection proved difficult, especially in the early months, and in individual cases it may not have been possible to determine whether infection with this virus was the direct cause of death, significantly contributed to death or coincided with another cause of death. On many occasions, the fact of infection may not have been known due to a failure to test or a false negative test result. This may have led to either under- or

10 Islam N., "Excess deaths" is the best metric for tracking the pandemic. BMJ 2022;376:o285 | doi: 10.1136/bmj.o285

11 Beaney T, Clarke JM, Jain V, et al. Excess mortality: the gold standard in measuring the impact of COVID-19 worldwide? J R Soc Med 2020;113:329–34. doi: 10.1177/0141076820956802. pmid: 32910871

12 World Health Organization, United Nations Department of Economic and Social Affairs. Technical advisory group on covid-19 mortality assessment. 2021.https://www.who.int/data/technical-advisory-group/covid-19--mortality-assessment

overestimation of COVID-19 deaths[13, 14, 15]. Customs and habits in relation to the assessment of causes of death vary not only between countries but such differences are also observed between regions in Poland[16].

Of course, the size of the estimated excess depends on the method adopted to determine the baseline and therefore the "expected" number of deaths or mortality rate[17]. In our analyses, out of the many methods available for analysing and forecasting time series, we have primarily used the TBATS models *(Exponential smoothing state space model with* B*ox-Cox transformation,* A*RMA errors,* T*rigonometric* T*rend and* S*easonal components)*[18, 19]. The analysis was performed using the statistical program R[20], using the packages forecast[21, 22], rmeta[23] i mgcv[24]. The subject of the analysis was the time series of monthly age-standardised mortality rates due to all and selected causes in 2010–2019, the course of which was analysed using the TBATS model and their expected values in the following months in 2020–2021 were estimated. The observed standardised monthly

13 Rao C. Medical certification of cause of death for COVID-19. Bull World Health Organ 2020 May 1;98(5):298. 298A.

14 Ioannidis JPA. Over and underestimation of COVID19 deaths. Eur J Epid. (2021) 36:581–588. /doi.org/10.1007/s10654-021-00787-9.

15 Lampl BMJ, Lang M, Jochem C, Leitzmann MF, Salzberger B. COVID or not COVID: attributing and reporting cause of death in a community cohort. Public Health 205 (2022) 157–163, doi.org/10.1016/j.puhe.2022.02.008

16 Wojtyniak B., Stokwiszewski J., Goryński P. i wsp.: Długość życia i umieralność ludności Polski. W: Wojtyniak B., Goryński P. (red.) Sytuacja zdrowotna ludności Polski i jej uwarunkowania 2020, NIZP-PZH 2020, Warszawa 2020.

17 Nepomuceno, M.R., Klimkin, I., Jdanov, D.A., Aluztiza-Galarza, A., Shkolnikov, V.M., 2022. Sensitivity analysis of excess mortality due to the COVID-19 pandemic. Popul. Dev Rev. https://doi.org/10.1111/padr.12475 first published: 03 March 2022.

18 Hyndman, R. J. & Khandakar, Y. Automatic Time Series Forecasting: The forecast Package for *R. J. Stat. Softw.* 27. (2008)

19 De Livera, A. M., Hyndman, R. J. & Snyder, R. D. Forecasting Time Series with Complex Seasonal Patterns Using Exponential Smoothing. *J. Am. Stat. Assoc.* 106, 1513–1527 (2011)

20 R Core Team. *R: A Language and Environment for Statistical Computing.* (R Foundation for Statistical Computing, 2021)

21 Hyndman, R. J. & Khandakar, Y. Automatic time series forecasting: the forecast package for R. *J. Stat. Softw.* 26, 1–22 (2008)

22 Hyndman, R. *et al. forecast: Forecasting functions for time series and linear models.* (2021)

23 Lumley, T. *rmeta: Meta-Analysis.* (2018)

24 Wood, S.N. (2011) Fast stable restricted maximum likelihood and marginal likelihood estimation of semiparametric generalized linear models. Journal of the Royal Statistical Society (B) 73(1):3–36

mortality rates were related to the expected rates by estimating the excess mortality in each month.

A direct method was used to standardise mortality rates against age. The new European structure, equal for men and women, developed and used by Eurostat, was adopted as the standard age structure[25].

As mentioned earlier, the analysis of mortality in Poland was conducted using Statistics Poland's database of individual data on deaths in Poland, which covers the period up to 2021, while the analysis of mortality in selected EU countries used the (WHO *Mortality Database)*, which covers the period up to 2020 at the most. Thus, a comparison of the change in mortality trends due to the analysed diseases caused by the COVID-19 pandemic in Poland and other EU countries could only be conducted for the selected countries and the year 2020.

The decline in overall mortality in Poland slowed markedly between 2014 and 2019 and the 2020–2021 pandemic years saw a sharp increase in mortality in men and women by about a quarter (Fig. 3.14a). The standardised mortality rate in 2021 was at a similar level to that in 2005.

[25] Eurostat. Revision of the European Standard Population – Report of Eurostat's task force. 2013 11/07/2013. Report No.: 1977–0375. European Union 2013

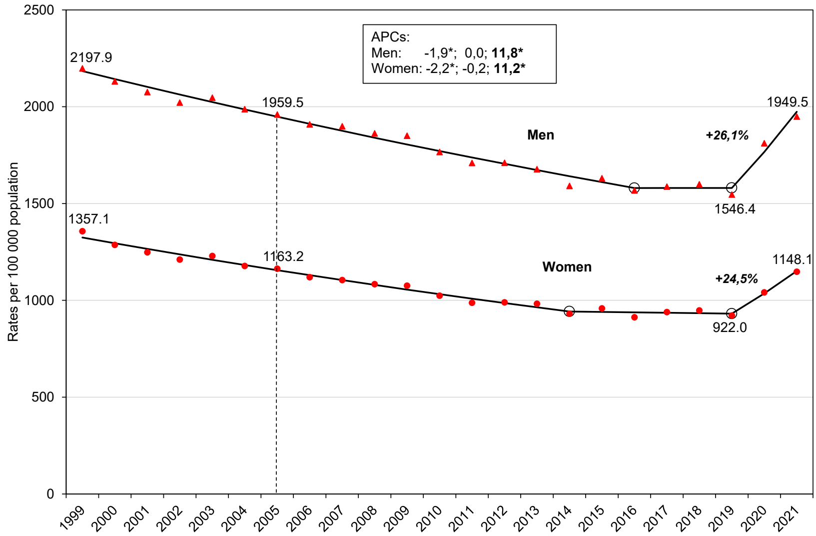

Fig. 3.14a. Age-standardised mortality rates due to all causes for men and women in Poland in 1999–2021 – their trends and average annual relative (%) rate of change (APC) *(authors' own calculations availing Statistics Poland databases)*

The decline in mortality among people of working age 25–64 slowed markedly twice after 1999 and even before the COVID-19 pandemic. The first time was in 2002–2007 and then in the years leading up to the 2014–2019 pandemic for men and 2016–2019 for women (Fig. 3.14b). During the pandemic period, the mortality rate also rose sharply in this age group, by 17.3% among men and 19.7% among women. The standardised mortality rate in 2021 was at a level similar to that observed 11–12 years earlier.

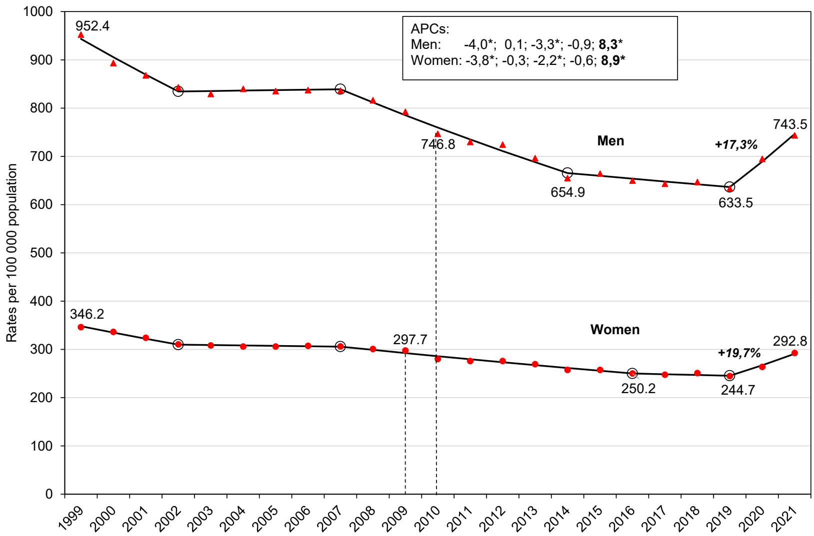

Fig. 3.14b. Age-standardised mortality rates due to all causes for men and women in age 25–64 in Poland in 1999–2021 – their trends and average annual relative (%) rate of change (APC) *(authors' own calculations availing Statistics Poland databases)*

Older people's mortality increased the most during the pandemic period, with the standardised mortality rate for men aged 65 and more in 2021 being 28.8 percent higher than in 2019 and women of the same age increasing by 25.5 percent (Fig. 3.14c). It is important to emphasise that for this sub-population, too, there was a complete halt in mortality decline in years 2014–2019 leading up to the pandemic.

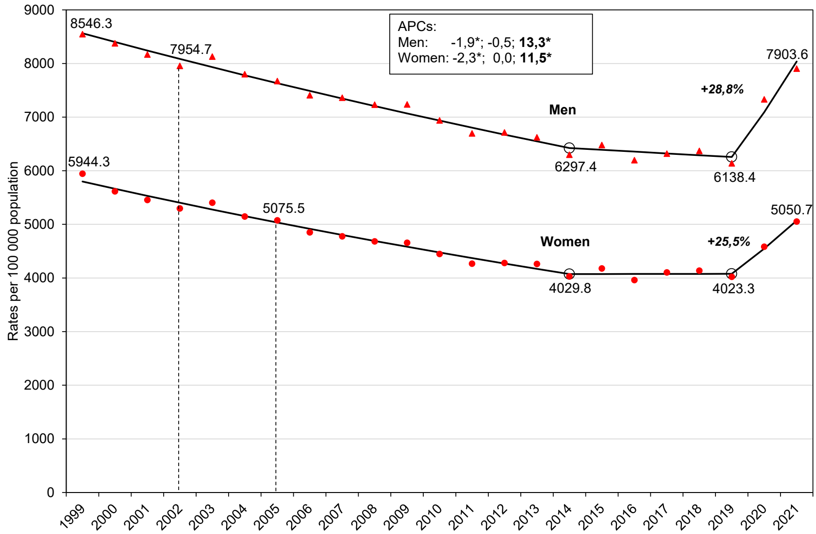

Fig. 3.14c. Age-standardised mortality rates due to all causes for men and women aged 65 and over in Poland in 1999–2021 – their trends and average annual relative (%) rate of change (APC) *(authors' own calculations availing Statistics Poland databases)*

Excess mortality due to the 2020–2021 pandemic was characterised by high variability between months. Fig. 3.15 shows our estimated trends in the observed monthly values of the standardised total mortality rate from 2010 to 2021, with changes in the monthly values of the expected rates based on previous 10-year trends also shown for 2020 to 2021. In contrast, Table 3.3 shows the percentages of estimated monthly excesses overall and by age group. Estimated excess total mortality in 2020 (14.6%) was significantly lower than in 2021 (23.9%) with those aged 25–44 increasing from 11.3% to 23.3% and those aged 65–79, the most affected age group, from 18.2% to 30.2%. The highest level of excess mortality in 2020 occurred in November (90.3%) and in 2021 in December (57.0%).

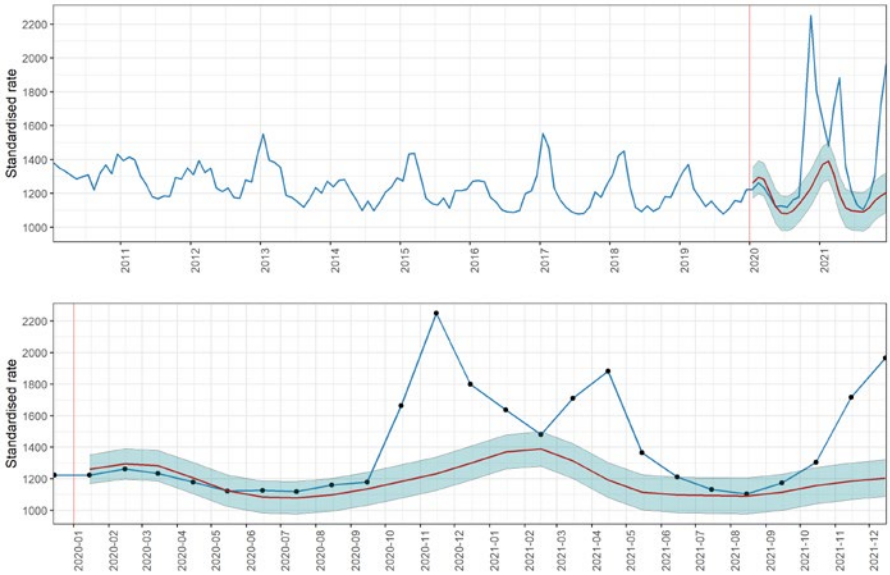

Fig. 3.15. Monthly all-cause age-standardised mortality rates for 2010–2021 and their expected values for 2020–2021 estimated from previous 10-year trends (rates per 100 000 population) *(authors' own calculations)*

Table 3.3. Relative difference (%) of observed age-standardised monthly all-cause mortality rates compared to their expected values based on previous 10-year trends in age groups in 2020 and 2021 *(authors' own calculations)*

Month	Total	25–44	45–64	65–79	80+ years
2020					
January	-5.7	-2.2	-3.9	-5.0	-8.4
February	-4.2	-1.4	-2.4	-4.9	-4.2
March	-4.1	0.0	0.7	-3.1	-5.2
April	-2.2	2.2	3.2	0.5	-5.7
May	-0.8	6.2	7.4	0.9	-2.4
June	3.0	4.4	2.8	3.9	0.6
July	1.1	11.9	3.7	4.3	-1.6
August	8.0	12.9	6.5	10.2	7.2
September	6.3	6.5	3.2	8.7	5.8
October	40.6	23.4	28.7	48.9	44.3
November	90.3	42.8	63.1	100.7	95.6
December	43.7	28.1	33.0	54.9	44.1
Total	**14.6**	**11.3**	**12.2**	**18.2**	**14.1**
2021					
January	24.8	18.5	18.5	29.6	24.3
February	11.9	15.4	11.1	17.1	9.8
March	32.5	34.2	32.2	48.3	24.3
April	56.0	48.4	58.9	79.2	40.8
May	20.4	21.3	25.9	28.5	16.7
June	10.8	22.6	11.1	10.4	8.7
July	2.3	11.3	1.8	4.0	2.3
August	2.6	5.0	-0.8	3.1	4.0
September	5.8	7.4	-0.1	7.1	7.3
October	10.3	13.7	7.3	13.1	12.1
November	45.1	40.0	30.8	48.7	47.6
December	57.0	42.8	43.4	65.0	61.2
Total	**23.9**	**23.3**	**20.3**	**30.2**	**22.3**

Monthly excess mortality during the October 2020 – February 2022 pandemic period in Poland was higher than in most EU countries and significantly different from the averages for these countries (Fig. 3.16a). The largest difference, by 57 p.p., was in November

2020. It is important to note that, as the figure shows, a relatively small but constant excess in mortality occurs in Poland and other EU countries up to the present (August 2022). Our analysis of excess mortality in Poland by week from January 2020 to 15 October 2022 (41st week 2022) shows that, although a certain excess of deaths persists, it is not due to COVID-19 mortality (Fig. 3.16b). This is an undoubted argument for the so-called health debt, i.e., the long-term impact of the pandemic on the health of the population. It should be added that, as our additional analyses show, the excess of deaths in recent months (from March to mid-October 2022) is basically only among people aged 65 and over (Fig. 3.16c). In this population, i.e., in the elderly, the health debt is the soundest because of additional deaths.

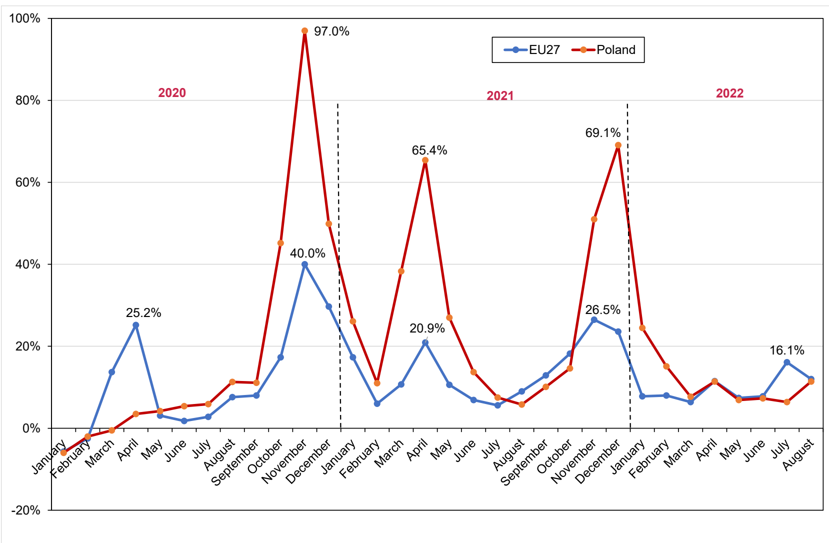

Fig. 3.16a. Percentage of additional monthly deaths between January 2020 and August 2022 compared to the average monthly number of deaths in 2016–2019 in Poland and EU27 overall *(Eurostat data)*

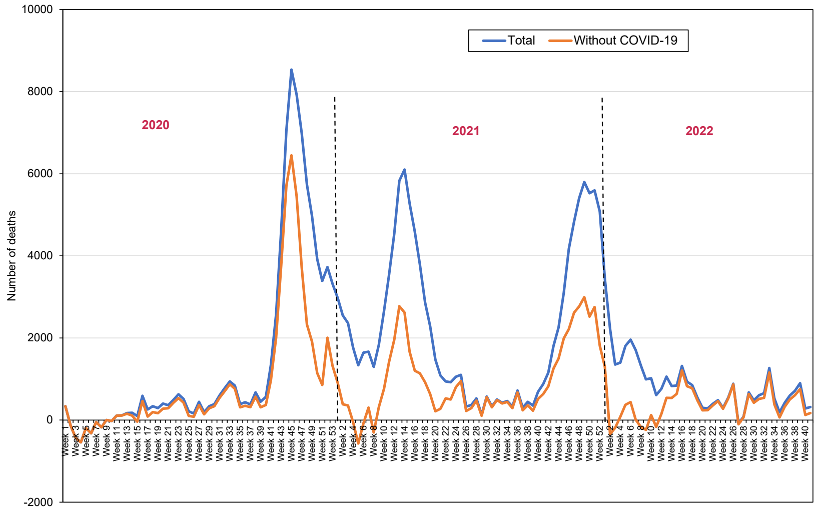

Fig. 3.16b. Absolute excess of the observed number of total weekly deaths and excluding COVID-19 deaths compared to the number of expected deaths based on a 10-year model of previous weekly deaths (authors' own calculations availing Statistics Poland, and Johns Hopkins University data)

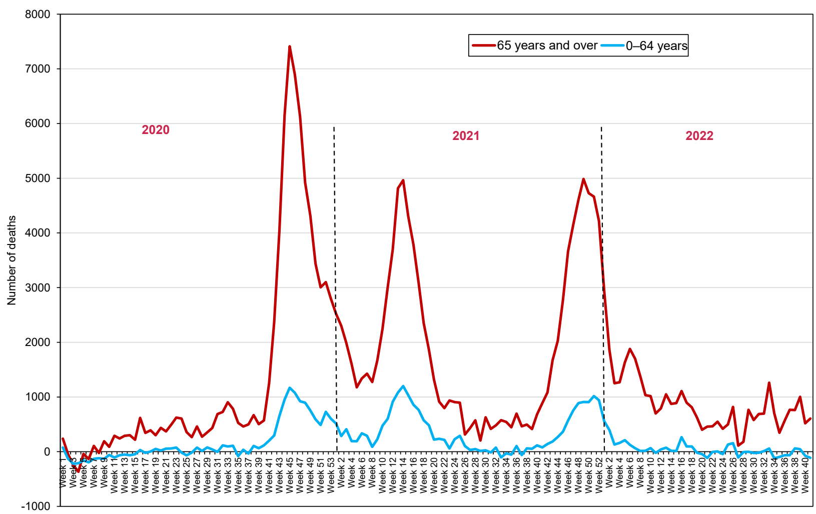

Fig. 3.16c. Absolute excess of the observed number of total weekly deaths compared to the number of expected deaths based on a 10-year model of previous weekly deaths in population 0–64 years, and 65 years and over (authors' own calculations)

3.4. Mortality by cause

When considering population mortality by cause of death, it must be taken into consideration that the COVID-19 pandemic has caused some turbulence in the assessment of cause of death. It may have affected the frequency of deaths from COVID-19 itself on the one hand and from other diseases on the other. According to WHO guidelines[26], "A COVID-19 death is defined for surveillance purposes as a death resulting from a clinically compatible disease, in a probable or confirmed COVID-19 case, unless there is a clear alternative cause of death that cannot be related to the COVID disease (e.g., trauma). There should be no period of complete recovery from COVID-19 between sickness and death.

COVID-19 deaths cannot be attributed to another disease (e.g., cancer) and should be counted independently of pre-existing conditions suspected of causing COVID-19 severity. (…)

Note: people with COVID-19 may die from other conditions, such as myocardial infarction. Such cases are not COVID-19 deaths and should not be confirmed as such."

Undoubtedly, this situation may have resulted in a reduction in the rate of death from certain chronic diseases such as the aforementioned cancers. On the other hand, the co-occurrence of undiagnosed COVID-19 with a chronic disease may have contributed to an increase in the number of deaths assessed due to the chronic disease in question. This may have been, for example, part of the reason for the significant increase in the diabetes mortality rate in 2020. For these reasons, interpreting changes in cause-specific mortality rates during the 2020 and 2021 pandemic period requires great caution.

By far the most common cause of death in the Polish population is total cardiovascular diseases (CVD), more commonly referred to in clinical nomenclature as cardiovascular disease (CVD), and the two names will be used interchangeably (Fig. 3.17). In 2019, they were responsible for 39.4 percent of all deaths, but due to the COVID-19 pandemic, their share decreases to 34.8 percent in 2021. It is noteworthy that in 2021,

[26] INTERNATIONAL GUIDELINES FOR CERTIFICATION AND CLASSIFICATION (CODING) OF COVID-19 AS CAUSE OF DEATH Based on ICD International Statistical Classification of Diseases (20 April 2020) WHO/HQ/DDI/DNA/CAT https://www.who.int/docs/default-source/classification/icd/covid-19/guidelines-cause-of-death-covid-19–20200420-en.pdf?sfvrsn=35fdd864_2 (accessed 8.08.2022)

the proportion of deaths from malignant tumours and from COVID-19 was virtually equal (18.0% vs 17.9%). A marked reduction in the frequency of deaths attributed to disease symptoms and causes unknown (R00-R99) from 11.0% to 7.1% should be considered a positive development.

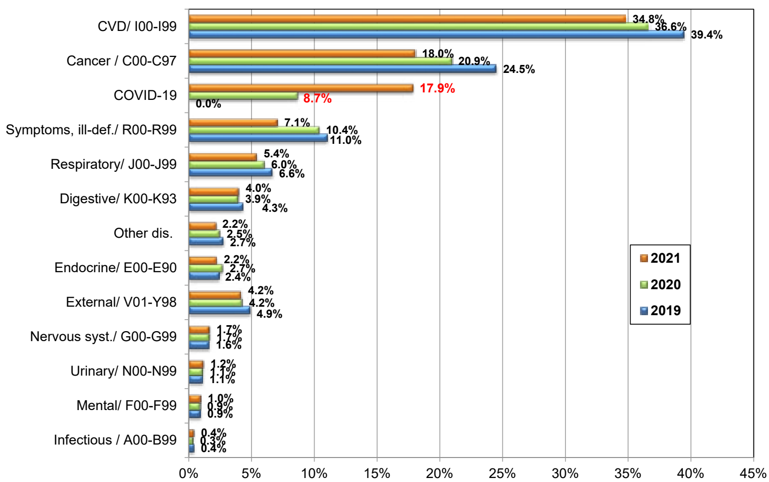

Fig. 3.17. Percentage of total deaths for the leading causes of death in Poland in 2019, 2020 and 2021 (based on Statistics Poland data)

To determine the most common causes of mortality in Poland, including more specific causes of deaths, we used the grouping list prepared by WHO and used, among others, in England, Wales, Australia[27]. We have made one modification to the list related to provincial differences in the assessment of cardiovascular causes of death and a category "heart disease" has been created, which is also used in the English grouping. And it was heart disease that was the most common cause of death in 2021 for the Polish population overall and those aged 75 and over (Table 3.4). The second most common disease responsible for the deaths of Poles in 2021 was COVID-19, which was the most

[27] Becker R, Silvi J, Ma Fat D, L'Hours A & Laurenti R 2006. A method for deriving leading causes of death. Bulletin of the World Health Organization 84:297–304

common cause among those aged 25–74 years and was in second place among the oldest 75 years and more. It is a very sad fact that the most common cause of death for young Poles aged 15–24 and the second most common for those aged 25–44 is suicide. Tracheal, bronchial and lung cancer still ranks very high – third for those aged 45–74 – a cause of death that is overwhelmingly preventable. On the other hand, it bears a very bad testimony to our death statistics that, in more than one in ten death certificates of people of working age 25–64, the doctor entered an unspecified cause.

Table 3.4. Top ten causes of deaths of the Polish population by age in 2021 (authors' own elaboration availing Statistics Poland databases)

Rank	Total	1–14	15–24	25–44	45–64	65–74	75 years
1	Heart disease (I00-I09, I11, I13, I20-I51) N=117972 (23%)	Congenital malformations and chromosomal aberrations (Q00-Q99) N=110 (17%)	Intentional self-harm [suicide] (X60-X84) N=386 (21%)	COVID-19 (U07, U10) N=1982 (11%)	COVID-19 (U07, U10) N=14369 (16%)	COVID-19 (U07, U10) N=27216 (21%)	Heart disease (I00-I09, I11, I13, I20-I51) N=78355 (28%)
2	COVID-19 (U07, U10) N=92780 (18%)	Malignant neoplasms of the brain (C71) N=55 (9%)	Accidents in land transportation (V01- V89) N=313(17%)	Intentional self-harm [suicide] (X60-X84) N=1581 (9%)	Heart disease (I00-I09, I11, I13, I20-I51) N=14220 (16%)	Heart disease (I00-I09, I11, I13, I20-I51) N=24115 (18%)	COVID-19 (U07, U10) N=49099 (18%)
3	Cerebrovascular diseases (I60-I69) N=31521 (6%)	Accidents in land transportation (V01- V89) N=47(7%)	Event of undetermined intent (Y10-Y34) N=85 (5%)	Cirrhosis and other liver diseases (K70-K76) N=1564 (9%)	Trachea, bronchus and lung cancer (C33, C34) N=5410 (6%)	Trachea, bronchus and lung cancer (C33, C34) N=9543 (7%)	Atherosclerosis (I70) N=20504 (7%)
4	Atherosclerosis (I70) N=24802 (5%)	Influenza and pneumonia (J10-J18) N=46 (7%)	COVID-19 (U07, U10) N=82 (4%)	Heart disease (I00-I09, I11, I13, I20-I51) N=1244 (7%)	Cirrhosis and other liver diseases (K70-K76) N=4696 (5%)	Cerebrovascular diseases (I60-I69) N=7051 (5%)	Cerebrovascular diseases (I60-I69) N=20192 (7%)
5	Trachea, bronchus and lung cancer (C33, C34) N=20866 (4%)	Malignant neoplasms of lymphoid and hematopoietic tissue (C81-C96) N=35 (5%)	Accidental poisoning (X40- X49) N=76 (4%)	Accidents in land transportation (V01- V89) N=736(4%)	Cerebrovascular diseases (I60-I69) N=3684 (4%)	Influenza and pneumonia (J10-J18) N=4047 (3%)	Influenza and pneumonia (J10-J18) N=11425 (4%)
6	Influenza and pneumonia (J10-J18) N=18340 (4%)	COVID-19 (U07, U10) N=24 (4%)	Influenza and pneumonia (J10-J18) N=50 (3%)	Accidental poisoning (X40-X49) N=572 (3%)	Colorectal cancer (C18- C21) N=2266 (3%)	Colorectal cancer (C18- C21) N=3939 (3%)	Diabetes (E10-E14) N=6273 (2%)
7	Colorectal cancer (C18- C21) N=11592 (2%)	Intentional self-harm [suicide] (X60-X84) N=20 (3%)	Congenital malformations and chromosomal aberrations (Q00-Q99) N=48 (3%)	Cerebrovascular diseases (I60- I69) N=557 (3%)	Influenza and pneumonia (J10-J18) N=2254 (3%)	Atherosclerosis (I70) N=3394 (3%)	Trachea, bronchus and lung cancer (C33, C34) N=5807 (2%)
8	Diabetes (E10-E14) N=10834 (2%)	Epilepsy and status epilepticus (G40, G41) N=17 (3%)	Falls (W00-W19) N=43 (2%)	Mental disorders caused by psychoactive substances (F10-F19) N=521 (3%)	Mental disorders caused by psychoactive substances (F10-F19) N=1768 (2%)	Diabetes (E10-E14) N=2833 (2%)	Colorectal cancer (C18- C21) N=5188 (2%)
9	Cirrhosis and other liver diseases (K70-K76) N=9230 (2%)	Event of undetermined intent (Y10-Y34) N=12 (2%)	Malignant neoplasms of lymphoid and hematopoietic tissue (C81-C96) N=35 (2%)	Influenza and pneumonia (J10-J18) N=479 (3%)	Female breast cancer (C50) N=1721(2%)	Benign, in situ, and unknown neoplasms (D00-D48) N=2562 (2%)	Benign, in situ, and unknown neoplasms (D00-D48) N=4331 (2%)
10	Benign, in situ, and unknown neoplasms (D00-D48) N=8202 (2%)	Accidental poisoning (X40- X49) N=11 (2%)	Accidental immersion and drowning (W65-W74) N=31 (2%)	Event of undetermined intent (Y10-Y34) N=382 (2%)	Intentional self-harm [suicide] (X60-X84) N=1640 (2%)	Cirrhosis and other liver diseases (K70-K76) N=2247 (2%)	Dementia and Alzheimer's disease (F01, F03, G30) N=4182 (2%)
Symptoms, disease features and unknown causes (R00-R99)	N=36710 (7%)	N=22 (3%)	N=167 (9%)	N=2413 (14%)	N=8842 (10%)	N=7390 (6%)	N=17838 (6%)

The significance of each broad disease group as a cause of death in 5-year age groups in 2021 is shown in Figures 3.18a and 3.18b. The lives of younger people, males aged 5–44 and females aged 10–29, were most at risk from external causes such as accidents (traffic accidents, falls, poisoning, drowning), suicide and the effects of crime. In subsequent age groups, men's lives were most threatened by cardiovascular diseases and, to a slightly lesser extent, by cancers, and by COVID-19 in those over 80 years of age. In contrast, the lives of women aged 30–74 years were most threatened in 2021 by total malignancies, which only give way to cardiovascular diseases at the oldest age. COVID-19 was the second most common cause of death among women aged 35–64 years, after cancer.

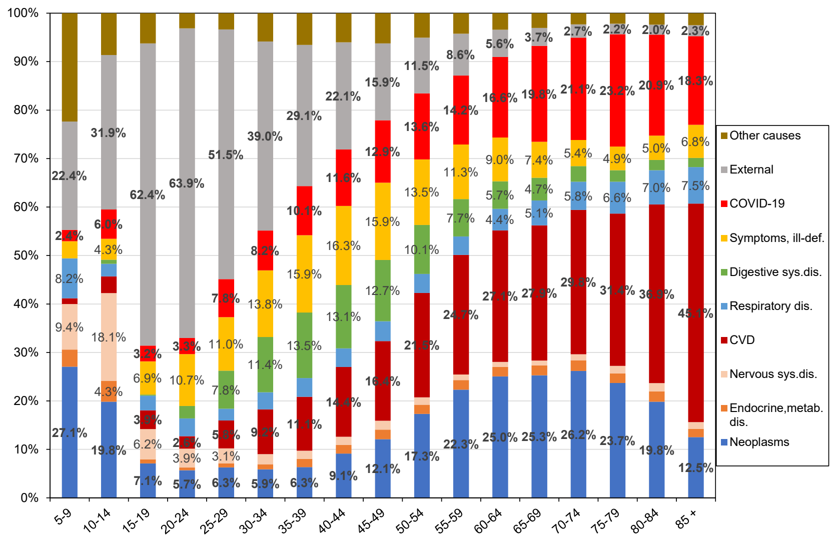

Fig. 3.18a. Percentage of total deaths for the main groups of causes in each five-year age group, 2021, MEN (based on Statistics Poland data)

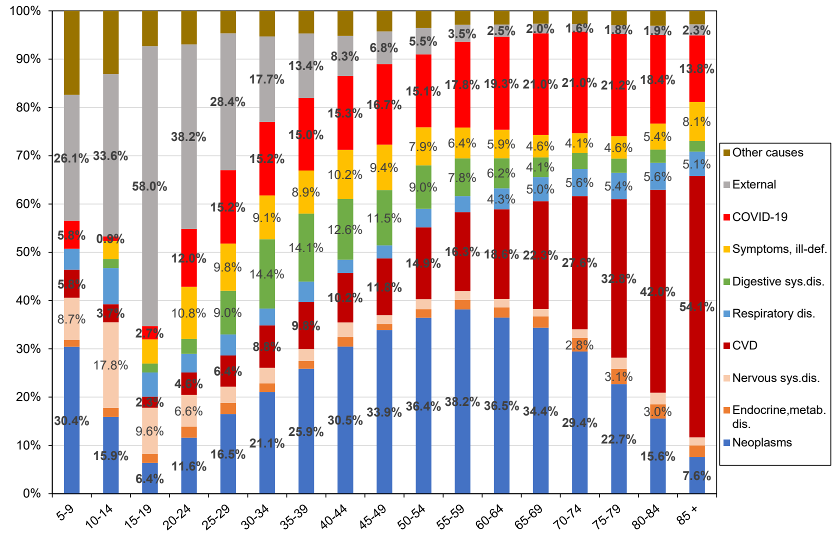

Fig. 3.18b. Percentage of total deaths for the main groups of causes in each five-year age group, 2021, WOMEN (based on Statistics Poland data)

If death before reaching the age of 75 is assumed to be premature[28], then the fact of death results in as many Potential Years of Life Lost (PYLL) as the difference between the age of death and 75. Therefore, deaths at younger ages are more significant than at older ages. Taking this into account, it is possible to calculate the extent to which individual causes of death contribute to the loss of potential years of life for the Polish population. The PYLL rate is included among the primary measures of the burden of premature mortality. As OECD data show, Poland belongs to that group of developed countries which have a clear problem with premature population mortality[29].

In 2021, as a result of deaths before the age of 75, Polish men lost 2 133 896 (11 567.7 per 100 000) potential years of life and women lost 939 421 (4 764.9 per 100 000). Figures 3.19a and 3.19b show the percentage of deaths due to individual diseases or groups of diseases and external causes in the total pool of potential life years lost in 2019, 2020

[28] The limit adopted is a matter of convention, the same limit is used by the USA and England, for example, in their calculations, while the OECD and Eurostat adopt 70 years.

[29] https://data.oecd.org/healthstat/potential-years-of-life-lost.htm; OECD (2022), Potential years of life lost (indicator). doi: 10.1787/193a2829-en (Accessed on 21 September 2022)

and 2021 for men and women. For women, the predominant cause of years of life lost prematurely is cancer, which accounted for about 30% of PYLL75 in 2021, about 10 p.p. less than in 2019 due to the emergence of the COVID-19 pandemic. It was this disease that was the second cause of PYLL75 (16.7%) overtaking not only heart disease but even cardiovascular disease overall. Among malignant neoplasms, breast cancer and to a slightly lesser extent tracheal, bronchial and lung cancer were the largest contributors to premature mortality in women in 2021. It is worth noting that cirrhosis and chronic liver disease already account for greater loss of potential life years than cerebrovascular disease, and colorectal cancer causes greater loss of potential life years for women than cervical cancer.

For men, cardiovascular diseases are responsible for a greater burden of premature loss of life (19.9%) than cancer (16.2%), which in turn outweigh external causes (15.4%). COVID-19 deaths in 2021 accounted for less of the burden of premature deaths than these three main groups and even than heart disease. Traffic accidents and lung cancer have greatly reduced their importance. Suicide is responsible for more years of potential life lost than lung cancer, cerebrovascular diseases, or myocardial infarction.

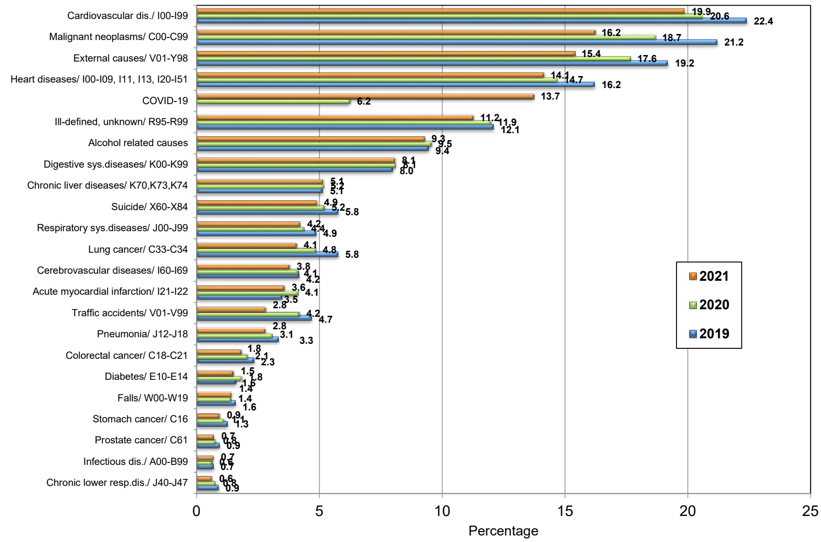

Fig. 3.19a. Percentage of total potential life years lost by the leading causes of death in Poland, 2019, 2020 and 2021, MEN (authors' own calculations availing Statistics Poland databases)

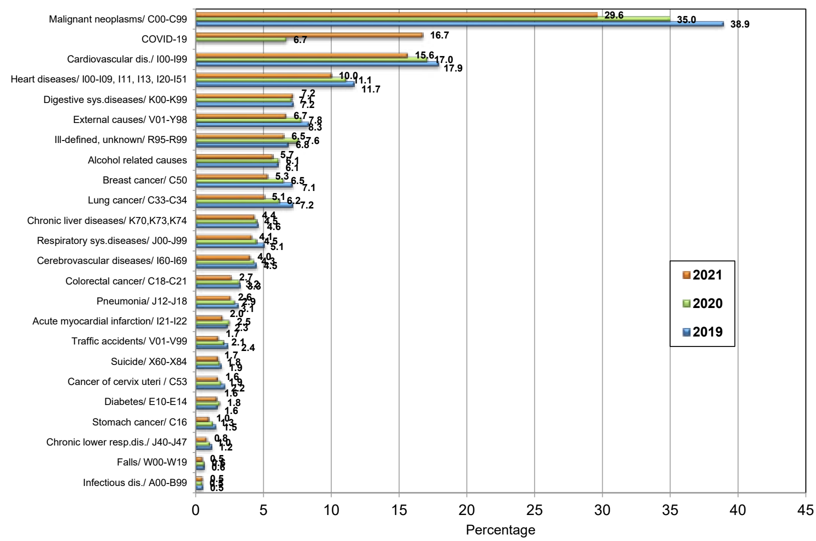

Fig. 3.19b. Percentage of total potential life years lost by the leading causes of death in Poland, 2019, 2020 and 2021, WOMEN (authors' own calculations availing Statistics Poland databases)

After eliminating the impact of differences in age structure from one year to the next and between men and women (the European age structure was the standard), it can be concluded that the burden of premature mortality for men is now almost two and a half times higher than for women (Table 3.5). The overall PYLL rate of the burden of premature deaths for men and women trended upwards between 2019 and 2021.

In assessing changes in the rates of life years lost due to specific causes of death between 2019 and 2021, it is important to note the steady, marked increase in these for digestive system diseases, including chronic liver disease, and for all causes directly related to alcohol consumption[30]. The rate of life years lost due to COVID-19 in 2021 was 2.5 times higher than in 2020, while 2020 saw an increase of 30% in PYLL due to myocardial infarction in men. It is important to note the slow increase in pandemic years of life lost in men due to amenable diseases.

[30] OECD, EUROSTAT, Avoidable mortality: OECD/Eurostat lists of preventable and treatable causes of death (November 2019 version)), November 2019 http://www.oecd.org/health/health-systems/Avoidable-mortality-2019-Joint-OECD-Eurostat-List-preventable-treatable-causes-of-death.pdf

Table 3.5. Age-standardised rates of potential life years lost for men and women by main causes of death in 2019–2021 (per 100 000 population) (authors' own calculations availing Statistics Poland databases)

Cause of death (ICD-10)	Men			Women		
	2019	2020	2021	2019	2020	2021
Total including:	9440.3	10349.0	11100.6	3830.2	4091.5	4563.1
Infectious and parasitic diseases (A00-B99)	63.2	64.2	75.1	19.3	20.2	23.5
Malignant neoplasms (C00-C97)	2028.2	1952.5	1817.9	1466.1	1411.5	1331.4
malignant neoplasm of the stomach (C16)	120.2	116.7	105.4	57.0	51.8	43.4
malignant neoplasm of the colon, rectum, and anus (C18-C21)	224.6	218.0	204.2	121.4	129.6	119.7
malignant neoplasm of the trachea, bronchus, and lung (C33-C34)	551.6	506.1	457.4	260.7	240.4	219.4
malignant neoplasm of breast (C50)	-	-	-	275.0	265.9	244.6
malignant neoplasm of cervix uteri (C53)	-	-	-	83.3	78.2	75.3
malignant neoplasm of prostate (C61)	88.9	82.0	79.9	-	-	-
Diabetes (E10-E14)	152.0	191.0	166.5	58.3	69.7	68.0
Diseases of the circulatory system (I00-I99)	2147.5	2153.9	2219.6	662.1	668.0	684.1
heart diseases (I00-I09, I11, I13, I20-I51)	1555.3	1534.5	1581.5	430.4	433.2	436.4
acute myocardial infarction (I21-I22)	331.2	430.6	397.6	86.9	100.1	87.4
cerebrovascular disease (I60-I69)	397.2	429.3	418.7	166.9	170.5	179.7
Diseases of the respiratory system (J00-J99)	461.1	451.7	466.3	192.9	181.5	186.4
pneumonia (J12-J18)	316.5	319.1	309.1	122.0	118.0	119.2
chronic lower respiratory diseases (J40-J47)	85.0	80.3	69.9	41.8	40.2	34.6
Diseases of the digestive system (K00-K93)	744.1	823.6	877.9	275.8	291.3	328.8
chronic liver disease (K70, K73, K74)	479.2	524.3	558.4	177.7	186.7	201.5
Symptoms and ill-defined causes (R00-R99)	1138.0	1236.5	1238.8	262.6	314.1	302.8
COVID-19	-	651.0	1521.1	-	267.5	740.4
External causes of death (V01-Y98)	1754.3	1784.4	1677.7	337.4	340.2	328.2
traffic accidents (V01-V99)	431.9	426.9	310.9	98.2	95.1	85.1
falls (W00-W19)	145.6	143.4	156.8	24.3	26.8	24.0
suicide and self-harm (X60-X84)	521.8	521.2	531.4	77.1	77.0	82.5
Alcohol related causes	877.7	969.9	1006.9	234.3	252.8	264.0
Avoidable causes	6380.8	6684.4	6568.3	2548.7	2536.9	2499.2
Preventable causes	4426.2	4579.4	4431.0	1334.0	1329.5	1298.0
Treatable causes	1954.6	2104.9	2137.3	1214.7	1207.4	1201.3

Below, mortality due to the most important causes of death in Poland during the 2020–2021 pandemic years is discussed in more detail, showing the variation between men and women, urban and rural residents and between voivodships. The differences caused by the 2020 pandemic (unfortunately, international data for 2021 are not yet available) in mortality from selected diseases among Polish residents compared to residents of some European Union countries are also presented. To enable a better comparison of mortality rates in different years and also in different populations, e.g., men and women, urban and rural residents, residents of different voivodships and different countries, age-standardisation of the rates was carried out. Also presented are the crude mortality rates in Poland for the years 2019–2021 as they show what the actual extent of population mortality associated with a particular group of diseases was in a given year.

3.5. COVID-19 mortality

COVID-19 as a cause was present in 41451 deaths (108.1 per 100 000) in 2020 and 92780 deaths (243.1 per 100 000) in 2021. COVID-19 mortality increased greatly with age and was higher among men than women (Table 3.6, Fig. 3.20). As the Median Age (Me) value shows, half of the deceased were older than approximately 80 for women and 74 (2020) and 72 (2021) for men. Urban and rural mortality rates were at similar levels (Fig. 3.2a) and the standardised mortality rate was the same 265 per 100 000 population in both populations (Table 3.10a and 3.10b). To date, the data from the National Census of Population and Housing 2021 on the structure of education of the population by sex and age have not yet been made available by the Central Statistical Office, which does not allow for the calculation of age-standardized mortality rates by level of education. Therefore, after eliminating differences in the age structure between groups of people with different education, we calculated age-standardised proportional mortality rates for people aged 25 and older, which show the share of deaths due to COVID-19 among the total deaths of people with a given level of education (Fig. 3.21b). It should be noticed that the differences between the values of this indicator show in which subpopulations these deaths are responsible for overall risk to life of their persons, but do not inform what was the difference in the absolute risk of mortality due to COVID-19 of the compared subpopulations. A very strong increase in the share of deaths due to COVID-19 in men with an increasing of the level of education is observed. Thus, we can conclude that deaths due to COVID-19 is an almost twice bigger part of the mortality of men with higher than primary education. Interestingly, this situation practically does not occur among women.

Table 3.6. Mortality from COVID-19 by age groups in 2020 and 2021 in Poland (rates per 100 000 population) (based on Statistics Poland data)

Age	2020		2021	
	number of deaths	rate	number of deaths	rate
0–4	4	0.2	18	1.0
5–14	3	0.1	14	0.4
15–19	9	0.5	21	1.2
20–24	24	1.2	61	3.1
25–29	51	2.1	169	7.2
30–34	94	3.3	300	10.8
35–39	217	6.7	576	17.9
40–44	315	10.3	937	30.4
45–49	503	19.0	1484	54.1
50–54	867	38.1	2017	87.7
55–59	1627	68.8	3477	151.6
60–64	3116	114.6	7391	281.2
65–69	4962	199.5	12596	502.0
70–74	6361	345.5	14620	747.2
75–79	5714	555.2	12442	1190.6
80–84	7233	824.4	13926	1640.0
85+	10351	1256.1	22731	2788.0

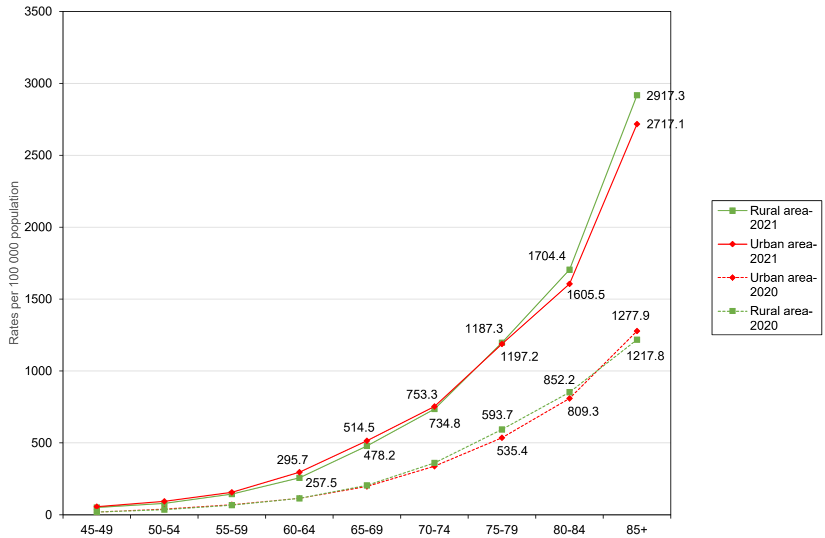

Fig. 3.20. COVID-19 deaths at age 45 and over in five-year age groups by sex in 2020 and 2021 (based on Statistics Poland data)

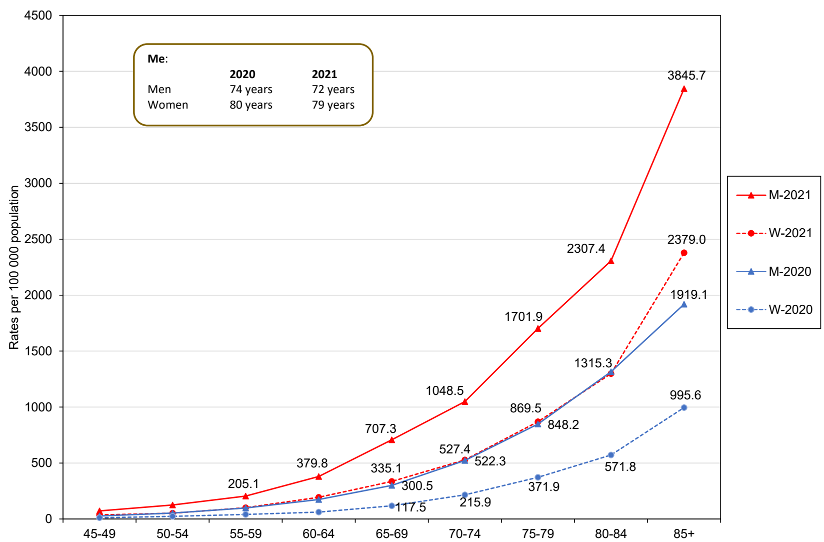

Fig. 3.21a. Age-standardized share of deaths due to COVID-19 in the total number of deaths of men and women aged 25 and older by level of education in years 2020 and 2021 (own calculations based on Central Statistical Office data)

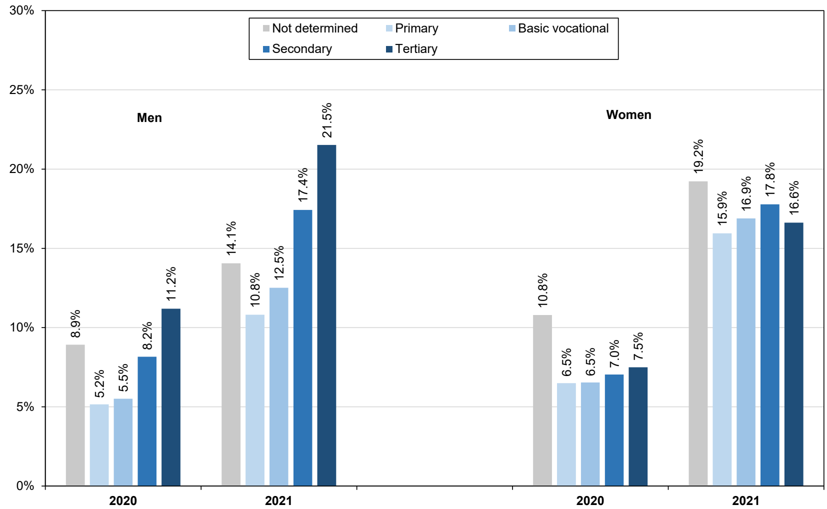

Fig. 3.21b. Age-standardized share of deaths due to COVID-19 in the total number of deaths of men and women aged 25 and older by level of education in years 2020 and 2021 (own calculations based on Central Statistical Office data)

Tables 3.7a to 3.7d present voivodship values for the number of COVID-19 deaths and actual and standardised mortality rates for men and women overall and aged 65 and over. The intervoivodship variation in the risk of death due to this disease was greater in 2020 than in 2021 and in 2020 it was greater in men than in women. Voivodship mortality rates for men overall and aged 65 and more in 2020 were not correlated with mortality rates in 2021 (Spearman rank correlation coefficients -0.074 and -0.068, and female mortality rates were positively but weakly correlated 0.309 and 0.294). On the other hand, there was a clear correlation of voivodship standardised mortality rates for men and women in both years (coefficients in the range of 0.87–0.92).

Table 3.7a. COVID-19 male mortality by voivodship in 2020 and 2021 – absolute numbers, crude, and age-standardised rates (authors' own calculations availing Statistics Poland databases)

Voivodship	2020			2021		
	number of deaths	crude rates	standardised rates	number of deaths	crude rates	standardised rates
Dolnośląskie	1752	125.7	176.5	3574	258.0	340.2
Kujawsko-pomorskie	1275	127.2	188.3	2819	283.3	405.2
Lubelskie	1485	145.7	199.4	2954	292.3	404.1
Lubuskie	641	130.4	198.8	1341	275.0	398.2
Łódzkie	1856	159.1	210.8	3197	276.6	357.4
Małopolskie	2021	122.0	177.2	3615	218.6	313.3
Mazowieckie	2770	106.6	146.4	7169	276.5	372.8
Opolskie	829	174.8	227.8	1226	260.7	322.4
Podkarpackie	1413	135.7	201.0	2830	273.3	393.9
Podlaskie	697	121.6	163.6	1783	313.1	429.1
Pomorskie	1221	106.9	165.7	2610	228.7	335.8
Śląskie	3113	143.3	182.2	6967	323.6	401.3
Świętokrzyskie	900	150.1	194.3	1670	281.5	361.3
Warmińsko-mazurskie	816	117.4	188.2	1844	267.5	421.1
Wielkopolskie	2240	131.5	204.7	4064	239.4	357.8
Zachodniopomorskie	937	113.9	165.2	1998	244.7	341.6
Poland	**23966**	**129.2**	**182.1**	**49661**	**269.2**	**369.6**

Table 3.7b. COVID-19 female mortality by voivodship in 2020 and 2021 – absolute numbers, crude, and age-standardised rates (authors' own calculations availing Statistics Poland databases)

Voivodship	2020			2021		
	number of deaths	crude rates	standardised rates	number of deaths	crude rates	standardised rates
Dolnośląskie	1169	77.7	69.2	3060	204.2	177.5
Kujawsko-pomorskie	942	88.3	84.4	2369	223.7	211.2
Lubelskie	1157	106.7	92.8	2915	271.0	231.8
Lubuskie	457	88.1	86.3	1109	215.1	206.2
Łódzkie	1527	119.1	98.1	3170	249.4	204.5
Małopolskie	1488	84.7	80.7	3193	182.0	172.1
Mazowieckie	2230	78.8	70.9	6229	220.3	198.5
Opolskie	557	110.0	94.1	1063	211.3	179.0
Podkarpackie	949	87.5	83.4	2485	230.1	216.3
Podlaskie	504	83.5	72.5	1593	265.5	225.5
Pomorskie	815	67.7	68.5	2148	178.2	178.8
Śląskie	2075	88.8	79.5	5545	239.0	209.7
Świętokrzyskie	649	102.9	84.8	1588	254.1	208.8
Warmińsko-mazurskie	658	90.7	90.2	1610	223.2	217.5
Wielkopolskie	1608	89.5	91.8	3351	186.8	189.6
Zachodniopomorskie	700	80.4	75.3	1691	195.4	178.7
Poland	**17485**	**88.3**	**81.1**	**43119**	**218.7**	**199.0**

Table 3.7c. COVID-19 65+ male mortality by voivodship in 2020 and 2021 – absolute numbers, crude, and age-standardised rates (authors' own calculations availing Statistics Poland databases)

Voivodship	2020			2021		
	number of deaths	crude rates	standardised rates	number of deaths	crude rates	standardised rates
Dolnośląskie	1391	625.2	780.6	2747	1209.0	1455.1
Kujawsko-pomorskie	1033	688.9	850.4	2253	1475.3	1804.6
Lubelskie	1167	753.2	871.0	2302	1463.1	1755.1
Lubuskie	492	672.3	873.9	1017	1360.0	1722.3
Łódzkie	1463	762.2	920.5	2524	1297.7	1550.8
Małopolskie	1635	687.1	789.7	2896	1197.8	1383.6
Mazowieckie	2200	560.3	639.3	5539	1391.0	1586.3
Opolskie	674	891.6	1019.2	927	1206.9	1367.5
Podkarpackie	1152	775.2	905.4	2269	1505.9	1752.2
Podlaskie	535	637.5	705.6	1372	1610.1	1856.9
Pomorskie	1022	614.9	761.4	2073	1220.1	1479.1
Śląskie	2470	695.1	795.0	5448	1515.2	1724.6
Świętokrzyskie	730	734.1	865.2	1325	1315.4	1575.0
Warmińsko-mazurskie	648	672.7	851.0	1422	1438.4	1869.0
Wielkopolskie	1791	741.2	916.1	3158	1283.0	1562.2
Zachodniopomorskie	758	582.6	744.9	1573	1176.0	1502.0
Poland	**19161**	**679.4**	**807.3**	**38845**	**1354.3**	**1606.3**

Table 3.7d. COVID-19 65+ female mortality by voivodship in 2020 and 2021 – absolute numbers, crude, and age-standardised rates (authors' own calculations availing Statistics Poland databases)

Voivodship	2020			2021		
	number of deaths	crude rates	standardised rates	number of deaths	crude rates	standardised rates
Dolnośląskie	1043	307.3	313.5	2626	758.2	770.3
Kujawsko-pomorskie	835	373.1	383.8	2070	909.5	947.5
Lubelskie	995	410.4	401.9	2564	1045.6	1027.4
Lubuskie	411	379.2	398.0	950	859.6	908.6
Łódzkie	1332	431.2	430.2	2757	883.2	893.7
Małopolskie	1321	376.4	364.7	2813	790.7	770.3
Mazowieckie	1980	326.9	317.5	5416	881.3	868.9
Opolskie	487	433.3	417.7	935	820.7	799.4
Podkarpackie	852	392.4	382.1	2145	974.5	951.5
Podlaskie	449	349.5	328.0	1414	1087.6	1014.3
Pomorskie	732	307.9	316.5	1878	772.1	801.4
Śląskie	1820	346.5	356.5	4733	887.0	910.6
Świętokrzyskie	573	389.3	377.3	1419	953.7	942.3
Warmińsko-mazurskie	584	403.8	415.0	1414	956.7	987.2
Wielkopolskie	1408	395.0	414.5	2894	796.2	844.5
Zachodniopomorskie	638	337.1	354.2	1442	743.5	780.6
Poland	**15460**	**364.8**	**365.7**	**37470**	**870.0**	**879.6**

Fig. 3.22. shows the standardised mortality rates for COVID-19 by voivodship for men and women combined. The largest increase in mortality in 2021 compared to 2020 took place in Podlaskie voivodship and was nearly threefold, by 180%. The least change in mortality occurred in the Wielkopolskie (56% increase) and Opolskie (62%) voivodships.

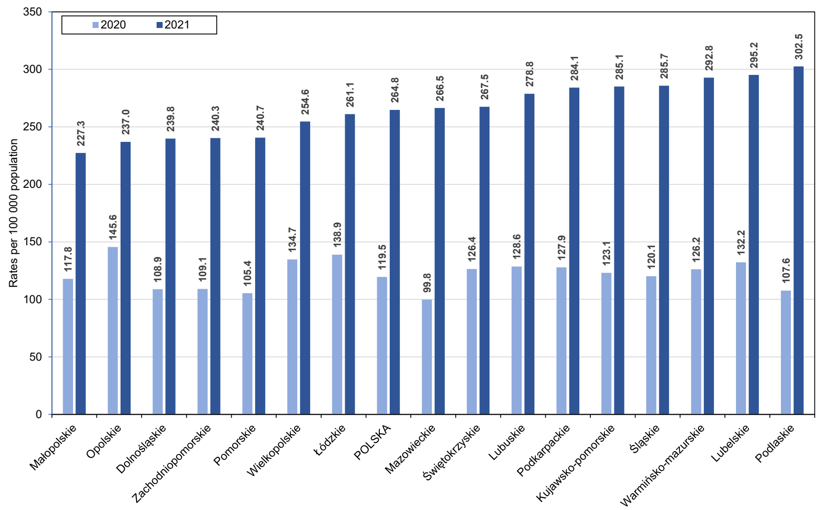

Fig. 3.22. Age-standardised mortality rates from COVID-19 for the total population by voivodship in 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

3.6. Mortality due to cardiovascular disease

The rates of cardiovascular disease (CVD) mortality and its share of total deaths gradually decreased until 2019, but the pandemic years saw an increase in mortality rates while the proportion of CVDs in total deaths decreased due to the emergence of COVID-19 (Table 3.8a and 3.8b). All the time, these diseases are the biggest threat to the lives of Poles. In 2021, 180760 people died in Poland due to them, i.e., 473.7 for every 100 000 population. The pandemic period brought an excess of CVD mortality over the level expected based on the previous 10-year trend of 8.7% in 2020 and 12.8% in 2021 (Table 3.9c).

Table 3.8a. MALE mortality by main causes in 2012–2021 (authors' own calculations availing Statistics Poland databases)

Cause of death (ICD-10)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Age-standardised mortality rates per 100 000 men										
Malignant neoplasms (C00-C97)	422.8	410.2	405.1	426.5	414.3	400.6	398.8	382.6	377.7	350.3
Circulatory system diseases (I00-I99)	780.7	756.1	703.1	723.9	656.3	636.4	624.1	593.7	633.1	648.1
Respiratory system diseases (J00-J99)	113.2	122.5	106.4	119.9	111.6	122.1	125.3	120.4	127.0	119.4
Digestive system diseases (K00-K93)	67.9	66.2	60.6	57.3	61.6	62.4	64.2	64.1	68.2	74.3
Symptoms, ill-defined (R00-R99)	101.1	106.4	118.2	105.1	117.8	150.4	163.2	165.1	179.8	140.1
COVID (U07, U10)	-	-	-	-	-	-	-	-	182.1	369.6
External causes (V01-Y98)	107.3	101.3	96.2	87.5	84.6	83.9	87.6	85.3	86.4	91.4
Percentage of total male deaths										
Malignant neoplasms (C00-C97)	26.1	25.9	26.9	27.3	27.3	26.3	25.9	25.7	21.8	18.8
Circulatory system diseases (I00-I99)	41.2	40.9	40.3	40.8	38.2	36.5	35.9	35.7	32.6	30.8
Respiratory system diseases (J00-J99)	5.8	6.5	5.9	6.6	6.4	6.9	7.1	7.1	6.5	5.7
Digestive system diseases (K00-K93)	4.7	4.6	4.5	4.2	4.6	4.6	4.7	4.9	4.5	4.5
Symptoms, ill-defined (R00-R99)	6.2	6.6	7.6	7.0	8.2	10.1	10.5	10.6	10.1	7.7
COVID (U07, U10)	-	-	-	-	-	-	-	-	9.6	18.5
External causes (V01-Y98)	8.9	8.4	8.3	7.2	7.1	6.9	7.0	7.0	6.0	5.7

Table 3.8b. FEMALE mortality by main causes in 2012–2021 (authors' own calculations availing Statistics Poland databases)

Cause of death (ICD-10)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Age-standardised mortality rates per 100 000 women										
Malignant neoplasms (C00-C97)	223.6	219.1	220.9	227.5	223.1	221.3	222.5	219.3	213.9	201.5
Circulatory system diseases (I00-I99)	516.4	505.6	468.9	487.3	441.6	434.1	425.9	395.6	418.3	440.1
Respiratory system diseases (J00-J99)	45.9	52.4	45.2	54.9	49.0	57.6	58.4	56.5	57.3	58.2
Digestive system diseases (K00-K93)	37.5	37.9	34.1	31.2	33.0	34.4	34.3	34.2	35.6	40.2
Symptoms, ill-defined (R00-R99)	56.4	60.8	67.0	58.1	62.7	80.6	93.8	103.1	108.9	72.5
COVID (U07, U10)									81.1	199.0
External causes (V01-Y98)	29.2	28.1	26.4	25.0	24.1	24.1	24.6	24.5	24.9	29.6
Percentage of total female deaths										
Malignant neoplasms (C00-C97)	23.0	22.6	23.7	23.6	24.1	23.1	23.0	23.2	20.0	17.2
Circulatory system diseases (I00-I99)	51.7	51.1	50.3	51.0	48.8	46.7	45.5	43.4	40.9	39.1
Respiratory system diseases (J00-J99)	4.6	5.3	4.8	5.7	5.4	6.1	6.2	6.1	5.5	5.1
Digestive system diseases (K00-K93)	3.9	3.9	3.7	3.3	3.6	3.6	3.6	3.7	3.4	3.4
Symptoms, ill-defined (R00-R99)	5.6	6.1	7.2	6.1	7.0	8.7	10.1	11.6	10.7	6.4
COVID (U07, U10)							0.0	0.0	7.7	17.2
External causes (V01-Y98)	3.1	2.9	2.9	2.6	2.6	2.5	2.5	2.6	2.3	2.5

Although women are more likely to die from CVD than men (in 2021, the actual rates for both groups were 497 and 449 per 100 000 respectively) but this is due to the older average age of women. After adjusting for the differences in the age structures of the two sex groups, we find that these diseases are a much greater threat to men's lives, as the standardised mortality rate in 2021 for men was 47.3% higher than for women (Table 3.9a and 3.9b).

Table 3.9a. Crude mortality rates by sex and cause in 2019, 2020 and 2021 (per 100 000 population) (authors' own calculations availing Statistics Poland databases)

Causes of death (ICD-10)	Men			Women		
	2019	2020	2021	2019	2020	2021
Total including:	1138.5	1346.2	1456.4	1000.6	1149.4	1272.4
Infectious and parasitic diseases (A00-B99)	5.0	5.0	6.3	3.8	3.6	5.2
tuberculosis (A15-A19)	1.9	2.0	1.9	0.5	0.5	0.5
Malignant neoplasms (C00-C97)	292.8	293.1	274.2	231.9	229.8	218.5
malignant neoplasm of the stomach (C16)	16.8	16.8	15.3	8.7	8.4	7.8
malignant neoplasm of the colon, rectum, and anus (C18-C21)	37.9	38.7	35.6	27.0	26.9	25.5
malignant neoplasm of the trachea, bronchus, and lung (C33-C34)	80.4	76.7	70.8	41.5	40.4	39.6
malignant neoplasm of breast (C50)	0.4	0.4	0.3	35.1	35.1	32.5
malignant neoplasm of cervix uteri (C53)	-	-	-	7.9	7.6	6.9
malignant neoplasm of prostate (C61)	30.3	31.0	29.6	-	-	-
malignant neoplasm of bladder (C67)	16.9	17.3	16.1	5.1	4.6	4.5
Diabetes (E10-E14)	22.6	30.0	26.3	25.7	33.3	30.3
Mental and behavioural disorders (F00-F99)	16.2	18.9	18.6	4.1	4.5	8.2
Diseases of the nervous system (G00-G99)	16.1	18.8	20.4	18.2	22.2	24.6
Diseases of the circulatory system (I00-I99)	406.4	439.3	448.7	434.6	469.9	497.0
heart diseases (I00-I09, I11, I13, I20-I51)	265.7	282.0	302.7	247.7	262.9	315.1
acute myocardial infarction (I21-I22)	40.7	49.5	43.7	25.5	28.1	24.0
cerebrovascular disease (I60-I69)	69.9	79.5	76.5	80.2	89.9	88.3
Diseases of the respiratory system (J00-J99)	81.1	87.4	83.5	61.3	63.2	64.6
pneumonia (J12-J18)	52.8	58.5	53.3	42.6	45.0	43.1
chronic lower respiratory diseases (J40-J47)	21.0	22.0	18.3	13.5	13.4	12.1
Diseases of the digestive system (K00-K93)	55.6	60.2	65.5	36.7	38.6	43.7
chronic liver disease (K70, K73, K74)	28.6	31.2	32.6	11.8	12.5	12.8
Diseases of the genitourinary system (N00-N99)	10.5	13.3	14.7	13.0	14.9	17.3
Symptoms and ill-defined causes (R00-R99)	120.1	135.4	112.2	115.6	123.5	81.2
COVID (U07, U10)	-	129.2	269.2	0.0	88.3	218.7
External causes of death (V01-Y98)	79.6	80.7	83.3	26.0	26.8	32.0
traffic accidents (V01-V99)	15.8	15.4	11.2	4.3	3.9	3.2
falls (W00-W19)	13.5	13.6	15.3	11.0	12.0	13.9
suicide and self-harm (X60-X84)	21.3	21.3	21.3	3.1	3.0	3.3
Causes directly related to alcohol	50.3	56.7	57.6	14.5	16.0	16.1
Avoidable causes*	472.6	507.9	512.7	228.8	241.7	247.1
Preventable causes*	315.4	330.5	328.9	121.2	126.3	128.6
Treatable causes*	157.2	177.4	183.8	107.6	115.4	118.4

* Refers to the population aged 0–74

Table 3.9b. Age-standardised mortality rates by sex and cause in 2019, 2020 and 2021 (per 100 000 population) (authors' own calculations availing Statistics Poland databases)

Causes of death (ICD-10)	Men			Women		
	2019	2020	2021	2019	2020	2021
Total including:	1546.4	1811.3	1949.5	922.0	1040.9	1148.1
Infectious and parasitic diseases (A00-B99)	6.1	6.1	7.8	3.5	3.4	4.8
tuberculosis (A15-A19)	2.1	2.2	2.0	0.5	0.5	0.4
Malignant neoplasms (C00-C97)	382.6	377.7	350.3	219.3	213.9	201.5
malignant neoplasm of the stomach (C16)	21.7	21.6	19.4	8.2	7.8	7.2
malignant neoplasm of the colon, rectum, and anus (C18-C21)	51.9	51.8	47.0	25.5	24.9	23.5
malignant neoplasm of the trachea, bronchus, and lung (C33-C34)	99.7	93.5	85.8	38.9	37.3	36.2
malignant neoplasm of breast (C50)	0.7	0.6	0.4	33.3	32.9	30.2
malignant neoplasm of cervix uteri (C53)	-	-	-	7.5	7.2	6.4
malignant neoplasm of prostate (C61)	46.4	46.7	44.3	-	-	-
malignant neoplasm of bladder (C67)	24.2	24.4	22.7	4.8	4.3	4.1
Diabetes (E10-E14)	30.9	40.8	35.3	23.8	30.4	27.5
Mental and behavioural disorders (F00-F99)	16.6	19.3	20.0	3.8	4.2	7.4
Diseases of the nervous system (G00-G99)	21.9	25.7	27.9	17.1	20.5	22.6
Diseases of the circulatory system (I00-I99)	593.7	633.1	648.1	395.6	418.3	440.1
heart diseases (I00-I09, I11, I13, I20-I51)	378.6	396.6	433.1	226.4	235.1	278.8
acute myocardial infarction (I21-I22)	52.7	62.0	53.2	23.7	25.7	21.7
cerebrovascular disease (I60-I69)	99.8	111.5	107.5	73.8	80.9	79.1
Diseases of the respiratory system (J00-J99)	120.4	127.0	119.4	56.5	57.3	58.2
pneumonia (J12-J18)	79.6	85.9	77.1	38.9	40.6	38.8
chronic lower respiratory diseases (J40-J47)	30.7	31.9	26.4	12.7	12.3	11.0
Diseases of the digestive system (K00-K93)	64.1	68.2	74.3	34.2	35.6	40.2
chronic liver disease (K70, K73, K74)	29.2	31.7	32.6	11.2	11.8	12.1
Diseases of the genitourinary system (N00-N99)	16.1	20.1	21.8	11.9	13.4	15.5
Symptoms and ill-defined causes (R00-R99)	165.1	179.8	140.1	103.1	108.9	72.5
COVID (U07, U10)	-	182.1	369.6	0.0	81.1	199.0
External causes of death (V01-Y98)	85.3	86.4	91.4	24.5	24.9	29.6
traffic accidents (V01-V99)	16.1	15.7	11.5	4.2	3.9	3.2
falls (W00-W19)	18.1	18.2	20.4	9.9	10.5	12.3
suicide and self-harm (X60-X84)	21.6	21.4	21.6	3.0	2.9	3.2
Causes directly related to alcohol	50.5	56.9	57.1	13.8	15.1	15.3
Avoidable causes*	502.8	529.1	527.7	213.9	219.8	219.9
Preventable causes*	332.9	342.2	337.1	112.9	114.6	114.4
Treatable causes*	169.9	186.9	190.5	101.0	105.2	105.5

* Refers to the population aged 0–74

Table 3.9c. Age-standardised mortality rates for the total Polish population by cause of death, their observed values (obs. value), expected values based on previous 10-year trends (exp. value) and their relative difference (%) in 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

Causes of death (ICD-10)	2020			2021		
	obs. value	exp. value	%	obs. value	exp. value	%
Total including:	1358.5	1186.8	14.5	1478.8	1189.1	24.4
Infectious and parasitic diseases (A00-B99)	4.6	3.0	54.2	6.1	1.1	458.0
tuberculosis (A15-A19)	1.3	1.7	-26.2	1.1	1.7	-32.7
Malignant neoplasms (C00-C97)	276.8	277.6	-0.3	258.3	277.6	-7.0
malignant neoplasm of the stomach (C16)	13.3	12.3	8.0	12.0	7.2	67.3
malignant neoplasm of the colon, rectum, and anus (C18-C21)	35.3	35.6	-0.9	32.6	35.6	-8.4
malignant neoplasm of the trachea, bronchus, and lung (C33-C34)	60.0	62.4	-3.9	56.1	62.4	-10.1
malignant neoplasm of breast (C50)	32.9	33.2	-1.0	30.2	33.4	-9.6
malignant neoplasm of cervix uteri (C53)	7.2	7.5	-4.2	6.4	7.4	-13.3
malignant neoplasm of prostate (C61)	46.7	46.3	0.9	44.3	46.3	-4.3
malignant neoplasm of bladder (C67)	11.7	14.5	-19.1	11.0	18.0	-39.2
Diabetes (E10-E14)	35.2	25.9	35.8	31.2	25.9	20.5
Mental and behavioural disorders (F00-F99)	11.3	11.1	1.6	13.5	11.1	21.6
Diseases of the nervous system (G00-G99)	22.9	43.3	-47.1	25.0	72.2	-65.4
Diseases of the circulatory system (I00-I99)	508.3	467.6	8.7	528.5	468.3	12.8
heart diseases (I00-I09, I11, I13, I20-I51)	301.8	266.1	13.4	343.7	266.1	29.2
acute myocardial infarction (I21-I22)	41.1	37.7	9.1	35.3	37.7	-6.5
cerebrovascular disease (I60-I69)	94.5	85.5	10.6	91.7	85.5	7.3
Diseases of the respiratory system (J00-J99)	83.1	78.4	6.0	81.1	78.8	3.0
pneumonia (J12-J18)	57.5	52.6	9.2	53.2	52.6	1.1
chronic lower respiratory diseases (J40-J47)	19.3	18.8	2.6	16.5	19.0	-13.3
Diseases of the digestive system (K00-K93)	50.7	47.8	6.0	56.0	47.8	17.1
chronic liver disease (K70, K73, K74)	21.1	19.5	8.2	21.7	19.4	12.1
Symptoms and ill-defined causes (R00-R99) (R00-R99)	140.9	142.1	-0.8	103.0	142.1	-27.5
External causes of death (V01-Y98)	53.9	51.9	3.9	58.5	51.9	12.7
traffic accidents (V01-V99)	9.6	9.5	0.8	7.2	9.5	-24.6
falls (W00-W19)	11.6	11.8	-1.4	11.9	11.8	0.4
suicide and self-harm (X60-X84)	14.0	13.5	4.0	16.1	13.5	19.0
Causes directly related to alcohol	34.7	29.9	16.1	35.0	29.9	17.0

Table 3.10a. Crude mortality rates by sex, place of residence and cause in 2021 (per 100 000 population) (authors' own calculations availing Statistics Poland databases)

Causes of death (ICD-10)	Total		Men		Women	
	Urban	Rural	Urban	Rural	Urban	Rural
Total in it:	1412.8	1284.7	1518.1	1369.0	1318.1	1200.9
Infectious and parasitic diseases (A00-B99)	6.5	4.5	7.3	4.9	5.8	4.2
tuberculosis (A15-A19)	1.2	1.0	2.1	1.6	0.5	0.4
Malignant neoplasms (C00-C97)	264.5	216.9	289.8	252.2	241.8	181.9
malignant neoplasm of the stomach (C16)	11.9	10.7	16.0	14.2	8.2	7.2
malignant neoplasm of the colon, rectum, and anus (C18-C21)	32.5	27.2	37.7	32.7	27.8	21.8
malignant neoplasm of the trachea, bronchus, and lung (C33-C34)	59.6	47.4	73.4	67.1	47.1	27.8
malignant neoplasm of breast (C50)	19.2	13.6	0.4	0.2	36.1	26.9
malignant neoplasm of cervix uteri (C53)	4.0	2.9	-	-	7.6	5.7
malignant neoplasm of prostate (C61)	15.0	13.3	31.7	26.6	-	-
malignant neoplasm of bladder (C67)	11.0	8.8	17.6	14.1	5.2	3.5
Diabetes (E10-E14)	28.4	28.3	27.4	24.7	29.4	31.9
Mental and behavioural disorders (F00-F99)	12.6	14.1	17.3	20.5	8.4	7.8
Diseases of the nervous system (G00-G99)	24.8	19.2	22.3	17.7	27.1	20.7
Diseases of the circulatory system (I00-I99)	477.5	467.9	458.7	434.4	494.4	501.2
heart diseases (I00-I09, I11, I13, I20-I51)	313.2	303.1	311.1	290.9	315.0	315.2
acute myocardial infarction (I21-I22)	36.4	29.2	47.7	38.0	26.3	20.4
cerebrovascular disease (I60-I69)	85.3	78.5	78.7	73.4	91.3	83.5
Diseases of the respiratory system (J00-J99)	77.7	67.9	87.4	78.0	68.9	57.9
pneumonia (J12-J18)	52.0	42.1	58.8	45.5	45.9	38.8
chronic lower respiratory diseases (J40-J47)	14.6	15.9	15.9	21.7	13.3	10.1
Diseases of the digestive system (K00-K93)	59.1	46.9	70.6	58.1	48.8	35.7
chronic liver disease (K70, K73, K74)	24.5	19.2	34.9	29.3	15.1	9.2
Diseases of the genitourinary system (N00-N99)	17.1	14.5	15.7	13.4	18.3	15.6
Symptoms and ill-defined causes (R00-R99)	94.1	99.3	111.2	113.6	78.8	85.0
COVID (U07, U10)	263.6	212.6	300.2	225.4	230.8	199.8
External causes of death (V01-Y98)	53.8	61.3	76.4	93.0	33.4	29.8
traffic accidents (V01-V99)	5.8	9.1	8.9	14.6	3.0	3.7
falls (W00-W19)	15.5	13.2	16.1	14.1	15.0	12.3
suicide and self-harm (X60-X84)	10.3	14.5	18.0	25.9	3.4	3.2
Causes directly related to alcohol	37.7	33.9	58.6	56.2	18.8	11.8
Avoidable causes*	392.2	358.3	519.6	503.0	272.3	208.3
Preventable causes*	233.4	219.3	328.3	329.9	144.3	104.7
Treatable causes*	158.8	139.0	191.4	173.1	128.1	103.6

*Refers to the population aged 0–74

Table 3.10b. Age-standardised mortality rates by sex, place of residence and selected causes in 2021 (per 100 000 population) (authors' own calculations availing Statistics Poland databases)

Causes of death (ICD-10)	Total		Men		Women	
	Urban	Rural	Urban	Rural	Urban	Rural
Total in it:	1424.4	1580.3	1876.1	2089.0	1115.8	1208.5
Infectious and parasitic diseases (A00-B99)	6.5	5.5	8.4	6.7	5.0	4.3
tuberculosis (A15-A19)	1.2	1.1	2.1	1.8	0.4	0.4
Malignant neoplasms (C00-C97)	258.9	256.8	344.8	359.3	207.5	189.9
malignant neoplasm of the stomach (C16)	11.7	12.7	19.1	19.7	7.0	7.6
malignant neoplasm of the colon, rectum, and anus (C18-C21)	32.4	33.1	46.1	48.6	23.9	22.9
malignant neoplasm of the trachea, bronchus, and lung (C33-C34)	56.7	54.8	83.1	90.2	39.7	29.1
malignant neoplasm of breast (C50)	19.0	16.1	0.5	0.4	31.4	27.9
malignant neoplasm of cervix uteri (C53)	3.9	3.2	-	-	6.7	5.9
malignant neoplasm of prostate (C61)	15.2	17.1	42.9	46.9	-	-
malignant neoplasm of bladder (C67)	11.0	10.8	22.5	23.0	4.3	3.6
Diabetes (E10-E14)	28.8	35.7	33.8	38.1	24.8	32.8
Mental and behavioural disorders (F00-F99)	12.3	15.6	17.9	23.3	7.2	7.8
Diseases of the nervous system (G00-G99)	25.6	23.7	28.7	26.4	23.2	21.5
Diseases of the circulatory system (I00-I99)	491.5	597.7	602.6	735.4	411.5	493.0
heart diseases (I00-I09, I11, I13, I20-I51)	321.5	385.2	405.6	486.0	262.0	309.8
acute myocardial infarction (I21-I22)	35.8	34.5	54.4	51.5	22.2	20.8
cerebrovascular disease (I60-I69)	87.5	99.6	101.3	119.2	76.7	83.7
Diseases of the respiratory system (J00-J99)	79.0	85.3	114.2	129.7	58.1	58.4
pneumonia (J12-J18)	53.3	53.1	77.8	76.2	38.8	38.9
chronic lower respiratory diseases (J40-J47)	14.6	20.1	20.7	37.2	11.2	10.5
Diseases of the digestive system (K00-K93)	57.8	53.0	76.4	71.1	42.5	36.2
chronic liver disease (K70, K73, K74)	23.1	19.7	34.2	30.1	13.7	9.5
Diseases of the genitourinary system (N00-N99)	17.5	18.6	21.1	23.2	15.4	15.9
Symptoms and ill-defined causes (R00-R99)	94.4	119.1	129.0	161.0	66.8	83.0
COVID (U07, U10)	264.8	265.3	376.0	360.5	195.6	205.3
External causes of death (V01-Y98)	53.7	66.4	82.0	106.1	29.6	29.7
traffic accidents (V01-V99)	5.8	9.1	9.1	14.8	2.9	3.7
falls (W00-W19)	16.0	16.2	20.1	21.2	12.5	11.9
suicide and self-harm (X60-X84)	10.1	14.6	18.0	27.1	3.3	3.2
Causes directly related to alcohol	35.4	34.5	57.1	57.2	17.1	12.1
Avoidable causes*	352.6	380.9	510.4	555.5	223.9	213.6
Preventable causes*	210.8	231.4	322.4	360.4	118.7	107.0
Treatable causes*	141.8	149.5	188.1	195.1	105.1	106.6

*Refers to the population aged 0–74

The years 2020 and 2021 have seen significant changes in CVD mortality rates in some voivodships. Particularly evident is the increase in mortality in 2020 in the Świętokrzyskie voivodship and in 2021 in the Dolnośląskie, Kujawsko-pomorskie, Lubuskie and Mazowieckie voivodships (Fig. 3.23). In contrast, in Lubelskie voivodship, an increase in mortality occurred in both years of the pandemic. In all these situations, the increase in CVD mortality rates may in part be an artefact of differences in cause-of-death assignment and a large reduction in mortality rates from causes that are either specified inaccurately or unknown (ICD-10 R00-R99) including primarily "old age" (R54). It is very likely that, because of this peculiar shift, the incidence of death from atherosclerosis increased as much as tenfold (from 37/100 000 to 370/100 000) in Lubuskie voivodship.

Tables 3.11a and 3.11b show, for each voivodship, the percentage differences in the observed standardised mortality rates for total CVD for men and women overall and aged 65 and more in 2020 and 2021 compared to their expected values based on previous 10-year trends. It is noteworthy that in the Warmińsko-mazurskie, Wielkopolskie and Zachodniopomorskie voivodships, the level of CVD mortality was virtually unchanged despite the pandemic.

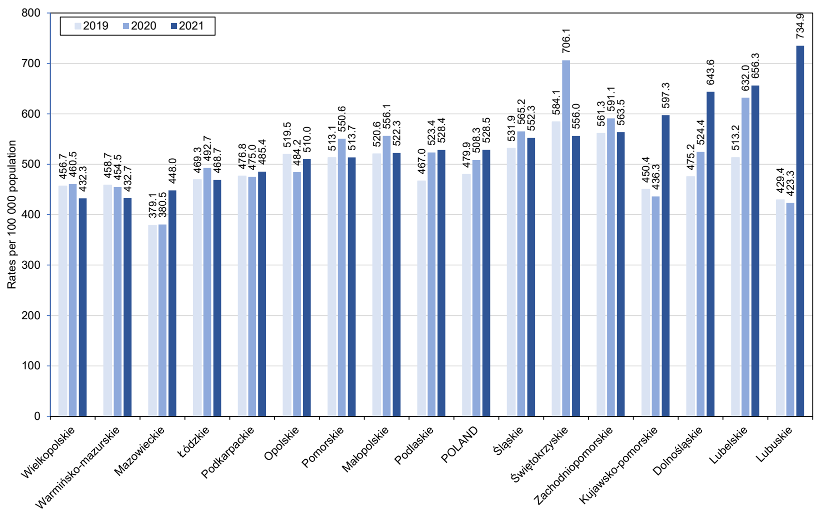

Fig. 3.23. Age-standardised mortality rates due to cardiovascular diseases of the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

Table 3.11a. Relative difference (%) in observed standardised mortality rates from total cardiovascular disease for men and women compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	16.6	38.4	42.6	70.7
Kujawsko-pomorskie	3.9	-4.3	40.8	31.1
Lubelskie	25.2	26.3	28.2	32.0
Lubuskie	2.1	8.1	73.5	90.6
Łódzkie	9.9	3.9	4.1	-1.5
Małopolskie	8.6	8.2	0.2	2.7
Mazowieckie	6.5	7.7	23.8	29.0
Opolskie	-3.8	-0.7	-6.1	11.6
Podkarpackie	5.4	3.1	7.2	6.3
Podlaskie	11.9	10.6	7.5	14.8
Pomorskie	10.6	6.3	2.6	0.4
Śląskie	8.8	7.8	6.1	5.2
Świętokrzyskie	30.5	20.8	0.1	-2.0
Warmińsko-mazurskie	1.9	2.6	-7.2	1.3
Wielkopolskie	0.9	2.9	-5.4	-3.0
Zachodniopomorskie	8.4	2.7	-1.5	1.4
Poland	**10.8**	**8.6**	**13.5**	**14.1**

Table 3.11b. Relative difference (%) in observed standardised mortality rates from total cardiovascular disease for men and women aged 65+ compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	24.9	42.5	50.3	76.3
Kujawsko-pomorskie	1.2	-4.8	33.4	28.8
Lubelskie	30.0	28.7	32.4	34.2
Lubuskie	2.8	9.5	71.0	96.3
Łódzkie	9.3	4.7	2.0	-0.8
Małopolskie	9.7	8.4	2.0	4.0
Mazowieckie	5.3	7.1	25.2	29.3
Opolskie	-5.0	-3.3	-7.6	9.6
Podkarpackie	5.3	1.3	8.8	6.0
Podlaskie	10.9	12.1	3.0	14.0
Pomorskie	10.1	6.8	4.8	1.2
Śląskie	8.7	5.2	4.6	2.0
Świętokrzyskie	37.6	23.9	7.2	0.8
Warmińsko-mazurskie	0.8	3.8	-8.3	3.7
Wielkopolskie	0.4	2.7	-4.3	-1.9
Zachodniopomorskie	7.9	3.0	-1.8	0.4
Poland	**12.3**	**11.0**	**14.7**	**17.0**

When analysing the mortality of the Polish population due to cardiovascular diseases, one must unfortunately bear in mind the great limitation of comparative analyses of the mortality of our country's population due to more detailed subgroups of CVD, both regionally and internationally. On the one hand, for many specific cardiovascular diseases, there are significant inter-regional differences in the assessment and coding of causes of death, and on the other hand, there is the assignment of diagnoses/codes described by WHO experts as garbage codes as causes of death in Poland[31, 32]. It is worth noting, however, that the pandemic period has brought a marked improvement in this area. While as

[31] https://stat.gov.pl/obszary-tematyczne/ludnosc/statystyka-przyczyn-zgonow/zgony-wedlug-przyczyn-okreslanych-jako-garbage-codes,3,2.html

[32] *WHO methods and data sources for country-level causes of death 2000–2012*, Global Health Estimates Technical Paper WHO/HIS/HSI/GHE/2014.7, WHO, Geneva, May 2014*Na co umarł pacjent – czyli, co jest wpisywane na kartach zgonów* http://stat.gov.pl/obszary-tematyczne/ludnosc/statystyka-przyczyn-zgonow/na-co-umarl-pacjent-czyli-co-jest-wpisywane-na-kartach-zgonow-,1,1.html

many as 41.4% of CVD deaths in 2018 had codes on this list, this figure in 2020 was 30.0% and in 2021 22.9%. The inter-regional differences are, unfortunately, still dramatic, as the percentage of these deaths ranged in 2021 from 0.6% in the Pomeranian voivodship to 58% in the Świętokrzyskie voivodship. Because of these types of codes, the analysis presented below distinguishes among CVD overall heart diseases (ICD-10 I00-I09, I11, I13, I20-I51), including myocardial infarction (I21-I22), and cerebrovascular diseases (I60-I69).

By far the most common cause of death among cardiovascular diseases is **heart disease** (118.0 thousand deaths in 2021, including myocardial infarction 12.8 thousand, i.e., 65.3% and 7.1% of deaths from total cardiovascular diseases respectively), with **cerebrovascular diseases** (CEVD) being the second most common (31.5 thousand deaths, 17.4% of the total group). Only for heart disease did age-standardised mortality rates increase in both years of the pandemic, while for myocardial infarction and CEVD a clear increase in mortality occurred in 2020 (Table 3.9b).

Cardiovascular diseases are more life-threatening for rural residents than for urban residents, which is evident when the rates are standardised for age (urban residents are on average older than rural residents) (Table 3.10a and 3.10b). Exceptions include myocardial infarction, from which more urban than rural residents are likely to die.

Cardiovascular diseases are more life-threatening for rural than urban residents in all voivodships. Fig. 3.24 shows the excess mortality of these subpopulations in each voivodship in relation to the observed mortality for the whole country in 2021. The highest excess mortality in relation to the average level for the whole country for both urban and rural residents was in Lubuskie voivodship. The smallest difference in the magnitude of excess mortality between rural and urban residents occurred in Małopolskie voivodship and the largest in Pomorskie, Kujawsko-pomorskie and Lubelskie voivodships.

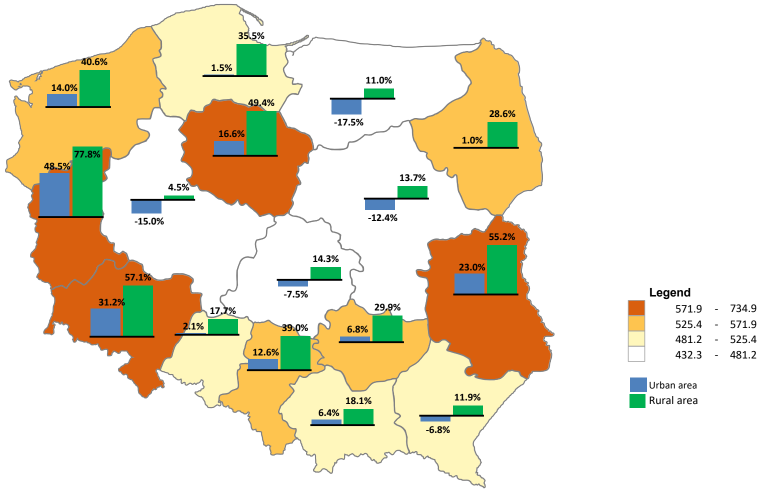

Fig. 3.24. Relative difference (%) of standardised mortality rates due to total cardiovascular disease (I00-I99) of urban and rural residents in relation to the observed national level by voivodship in 2021 (authors' own calculations availing Statistics Poland databases)

The years 2020 and 2021 have seen significant changes in myocardial infarction mortality rates in some voivodships. Particularly evident is the increase in mortality in 2020 in Świętokrzyskie and Lubelskie voivodships and in 2021 in Kujawsko-pomorskie and Lubuskie voivodships, (Fig. 3.25). In contrast, in Lubelskie voivodship, an increase in mortality occurred in both years of the pandemic.

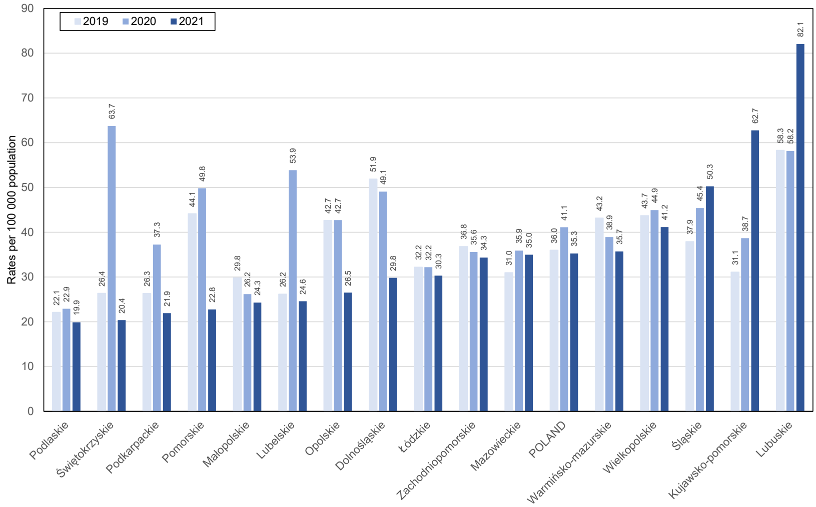

Fig. 3.25. Age-standardised mortality rates from myocardial infarction of the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

Tables 2.12a and 2.12b show, for each voivodship, the percentage differences in the observed standardised mortality rates for myocardial infarction for men and women overall and aged 65 and more in 2020 and 2021 compared to their expected values based on previous 10-year trends. The excess mortality in most voivodships occurred only in the first year of the pandemic, with more than double that in Świętokrzyskie voivodship and double that in Lubelskie voivodship. In both voivodships, there were fewer deaths than expected in the second year of the pandemic. In Dolnośląskie voivodship in both 2020 and 2021, the mortality rate from myocardial infarction was lower than expected, while in Śląskie voivodship it was higher in both years. In 2021, the highest excess mortality due to myocardial infarction occurred in the Kujawsko-pomorskie voivodship.

Table 3.12a. Relative difference (%) in observed standardised mortality rates from myocardial infarction for men and women compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	-22.5	-18.1	-54.9	-48.1
Kujawsko-pomorskie	38.2	13.7	128.9	68.7
Lubelskie	102.7	90.5	-10.1	0.5
Lubuskie	-7.9	-5.0	30.8	7.3
Łódzkie	8.8	-10.6	3.9	-17.4
Małopolskie	6.2	-10.5	22.7	-22.0
Mazowieckie	20.8	23.5	24.7	8.6
Opolskie	8.3	4.5	-44.1	-14.5
Podkarpackie	59.1	14.6	-7.0	-29.4
Podlaskie	12.1	-4.4	-8.0	-12.4
Pomorskie	11.0	11.9	-49.1	-48.1
Śląskie	36.8	26.3	72.2	48.1
Świętokrzyskie	160.6	99.5	-14.7	-31.5
Warmińsko-mazurskie	-6.2	5.0	-14.4	-7.8
Wielkopolskie	9.0	-9.0	-0.9	-14.8
Zachodniopomorskie	7.1	-9.1	11.1	-14.1
Poland	**14.3**	**3.7**	**-1.9**	**-12.4**

Table 3.12b. Relative (%) difference in observed standardised mortality rates from myocardial infarction for men and women aged 65 and more compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	-0.4	-17.4	-38.9	-43.4
Kujawsko-pomorskie	23.2	4.5	79.3	44.2
Lubelskie	68.1	63.7	-11.1	-3.5
Lubuskie	-6.0	-6.6	-35.7	-31.6
Łódzkie	6.5	-10.8	-2.1	-15.5
Małopolskie	-5.3	-11.1	-15.7	-14.0
Mazowieckie	25.0	27.7	15.3	2.7
Opolskie	11.3	-6.8	-50.8	-24.1
Podkarpackie	45.6	-9.0	-9.1	-50.3
Podlaskie	17.5	1.1	-10.6	-18.6
Pomorskie	14.2	12.7	-36.1	-38.1
Śląskie	25.1	24.6	29.9	48.3
Świętokrzyskie	137.8	82.1	2.9	-30.1
Warmińsko-mazurskie	-4.1	3.6	-16.4	-12.8
Wielkopolskie	2.0	-11.3	-8.9	-17.1
Zachodniopomorskie	-11.5	-7.1	-1.4	-15.3
Poland	**13.3**	**1.6**	**-7.0**	**-14.5**

Changes in cerebrovascular disease mortality in the voivodships in 2020 and 2021 are smaller than for myocardial infarction. Of note is the significant increase in mortality in 2021 in the Śląskie voivodship and the marked decrease in that year in the Podkarpackie, Lubuskie and Opolskie voivodships (Fig. 3.26).

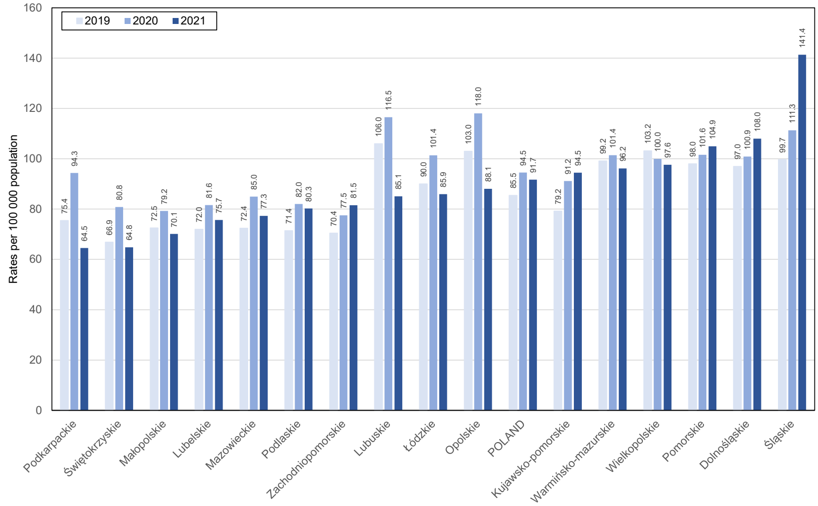

Fig. 3.26. Age-standardised mortality rates from cerebrovascular disease of the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

Tables 3.13a and 3.13b show, for each voivodship, the percentage differences in the observed standardised mortality rates for cerebrovascular disease for men and women overall and aged 65 and more in 2020 and 2021 compared to their expected values based on previous 10-year trends. It is worth noting that the excess mortality in 2020 in the Lubelskie voivodship occurred only in men and in the Świętokrzyskie voivodship was much higher in men than in women. The highest excess mortality from these diseases in 2021 that occurred in Śląskie voivodship affected both men and women.

Table 3.13a. Relative difference (%) in observed age-standardised mortality rates from cerebrovascular diseases for men and women compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	-2.3	12.3	4.8	21.6
Kujawsko-pomorskie	22.9	17.0	21.8	23.7
Lubelskie	29.8	-2.5	7.6	-0.4
Lubuskie	6.1	10.6	-22.6	-20.0
Łódzkie	19.7	17.5	9.3	-3.7
Małopolskie	10.2	12.4	-2.0	-0.9
Mazowieckie	18.4	14.8	4.8	6.8
Opolskie	-2.5	12.6	-16.9	-23.3
Podkarpackie	28.5	22.0	-6.0	-21.0
Podlaskie	14.4	7.3	11.1	5.3
Pomorskie	8.1	-1.1	12.6	2.2
Śląskie	14.2	10.1	40.6	43.8
Świętokrzyskie	30.2	12.7	5.9	-8.9
Warmińsko-mazurskie	-2.0	1.9	-6.3	-2.8
Wielkopolskie	-6.8	3.7	-4.4	-2.0
Zachodniopomorskie	-7.5	8.5	-7.3	19.0
Poland	**10.3**	**10.4**	**6.3**	**7.9**

Table 3.13b. Relative difference (%) in observed age-standardised mortality rates from cerebrovascular diseases for men and women aged 65 years and more compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	-0.3	14.8	6.8	24.4
Kujawsko-pomorskie	21.1	16.8	18.3	21.1
Lubelskie	29.3	0.7	7.8	0.3
Lubuskie	9.7	10.7	-22.3	-22.2
Łódzkie	17.4	19.7	5.2	-1.0
Małopolskie	9.2	14.8	-8.5	1.8
Mazowieckie	19.6	14.1	7.8	5.9
Opolskie	1.3	14.1	-17.0	-24.9
Podkarpackie	31.8	20.4	-3.6	-21.5
Podlaskie	17.4	13.9	11.8	7.7
Pomorskie	10.3	0.2	17.0	2.2
Śląskie	15.8	10.6	45.5	46.1
Świętokrzyskie	34.4	16.5	6.4	-6.1
Warmińsko-mazurskie	-5.6	3.4	-6.8	0.2
Wielkopolskie	-6.1	3.4	-3.4	-2.2
Zachodniopomorskie	-3.5	16.0	-1.3	22.9
Poland	**11.6**	**11.7**	**7.7**	**8.7**

Cerebrovascular diseases are more life-threatening for rural than urban residents in all voivodships. Fig. 3.27 shows the excess mortality of these subpopulations in each voivodship in relation to the observed mortality for the whole country in 2021. The largest differences in excess mortality between rural and urban residents (at a disadvantage of rural residents) occurred in the Śląskie, Mazowieckie, Dolnośląskie and Zachodniopomorskie voivodships. The Śląskie voivodship has the highest excess mortality of both urban and rural residents.

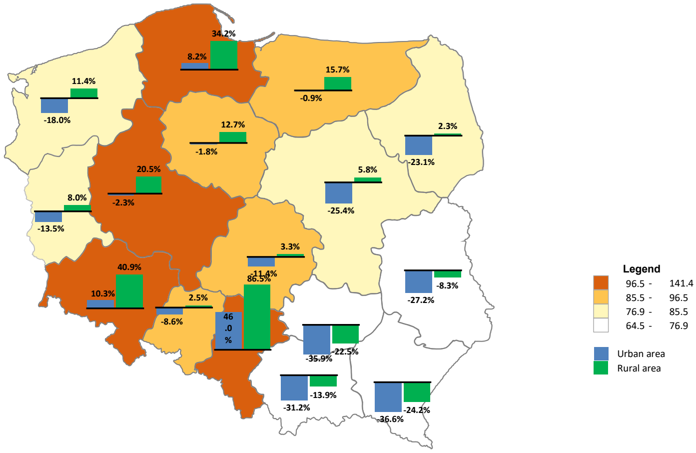

Fig. 3.27. Relative difference (%) of standardised mortality rates due to cerebrovascular disease (I60-I69) of urban and rural residents from the observed national level by voivodship in 2021 (authors' own calculations availing Statistics Poland databases)

3.7. Mortality from malignant neoplasms

Malignant neoplasms are the second most common group of causes of death in the Polish population, with both age-standardised mortality rates and their share among the total causes of death for men and women decreasing between 2020 and 2021 (Table 3.8a and 3.8b). In 2021, 93652 people (50581 men and 43071 women) died in Poland due to them, i.e. 245.4 for every 100 000 inhabitants. It is worth noting that the number of men who died from malignant tumours in 2021 was only 920 more than the number of COVID-19 deaths while the number of female deaths was 48 fewer. However, it is important to bear in mind the remarks we made at the beginning of the section of the guidelines on the determination of the cause of death.

Malignant neoplasms are a much greater threat to men's lives than women's and in 2021, the age-standardised mortality rate for men was 73.8 percent higher than that for women (Table 3.9a and 3.9b). Thus, the excess mortality of men over women is much higher for malignant neoplasms than for cardiovascular diseases.

Throughout the period 2019–2021, the highest risk of life from malignant neoplasms was in Wielkopolskie voivodship, while the lowest was in Podkarpackie voivodship (Fig. 3.28). The pandemic years and, in particular, 2021, saw a decrease in mortality rates from malignant neoplasms in all voivodships except Świętokrzyskie

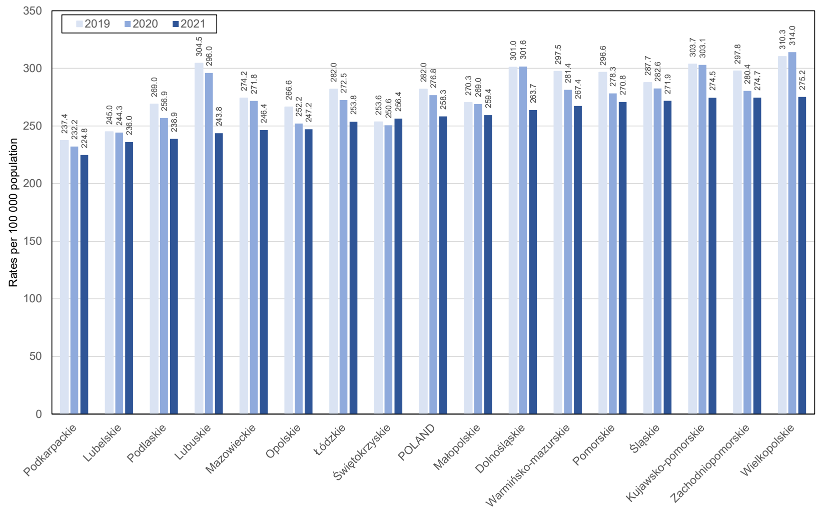

Fig. 3.28. Age-standardised annual mortality rates from total malignant neoplasms (C00-C97) of all persons by voivodship in 2019, 2020, and 2021 (authors' own calculations availing Statistics Poland databases)

Tables 3.14a and 3.14b show, for each voivodship, the percentage differences in the observed standardised mortality rates for total malignant tumours for men and women overall and aged 65 and more in 2020 and 2021 compared to their expected values based on previous 10-year trends. Overall, it can be concluded that the observed mortality rates for both men and women were lower than expected (except for Świętokrzyskie voivodship) and the largest difference occurred in Lubuskie voivodship.

Table 3.14a. Relative (%) difference in observed standardised mortality rates from total malignant tumours for men and women compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	3.1	-1.5	-11.7	-11.9
Kujawsko-pomorskie	-1.3	-2.5	-11.2	-9.7
Lubelskie	0.2	-2.8	-5.8	-2.9
Lubuskie	-9.6	-1.2	-25.0	-18.1
Łódzkie	-4.7	-2.3	-8.7	-11.9
Małopolskie	0.1	-2.7	-4.6	-4.1
Mazowieckie	-2.0	-0.8	-9.9	-11.4
Opolskie	2.6	-11.8	-5.9	-6.8
Podkarpackie	-5.0	-0.4	-8.2	-1.9
Podlaskie	-7.9	-0.6	-12.0	-9.2
Pomorskie	-1.8	-12.2	-6.7	-12.5
Śląskie	-2.2	-1.4	-5.7	-5.1
Świętokrzyskie	-2.5	3.0	2.0	2.9
Warmińsko-mazurskie	0.3	-6.3	-2.1	-12.6
Wielkopolskie	-0.3	0.5	-14.6	-9.5
Zachodniopomorskie	-2.2	-10.7	-9.4	-6.6
Poland	**0.1**	**-4.0**	**-7.2**	**-9.6**

Table 3.14b. Relative difference (%) in observed age-standardised mortality rates from total malignant tumours for men and women aged 65 and more compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	6.1	0.3	-9.4	-11.0
Kujawsko-pomorskie	-1.9	2.4	-14.9	-5.6
Lubelskie	2.2	1.8	-4.9	-0.5
Lubuskie	-5.7	7.9	-23.6	-10.9
Łódzkie	-4.1	-0.3	-8.6	-8.6
Małopolskie	-0.4	-1.4	-3.3	-3.2
Mazowieckie	-2.0	0.8	-10.6	-9.8
Opolskie	2.7	-13.5	-5.5	-4.6
Podkarpackie	-7.8	0.0	-9.8	-2.1
Podlaskie	-9.1	0.8	-11.8	-11.3
Pomorskie	-3.0	-11.8	-8.0	-10.5
Śląskie	-3.8	-0.8	-7.1	-2.8
Świętokrzyskie	-2.3	2.6	3.8	6.9
Warmińsko-mazurskie	-7.5	-4.5	-11.5	-8.7
Wielkopolskie	0.5	2.4	-15.5	-10.4
Zachodniopomorskie	-5.0	-12.3	-11.1	-6.2
Poland	**0.4**	**-1.1**	**-7.0**	**-6.6**

Among malignant neoplasms, by far the greatest threat to life for the Polish population has for many years been lung cancer (C33-C34), from which 20866 people died in 2021 (22.3 percent of all deaths from malignant neoplasms). Neoplasms of other locations are noticeably rarer, and so in 2021 due to colorectal cancer (ICD10 C18-C21) died 11592 people (12.4% of tumour deaths), due to stomach cancer (C16) 4359 people (4.7%), due to breast cancer (C50) 6406 women (and also 63 men) died (6.8% of total cancer deaths and 14. 9% of female cancer deaths), cervical cancer (C53) 1361 women (1.5% of total cancer deaths and 3.2% of female cancer deaths), while 5458 men died from prostate cancer (5.8% of total cancer deaths and 10.8% of male cancer deaths). In the years of the pandemic, and especially in 2021, the standardised mortality rates for all cancer groups analysed have decreased (Table 3.9b).

Malignant neoplasms in general pose a slightly greater threat to the lives of men living in rural and urban areas, but due to differences in age structure, the crude mortality rate is higher in urban areas. This not-too-large excess of rural male mortality in 2021 was present for all cancer locations analysed (Table 3.10a and 3.10b). For women, the mortality rate in rural areas is lower than in urban areas for both malignant neoplasms in general and the analysed locations with the exception of stomach cancer.

Fig. 3.29 shows the excesses/"shortfalls" mortality of urban, rural sub-populations in each voivodship in relation to the observed mortality for the whole country in 2021. The differences between the rates for urban and rural residents in each voivodship are not very large. The biggest difference is in the Pomorskie voivodship, where the observed urban mortality rate was only 1.4% higher than expected for Poland, while the rural mortality rate was 13.1% higher, and this is the biggest excess of rural residents in relation to the national level.

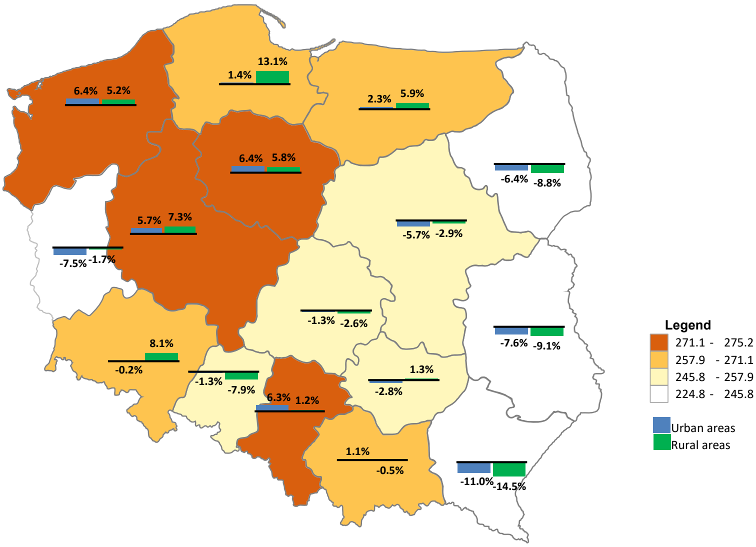

Fig. 3.29. Relative difference (%) of age-standardised mortality rates from total malignant neoplasms of urban and rural residents in relation to the observed national level by voivodship, 2021 (authors' own calculations availing Statistics Poland databases)

3.8. Mortality due to diseases of the respiratory system

The level of mortality from respiratory diseases between 2017 and 2021 remains similar (Table 3.8a and 3.8b). In 2021, these diseases accounted for 28141 deaths (15407 males and 12734 females), i.e., 74 people died from them for every 100 000 population (84 for males and 65 for females, Table 3.9a).

Respiratory diseases are a much greater threat to men's lives than women's and, after adjusting for differences in age structure, the level of deaths from them in 2021 among men was 2.1 times higher than among women (Table 3.9b).

Throughout the 2019–2021 period, the highest risk of death from respiratory diseases was in the Warmińsko-mazurskie and Łódzkie voivodships, while the lowest was in the Lubelskie and Śląskie voivodships (Fig. 3.30). The years 2020 and 2021 have seen significant changes in mortality rates from these diseases in some voivodships. Particularly evident is the increase in mortality in 2020 in the Świętokrzyskie, Podkarpackie and

Lubelskie voivodships, the level of which was also maintained in 2021. In contrast, mortality in the second year of the pandemic decreased quite markedly in the voivodships of Lubuskie and Podlaskie and in 2021 in the voivodships of Dolnośląskie, Kujawsko-pomorskie, Lubuskie and Mazowieckie. In Lubelskie voivodship, an increase in mortality occurred in both years of the pandemic.

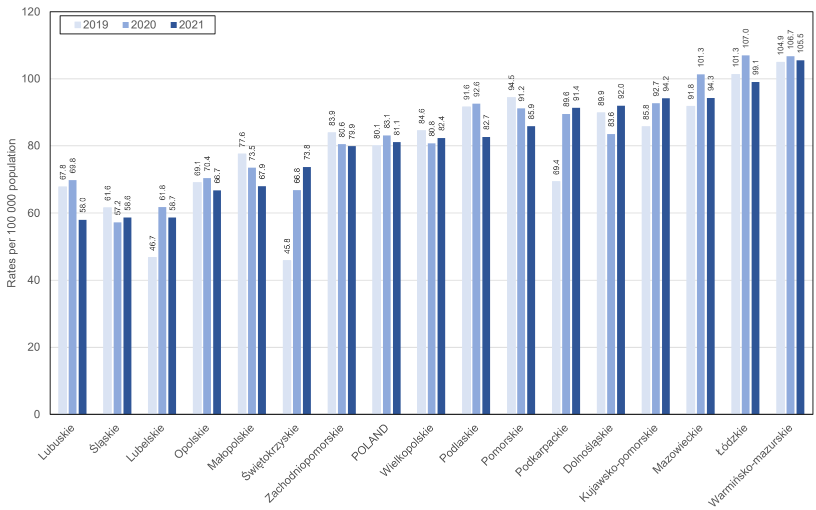

Fig. 3.30. Age-standardised mortality rates due to respiratory diseases for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations based on Statistics Poland databases)

Tables 3.13a and 3.13b show, for each voivodship, the percentage differences in the observed standardised mortality rates for total respiratory diseases for men and women overall and aged 65 and more in 2020 and 2021 compared to their expected values based on previous 10-year trends. It is noteworthy that there was a very large mortality excess in both years in Świętokrzyskie voivodship among both men and women, and a smaller but also significant excess in Lubelskie voivodship. In contrast, only in 2021 was there a significant excess of mortality in Opolskie voivodship. In the Pomorskie and Zachodniopomorskie voivodships, mortality was lower than expected and in the Śląskie, Warmińsko-mazurskie, Wielkopolskie voivodships, the level of mortality due to respiratory diseases practically did not change much due to the pandemic.

Table 3.15a. Relative difference (%) in observed age-standardised mortality rates from total respiratory disease for men and women compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	-1.4	-14.1	5.2	-2.4
Kujawsko-pomorskie	10.5	5.1	4.8	15.3
Lubelskie	31.7	36.6	15.6	39.9
Lubuskie	8.3	-0.3	-2.4	-26.1
Łódzkie	12.8	2.4	0.0	-1.9
Małopolskie	-5.8	0.4	-14.2	-5.4
Mazowieckie	9.6	15.2	-0.8	9.9
Opolskie	3.4	39.5	-0.9	34.9
Podkarpackie	39.5	11.6	19.9	40.1
Podlaskie	10.3	4.4	-2.4	-5.8
Pomorskie	1.6	-10.3	-10.3	-9.5
Śląskie	-1.3	0.4	-0.1	4.6
Świętokrzyskie	78.2	51.4	89.8	76.8
Warmińsko-mazurskie	2.4	4.3	0.5	3.1
Wielkopolskie	-2.7	-1.3	-3.0	1.8
Zachodniopomorskie	1.5	-12.7	-5.3	-8.9
Poland	**10.7**	**3.2**	**3.2**	**4.9**

Table 3.15b. Relative difference (%) in observed age-standardised mortality rates from total respiratory diseases for men and women aged 65 and more compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	-2.0	-10.7	1.6	-1.6
Kujawsko-pomorskie	8.2	4.2	2.6	16.0
Lubelskie	48.3	32.8	28.0	37.3
Lubuskie	10.2	26.1	-5.6	-14.7
Łódzkie	9.0	2.6	-4.8	0.2
Małopolskie	-3.1	-0.8	-12.3	-4.8
Mazowieckie	8.8	9.8	-1.9	4.2
Opolskie	4.2	36.8	0.6	36.1
Podkarpackie	40.3	12.4	20.8	44.3
Podlaskie	8.5	5.8	-8.2	-6.3
Pomorskie	1.4	-10.2	-11.2	-9.9
Śląskie	-3.7	-0.6	-1.1	6.4
Świętokrzyskie	74.1	56.7	82.9	79.1
Warmińsko-mazurskie	1.4	5.5	-2.0	-0.3
Wielkopolskie	-2.5	-4.6	-3.9	1.7
Zachodniopomorskie	2.0	-12.5	-7.4	-7.1
Poland	**10.1**	**5.4**	**1.7**	**8.8**

Among respiratory diseases, the most important causes of death are pneumonia, from which 18330 people died in 2021 (9829 men and 8501 women), and chronic diseases of the lower respiratory tract, from which 5758 people died (3380 men and 2378 women).

Respiratory diseases in general are a greater threat to life, after eliminating differences in age structure, for men living in rural areas than in urban areas (by 13.6% in 2021), while the mortality rate for rural and urban female residents is the same (Table 3.10a and 3.10b). Pneumonia mortality is at similar level among urban and rural residents, and this is true for both men and women, while chronic lower respiratory diseases are much more life-threatening for men living in rural areas than in urban areas – the excess mortality for rural men is as high as 80%. Among women, the mortality rate in urban areas is currently 6% higher than in rural areas.

Fig. 3.31 shows the excess mortality due to respiratory diseases of urban and rural residents in each voivodship in relation to the observed mortality for the whole country in 2021. The most unfavourable difference for rural residents was in the Warmińsko-mazurskie voivodship, where the excess mortality of rural residents is the highest in the country, and in the Wielkopolskie voivodship. However, in the Łódzkie voivodship, as the only one, the excess mortality in cities was higher than in rural areas (excess mortality in cities is the highest in the country).

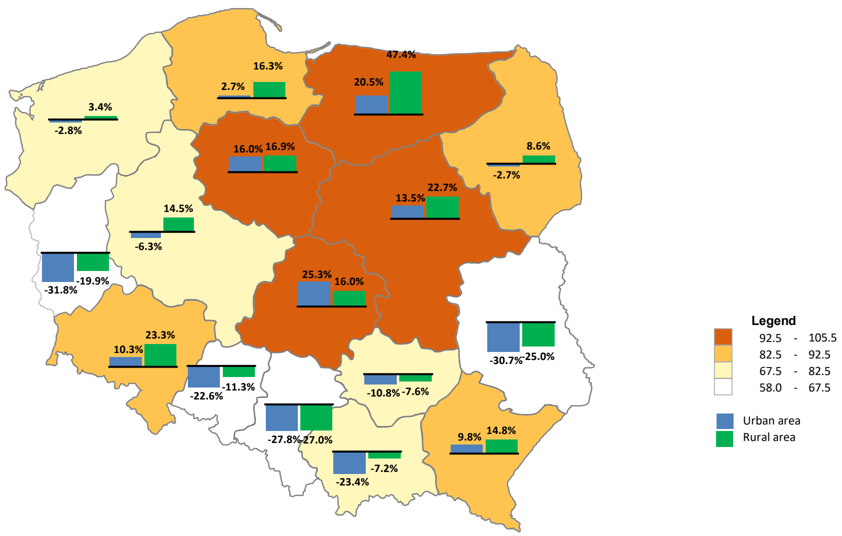

Fig. 3.31. Relative difference (%) of age-standardised mortality rates due to respiratory diseases of total urban and rural residents from the observed national level by voivodship in 2021 (authors' own calculations availing Statistics Poland databases)

The interregional variation in the level of mortality due to **pneumonia** is large, and the changes in mortality rates over the last 3 years in the individual voivodships also showed large variation (Fig. 3.32). Noteworthy is the marked increase in mortality in 2020 followed by a decrease in 2021 in the Świętokrzyskie and Podkarpackie voivodships. Large reductions in mortality in 2021 also occurred in the Opolskie, Dolnośląskie and Podlaskie voivodships. The question arises as to what extent these changes represent the actual situation and to what extent they were due to changes in the attribution of death cause during the pandemic period.

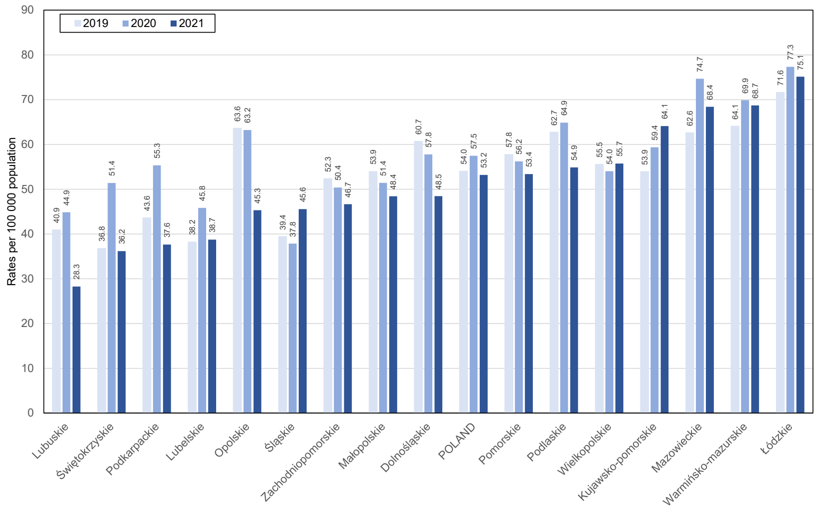

Fig. 3.32. Age-standardised mortality rates from pneumonia (J12-J18) for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

As in the case of pneumonia, the life-threatening risk to the general population of Poland caused by **chronic lower respiratory diseases** is characterised by large inter-regional variation and variation in the changes that occurred during the pandemic period (Fig. 3.33). The mortality level in 2020 was in most voivodships quite like that in 2019, and only in the Lubelskie and Świętokrzyskie voivodships did mortality rates increase significantly (by 102% and 69% respectively). In contrast, mortality rates have decreased in all voivodships except Opolskie and Świętokrzyskie in 2021. Such a substantial increase in the mortality rate in 2021 in the Opolskie voivodship may be a compensation for a certain abnormality that was present in 2019 and 2020 when the rates were clearly lower than in earlier years and generally differed in their values from the rates in the other voivodships.

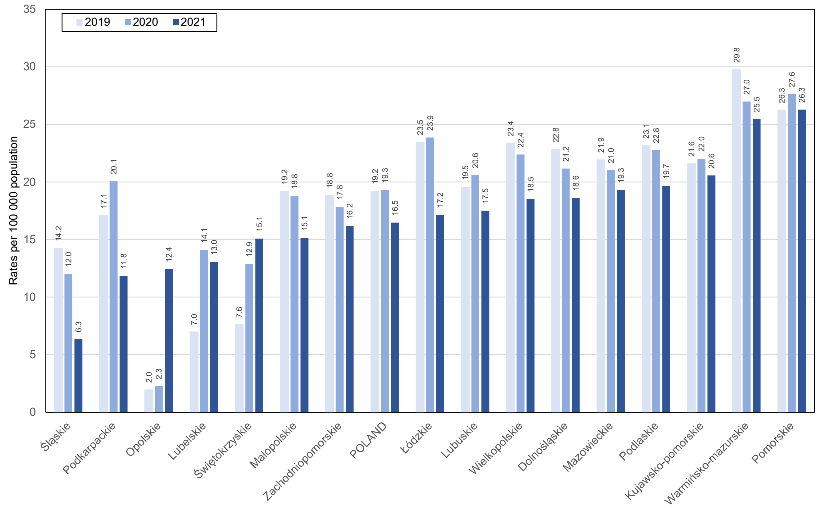

Fig. 3.33. Age-standardised annual mortality rates due to chronic lower respiratory diseases (J40-J47) for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

3.9. Mortality due to diseases of the digestive system

Mortality in the total Polish population due to digestive system diseases increased between 2015 and 2018 and the 2020–2021 pandemic years saw a further increase in the mortality rate but the share of deaths due to these causes in the total number of deaths decreased (Tables 3.8a and 3.8b). In 2021, digestive system diseases accounted for 20693 deaths (12076 males and 8617 females), i.e., 54 people died from them for every 100 000 people (65 for males and 44 for females, Table 3.9a). Although the overall mortality rate for these diseases is lower than for respiratory diseases, digestive system diseases are the more common cause of death among Poles aged 25–64 years (Figures 3.18a and 3.18b).

Digestive system diseases are a much greater threat to men's lives than women's and, adjusting for eliminating differences in age structure, the death rate from them among men is 85% higher than among women (Table 3.9b).

Among digestive system diseases, the most important subgroup in causes of death is chronic liver disease (K70, K73 and K74) (practically cirrhosis and alcoholic liver disease), from which 8541 people (6015 men and 2526 women) died in 2021 (43% of total deaths from digestive system diseases).

The risk of death from **digestive system diseases** of the **total** population in 2019–2021, alike in previous years, was highest in the Łódzkie and Śląskie voivodships (Fig. 3.34). The years 2020 and 2021 have seen significant increase in mortality rates from these diseases in some voivodships. Particularly evident is the increase in the mortality rate in the Świętokrzyskie (especially in 2021), Lubelskie and Zachodniopomorskie voivodships, and in 2021 only in Dolnośląskie, Kujawsko-pomorskie and Warmińsko-mazurskie voivodships. In contrast, the Opolskie voivodship was the only one where mortality in the second year of the pandemic decreased quite markedly.

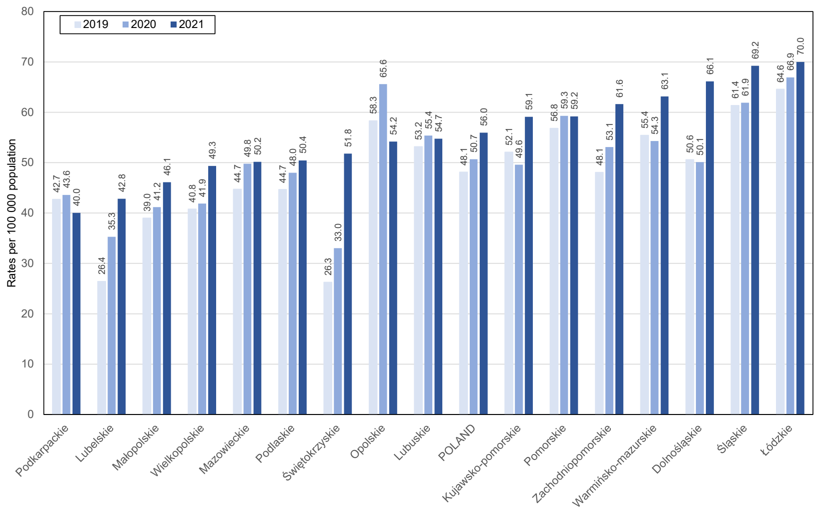

Fig. 3.34. Age-standardised annual mortality rates due to total digestive system diseases (K00-K93) for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

Tables 3.16a and 3.16b show, for each voivodship, the percentage differences in the observed standardised mortality rates for total digestive system diseases for men and women overall and aged 65 and more in 2020 and 2021 compared to their expected values based on previous 10-year trends. It is noteworthy that there is a very high excess mortality in both years in Lubelskie and Świętokrzyskie voivodships, particularly high in women in 2021, especially those aged 65 and more. This large excess value in these voivodships was due, on the one hand, to the large increase in mortality from these causes in 2021 and, on the other hand, to the strong downward trend in mortality rates in the preceding years, which is taken into account when estimating the expected mortality rate.

Table 3.16a. Relative difference (%) in observed age-standardised mortality rates from total digestive system disease for men and women compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	4.0	-3.7	33.5	36.5
Kujawsko-pomorskie	-7.5	-1.4	8.6	18.0
Lubelskie	20.4	49.2	37.6	107.1
Lubuskie	9.2	10.8	5.2	23.7
Łódzkie	4.4	12.7	6.9	20.4
Małopolskie	11.0	-2.8	18.3	16.0
Mazowieckie	10.6	12.2	9.1	15.9
Opolskie	-3.3	48.7	-14.8	18.0
Podkarpackie	4.4	5.5	-7.1	3.2
Podlaskie	-0.2	3.6	18.7	-6.4
Pomorskie	11.1	4.7	13.6	5.9
Śląskie	2.2	-0.6	17.4	7.9
Świętokrzyskie	27.7	26.4	79.9	152.0
Warmińsko-mazurskie	1.8	-5.1	13.9	13.0
Wielkopolskie	4.8	-1.9	23.5	16.1
Zachodniopomorskie	13.5	-1.6	20.9	28.5
Poland	**5.2**	**6.5**	**14.6**	**20.3**

Table 3.16b. Relative difference (%) in observed age-standardised mortality rates from total digestive system diseases for men and women aged 65 and more compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	13.6	-2.3	38.4	34.5
Kujawsko-pomorskie	-0.7	-1.5	3.7	13.4
Lubelskie	3.6	147.2	46.7	544.4
Lubuskie	14.4	6.8	2.0	14.7
Łódzkie	1.2	9.7	8.2	16.8
Małopolskie	4.5	-1.7	15.2	15.8
Mazowieckie	16.0	9.0	10.5	8.0
Opolskie	8.8	44.3	-2.2	19.9
Podkarpackie	-0.4	4.0	-16.5	-9.7
Podlaskie	-2.0	-3.1	27.7	-15.8
Pomorskie	1.4	4.9	11.0	-3.1
Śląskie	0.8	-0.5	23.8	14.2
Świętokrzyskie	48.4	83.3	178.8	617.9
Warmińsko-Mazurskie	-0.5	-10.2	7.6	13.5
Wielkopolskie	-7.7	-1.3	15.6	23.9
Zachodniopomorskie	6.1	-3.2	10.3	24.9
Poland	**1.9**	**6.2**	**13.0**	**20.2**

Digestive system diseases in general are a greater threat to the lives of urban residents than rural residents, and this is true for both men and women (Table 3.10a and 3.10b). There is an even greater disparity to the disadvantage of urban dwellers when it comes to chronic liver diseases, particularly in women. The mortality rate due to them for women in urban areas is 44% higher than in rural areas.

Fig. 3.35 shows the excess mortality due to digestive system diseases of urban and rural residents in each voivodship in relation to the observed mortality for the whole country in 2021. The most unfavourable difference for rural residents was in the Warmińsko-mazurskie and Wielkopolskie voivodships. In contrast, in the Łódzkie voivodship, as the only one, the excess mortality in cities was higher than in the countryside.

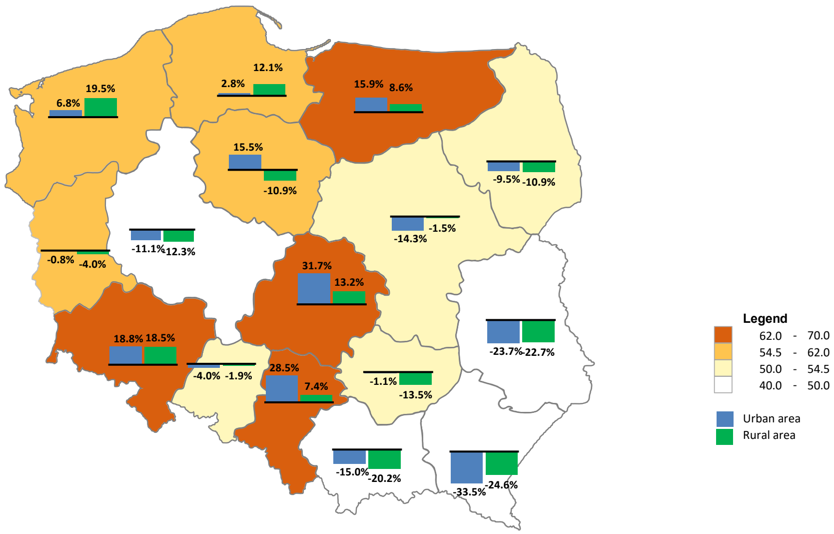

Fig. 3.35. Relative difference (%) of age-standardised mortality rates due to digestive system diseases for urban and rural residents compared to the national level by voivodship, 2021 (authors' own calculations availing Statistics Poland databases)

There is a large interregional variation in the level of deaths from **chronic liver disease**. They are the greatest threat to life for the inhabitants of the Śląskie voivodship – about 40% higher than the average for the whole country. The years 2020 and 2021 have seen an increase in mortality rates from these diseases in some voivodships. In 2020, the increase in the mortality rate in the Opolskie and Lubelskie voivodships and in 2021 in the Dolnośląskie voivodship stands out in particular.

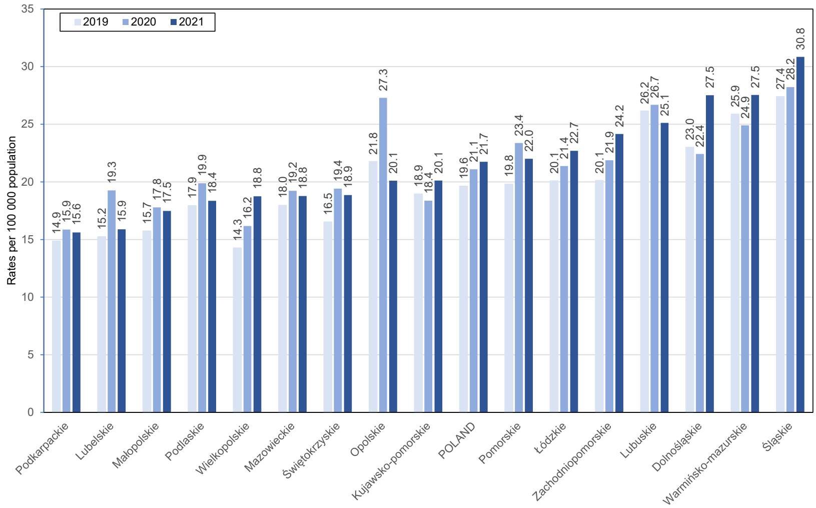

Fig. 3.36. Age-standardised annual mortality rates from chronic liver disease and cirrhosis (K70, K73-K74) for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

The mortality rate from chronic liver diseases and cirrhosis of urban residents is higher than that of rural residents in all voivodships except Pomorskie, Zachodniopomorskie and Mazowieckie. The largest relative difference between urban and rural mortality levels is in the Kujawsko-pomorskie (lowest rural mortality in the country) and Śląskie voivodships (highest urban mortality in the country (Fig. 3.37).

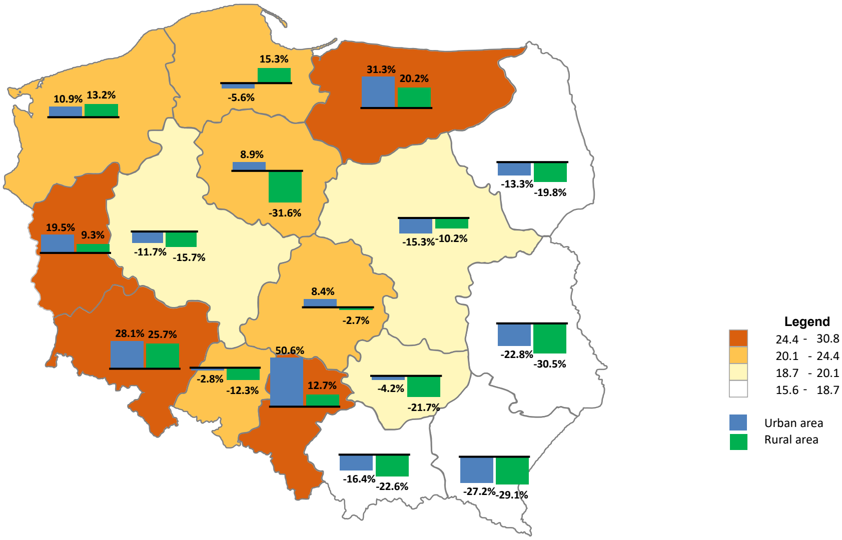

Fig. 3.37. Relative difference (%) of age-standardised mortality rates from chronic liver disease and cirrhosis (K70, K73-K74) for urban and rural residents compared to the national level by voivodship, 2021 (authors' own calculations availing Statistics Poland databases)

3.10. Mortality due to external causes of death

The importance of this group as a cause of death for men and women was decreasing until 2017 but mortality rates increased in subsequent years, particularly in 2021 (Table 3.8a and 3.8b). External causes of death are the biggest threat to the lives of people aged 10–44 years (Figures 3.18a and 3.18b). In 2021, 21670 people (15358 men and 6312 women) lost their lives due to them, i.e., 56.8 for every 100 000 population (83.3 for men and 32.0 for women, Table 3.9a).

External causes of death are a much greater threat to men's lives than women's; in 2021, the standardised mortality rate for men was 3.1 times higher than that of women (Table 3.9b). These causes pose a greater threat to the lives of men living in rural areas than in urban areas (by 29%) while the threat to the lives of rural and urban women is now equal (Table 3.10b).

Among external causes of death, **falls** were the most common cause of loss of life for total and female residents in 2021, responsible for the deaths of 4549 people, 23% of deaths from total external causes (2465 men and 2084 women). It is worth noting that, among women, only 6% of deaths from this cause involve those aged under 65, while men of this age account for as many as 39%. Falls threaten the lives of urban and rural residents to a similar degree. The second cause of death among external causes is **suicide**, which is the most common cause among men, with 4582 people (as many as 3,928 men and 654 women) losing their lives in 2021. They are a significantly greater (by 51% in 2021) threat to the lives of men living in rural areas than in urban areas, and in the last year were a slightly greater (by 3%) threat to the lives of female urban residents than rural residents. Only the third most common external cause of death for Poles is **traffic accidents**, from which 2710 people (2074 men and 636 women) died in 2021. These accidents pose a greater threat to the lives of those living in rural areas than in urban areas – by 63% for men and 28% for women in 2021 (Table 2.9).

The interregional variation in mortality rates due to **external causes of death** is significant and the pandemic period has contributed to this variation (Fig. 3.38). Noteworthy is the increase in mortality in 2020 in the Świętokrzyskie and Lubelskie voivodships, caused primarily by an increase in mortality due to traffic accidents, and in 2021 in the Mazowieckie, Warmińsko-mazurskie and Lubelskie voivodships, caused by a higher number of deaths due to falls, and in the Zachodniopomorskie voivodship.

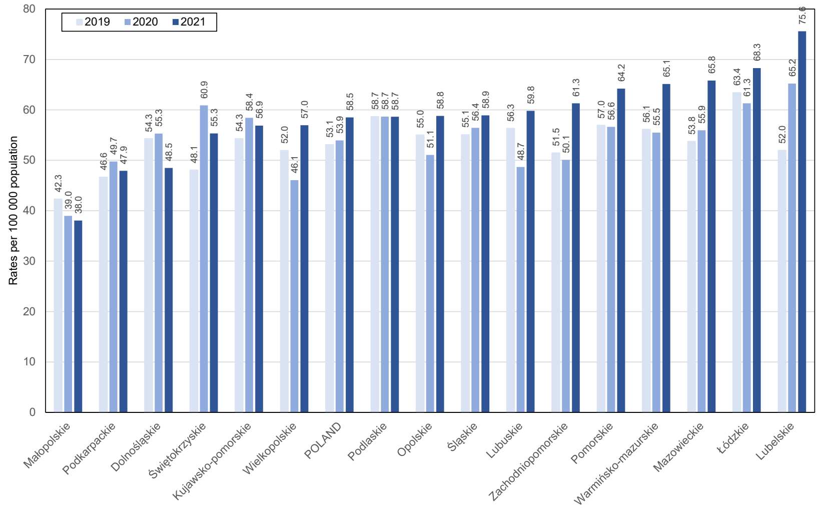

Figure 3.38. Age-standardised annual mortality rates due to external causes (V00-Y98) for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

Tables 3.17a and 3.17b show, for each voivodship, the percentage differences in the observed standardised mortality rates for total external causes for men and women overall and aged 65 and more in 2020 and 2021 compared to their expected values based on previous 10-year trends. Noteworthy is the significantly higher excess mortality in 2021 in women than in men but not among the older people. There was a large excess mortality in both years in the Lubelskie and Świętokrzyskie voivodships, particularly large in 2021 in women aged 65 and more. This large excess in these voivodships was due, on the one hand, to the large increase in mortality from falls in 2021 and, on the other hand, to the strong downward trend in mortality rates in the preceding years, which is taken into account when estimating the expected mortality rate. A higher number of deaths due to traffic accidents contributed to the excess mortality in 2020 in the Lubelskie voivodship.

Table 3.17a. Relative difference (%) in observed age-standardised mortality rates from total external causes for men and women compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	0.3	4.7	-13.2	-3.9
Kujawsko-pomorskie	6.1	22.9	-0.4	48.0
Lubelskie	21.6	41.7	29.3	139.4
Lubuskie	-14.4	-5.8	5.9	21.0
Łódzkie	-6.4	1.7	1.5	27.7
Małopolskie	-3.0	-9.5	-3.3	-14.4
Mazowieckie	8.4	9.7	22.7	49.5
Opolskie	-11.3	9.4	5.3	23.8
Podkarpackie	4.6	11.1	-2.1	17.1
Podlaskie	-5.2	10.9	-4.7	12.0
Pomorskie	-3.2	-9.5	6.7	10.0
Śląskie	1.8	3.4	7.6	5.2
Świętokrzyskie	24.2	44.9	12.9	62.5
Warmińsko-mazurskie	-1.1	-6.1	2.3	56.5
Wielkopolskie	-6.3	-17.1	15.4	1.3
Zachodniopomorskie	0.5	-1.6	24.1	23.4
Poland	**3.2**	**2.9**	**9.2**	**22.3**

Table 3.17b. Relative difference (%) in observed age-standardised mortality rates from total external causes for men and women aged 65 and more compared to their expected values based on previous 10-year trends by voivodship in 2020 and 2021 (authors' own calculations)

Voivodship	2020		2021	
	Men	Women	Men	Women
Dolnośląskie	8.9	5.1	0.3	-5.6
Kujawsko-pomorskie	-6.2	34.8	47.9	95.6
Lubelskie	12.2	23.8	99.9	219.3
Lubuskie	-14.4	-9.4	38.9	48.2
Łódzkie	-7.4	-6.5	17.7	31.0
Małopolskie	7.4	-6.1	8.0	-14.9
Mazowieckie	9.2	-3.4	76.2	78.2
Opolskie	-9.9	9.1	16.1	32.6
Podkarpackie	10.1	18.4	20.5	50.2
Podlaskie	-9.9	7.0	-3.7	22.0
Pomorskie	-7.5	17.0	14.3	40.2
Śląskie	-1.3	4.1	3.8	3.0
Świętokrzyskie	38.4	73.0	56.1	105.5
Warmińsko-mazurskie	-4.9	-13.3	11.9	86.0
Wielkopolskie	-19.2	-19.4	-8.6	1.9
Zachodniopomorskie	-1.1	-0.9	40.1	27.1
Poland	**7.1**	**1.3**	**41.0**	**33.9**

The nationwide standardised mortality rate from **suicide** remained stable in 2019, 2020 and 2021. In contrast, several voivodships experienced marked changes in its values (Fig. 3.39). We highlighted the problems associated with the comparative analysis of suicide mortality rates in the previous 2020 Report. It can now be seen that the increase in suicide mortality in Kujawsko-pomorskie voivodship in 2021 (the number of deaths increased from 183 in 2020 to 277) may be partly due to a large decrease in deaths from events of undetermined intent (ICD-10 Y10-Y34) (from 316 in 2020 to 80), which may indicate some changes in assigning causes of deaths. But such changes can no longer explain changes in mortality in 2020 and 2021 in the Świętokrzyskie voivodship.

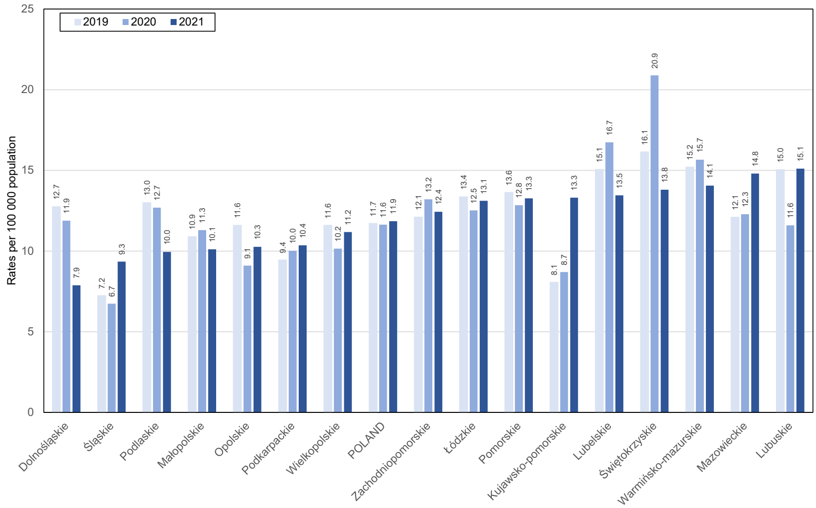

Fig. 3.39. Age-standardised annual mortality rates from suicide (X60-X84) for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

In all voivodships, the suicide mortality rate of rural residents is significantly higher than that of urban residents. The largest relative difference between rural and urban mortality levels is in the Świętokrzyskie and Małopolskie voivodships (Fig. 3.40). The highest risk to life from suicide among both rural and urban residents is currently in Lubuskie and Mazowieckie voivodships.

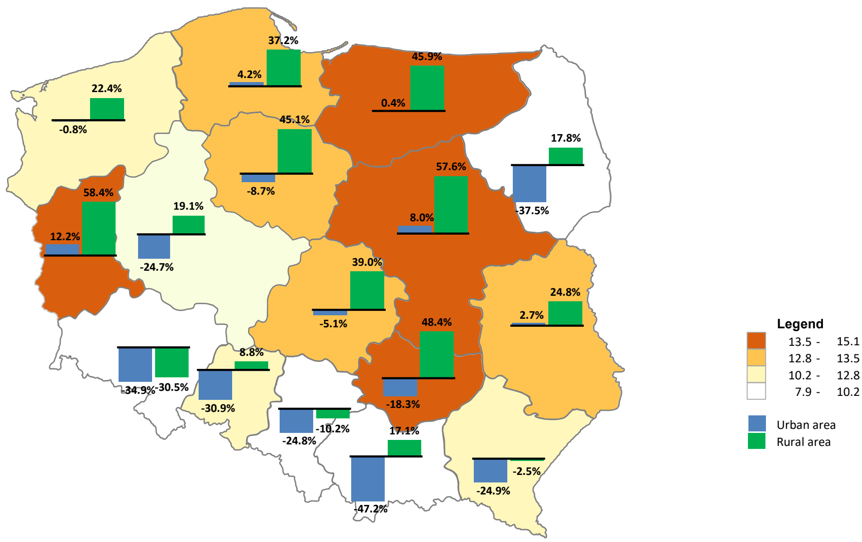

Fig. 3.40. Relative difference (%) of age-standardised mortality rates due to suicide (X60-X84) for urban and rural residents compared to the national level by voivodship, 2021 (authors' own calculations availing Statistics Poland databases)

The risk of life due to **traffic accidents** in Poland has decreased somewhat during the pandemic period, especially in 2021, both nationwide and in most voivodships. Of note, however, are the Świętokrzyskie and Lubelskie voivodships where mortality levels in 2019 and especially 2020 were generally above those observed in the other voivodships (Fig. 3.41). Excluding these two voivodships, the mortality level in 2021 decreased the most in relation to 2020 in the Dolnośląskie, Lubuskie and Podkarpackie voivodships – by 40%. The situation in the last three years allows us to identify the Małopolskie, Śląskie and Zachodniopomorskie voivodships as those where the lives of residents are least at risk from traffic accidents, and the Podlaskie, Mazowieckie and Wielkopolskie voivodships as those with the highest risk.

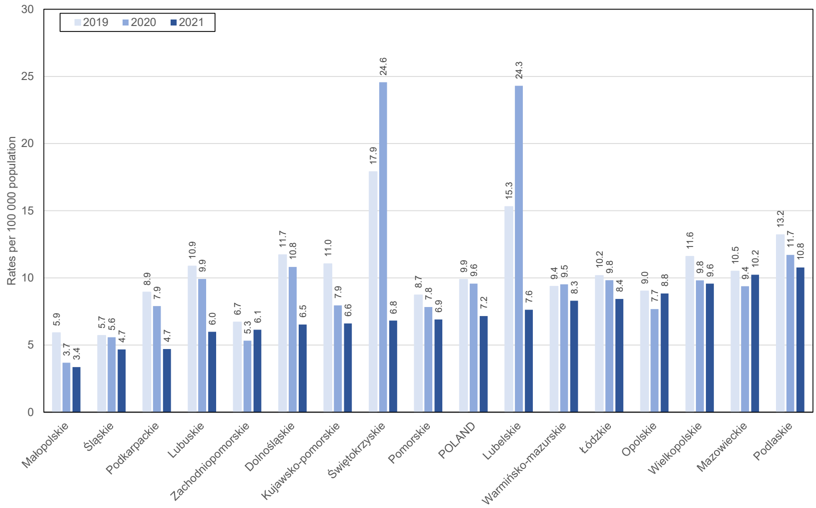

Fig. 3.41. Age-standardised annual mortality rates from traffic accidents (V00-V99) for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

In all voivodships, the traffic accidents mortality rate of rural residents is significantly higher than that of urban residents (Fig. 3.42). The largest relative difference between rural and urban mortality levels is in the Podlaskie voivodship, followed by the Mazowieckie voivodship, where the mortality risk for rural residents is currently the highest in the country. In the latter voivodship, the level of urban mortality is second only to that in Wielkopolskie voivodship.

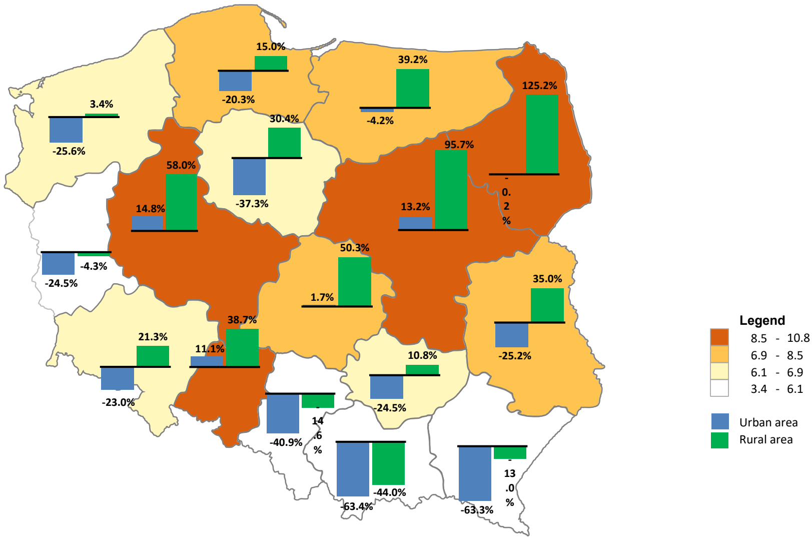

Fig. 3.42. Relative difference (%) of age-standardised mortality rates from traffic accidents (V00-V99) for urban and rural residents compared to the national level by voivodship, 2021 (authors' own calculations availing Statistics Poland databases)

3.11. Mortality due to symptoms, ill-defined and unknown causes

When discussing mortality due to individual causes of death, it is important to note the group of ill-defined and unknown causes, i.e. where the cause of death included a description of symptoms, was specified inaccurately or even unknown (ICD-10 R00-R99). In 2021, such inaccurately specified cause was attributed in 36710 deaths (20699 males and 16011 females) (96 per 100 000 population). These causes occur not only among the oldest people, but in all age groups (Table 3.4, Figures 3.18a and 3.18b), are significantly more common in male than female deaths and are more common in deaths of rural than urban residents (Tables 3.9a, 3.9b, 3.10a, 3.10b).

For years, we have been drawing attention to the inadequate situation that exists in the case of regional variations in deaths whose causes are inaccurately determined or unknown. Both mortality levels and their changes during the pandemic show huge interregional variation (Fig. 3.43). Firstly, the differences in the size of the rates in the extreme voivodships are dozens of times greater. Secondly, changes in the rates over time showed very large ups and downs that were difficult to understand. These changes must have had their impact on the changes and magnitude of mortality rates from other causes, as already highlighted earlier in this section. Only the situation in the Pomorskie voivodship is commendable.

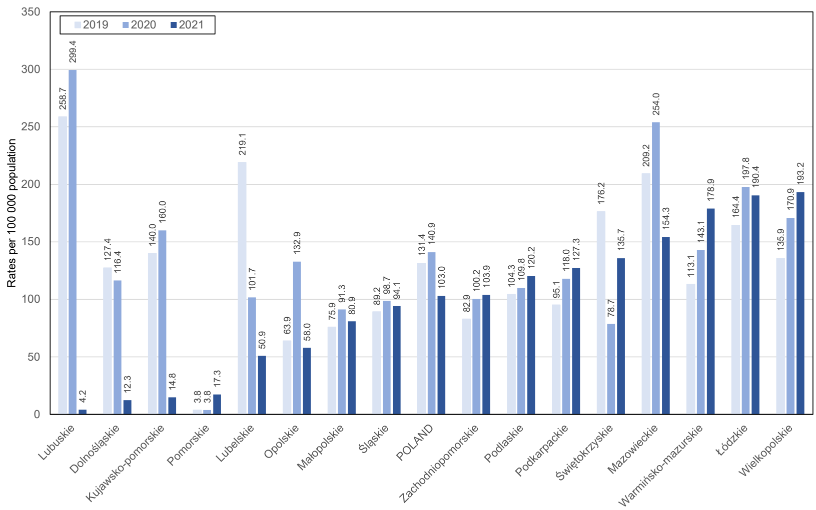

Fig. 3.43. Age-standardised annual mortality rates due to symptoms and ill-defined causes (R00-R99) for the total population by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

3.12. Decomposition of change in life expectancy by causes of deaths

Concluding our discussion of changes in mortality in Poland due to individual causes of death during the pandemic period, we would like to show what impact these changes had on the shortening life expectancy of Poles. Figures 3.44a and 3.44b show the results of decomposing the change in life expectancy into components related to changes in mortality by cause of death using the Ariaga method mentioned at the beginning[33].

[33] Arriaga E. E. "Measuring and Explaining the Change in Life Expectancies", Demography, Vol. 21, No. 1 (Feb. 1984), pp. 83–96

Deaths from the new disease COVID-19 were the main contributor to the shortened life expectancy of Poles. During the pandemic period, i.e. the two years 2020–2021, it "took" 25.5 months of life away from men (81.8% of the total loss) and 22.8 months from women (76.7%). Cardiovascular diseases shortened the lives of men by 2 months and women by 3 months.

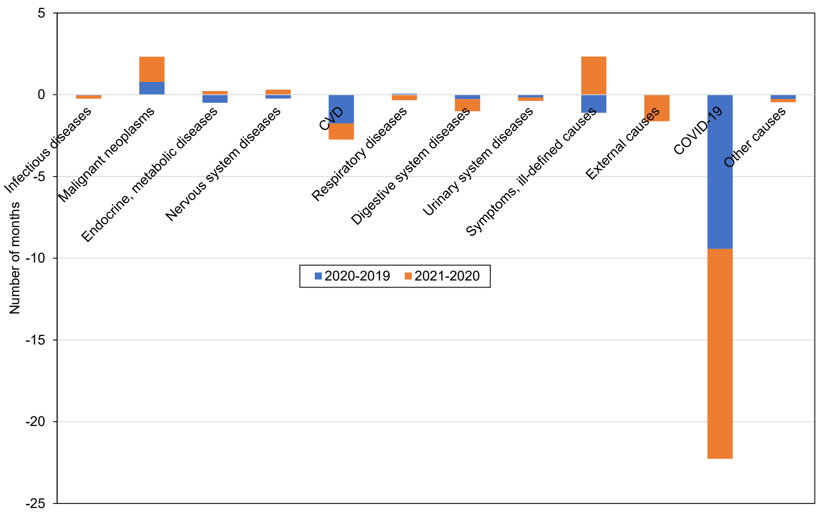

Fig. 3.44a. Number of months of shorter life expectancy for males in Poland in 2020 compared to 2019, and in 2021 compared to 2020, resulting from higher mortality by cause of death groups (authors' own calculations availing WHO Mortality Data Base)

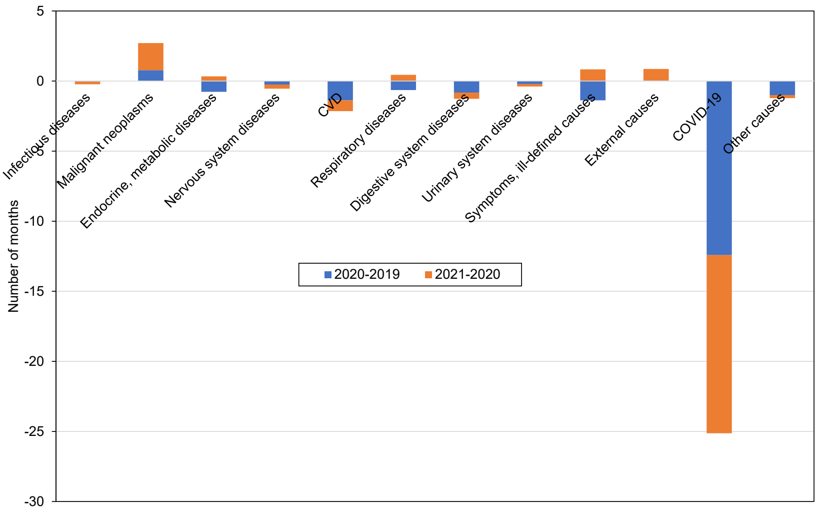

Fig. 3.44b. Number of months of shorter life expectancy for females in Poland in 2020 compared to 2019, and in 2021 compared to 2020, resulting from higher mortality by cause of death (authors' own calculations availing WHO Mortality Data Base data)

3.13. Mortality due to preventable and amenable causes

The concept of avoidable mortality is based on the notion that premature deaths from certain health problems/events should be rare, or preferably not occur at all, if timely and effective medical or public health interventions are in place. Mortality from these causes includes deaths from causes that are preventable and deaths from causes that are amenable to medical intervention and as such treatable. We will now discuss the problem of mortality in the Polish population due to these two groups of causes. Although preventable death rates do not provide a precise, unambiguous measure for assessing the performance of the health system, they are considered to be those population health indicators that provide a good starting point for evaluating the performance of the system and comparisons of public health performance and treatment activities that should lead to a reduction in premature deaths from preventable or amenable causes.

A cause of death is preventable if, in the light of the understanding of the determinants of health at the time the death occurred, all or most of that cause (subject to age restrictions where appropriate) could have been avoided by public health interventions in the broadest sense. In contrast, **a cause of death is amenable to medical intervention** if, in the light of medical knowledge and available technology at the time when the death occurred, all or most of the deaths due to it could have been avoided by good quality healthcare. The highlighted disease groups were created according to the aforementioned list recently agreed by Eurostat and the OECD and published in November 2019.[34] Unlike in earlier versions, the current version of the list uniformly sets the age threshold at 75 years for all selected causes of death. The following three important principles described by the list authors were also among the principles established: "For those causes of death that are largely preventable and treatable once they have occurred, these causes of death have been assigned to the preventable category for the reason that if they were prevented there would be no need for treatment. As a general rule, causes of death should not be divided into partially preventable and treatable parts, given the lack of evidence to do so accurately and systematically, except where there is no strong evidence of dominance, in which case a 50% -50% division has been used. Any double counting of the same causes of death in the two lists is avoided, so that the two lists can be used together to provide a broad assessment of the relative importance of preventive and health interventions in reducing avoidable deaths". A 50–50 allocation was applied to cervical cancer, diabetes and most selected avoidable cardiovascular diseases (CVD), including hypertensive disease, ischaemic heart disease and cerebrovascular disease. All these rules make the new lists slightly different from the earlier ones.

As the authors point out, both cause-of-death lists and age restrictions reflect current health expectations, technology and medical knowledge and health policy developments, and are therefore subject to future change. The emergence of COVID-19 and the possibility of preventing deaths from it through vaccination will undoubtedly

[34] OECD, EUROSTAT, Avoidable mortality: OECD/Eurostat lists of preventable and treatable causes of death (November 2019 version)), November 2019. Retrieved April 24, 2020, from http://www.oecd.org/health/health-systems/Avoidable-mortality-2019-Joint-OECD-Eurostat-List-preventable-treatable-causes-of-death.pdf

have to be considered. As there is still no decision to date, deaths due to COVID-19 are not considered.

The most important specific categories of **preventable deaths** include those caused by vaccine-preventable diseases, HIV/AIDS, lung cancer, chronic obstructive pulmonary disease, diseases related to the consumption of alcohol and other psychoactive drugs, as well as accidental injuries and suicide.

In 2021, 80719 people (57661 men and 23058 women) died from preventable causes (228 per 100 000 population). Causes included in this category are a much greater threat to men's lives than women's and, after eliminating differences in age structure, the intensity of deaths due to them among men is 2.9 times higher than among women (Table 3.9b). Deaths belonging to this group account for 15.5% of total deaths, 21.5% of male deaths and 9.2% of female deaths, while they account for 33%, 36% and 28% respectively in deaths of people under 75.

Standardised mortality rates for preventable causes for men are 11.8% higher for those living in rural areas than in urban areas and for women are 9.9% higher for those living in urban areas (Table 3.10b).

The mortality risk of the Polish population due to all preventable causes was higher in 2020 and 2021 than would be expected from the earlier trend in mortality rates due to these causes (Fig. 3.45). This was more marked for treatable than preventable causes.

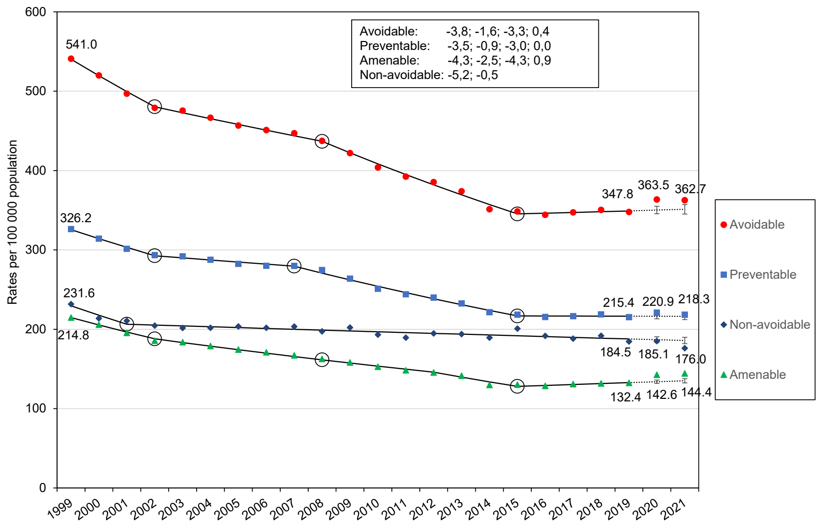

Fig. 3.45. Age-standardised mortality rates for persons under 75 years of age due to avoidable, preventable, and amenable causes of deaths, and all other causes from 1999 to 2021 – their trends and average annual relative rate of change (%) (authors' own calculations availing Statistics Poland databases)

The years 2020 and 2021 have seen significant changes in mortality rates due to preventable diseases in some voivodships. Particularly evident is the increase in mortality in 2020 in Świętokrzyskie voivodship and in 2021 in Kujawsko-pomorskie and Lubuskie voivodships (Fig. 3.46). In contrast, in Lubelskie voivodship, an increase in mortality occurred in both years of the pandemic.

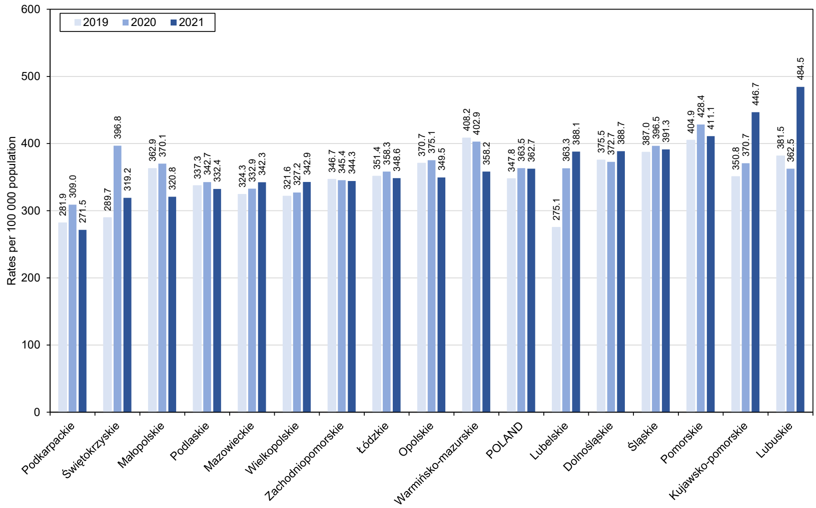

Fig. 3.46. Age-standardised mortality rates due to preventable causes of the total population under 75 years of age by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

A very interesting picture is presented in Figures 3.47a and 3.47b, which show the changes in standardised mortality rates for cardiovascular diseases, tumour and for causes directly related to preventable alcohol consumption between 1999 and 2021. Their trends up to 2019 are shown and, for 2020 and 2021, the observed values and ones expected from the extrapolation of trends, the average relative annual rate of decline (%) in the time segments determined by the significant change in this rate. The following facts are worth noting. Preventable mortality due to tumour was clearly lower during the pandemic period than expected based on extrapolation of the previous trend of change, which may have been due to the COVID-19 co-occurrence and associated cause-of-death assessment, as already pointed out at the beginning of the section. At the same time, CVD mortality was significantly higher than expected – by 22% in men and women in 2021. In the case of mortality from causes directly related to alcohol consumption, the increasing trend of mortality rates for men has continued during the pandemic period while that for women has stalled somewhat.

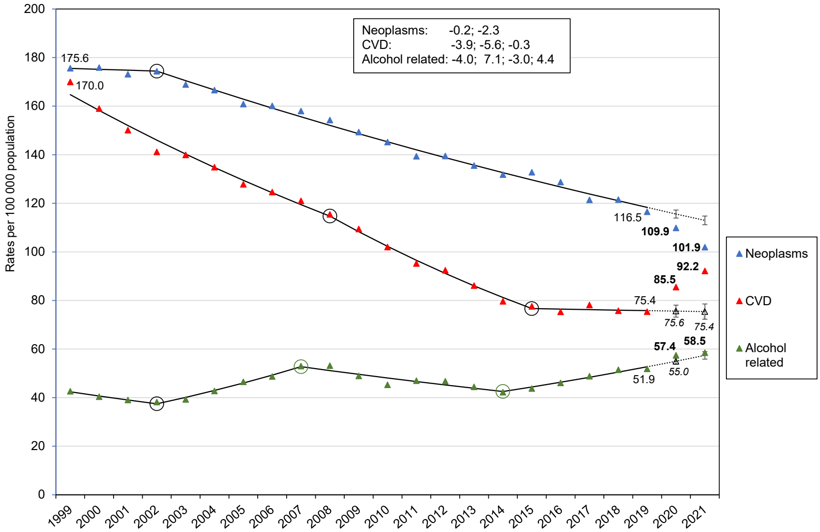

Fig. 3.47a. Age-standardised mortality rates for men under 75 years of age due to preventable CVD, cancer and causes directly related to alcohol consumption, 1999–2021 – their trends and average annual relative rate of change (%) (authors' own calculations availing Statistics Poland databases)

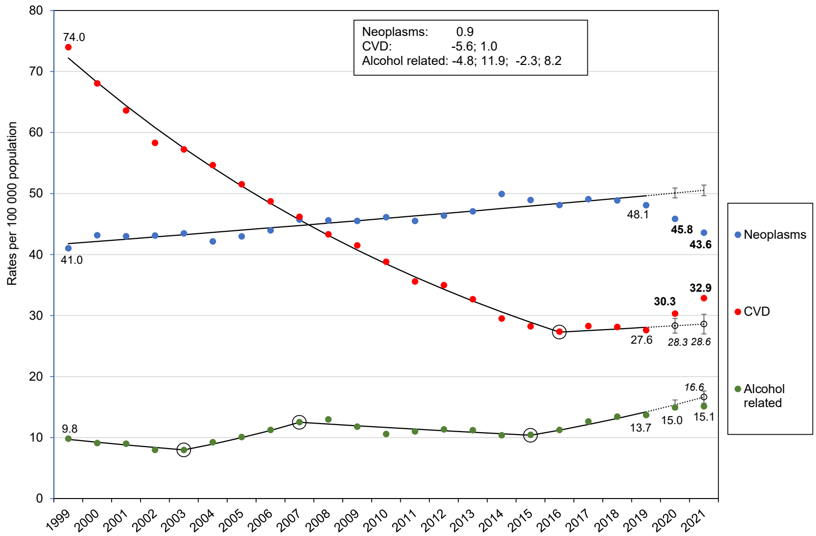

Fig. 3.47b. Age-standardised mortality rates for women under 75 years of age due to preventable CVD, cancer and causes directly related to alcohol consumption, 1999–2021 – their trends and average annual relative rate of change (%) (authors' own calculations availing Statistics Poland databases)

Specific categories of causes of **amenable death** include malignant neoplasms of the breast, colon, rectum and anus, Hodgkin's disease, non-malignant neoplasms, acute and chronic rheumatic heart disease, pneumonia and acute lower respiratory tract infection, asthma, gastric and duodenal ulcer, appendix disease, hernia, among others.

In 2021, 53437 people (32212 men and 21225 women) died from amenable causes (151 per 100 000 population). Causes falling into this category are a greater threat to men's lives than women's and, after adjusting for differences in age structure, mortality due to them among men is 80.6% higher than among women (Table 3.9b). Deaths belonging to this group account for 10.3% of total deaths, 12.0% of total male deaths and 8.5% of total female deaths, while they account for 22%, 20% and 25% respectively in deaths of people under 75 years.

Standardised mortality rates for amenable causes have similar values for urban and rural residents (Table 3.10b).

The years 2020 and 2021 have seen significant changes in mortality levels in some voivodships for amenable causes (Fig. 3.48). Particularly evident is the increase in mortality in 2020 in the Świętokrzyskie and Podkarpackie voivodships, and in 2021 in the Kujawsko-pomorskie and Lubuskie voivodships. In Lubelskie voivodship, an increase in mortality occurred in both years of the pandemic.

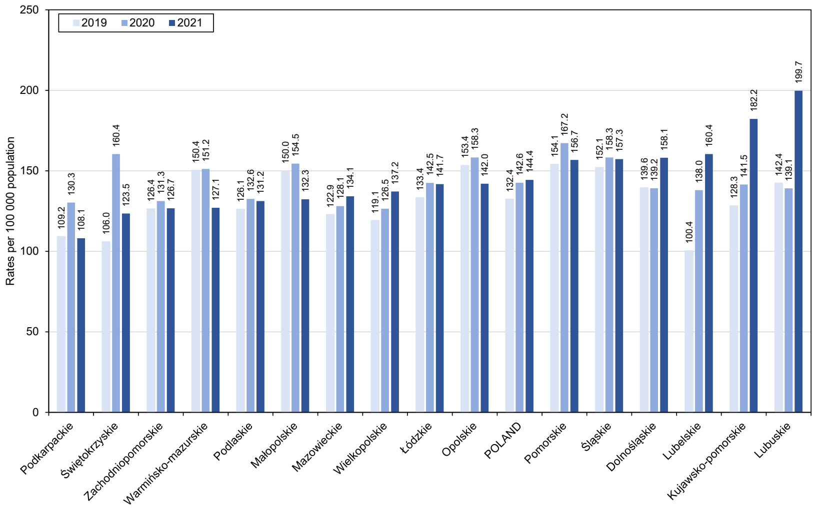

Fig. 3.48. Age-standardised annual mortality rates from amenable causes of the total population under 75 years of age by voivodship in 2019, 2020 and 2021 (authors' own calculations availing Statistics Poland databases)

Figure 3.49 shows the changes in standardised mortality rates for amenable cardiovascular diseases between 1999 and 2021. Their trends up to 2019 are shown and, for 2020 and 2021, the observed values and ones expected from the extrapolation of trends, the average relative annual rate of decline (%) in the time segments determined by the significant change in this rate. The observations are like those for preventable diseases. Mortality from amenable tumours was slightly lower during the pandemic period than expected based on extrapolation of the previous trend of change which may have been due to the COVID-19 co-occurrence and associated cause of death assessment. At the same time, CVD mortality was significantly higher than expected – by 23% in men and 17% in women in 2021. Possible reasons for this are discussed in section 5 on cardiovascular disease.

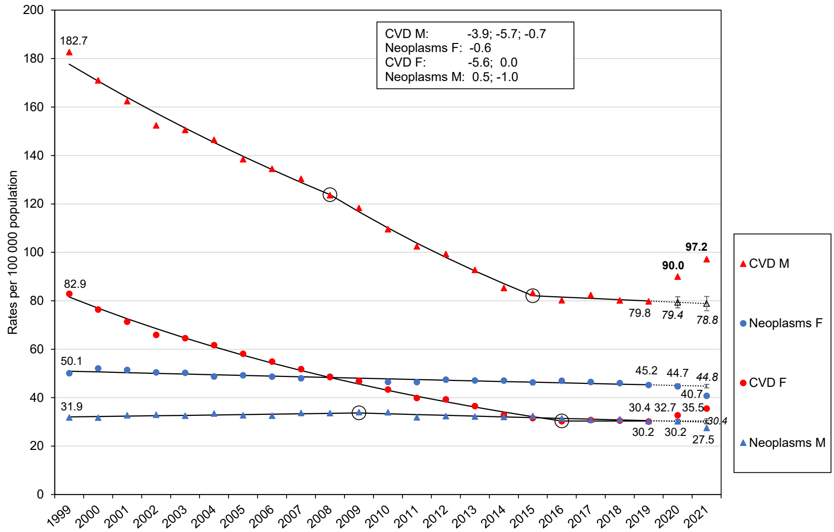

Fig. 3.49. Age-standardised mortality rates for males (M) and females (F) under 75 years due to amenable CVD and neoplasms, 1999–2021 – their trends and average annual relative rate of change (authors' own calculations availing Statistics Poland databases)

3.14. Infant mortality

Infant mortality, i.e., children under one year of age, has been on a declining trend in Poland for many years. The pandemic period will see a further reduction in mortality in 2020 on the one hand and some increase in 2021 on the other. In 2021, 1306 children under the age of one year died in Poland (3.9 per 1000 live births) and therefore 23 more infants died for every 10 000 live births than in 2020 (Table 3.18). This increase in mortality concerned babies in the first week of life who were born with a low birth weight, i.e., weighing less than 2500 g, and who were born slightly more often in 2021 than in 2020 (Table 3.19). Low birth weight is one of the main risk factors for infant mortality. The mortality rate of infants weighing less than 2500 g at birth was 36 times higher than the mortality rate of infants who weighed more.

Table 3.18. Infant deaths by age 2011–2021 (Statistics Poland data)

Years	Total	Age in completed days				
		0–27				28–365
		total	0–6		7–27	
			total	0		
	number	percentage				
2011	1836	68.5	51.4	31.0	17.2	31.5
2012	1791	71.2	51.3	33.4	20.0	28.8
2013	1684	69.1	50.2	30.8	18.9	30.9
2014	1583	68.5	49.3	29.9	19.1	31.5
2015	1476	72.3	51.6	29.1	20.7	27.7
2016	1522	71.9	52.2	28.3	19.7	28.1
2017	1604	70.8	53.4	31.0	17.5	29.2
2018	1494	71.5	53.7	32.7	17.8	28.5
2019	1412	72.5	53.4	31.6	19.1	27.6
2020	1270	71.6	52.4	30.3	19.2	28.4
2021	1306	73.9	52.6	32.7	21.3	26.1
	per 1000 live births					
2011	4.7	3.2	2.4	1.5	0.8	1.5
2012	4.6	3.3	2.4	1.5	0.9	1.3
2013	4.6	3.1	2.3	1.4	0.9	1.4
2014	4.2	2.9	2.1	1.3	0.8	1.3
2015	4.0	2.9	2.1	1.2	0.8	1.1
2016	4.0	2.9	2.1	1.1	0.8	1.1
2017	4.0	2.8	2.1	1.2	0.7	1.2
2018	3.8	2.8	2.1	1.3	0.7	1.1
2019	3.8	2.7	2.0	1.2	0.7	1.0
2020	3.6	2.6	1.9	1.1	0.7	1.0
2021	3.9	2.9	2.1	1.3	0.8	1.0

Table 3.19. Infant deaths by weight at birth 2011–2021 (Statistics Poland data)

Years	Less than 2500 g		2500 g and more	
	percentage of deaths[1]	deaths per 1000 live births	percentage of deaths[1]	deaths per 1000 live births/
2011	67.6	56.9	32.2	1.6
2012	66.1	54.2	33.9	1.7
2013	66.4	50.8	33.4	1.6
2014	66.7	47.5	33.2	1.5
2015	68.8	47.6	31.2	1.3
2016	68.4	46.6	31.6	1.3
2017	67.0	46.6	33.0	1.4
2018	70.8	49.2	29.2	1.2
2019	69.8	46.3	30.2	1.2
2020	66.5	44.2	33.5	1.3
2021	68.1	47.4	31.9	1.3

[1] Percentages may not add up to 100 due to lack of information on birth weight

Half (49.8%) of infant deaths, in 2021, were due to neonatal conditions starting in the perinatal period, so primarily disorders related to shortened gestation and low birth weight, which are responsible for about 51 percent of deaths in this group of causes (Table 3.20). Compared to 2019 and 2020, the number and proportion of infant deaths due to respiratory and cardiovascular disorders and bacterial septicaemia of the newborn increased in 2021. In the second most common cause of death, congenital malformations, responsible for 38.9% of all infant deaths, the number and share of deaths due to cardiovascular malformations decreased. Unfortunately, there has been an increase in infant mortality due to sudden infant death syndrome in 2021.

Table 3.20. Infant deaths due to selected causes in 2019, 2020 and 2021 (Statistics Poland data)

Causes of death (ICD-10)	2019			2020			2021		
	number of	percent-age	per 1000 live births	number of	percent-age	per 1000 live births	number of	percent-age	per 1000 live births
Total	1412	100.0	3.8	1270	100.0	3.6	1306	100.0	3.9
including:									
Infectious and parasitic diseases (A00-B99)	4	0.3	0.0	1	0.1	0.0	4	0.3	0.0
septicaemias (A40-A41)	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Pneumonia (J12-J18)	43	3.0	0.1	26	2.0	0.1	39	3.0	0.1
Conditions of the perinatal period (P00-P96)	749	53.0	2.0	639	50.3	1.8	650	49.8	2.0
prematurity and low birth weight (P07)	474	33.6	1.3	341	26.9	1.0	334	25.6	1.0
birth trauma (P10-P15)	6	0.4	0.0	1	0.1	0.0	4	0.3	0.0
respiratory and cardiovascular disorders (P20-P29)	60	4.2	0.2	60	4.7	0.2	87	6.7	0.3
bacterial septicaemia of the newborn (P36)	21	1.5	0.1	12	0.9	0.0	40	3.1	0.1
Congenital malformations (Q00-Q99)	511	36.2	1.4	507	39.9	1.4	508	38.9	1.5
defects of the nervous system (Q00-Q07)	37	2.6	0.1	44	3.5	0.1	39	3.0	0.1
cardiovascular malformations (Q20-Q28)	227	16.1	0.6	223	17.6	0.6	158	12.1	0.5
Sudden infant death syndrome (R95)	22	1.6	0.1	15	1.2	0.0	19	1.5	0.1
Symptoms and ill-defined and unknown (R96-R99)	7	0.5	0.0	9	0.7	0.0	19	1.5	0.1
External causes of death (V01-Y98)	40	2.8	0.1	29	2.3	0.1	23	1.8	0.1

The level of infant mortality varies considerably between voivodships and showed large changes during the pandemic period. In 2021, the infant mortality rate assumed values ranging from 26 deaths per 10000 live births in the Świętokrzyskie voivodship to 56 in the Kujawsko-pomorskie voivodship (Fig. 3.50). Noteworthy is the large increase in infant mortality in 2020 in Świętokrzyskie voivodship; in 2021 in Kujawsko-pomorskie, Podlaskie and Warmińsko-mazurskie voivodships. Noteworthy are the fluctuations in the size of the rates in individual voivodships in 2016–2019. Only in the Mazowieckie and Małopolskie voivodships they were below the national level throughout the four-year period. However, in the Kujawsko-pomorskie, Warmińsko-mazurskie, Lubelskie and Podkarpackie voivodships, the level of infant mortality in 2019–2021 was always higher than the national level.

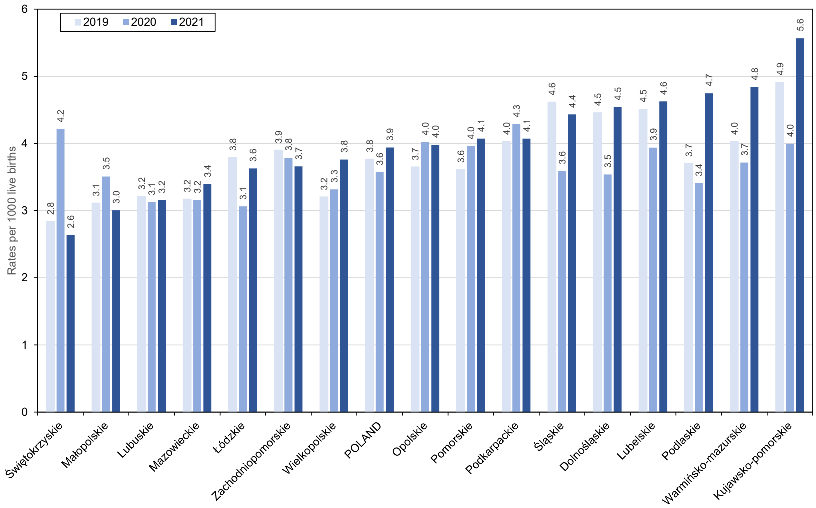

Fig. 3.50. Infant mortality rates by voivodship in 2019, 2020 and 2021 (Statistics Poland data)

3.15. Mortality in Poland in comparison with the situation in the EU countries

Cross-country comparisons of changes in mortality rates due to specific causes of death during a pandemic are difficult for two reasons. Primarily because of differences in the attribution of cause of death in cases of uncertainty/lack of knowledge of SARS-Cov-2 infection. And, in addition, due to the delayed update of the WHO mortality database[35], which currently has data for 2020 at most in some countries only. For this reason, in the comparative analyses of mortality in Poland, we only present estimates of

[35] https://www.who.int/healthinfo/statistics/mortality_rawdata/en/

excess mortality in the first year of the pandemic, i.e., 2020, for Austria, the Czechia, the Netherlands, Lithuania and Germany. A broader analysis was presented in our previous report[36]. For the countries compared, we calculated the age-standardised mortality rates from the main chapters of causes and carried out an analysis of their time trends using the jointpoint models mentioned earlier. Extrapolating the last segment of the trend ending in 2019 allowed us to estimate the expected value of the mortality rate in 2020 and compare its value with the observed one and calculate the percentage excess or "shortfall" of the mortality rate in 2020 as a result of the deviation of the mortality rate in that year from the expected, extrapolated value.

The life risk of the Polish population due to **cardiovascular disease (CVD)** in general is higher in Poland than in Austria, the Netherlands and Germany, slightly lower than in the Czech Republic and significantly lower than in Lithuania. CVD mortality rates are decreasing in all these countries. In contrast, in 2020, there was an excess of deaths over expected values in both men and women, except in Germany and in females also except in Austria (Table 3.21a). The magnitude of these excesses was quite similar from country to country. There was some excess mortality from myocardial infarction in all these countries, except for women in Lithuania and the Czech Republic, with Poland by far the highest (Table 3.21b). There is also an excess mortality from cerebrovascular disease (except for men in Lithuania), which was similar among men in Poland and Austria, while it was highest among women in Poland (Table 3.21c).

[36] B. Wojtyniak, J. Stokwiszewski, P. Goryński, A. Trochonowicz, T. Zdrojewski, D. Rabczenko "Life expectancy and mortality of the Polish population", in B. Wojtyniak, P. Goryński ed. Health status of Polish population and its determinants, 2020, National Institute of Public Health, National Institute of Hygiene, Warsaw 2020

Table 3.21a. Age-standardised CVD mortality rates for Poland, Austria, Czechia, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**593.7**	**-3.8 (2013)**	**633.1**	**573.3**	**10.4%**	**395.6**	**-3 (1999)**	**418.3**	**398.1**	**5.1%**
Austria	407.9	-2.4 (2005)	407.7	402.0	1.4%	311.0	-2 (2007)	308.6	312.7	-1.3%
Czechia	604.7	-3.2 (2006)	639.3	587.8	8.8%	429.3	-3.8 (2003)	449.6	408.6	10.0%
Netherlands	239.0	-8.7 (2017)	237.7	218.2	8.9%	173.7	-10 (2017)	176.0	156.7	12.3%
Lithuania	906.4	-2.5 (2006)	999.9	909.5	9.9%	573.1	-2.6 (2005)	618.7	579.0	6.8%
Germany	394.7	-1.8 (2010)	395.1	399.5	-1.1%	292.8	-2.6 (2007)	288.5	290.3	-0.6%

Table 3.21b. Age-standardised myocardial infarction mortality rates for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**52.7**	**-2.2 (2016)**	**62.0**	**50.7**	**22.2%**	**23.7**	**-3.6 (2014)**	**25.7**	**22.1**	**16.4%**
Austria	68.0	-3.7 (2008)	71.1	66.3	7.2%	32.0	-3.4 (2011)	32.7	32.0	2.2%
Czechia	54.4	-9.4 (2012)	53.2	48.4	10.0%	26.1	-10.1 (2012)	23.0	23.6	-2.7%
Netherlands	36.9	-5 (2014)	36.1	35.6	1.5%	19.7	-6.1 (2011)	19.2	18.9	1.6%
Lithuania	59.5	-1.9 (1999)	62.4	57.7	8.1%	25.9	-1.8 (1999)	24.2	26.8	-9.7%
Germany	64.1	-4.6 (1999)	63.7	61.0	4.5%	31.1	-4.9 (2005)	30.2	29.9	1.2%

Table 3.21c. Age-standardised cerebrovascular diseases mortality rates for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**99.8**	**·2.8 (2014)**	**111.5**	**98.7**	**13.0%**	**73.8**	**·5.1 (2003)**	**80.9**	**68.6**	**18.0%**
Austria	56.0	-4.1 (2004)	56.8	49.5	14.8%	49.1	-3.3 (2005)	47.0	46.4	1.4%
Czechia	88.4	-6.2 (2007)	90.1	85.6	5.2%	71.9	-7.2 (2002)	70.9	67.9	4.3%
Netherlands	54.9	-5.6 (2015)	52.4	50.8	3.0%	49.5	-5.9 (2015)	49.6	47.3	4.9%
Lithuania	190.8	-2.2 (2008)	193.4	196.6	-1.6%	147.4	-3 (2009)	158.4	150.8	5.0%
Germany	58.5	-2.6 (2009)	57.9	58.1	-0.4%	50.0	-3.6 (2007)	48.7	48.3	0.7%

The level of male mortality from total malignant tumours varies considerably between the compared countries, with Poland significantly higher than Austria, the Netherlands and Germany, but the deviations of observed mortality rates from their expected values in 2020 were small both plus and minus in the compared countries (Table 3.21d). In women, the variation in mortality rates is much smaller than in men and the differences between observed and expected mortality rates are also small.

Table 3.21d. Age-standardised malignant neoplasms mortality rates for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**382.6**	**·1.3 (2002)**	**377.7**	**384.3**	**-1.7%**	**219.3**	**0 (2011)**	**213.9**	**222.0**	**-3.6%**
Austria	288.7	-1.7 (2002)	290.8	285.4	1.9%	186.8	-1.0 (2002)	184.9	184.9	0.0%
Czechia	361.5	-0.9 (2015)	353.8	355.6	-0.5%	211.7	(2017)	207.3	213.9	-3.1%
Netherlands	306.5	-6.1 (2017)	304.3	285.0	6.8%	213.9	-3.1 (2016)	215.3	206.1	4.4%
Lithuania	424.0	-0.3 (1999)	430.7	431.2	-0.1%	193.8	-0.5 (1999)	196.8	190.9	3.1%
Germany	304.3	-1.0 (2007)	300.7	304.4	-1.2%	198.3	-0.4 (2007)	194.5	197.7	-1.6%

Mortality due to diabetes in Poland was at the average level of the compared countries but the excess of the observed 2020 mortality rate over the expected rate was highest in both men and women (Table 3.21e). This may be partly due to the differences in the diagnosis of SARS-CoV-2 infections as well as differences in the assessment of cause of death.

Table 3.21e. Age-standardised diabetes mortality rates for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**30.9**	(1999)	**40.8**	**31.1**	**31.1%**	**23.8**	(1999)	**30.4**	**23.2**	**30.8%**
Austria	35.7	-6.1 (2015)	38.0	34.6	10.0%	24.6	-12.9 (2017)	25.4	21.8	16.4%
Czechia	52.5	(1999)	59.7	58.9	1.3%	38.5	(1999)	44.9	42.9	4.6%
Netherlands	17.7	-4.3 (2001)	19.0	16.6	14.4%	13.2	-8.1 (2016)	13.4	11.8	13.5%
Lithuania	24.6	(2016)	28.8	30.8	-6.2%	17.3	(2016)	20.5	23.2	-11.4%
Germany	28.7	-0.1 (2007)	30.0	29.4	2.1%	20.8	-1.9 (2007)	22.1	21.0	5.3%

The observed mortality rates from respiratory diseases, including pneumonia and chronic lower respiratory diseases, in 2020 were mostly lower than the expected rates, while in Poland the rates were higher in men and the inverse deviation in women was smaller than in the other countries (Tables 3.21f to 3.21h). This may indicate a more frequent recognition of SARS-CoV-2 infections in these countries and an underestimation of COVID-19 as a cause of death in the first year of the pandemic in Poland.

Table 3.21f. Age-standardised respiratory diseases mortality rates for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**120.4**	**·0.5 (1999)**	**127.0**	**115.4**	**10.1%**	**56.5**	(2011)	**57.3**	**60.0**	**-4.6%**
Austria	76.3	(2014)	69.9	84.5	-17.3%	47.5	(2014)	41.6	56.5	-26.2%
Czechia	116.5	(1999)	119.9	116.8	2.7%	63.3	(1999)	60.4	59.8	1.1%
Netherlands	85.9	-4.4 (1999)	74.4	88.0	-15.5%	61.2	-2.3 (1999)	50.9	62.6	-18.7%
Lithuania	76.9	-1.9 (2010)	78.7	81.6	-3.5%	22.2	(2011)	20.4	24.6	-17.4%
Germany	91.6	-1.3 (1999)	83.6	91.7	-8.9%	53.9	-0.1 (1999)	47.2	54.8	-13.9%

Table 3.21g. Age-standardised pneumonia mortality rates for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**79.6**	(2010)	**85.9**	**82.8**	**3.8%**	**38.9**	(2010)	**40.6**	**41.1**	**-1.3%**
Austria	16.1	(2013)	12.3	18.7	-34.4%	10.3	(2014)	8.2	14.0	-41.2%
Czechia	50.6	(2013)	56.8	55.5	2.3%	28.5	(2013)	29.1	32.6	-10.8%
Netherlands	22.8	-3.4 (2014)	19.6	23.5	-16.3%	16.3	-0.3 (2014)	13.5	18.3	-26.2%
Lithuania	31.1	(2011)	36.0	39.0	-7.7%	11.0	(2011)	11.0	13.8	-19.8%
Germany	25.1	-3.3 (2005)	21.8	24.2	-9.8%	14.7	-3.5 (2003)	11.7	14.0	-16.8%

Table 3.21h. Age-standardised chronic lower respiratory diseases mortality rates for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**30.7**	**·5.6 (2007)**	**31.9**	**29.7**	**7.4%**	**12.7**	**·1.2 (1999)**	**12.3**	**12.6**	**-2.6%**
Austria	47.0	-0.9 (2011)	46.7	46.8	-0.3%	29.5	(2012)	27.1	30.3	-10.6%
Czechia	49.1	(1999)	47.3	56.0	-15.6%	25.0	(1999)	23.2	27.1	-14.5%
Netherlands	46.6	-4.1 (1999)	39.4	46.8	-15.9%	34.6	(1999)	28.7	36.2	-20.8%
Lithuania	37.2	-5.8 (2007)	37.4	37.8	-1.2%	7.5	-5.4 (1999)	7.2	7.4	-1.8%
Germany	47.5	-0.2 (2007)	43.8	49.7	-11.9%	29.9	(2007)	27.3	32.1	-15.0%

The deviation of the mortality rate from digestive system diseases observed in Poland in 2020 from their expected values did not differ substantially from that observed in the other countries analysed (Table 3.21i).

Table 3.21i. Age-standardised digestive system diseases mortality rates for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the most recent period (%), the observed value (obs. rate) and the expected value (exp. rate) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**64.1**	(2015)	**68.2**	**66.4**	**2.7%**	**34.2**	(2015)	**35.6**	**34.7**	**2.4%**
Austria	43.0	-3.1 (2002)	43.2	37.9	14.0%	25.2	(2015)	27.2	24.8	9.3%
Czechia	62.0	1 (2014)	63.1	62.5	1.0%	36.6	(2016)	35.9	37.1	-3.3%
Netherlands	29.1	-4.1 (2003)	31.5	27.7	13.6%	23.5	-4.2 (2003)	24.5	22.2	10.3%
Lithuania	89.1	-2.1 (2007)	98.7	88.5	11.5%	47.7	-1.1 (2010)	52.9	48.2	9.8%
Germany	53.5	-0.4 (2012)	54.2	53.6	1.1%	34.5	-0.6 (2014)	34.8	34.3	1.4%

In all countries, except Lithuania for women, mortality due to traffic accidents was lower than expected and the difference in coefficients in Poland was not substantially different from that observed for the countries analysed (Table 3.21j).

Table 3.21j. Age-standardised mortality rates due to traffic accidents for Poland, Austria, the Czech Republic, the Netherlands, Lithuania, and Germany in 2019, their average annual rate of change over the recent period (%), the observed value (obs. rate) and the expected value (wsp) in 2020, the relative difference in observed versus expected value (%) by sex (authors' own calculations availing WHO mortality database)

Country	Men					Women				
	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (1)	exp. rate 2020 (2)	(1)/(2)-100%	2019 rate	average annual change (%) (latest period to 2019)	obs. rate 2020 (3)	exp. rate 2020 (4)	(3)/(4)-100%
Poland	**16.1**	(2017)	**15.7**	**17.3**	**-8.9%**	**4.2**	**·0.4 (2013)**	**3.9**	**4.2**	**-8.3%**
Austria	7.6	(2017)	6.3	7.8	-18.7%	2.1	-6.2 (2002)	1.8	1.8	-1.4%
Czechia	10.9	-2 (2013)	9.9	10.4	-4.2%	3.1	-2 (2013)	2.9	3.1	-5.8%
Netherlands	5.7	-0.2 (2013)	5.5	6.0	-7.6%	2.2	4 (2015)	1.8	2.3	-20.2%
Lithuania	12.5	-5.3 (2010)	11.7	12.0	-2.2%	3.2	-5.5 (2009)	4.2	3.4	25.6%
Germany	6.0	-2.6 (2010)	5.5	5.9	-6.2%	1.7	-3.7 (2010)	1.5	1.7	-10.6%

SUMMARY:

1. Analysis of life expectancy and mortality data for the Polish population in 2020 and 2021 indicates that there was a fundamental deterioration in the health of Poles, particularly the older people, during the years of the COVID-19 pandemic.
2. In 2021, life expectancy for men was 71.75 years, 2.3 years shorter than in the pre-pandemic year 2019 and for men aged 65 years, 1.9 years shorter. Life expectancy for women was 79.68 years, 2.1 years shorter than in 2019 (at age 65, it was reduced by 1.7 years). Men were more affected in the first year of the pandemic (life expectancy reduced by 1.46 years) than in the second (a further reduction of 0.86 years) while women were similarly affected in both years (life expectancy reduced by 1.04 and 1.03 years respectively).

3. The impact of the pandemic on the reduction in life expectancy for urban and rural residents was greater among urban residents in both years, while for women it was greater among rural residents in 2020 and similar in both populations in 2021. The shorter life expectancy of urban residents in 2020 was clearly related to city size – the larger the city, the shorter it was. The reduction in life expectancy caused by the pandemic showed a significant interregional variation.
4. The life expectancy of Polish men and women changed more during the pandemic than in most EU countries. The shortening was greater than the average for EU countries by 1.1 years for men in general and by 1,0 year for those aged 65, respectively, while for women by 1,0 year and 1.1 years, respectively. The greater reduction in life expectancy of the Polish population than that of the EU population as a whole because of the COVID-19 pandemic has further widened our unfavourable deficit in this basic index of population health in relation to the EU countries.
5. Women's life expectancy in poviats depended very little on the deprivation index value, but the reduction in life expectancy during the pandemic period was greatest in poviats with the highest deprivation levels (deciles 9 and 10) and lowest in counties where the deprivation index was lowest (deciles 1–3). In contrast, for men, the difference in life expectancy is more clearly related than for women to the level of deprivation of the poviats, while no such relationship is observed for the reduction in life expectancy associated with the pandemic period.
6. Excess mortality due to the 2020–2021 pandemic was characterised by high variability between months. The highest level of excess mortality in 2020 occurred in November (90.3%) and in 2021 in December (57.0%). Monthly mortality excesses during the pandemic period of October 2020 – February 2022 in Poland were higher than in most EU countries and significantly different from the averages for these countries. A persistent, although no longer very high, excess mortality occurs in Poland and other EU countries until now (August 2022), indicating the presence of an extended pandemic effect, a "health debt".
7. In 2021, Poland's total population and those aged 75 and over were the most likely to die from heart disease. The second most common disease responsible for the

deaths of Poles in 2021 was COVID-19, which was the most common cause among those aged 25–74 years and was in second place among the oldest 75 years and more. The third cause was cerebrovascular disease, the fourth atherosclerosis and the fifth tracheal, bronchial and lung cancer

8. COVID-19 as a cause was present in 41451 deaths (108.1 per 100 000) in 2020 and 92780 deaths (243.1 per 100 000) in 2021. COVID-19 mortality increased greatly with age and was higher among men than women. Half of the deceased were older than 80 for women and 74 (2020) and 72 (2021) for men. Mortality rates of urban and rural residents were at similar levels.
9. During the pandemic, there was a significant excess of mortality due to diabetes, diseases of the nervous system, heart diseases, causes directly related to alcohol consumption. Undoubtedly, these health issues will require more attention in the coming months. The lower than expected mortality due to malignant neoplasms may be misleading as it is rather the result of assigning COVID-19 as the cause of death of people suffering from cancer and COVID-19 at the same time.
10. During the pandemic period, there was an excess of cardiovascular mortality of approximately 9% in 2020 and 14% in 2021. In the older people, the excess was higher at around 12% and 16% respectively. Mortality increased the most in both years in the Dolnośląskie and Lubelskie voivodships, while in the Warmińsko-mazurskie, Wielkopolskie and Zachodniopomorskie voivodships, the level of CVD mortality remained virtually unchanged in connection with the pandemic. The excess mortality from myocardial infarction in most voivodships occurred only in the first year of the pandemic. Changes in cerebrovascular disease mortality in 2020 and 2021 are smaller than for myocardial infarction.
11. The pandemic years, and 2021 in particular, saw a decrease in mortality rates from malignant tumours in all voivodships except Świętokrzyskie. This direction of the change may have been related to the guidelines for the assessment of causes of death during a pandemic.
12. The nationwide age-standardised mortality rate from suicide remained stable in 2019, 2020 and 2021.
13. There is a large interregional variation in changes in mortality during the pandemic period for most causes of death.

14. Mortality in people under 75 years of age due to preventable or amenable causes is an important element in assessing the performance of the health care system. The mortality risk of the Polish population due to all avoidable causes was higher in 2020 and 2021 than would be expected from the earlier trend in mortality rates due to these causes. This was more marked for amenable than preventable causes.

4. HOSPITALISED MORBIDITY IN POLAND – CHANGES IN TRENDS DURING THE COVID-19 PANDEMIC

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Information on the causes and frequency of hospitalisation is, irrespective of its importance for administrative purposes, one of the most important elements in analysing and assessing the medical condition of a population. Clearly, there are certain limitations to these data, as hospitalisation is determined by the severity of the course of the disease, the ability to establish a diagnosis and provide appropriate treatment outside hospital, admission selection related to the availability of hospital beds or socio-economic factors. On the other hand, an undoubted advantage of hospitalisation information is the accuracy and relevance of hospital diagnosis, which surpasses diagnostic accuracy in other routine population health assessment systems.

Data on hospitalisation of the Polish population are collected as part of the Nationwide General Hospital Morbidity Survey carried out in accordance with the Programme of Statistical Surveys of Public Statistics, and their processing and analysis are carried out at the National Institute of Public Health NIH – National Research Institute (NIPH NIH – NRI). The basic document of the system is statistical sheet Mz/Szp-11. Until 1999, a 10% random sample of people treated, discharged or died in all public and non-public hospitals was included in the survey, with the exception of those treated in hospitals or psychiatric wards, covered by a separate survey. Since 2000, the in-patient morbidity survey has been comprehensive and includes all patients treated in hospitals. This is an extremely important change from the point of view of population health monitoring.

The year 2021 is the second atypical period in terms of the number and pattern of hospital admissions following the outbreak of the COVID-19 pandemic in Poland in March 2020.

In 2020, due to the COVID-19 pandemic, the number of hospitalisations decreased significantly compared to previous years to 6 4824 33 or 31% less than in 2019 (8 478 953 hospitalisations). The observed changes were related to the reorganisation of hospitals in Poland, with the creation of so-called "dedicated hospitals" treating patients with COVID-19, while at the same time there was a change in patient treatment priorities. Patients with already scheduled hospitalisations for disease entities not requiring rapid action were rescheduled for later dates often even far after the acute phase of the pandemic. At the same time, some patients were abandoning their efforts to be admitted to hospital, fearing infections within the hospital. All of this has contributed to the accumulation of a so-called "health debt" in the Polish population and it may take several years to catch up.

There were also fewer patients admitted to hospital in 2021 than in 2019 – 7 872 687 or 7% less, but slightly more so than in 2020 by 21%.

The following section seeks to present the changes in the basic indicators of hospital treatment in Poland as a result of the COVID-19 pandemic.

4.1. Hospitalization by cause

In total, as noted above according to the Nationwide General Hospital Morbidity Survey data, 8 478 953 people were hospitalised in Poland in 2019, 6 482 433 in 2020 and 7 872 687 in 2021; some people were hospitalised several times (approximately 5%). Standardized rates of total hospitalization were 19013.7, 14213.5 and 17728.6 per 100 000 population in the following years.

Among the total number of patients (absolute numbers), women predominated in the subsequent years from 2019 onwards, with 24% more women than men being hospitalised in 2019 and 22% more in 2020 and 2021.

The five most common causes of hospitalisation in the past 10 years have been cardiovascular diseases, injuries and poisoning, tumour, genitourinary system diseases and digestive system diseases. Together, they account for almost 60% of all causes of hospitalisation.

It should be noted that the percentage structure of the reasons for hospitalisation has changed very little until 2019. In 2020, tumour slightly increased its share of hospitalisations, reaching 12.5%, compared to cardiovascular diseases at 12%, which in previous years had always been the most common cause of hospital stays in Poland.

A comparison of standardised male and female hospitalisation rates shows that overall, women were hospitalised 5.0% more often than men in 2020 and 2021[1] and 6% more frequently in 2019. As noted above, a comparison of the absolute number of male and female inpatients shows that general hospitals across the country hospitalised over 20% more women than men, but this is primarily due to hospitalisation for pregnancy, childbirth and puerperium.

Detailed comparisons of male and female hospitalisation rates have been presented in previous reports, which have shown that, despite higher rates of female hospitalisation overall, men were more frequently treated in hospital for a number of specific causes[2]. The biggest difference, more than double, concerns myocardial infarction, ischaemic heart disease and atherosclerosis. There is an over 1,5 times difference in burns and frostbite, liver disease, kidney failure, as well as trauma and a whole group of cardiovascular diseases. Men were hospitalised less frequently than women for diseases of the nervous system, hypertensive disease, tumour, endocrine disorders, and genitourinary system diseases.

The current study places more emphasis on changes in hospitalisation rates and structures in recent years, assuming that 2019 represents the state of hospitalisation characteristics for previous years before the pandemic, which was then subject to minimal annual changes

Tables 4.1–4.3 show the actual and standardised rates of selected groups of diagnoses for 2019–2021. The calculated hospitalisation rates were used for the analyses presented here, mainly aimed at verifying the hypothesis of a broad current and long-term impact of the COVID-19 pandemic on the health of the Polish population. The data in the tables can also provide material for more in-depth analyses on comparisons of hospitalisation rates by reason for hospital stay, taking into account patients' sex and place of residence.

The selected set of disease entities was based primarily on the requirements of Eurostat, to which the National Institute of Public Health NIH – National Research Institute sends annual data on the hospitalisation of the Polish population.

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1 Standardised rates

2 With comparable age structure (standardised rates)

Table 4.1. Actual and standardised rates of total hospitalisation by cause in Poland in 2019, 2020, 2021 (per 100 000 population, National Institute of Public Health NIH – National Research Institute data)

Diagnosis / ICD-10	Actual coefficients			Standardised rates		
	2019	2020	2021	2019	2020	2021
All diagnoses A00-Z99	21041,9	15966,5	19719,4	19013,7	14213,5	17728,6
Infectious diseases A00-B99	488,1	268,5	349,3	593,4	308,0	432,7
Cancers C00-D48	2364,9	2105,4	2472,3	1872,3	1640,7	1918,4
Malignant tumours C00-C97	151,	485,6	1712,6	1170,5	1137,6	1299,6
Endocrine disorders, internal, E00-E90	670,5	463,0	556	654,9	453,9	553,5
Diabetes E10-E14	182,2	119,5	133,6	152,5	100,2	112,9
Diseases of the nervous system G00-H95	2014,7	1332,6	1691,8	1686,4	1103,8	1393,8
Cardiovascular diseases a I00-I99	2757,5	2014,4	2298,5	1937,6	1387,8	1584,7
Hypertensive disease I10-I15	170,6	104,2	113,4	135,4	81,8	89,5
Ischaemic heart disease I20-I25	624,1	459,0	545,6	442,4	320,8	378
Myocardial infarction I21-I22	196,1	165,5	183,5	138,5	115,8	127,7
Pulmonary heart disease I26-I51	1184,2	856,2	962,8	800,6	568,7	643,3
Cerebrovascular diseases I60-I69	352,1	304,6	346,5	238,8	203,2	230
Atherosclerosis I70	163,2	125,7	135,9	105,8	80,6	86,9
Respiratory diseases J00-J99	1287,6	839,4	1036,7	1355,7	846,2	1127,8
Pneumonia J12-J18	282,9	218,1	278	307,1	214,3	308
Chronic lower respiratory tract disease, J40-J47	231,6	130,0	124,1	197,3	110,9	113,1
Digestive system diseases K00-K93	1564,2	1103,5	1348,6	1396,7	971,0	1202,5
Liver diseases K70-K77	130,7	92,6	97,6	111,	88	84,5
Genitourinary diseases N00-N99	1655,9	1186,3	1484,7	1483,1	1060,3	1329,1
Kidney failure N17-N19	201,3	156,7	168	145,1	112,1	121,3
Pregnancy, childbirth, puerperium 000-099 without 080 and 084	1076,9	902,2	977,3	1073,8	915,9	1012,6
Causes specified inaccurately R0 -R99	1068,7	723,9	945,2	1033,0	678,4	923,6
Injuries and poisonings S00-T14	1849,4	1426,3	1851,4	1863,2	1421,4	1870
Injuries S00-T14	1487,2	1167,0	1522,2	1492,8	1154,4	1528
Burns, frostbite T20-T35	30,8	22,6	27,4	36,5	27,0	32,3
Poisoning T6T5	83,6	59,5	64,5	94,1	67,5	75,8
SARS-CoV-2	0,0	267,0	764,2	0,0	205,3	561,5

Data: Department of Population Health Monitoring and Analysis, National Institute of Public Health NIH – National Research Institute

Figure 4.1 shows the values of the standardised rates of total hospitalisations by analysed reasons for hospitalisation, from which it can be seen that fewer people were hospitalised in 2020 than in 2019 and this applies to all analysed groups of diagnoses; in 2021 there was an increase in the rates, however, to a level lower than before the pandemic.

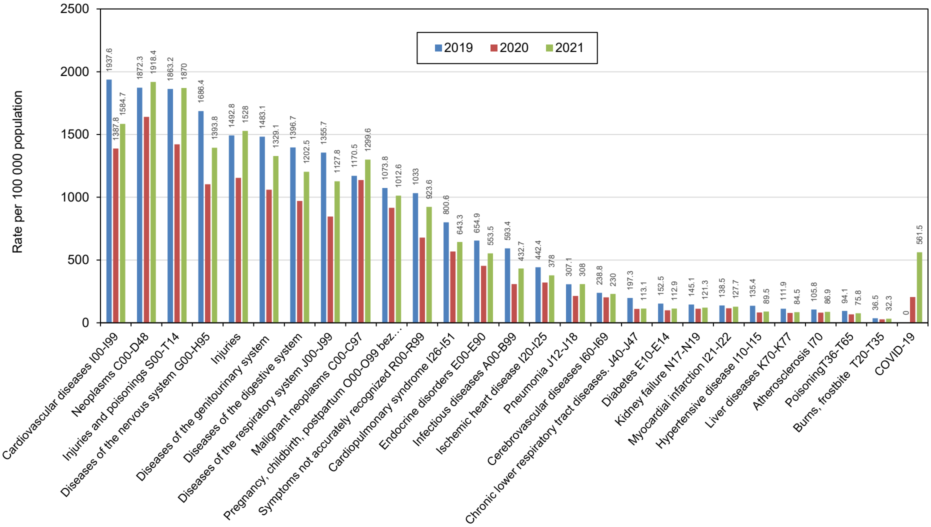

Fig. 4.1. Standardised rates of total hospitalisation of selected groups of diagnoses in 2019–2021 in Poland (National Institute of Public Health NIH – National Research Institute data)

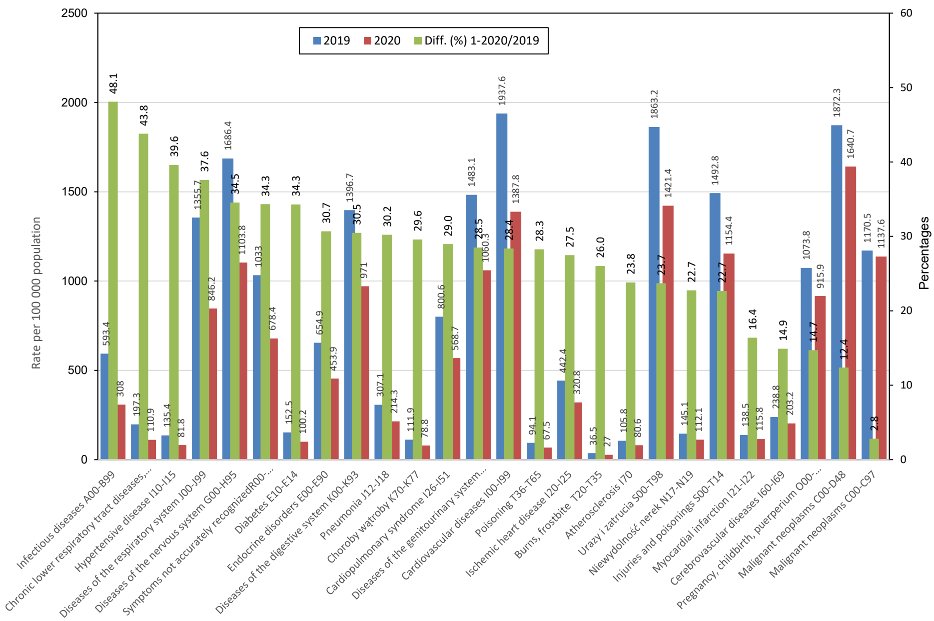

Fig. 4.2. Standardised rates of total hospitalisation in 2019 and 2020 by cause in Poland and differences in rates between years in percentages (data sorted by difference in rates) (National Institute of Public Health NIH – National Research Institute data)

As can be seen from the figure, the magnitudes of the differences in the coefficients between 2019 and 2020 were not the same for all diagnoses. Changes/decreases in standardised hospitalisation rates between the year.

Years 2019 and 2020, depending on the diagnosis, ranged from 2% to almost 100% (Fig. 4.2). The largest decreases in rates were observed for infectious diseases (excluding COVID-19), chronic lower respiratory diseases, hypertensive disease, nervous system diseases and cardiovascular diseases in general. In contrast, the smallest decreases in rates were found for myocardial infarction and cerebrovascular disease, hospital stays related to pregnancy and childbirth and for tumour overall.

The pattern of decreases and increases in hospitalisation rates between 2019 and 2020 shown may be indicative of a reduction in the incidence of infectious diseases requiring hospitalisation (with the exception of COVID-19) and a reduction in hospital treatment of those disease entities that do not require absolute rapid hospitalisation such as hypertensive disease or general nervous system diseases (G00-H95). In contrast, diseases requiring emergency intervention such as myocardial infarction, cerebrovascular diseases including stroke and cerebral haemorrhage or malignant tumours were treated in hospitals with the same frequency as in previous years (Fig. 4.2).

As noted above, in 2021 the differences in hospitalisation rates compared to 2019 start to narrow and for some disease entities the standardised rates exceed the 2019 values – this applies to tumour (C00-C97), trauma and pneumonia, and there is also a slight difference for stroke. In contrast, large differences persist for the hospitalisation of hypertension chronic lower respiratory diseases, infectious diseases, diabetes, and liver conditions.

As can be seen from the analyses presented, the differences in hospitalisation rates between 2019 and the COVID-19 pandemic years are mainly down to a reduction in hospitalisation rates to the "optimal" values forced by the pandemic situation, while maintaining higher levels of hospitalisation in those areas where there is a greater risk to health and life. This trend continues into the second year of the pandemic, with the significant decreases in hospitalisations observed in 2020 levelling off and even exceeding the rates observed in 2019, perhaps where the potential "health debt" is greatest.

Tables 4.4 and 4.5 show the standardised and actual hospitalisation rates of urban 4and rural residents. On the other hand, Fig. 4.4 illustrates in detail the comparison of hospitalisation rates of urban and rural residents in 2019–2021 by diagnosis group.

Figure 4.3 shows hospitalisation rates for selected causes of hospitalisation of urban and rural residents in Poland in 2019–2021

As can be seen from the figure, in both 2019 and 2020 the standardised hospitalization rates were higher for urban residents. The exceptions were infectious diseases in 2019 and 2020 and in 2021 the difference was minimal. A similar situation applied to the causes of hospitalisation related to burns (T20-T25), for which more rural residents were hospitalised.

A summary of the changes (in percentages) in the incidence of hospitalisation during the pandemic period in 2020, 2021 compared to 2019 is shown in Figure 4.5.

It is clear from the figure, as already stated above, that for almost all diagnoses analysed, the decreases in hospitalisation rates in 2020 compared to 2019 were higher in rural residents than in urban residents.

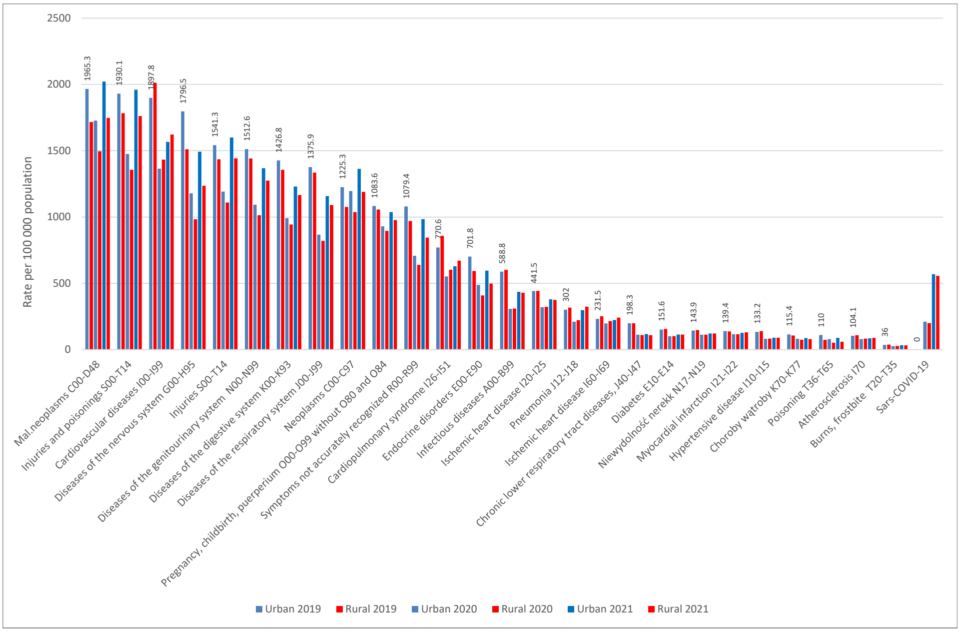

Fig. 4.3. Standardised rates of selected causes of hospitalisation in the years 2019–2021 in urban and rural Poland, per 100 000 inhabitants (National Institute of Public Health NIH – National Research Institute data)

This may indicate the greater impact of the COVID-19 pandemic on the incidence of hospital treatment of rural residents compared to urban residents, adding to the so-called "health debt" due to the postponement or omission of treatment for conditions that do not require rapid intervention, but in the longer term may affect the health of those who have postponed hospitalisation for organisational reasons or their own concerns.

In 2020, the largest decreases in hospitalisation rates were observed in both urban and rural areas for infectious diseases, chronic lower respiratory diseases and hypertensive disease and diseases of the nervous system. The smallest decreases for tumour, myocardial infarction, cerebrovascular disease, and causes of hospital stay related to childbirth (excluding deliveries).

The bars showing hospitalisation shortfalls in 2021 compared to 2019 are for all diagnoses analysed for both urban and rural residents lower than those observed for

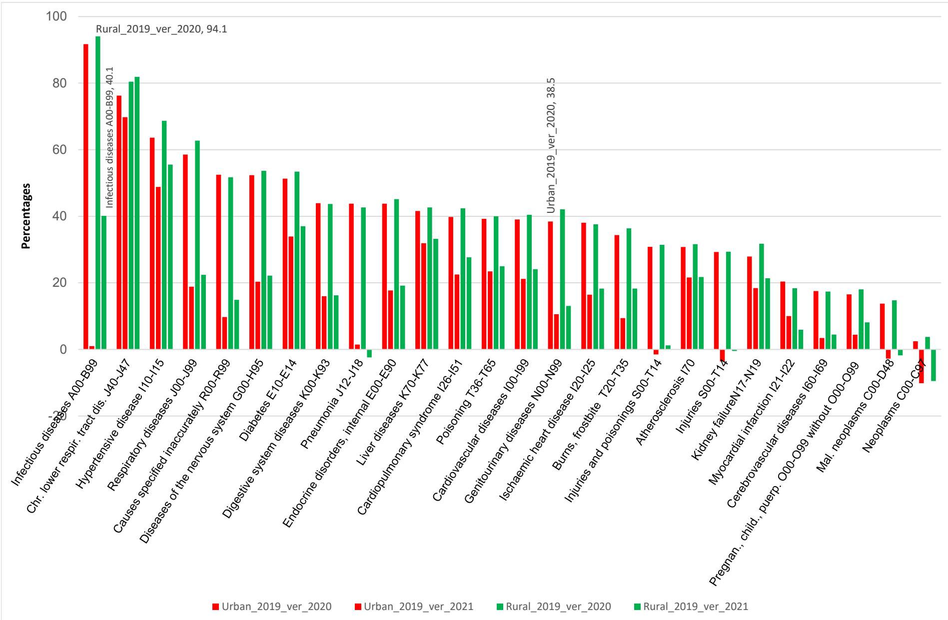

Figure 4.4. Changes in standardised hospitalisation rates in urban and rural residents in Poland in 2019–2020 and 2019–2021 – in percentage [(2019/2020*100)-100] (National Institute of Public Health NIH – National Research Institute data)

2020, which may indicate some reduction in the "health debt". For some diagnoses, e.g. tumour, the incidence of hospitalisation in both urban and rural areas was higher than in 2019. However, the reduced incidence of hospitalisation for chronic lower respiratory diseases and hypertension has been consistently maintained.

Summarising the above analyses, it can be concluded that the COVID-19 Pandemic in 2020–2021 has caused a shock to the health care system manifested, inter alia, in a significant reduction in the observed annual frequency of hospital treatment (health debt), which may be reflected in the burden of disease of the Polish population in the coming years. Finally, one can quote the text of the National Health Programme 2021–2025 where it states: "The COVID-19 epidemic, overlapping with the epidemic of chronic non-communicable diseases, creates a negative synergy effect." However, it must be emphasised that the 2021 figures suggest that the shortfall in hospital treatment from 2020 is gradually being made up.

Table 4.2. Actual and standardised rates of male hospitalisation by cause in Poland in 2019, 2020, 2021 (per 100 000 population, National Institute of Public Health, National Hygiene Institute-National Research Institute data)

Diagnosis / ICD-10	Actual rates			Standardised rates		
	2019	2020	2021	2019	2020	2021
All diagnoses A00-Z99	19700	15101.8	18654.6	18653.7	14012.8	17471.3
Infectious diseases A00-B99	525.7	296.7	383.2	631	337.9	468
Cancers C00-D48	2207.7	1967.9	2254.7	1827.2	1599.5	1818.4
Malignant tumours C00-C97	1482.4	1429.5	1615	1216	1154.9	1291.3
Endocrine disorders, internal, E00-E90	559.4	400.6	472.5	568.2	405.4	483.4
Diabetes E10-E14	200	136.5	153.1	180.2	122.1	137.6
Diseases of the nervous system G00-H95	1803.3	1222.6	1549.1	1651.7	1101.2	1393.2
Cardiovascular diseases a I00-I99	3045	2286.8	2637	2483.8	1826.7	2098
Hypertensive disease I10-I15	143.9	90	98.6	129.1	79.5	87.5
Ischaemic heart disease I20-I25	799.3	600	720.5	642.1	473.8	564
Myocardial infarction I21-I22	259.2	222.3	247.6	210.1	177.7	196.6
Pulmonary heart disease I26-I51	1277.3	946.9	1071.3	1040.3	755.3	853.7
Cerebrovascular diseases I60-I69	359.7	317.5	362.4	288.3	249.8	282.9
Atherosclerosis I70	196	156.4	173.8	152.8	119.2	131.1
Respiratory diseases J00-J99	1491.1	983.7	1217.5	1595.7	1013.9	1332.5
Pneumonia J12-J18	329.8	257.8	324.5	368.3	265.6	366.2
Chronic lower respiratory tract disease, J40-J47	242.9	139.5	133.5	223.8	127.5	128.7
Digestive system diseases K00-K93	1677.6	1214.5	1463.7	1557.6	1112	1351.3
Liver diseases K70-K77	163.2	118.8	124	144.2	104.2	109.7
Genitourinary diseases N00-N99	1123.3	820.3	971.2	1037.4	751.7	892
Kidney failure N17-N19	224.5	177.7	189.9	189.5	147.8	158.1
Pregnancy, childbirth, puerperium 000-099 without 080 and 084	0	0	0.	0	0	0.
Causes specified inaccurately R0 -R99	1009.1	704.9	909.7	999	676.8	904.3
Injuries and poisonings S00-T14	2206	1698.8	2185.5	2262.4	1729.8	2248.6
Injuries S00-T14	1776	1393.1	1795.9	1826.1	1417.3	1848.8
Burns, frostbite T20-T35	40.7	30	37	46.2	34.3	41.6
Poisoning T6T5	98.2	68	70.1	104.3	72.6	76.8
SARS-CoV-2	0	290.8	815.3	0	243.5	672.1

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Table 4.3. Actual and standardised rates of female hospitalisation by cause in Poland in 2019, 2020, 2021 (per 100 000 population, National Institute of Public Health, National Hygiene Institute-National Research Institute data)

Diagnoses / ICD-10	Actual coefficients			Standardised rates		
	2019	2020	2021	2019	2020	2021
All diagnoses / "A00-Z99"	22299.3	16776.5	20715.8	19675.8	14677.7	18283
Infectious diseases A00-B99	452.9	242.1	317.6	558.4	281.1	399.6
Tumours C00-D48	2512.3	2234.3	2675.9	1994	1744.9	2088.2
Malignant tumours C00-C97	1546	1538.2	1803.8	1174.5	1163.1	1355.1
Endocrine disorders, internal, E00-E90	774.7	521.3	634.1	741.1	502.7	624.1
Diabetes E10-E14	165.4	103.5	115.3	127.2	80.4	90.6
Diseases of the nervous system G00-H95	2212.8	1435.6	1825.3	1720.1	1110.2	1400
Cardiovascular diseases I00-I99	2488.1	1759.2	1981.7	1503.3	1037.3	1174.1
Hypertensive disease I10-I15	195.5	117.6	127.2	136.3	81.3	88.8
Ischaemic heart disease I20-I25	459.9	326.9	381.9	280.6	196.3	227.1
Myocardial infarction I21-I22	137.1	112.3	123.4	79.9	64.8	70.9
Pulmonary heart disease I26-I51	1096.9	771.2	861.3	614.7	423.5	478.3
Cerebrovascular diseases I60-I69	345	292.5	331.6	199.1	165.1	187.2
Atherosclerosis I70	132.5	97	100.4	69.1	50.7	52.4
Respiratory diseases J00-J99	1096.9	704.2	867.6	1145.1	701.4	943.2
Pneumonia J12-J18	239	180.9	234.4	257	173	258.6
Chronic lower respiratory tract disease, J40-J47	221.1	121.2	115.3	178.5	98.7	100.6
Digestive system diseases K00-K93	1457.9	999.6	1240.9	1258.7	847.4	1074.1
Liver diseases K70-K77	100.3	68.1	72.9	81.8	55.1	61.1
Genitourinary diseases N00-N99	2155	1529.2	1965.2	1948.1	1384.5	1780.5
Kidney failure N17-N19	179.6	137.1	147.4	111.3	84.8	92.5
Pregnancy, childbirth, puerperium 000-099 without 080 and 084	2086	1747.5	1891.3	2183.3	1862	2058.2
Causes specified inaccurately R00-R99	1124.5	741.7	978.3	1085.5	694.4	959.2
Injuries and poisonings S00-T14	1515.3	1171.1	1538.8	1442.8	1096.6	1470.3
Injuries S00-T14	1216.6	955.1	1266.1	1140.3	876.1	1187.2
Burns, frostbite T20-T35	21.4	15.7	18.4	26.8	19.8	23
Poisoning T36-T65	69.9	51.6	59.2	84.5	62.9	75.5
SARS-CoV-2	0	244.8	716.4	0	178.5	475.1

Data: Department of the Centre for Population Health Monitoring and Analysis, National Institute of Public Health, National Institute of Hygiene (National Institute of Public Health, National Hygiene Institute-National Research Institute)

Table 4.4. Actual and standardised rates of urban residents' hospitalisation by cause in Poland in 2019, 2020, 2021 (per 100 000 population, National Institute of Public Health NIH – National Research Institute

Diagnoses / ICD-10	Actual rates			Standardised rates		
	2019	2020	2021	2019	2020	2021
All diagnoses A00-Z99	22154.4	16907.3	20930.8	19559.9	14687.0	18392.7
Infectious diseases A00-B99	484.5	270.3	352.3	588.8	307.1	435.9
Tumours C00-D48	2616.0	2339.1	2747.4	1965.3	1727.4	2021.0
Malignant tumours C00-C97	1682.5	1656.4	1907.6	1225.3	1196.1	1363.9
Endocrine disorders, internal, E00-E90	713.2	494.0	594.0	701.8	488.1	596.1
Diabetes E10-E14	184.6	121.4	136.3	151.6	100.2	113.2
Diseases of the nervous system G00-H95	2235.5	1486.5	1895.2	1796.5	1179.3	1492.6
Cardiovascular diseases I00-I99	2865.6	2107.6	2423.9	1897.8	1364.7	1565.9
Hypertensive disease I10-I15	175.3	108.6	118.9	133.2	81.4	89.5
Ischaemic heart disease I20-I25	669.0	491.4	589.5	441.5	319.8	379.2
Myocardial infarction I21-I22	210.1	176.3	194.2	139.4	115.8	126.7
Pulmonary heart disease I26-I51	1208.6	884.1	1005.9	770.6	551.3	629.1
Cerebrovascular diseases I60-I69	363.0	314.6	361.2	231.5	197.0	223.8
Atherosclerosis I70	172.6	133.4	144.5	104.1	79.6	85.6
Respiratory diseases J00-J99	1312.7	868.3	1072.2	1375.9	867.7	1157.6
Pneumonia J12-J18	280.0	218.8	273.6	302.0	210.0	297.6
Chronic lower respiratory tract disease, J40-J47	237.3	133.9	129.3	198.3	112.5	116.8
Digestive system diseases K00-K93	1631.1	1151.0	1405.9	1426.8	991.3	1230.3
Liver diseases K70-K77	139.3	98.9	103.8	115.4	81.5	87.5
Genitourinary diseases N00-N99	1724.9	1247.5	1558.5	1512.6	1092.5	1368.0
Kidney failure N17-N19	210.5	165.6	177.5	143.9	112.5	121.5
Pregnancy, childbirth, puerperium 000-099 without 080 and 084	1059.8	888.7	965.6	1083.6	929.8	1037.7
Causes specified inaccurately R00-R99	1120.3	761.4	1004.5	1079.4	707.8	983.6
Injuries and poisonings S00-T14	1884.8	1459.0	1905.3	1930.1	1475.1	1959.4
Injuries S00-T14	1508.6	1187.6	1563.5	1541.3	1192.4	1599.1
Burns, frostbite T20-T35	29.5	21.7	26.9	36.0	26.8	32.9
Poisoning T36-T65	94.8	67.7	73.2	110.0	79.0	89.1
SARS-CoV-2	0.0	280.7	806.7	0.0	210.8	568

Data: Department of Population Health Monitoring and Analysis, National Institute of Public Health NIH – National Research Institute

Table 4.5. Actual and standardised rates of rural residents hospitalisation by cause in Poland in 2019, 2020, 2021 (per 100 000 population, National Institute of Public Health NIH – National Research Institute

Diagnoses / ICD-10	Actual rates			Standardised rates		
	2019.0	2020.0	2021.0	2019.0	2020.0	2021.0
All diagnoses A00-Z99	19369.0	14557.1	17914.9	18233.9	13535.9	16791.6
Infectious diseases A00-B99	493.5	265.9	344.9	601.4	309.9	429.2
Tumours C00-D48	1987.4	1755.4	2062.5	1716.5	1495.5	1747.4
Malignant tumours C00-C97	1263.7	1229.8	1422.0	1076.4	1037.4	1189.1
Endocrine disorders, internal, E00-E90	606.3	416.5	499.4	593.6	408.9	498.0
Diabetes E10-E14	178.5	116.6	129.5	156.2	101.8	114.0
Diseases of the nervous system G00-H95	1682.7	1102.0	1388.7	1510.5	983.1	1236.2
Cardiovascular diseases I00-I99	2595.0	1874.8	2111.7	2012.5	1432.6	1621.7
Hypertensive disease I10-I15	163.3	97.8	105.1	139.5	82.7	89.7
Ischaemic heart disease I20-I25	556.5	410.5	480.2	443.3	322.2	374.8
Myocardial infarction I21-I22	175.2	149.3	167.4	137.3	116.0	129.6
Pulmonary heart disease I26-I51	1147.4	814.4	898.7	857.5	602.3	671.6
Cerebrovascular diseases I60-I69	335.7	289.6	324.6	252.3	214.9	241.5
Atherosclerosis I70	149.2	114.2	123.1	108.6	82.5	89.2
Respiratory diseases J00-J99	1249.9	796.1	983.9	1334.4	820.0	1090.1
Pneumonia J12-J18	287.2	217.0	284.4	316.6	221.9	324.4
Chronic lower respiratory tract disease, J40-J47	223.1	124.2	116.3	199.0	110.3	109.4
Digestive system diseases K00-K93	1463.5	1032.4	1263.2	1356.5	944.1	1166.6
Liver diseases K70-K77	117.9	83.2	88.3	106.3	74.5	79.8
Genitourinary diseases N00-N99	1552.1	1094.5	1374.9	1441.2	1014.2	1274.5
Kidney failure N17-N19	187.6	143.5	153.7	147.6	112.0	121.6
Pregnancy, childbirth, puerperium 000-099 without 080 and 084	1102.5	922.4	994.8	1056.6	895.0	976.9
Causes specified inaccurately R00-R99	991.0	667.7	856.9	970.5	639.6	844.5
Injuries and poisonings S00-T14	1796.3	1377.3	1771.2	1782.3	1356.2	1760.8
Injuries S00-T14	1455.0	1136.0	1460.8	1435.7	1109.8	1442.4
Burns, frostbite T20-T35	32.7	24.0	28.1	37.5	27.5	31.7
Poisoning T36-T65	66.8	47.3	51.4	73.5	52.5	58.8
SARS-CoV-2	0.0	246.6	700.8	0.0	200.1	556.8

Data: Department of Population Health Monitoring and Analysis, National Institute of Public Health NIH – National Research Institute

4.2. Structure of causes of hospitalisation by age in Poland

In order to gain more in-depth information on the pattern of hospitalisations, an analysis of the reasons for hospital stays in 2020 was carried out in 5-year age groups – separately for men and women. As can be seen from the figure (Fig. 4.5), boys under the age of 10 are most often hospitalised for respiratory diseases and injuries. Infectious diseases are also a fairly large group among the causes of hospitalisation in this age group.

It should be noted that the significant incidence of hospitalisation of children under 5 years due to factors affecting contact with health services is determined by the normal births coded in this cause category (ICD-10: Z38). It should also be added that in no older age group do infectious diseases quantitatively represent such a problem as in the youngest group. Trauma and poisoning are beginning to dominate among hospitalised boys over the age of 10 years, along with digestive system diseases. This situation persists among men up to the age of 45, when cardiovascular diseases predominate among the causes of hospitalisation. From the age of 50, in addition to cardiovascular diseases, tumours appear, reaching their maximum among causes of hospitalisation in the 65–69 age group. However, they do not exceed the incidence of hospitalisation for cardiovascular diseases, which are increasing in importance among the causes of hospitalisation until the oldest age group of men. The prevalence of respiratory diseases as a cause of hospitalisation for men also increases in older age groups.

It is noteworthy that hospitalisations for tumour are decreasing after the age of 70. A relatively high proportion of eye disease after the age of 70 is associated with lens implantation procedures due to senile cataract.

The pattern of female hospital admissions is slightly different (Fig. 4.6). Respiratory diseases and infectious diseases, as the main morbid cause of hospitalisation, predominate among girls under 10 years of age, as they do among boys. Injuries and poisonings, unlike in boys, are the most common cause of hospitalisation among girls only up to the age group of 10–14 years. From the age group 15–19 up to the age of 39, events related to pregnancy, childbirth and puerperium predominate, with an increase in the incidence of genitourinary diseases at a much higher rate than in men. From the age of 60 until the oldest age groups, cardiovascular disease begins to dominate among the causes of hospitalisation for women. Gradually, but more so than for men, a reduction is being recorded in the share of

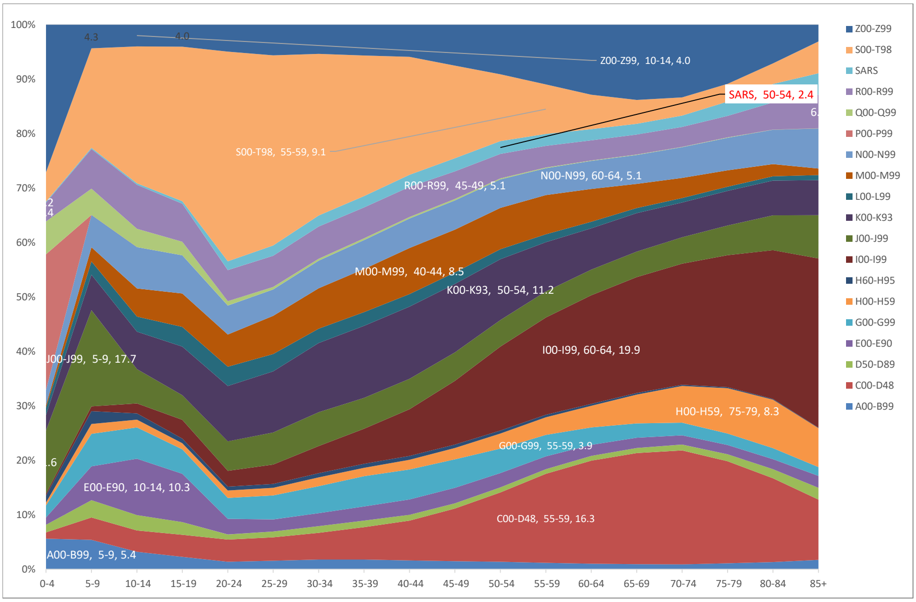

Fig. 4.5. Structure of causes of hospitalisation in Poland in 2018 by age of patients – men (National Institute of Public Health NIH – National Research Institute data)

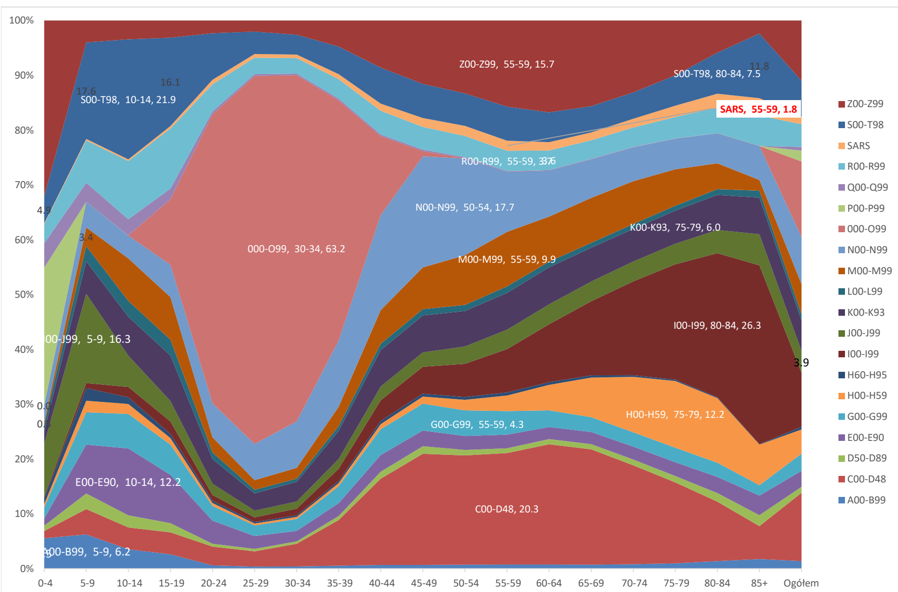

Fig. 4.6. Structure of causes of hospitalisation in Poland in 2018 by age of patients – women (National Institute of Public Health NIH – National Research Institute data)

cancers, the increase in frequency of which is marked in earlier age groups than in men. Infectious diseases are a significant cause of hospitalisation for both sexes only in the youngest age groups, while in the older age groups their share among causes of hospitalisation is higher among men. It is worth noting that a significant difference exists between men and women in the proportion of injuries and poisonings in hospital admissions for men especially in the younger age groups, which is due to the risky behaviour of men especially in the under-40 age group. In both men and women, there is a significant proportion of causes specified inaccurately (R00-R99) especially among children and adolescents.

4.3. Changes in the structure of the causes of hospitalisation between 2006 and 2021

In addition to the detailed analyses presented, which include selected hospitalisation rates for selected diagnoses, changes in the entire group of ICD-10 diagnoses from 2006 to 2021 are visualised – Figure 4.7. As can be seen from the figure, among all causes of hospitalisation, taking into account the share in the pool of all hospital stays in all the years presented, the predominant causes were cardiovascular diseases (I00-I99), tumour (C00-D48), trauma and poisoning (S00-T98), genitourinary diseases (N00-N99) and stays related to pregnancy and childbirth O00-O99.

Observing changes in the percentage share of individual causes, it can be seen that the share of cardiovascular diseases (from 18% to 14%), diseases of the genitourinary and digestive systems (from 10% to 8%) and causes related to childbirth (from 9% to 8%) decreased steadily between 2003 and 2021. In recent years, after an initial decline, the share of tumour among the causes of hospitalisation has been increasing, especially in 2018. There is also an undoubted increase in the proportion relating to musculoskeletal and nervous system diseases. Unfortunately, the proportion of causes specified inaccurately among the causes of hospitalisation is increasing, limiting our knowledge of the causes of hospitalisation, although there has been an improvement in the last four years. A variable situation is observed with regard to injuries and poisonings – although there has been a recent decrease in the frequency of hospitalisations. In contrast, the situation is stable for infectious diseases, skin diseases and developmental defects.

It should be noted that the percentages of causes of hospitalisation do not change over short time intervals, and it can be concluded that the COVID-19 pandemic was most marked in the increase in the proportion of tumour, trauma and poisoning (S00-T98) perinatal causes (P00-P96) among those treated in hospitals.

The trends in temporal changes in the structure of the causes of hospitalisation presented here can be used as a basis for planning decisions on system transformations to optimise hospital treatment in order to meet the health needs of the population as well as to determine the need for specialists in particular medical fields.

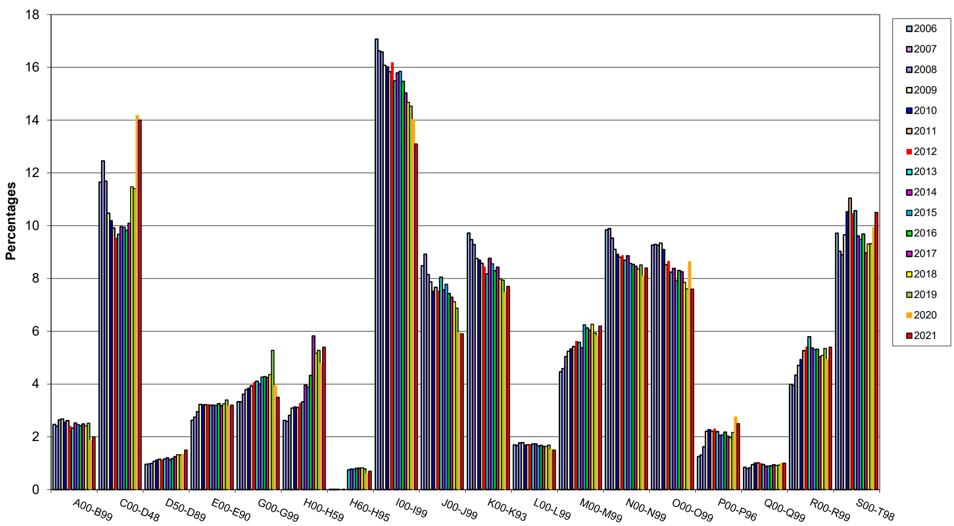

Fig. 4.7. Percentage structure of causes of hospitalisation in Poland from 2006 to 2018 (National Institute of Public Health NIH – National Research Institute data)

4.4. Changes in hospital admissions over time by age of patients treated between 2006 and 2021

Changes in the structures of hospitalisation rates[3] by age between 2006 and 2021 overall and by age are shown in Figure 4.6.

As can be seen from the figure, the most frequent hospital admissions are children under one year and people over 65 years of age.

Overall, hospitalisation rates increased between 2006 and 2019, by 12%, although the general upward trend in the value of hospitalisation rates can also be seen in almost all age groups with the exception of the two subgroups 45–54 and 55–64, although even here there has been some increase in recent years. A marked decrease in the frequency of total hospital treatment in Poland occurred in 2020, amounting to more than 30% of the 2019 value, visible in all age groups of hospital admissions.

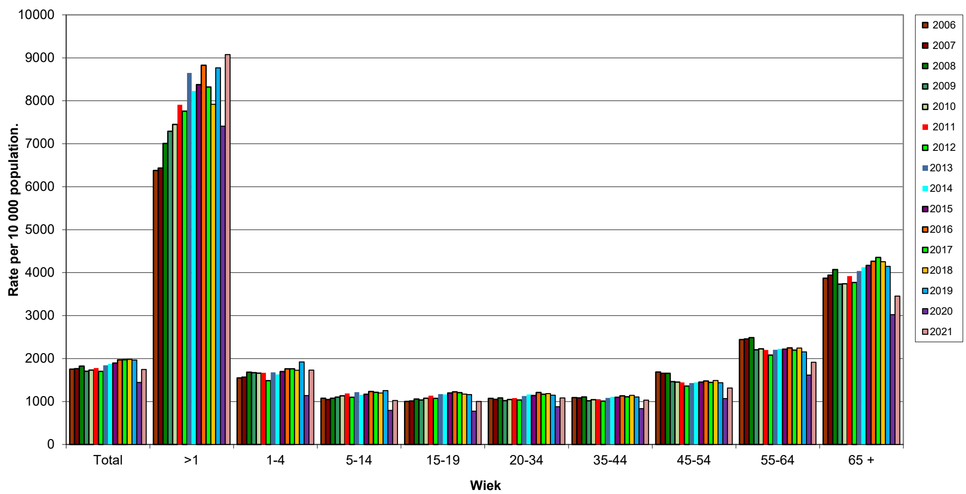

Fig. 4.8. Hospitalisation in Poland between 2006–2020 by age – rates per 10 000 population (National Institute of Public Health NIH – National Research Institute data)

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[3] It should be noted that the previous subsection presented the percentages of hospitalisations by cause, calculated in relation to the total number of patients treated in hospitals in Poland. This subsection discusses hospitalisation rates by age group of hospitalised patients (the denominators are the population numbers in each age group.

After the first year of the COVID-19 pandemic, there is a 21% increase in total hospitalisation rates compared to the value observed in 2020, but the hospitalisation rate is still lower than in 2019.

It is noteworthy that the greatest catch-up in the reduction in hospitalisation rates occurred in the youngest hospitalised groups – "below one year" and "1–4 years".

4.5. Length of hospitalisation

Depending on the country, hospital treatment generates between 40–50% of healthcare costs; a significant proportion of these costs is the hospital stay itself, i. e. so-called "hotel costs". Therefore, healthcare organisers aim to reduce them and therefore shorten hospital stays. An additional argument in favour of a shorter hospital stay is the exposure to in-hospital infections, the likelihood of which increases with a longer hospital stay.

Due to the increasing use for some diagnoses of same-day procedures performed in hospitals or specialist outpatient clinics, the average length of stay in hospitals is decreasing[4]. As can be seen from Fig. 4.9 in Poland, the length of hospital stay between 2006 and 2018 decreased by 1 day (15%) and Poland now ranks among countries with relatively short hospital stays (6 days) due to all causes, but still 1 day higher than in Hungary, Malta and Iceland. On the other hand, Poland has 3 fewer days of hospitalisation than Portugal.

This part of the study shows the lengths of stay in hospitals in Poland depending on the disease entity which is the cause of the hospital stay (main sickness groups (ICD-10), including the period before and during the COVID-19 pandemic.

[4] Eurostat uses its own breakdown of hospitals, distinguishing short-stay hospitals (acute hospitals) from all hospitals. This section looks at length of stay for all hospitals

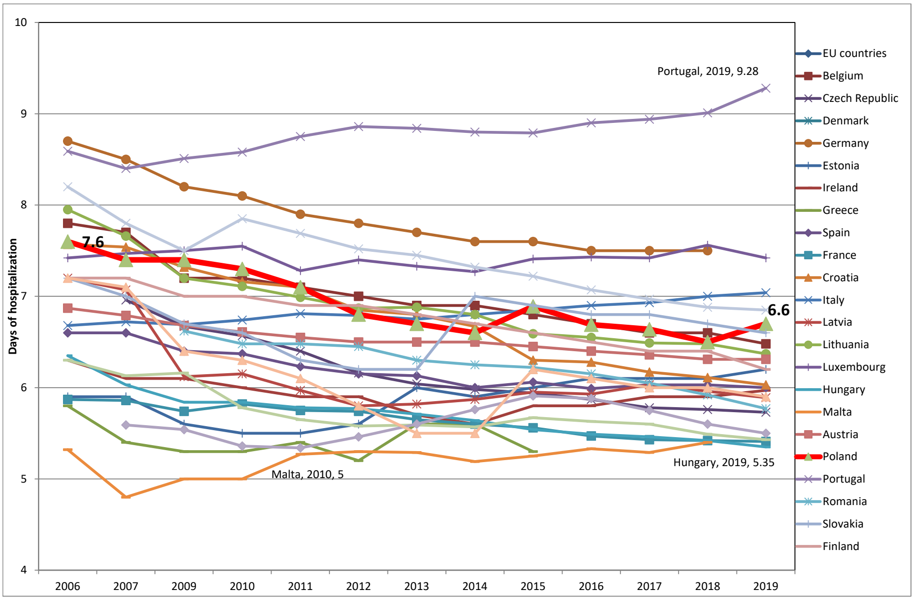

Fig. 4.9. Length of hospital stay for all causes in Poland and other EU countries (Eurostat OECD data)

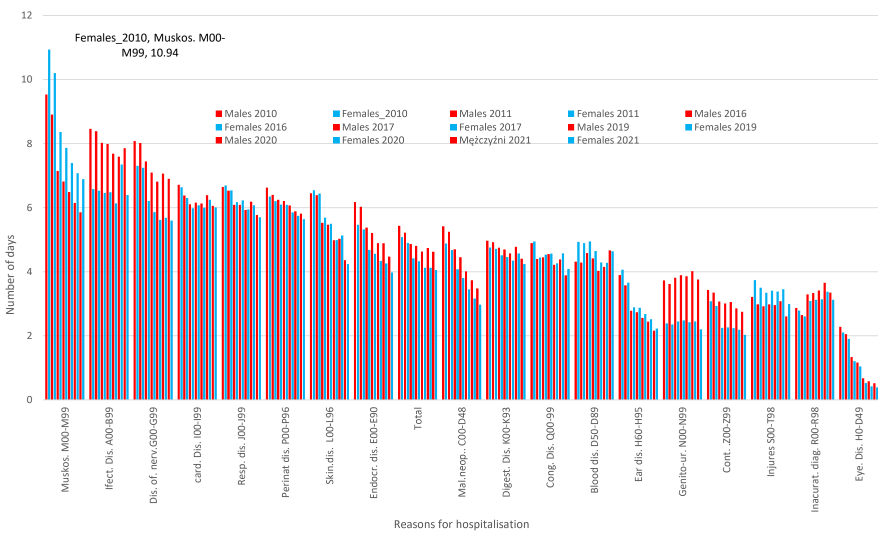

Fig. 4.10. Length of hospital stay in 2010, 2011, 2016, 2019, 2020 and 2021 (National Institute of Public Health NIH – National Research Institute data)

According to the recommendations of OECD experts from healthcare organisations, the length of hospitalisation should be reduced, and this is the case in almost all EU countries except those where it is already very short. This is due to new technologies allowing a number of procedures to be performed in a single day and avoiding, however, hospital-acquired infections. Figure 4.9 documents these trends also visible for our country.

Figure 4.10 shows the length of hospitalisation in Poland in 6 selected years from 2010 onwards according to groups of diagnoses in the International Classification of Diseases (ICD-10) by sex. From the figure, it can be seen that osteoarticular, infectious diseases and diseases of the nervous system are and used to be the longest hospitalisations, closely followed by cardiovascular diseases and respiratory diseases. The shortest stays in hospital are for people treated for diseases of the eye, causes specified inaccurately and trauma.

It is worth noting, as can be clearly seen from the figure, that for almost all diagnoses a trend towards shorter lengths of hospital stay is evident. This is most evident for diseases of the musculoskeletal system and, understandably given the widespread introduction of same-day procedures, diseases of the eye. The length of hospital stay of those treated for urinary and genitourinary diseases and causes specified inaccurately remains unchanged, while the length of hospital stay of those treated for cardiovascular diseases and respiratory diseases is slowly decreasing. It is noteworthy that for some diagnoses there are marked differences in the length of hospital stay between men and women. Men take significantly longer than women to be treated in hospital for infectious diseases and genitourinary diseases and causes specified inaccurately. Women stay in hospital longer than men due to osteoarticular diseases and injuries. Overall, however, considering all diagnoses, men stayed longer than women in hospital for treatment. It is noteworthy that during the 2020–2021 pandemic years, the trend of reduced length of hospital stay continued for most causes of hospitalisation.

4.6. Hospital mortality

Overall, for all causes of hospitalisation, mortality associated with treatment in general hospitals in Poland decreased slightly between 2003 and 2006 from 2.3% to 2.1%; in 2015 it was 2.0%, in 2016 1.9% – for all causes of hospitalisation combined. In the last two years before (2017 and 2018) the COVID-19 pandemic, hospital mortality rates were 1.95% and 2.0%.

The largest positive changes in hospital mortality are observed for total tumour: a change from 5% in 2003 to 3.6% in 2006, and then to 3.2% in 2015, 3% in 2016 and 2.7 in 2018. In cardiovascular disease overall, there was also a reduction in mortality from 6.3% to 5.9% and 5.6 in 2015 at the end to 5.3% in 2016. In 2018, cardiovascular mortality increased to 5.9% although it was 5.7% in 2017.

Hospital mortality from other causes has not changed much in recent years and was highest in 2018 for respiratory diseases 3.8%, infectious diseases 3.4%, digestive system diseases 2.2%, endocrine diseases and haematopoietic diseases 2.1 each. A fairly high hospital mortality (2.6%) is recorded due to causes specified inaccurately (2.6%) by ICD-10: R00-R99.

The aim of the analysis presented below is to show hospital mortality in the year prior to the COVID-19 pandemic and in the years of the pandemic compared to 2019.

From table 4.6 and figure 4.8, it can be seen that total hospital mortality increased by 1% in both men and women in 2020 compared to 2019. It is noteworthy that in 2019 this mortality was equal to that observed in 2018 and therefore 2% overall[5].

At the outset, it should be noted that total hospital mortality was higher in each year in the period 2019–2021 among men than among women, a difference that was slightly smaller in the pre-pandemic period. Regardless of changes in hospital mortality from one year to the next, the highest mortality rates can be found among those treated for cardiovascular diseases, respiratory diseases and infectious diseases. There are distinct groups of diseases for which the mortality rate among women is higher than among men. This includes cardiovascular diseases and skin diseases. Higher hospital mortality for men than for women is found for tumours and diseases of the nervous system. For all disease groups in men and almost all diseases in women, there is an increase in

[5] No sex breakdown.

hospital mortality in the first year of the pandemic. Thus, despite the reduction in general hospital admissions to increase health security, hospital mortality overall and by cause group increased in both men and women. In the second year of the pandemic (2021), total hospital mortality is slightly higher than in 2020, but for many groups of disease entities it is lower than in 2020, this is especially true for infectious diseases.

Table 4.6. Hospital mortality in Poland in 2019, 2020 and 2021 according to causes of hospitalisation by sex (National Institute of Public Health NIH – National Research Institute data)

ICD-10 diagnoses	Men 2019	Women 2019	Men 2020	Women 2020	Men 2021	Women 2021
Infectious diseases A00-B99	3.3	3.4	6.3	6.2	5.0	5.6
Malignant tumours C00-C97	3.2	2.2	3.1	2.1	2.8	1.8
Blood diseases D50 – D89	2.0	2.1	2.6	2.6	2.8	2.8
Endocrine disorders, internal E00-E90	2.2	2.0	2.9	2.5	2.5	2.2
Nervous system diseases G00-G99	0.7	0.5	1.0	0.7	1.0	0.7
Eye diseases H00-H59	0.0	0.0	0.0	0.0	0.0	0.0
Ear diseases H60-H95	0.0	0.0	0.1	0.0	0.0	0.0
Cardiovascular diseases I00-I99	5.3	6.4	6.9	8.2	6.3	7.7
Respiratory diseases J00-J99	4.0	4.0	6.8	6.3	5.7	5.8
Digestive system diseases K00-K93	2.3	2.2	3.2	3.2	2.9	2.9
Skin diseases L00-L99	1.2	1.6	1.6	2.5	1.6	2.3
Skeletal system diseases M00-M99	0.1	0.1	0.1	0.1	0.2	0.1
Urinary-genital diseases Genitourinary diseases N00-N99	2.5	1.3	3.3	1.7	2.8	1.4
Perinatal conditions P00-P96	0.7	0.8	0.8	0.8	0.8	0.7
Developmental defects Q00-Q96	0.5	0.6	0.6	0.6	0.5	0.6
Causes specified inaccurately R00-R99	2.9	2.5	4.3	3.4	3.5	3.0
SARS-CoV-2			24.3	19.1	22.9	19.9
Injuries and poisonings S00-T14	1.0	1.1	1.2	1.2	1.0	1.1
Individual contact Z00-Z99	0.3	0.2	0.3	0.2	0.3	0.2
Total	**2.3**	**1.8**	**3.4**	**2.4**	**3.5**	**2.6**

Against the backdrop of the presented hospital mortality by major cause ICD-010, COVID-19 mortality stands out. It was just over 24% in men in 2020 and almost 23% in 2021. In women, there is a minimal increase in mortality during the pandemic period from

19.1% to 19.9% in 2021. It can be seen, therefore, that the life-threatening risk of COVID-19 female patients has increased slightly and that in men it has decreased minimally.

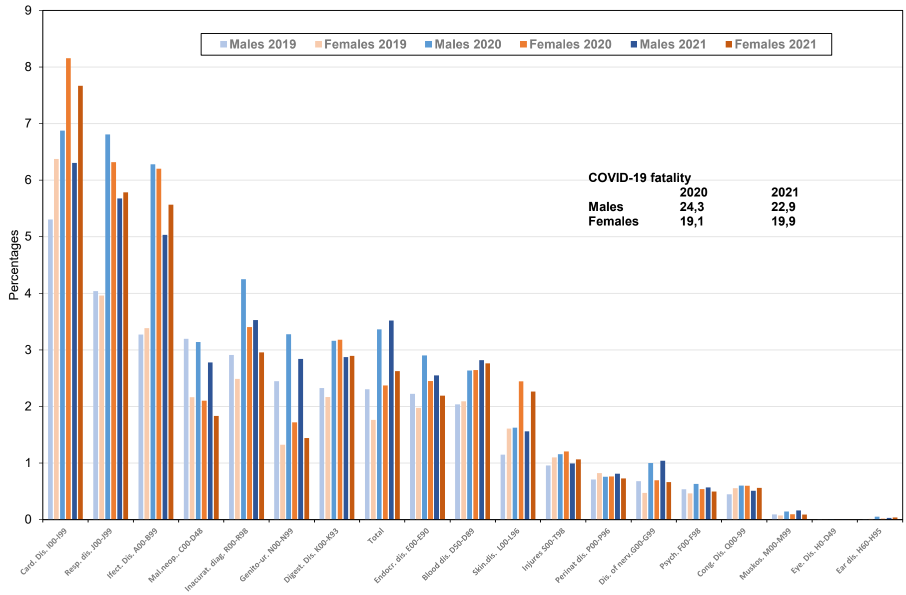

Fig. 4.11. Hospital mortality in Poland in 2019, 2020 and 2021 according to causes of hospitalisation by sex (National Institute of Public Health NIH – National Research Institute data)

4.7. Hospitalization due to SARS-CoV-2 in hospitals in Poland

The data presented below are taken from the Nationwide General Hospital Morbidity Survey, which is conducted in accordance with the current Public Statistics Survey Programme.

Two new disease codes have been introduced into the International Classification of Diseases (ICD-10) in line with the findings introduced by the World Health Organisation in connection with the COVID-19 pandemic:

15. U07.1 COVID-19 – when SARS-CoV-2 virus is identified by laboratory testing (molecular RT-PCR), cases confirmed according to the definition of communicable disease cases for epidemiological surveillance,

16. UO7.2 COVID-19 – when the virus is unidentified and COVID-19 has been diagnosed on the basis of clinical signs or epidemiological criteria, but the laboratory result is inconclusive or unavailable.

Two subsets of data were selected from the dataset collected at the National Institute of Public Health NIH – National Research Institute as part of the aforementioned survey (Nationwide General Hospital Morbidity Survey) in 2020, and 2021, of people who had a hospital stay and, on discharge from hospital in 2020 and 2021, had one of the two codes listed above as the main reason for hospitalisation. The total number of COVID-19 hospitalised patients included in the analysis was 91589 in 2020 and 289178 in 2021. It should be added that many people hospitalised for other reasons in 2020 and 2021 had an ICD-10 comorbidity code U07.1 or U07.2 entered as a concurrent reason for hospitalisation. It was 40 000 people in 2020 and 53 000 in 2021. In the analysis presented in this study, only those patients were included who had one of the two above-mentioned ICD-10 codes entered in the general hospital statistical chart (Mz/Szp-11) as the principal reason for hospitalisation.

Figure 4.12. shows inpatient hospitalisation rates for COVID-19 in 2020 and 2021. As can be seen from the figure, the increase in hospital admissions in the population with age was close to exponential and after the age of 50 the number of people requiring hospital treatment for COVID-19 was rapidly increasing. It should be noted that more men than women were hospitalised in each age group in both 2020 and 2021. It is clear from the figure that the 2021 epidemic covered a significantly larger proportion of the older people population. What is puzzling is the relatively high incidence of hospitalisation due to COVID-19 in 2021 compared to 2020 for children aged 0–4 years.

The analysis of data on people hospitalised in hospitals in Poland during the Pandemic presented the basic characteristics of this group of patients and made a comparative analysis of these characteristics in both years.

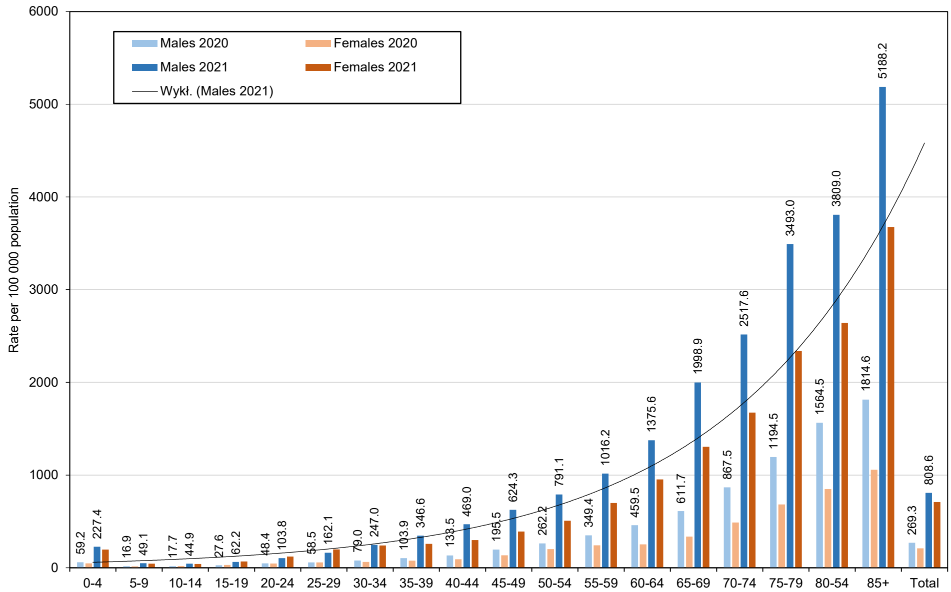

Fig. 4.12. Hospitalisation rates due to COVID-19 in Poland by age group and sex (National Institute of Public Health NIH – National Research Institute data)

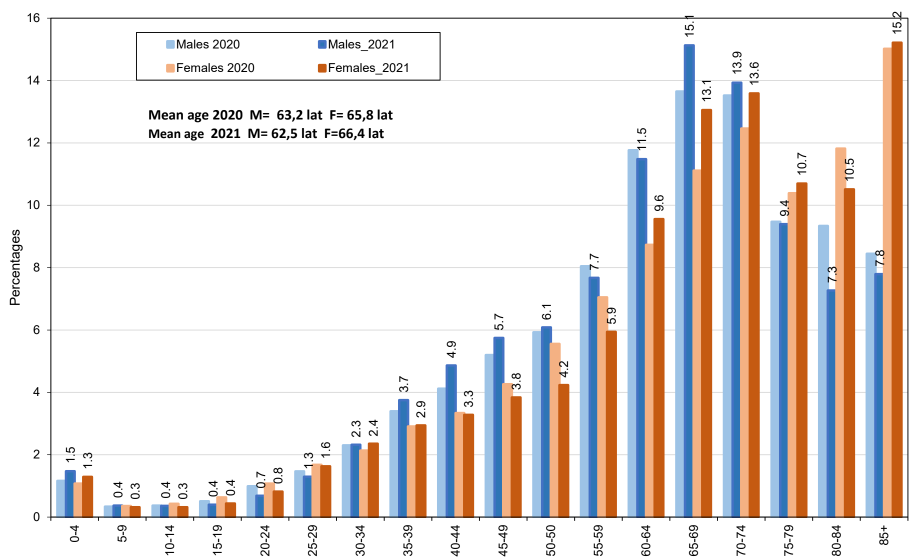

Fig. 4.13. Age structure of men and women treated for COVID-19 in hospitals in Poland in 2020 and 2021 (National Institute of Public Health NIH – National Research Institute data)

Average age of patients treated in hospitals for COVID 19 in 2020 was 63.2 years in men and 65.8 in women. Men treated in 2021 were also slightly younger 62.5 and women older 66.4.

As can be seen, patients treated for COVID-19 under 30 years of age constituted a small group of hospitalised patients not reaching 2% in each of the under-30 age groups. Among those treated for COVID-19 in the under-30 age groups, there are almost equal hospitalisation rates in both years of the pandemic, and this applies to both men and women.

From 30 to 60 years, more men were hospitalised than women and from 70 years onwards the hospitalisation rates for both sexes decrease. However, above the age of 80, the proportions of hospitalised men and women diverge in opposite directions. In conclusion, it can be said that the age percentage structures of hospitalised COVID-19 patients in 2020 and 2021 were similar. Overall, it can be stated that more than 80% of patients treated in hospitals in Poland for COVID-19 were over 50 years of age.

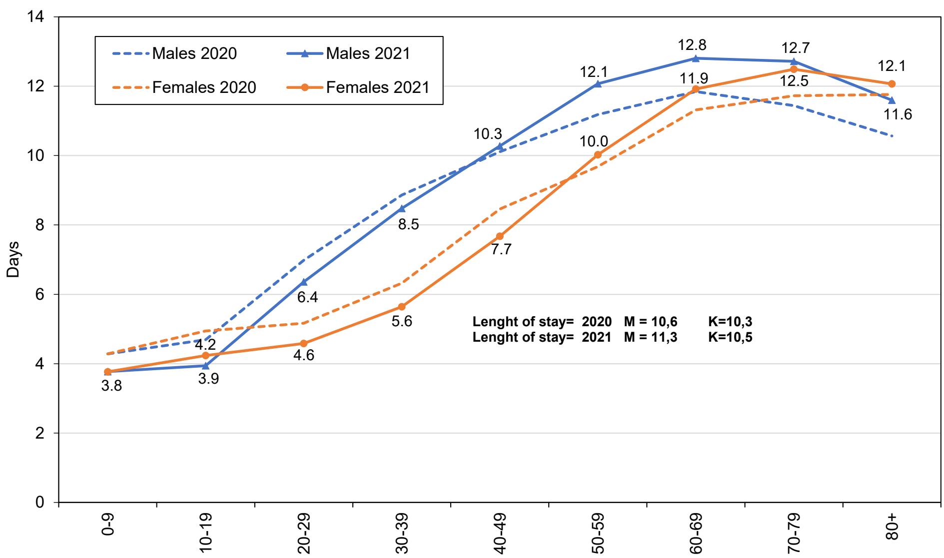

Fig. 4.14. Length of hospital stay by age group of patients hospitalised for COVID-19 in Poland in 2020 and 2021 (National Institute of Public Health NIH – National Research Institute data)

The average length of stay for patients treated for COVID-19 in Poland was similar for men and women in both years of the pandemic, ranging from 10.3 days to 10.6 days.

However, there were large differences in length of stay depending on age, ranging from four days in the youngest (0–4) years to almost 13 days in the 70–79 age group. It is worth noting that after the age of 70 there is some reduction in the length of hospital stay. Women aged 20–60 years had shorter hospital stays than men.

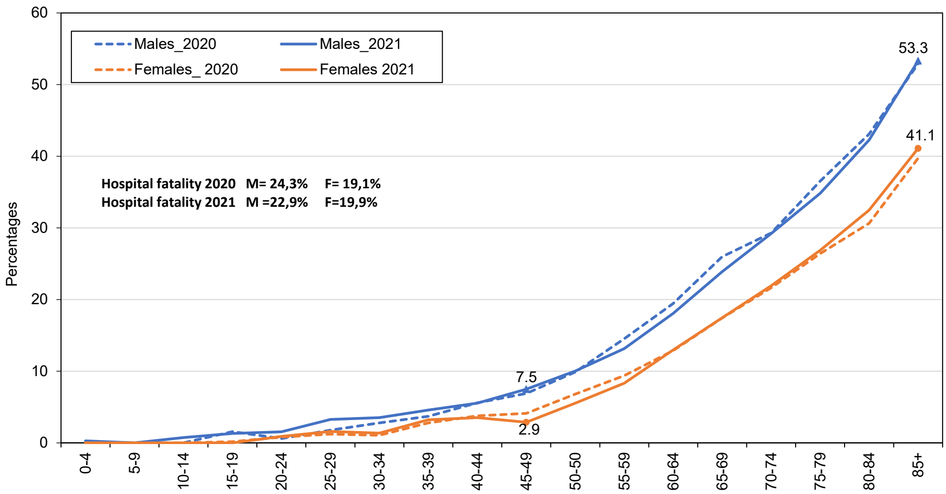

Fig. 4.15. Hospital mortality due to COVID-19 in Poland in 2020 and 2021 according to the age of hospitalised patients (National Institute of Public Health NIH – National Research Institute data)

Hospital mortality in both men and women increased with age very similarly in both years of the COVID-19 pandemic. Up to the age of 20, it was close to zero, but from the age of 30 onwards, one can see the mortality rate increase faster in men than in women, so that at the age of 85 and above, the mortality rate among men was more than 50 percent of those treated in hospital for COVID-19, and 10 percent higher than the mortality rate among women. Overall, during the 2020 pandemic, among men treated in hospital, 24% of those hospitalised died in 2020 and slightly less, 22.9%, in 2021. The risk of death among hospitalised women was lower than for men, as 19% of women treated for COVID-19 died in 2020 and the hospital mortality rate increased slightly to 19.9% in 2021.

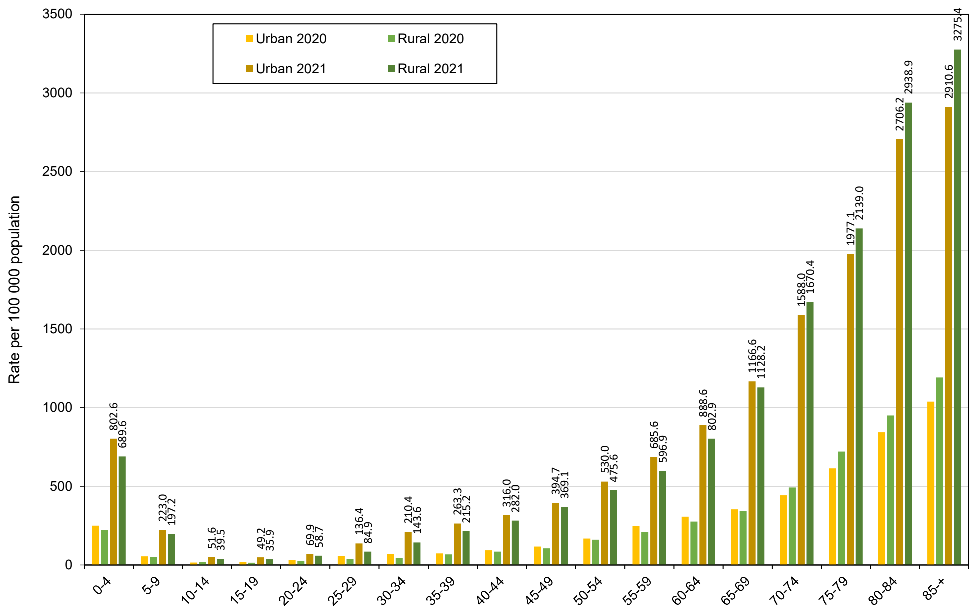

Fig. 4.16. Hospitalisation rates of urban and rural residents by age in 2020 and 2021 (National Institute of Public Health NIH – National Research Institute data)

Hospitalization of urban and rural residents due to COVID-19 in 2020 and 2021 looked similar – Fig. 4.16. However, in both the first and second year of the pandemic, urban residents before 60 years of age were more likely to be hospitalized and rural residents from 65 years of age onwards. As noted previously, more than twice as many people were hospitalised in almost all age groups in the second year of the pandemic. The age of urban and rural residents hospitalised for COVID-19 was similar, 64.4 and 64.3 respectively; the length of hospital stay was similar: 10.4 days and hospital mortality 22.3 days.

4.8. Hospitalization of adolescents and the older people for eye diseases in 2019–2021

The World Health Organisation estimates that visual impairment affects 285.4 million people globally, 13.8 percent of whom are blind. The most common causes of eye disease worldwide include refractive errors that translate into visual acuity (42%), cataracts

(33%) and glaucoma (2%). The predominant cause of blindness is cataracts (51%), followed by glaucoma (8%) and macular degeneration (AMD).

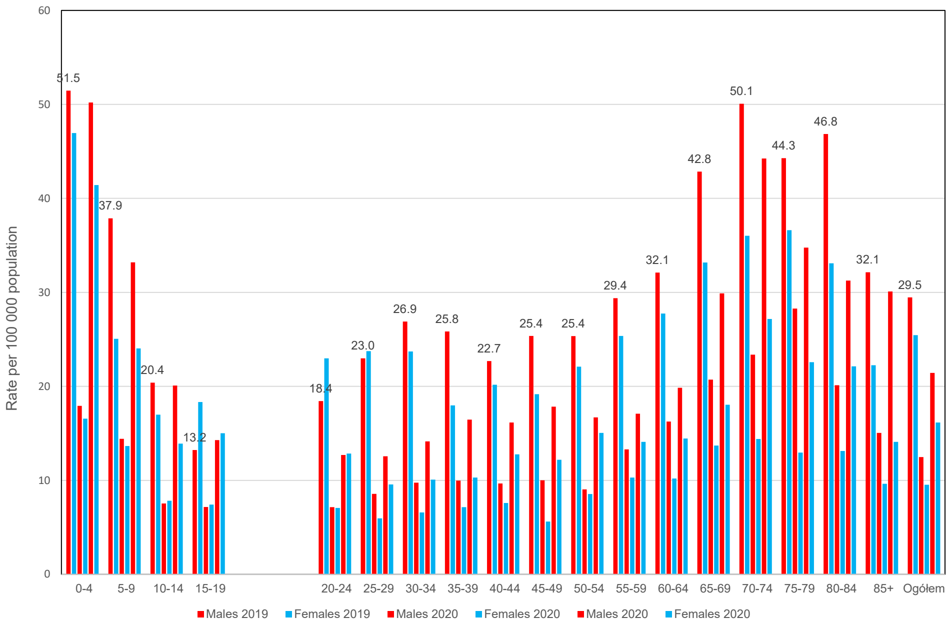

Fig. 4.17. Hospitalizations due to conjunctival disorders (H10-H13) in 2019–2021; rates per 100 000 population (National Institute of Public Health NIH – National Research Institute data)

The following subsection presents a selection of the above-mentioned eye diseases hospitalised in Poland in 2019–2020, with the aim of examining whether the COVID-19 pandemic period has affected the frequency of treatment for these socially important health problems particularly in the child and adolescent population and the older people.

Figure 14.17 shows the hospitalisation of adolescents up to the age of 19 years and the older people for conjunctival disorders; this group of diagnoses mainly includes conjunctivitis. As can be seen from the figure, in all the years analysed, these conditions predominate in the youngest age groups and hospitalisation for them decreases steadily until the age of 19. In the older people, hospital treatment of conjunctival disorders increases steadily in both men and women, reaching a maximum at age 70 and declining in the oldest people to the level seen in those in their 20s. In each age group, in both the youngest and the oldest, men were more frequently hospitalised than women.

In 2020, the hospitalisation rate decreased in men from 29 to 12 and therefore more than doubled and in women from 25 to 10. In 2021, there was an increase in the incidence of hospital treatment for conjunctival disorders, but the value of hospitalisation rates did not reach that observed in 2019.

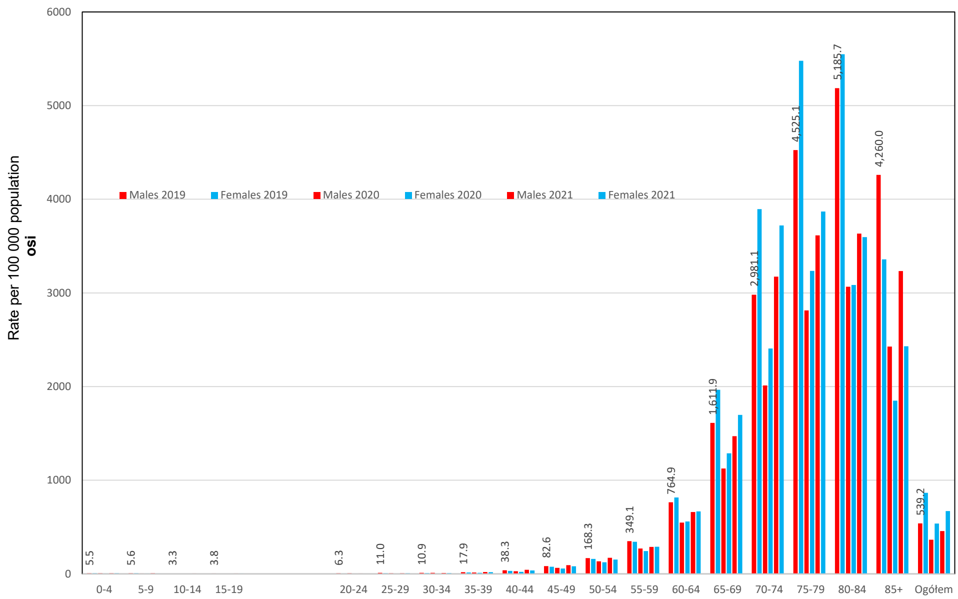

Fig. 4.18. Hospitalization from lens disorders (H25-H28) in 2019–2021 – rates per 100 000 population (National Institute of Public Health NIH – National Research Institute data)

Lens disorders, mainly cataracts (Fig. 4.18 occur primarily in the older people as senile cataracts, but as can be seen from the figure, hospitalisations for cataracts also occur in the very young and in adolescents up to 19 years of age. However, the majority of cataract hospitalisations occur in people over 60 years of age. In general, women are hospitalised more often than men for cataracts and this applies to almost all age groups in the years analysed. As in the case of conjunctivitis, a reduction in the incidence of hospital treatment for cataract was observed in 2020. 2021 is characterised by an increase in the incidence of hospital treatment for cataract and thus a reduction in the so-called "health debt" created. It should be noted that cataract treatment is mainly the removal of the cloudy lens (senile cataract), and treatments of this kind are increasingly taking place outside the hospital on an outpatient basis.

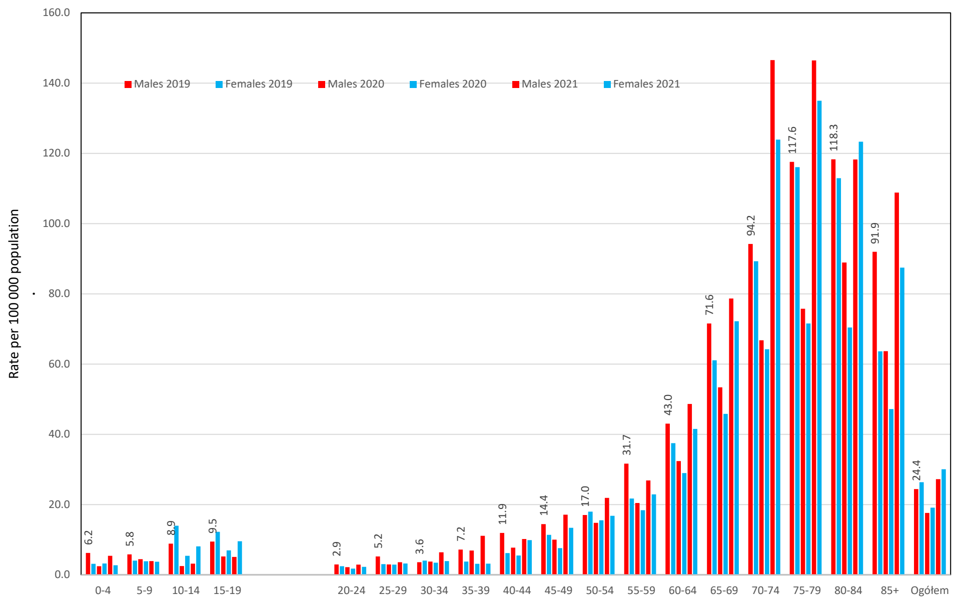

Fig. 4.19. Hospitalisation due to glaucoma (H40-H42) rates per 100 000 population (National Institute of Public Health NIH – National Research Institute data)

Glaucoma, Fig. 4.19 is a disorder like cataract that develops in old age, but as can be seen from the figure up to the age of 19 there are cases of hospitalisation – and slightly more common at that – among 15–19-year-olds. However, most people are treated in hospital for cataracts between the ages of 70 and 80, although a systematic increase in the incidence of cataracts has been observed from the age of 40. Up to the age of 19, cataracts were slightly more often treated in women and after 40; men are more often treated for glaucoma. Characteristically, the catch-up in glaucoma treatment in 2020 is evident after the age of 60 in both men and women, and also visible overall for all age groups.

Cataracts and glaucoma can lead to visual impairment, which is treated in hospital with an ICD-10 diagnosis: H53-H54 (Fig. 4.20). As can be seen from the figure, a very high number of children of adolescents under the age of 19, especially those aged 5–9, are in hospital for this reason, with more girls than boys. In older people over 60 years of age, women predominate among those hospitalised. Overall, as in the case of hospital treatment of glaucoma, a trend is evident of making up for the shortfall in hospitalisation due to amblyopia in the year of the pandemic by an increase in hospitalisation in 2021.

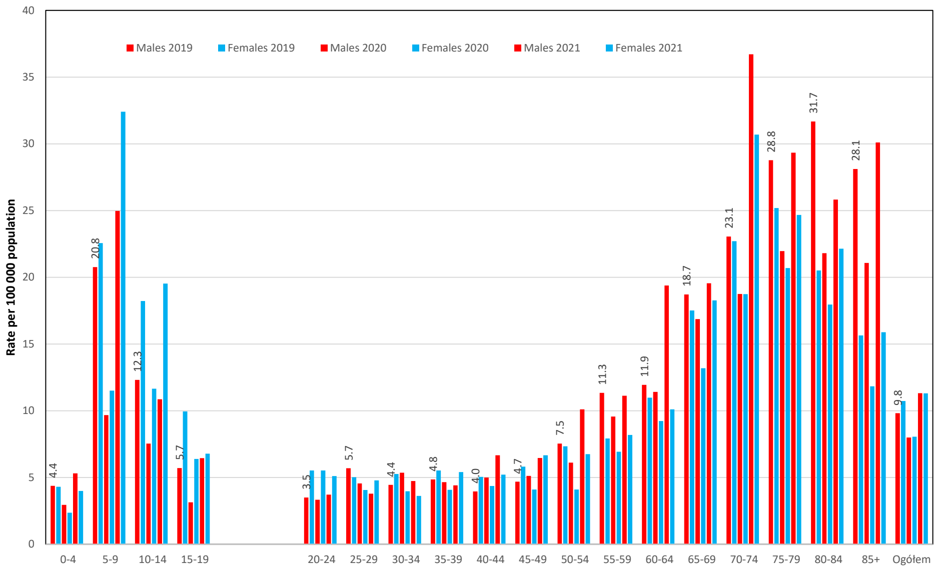

Fig. 4.20. Hospitalization due to visual impairment and blindness (H53-H54) in 2019–2021 – rates per 100 000 population (National Institute of Public Health NIH – National Research Institute data)

SUMMARY

In the first year of the COVID-19 pandemic (2020), there was an unprecedented reduction in hospitalisation rates in Poland; in the second year of the pandemic (2022), the catch-up in hospitalisation shortfalls (the so-called "health debt") varied in magnitude, so that for some diagnoses, hospitalisation rates exceeded those of 2019.

1. In 2019, hospitalisation in general hospitals was provided in Poland to: 8 478 000 people and in 2020 6 482 000 people, or 31% less, due to the COVID-19 pandemic

and the reorganisation of the operation of hospitals by, among other things, converting some of them to so-called "dedicated hospitals". There were also fewer patients admitted to hospital in 2021 than in 2019–7 872 thousand or 7% less, but slightly more so than in 2020 (by 21%). This did not compensate for the so-called "health debt" created by the COVID-19 pandemic, which was also caused by patients with scheduled hospital treatment abandoning it.

2. The Standardised rates of total hospitalisation were 19013.7, 14213.5 and 17728.6 per 100 000 population in the subsequent years analysed. The difference in rates between 2019 and the pandemic year was 33.8%, and the increase in 2021 was 7.2% – still more than 24% less than the pre-pandemic COVID-19 hospitalisation rate.
3. If absolute numbers are taken into account, women were hospitalised more often than men, but as shown in the analysis of most causes of sickness after standardisation of hospitalisation rates, men are more likely to be hospitalised for most of the main causes of hospitalisation. Of the 28 causes of hospitalisation analysed, only six standardised rates were higher in women, and this applies in principle to the three years analysed. Some of the differences in rates to the detriment of men especially regarding cardiovascular diseases (myocardial infarction, atherosclerosis) exceeded 100%. Higher female hospitalisation rates are found for endocrine disorders and genitourinary diseases.
4. Fewer people were hospitalised in 2020 than in 2019 and this applies to all analysed diagnosis groups, with an increase in rates in 2021, however, to a lower level than before the pandemic. The largest decreases in rates were observed for infectious diseases (excluding COVID-19), chronic lower respiratory diseases, hypertensive disease, nervous system diseases and cardiovascular diseases in general. In contrast, the smallest decreases in rates were found for myocardial infarction and cerebrovascular disease, hospital stays related to pregnancy and childbirth and for tumour overall.
5. For almost all diagnoses analysed, the decreases in hospitalisation rates in 2020 compared to 2019 were higher in rural residents than in urban residents. In 2020, the largest decreases in hospitalisation rates were observed in both urban and rural areas for infectious diseases, chronic lower respiratory diseases and

hypertensive disease and diseases of the nervous system. The smallest decreases for tumour, myocardial infarction, cerebrovascular disease, and causes of hospital stay related to childbirth (excluding deliveries). The year 2021 sees a levelling off of the shortfall in hospital admissions and thus a reduction in the so-called "health debt", which, as stated above, is greater for rural than urban residents.

6. Only 5 of the 27 EU countries hospitalise their citizens longer than Poland (2019 figures), but since 2006, according to OECD expert recommendations, the length of hospitalisation in Poland overall for all causes has decreased by 1 day. The longest hospitalisations are and used to be osteoarticular diseases, infectious diseases and nervous system diseases, closely followed by cardiovascular diseases and respiratory diseases. The shortest stays in hospitals in Poland are for people treated for diseases of the eye, causes specified inaccurately and injuries.
7. Overall hospital mortality in Poland for all causes has remained similar for many years with slight fluctuations of 2–3 percent and in the first year of the pandemic it rose to 3.5 percent. Total hospital mortality was higher among males than females in each year during the 2019–2021 period, a difference that was slightly smaller in the pre-pandemic period. The highest mortality rates are found among those treated for cardiovascular diseases, respiratory diseases and infectious diseases.
8. According to the Nationwide General Hospital Morbidity Survey, during the COVID-19 pandemic, 91589 people were hospitalised for Sars-Cov-2 (principal diagnosis) in hospitals in Poland and 289178 in 2021. In addition, 40 000 people were hospitalised in 2021 who had a diagnosis of U07.1 or U07.2 entered as a co-morbid diagnosis.
9. The majority of people treated for COVID-19 are older people; 80% were over 50 years of age and the average age of those treated was 63 years for men in 2020 and 66 years for women; in 2021, the ages of men and women were 63 and 66 respectively.
10. Hospital mortality for COVID-19 was less than 10% up to the age of 50 years but in the older people in both 2020 and 2021 it increased very rapidly reaching 50% in men aged 85 years and more. From the age of 50 years, hospital mortality due to COVID-19 was significantly higher in men than in women. On average, it decreased slightly in men from 23% to 21% and in women from 19.1 to 18.9.

11. Hospitalization of urban and rural residents in 2020 and 2021 looked similar. However, in both the first and second year of the pandemic, urban residents before 60 years of age were more likely to be hospitalized and rural residents from 65 years of age onwards. The length of hospitalisation for urban and rural residents was similar at 10 days and hospital mortality was 22%.
12. Despite an overall sustained reduction in hospitalisation rates also in the second year of the COVID-19 pandemic, for some diagnoses – ICD-10 e.g. glaucoma or visual impairment, an increase in hospitalisation is observed compared to the pre-pandemic 2019.

5. CARDIOVASCULAR DISEASES DURING THE COVID-19 PANDEMIC IN POLAND

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The impact of the COVID-19 pandemic on cardiovascular diseases can be considered at two levels. The first are patients diagnosed with COVID-19 infection. In these patients, there may have been either direct damage to the heart resulting in myocarditis or inflammatory myocarditis and pericarditis. COVID-19 patients may also have suffered from activation or destabilisation of pre-infection cardiovascular diseases: ischaemic heart disease, hypertension, heart failure, arrhythmias or venous thromboembolism. The second tier of analysis consists of individuals who were not diagnosed with the COVID-19 infection. This group of people did not receive adequate health care. This could have happened through the fault of the potential patient himself, but also through the fault of the healthcare system. The patient's fault is the disregard of emerging symptoms and the fear of COVID-19 infection in healthcare facilities, which together led to receiving qualified healthcare too late. The fault of the health system is the inability to get professional help due to closed doctors' offices, which has led to significantly longer already long queues in outpatient care. Not all health problems could be diagnosed through the use of phone consultation. A combination of "patient fault" and "health system fault" led to appropriate diagnoses being made too late, leading directly to a worsening of the prognosis of patients. The inability to receive appropriate care in outpatient care has led to an overload of hospital emergency departments (EDs).

Potentially ambulatory patients waiting for advice, in queues of many hours in the ED, were further exposed to COVID-19 infection.

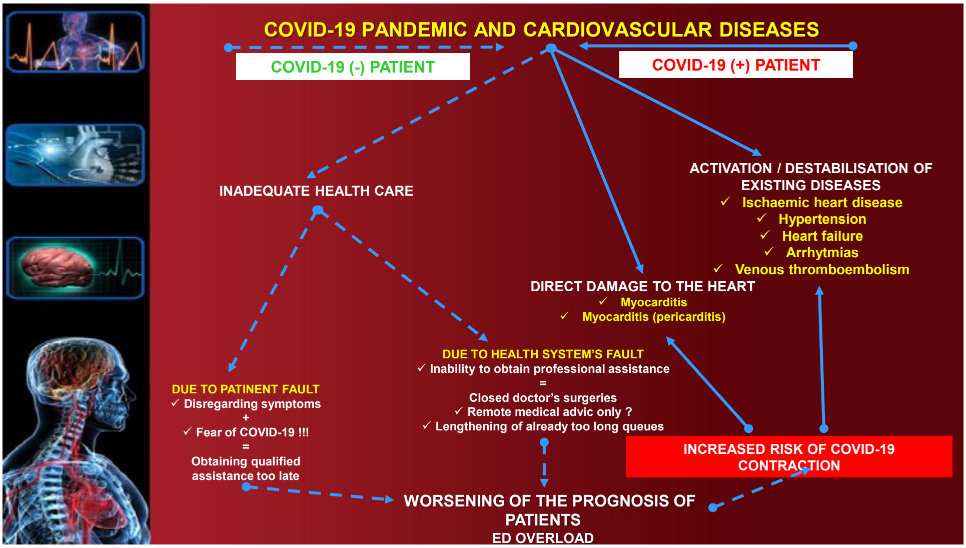


Fig. 5.1. COVID-19 pandemic and cardiovascular disease

5.1. Cardiovascular mortality in the era of the COVID-19 pandemic

Cardiovascular diseases (CVD) have been a major health problem and the leading cause of death in Poland since the second half of the 20th century. According to a recent analysis by Global Burden of Disease 2019 in 2019, CVD was responsible for 23% of DALY and 34% of life years lost due to premature death[1]. Until 2019, the level of CVD mortality as measured by the standardised mortality rate was decreasing (see section 3) but the years of the COVID-19 pandemic disrupted this trend. Time series analysis

1 Institute for Health Metrics and Evaluation, GBD Result Tool, http://ghdx.healthdata.org/gbd-results-tool, accessed: 10.10.2022

of mortality rates and estimation of excess CVD mortality in 2020 and 2021 relative to the level expected from the previous trend was carried out according to the method discussed in section 3.

Table 5.1 shows the observed values of the standardised mortality rate (obs. value) and estimates of the expected values (expected value) and the percentage of excess (or possibly reduction) of CVD mortality rates in Poland and individual provinces in 2020 and 2021. In the first year of the pandemic, the level of CVD mortality nationwide increased by 8.8% over the expected level and by 12.6% in the following year. Noteworthy is the large regional variation in excess deaths, especially in the second year of the pandemic, when the percentage of excess deaths in the Lubuskie and Dolnośląskie provinces was 82.5% and 53.7%, respectively, while in the Świętokrzyskie, Wielkopolskie and Zachodniopomorskie provinces the mortality level was even lower than expected.

The magnitude of excess CVD mortality varied over the months of the pandemic. Figure 5.2 shows the changes in the observed monthly mortality rates between 2010 and 2021 and between 2020 and 2021 also the changes in the rates expected from the pattern of monthly changes in earlier years, while Table 5.2 shows the values of the estimated rates in 2020 and 2021. It is noteworthy that while in 2020, a significant excess of CVD mortality only occurred in October and November, in 2021 the excess persisted throughout April.

The excess mortality from total CVD was fairly similar among men (10.9% and 13.1% in 2020 and 2021 respectively) and women (8.7% and 13.9%). There is considerable variation in excess deaths depending on the specific CVD subgroup (Table 5.3). The highest relative excess mortality occurred for hypertensive disease and ischaemic heart disease (IHD). It should be noted that the excess mortality due to IHD in 2021 was not due to the excess mortality due to myocardial infarction, whereas, as can be seen from Fig. 5.3, the excess deaths due to myocardial infarction in 2020 occurred quite earlier as early as June.

Excess mortality from CVD overall among urban and rural residents was at similar levels (Table 5.4). Noteworthy is the higher excess mortality from IHD including myocardial infarction in the first year of the pandemic among rural than urban residents.

Table 5.1. Observed standardised mortality rates (obs. value) and estimates of expected rates (expectation value) and their relative difference (%) by province in the years 2020–2021 (own calculations)

Province	2020			2021		
	Obs. value	Exp. value	%	Obs. value	Exp. value	%
Dolnośląskie	524.4	416.9	25.8	643.6	416.9	54.4
Kujawsko-pomorskie	436.3	439.3	-0.7	597.3	439.3	36.0
Lubelskie	632.0	504.5	25.3	656.3	504.5	30.1
Lubuskie	423.3	401.5	5.4	734.9	401.5	83.1
Łódzkie	492.7	461.9	6.7	468.7	461.9	1.5
Małopolskie	556.1	514	8.2	522.3	514	1.6
Mazowieckie	380.5	350.8	8.5	448.0	350.8	27.7
Opolskie	484.2	477.9	1.3	510.0	477.9	6.7
Podkarpackie	475.0	457	3.9	485.4	456.7	6.3
Podlaskie	523.4	473.1	10.6	528.4	474.9	11.3
Pomorskie	550.6	506.7	8.7	513.7	506.7	1.4
Śląskie	565.2	511.4	10.5	552.3	511.4	8.0
Świętokrzyskie	706.1	593.6	19.0	556.0	598.5	-7.1
Warmińsko-Mazurskie	454.5	431.7	5.3	432.7	431.7	0.2
Wielkopolskie	460.5	451	2.1	432.3	451	-4.1
Zachodniopomorskie	591.1	564.6	4.7	563.5	564.6	-0.2
Poland	**508.3**	**467.6**	**8.7**	**528.5**	**468.3**	**12.8**

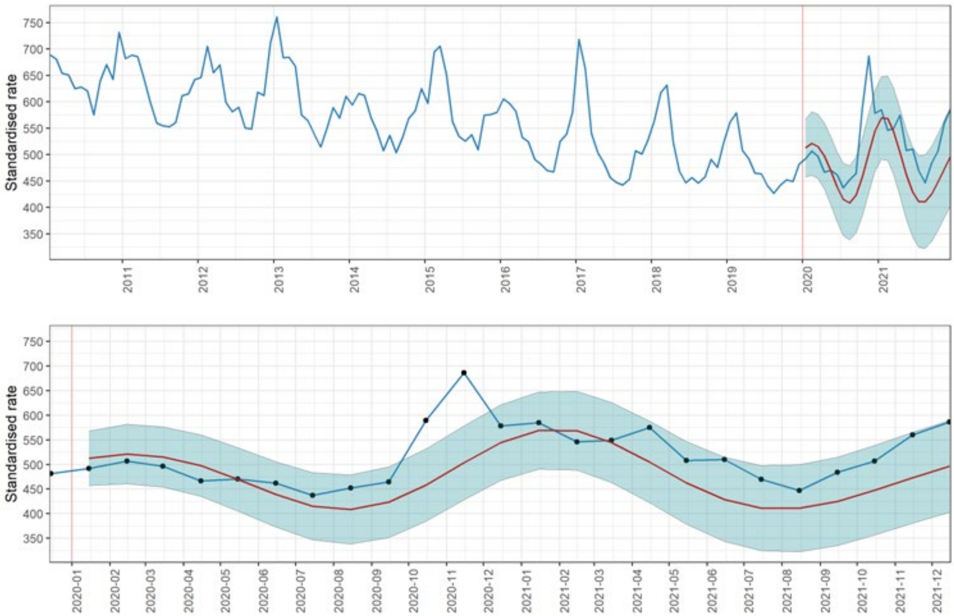


Fig. 5.2. Monthly mortality rates for total cardiovascular diseases for 2010–2021 and their expected values for 2020–2021 estimated from previous 10-year trends *(own calculations)*

Table 5.2. Observed standardised CVD mortality rates (obs. value) and estimates of expected rates (exp. value) and their relative difference (%) by month in Poland in 2020–2021 (own calculations)

Month	2020			2021		
	Obs. value	Exp. value	%	Obs. value	Exp. value	%
January	492.1	530.0	-7.2	585.2	538.2	8.7
February	506.6	547.4	-7.5	545.9	547.7	-0.3
March	496.8	526.8	-5.7	549.2	526.8	4.2
April	466.8	478.4	-2.4	574.9	478.4	20.2
May	470.2	437.1	7.6	507.9	437.1	16.2
June	462.2	416.6	10.9	510.3	416.6	22.5
July	437.0	424.6	2.9	469.5	424.6	10.6
August	452.1	401.0	12.8	446.9	401.0	11.5
September	464.6	422.3	10.0	483.9	422.3	14.6
October	589.7	461.1	27.9	506.7	461.1	9.9
November	686.5	460.7	49.0	560.1	460.7	21.6
December	578.4	504.9	14.6	586.0	504.9	16.1

Table 5.3. Observed standardised mortality rates (obs. value) due to selected CVD subgroups and estimates of expected rates (exp. value) and their relative difference (%) for men and women in 2020–2021 (own calculations)

Cause of death	2020			2021		
	Obs. value	Exp. value	%	Obs. value	Exp. value	%
Total						
CVD (I00-I99)	508.3	467.6	8.7	528.5	468.3	12.8
Hypertensive diseases (I10-I15)	34.9	24.7	41.4	41.1	24.7	66.2
Heart diseases ((I00-I09, I11, I13, I20-I51)	301.8	266.1	13.4	343.7	266.1	29.2
IHD (I20-I25)	157.1	129.2	21.6	213.2	129.2	65.0
Myocardial infarction (I21-I22)	41.1	37.7	9.1	35.3	37.7	-6.5
Pulmonary embolism (I26)	5.5	5.4	1.7	6.4	5.4	18.0
CEVD (I60-I69)	94.5	85.5	10.6	91.7	85.5	7.3
Males						
CVD (I00-I99)	633.1	571.2	10.8	648.1	571.2	13.5
Hypertensive diseases (I10-I15)	39.5	27.7	42.4	44.6	27.7	60.9
Heart diseases ((I00-I09, I11, I13, I20-I51)	396.6	365.0	8.6	433.1	365.5	18.5
IHD (I20-I25)	214.6	178.6	20.2	274.8	178.6	53.9
Myocardial infarction (I21-I22)	62.0	54.2	14.3	53.2	54.2	-1.9
Pulmonary embolism (I26)	6.5	6.3	3.3	7.6	6.3	20.6
CEVD (I60-I69)	111.5	101.1	10.3	107.5	101.1	6.3
Females						
CVD (I00-I99)	418.3	385.0	8.6	440.1	385.8	14.1
Hypertensive diseases (I10-I15)	30.9	23.0	34.5	37.2	22.8	63.0
Heart diseases ((I00-I09, I11, I13, I20-I51)	235.1	220.1	6.8	278.8	221.1	26.1
IHD (I20-I25)	117.1	94.8	23.5	169.5	94.8	78.8
Myocardial infarction (I21-I22)	25.7	24.8	3.7	21.7	24.8	-12.4
Pulmonary embolism (I26)	4.7	4.8	-3.1	5.4	4.8	11.9
CEVD (I60-I69)	80.9	73.3	10.4	79.1	73.3	7.9

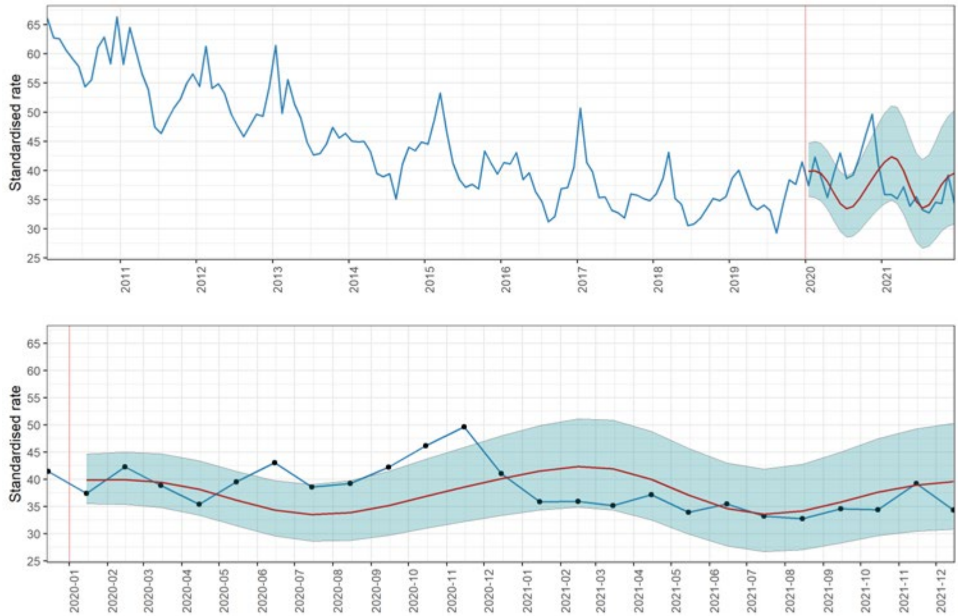


Fig. 5.3. Monthly mortality rates from myocardial infarction in Poland 2010–2021 and their expected values in 2020–2021 *(own calculations)*

Table 5.3. Observed standardised mortality rates (obs. value) due to selected CVD subgroups and estimates of expected rates (exp. value) and their relative difference (%) for urban and rural residents in 2020–2021 (own calculations)

Cause of death	2020			2021		
	Obs. value	Exp. value	%	Obs. value	Exp. value	%
Urban						
CVD (I00-I99)	468.5	420.2	11.5	491.5	420.2	17.0
Hypertensive diseases (I10-I15)	30.9	21.9	41.0	36.8	21.9	68.0
Heart diseases ((I00-I09, I11, I13, I20-I51)	281.7	245	15.0	321.5	245	31.2
IHD (I20-I25)	145.3	124.2	17.0	200.5	124.2	61.4
Myocardial infarction (I21-I22)	39.9	37.8	5.5	35.8	37.8	-5.3
Pulmonary embolism (I26)	5.2	5.4	-3.2	6.6	5.4	21.9
CEVD (I60-I69)	88.5	80.5	10.0	87.5	80.5	8.7
Rural						
CVD (I00-I99)	580.4	523.6	10.8	597.7	523.6	14.2
Hypertensive diseases (I10-I15)	42.3	30.2	40.1	48.9	30.2	61.9
Heart diseases ((I00-I09, I11, I13, I20-I51)	338.5	306.1	10.6	385.2	306.1	25.8
IHD (I20-I25)	178.5	139.2	28.2	236.9	139.2	70.2
Myocardial infarction (I21-I22)	43.2	36.9	17.1	34.5	36.9	-6.6
Pulmonary embolism (I26)	6.0	5.7	5.2	6.0	5.7	4.6
CEVD (I60-I69)	105.5	94.8	11.3	99.6	94.8	5.1

5.2. HOSPITALIZATIONS FOR CARDIOVASCULAR DISEASES IN THE ERA OF THE COVID-19 PANDEMIC

The analysis of total hospitalisations due to cardiovascular diseases presented below is based on data for the years 2010–2020 from the Nationwide General Hospital Morbidity Survey conducted by National Institute of Public Health, National Hygiene Institute – National Research Institute on behalf of the Ministry of Health as part of the Programme of Statistical Surveys of Public Statistics. The number of hospitalisations for cardiovascular diseases in 2020 (diagnoses I00-I99) was significantly lower than projected based on long-term observations (Fig. 5.4, Table 5.4a – 5.4e). A lower number of hospitalisations was observed in both the male and female groups, and also among rural as well as urban residents. The reduced number of hospitalisations for cardiovascular diseases peaked in the spring and autumn/winter months, which is clearly linked to the number of COVID-19 infections found.

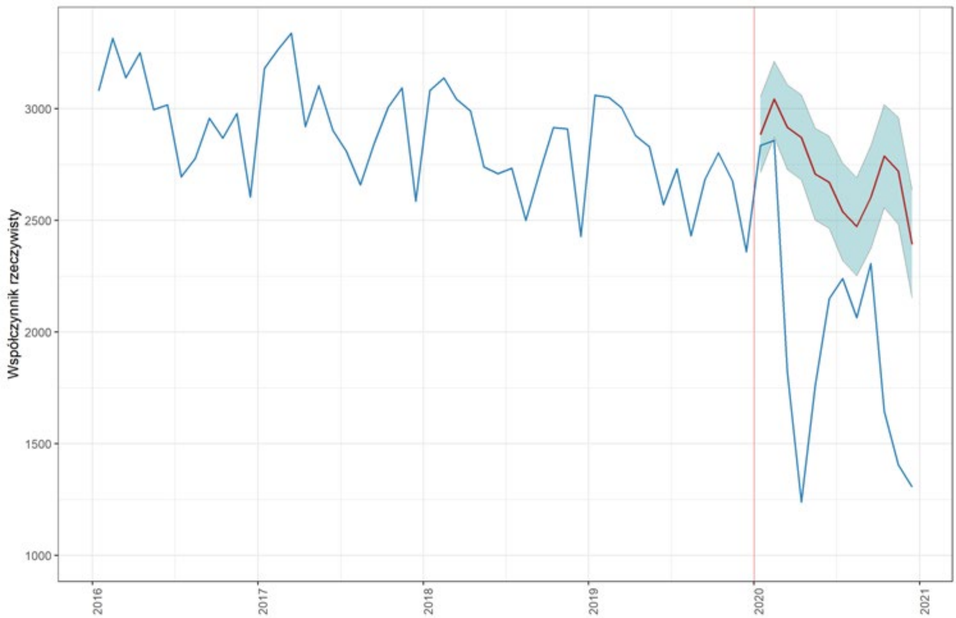


Fig. 5.4. Monthly hospitalisation rates for total cardiovascular diseases for 2010–2021 and their expected values for 2020 estimated from previous 10-year trends *(own calculations)*

Table 5.4a. Observed standardised hospitalisation rates of the total Polish population due to CVD (obs. value) and estimates of expected rates (exp. value) and their relative difference (%) by month in 2020 (own calculations)

Month	Value observed	Value projected	Percentage change
JAN	2,836.2	2,893.334	-2.0
FEB	2,858.5	3,085.857	-7.4
MAR	1,822.7	2,961.846	-38.5
APR	1,239.0	2,923.362	-57.6
MAY	1,758.8	2,773.386	-36.6
JUN	2,149.0	2,743.183	-21.7
JUL	2,239.2	2,543.898	-12.0
AUG	2,064.9	2,497.490	-17.3
SEP	2,307.3	2,611.465	-11.6
OCT	1,644.3	2,774.865	-40.7
NOV	1,405.2	2,695.360	-47.9
DEC	1,306.8	2,412.788	-45.8

Table 5.4b. Observed standardised hospitalisation rates of males due to CVD (obs. value) and estimates of expected rates (exp. value) and their relative difference (%) by month in 2020 (own calculations)

Month	Value observed	Value projected	Percentage change
JAN	3,142.1	3,216.380	-2.3
FEB	3,149.8	3,358.247	-6.2
MAR	2,059.0	3,248.675	-36.6
APR	1,434.2	3,213.510	-55.4
MAY	2,006.0	3,058.560	-34.4
JUN	2,459.9	3,067.260	-19.8
JUL	2,550.9	2,849.958	-10.5
AUG	2,353.4	2,769.189	-15.0
SEP	2,599.9	2,875.725	-9.6
OCT	1,879.4	3,027.953	-37.9
NOV	1,654.2	2,939.597	-43.7
DEC	1,542.6	2,692.274	-42.7

Table 5.4c. Observed standardised hospitalisation rates of females due to CVD (obs. value) and estimates of expected rates (exp. value) and their relative difference (%) by month in 2020 (own calculations)

Month	Value observed	Value projected	Percentage change
JAN	2,549.6	2,577.724	-1.1
FEB	2,585.6	2,790.605	-7.3
MAR	1,601.3	2,699.062	-40.7
APR	1,056.0	2,636.946	-60.0
MAY	1,527.2	2,462.197	-38.0
JUN	1,857.7	2,445.165	-24.0
JUL	1,947.2	2,236.929	-13.0
AUG	1,794.7	2,224.110	-19.3
SEP	2,033.2	2,382.430	-14.7
OCT	1,424.0	2,514.919	-43.4
NOV	1,171.9	2,457.779	-52.3
DEC	1,085.8	2,164.153	-49.8

Table 5.4d. Observed standardised hospitalisation rates of urban residents due to CVD (obs. value) and estimates of expected rates (exp. value) and their relative difference (%) by month in 2020 (own calculations)

Month	Value observed	Value projected	Percentage change
JAN	2,951.9	2,983.600	-1.1
FEB	2,974.8	3,174.439	-6.3
MAR	1,896.0	3,064.861	-38.1
APR	1,281.5	3,007.149	-57.4
MAY	1,807.7	2,841.520	-36.4
JUN	2,233.2	2,847.518	-21.6
JUL	2,338.5	2,614.998	-10.6
AUG	2,162.3	2,586.629	-16.4
SEP	2,446.7	2,749.351	-11.0
OCT	1,761.6	2,893.844	-39.1
NOV	1,503.2	2,795.635	-46.2
DEC	1,386.1	2,491.916	-44.4

Table 5.4e. Observed standardised hospitalisation rates of urban residents due to CVD (obs. value) and estimates of expected rates (exp. value) and their relative difference (%) by month in 2020 (own calculations)

Month	Value observed	Value projected	Percentage change	Materiality
JAN	2,662.7	2,735.821	-2.7	
FEB	2,684.3	2,926.935	-8.3	*
MAR	1,712.9	2,828.076	-39.4	*
APR	1,175.3	2,784.575	-57.8	*
MAY	1,685.4	2,648.940	-36.4	*
JUN	2,022.7	2,628.425	-23.0	*
JUL	2,090.4	2,439.117	-14.3	*
AUG	1,919.1	2,385.496	-19.6	*
SEP	2,098.5	2,455.017	-14.5	*
OCT	1,468.5	2,588.486	-43.3	*
NOV	1,258.3	2,569,212	-51.0	*
DEC	1,187.9	2,330,897	-49.0	*

Below, we present summaries and analyses derived both from reporting data to the National Health Fund from selected provinces (Śląskie, Opolskie and Podlaskie provinces), including the Silesian SILICARD Cardiovascular Database and the Opole Civilisation Diseases Database, but also from data from selected hospitals in Poland. In particular, the Silesian SILICARD Cardiovascular Database was created on the initiative of Prof. Mariusz Gasior and includes all medical events reported to the National Health Fund of patients with cardiovascular diseases from the Śląskie province since 2009; similarly, the Opole Civilisation Diseases Database, which was created on the initiative of Prof. Marek Gierlotka, includes similar data from the Opolskie province.

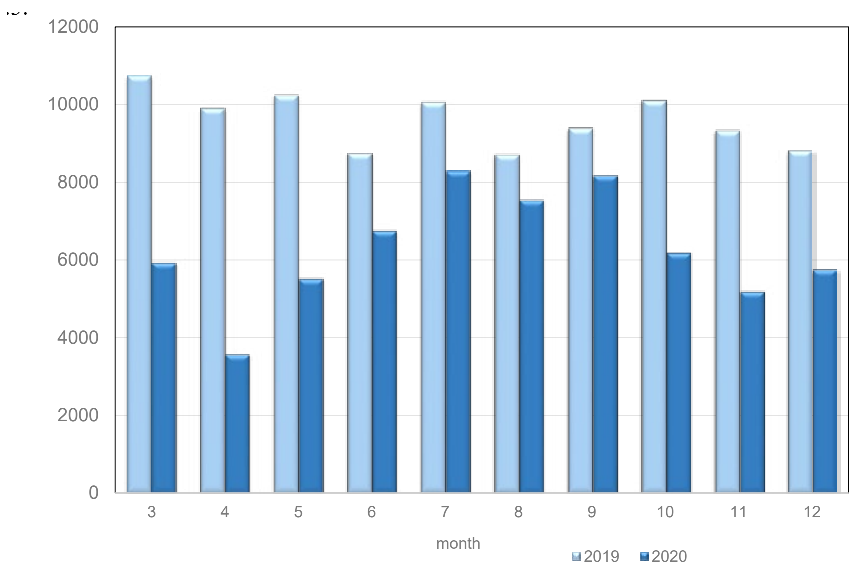


Fig. 5.5. Number of hospitalizations due to cardiovascular diseases in total in Śląskie province in 2019 and 2020 *(Figures: SILICARD)*

5.3. Silesian Cardiovascular Database SILICARD M. Gąsior, D. Cieśla et al.

According to data from Silesian Cardiovascular Database – SILICARD, the number of hospitalisations due to cardiovascular diseases in Śląskie province in the period March-December 2019 – March-December 2020 decreased by nearly 34%. Again, the decrease in hospitalisations was most pronounced in the months with the highest number of COVID-19 infections (Fig. 5.5.).

5.4. CARDIAC AMBULATORY CARE DURING THE COVID-19 PANDEMIC

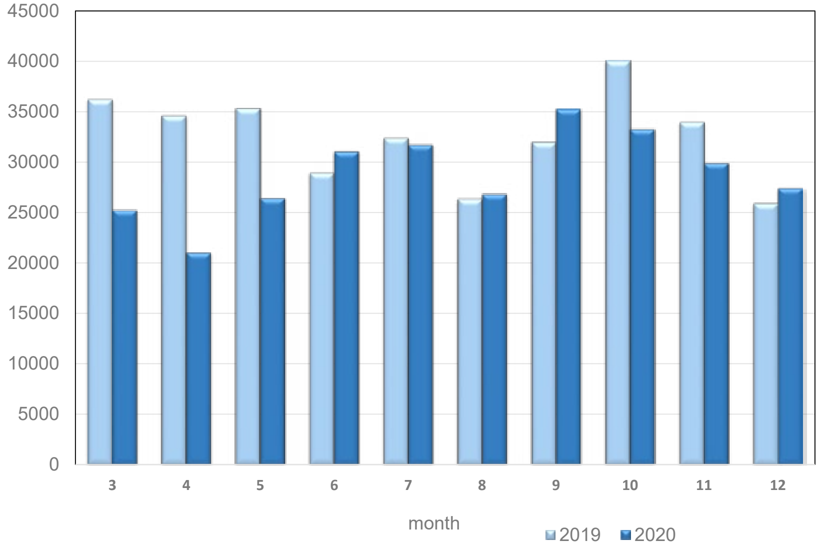


Fig. 5.6. Number of cardiology outpatient clinic visits (including phone consultation) in the Śląskie province in 2019 and 2020

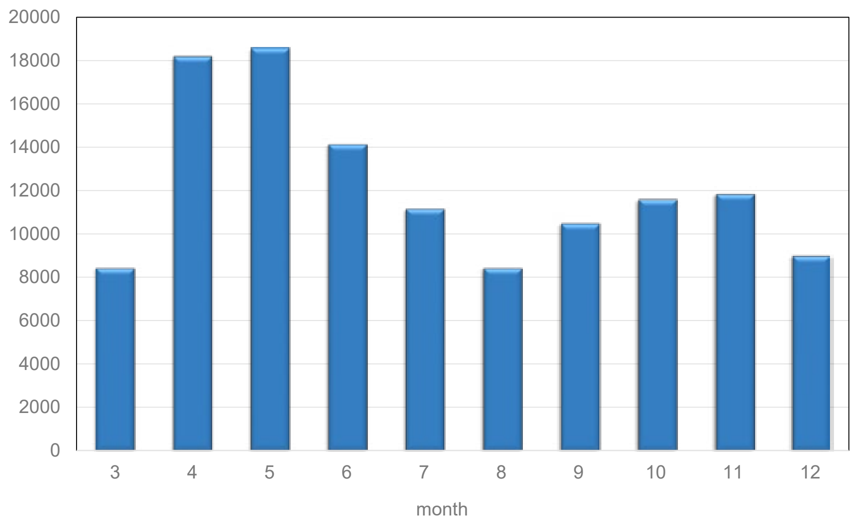


Fig. 5.7a. Number of phone consultations in cardiology outpatient clinics by month in Śląskie province in 2020 (*Figures: SILICARD)*

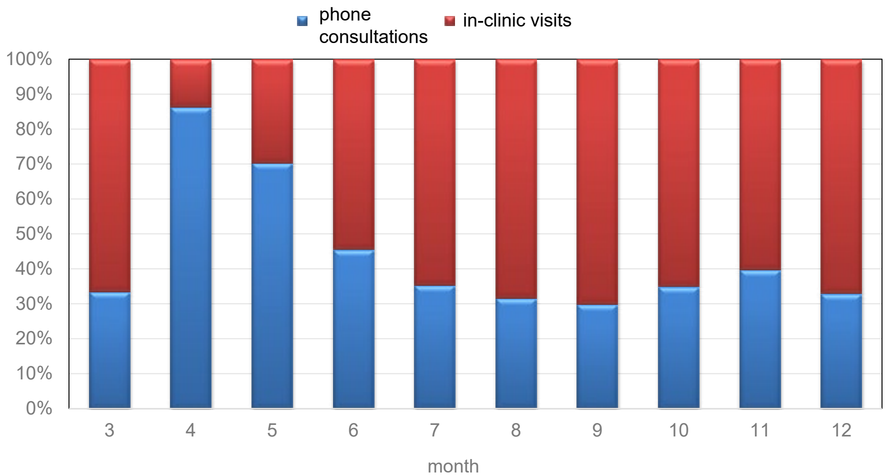


Fig. 5.7b. Distribution of type of visits in cardiology outpatient clinics by month in Śląskie province in 2020. (*Figures: SILICARD)*

Data presented by M. Gąsior et al. based on analyses from the Silesian SILICARD Cardiovascular Database indicate a 12% decrease in the number of cardiology consultations year-on-year in 2020–2019. In the months with the highest incidence of COVID-19, phone consultations dominated in cardiology outpatient clinics, accounting for up to 80% of all consultation made (Figs. 5.6, 5.7a, 5.7b).

5.5. COURSE OF SELECTED DISEASES DURING THE COVID-19 PANDEMIC

5.5.1. Acute myocardial infarction in the emergency medical system

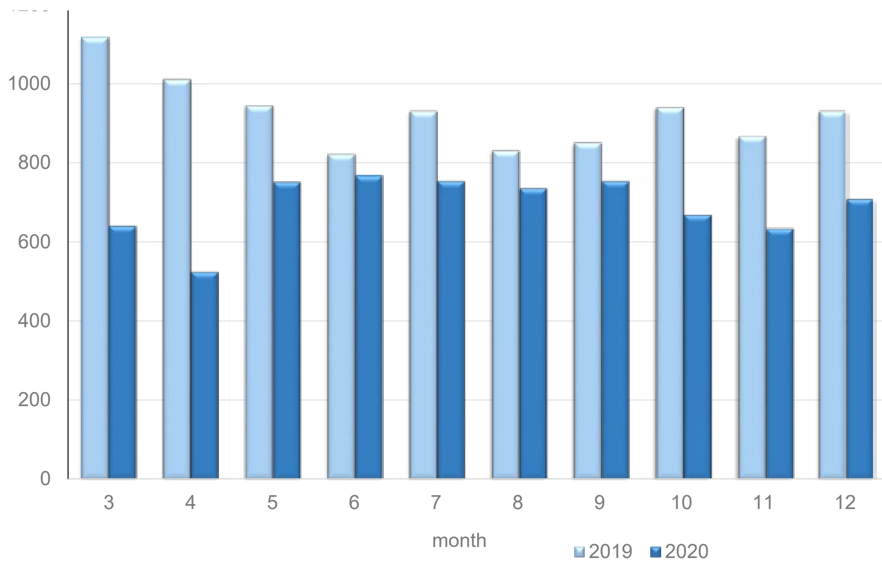


Fig. 5.8. Number of patients hospitalised for myocardial infarction in the Śląskie region in months in 2019 and 2020 *(Figures: SILICARD)*

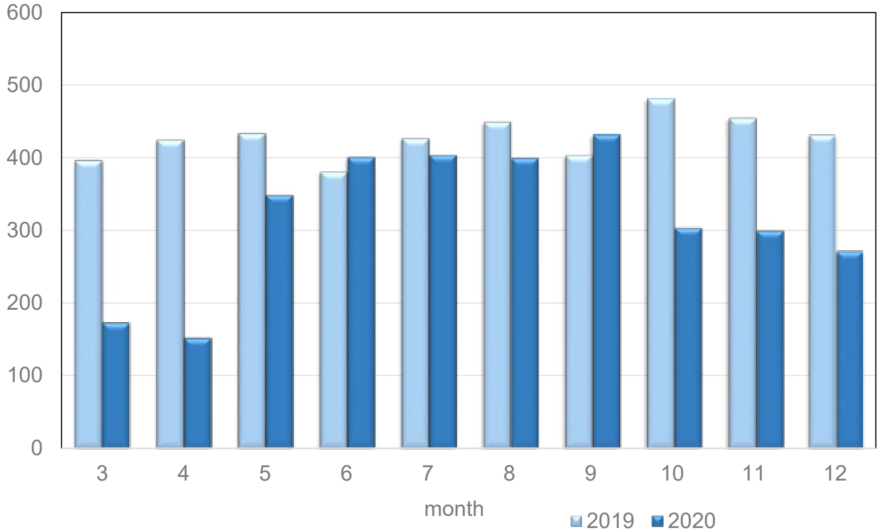


Fig. 5.9. Number of patients included in the KOS coordinated post-MI care programme in the Śląskie province in months in 2019 and 2020 *(Figures: SILICARD)*

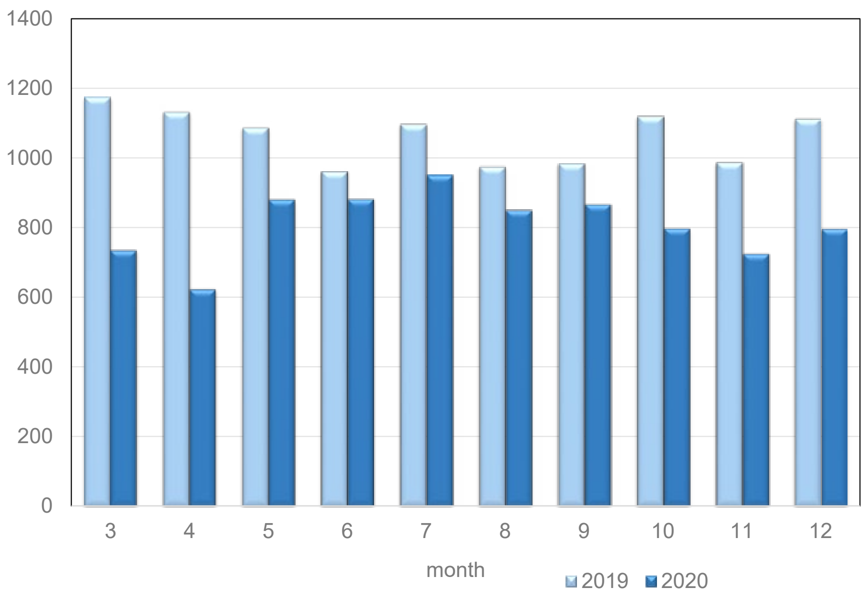


Fig. 5.10. Number of hospitalisations due to myocardial infarction in the Śląskie province by month in 2019 and 2020 *(Figures: SILICARD)*

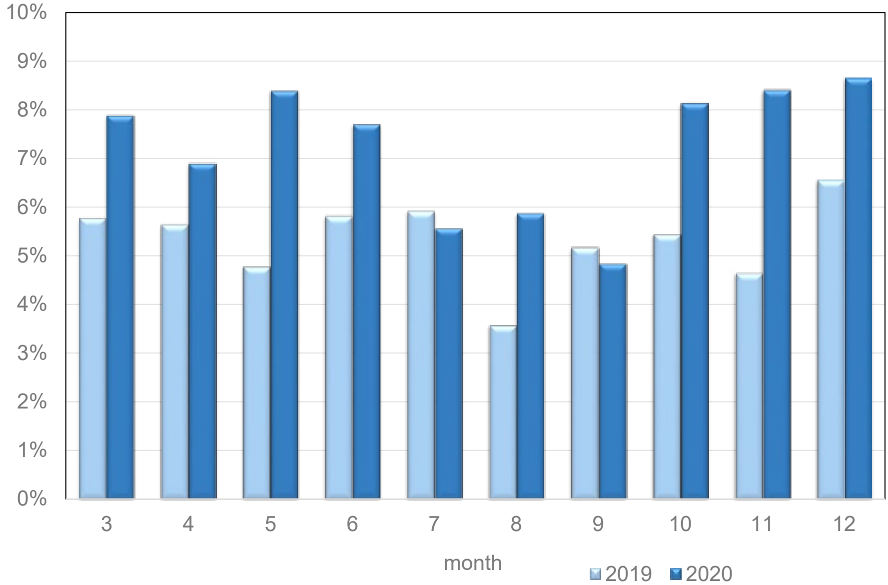


Fig. 5.11. Hospital mortality among patients with myocardial infarction in the Śląskie province by month in 2019 and 2020 *(Figures: SILICARD)*

The number of hospitalisations for myocardial infarction according to data from the Silesian Cardiovascular Database was 25% lower in 2020 than in 2019 (Fig. 5.8). This translated into fewer patients enrolled in the KOS coordinated post-MI care programme (26% decrease, Fig. 5.9). The outcome of myocardial infarction treatment in 2020 was also worse than 2019 – hospital mortality in 2020 was 34% higher than in 2019 (Fig. 5.11).

Table 5.5. Clinical characteristics of patients with myocardial infarction and positive COVID recorded in the SILICARD database

Characteristics	Number of people	interest
Age (mean and SE)	71.7	± 10.4
Female	61	37.4%
Coronary artery disease	72	44.2%
Heart failure	46	28.2%
Hypertension	113	69.3%
Diabetes	65	39.9%
Atrial fibrillation	22	13.5%
Other arrhythmias	28	17.2%
Pulmonary oedema	9	5.5%
COPD	15	9.2%
Kidney failure	13	8.0%
Tumours	36	22.1%
CNS stroke	9	5.5%
Pulmonary embolism	2	1.2%
Past PCI	20	12.3%
Past CABG	1	0.6%
Length of hospitalisation (mean and SE)	13.4	± 13.3
Hospital death	52	31.9%

A separate topic worthy of discussion is patients with myocardial infarction and a positive COVID-19 result. The SILICARD database analysed 163 such patients. Of these, only 62% were treated with a PCI procedure. Hospital death was recorded in 32% of the patients analysed (Table 5.5).

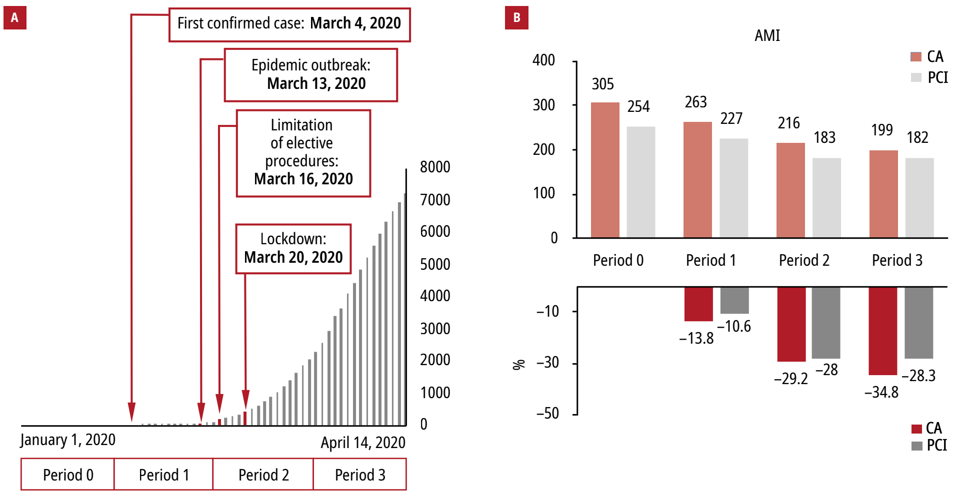


Fig. 5.12a. *(Source: Kardiologia Polska)*

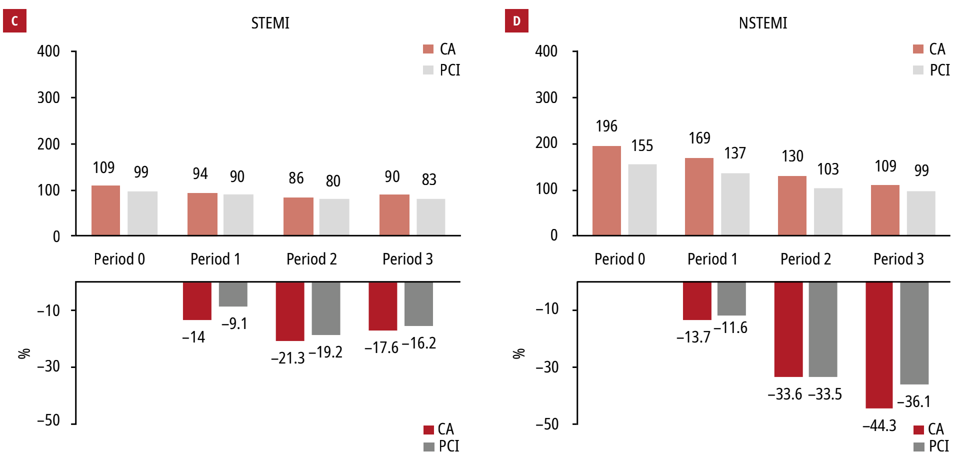


Fig. 5.12b. *(Source: Kardiologia Polska)*

Data from 11 invasive cardiology centres in Poland show a significant decrease in the number of coronary angiographies (CA) and percutaneous coronary procedures (PCI) performed in patients with acute myocardial infarction. A particularly marked decrease in procedures performed was observed among patients with NSTEMI.

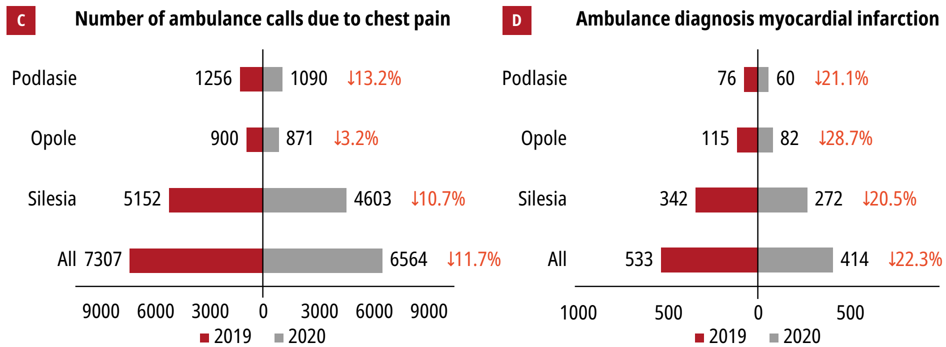


Fig. 5.12c. *(Source: Kardiologia Polska)*

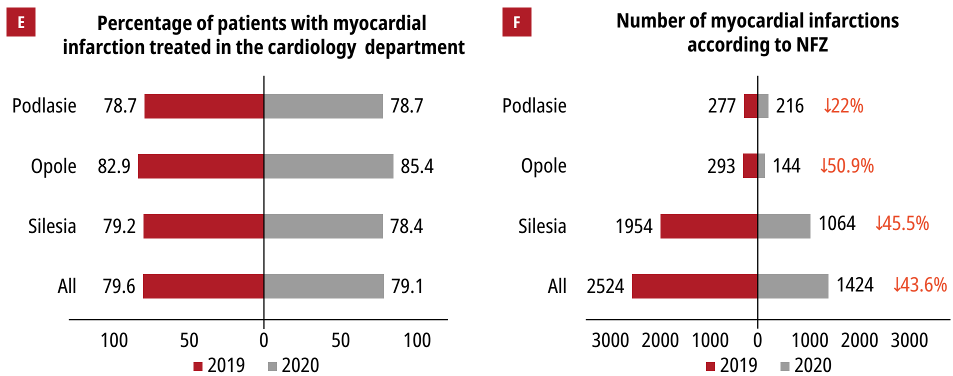


Fig. 5.12d. *(Source: Kardiologia Polska)*

An analysis of the 7 million-strong population of three different Polish regions – Podlasie, a predominantly agricultural region, Górny Śląsk, an industrial region and Śląsk Opolski, a region with a mixed structure – also provides interesting observations. Comparing 2019 with 2020, there was a decrease in calls to the emergency medical system for chest pain in all regions – the largest in Podlasie. The number of diagnoses of myocardial infarction made by emergency teams in 2020 was on average 22% lower than in 2019. The highest decrease was recorded in the Opolskie province, over 28%. The overwhelming majority of patients in all regions, due to myocardial infarction, were treated in cardiology departments. And here 2020 was no different from 2019. According to National Health Fund data, the average number of myocardial infarctions diagnosed in 2020 was more than 43% lower than in 2019. The largest number was in Opolskie – by more than 50%, while the smallest in Podlasie – only 22%. The authors of the study point to a significant decrease in the number of patients treated for myocardial infarction. Differences in the decline in the number of patients with myocardial infarction in different regions of Poland may be due to the severity of the epidemic.

Managed care for acute myocardial infarction survivors in the Silesian agglomeration during the COVID-19 pandemic

Katarzyna Wilkosz[1], Krystian Wita[2], Mariusz Gąsior[3], Daniel Cieśla[3]

Variables	Before COVID-19 n = 9585	During COVID-19 n = 1226	*P*-value
Age, years, median (IQR)	65.7 (59.0–73.1)	66.5 (59.5–73.9)	0.014
Female sex	3124 (32.59)	369 (30.10)	0.084
CHD	4082 (42.59)	415 (33.85)	<0.001
Previous MI	8977 (93.66)	1141 (93.07)	0.464
HF	1195 (12.47)	174 (14.19)	0.096
Hypertension	6472 (67.52)	805 (65.66)	0.202
Type II DM	2771 (28.91)	326 (26.59)	0.097
AF	748 (7.80)	108 (8.81)	0.241
Pulmonary edema	85 (0.89)	21 (1.71)	0.009
COPD	780 (8.14)	102 (8.32)	0.870
Asthma	698 (7.28)	78 (6.36)	0.264
CKD	421 (4.39)	50 (4.08)	0.665
Cancer history	2051 (21.40)	270 (22.02)	0.642
Stroke	318 (3.32)	43 (3.51)	0.792
Pulmonary embolism	53 (0.55)	8 (0.65)	0.814
Previous PCI	932 (9.72)	77 (6.28)	<0.001
Previous CABG	99 (1.03)	6 (0.49)	0.094
PM	89 (0.93)	12 (0.98)	0.988
ICD	54 (0.56)	4 (0.33)	0.388
CRT	16 (0.17)	2 (0.16)	0.733
Dialysis	49 (0.51)	5 (0.41)	0.788

There was a significant decrease in patients who qualified for the MACAMIS program during the first wave of the COVID-19 pandemic (March–April 2020). Along with proven effectiveness in reducing mortality and cardiovascular events in the annual follow-up, every effort was made to ensure that the MACAMIS program was not limited to only patients in the Silesian province, despite the current epidemiological situation.

Fig. 5.13. *(Source: Kardiologia Polska)*

An undoubted success of Polish cardiology is the the KOS coordinated post-MI care programme (MACAMIS) (Fig. 5.13). This programme has contributed to a significant improvement in the prognosis of patients after myocardial infarction. During the epidemic period, the number of patients who were included in the *MACAMIS* programme was significantly lower than in the pre-pandemic period. Which undoubtedly translated into a worse prognosis for them.

5.5.2. Heart failure

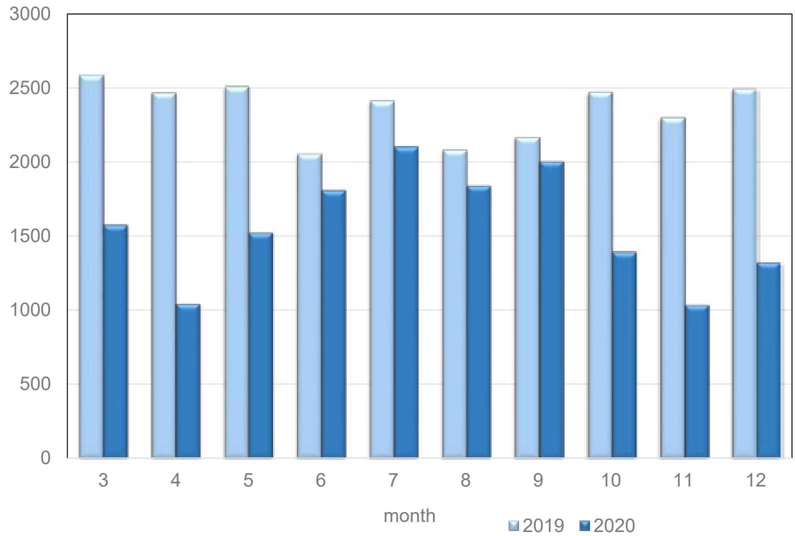


Fig. 5.14. Number of hospitalisations due to heart failure in Śląskie province by month in 2019 and 2020 *(Figures: SILICARD)*

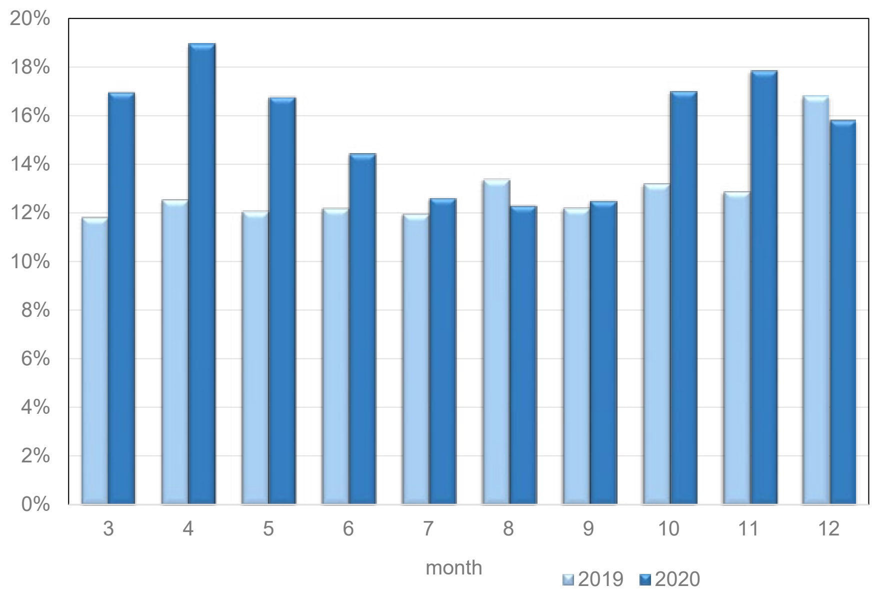


Fig. 5.15. Hospital mortality among patients with heart failure in the Śląskie province by month in 2019 and 2020 *(Figures: SILICARD)*

In the Silesian SILICARD Cardiovascular Database, already cited in the previous study, the number of hospitalisations for heart failure in the analysed period of 2020 was 33% lower than in 2019 (Fig. 5.14). In contrast, hospital mortality for heart failure patients was 16% higher comparing 2020 with 2019 (Fig. 5.15).

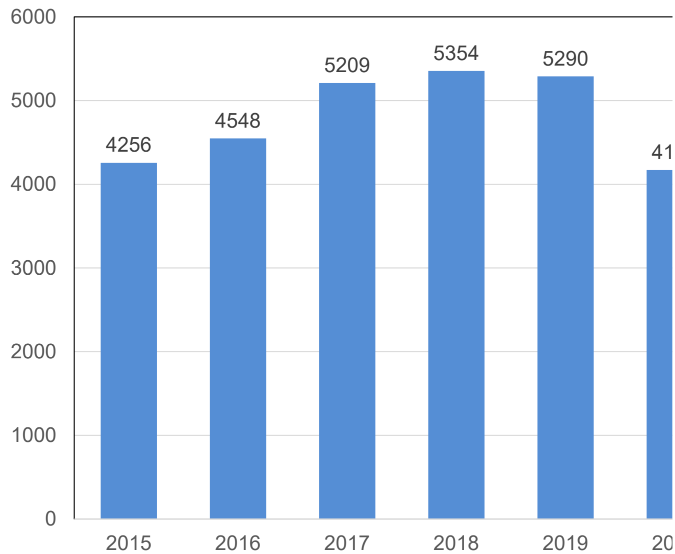


Fig. 5.16. Number of hospitalisations due to heart failure in Opolskie province in 2015–2020 *(Data: Opole Civilisation Diseases Database)*

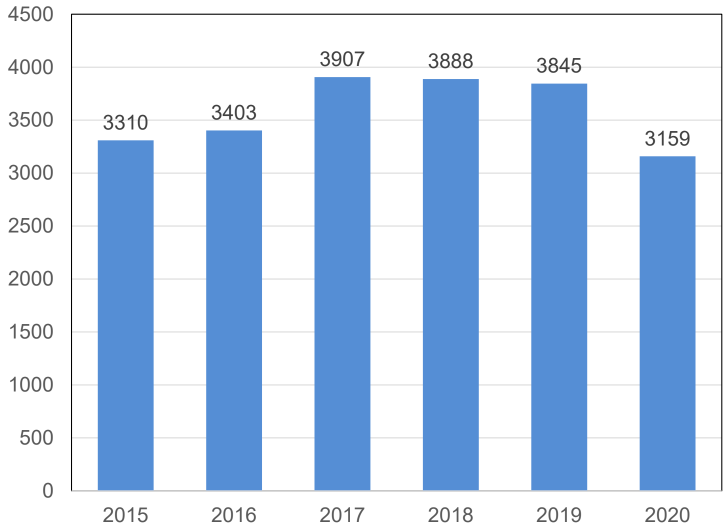


Fig. 5.17. Number of patients previously diagnosed with heart failure hospitalised due to heart failure in Opole province in 2015–2020 *(Figures: Opole Civilisation Diseases Database)*

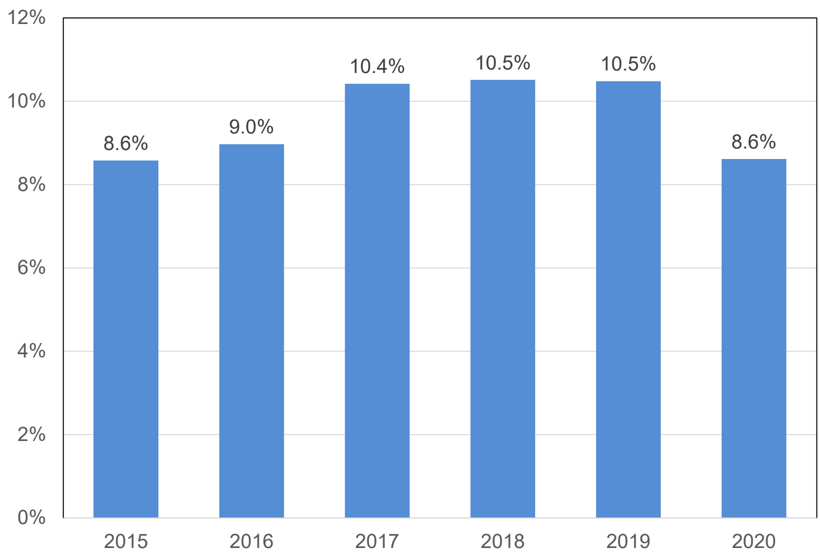


Fig. 5.18. Percentage of patients with heart failure who were hospitalised due to heart failure in Opole province in 2015–2020 *(Figures: Opole Civilisation Diseases Database)*

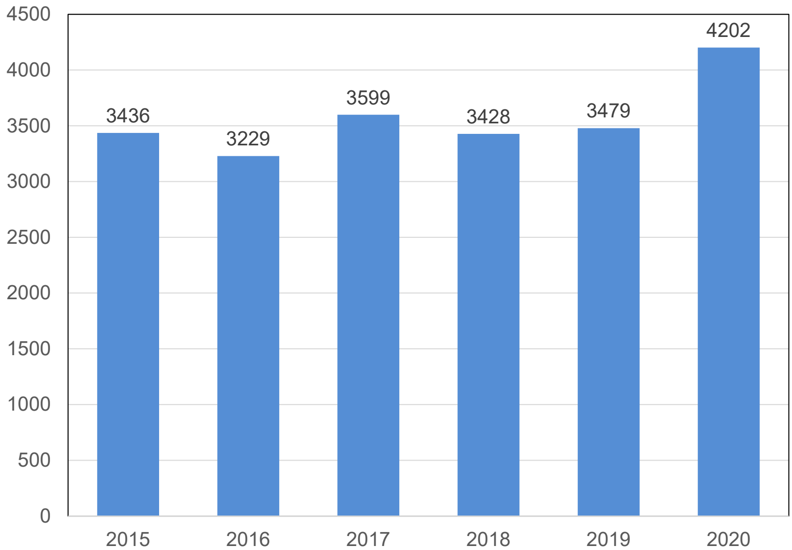


Fig. 5.19. Number of deaths among heart failure patients 2015–2020 *(Figures: Opole Civilisation Diseases Database)*

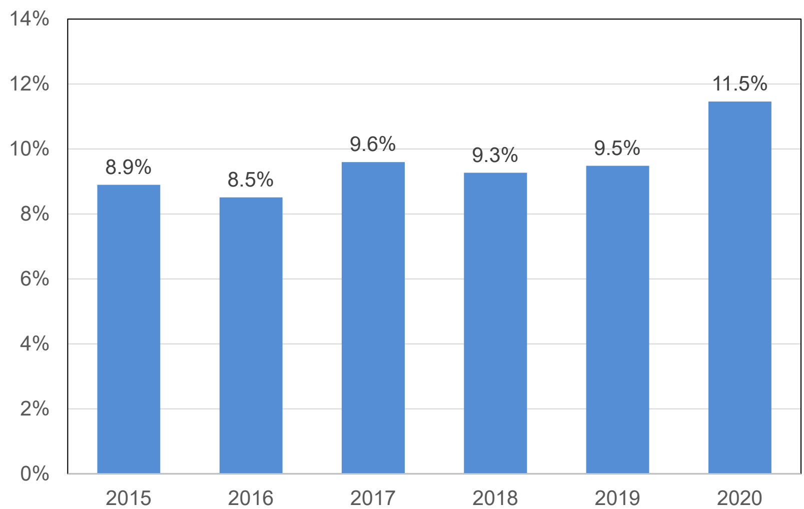


Fig. 5.20. Percentage of deaths among patients with heart failure between 2015 and 2020 *(Figures: Opole Civilisation Diseases Database)*

Similar information to SILICARD on patients with heart failure is provided by the Opole Civilisation Diseases Database. More than 21% fewer hospitalisations for heart failure were recorded in 2020 compared to 2019 (Figure 5.16). Comparing 2019 with 2020, the number of patients with heart failure (Figure 5.17) who were hospitalised also decreased. In contrast, there was an increased number of deaths of patients diagnosed with heart failure in 2020 (Figure 5.19). The results of the Opole Civilisation Diseases Database closely correspond to those of the Silesian SILICARD Cardiovascular Database, despite the undoubted differences in the demographic structure of the two provinces.

5.5.3. Atrial fibrillation, aortic stenosis

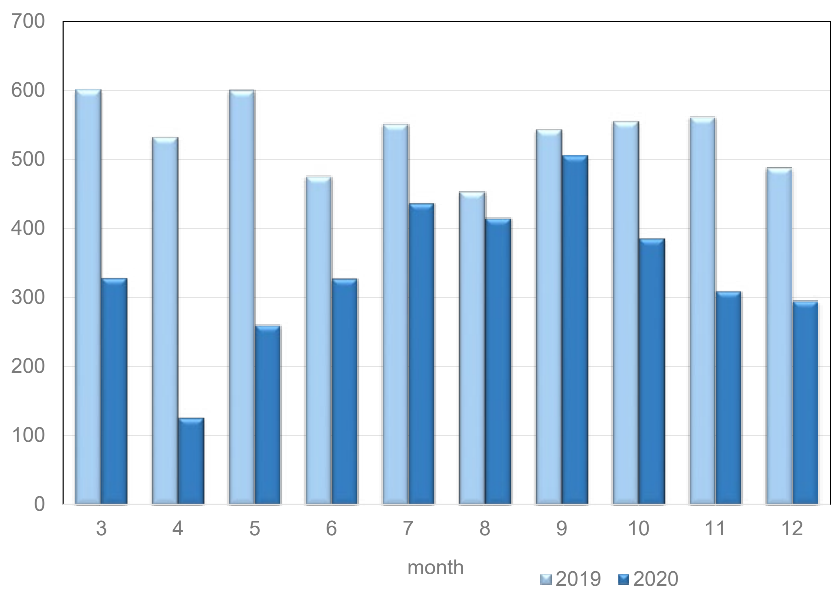


Fig. 5.21. Number of hospitalisations for atrial fibrillation in the Śląskie region by month in 2019 and 2020 *(Data: SILICARD)*

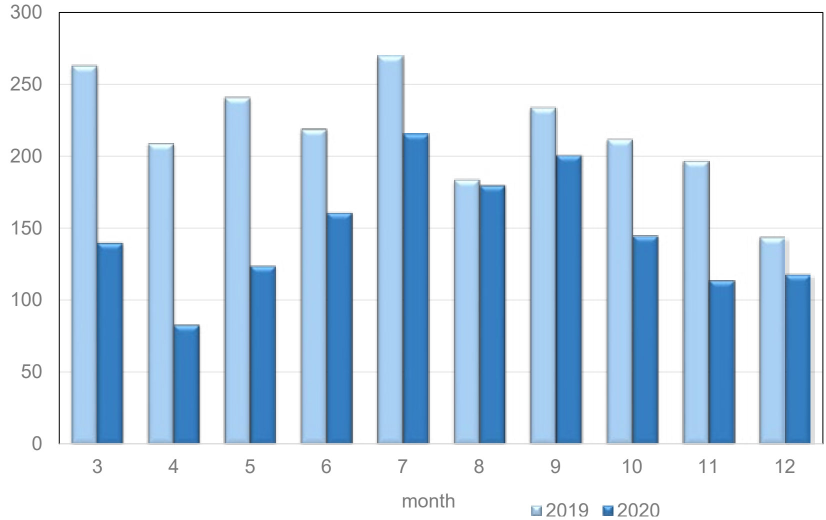


Fig. 5.22. Number of hospitalisations for aortic stenosis in Śląskie province by month in 2019 and 2020 *(Data: SILICARD)*

The Silesian SILICARD Database also contains data on other cardiovascular diseases in the pandemic period. In the 2020 analysis period, there was a 37% decrease in hospitalisations for atrial fibrillation (Fig. 5.21) and also a 32% decrease in hospitalisations for aortic stenosis (Fig. 5.22).

5.5.4. Acute pulmonary embolism, stroke

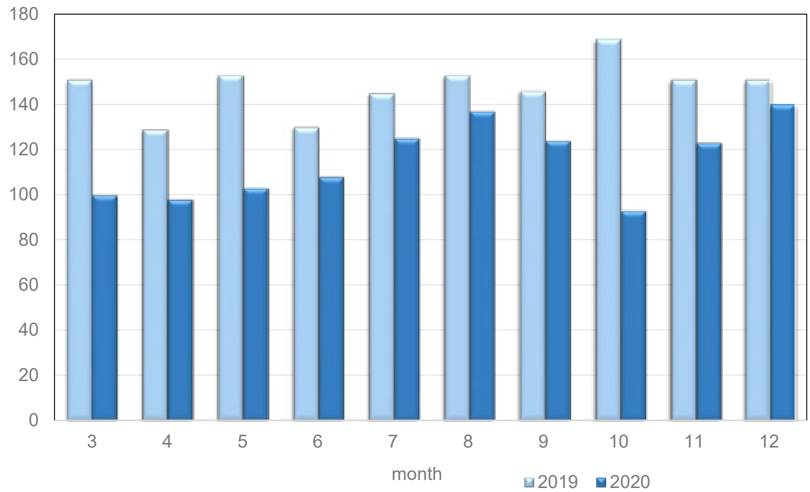


Fig. 5.23. Number of hospitalisations due to pulmonary embolism in the Śląskie province by month in 2019 and 2020 *(Figures: SILICARD)*

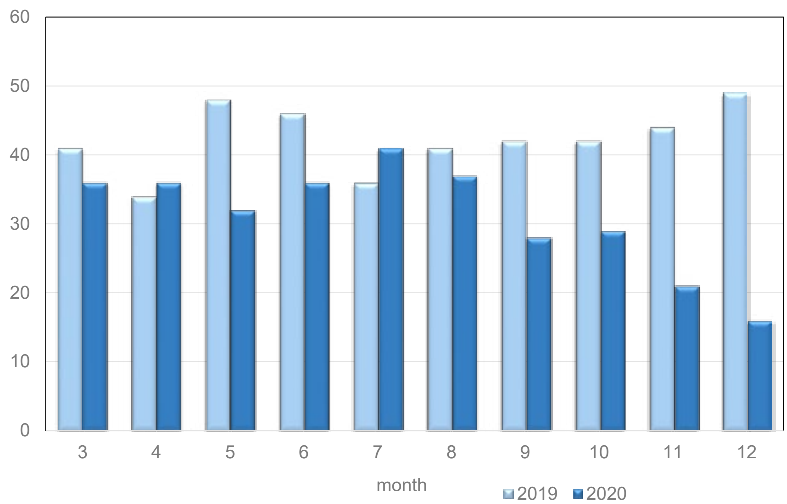


Fig. 5.24. Number of hospitalisations due to stroke by month in the Śląskie province in 2019 and 2020 *(Data: SILICARD)*

In 2020 compared to 2019, there is a decrease in hospitalisations for pulmonary embolism by 22% (Figure 5.23) and for stroke by 26% (Figure 5.24).

5.6. SELECTED PROCEDURES PERFORMED IN CARDIOVASCULAR DISEASES DURING THE COVID-19 PANDEMIC

5.6.1. Coronary procedures

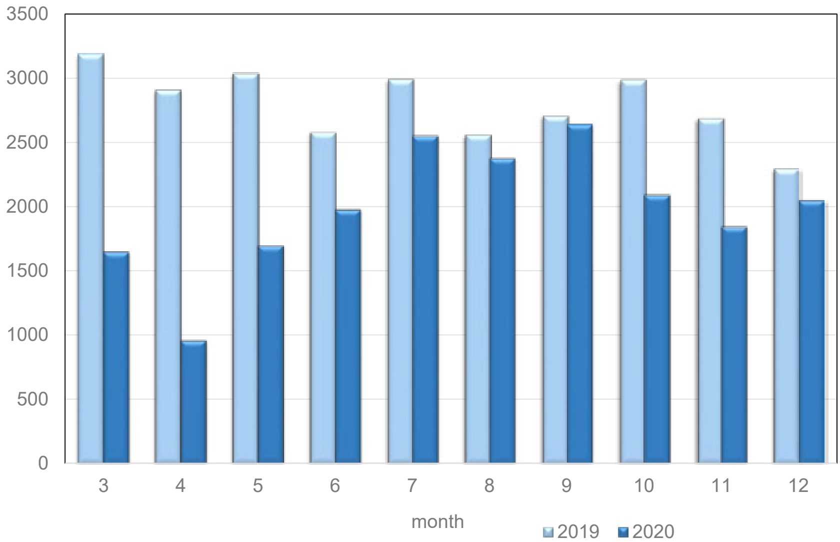


Fig. 5.25. Number of hospitalisations with coronary angiography procedure in Śląskie province by month in 2019 and 2020 *(Data: SILICARD)*

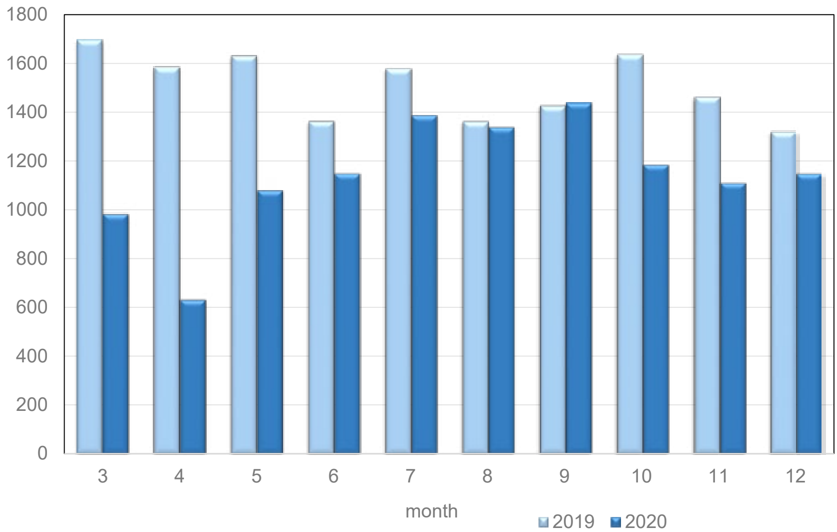


Fig. 5.26. Number of hospitalisations with PCI procedure in the Śląskie province by month in 2019 and 2020 *(Data: SILICARD)*

5.6.2. Electrophysiology

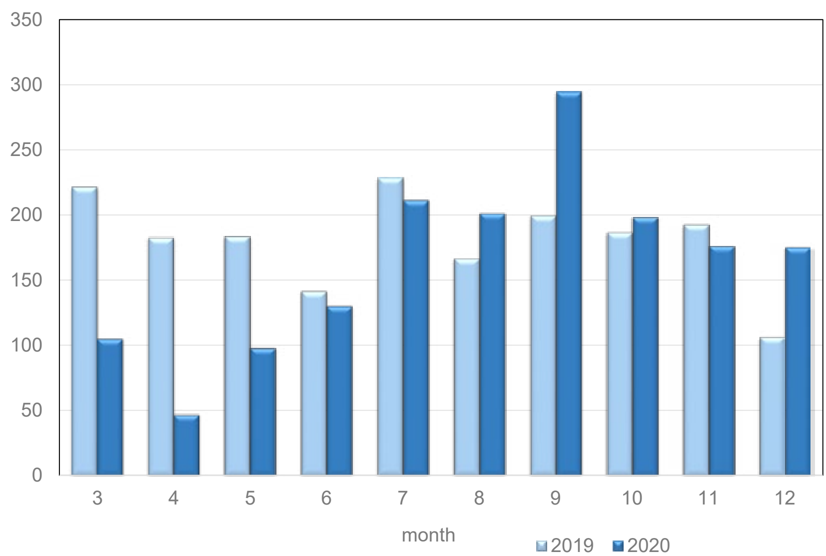


Fig. 5.27. Number of hospitalisations with ablation procedure in the Śląskie province by month in 2019 and 2020 *(Data: SILICARD)*

5.28.

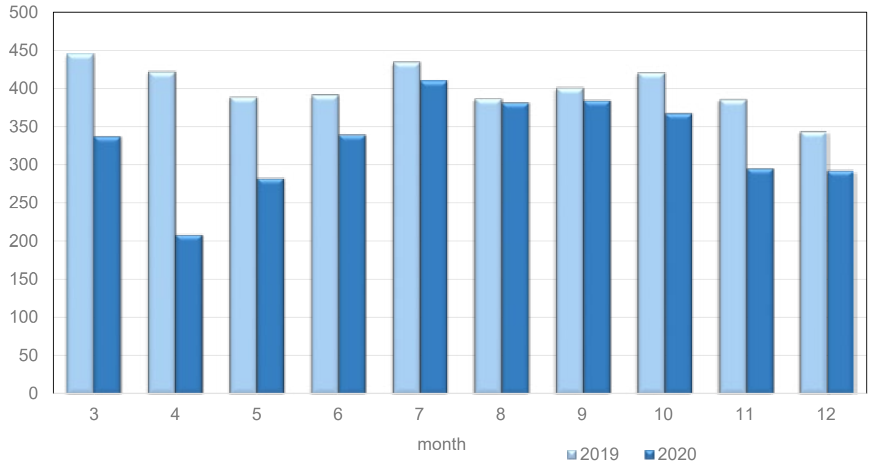


Fig. 5.28. Number of hospitalisations with pacemaker implantation in the Śląskie province by month in 2019 and 2020 *(Data: SILICARD)*

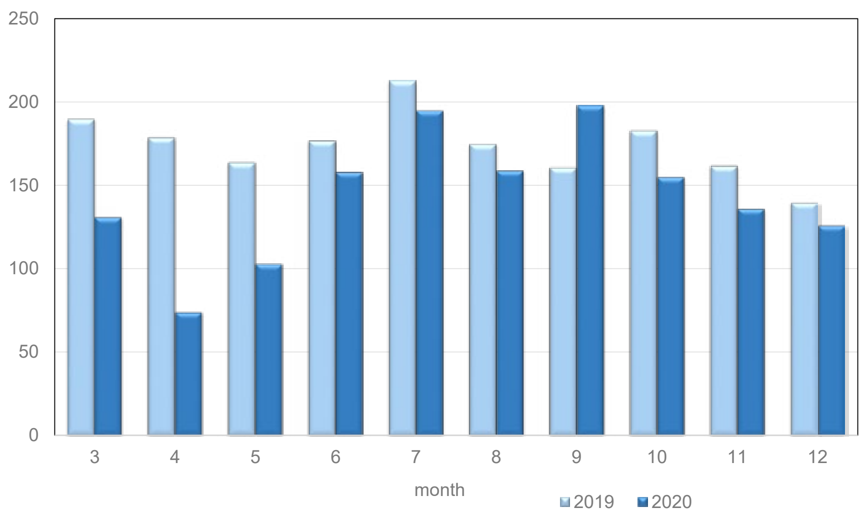


Fig. 5.29. Number of hospitalisations with ICD or CRT implantation in the Śląskie province by month in 2019 and 2020 *(Data: SILICARD)*

5.6.3. Cardiac surgery

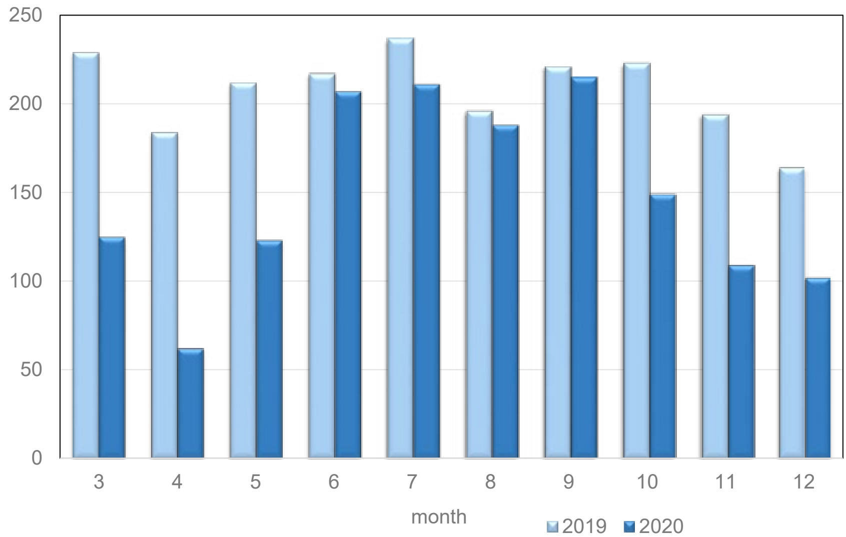


Fig. 5.30. Number of hospitalisations with CABG procedure in the Śląskie province by month in 2019 and 2020 *(Data: SILICARD)*

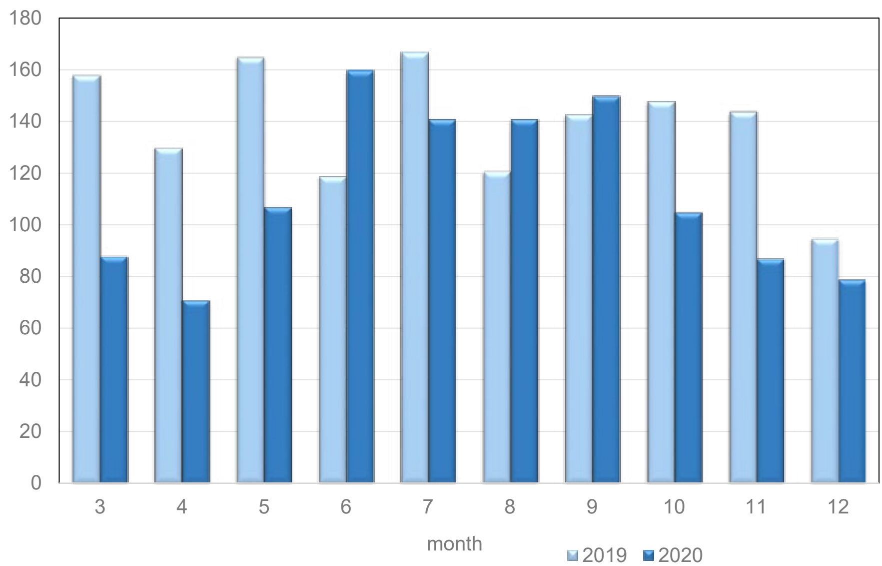


Fig. 5.31. Number of hospitalisations with valve surgery procedure in the Śląskie province by month in 2019 and 2020 *(Data: SILICARD)*

The first year of the COVID-19 pandemic also saw a decline in the number of cardiac procedures performed. According to data from the Silesian SILICARD Cardiovascular Database, comparing 2020 with 2019, the number of coronary angiography procedures fell by 29% in 2020 (Fig. 5.25) and percutaneous coronary interventions by 24% (Fig. 5.26). In the field of electrophysiology, there was an 18% decrease in procedures performed (Figs. 5.27, 5.28, 5.29). The year 2020 will also see a decline in cardiac surgery hospitalisations. There were 28% fewer hospitalisations with CABG (Fig. 5.30) and 19% fewer for heart valve procedures (Fig. 5.31).

SUMMARY:

1. The first year of the COVID-19 pandemic (year 2020) was characterised by a significant deterioration in cardiovascular care.
2. The deterioration of care for patients with medical conditions has affected both inpatient and outpatient care.
3. In the first year of the COVID-19 pandemic, there was a significant reduction in the numbers of:
   - hospitalisations due to cardiovascular diseases
   - outpatient visits, and during the critical months of the pandemic, phone consultation was prevalent
   - procedures performed in invasive cardiology, electrophysiology and cardiac surgery
4. The decrease in the number of hospitalizations for cardiovascular diseases varied according to the severity of COVID-19 and also showed some regional differences
5. Coronary heart disease:
   - there has been a reduction in the number of hospitalisations for myocardial infarction
   - there has been a reduction in the number of coronary arteries and angioplasties performed in myocardial infarction, with a decrease particularly in NSTEMI
   - hospital mortality in patients with myocardial infarction has significantly increased

6. Heart failure:
   - the number of hospitalisations for heart failure has decreased, as has the number of hospitalisations of patients with already diagnosed heart failure
   - mortality among patients diagnosed with heart failure has increased
7. Other cardiovascular diseases:
   - there has been a decrease in the number of hospitalisations for: atrial fibrillation, aortic stenosis, pulmonary embolism and stroke
8. The significant deterioration in cardiovascular care observed in the first year of the COVID-19 pandemic has led to a “health debt” that will have to be “repaid” in the years following the end of the pandemic.

6. IMPACT OF THE COVID-19 PANDEMIC ON SECONDARY CANCER PREVENTION IN POLAND

Paweł Koczkodaj, Urszula Sulkowska, Urszula Wojciechowska, Magdalena Rosińska, Hubert Pawlik, Jan Poleszczuk, Piotr Rutkowski, Joanna Didkowska (Maria Skłodowska-Curie National Institute of Oncology – National Research Institute)

The impact of the pandemic on the health of the population can be observed on several levels. In the first waves of the outbreak, the functioning of healthcare facilities was altered due to the redirection of available resources to care for COVID-19 patients, but also due to recommendations or even regulations temporarily suspending certain services classified as less urgent (e. g. suspension of elective admissions or screening programmes, teleconsultations in primary health care). In addition, admissions to specialist clinics and hospitals (e. g. the requirement for testing) and patient visits were less available. COVID-19 incidence among oncology patients as well as (especially in the first wave) the incidence among medical staff also had an impact on oncology care[1]. In many countries, the disruption to oncology diagnosis and specialised care did not last long, and even so, it is estimated that it will translate into increased mortality of oncology patients in a few years' perspective[2, 3].

1 Rutkowski P., Maciejczyk A., Krzakowski M., Flisiak R., Gałązka-Sobotka M., Reguła J., Zegarski W., Kubiatowski W., Rosińska M., Poleszczuk J., Śmiglewska A., Rybski S., Maluchnik M., Droździkowska A. Raport 2021: Wpływ pandemii Covid-19 na system opieki onkologicznej. Maria Skłodowska-Curie National Institute of Oncology – National Research Institute. 2021_07_14_NIO_Raport-Wplyw-pandemii-COVID-19-na-system-opieki-onkologicznej.pdf (pib-nio.pl)

2 Maringe C, Spicer J, Morris M, Purushotham A, Nolte E, Sullivan R, Rachet B, Aggarwal A. The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in England, UK: a national, population-based, modelling study. Lancet Oncol. 2020 Aug;21(8):1023–1034. doi: 10.1016/S1470-2045(20)30388-0. Epub 2020 Jul 20. Erratum in: Lancet Oncol. 2021 Jan;22(1):e5. PMID: 32702310; PMCID: PMC7417808.

3 Ward ZJ, Walbaum M, Walbaum B, Guzman MJ, Jimenez de la Jara J, Nervi B, Atun R. Estimating the impact of the COVID-19 pandemic on diagnosis and survival of five cancers in Chile from 2020 to 2030: a simulation-based analysis. Lancet Oncol. 2021 Oct;22(10):1427–1437. doi: 10.1016/S1470-2045(21)00426-5. Epub 2021 Sep 3. PMID: 34487693; PMCID: PMC8415898.

The section summarises data from the National Health Fund (NFZ) on services provided to oncology patients during the pandemic period in relation to the preceding pre-pandemic periods. As indicators of new diagnoses, data on diagnoses recorded in the Oncology Diagnosis and Treatment Card (DiLO) system were included, highlighting reported consylium quarter, as well as data on the number of first-time services and first-time hospitalisations with a diagnosis of malignant tumour reported to the National Health Fund. The total number of services and the total number of hospitalisations with a diagnosis of malignant tumour are also summarised. Mortality trends for tumours, with a particular focus on those for which screening is conducted, were analysed against the COVID-19 epidemic situation.

One of the areas most affected by impediments during the pandemic was the implementation of screenings. In the case of oncology, they play a key role in the early diagnosis of disease and thus, have a significant impact on therapeutic options and patient survival. The implementation of screening already in the pre-pandemic period remained insufficient. However, in the case of mammography, there was a slow increase in the coverage. This section presents the screening programmes implemented in Poland, together with the inclusion criteria and the rationale for their implementation. An analysis of historical trends in screening participation and disease detection rate, based on the National Health Fund data (participation by month) by period before and during the COVID-19 pandemic, are presented.

Malignant tumours continually represent one of the greatest challenges of modern medicine. According to the latest data from the National Cancer Registry (KRN)[4], there were more than 171 000 new cases and more than 100 000 tumour deaths in Poland in 2019. Malignancies account for about ¼ (25.7%) of all male deaths and nearly ¼ of all female deaths (23.2%), still ranking as the second most common cause of death in the general population (after cardiovascular diseases).

When considering incidence, breast cancer and colorectal cancer are among the most common malignancies that occur in the Polish population. According to KRN data, 19 620 women developed breast cancer (C50) in 2019 *(European Standard Population*

[4] Didkowska J, Wojciechowska U, Olasek P, Caetano dos Santos F, Michałek I. Nowotwory złośliwe w Polsce w 2019 roku. ISSN 0867–8251, Warszawa 2021

2013[5] – ESP2013: 95.2) – it was the most common malignant tumour suffered by Polish women. In the same year, breast cancer also contributed to 6 951 female deaths (ESP2013: 33.3). Breast cancer was the second cause of cancer deaths, just behind lung cancer, and contributed to 33.3% of all tumour deaths in women. In contrast, colorectal cancer (C18) (including the rectosigmoid junction – C19, cancer of the rectum – C20, anus and anal canal – C21) is the third most common type of tumour – among both men and women. In 2019, among women, KRN recorded 5 043 cases of colorectal cancer (C18) (ESP2013: 24.3), while among men it was 5 802 (ESP2013: 39.8). In the same year, this tumour caused 3 537 (ESP2013: 16.9) female deaths and 4 331 (ESP2013: 32.3) male deaths, contributing to 17% and 32% of all tumour deaths among men and women, respectively. Analysing epidemiological data for the last of the cancers subject to screening in Poland, cervical cancer (C53), it had a relatively low incidence of 2 407 cases in 2019. (ESP2013: 11.6), with a concomitant high mortality rate of 1 569 (ESP2013: 7.5) – especially when compared to other countries in the World Health Organisation's European Region where, among 40 countries, Poland ranks 11th in terms of cervical cancer mortality rate (5/100 000 in 2018)[6, 7].

Malignant cancer incidence and mortality trends are mainly shaped by the age structure of the population, as well as by exposure to carcinogens. For breast cancer, colorectal cancer and cervical cancer, participation in screening is also very important. The effectiveness of population-based screening is considered to be achieved when at least 70% of the participation threshold of the eligible population is reached[8],[9]. In Poland, the

5 ESP2013 – standardised rates according to the standardised population of Europe, standard 2013

6 Arbyn M, Weiderpass E, Bruni L, de Sanjosé S, Saraiya M, Ferlay J, Bray F. Estimates of incidence and mortality of cervical tumour in 2018: a worldwide analysis. Lancet Glob Health. 2020 Feb;8(2):e191-e203. doi: 10.1016/S2214-109X(19)30482-6. Epub 2019 Dec 4. Erratum in: Lancet Glob Health. 2022 Jan;10(1):e41. PMID: 31812369; PMCID: PMC7025157.

7 Nowakowski, A., Wojciechowska, U., Wieszczy, P. et al. Trends in cervical tumour incidence and mortality in Poland: is there an impact of the introduction of the organised screening? Eur J Epidemiol 32, 529–532 (2017). https://doi.org/10.1007/s10654-017-0291-6

8 Jafari M, Nakhaee N, Goudarzi R, Zehtab N, Barouni M. Participation of the Women Covered by Family Physicians in Breast Cancer Screening Program in Kerman, Iran. Asian Pac J Cancer Prev. 2015;16(11):4555-61. doi: 10.7314/apjcp.2015.16.11.4555. PMID: 26107203.

9 Strech D. Participation rate or informed choice? Rethinking the European key performance indicators for mammography screening. Health Policy. 2014 Mar;115(1):100–3. doi: 10.1016/j.healthpol.2013.11.012. Epub 2013 Dec 1. PMID: 24332817.

participation rate in screening programmes has not yet reached this level, despite many efforts to improve the situation. Moreover, the COVID-19 pandemic brought further deterioration in the area under discussion.

In Poland, the first cases of SARS-CoV-2 infection were reported at the beginning of March 2020. At that time, the operation of healthcare providers was radically curtailed, e.g. by limiting or stopping admissions, changing the profiles of wards or entire hospitals to treat only COVID-19 patients. In addition, significant restrictions were placed on the movement of people within the country, and for several weeks there was an order to remain indoors. Although the epidemic state was only revoked in May 2022[10], intensified restrictions only took place during the initial period of the pandemic in 2020.

6.1. Change in frequency of services provided for malignant tumours during pandemic

The DiLO card system was introduced on 1 January 2015, as part of the oncology package, which aims to enable an effective oncology diagnosis pathway and rapid implementation of treatment. DiLO cards can be issued in primary health care, but also by outpatient specialised care doctors and in hospitals. The issuing of a DiLO card is synonymous with the suspicion of malignant tumour and the referral of the patient for appropriate diagnostics. Once the tumour is diagnosed, a multidisciplinary consilium is assembled to establish a treatment plan. Information about the consilium is recorded in the DiLO system and is considered reliable information about the diagnosis. Having a DiLO card is not a requirement for oncology treatment and a DiLO card is not established in every case. Therefore, in addition to the dynamics of the number of case consilia with malignant tumour diagnoses reported in the DiLO system, the rates of first-time contacts and first-time hospitalizations were also analysed.

The quarterly rate of case consilia reported in the DiLO card with a diagnosis of malignant tumour has increased steadily between the implementation of DiLO cards

10 Regulation of the Minister of Health of 12 May 2022 on the cancellation of an epidemic state in the territory of the Republic of Poland, Journal of Laws of 2022, item 1027

and 2019. Nationally, this was an increase on average from 76 per 100 000 in 2015 to 95 per 100 000 in 2019. This increase partly corresponds to the increase in the crude incidence rate of malignant tumours in Poland, also reported by in KRN[11]. However, the increase in the rate of consilia is slightly faster, which may be due to the increasing use of this route in the diagnosis of malignant tumours in Poland. The role of the way the DiLO system operates in changing these statistics is also indicated by the large differences in the rate between provinces (Fig. 6.1), which does not corrpond to real epidemiological differences.

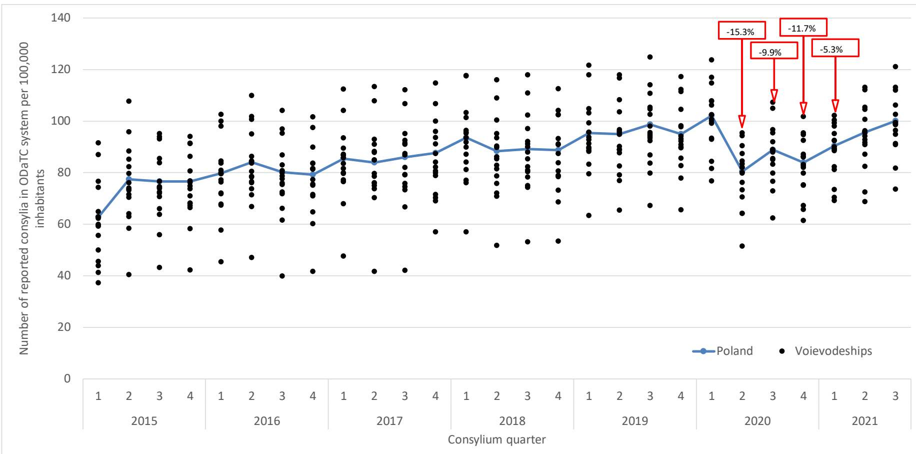


Fig. 6.1. Quarterly number of consilia with a tumour diagnosis reported in DiLO cards per 100 000 population, nationwide data and by province. Decreases during the pandemic period of the nationwide indicator, in relation to the corresponding quarters of 2019, are marked (Source: data provided by the National Health Fund)

In 2020, quarters II to IV showed a clear break in the trend of the number of consilia with decreases ranging from – 9.9% to -15.3% depending on the quarter. On an annual basis, there was an 8.1% decrease in the number of consilia in 2020 compared to 2019.

11 Wojciechowska Urszula, Didkowska Joanna. Zachorowania i zgony na nowotwory złośliwe w Polsce. National Cancer Registry, Maria Skłodowska-Curie National Institute of Oncology – National Research Institute. Available at: http://onkologia.org.pl/raporty/ accessed 10/10/2022.

On the other hand, in 2021, the number of consilia with malignant tumour diagnoses exceeded the 2019 level.

Qualitatively similar trends could be noted for all diagnoses (grouped according to ICD-10 groups) (Fig. 6.2). It is noted that the increase in DiLO consilia in 2020 was only for the secondary and indeterminate tumour group, for which the increase in 2021 was also particularly pronounced. In 2021, there was no increase of DiLO consilia rate in the haematological malignancy group (C81-C96). In the other groups, there was a noticeable increase compared to 2019.

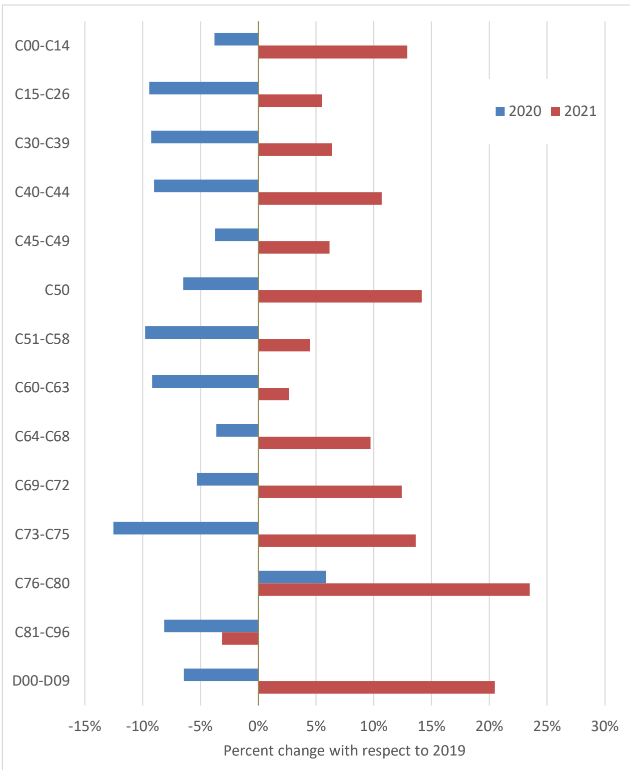
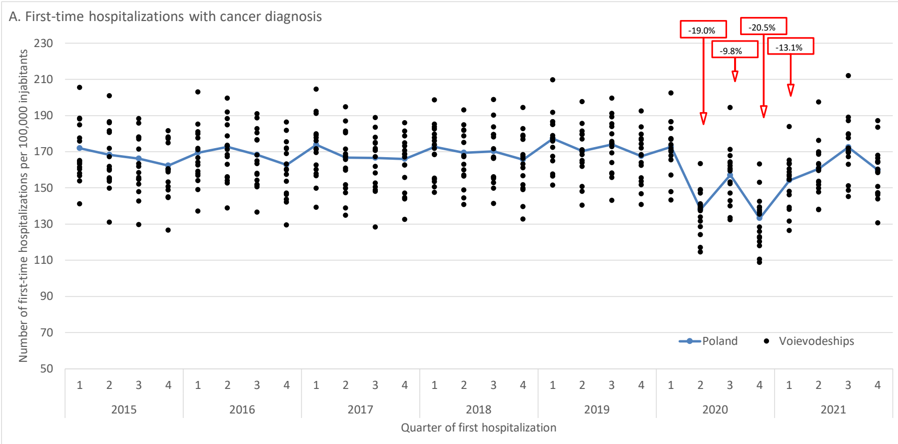


Fig. 6.2. Percentage change in the number of consylium quarter in 2020–2021 compared to the number of consilia in 2019, by diagnosis (Source: data provided by the National Health Fund)

The decrease in the number of first-time hospitalisations with a cancer diagnosis was particularly pronounced in the second and fourth quarters of 2020, by 19.0 percent and 20.5 percent, respectively, compared to the second and fourth quarters of 2019 (Fig. 6.3). A similar trend can also be seen for first-time contacts with a diagnosis of malignant tumour, which was paralleled by the number of outpatient or inpatient services in this group therefore being reported to the National Health Fund. This corresponds to the introduction of a high level of contact restrictions at the beginning of the COVID-19 epidemic, as well as during the epidemic wave in late 2020, with the resulting high burden on healthcare for the treatment of patients with severe COVID-19. This may have resulted in less accessibility to health care, but also influenced people's increased fear of contracting COVID-19 and self-limiting contacts, including even medical visits.

In contrast to first-time hospitalisations and first-time contacts with a diagnosis of malignant cancer, the frequency of hospitalisations and total contacts with these diagnoses showed an increasing trend between 2015 and 2019 (Fig. 6.4). In terms of numbers, total hospitalisations are about 5–6 times more than first-time hospitalisations, and total contacts about 15–20 times more. Hence, the impact of the decrease in diagnoses on the frequency of total hospital admissions will be greater than for total contacts. In the case of hospitalisation rates, a clear, break in the trend in 2020 is apparent, although less so than in the case of first-time hospitalisations. In the case of total contacts, a clear decrease in principle occurred only in the second quarter of 2020, during the order to remain at home. During the wave of COVID-19 cases in the fourth quarter, the decrease was small, with a high probability completely explained by the reduced frequency of diagnoses.



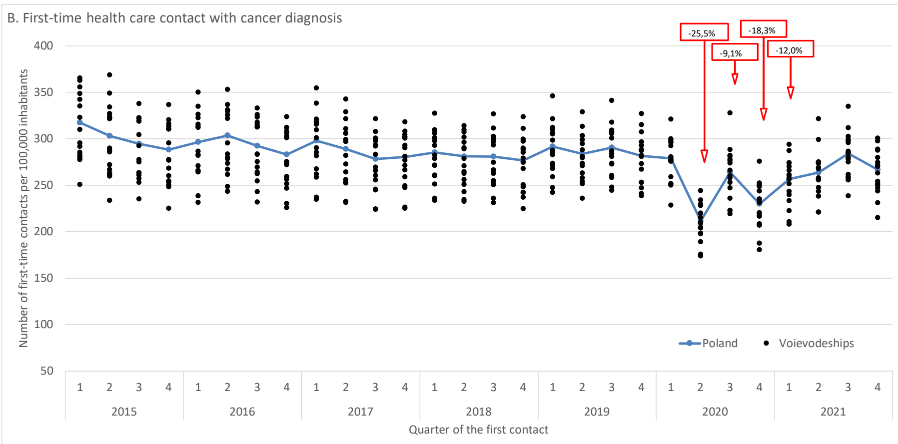


Fig. 6.3. Quarterly number of first-time hospitalisations (A) and first-time contacts (B) with a diagnosis of malignant tumour per 100 000 population. Data nationwide and by province. Decreases during the pandemic period of the nationwide indicator, in relation to the corresponding quarters of 2019, are marked (Source: data provided by the National Health Fund)

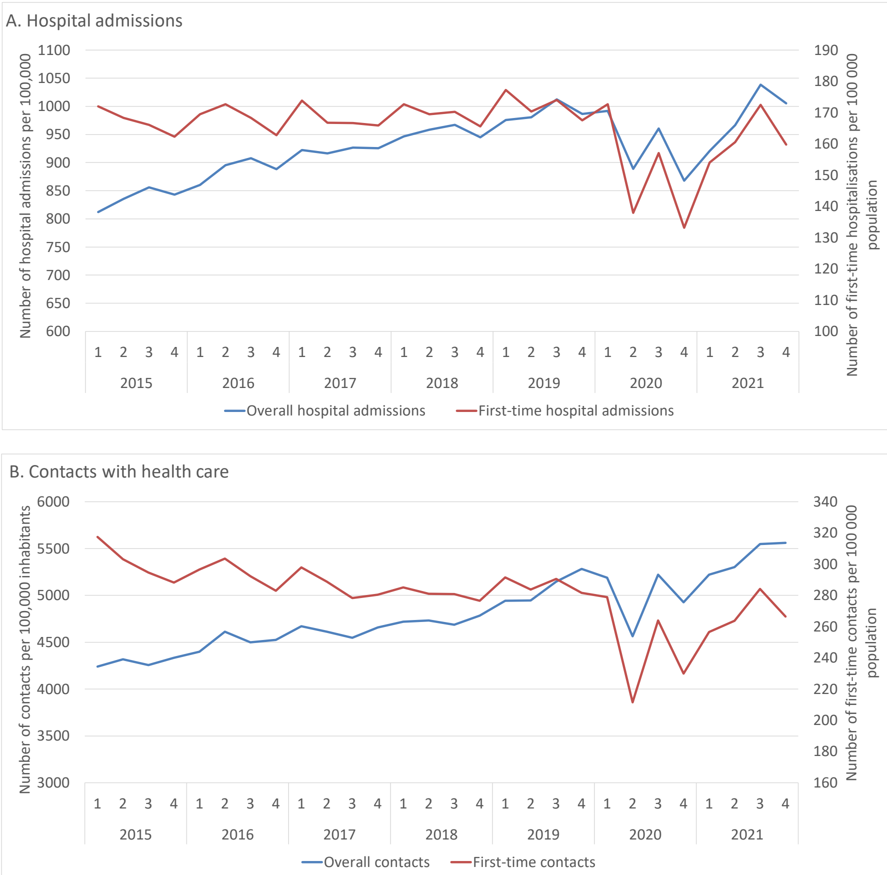


Fig. 6.4. Comparison of trends in first-time hospitalisations and total hospitalisations with a diagnosis of malignant tumour (A) and trends in first-time contacts and total contacts with a diagnosis of malignant tumour (B). Nationwide data, number of episodes per quarter per 100 000 population. (Source: data provided by the National Health Fund)

6.2. Impact of the pandemic on secondary prevention of tumour in Poland

The period of the pandemic, especially the period of increased restrictions related to its combating, contributed significantly to the large decrease in participation in screening. The adverse health effect was further multiplied by the disruption of diagnoses initiated in other areas (including primary care and outpatient specialised care), which is also reflected in changes in the number of DiLO cards issued by medical doctors (Fig. 6.5–6.7).

In Poland, as part of the breast cancer early detection programme, prophylactic mammography is recommended for women aged 50–69 years at a two-year interval (unless there are medical reasons for a different schedule and/or other/additional examinations)[12]. When analysing women's participation in preventive mammography between 2019 and 2022, a recurrence of a decrease in participation at the beginning of each year is evident (Fig. 6.5). A likely explanation for this regularity is the way the National Health Fund (NFZ) reports data and the holiday and Christmas period at the turn of the year. The data refer to the status on the first day of the calendar month in question, so *de facto* the month under review reflects the percentage participating in the screening in the previous month. However, when comparing individual years, 2019 had the highest participation rate, reaching nearly 40%. In contrast, 2020 saw the largest decrease in the proportion of women undergoing mammography. The unfavourable trend continued in 2021 with the lowest mammography participation rate of around 32% in February, which was clearly – despite some loosening of restrictions – related to the ongoing COVID-19 epidemic. To date (September 2022), participation in the programme for early detection of breast cancer has not returned to the level before the epidemic was declared.

[12] Mańczuk M, Cedzyńska M, Koczkodaj P, Łobaszewski J, Przepiórka I, Didkowska J. 12 sposobów na zdrowie, Warszawa 2017, ISBN 978-83-88681-13-4

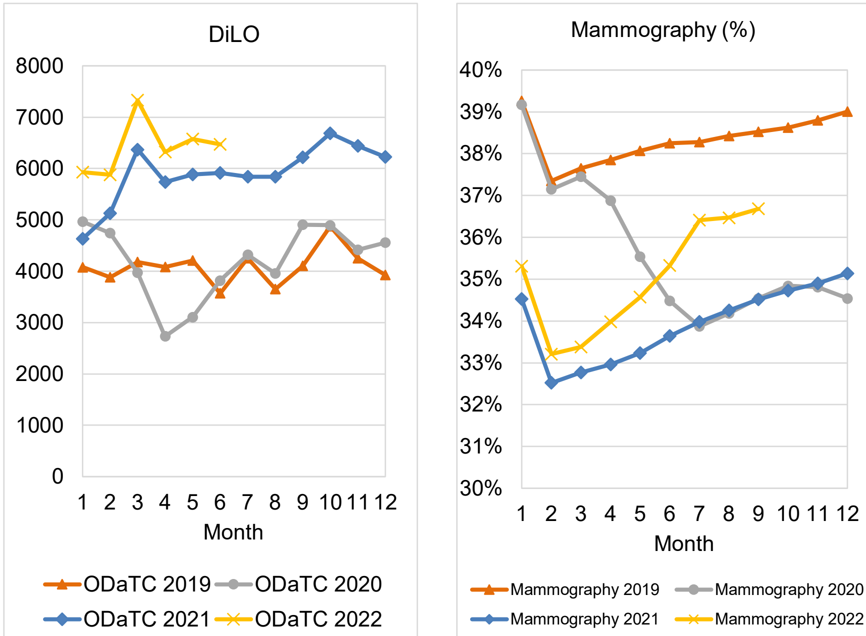


Fig. 6.5. Number of DiLO cards issued and percentage of eligible women participating in the breast cancer early detection screening programme in Poland in 2019–2022 (diagnoses C50, D05, D48)[13]

The opposite situation can be seen when analysing the data on the number of DiLO cards issued with a breast cancer diagnosis. In March 2022, more than 7 300 DiLO cards were issued, a record number over the four years analysed. This compares with less than 4 000 issued in 2020 in the same month, followed by just over 2 700 in April – the lowest number for 2019–2022. Furthermore, already in 2020, the year of the outbreak, the number of DiLO cards issued had already returned to the previous year's level, even surpassing it (Fig. 6.5). The above correlation suggests a rapid return to the prepandemic oncology care capacity, so the declines in screening participation may have had its main cause more in women's beliefs and attitudes about coronavirus and the safety of

[13] Data obtained upon request from the Headquarters of the National Health Fund (number of DiLO cards issued) and from the website www.nfz.gov.pl, Preventive programmes tab, Programme implementation data (percentage of eligible population participating in screening).

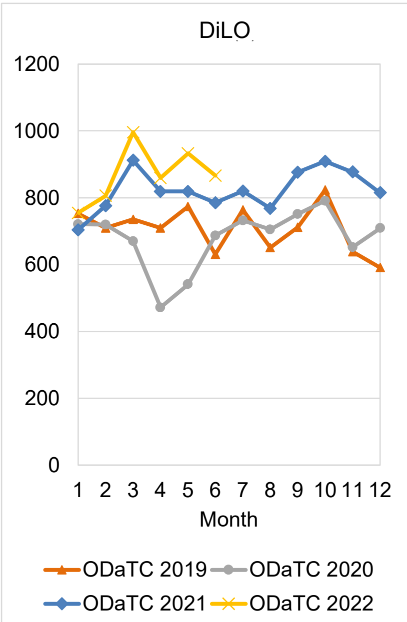
the test (in terms of the risk of SARS-CoV-2 infection) than in the reduced availability of screening due to the ongoing epidemic state.

In Poland, the screening test that continues to be used for early detection of cervical cancer is cytology (HPV DNA testing is currently being piloted and should replace cytology in the future). The current recommendation is for women aged 25–59 years to have cytology at a 3-year interval[8]. Data on the percentage of women participating in the cytology programme should be treated as indicative, due to the reporting by the National Health Fund of only those examinations that took place in the public system. While it can be said with a high degree of certainty that these figures are underestimated, they show general trends that also provide valuable feedback.

In each of the following years, a downward trend in participation in cytological examinations is evident. The situation is similar in the context of consecutive months. In January 2019, the percentage of women participating in the cervical cancer early detection programme was around 17%, in the same month in 2020 it was 16%, in 2021 less than 14% and in 2022 less than 13%. Currently (September 2022), we are seeing the historically lowest participation of women in cytological screening – just over 11%. Nevertheless, 2020 remains the period with the largest decrease in participation, from 16.22% in January to 13.92% in December (Fig. 6.6).

As in the case of DiLO cards issued to women with breast cancer, a rapid rebound in the downward trend in 2020 is also evident for cervical cancer (the fewest cards issued in April 2020–472). Already in June of the same year, the number of DiLO cards surpassed their level in the corresponding month of 2019. The latest figures show record numbers of DiLO cards issued in 2022. The observed relationship may be the result of rapid adaptation of oncology care to function in an epidemic reality, the effect of the introduction of vaccines and drugs to treat the COVID-19 course, but also the low participation in cytological screening observed over the years (Fig. 6.6).

So far, the screening test for early detection of colorectal cancer in Poland has been colonoscopy. Recommendations to participate in the programme were for women and men in the 55–64 age range. In the case of a negative result, the time interval from the performance of the test to its repetition was 10 years[8]. This programme was the only one of the three directly funded by the Ministry of Health and coordinated by the Maria Skłodowska-Curie National Institute of Oncology in Warsaw. Due to a change in the funding model (funding by the National Health Fund), as well as the introduction of an additional test (Faecal Immunochemical Test), procedural difficulties led to a complete halt in the programme's operation from January 2022 until now (September 2022).



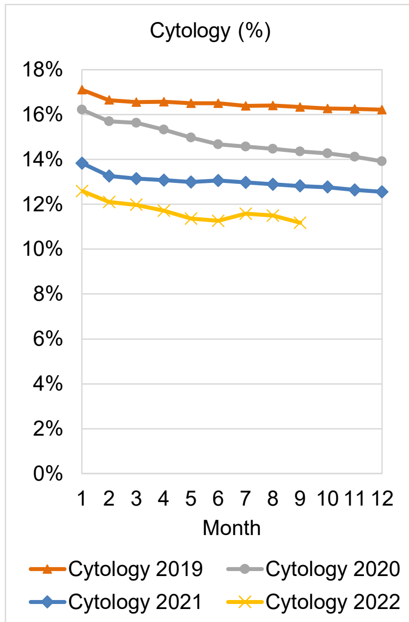


Fig. 6.6. Number of DiLO cards issued and percentage of eligible women participating in the cervical cancer early detection screening programme in Poland in 2019–2022 (diagnoses C53, D07, D39)[8]

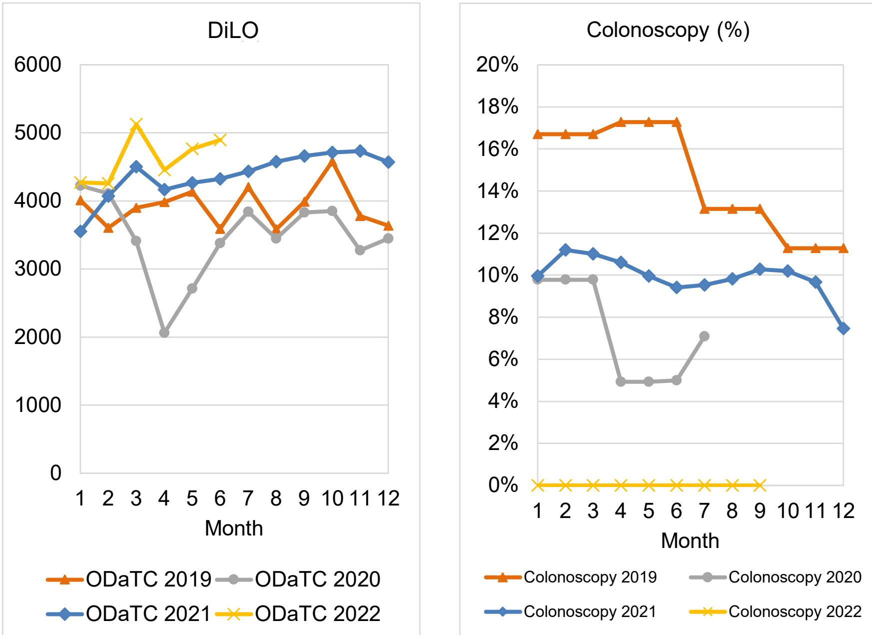


Fig. 6.7. Number of DiLO cards issued (2019–2022) and percentage of eligible women and men participating in the screening programme for early detection of colorectal cancer in Poland (2020–2021) – available data as of 23.09.2022 (without data for August-December 2020) (diagnoses C18-C21, D01, D37)

It should be emphasised that the data presented refer to the percentage of people presenting for colonoscopy as a result of receiving an invitation from the programme – these data do not reflect coverage of the eligible population, as in the case of mammography and cytology (Fig. 6.7). Notwithstanding this fact, the COVID-19 outbreak contributed to a significant decrease in the participation of men and women in this screening, leading to only 5% reporting for colonoscopy in April, May and June 2020. 2021 brought a significant improvement in this regard. Already in January, the percentage of people performing colonoscopy reached pre-pandemic levels, and in February it surpassed them (11.20%). Unfortunately, despite increasing participation in the programme in the later stages of the epidemic (2021), 2022 brought a complete collapse in the implementation of screening colonoscopy due to the aforementioned procedural difficulties related to the change in the programme model and source of funding. In contrast to the situation observed in breast cancer and cervical cancer, the number of DiLO cards issued to patients diagnosed with colorectal cancer did not exceed in 2020 the number of cards issued in the corresponding months in 2019. Moreover, since the outbreak, the number of DiLO cards issued to these patients has been lower than in 2019. The observed situation may be explained by the lower number of colonoscopies performed and the nature of the examination itself. Colonoscopy is an invasive procedure unlike cytology or mammography. During the initial phase of the epidemic, the diagnosis of colorectal cancer may have been much more complicated, if only because of the diversion of resources of medical facilities towards the fight against COVID-19 mentioned earlier in this section. An additional factor may also have been staff shortages (colonoscopy is performed by a doctor), as well as the age structure of the medical staff population in Poland (a large proportion of doctors are over 60 years of age, which is a serious risk factor for infection and severe COVID-19, and consequently exclusion from professional duties)[14].

6.3. Impact of the pandemic on cancer mortality

The argument of increased mortality from malignancies due to delays in diagnosis and treatment resulting from epidemics is often raised in many studies, as well as in public discussion[15, 16]. However, the real effect of these delays and the so-called "health debt" will take some time to become apparent, not least because of the nature of cancer. Currently, available epidemiological data paradoxically show decreases in mortality rates (Fig. 6.8) since 2020, the year of the outbreak in Poland. However, this seemingly positive phenomenon confirms the data described earlier – the decreases in mortality

14 Koczkodaj P, Cedzyńska M, Didkowska J. Smoking and SARS-CoV-2: Are Polish health professionals at higher risk of infection? Tobacco Induced Diseases. 2020;18(June):52. doi:10.18332/tid/122760.

15 Maringe C, Spicer J, Morris M, Purushotham A, Nolte E, Sullivan R, Rachet B, Aggarwal A. The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in England, UK: a national, population-based, modelling study. Lancet Oncol. 2020 Aug;21(8):1023–1034. doi: 10.1016/S1470-2045(20)30388-0. Epub 2020 Jul 20. Erratum in: Lancet Oncol. 2021 Jan;22(1):e5. PMID: 32702310; PMCID: PMC7417808.

16 Kościelecka KE, Kuć AJ, Kubik DM, Męcik-Kronenberg T, Ceglarz D. IMPACT OF THE COVID-19 PANDEMIC ON THE AVAILABILITY OF MEDICAL CARE AMONG ONCOLOGICAL PATIENTS. Wiad Lek. 2021;74(7):1542-1551. PMID: 34459750.

are most likely related to fewer oncology patients being diagnosed (also as a result of reduced screening participation) and attributing a different cause of death – often related to the course of COVID-19.

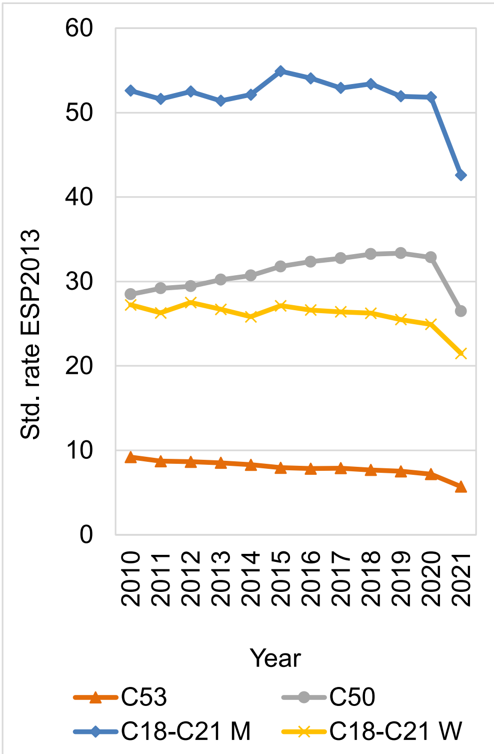


Fig. 6.8. Mortality rates for selected malignant tumours in Poland

This is confirmed by the statistics of all-cause deaths among patients diagnosed with malignant tumours available from National Health Fund. To refer to the group of patients remaining in treatment, only deceased patients for whom the last service with a diagnosis from the malignant tumour group occurred in the 12 months prior to death were included. A slight downward trend was observed between 2015 and 2019, with more deaths during the winter period, which is probably related to the flu season[17]. There was a significant decrease in the second quarter of 2020 (Fig. 6.9). This was the initial period of the pandemic, so the decrease is likely to be directly attributable to fewer cancer diagnoses during this period. In contrast, despite the lower number of oncology patients in 2020, the number of deaths increased significantly in the fourth quarter of 2020, as well as in the fourth quarter of 2021, during the subsequent epidemic waves. The number of deaths in the first two quarters of 2022 was lower than expected based on previous trends, which can be explained on the one hand by increased mortality in the preceding quarters and on the other hand by fewer diagnoses in 2020–2021.

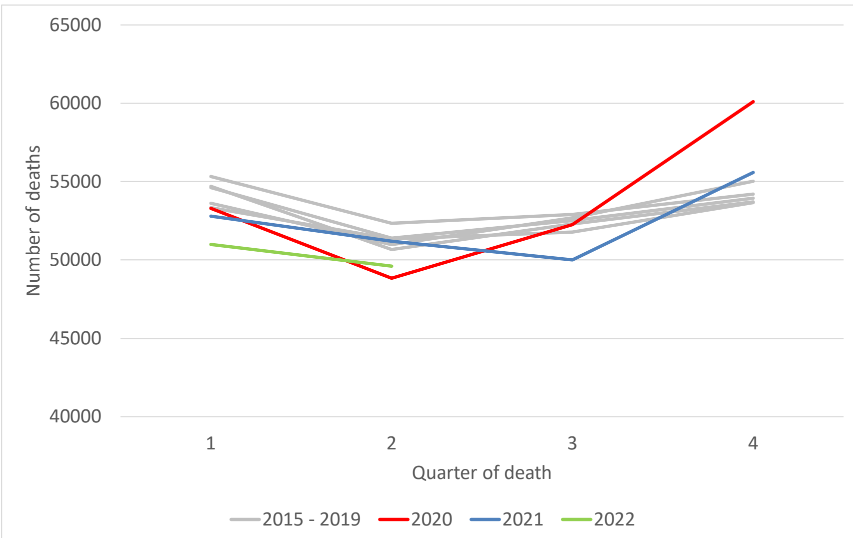


Fig. 6.9. Number of deaths in patients with a diagnosis of malignant cancer that occurred within 12 months of the last service with a diagnosis of cancer (Source: data provided by the National Health Fund)

[17] Marti-Soler H, Gonseth S, Gubelmann C, Stringhini S, Bovet P, Chen PC, Wojtyniak B, Paccaud F, Tsai DH, Zdrojewski T, Marques-Vidal P. Seasonal variation of overall and cardiovascular mortality: a study in 19 countries from different geographic locations. PLoS One. 2014 Nov 24;9(11):e113500. doi: 10.1371/journal.pone.0113500. PMID: 25419711; PMCID: PMC4242652.

Summary

1. During the pandemic, there is a significant decrease in indicators related to the diagnosis of malignant cancer in Poland (number of consilia in the DiLO system, number of first-time hospitalisations, number of first-time contacts). Delayed diagnoses generate a health debt that may lead to a higher proportion of diagnoses at an advanced stage of tumour in the future.
2. The number of cancer deaths decreased during the previous pandemic years. At the same time, there was a significant increase in all-cause mortality among cancer patients, mainly related to COVID-19. Significant excess mortality in the population aged 50 years and more in 2021 in Poland may paradoxically reduce the number of oncology patients in the coming years.
3. A return to the pre-pandemic state in Poland in terms of participation in screening will not be possible without real action tailored to specific audiences, including the reinstatement of invitations in a modified form. There is also research confirming that the most effective way to encourage participation in screening is through direct contact with a doctor, or other health system professional, dealing with the subject[18].
4. The COVID-19 epidemic confirmed that, to a large extent, the problem of low participation in screening in Poland is related to attitudes and beliefs about screening, the level of knowledge about screening, rather than the capacity of the system or lack of access to screening (screening data vs. number of DiLO cards issued in 2020).
5. The health debt, when preventive colonoscopies are not performed or delayed during the pandemic, is now further exacerbated by the stoppage of the early detection programme for colorectal cancer. Its relaunch now appears to be one of the most urgent needs for secondary prevention of malignant tumours.

[18] Koczkodaj P, Camacho F, Batten GP, Anderson RT. Are Wellness Visits a Possible and Effective Cure for the Increasing Cancer Burden in Poland? Example of Women's Preventive Services in the U.S. Cancers (Basel). 2022 Sep 1;14(17):4296. doi: 10.3390/tumours14174296. PMID: 36077829; PMCID: PMC9454863.

The authors of this section would like to thank Dr hab. Michał Kamiński, Prof. NIO-PIB, Head of the Department of Cancer Prevention at the Maria Skłodowska-Curie National Cancer Institute – National Research Institute, for providing data on the early detection programme for colorectal cancer.

7. MENTAL AND BEHAVIOURAL DISORDERS WITH A FOCUS ON THE IMPACT OF THE SARS COV-19 PANDEMIC ON MENTAL HEALTH

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(Institute of Psychiatry and Neurology)

Mental health and mental health disorders are an important area of public health. The WHO defines mental health as well-being in which an individual realises his or her potential, is able to cope with a variety of life situations, is able to participate in society and work productively.

Existing data and projections on mental health show that mental disorders are a serious and growing problem worldwide. Depression and alcohol abuse disorders are the two most common mental disorders in the world. Depression is listed as one of the top 20 causes of disability worldwide. The disease affects 120 million people and this number is constantly increasing. It is estimated that less than 25 percent of people with depression have access to appropriate healthcare and therapy. Mental disorders and sicknesses represent a serious burden on the individual and on the population, especially if left untreated. Psychiatric and substance abuse disorders contribute to explaining as much as 31% of the Global Burden of Disease (GBD). According to a WHO projection, depression will be the factor most responsible for GBD in 2030. It is estimated that in high-income countries, depression may contribute more to GBD than in low-income countries. Mental disorders cause significant disability, although they may not affect premature mortality. In terms of the global burden of disease measured in DALY (Disability Adjusted Life Years, a health indicator), depression, violence and alcohol abuse disorders top the list of factors contributing to GBD in all WHO regions. According to the WHO, suicide rates worldwide have increased by 60% in the last 45 years. Suicide is one of the 3 leading causes of death in the 15–44 year old population, and it is estimated that the numbers identifying attempted suicide are 20 times higher than cases of suicide ending in death. The number of suicides committed by young people is increasing. Around 90 percent of suicide cases are linked to depression and the use of various substances such as alcohol, drugs and others.

In many countries, efforts are being made to strengthen mental health systems and integrate people with disorders into the community and enjoy full-time employment.

In order to improve the mental health of the Polish population, measures have been taken by the Council of Ministers, which on 28 December 2010 adopted the Regulation on the National Programme for the Protection of Mental Health (Journal of Laws of 2011, No. 24, item 128). The implementation period of the Programme was 2011–2015. On 2 March 2017, the Regulation of the Council of Ministers on the National Programme for Mental Health Protection 2017–2022 was published (Journal of Laws 2017, item 458). The programme defines a strategy of activities aimed at: providing persons with mental disorders with comprehensive, multifaceted and universally accessible health care and other forms of care and assistance necessary for living in the family and social environment; shaping appropriate social attitudes towards persons with mental disorders, in particular understanding, tolerance, kindness, as well as counteracting their discrimination. Mental health issues are also addressed by the National Health Programme 2016–2020, whose operational objective 3 addresses the prevention of mental health problems and the improvement of the mental well-being of the population. It points to the need to monitor, among other things, the morbidity of depression and the number of suicide attempts and suicides.

Below, we present the size and dynamics of selected mental health problems in Poland based on existing routine information systems. The specific nature of mental sicknesses has meant that, for years, information on Polish residents treated for mental disorders in 24-hour mental health care institutions (hospitals, care and treatment institutions, addiction treatment centres, rehabilitation centres for addicts) has been collected as part of the Nationwide General Hospital Morbidity Survey, carried out by the Institute of Psychiatry and Neurology in Warsaw, where data analysis and compilation is carried out. The result tables are published in the statistical yearbook published by the Institute. The coefficients presented are for individuals and not for cases, as multiple hospitalisations were pooled according to the identification key adopted by the Institute for the purposes of statistical analysis. Substantive supervision of these systems is provided by the Institute of Psychiatry and Neurology in Warsaw.

However, it is worth referring at this point to data on mortality in Poland and recalling that one of the most important symptoms in the area of mental health, namely the mortality rate from suicide, is among men in Poland (in 2020 it is 20.0/100 000) significantly higher than the average for EU countries (15.3/100 000 in 2016) (age-standardised ratios). In contrast, the mortality rate for women from this cause in Poland (2.6/100,000) is many times lower than the mortality rate for men and is lower than the EU28 average (4.3/100,000). No country in the European Union has seen such a huge persistent sex disproportion.

7.1. Treated in outpatient mental health care facilities

Information on people treated in outpatient mental health care concerns treatment in mental health outpatient clinics (MHOC), alcohol treatment outpatient clinics (ATOC) and substance abuse treatment outpatient clinics (SATOC). This information is compiled at the Institute of Psychiatry and Neurology in Warsaw and is published in the statistical yearbook "Mental health care facilities" published by the Institute. The yearbook presents counts of total patients and those treated for the first time. The number of patients treated in total refers to those who were registered in outpatient care facilities during the year. The patient is counted once in the record, regardless of the number of consultations during the year. Patients treated for the first time are those registered in a given year at an outpatient clinic of a given type for the first time in their lives. The aggregated form of data collection limits the possibilities for detailed analysis, but nevertheless represents an important source of information on the prevalence of mental disorders in Poland.

In 2020, 1,680,000 people with mental disorders were treated in outpatient care (1,472,000 were patients treated in MHOC, 187,000 treated in ATOC and 21,000 treated in SATOC), including 364,000 for the first time. Between 2010 and 2019, the number of total and first-time treated patients increased significantly; the decrease in 2020 is due to the partial closure of treatment entities in the first wave of the coronavirus pandemic (Fig. 7.1a).

Fig. 7.1a. Outpatient mental health care –dynamics of the number of all treated patients (O) and the first time treated (I) during 2010–2020, 2010=100 (on the basis of the data of the Institute of Psychiatry and Neurology)

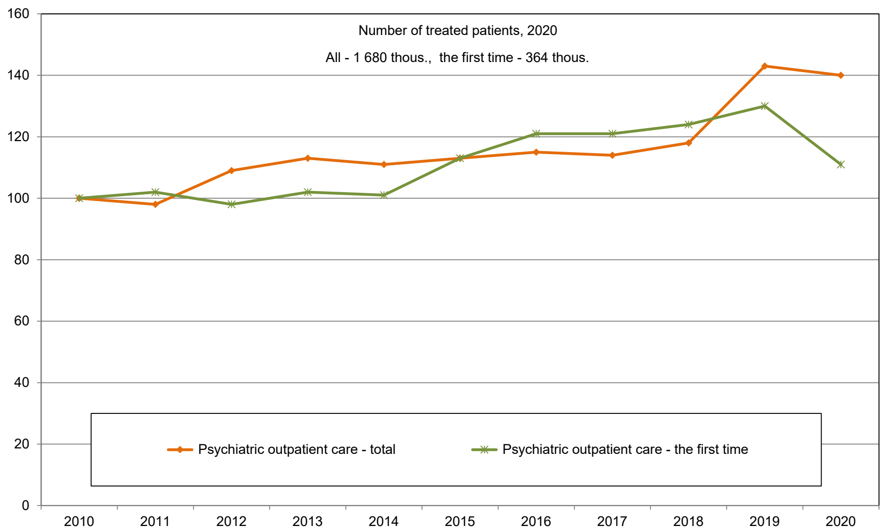

Table 7.1a. Outpatient mental health care – all treated patients and the first time treated patients by selected diagnosis, 2017–2020 (per 100000 population)

Diagnosis	Total treated patients				First-time treated patients			
	2017	2018	2019	2020	2017	2018	2019	2020
Organic, including symptomatic, mental disorders	532.2	550.4	554.5	515.3	106.0	110.3	113.6	89.9
Schizophrenia (F20)1	354.8	371.3	359.9	342.2	29.9	32.9	31.2	31.8
Mood (affective) disorders (F30-F39)1	829.9	850.1	877.5	885.7	150.0	157.3	170.4	168.7
Neurotic, stress-related and somatoform disorders (F40-F48)1	1149.4	1217.8	1210.7	1215.7	340.4	354.3	348.9	298.9
Mental and behavioural disorders due to use of alcohol (F10)2	419.1	437.4	425.1	373.9	146.4	149.0	136.9	105.3
Mental and behavioural disorders due to use of psychoactive substances (F11-F19)2	105.7	116.4	123.2	126.7	38.1	42.7	43.3	37.8

[1] *patients treated in mental health clinics*
[2] *patients treated in mental health clinics and alcohol and drug addiction therapy centres*

Source: based on data of the Institute of Psychiatry and Neurology

The most common group of diagnoses among people treated in outpatient mental health care are stress-related and somatoform disorders, for which 1215.7 people were treated in MHOC per 100 000 population in 2020, including 298.9 for the first time (the respective absolute values were 466 000 and 87 000 people) (Table 7.1a). The second largest group were those treated for mood (affective) disorders – 886/100 000, and for the first time 169/100 000. There is no clear trend of change in the number of people treated for these two groups of disorders over the past four years.

Patients treated for alcohol disorders represent the fourth largest group among those treated overall in open care, but the third largest group in terms of the frequency of first-time treatment. In 2020, a total of 154 000 people were treated for this reason (374 per 100 000). Between 2017 and 2020, a slight downward trend in the number of people being treated for alcohol disorders is marked.

In 2020, the number of total patients with mental disorders treated in mental health clinics was 1480 000 people, i. e. 3538 people were treated for every 100 000 population (Table 7.2a). Of this figure, 313,000 (801 per 100 000 population) were first-time inpatients. Women were treated at Mental Health Clinics more than 50% more often than men (men 2790/100 000 and women 4196/100 000). However, it should be borne in mind that only a small proportion of patients with mental disorders caused by alcohol and psychoactive substance use are treated in mental health clinics, as they are primarily treated in addiction counselling and prevention, treatment and rehabilitation centres. In outpatient mental health care, the excess of treated women over men is smaller, with women treated 24% more often than men in 2020 (men 3870/100 000 and women 4792/100 000). In 2015, the excess was 14.4 percent, indicating a greater increase in the number of female than male patients in recent years.

Heterogeneous trends are particularly true for those in alcohol and substance abuse treatment centres.

Table 7.2a. Outpatient mental health care, mental health clinics – all treated patients with mental disorders by sex and by place of residence, 2011–2020 (per 100000 population)

Year	Total	Men	Women	Urban area	Rural area
			Outpatient mental health care		
2011	3601.4	3351.7	3835.6	4323.3	2484.0
2012	3969.7	3632.0	4289.5	4879.2	2569.4
2013	4124.1	3781.6	4445.3	5069.5	2676.3
2014	4066.6	3658.3	4449.4	5017.1	2616.7
2015	3809.7	3360.1	4231.2	4694.1	2464.2
2016	3859.7	3385.0	4304.7	4857.8	2347.4
2017	4050.0	3676.4	4400.1	5099.4	2463.5
2018	4213.1	3785.7	4613.6	5280.5	2603.6
2019	4415.1	3976.6	4826.0	5626.6	2597.2
2020	4346.4	3870.2	4792.2	5570.8	2520.5
			Mental health clinics		
2011	2860.7	2150.7	3392.0	3409.9	2010.6
2012	3205.8	2549.4	3821.4	3922.2	2102.7
2013	3364.8	2696.9	3991.3	4132.7	2188.9
2014	3270.3	2562.9	3933.7	4031.7	2109.0
2015	3288.2	2609.9	3924.1	4041.7	2141.9
2016	3347.0	2654.7	3996.0	4212.3	2035.9
2017	3252.1	2579.8	3882.2	4100.1	1969.9
2018	3383.3	2658.2	4062.9	4257.0	2066.0
2019	3569.0	2805. 0	4244.1	4526. 0	2077.3
2020	3538.4	2790.3	4195.9	4538.8	1991.3

Source: based on data of the Institute of Psychiatry and Neurology

In mental health clinics, urban residents are treated far more often than rural residents – in 2020; the excess was as high as 128% (urban residents 4539/100 000, rural residents 1991/100 000) (Table 7.2a). There is a similar excess (121%) of treating urban residents (5571/100 000) compared to rural residents (2521/100 000) for outpatient mental health care, which includes alcohol and substance abuse treatment clinics combined. Both excesses changed by almost 20% compared to the period covered by the previous report. It is noteworthy that the number of urban residents treated between 2011 and 2020 is increasing, while the number of rural residents is decreasing slightly. Such large differences in rates between urban and rural residents may indicate large gaps in meeting the mental health needs of the latter group of people, especially if one considers, for example, the significant excess of suicide mortality of rural residents compared to urban residents (see Section 3).

7.2. Treated in 24-hour mental health care institutions

In 2020, the total number of people with mental disorders treated in 24-hour mental health care facilities was 142,000, i. e. 685 people were treated for every 100 000 population, of which 59 000 were treated in the same facility. (258/100 000) for the first time. In the relatively stable pattern of variation in the number of total and first-time patients per 100 000 population in 24-hour mental health care between 2010 and 2020, three moments of growth of over a dozen percent can be seen in the periods 2010–2011, 2014–2015 and 2018 (Fig. 7.1.b). The decrease in 2019–2020 is due to a temporary reduction in the availability of 24-hour wards due to the coronavirus pandemic.

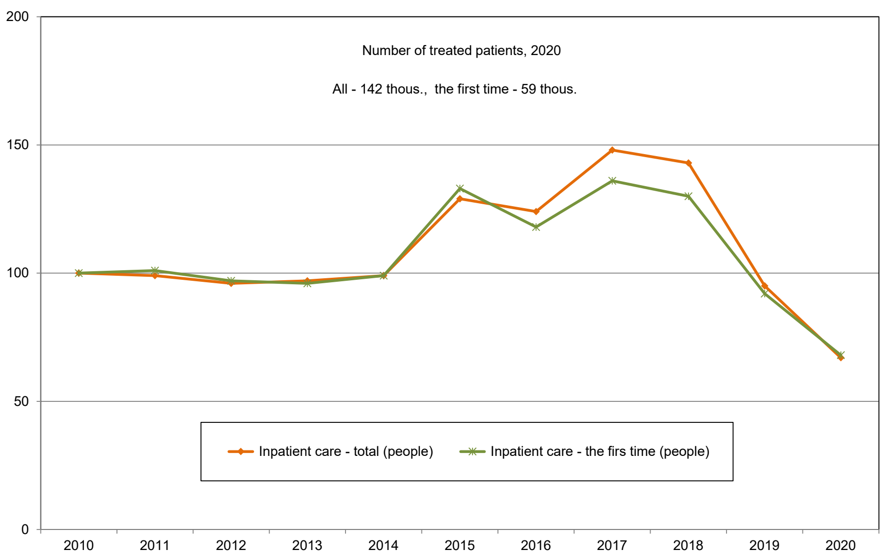

Fig. 7.1b. In-patient mental health care – dynamics of the number of all treated patients (O) and the first time treated (I) during 2010–2020, 2010=100 (on the basis of the data of the Institute of Psychiatry and Neurology)

While women were treated more frequently than men in outpatient mental health care, men were treated almost 103% more frequently than women in 24-hour care facilities in 2020, and this excess has been fairly constant in recent years (Table 7.2.b).

Table 7.1b. In-patient mental health care – all treated patients and the first time treated patients by selected diagnosis, 2017–2020 (per 100000 population)

Diagnosis	Total treated patients				First-time treated patients			
	2017	2018	2019	2020	2017	2018	2019	2020
Organic, including symptomatic, mental disorders	87.3	82.2	83.1	57.0	33.0	30.5	52.4	35.3
Schizophrenia (F20)	114.2	108.4	109.7	86.9	16.5	15.3	94.9	71.9
Mood (affective) disorders (F30-F39)	67.9	65.2	66.0	47.1	21.5	20.4	45.7	31.3
Neurotic, stress-related and somatoform disorders (F40-F48)	44.3	47.2	47.3	29.2	25.9	26.5	20.8	12.0
Mental and behavioural disorders due to use of alcohol (F10)	263.1	254.3	269.9	177.2	114.3	109.4	152.6	96.8
Mental and behavioural disorders due to use of psychoactive substances (F11-F19)	62.3	60.1	66.6	44.7	25.9	24.7	40.2	25.9

Source: based on Institute of Psychiatry and Neurology data.

Table 7.2b. In-patient mental health care – all treated patients with mental disorders by sex and by place of residence, 2011–2020 (per 100 000 population)

Year	Total	Men	Women	Urban area	Rural area
2011	534.9	709.2	371.4	566.6	449.9
2012	520.1	687.8	362.8	546.9	440.0
2013	523.8	695.7	362.6	547.2	444.4
2014	532.0	709.4	365.7	550.3	462.1
2015	614.8	806.0	435.4	680.2	515.2
2016	594.9	784.8	417.0	661.9	493.5
2017	707.7	973.1	459.0	771.3	611.6
2018	683.6	941.1	442.4	729.2	614.9
2019	521.1	705.2	348.6	576.6	437.8
2020	369.8	502.9	247.8	412.9	298.7

Source: based on Institute of Psychiatry and Neurology data.

Urban residents treated in 24-hour care facilities 38% more often than rural residents both for the first time and overall. The higher incidence of hospitalisation of urban than rural populations applies to all categories of disorders. The largest, more than twofold, difference between patients' residential environments concerned hospitalisations for substance use disorders (rural areas – 26.5/100 000 inhabitants, urban areas – 58.7/100 000), adult personality and behavioural disorders (7.8 and 17.3/100 000 respectively) and behavioural and emotional disorders usually beginning in childhood and adolescence (8.2 and 15.9/100 000).

The largest group of patients in 24-hour mental health care wards are those treated for alcohol use disorders. In 2020, this group numbered 95 000 people, i.e. 177/100 000 of the population (40% of the total treated in 24-hour mental health care wards, up to 35% treated for the first time). They were mainly men, accounting for as much as 83% of those treated for this reason. In the last three years (2017–2019), the rate of hospitalisation for alcohol disorders has remained similar. The total hospitalisation rate for alcohol use disorders for men was five times higher than for women in 2020, a relationship that also applies to first-time inpatients. Rural residents were slightly more frequently hospitalised than urban residents (203/100 000 and 209/100 000 population respectively).

Patients treated for schizophrenia represent the second largest group among all hospital admissions (20%), also among those treated for the first time (26%). In 2020, 36 000 people were treated inpatient for this reason (men – 108/100 000, women – 84/100 000, urban residents – 107/100 000, rural residents – 84/100 000). In the case of patients hospitalised for the first time (4.8 thousand patients), the rates were: men – 19/100 000, women – 14/100 000, urban residents – 18/100 000, rural residents – 14/100 000). In the last three years, the hospitalisation rate for schizophrenia in general has been decreasing slightly, while it has been increasing significantly for first-time patients. It is not yet possible to indicate a trend of change on the basis of these data, this requires further observations.

The next largest group are patients with organic mental disorders (11%) (men – 74/100 000, women – 70/100 000, urban residents – 84/100 000, rural residents – 58/100 000). The hospitalisation rate for this group of diseases (both overall and first-time) has remained similar over the past three years.

The incidence of total hospitalisations of Polish residents for mood (affective) disorders is 34% higher than hospitalisations for neurotic disorders, while for first-time hospitalisations the difference is smaller at 7%. For both groups of disorders, female hospitalisation rates were higher than male rates, but while the difference was marked for mood disorders (respective values of 72/100 000 and 42/100 000), it was only slight for neurotic disorders (59/100 000 and 55/100 000, respectively) and the situation was similar for first-time hospitalisations. Both mood disorders and neurotic disorders were more frequent causes of hospitalisation for urban residents than for rural residents (by 49% and 70% respectively).

There is a clear increase in the number of patients treated for substance use disorders – the rate for all clients treated for this reason in the period 2017–2019 increased by 10%, while for first-time clients the increase was greater at 54%. In 2020, almost 20 000 people were treated inpatient (men – 69/100 000, women – 15/100 000, urban residents – 55/100 000, rural residents – 21/100 000). In the case of patients hospitalised for the first time (4.9 thousand patients), the rates were: men – 27/100 thousand, women – 6/100 thousand, urban residents – 22/100 thousand, rural residents – 11/100 thousand).

As in previous years, significant differences are observed in the frequency of treatment in 24-hour mental health care wards, both in total and for the first time, of the population of each province (Fig. 7.2). The difference in hospitalisation rates between the outermost provinces was approximately twice as great for both total and first-time patients. In 2020, for the total treated population, these frequencies ranged from 229/100 000 population in the Małopolskie province to 521/100 000 in the Podlaskie province. Four provinces stand out as having a higher first-time hospitalisation rate of residents than the others, these being Podlaskie, Lubuskie, Warmińsko-Mazurskie and Łódzkie provinces. Compared to 2018, the frequency of first-time hospitalisations fell, most notably in the Łódzkie (by as much as 57%), Lubelskie (by 51%) and Mazowieckie (by 37%) provinces.

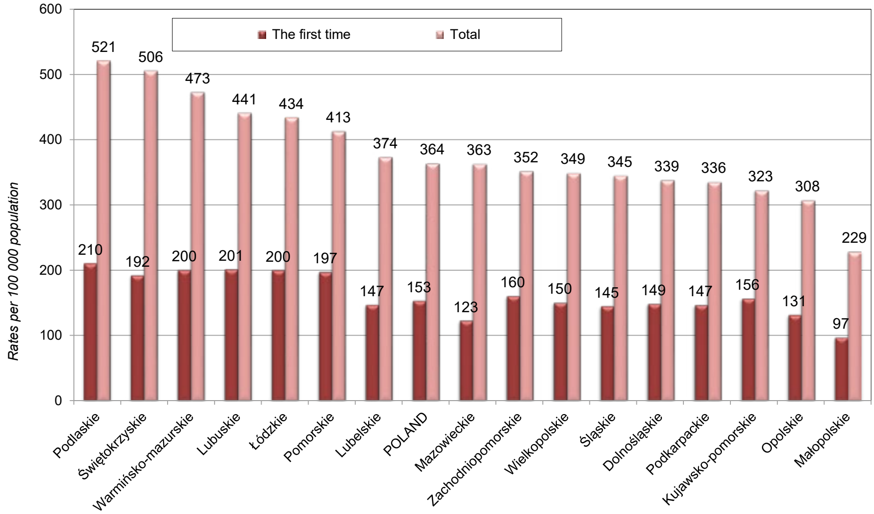

Fig. 7.2. In-patient mental health care wards – all patients and the first time treated patients by province (region) 2020 (data of the Institute of Psychiatry and Neurology)

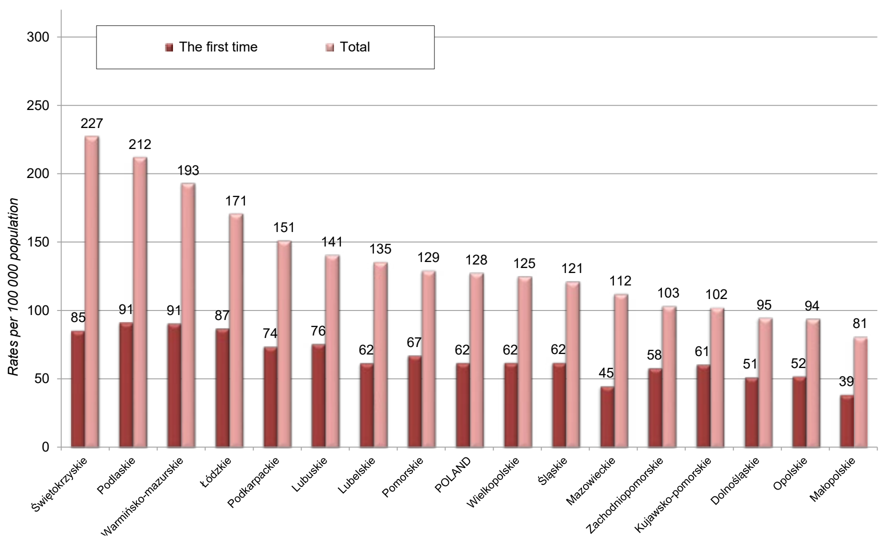

Fig. 7.3. In-patient mental health care wards – all treated patients and the first time treated for mental and behavioural disorders due to use of alcohol by provinces 2020 (data of the Institute of Psychiatry and Neurology)

Interprovincial differences in the size of mental disorder problems caused by alcohol use and requiring treatment in 24-hour care are also significant. The incidence of total hospitalisation of residents in each province ranged from 81/100 000 population in Małopolskie province to 227/100 000 in Świętokrzyskie province (Fig. 7.3) – the extremes are the same as in 2018. Podlaskie, Warmińsko-Mazurskie and Łódzkie provinces were also characterised by a high frequency of hospitalisations. This was also the case for those being treated for the first time. In relation to 2018, hospitalisation rates for people with alcohol use disorders are at a similar level. Changes (usually a decrease) are less than 7%.

The World Health Organisation predicts that depression will become the most common health problem in the next 20 years. There are a number of negative social consequences associated with this disorder, including that people suffering from severe depression often have to give up work and are sometimes long-term unemployed. This results in increased expenditure on sickness and unemployment benefits.

Depression is one of the mental disorders that prevent normal daily functioning. It is mainly characterised by a decrease in mood, energy and activity and a reduction in interests.

Depressive disorders often start at a very young age and are usually recurrent. The literature emphasises that depression is a systemic disease, the presence of which, in the absence of appropriate treatment, increases the risk of somatic diseases and, conversely, somatic diseases, especially chronic diseases, increase the risk of depression.

According to the World Health Organisation's Mental Health Action Plan 2013–2020 document, depression currently accounts for 4.3% of the global burden of all diseases and one of the largest single causes of disability worldwide (11% of all disability-adjusted life years worldwide – DALY3). It is particularly common among children and adolescents, but also among the older people. More than 350 million people are affected worldwide.

Statistically, in Poland, the number of people treated for affective disorders remained at a comparable level between 2014 and 2020, at 325 029 in 2014, 321 541 in 2015, 318 402 in 2016, 318 886 in 2017, 326 566 in 2018, 327 314 in 2019 and 204 587 in 2020. A nationally visible trend was an increase in the number of people treated in the age range 0–18 and 65+ and an increase in the number of people treated for bipolar affective disorder

(F31) and recurrent depressive disorder (F33). Nationally, in 2020, the rate of the number of people treated and the number treated for the first time for affective disorders (per 100 000 population of Poland) was 835 and 149 respectively.

Interprovincial differences in the magnitude of mental health problems caused by mood disorders, including depression, and requiring treatment in 24-hour care are also significant. The incidence of total hospitalisation of the population of individual provinces in 2020 ranged from 24/100 000 population in the Zachodniopomorskie province to 53/100 000 in the Pomorskie province (Fig. 7.4) – in 2018, these were the Świętokrzyskie and Wielkopolskie provinces, respectively. The Wielkopolskie, Kujawsko-Pomorskie and Podlaskie provinces were also characterised by a high frequency of hospitalisations. This was also the case for those being treated for the first time. In relation to 2018, hospitalisation rates for people with mood disorders show variability. In most provinces, a slight decrease was observed.

Interprovincial differences in the magnitude of mental disorder problems caused by depression and requiring treatment in 24-hour care are significant. The incidence of total hospitalisation of residents in each province ranged from 12/100 000 population in the Zachodniopomorskie province to 31/100 000 in the Pomeranian province (Fig. 7.5) – in 2018, these were the Małopolskie and Wielkopolskie provinces, respectively. The Wielkopolskie, Podlaskie and Warmińsko-Mazurskie provinces were also characterised by a high frequency of hospitalisations. This was also the case for those being treated for the first time. In relation to 2018, hospitalisation rates for people with depression show variability. In most provinces, a decrease of around a few percent was observed.

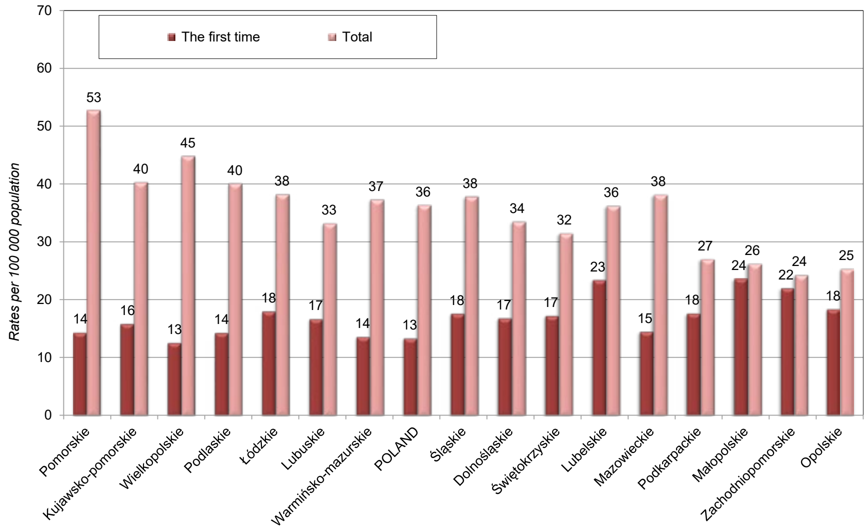

Fig. 7.4. In-patient mental health care wards – all treated patients and the first time treated for affective disorders by provinces 2020 (data of the Institute of Psychiatry and Neurology)

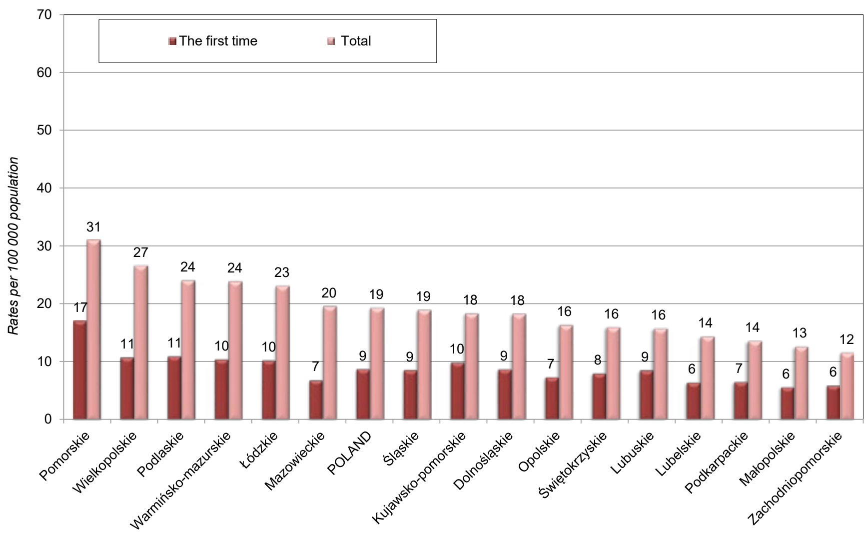

Fig. 7.5. In-patient mental health care wards – all treated patients and the first time treated for depression by provinces 2020 (data of the Institute of Psychiatry and Neurology)

7.3. Suicidal behaviour in 2017–2020 (based on National Police Headquarters data)

Suicide is a serious health and social problem. In Poland, more people die from suicide than die in road accidents. Suicide usually starts with suicidal thoughts and fantasies, then progresses to suicide plans and attempts, which in some cases end in death. Modern suicidology treats suicide as a process or sequence of events that consists of individual suicidal behaviours. The term "suicidal behaviour" refers to a whole range of behaviours including thoughts (fantasies), suicide plans and attempts, and completed suicide attempts

According to Statistics Poland, the last 60 years have seen a gradual increase in the number of suicides in Poland (with a marked decrease in 1981). The highest rate was recorded in 2009 (17.0 per 100 000 inhabitants). Since then, the number of suicides has been slowly decreasing. The rate was 11.7 in 2017 and 11.6 per 100 000 population in 2018.

This report analyses, among other things, statistical data from the National Police Headquarters on suicidal behaviour among Poles between 2017 and 2020. The 2020 figures largely coincide with the period of the SARS-Cov-2 virus pandemic. The pandemic has brought a number of mental health risks, increased stress levels and feelings of insecurity. The restrictions caused by the pandemic have also caused many people and their families to lose their jobs and a sense of financial security. These effects are largely similar to those of economic crises, so there was a legitimate concern that rates of suicidal behaviour could increase. On the other hand, a pandemic is a state of emergency compared by many to a state of war, which triggers in people a greater sense of solidarity with society than in times of peace (normality). Individual problems recede into the background. The fight for life and survival becomes paramount. Hence, it was conceivable that rates of suicidal behaviour might decrease, as they do during wars and other situations that threaten the survival of society as a whole. Monitoring suicidal behaviour rates during the pandemic period was (and is) an important task from a public health perspective and in particular the mental medical condition of the population.

7.4. Suicide attempts

Starting in 2013, the National Police Headquarters has been collecting data on **suicide attempts**. Suicide attempts include both **completed suicides** (resulting in death) and **suicide attempts** that did not result in death. Between 2017 and 2020, police statistics recorded around 11,000–12,000 suicide attempts per year, Table 7.3. Suicide attempts were far more common among men (approximately 8 500) than among women (approximately 3 000). The rate of men to women undertaking suicide attempts between 2017–2020 was roughly 4 to 1. The SARS-Cov-2 pandemic (2020 data) has not significantly changed the statistics of suicide attempts in Poland. It is worth noting that data from the last four years shows a slight increase in suicide attempts overall from 11,139 cases in 2017 to 12,013 cases in 2020 (an increase of approximately 900 cases). The increase in the number of women in registered suicide attempts is mainly responsible for this slight increase: from 2623 women in 2017 to 3216 women in 2020 (an increase of approximately 600 cases).

Table 7.3. Number of suicide attempts, including completed and uncompleted by sex: 2017–2020 figures

	Total suicide attempts			Suicide attempts ending in death			Suicide attempts that did not end in death		
Year	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**
2017	11139	8515	2623	5276	4524	751	5863	3991	1872
2018	11167	8364	2803	5182	4471	711	5985	3893	2092
2019	11961	8782	3177	5255	4497	756	6706	4285	2421
2020	12013	8796	3216	5165	4380	778	6848	4416	2438

Source: National Police Headquarters data

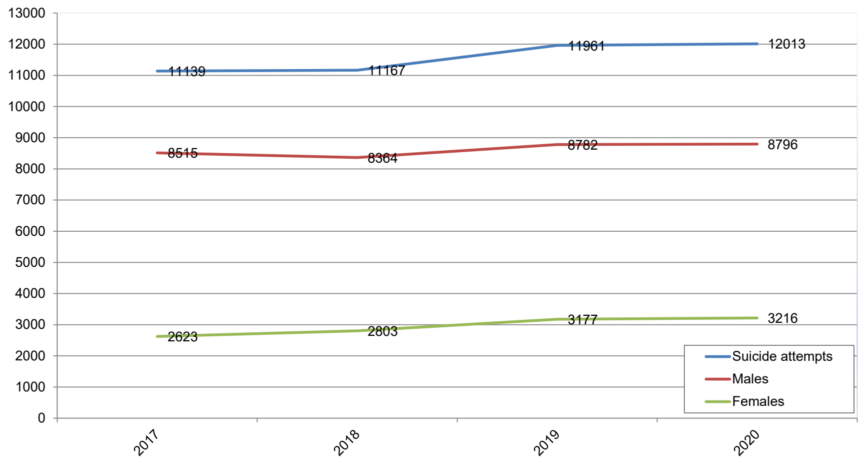

Fig. 7.6. Total number of suicide attempts (completed and uncompleted): 2017–2020 data (Source: National Police Headquarters data)

7.5. Suicide attempts ending in death

Less than half of suicide attempts recorded by the police (47% of all suicide attempts in 2017 and 43% in 2020) are fatal. The National Police Headquarters data provide important information that shows sex differences in the "lethality" of suicide attempts. If one takes the 2020 data as a basis, it appears that of the approximately 8,800 suicide attempts recorded among men, approximately 4,300 ended in death. Thus, among men, the rate of suicide attempts to deaths is like 2 to 1. In the case of women, of the 3,200 suicide attempts recorded by the police, approximately 0,800 were fatal. This indicates that among women, the rate of suicide attempts to deaths is like 4 to 1. The higher mortality of suicide attempts in men is probably related to the different methods of suicide for men and women. In the National Police Headquarters data, there is information on the methods of suicide in general, but this data is missing by sex, so it is not possible to say precisely which methods are used by men and which by women. In Poland, the predominant way to take one's own life is to hang oneself. It involves 50% of all suicide attempts and around 80% of all fatal attempts (National Police Headquarters data).

An analysis of statistical data collected by the National Police Headquarters shows that the number of suicide attempts resulting in death did not change much between 2017 and 2020. During these years, the number of completed suicides fluctuated around 5,200, Table 7.3, Figure 7.7. In 2020, 5165 people committed suicide. It can therefore be cautiously concluded that the suicide rate in Poland has remained at a similar level over the last four years. The first year of the pandemic did not bring significant changes to this statistic.

The number of suicides by sex has also not changed significantly. In 2020, as in previous years, suicide attempts ending in death were far more frequently undertaken by men (4,380 people) than by women (778 people). The rate of men to women committing suicide between 2017–2020 varied between 6.2 to 1 and 5.5 to 1, showing a tendency to decrease in the last two years, Table 7.3, Figure 7.7.

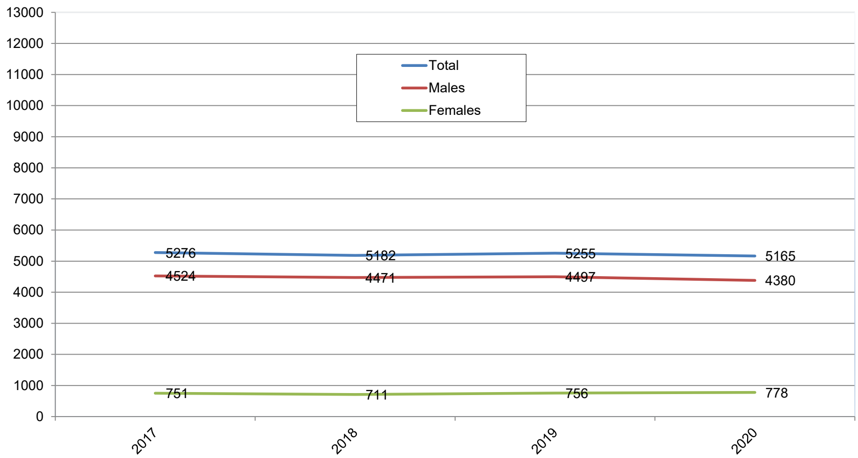

Fig. 7.7. Number of suicide attempts resulting in death: 2017–2020 figures (Source: National Police Headquarters data).

National Police Headquarters data also provides an insight into suicide statistics by age group. The highest suicide rates (around 900 suicides per year each) were recorded in four age groups, namely 30-year-olds, 40-year-olds, 50-year-olds and 60-year-olds. So, the highest numbers were recorded across a broad spectrum of working adults. A comparison of the 2020 suicide statistics with the previous three years by distinguished age groups does not show any great changes; Table 7.4, Figure 7.8, but the trends observed in the two age groups are worth noting.

The number of suicides among 50-year-olds has decreased from 1,045 in 2017 to 828 in 2020. On the other hand, a slight trend towards an increase in suicides is observed in the oldest age groups, namely 70-year-olds and 80-year-olds (from 602 in 2017 to 695 in 2020). These age groups during the pandemic may have found themselves in a difficult situation of feeling vulnerable and alone (due to the many restrictions on social contact). The steady number of suicides among schoolchildren is also worrying. In this group, the number of suicides per year has fluctuated around 100 over the past four years (107 in 2020).

Table 7.4. Number of suicide attempts resulting in death by age: 2017–2020 figures

Age group – total, without sex breakdown											
Year	Total	7–12 years	13–18 years	19–29 years	30–39 years	40–49 years	50–59 years	60–69 years	70–79 years	80+	Age not determined
2017	5276	1	115	759	964	867	1045	915	355	247	8
2018	5182	5	92	728	889	909	978	922	417	236	6
2019	5255	4	94	762	994	906	842	936	430	277	10
2020	5165	1	106	764	933	920	828	911	415	280	7

Source: National Police Headquarters data

The police data are supplemented by the results of a nationwide survey in the Polish population conducted on behalf of the Ministry of Health by the Institute of Psychiatry and Neurology called EZOP II. The preliminary results of this survey indicate that approximately 0.36% of the adult population of Poland (after extrapolation to the population – approximately 113 000 people) had a lifetime perspective of a suicide attempt. The highest prevalence of suicide attempts is found in the 30–39 age group and among divorced/single and unemployed people. Protective factors include being married, being permanently employed and living in a rural vs. urban area. At the same time, the results of these surveys indicate that 5.7% of school adolescents in Poland aged 12–17 manifest suicidal tendencies in the perspective of life, which, when extrapolated to the entire population of school adolescents, implies a need for specialist assistance for at least 131 000 young people (and their families). Approximately 0.6% of the adolescents surveyed had a history of suicide attempt (after extrapolation – 13,900 adolescents). Suicidal tendencies are significantly more often manifested by adolescents aged 16–17, residents of large cities and those adolescents whose families have benefited from social assistance. High current suicide risk in adolescents with suicidal tendencies was found in 0.4 percent of the population, implying the need for immediate specialist intervention for approximately 9,000 adolescents at serious risk of attempting suicide.

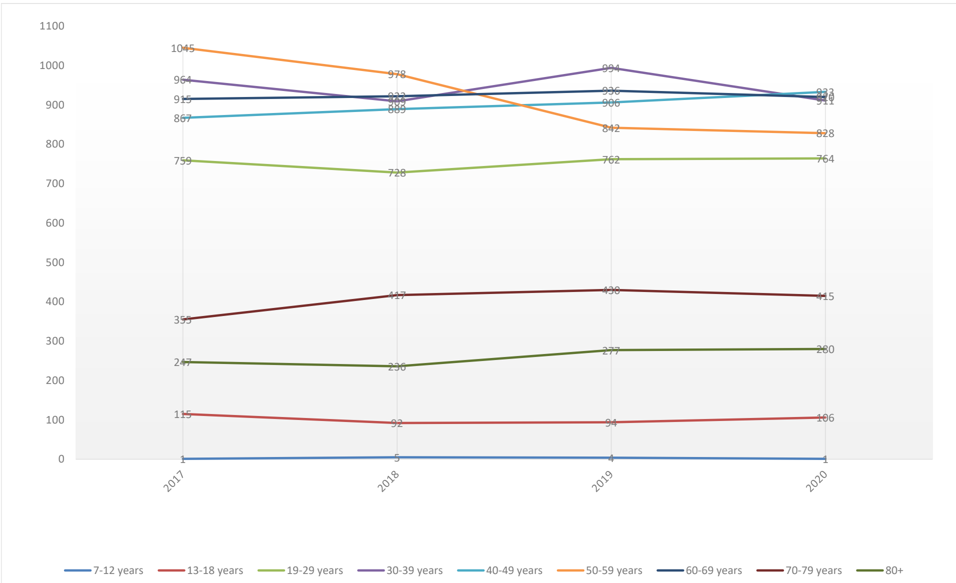

Fig. 7.8. Number of suicide attempts resulting in death by age groups: 2017–2020 figures (Source: National Police Headquarters data)

Looking for links between the chronology of pandemic events and suicide rates, data covering suicide statistics from 2017–2020 were collated by month, Table 7.5, Figure 7.9. In 2020, the highest number of suicides were committed during the spring and summer months (May, June, July and August), a period that largely included the loosening of pandemic restrictions. These monthly statistics for 2020 are very much in line with the trends observed in the last three years prior to the pandemic. In 2017–2019, the number of suicides also remained high (monthly) in these spring and summer months. It is difficult to see any regularities related to the pandemic and its consequences, rather the fluctuations due to the season observed in the last three years predominate.

Table 7.5. Summary of the number of suicides by month between 2017 and 2020

Month	Number of people who committed suicide			
	2017	2018	2019	2020
January	404	427	398	417
February	402	334	386	370
March	450	436	417	398
April	428	509	449	377
May	534	488	480	479
June	445	482	503	487
July	490	453	447	498
August	470	489	479	475
September	415	379	416	415
October	438	417	456	449
November	381	404	409	379
December	419	364	415	421
Total	**5276**	**5182**	**5255**	**5165**

Source: National Police Headquarters data

7.6. Suicide attempts that did not result in death

National Police Headquarters data also includes data on suicide attempts that did not result in death and were reported to the police. It is worth remembering that only some suicide attempts are entered into police statistics. Suicide attempts by people who have not been reported to the police are among the "dark number" of unrecorded suicide attempts, which is difficult to estimate accurately. It is estimated that the number of suicide attempts in the adult population is more than 20 times higher than those recorded in the statistics, while in the adolescent population it is more than one hundred, or even two hundred times higher. It can therefore be assumed with a high degree of probability that most suicide attempts are not recorded by the police.

Between 2017 and 2020, the number of non-fatal suicide attempts (suicide attempts recorded by the police) increased from 5863 in 2017 to 6848 in 2020 (an increase of approximately 1,000 cases). This overall increase has been contributed to by both higher numbers of men and women who have attempted to take their own lives. Police statistics recorded suicide attempts about twice as often among men (about 4 000 per year) as among women (about 2 000 per year), Table 7.1.

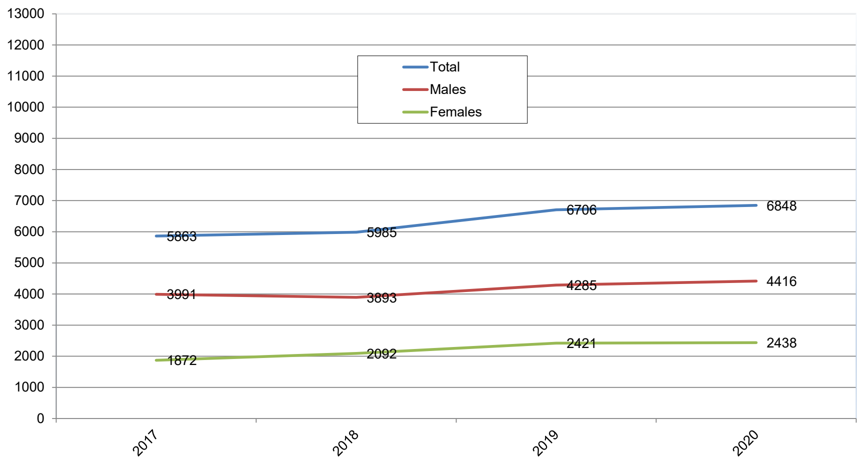

Fig. 7.9. Number of suicide attempts not resulting in death (suicide attempts): 2017–2020 figures (Source: National Police Headquarters data)

The highest numbers of suicide attempts (more than 1,000 suicide attempts per year) were reported in three age groups, namely 20-year-olds, 30-year-olds and 40-year-olds. So the highest numbers were recorded across a broad spectrum of young adults and mature people. A comparison of the 2020 suicide attempt statistics with the previous three years by distinguished age groups does not show any great differences, Table 7.4.

Table 7.6. Number of suicide attempts resulting in death (suicide attempts) by age: 2017–2020 figures

	Age group – total, without sex breakdown									
Year	Total	7–12 years	13–18 years	19–29 years	30–39 years	40–49 years	50–59 years	60–69 years	70–79 years	80+
2017	5863	27	587	1583	1439	1045	662	353	104	62
2018	5985	21	654	1519	1547	1110	641	314	113	65
2019	6706	42	811	1647	1706	1207	656	430	141	65
I– 2020	6848	28	708	1700	1722	1309	703	456	154	68

Source: National Police Headquarters data

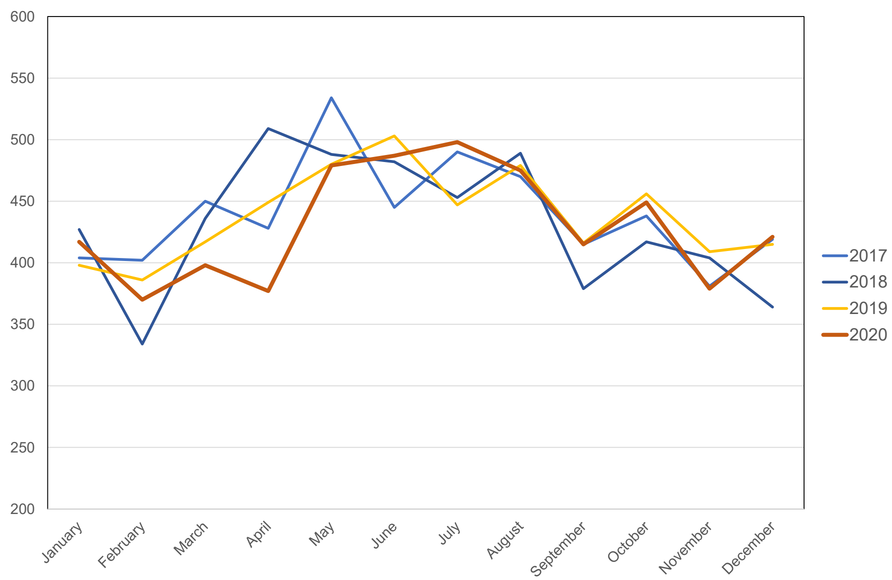

Fig. 7.10. Number of suicide attempts resulting in death by month: 2017–2020 figures

SUMMARY:

1. The number of outpatient mental health care patients treated in total is over one million six hundred thousand people. The number of patients treated between 2017 and 2020 has remained fairly constant, although an increase can be observed, including first-time patients. The trends of women being treated more than one-fifth more often than men and as much as 50 percent more often in mental health clinics alone, and of urban residents being treated far more often than rural residents, have continued for many years. In outpatient mental health care in 2020, the surplus was as high as 128%, and this difference indicates that the health needs of these two populations are not being met equally.
2. The most common health problems among people treated in outpatient mental health care have invariably been stress-related neurotic and somatoform disorders and mood (affective) disorders for several years.
3. Between 2011 and 2020, the number of Polish residents treated in 24-hour mental health care units is increasing, the exception being 2020, when admissions were reduced due to the pandemic. In 2020, 142,000 people were treated for mental disorders, men were treated as much as 103% more often than women (502.9/100 000 and 247.8/100 000 respectively), urban residents were treated more often than rural residents by 28% (412.9/100 000 and 298.79/100 000 respectively). The gap was much smaller than for outpatient treatment, but has nearly doubled in the last ten years.
4. By far the most common diagnosis among those treated in 24-hour wards was mental disorders caused by alcohol use, with 177.2/100 000 inhabitants in 2020 and 96.8/100 000 inhabitants treated for the first time. Particularly large numbers of residents are treated in Podlaskie, Świętokrzyskie and Warmińsko-Mazurskie provinces, as was the case three years ago.
5. On the basis of National Police Headquarters data, it can be determined that the number of suicides in the last four years in Poland has been stable, oscillating around the figure of 5,200 per year. The highest suicide rates (around 900 suicides per year each) were reported in four age groups: among 30-year-olds, 40-year-olds, 50-year-olds and 60-year-olds, a broad spectrum of working adults. The number

of suicides by sex has also not changed significantly. The rate of men to women committing suicide between 2017–2020 ranged between 6.2 to 1 and 5.5 to 1. The number of non-fatal suicide attempts (suicide attempts) recorded by the police has increased slightly in the last four years. It is uncertain whether this is the result of changes in the behaviour of the Polish population, or whether better detection by the police or greater "reporting" of suicide attempts by citizens is the decisive factor. Our analyses indicate that the pandemic period did not have a major impact on suicide statistics and suicide attempts in Poland.

8. INCIDENCE OF INFECTIOUS AND PARASITIC DISEASES

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Magdalena Rosińska, Małgorzata Stępień, Mirosław P. Czarkowski

For at least the past three decades, until 2019, the overall epidemiological situation of infectious diseases in Poland could be assessed as relatively stable and favourable. This by no means meant that the epidemiological picture of the individual diseases under surveillance did not change, and the incidence of the diseases recorded each year remained similar. However, if we disregard periodic increases in the incidence of some of the diseases, either due to their natural epidemic cycles or to random fluctuations in the number of cases registered each year, infectious disease surveillance data indicated that most of the diseases had more or less pronounced declining trends in incidence over the years or remained relatively stable. Spectacular declining trends were mainly observed in connection with consistent preventive vaccination against certain diseases.

In 2020, the COVID-19 pandemic rapidly affected the epidemiology of all other infectious diseases under surveillance. The extensive measures taken in the country to combat and contain the pandemic by cutting the COVID-19 transmission routes also largely prevented the spread of other infectious diseases. Reducing the transmission of infections between people by limiting contact between them (e.g. public gatherings ban, introducing remote working and learning, closing or limiting the activities of commercial and service establishments, closing cultural facilities, etc.), and reducing the risk of transmission on contact (e.g. requirements to wear masks and keep a distance in public places, making hand disinfectants available in public places, etc.) prevented not only the spread of other droplet– or airborne diseases, but also, for example, foodborne diseases. Unfortunately, the reported decline in incidence in 2020 (relative to the 2015–2019 median) for almost all notifiable infectious diseases was not solely indicative of an improved epidemiological situation for these diseases. It also had other reasons. Pandemic-related reductions in access to medical care and diagnostics, as well as the COVID-19-oriented prioritisation of the tasks of medical and health surveillance services, must have had an impact on the decrease in the number of diseases diagnosed and registered, especially those with a milder course, as well as chronic diseases. This is indicated, among other things, by very large decreases in the number of registered cases of diseases usually diagnosed in a chronic phase, such as e.g. hepatitis B and C, or echinococcosis, in 2020, which should in principle not be affected by the prevention measures taken in connection with the prevention of COVID-19.

In 2021, due, among other things, to the containment of the pandemic and the loosening of certain related restrictions, but also to the better adaptation of public health services to operate under pandemic conditions and the technical facilities put in place to carry out epidemiological surveillance, the registered incidence of most infectious diseases increased markedly relative to 2020, but generally not exceeding pre-pandemic levels. It was also not insignificant for the increase in incidence that the public became accustomed to the threat of COVID-19 and gradually returned to functioning as in the pre-pandemic period.

With all this in mind, the interpretation of the data on the incidence of infectious diseases in Poland in 2020–2021 collected by epidemiological surveillance should take into account the undoubted underestimation of the number of cases, while the degree of this underestimation may be very different for different diseases depending on their course and the threat they posed.

It is also with some caution that we should refer to the recorded share of deaths due to infectious diseases in the causes of all deaths in Poland in 2020 and 2021 (with COVID-19 deaths omitted, respectively: 0.42% and 0.47%) and to the rates of total mortality due to infectious diseases in these years (with COVID-19 deaths excluded, respectively: 5.27/100,000 and 6.45/100,000), characterising – to some extent – the general epidemiological situation of infectious diseases. Both rates fell quite markedly in 2020, as did the surveillance-recorded incidence of almost all infectious diseases, only to rise just as markedly in 2021, with a disproportionate – to judge by this – increase in the mortality rate in 2021.

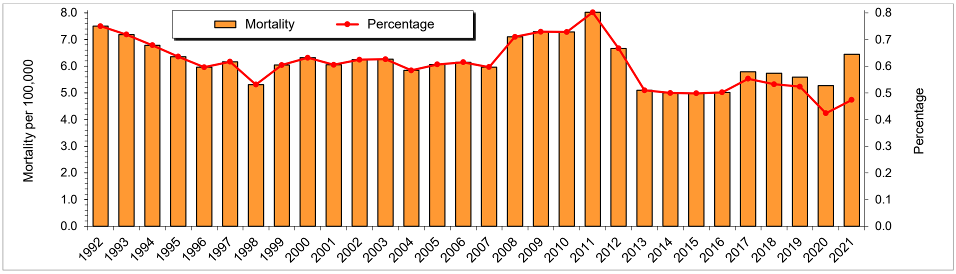


Fig. 8.1. Infectious diseases mortality (excluding COVID-19) per 100,000 population and deaths from infectious diseases as percentage of all deaths by year – Poland 1992–2021 *(based on CSO data)*

Since the epidemiological situation of infectious and parasitic diseases of particular significance for public health is analysed and discussed in detail in the "Epidemiological Chronicle" published in the " Epidemiological Review"[1], and detailed numerical data on registered incidences of all infectious diseases under surveillance in Poland are published regularly in the annual bulletins "Infectious Diseases and Poisons in Poland"[2], in the present chapter only selected diseases are discussed. Nevertheless, Table 8.1 provides basic data characterising the situation of the wider group of communicable diseases under surveillance. The numbers of registered cases and incidence rates in 2020 and 2021, as well as the medians of these values in 2010–2014 and 2015–2019, presented in the table, allow a general assessment of the direction and dynamics of changes in the epidemiological situation of these diseases.

[1] Quarterly published by the National Institute of Public Health NIH – National Research Institute and the Polish Society of Epidemiologists and Doctors of Infectious Diseases, available at: http://www.przeglepidemiol.pzh.gov.pl/

[2] Bulletins published by the National Institute of Public Health NIH – National Research Institute and the Chief Sanitary Inspectorate, available at: http://wwwold.pzh.gov.pl/oldpage/epimeld/index_p.html#04

Table 8.1. Selected notifiable infectious diseases in Poland. Number of cases and incidence per 100,000 population a) in years 2010–2021

Disease unit (in ICD-10 order)	Median 2010–2014	Median 2015–2019	2020	2021	Median 2010–2014	Median 2015–2019	2020	2021
	number of cases				Incidence			
Cholera	0	0	0	0	0	0	0	0
Typhoid fever	2	3	0	0	0.005	0.008	0	0
Paratyphoid fever A, B, C	5	2	0	2	0.013	0.005	0	0.005
* Salmonellosis	8444	9957	5470	8294	21.9	25.9	14.3	21.7
including: food poisoning	8267	9651	5302	8014	21.5	25.1	13.8	21.0
* parenteral infections	171	306	168	280	0.46	0.80	0.44	0.73
Bacterial dysentery	19	37	12	18	0.049	0.096	0.031	0.047
* Other bacterial intestinal infections	7046	15047	11879	23307	18.3	39.2	31.0	61.1
including: * diarrhoeic *E. coli*	532	288	66	103	1.38	0.75	0.17	0.27
verotoxigenic *E. coli*	5	8	7	9	0.013	0.021	0.018	0.024
* *E. coli* other and unspecified	845	306	109	124	2.19	0.80	0.28	0.32
Campylobacteriosis	431	726	418	631	1.12	1.89	1.09	1.65
Jersiniosis	206	172	90	142	0.54	0.45	0.23	0.37
caused by *Clostridium difficile*		11310	10139	21157		29.5	26.4	55.4
* other specified and unspecified		2351	1050	1141		6.12	2.74	2.99
* Other bacterial food poisoning	1787	510	96	329	4.64	1.33	0.25	0.86
including: * staphylococcal enterotoxin	147	54	4	4	0.38	0.14	0.010	0.010
Botulism	29	24	9	8	0.075	0.062	0.023	0.021
* *Clostridium perfringens*	16	1	6	14	0.042	0.003	0.016	0.037
* other specified	52	13	9	7	0.135	0.034	0.023	0.018
* unspecified	1561	419	68	296	4.05	1.09	0.18	0.78
Giardiasis	1872	1229	358	559	4.86	3.20	0.93	1.46
Cryptosporidiosis	1	3	2	3	0.003	0.008	0.005	0.008
* Viral and other specified intestinal infections	42699	55563	14450	23365	110.9	144.6	37.7	61.2
including: * rotavirus	23692	32995	5967	7417	61.5	85.9	15.6	19.4
* noroviruses	1569	3706	1483	7164	4.1	9.6	3.9	18.8
* other	14295	19880	7000	8784	37.1	51.7	18.3	23.0
* Diarrhoea in children under 2 years of age, unspecified	14201	17488	7235	9348	1798.9	2260.9	978.3	1330.9
Tuberculosis [1)]	7509	5787	3388	3704	19.57	15.06	8.83	9.71
including: respiratory system [1)]	6992	5531	3237	3553	18.21	14.40	8.44	9.31
Plague	0	0	0	0	0	0	0	0
Tularemia	6	18	5	43	0.016	0.047	0.013	0.113
Anthrax	0	0	0	0	0	0	0	0
Brucellosis (new cases)	0	2	0	1	0	0	0	0.003
Leptospirosis	4	4	1	2	0.010	0.010	0.003	0.005
Listeriosis	64	121	66	121	0.17	0.32	0.17	0.32
Tetanus	14	12	2	5	0.036	0.031	0.005	0.013
Diphtheria	0	0	0	0	0	0	0	0
Pertusis	2100	3061	753	182	5.46	7.97	1.96	0.48

Disease unit (in ICD-10 order)	Median 2010–2014	Median 2015–2019	2020	2021	Median 2010–2014	Median 2015–2019	2020	2021
	number of cases				Incidence			
* Scarlet fever	22885	20369	7662	2649	59.5	53.0	20.0	6.94
Meningococcal disease	241	200	106	107	0.63	0.52	0.28	0.28
including:meningitis and/or encephalitis	163	102	56	50	0.42	0.27	0.15	0.13
Septicaemia	154	139	67	63	0.40	0.36	0.17	0.17
* Rubella	4241	5492	3045	2089	11.01	14.29	7.94	5.47
Legionellosis	14	39	47	46	0.04	0.10	0.12	0.12
Syphilis (total) [2)]	1254	1602	706	1128	3.26	4.17	1.84	2.96
Gonorrhoea [2]	454	393	246	287	1.18	1.02	0.64	0.75
Sexually transmitted chlamydioses [2)]	236	258	169	283	0.61	0.67	0.44	0.74
* Lyme borreliosis	9157	20629	12934	12500	23.8	53.7	33.7	32.8
Q fever	0	0	0	1	0	0	0	0.003
* Typhus fever, spotted fever and other rickettsioses	3	4	0	2	0.008	0.010	0	0.005
Acute poliomyelitis	0	0	0	0	0	0	0	0
* Creutzfeldt-Jakob disease	21	26	11	18	0.055	0.068	0.029	0.047
Creutzfeldt-Jakob disease variant	0	0	0	0	0	0	0	0
Rabies	0	0	0	0	0	0	0	0
* Viral encephalitis	380	357	193	258	0.99	0.93	0.50	0.68
including:transmitted by ticks	221	265	158	210	0.57	0.69	0.41	0.55
* other specified	37	30	13	17	0.096	0.078	0.034	0.045
* unspecified	111	79	22	31	0.288	0.206	0.057	0.081
* Viral meningitis	1167	943	264	195	3.06	2.45	0.69	0.51
including:* enterovirus	53	71	13	5	0.138	0.185	0.034	0.013
* other specified and unspecified	1130	809	251	190	2.96	2.11	0.65	0.50
Dengue fever (classical or haemorrhagic)	6	30	9	2	0.016	0.078	0.023	0.005
Yellow fever	0	0	0	0	0	0	0	0
Lassa fever	0	0	0	0	0	0	0	0
Crimean-Congo haemorrhagic fever	0	0	0	0	0	0	0	0
Disease caused by the Marburg or Ebola virus	0	0	0	0	0	0	0	0
* Chickenpox	183446	173196	71567	57669	480.4	450.8	186.6	151.1
Measles	70	133	29	13	0.182	0.346	0.076	0.034
Rubella	5891	476	98	50	15.31	1.24	0.26	0.13
including:congenital rubella	0	0	0	0	0	0	0	0
Hepatitis A virus	71	1067	111	92	0.18	2.78	0.29	0.24
Hepatitis B virus [3)]	1583	3363	992	1547	4.11	8.75	2.59	4.05
including:Acute	81	50	14	10	0.210	0.130	0.037	0.026
Hepatitis C virus	2270	4010	955	1244	5.89	10.44	2.49	3.26
* Hepatitis virus other and unspecified	27	9	12	8	0.070	0.023	0.031	0.021
AIDS	162	109	50	47	0.42	0.28	0.13	0.12
Newly detected HIV infections	1104	1317	934	1096	2.87	3.43	2.44	2.87
Mumps	2585	1670	582	484	6.71	4.35	1.52	1.27
Diarrhoea / malaria	21	28	8	15	0.054	0.073	0.021	0.039
Echinococcosis	36	64	18	26	0.094	0.167	0.047	0.068
Trichinosis	23	4	20	2	0.060	0.010	0.052	0.005
Disease caused by *Streptococcus pneumoniae*	441	1192	629	937	1.14	3.10	1.64	2.46
including:meningitis and/or encephalitis	192	190	78	117	0.50	0.49	0.20	0.31

Disease unit (in ICD-10 order)	Median 2010–2014	Median 2015–2019	2020	2021	Median 2010–2014	Median 2015–2019	2020	2021
	number of cases				Incidence			
Septicaemia	259	815	422	625	0.67	2.12	1.10	1.64
other specified and unspecified	123	466	233	314	0.32	1.21	0.61	0.82
Disease caused by *Haemophilus influenzae*	31	102	78	52	0.08	0.27	0.20	0.14
including:meningitis and/or encephalitis	11	10	12	3	0.029	0.026	0.031	0.008
Septicaemia	15	54	43	30	0.039	0.141	0.112	0.079
* Bacterial meningitis and/or encephalitis – other specified	144	122	41	52	0.37	0.32	0.11	0.14
* Bacterial meningitis and/or encephalitis – unspecified	353	231	66	60	0.92	0.60	0.17	0.16
* Meningitis other and unspecified	597	720	270	312	1.55	1.87	0.70	0.82
* Encephalitis other and unspecified	107	104	52	66	0.28	0.27	0.14	0.17
Influenza and suspected influenza cases	1460037	4790033	3160711	2973793	3789.0	12478.4	8240.9	7792.5
Congenital toxoplasmosis	10	18	9	13	2.59	4.48	2.53	3.92

8.1. Diseases subject to obligatory vaccination in Poland

In 2020, due to the dynamic spread of the SARS-CoV-2 virus, the introduction of an epidemic emergency in our country and the declaration of a pandemic state by the WHO, a position paper was published on 20 March 2020 on the temporary suspension of the implementation of preventive vaccination[3]. The position paper was prepared jointly by Polish Paediatric Society, Polish Society of Family Medicine, the national consultant in paediatrics, the national consultant in family medicine and the national consultant in epidemiology, and the aim of the suspension of vaccination was to reduce the risk of infection among infants, children and their parents/guardians, as well as adolescents and adults, by suspending all preventive visits to primary health care (PHC) clinics, visits to outpatient specialist care (OSC), which could be postponed without prejudice to the child's health. The recommendation for preventive vaccination was not based on medical contraindications to preventive vaccination in the current epidemiological situation at the time, but was aimed at reducing direct contacts and encounters, advised against during the pandemic, which were conducive to the spread of a disease about which little was still known. The position paper requested parents/guardians to keep

[3] Ministry of Health. Suspension of compulsory vaccination under the Preventive Vaccination Programme. 20.03.2020. https://www.gov.pl/web/zdrowie/wstrzymanie-szczepien-obowiazkowychw-ramach-prograamu-szczepien-ochronnych, dostęp dnia 10.11.2022r.

children at home, away from potential hazards, until this recommendation is revoked. It was also pointed out that children can pass the infection asymptomatically and can be a source of infection for adults, for whom the infection can be fatal. It was emphasised that the only medical exception justifying immediate vaccination is for post-exposure prophylaxis against rabies, tetanus, measles and chickenpox. The suspension of vaccination implementation lasted one month. On 18 April 2020, the Minister of Health and the Chief Sanitary Inspector issued a communication on the resumption of the current implementation of compulsory vaccination under the Childhood Preventive Vaccination Programme[4] (PSO) with observance of the principles of antiepidemic safety during vaccination, with particular emphasis on vaccinations in neonatal wards, mandatory vaccinations in outpatient settings, especially those administered in accordance with the PSO in the first two years of a child's life, vaccinations taking into account the individual situations of children with chronic diseases for whom there are particular health indications for vaccination, post-exposure vaccinations against rabies, tetanus, measles, chickenpox, hepatitis B, according to medical indications in all age groups, the implementation of other preventive vaccination whose administration or completion of the vaccination schedule is required by the Characteristics of Medicinal Products. In addition, the communication included a recommendation to popularise pneumococcal and influenza vaccination in at-risk groups of adults, including those over 60 years of age and chronically ill patients, as chronic lung disease, cardiovascular disease, cancer, diabetes, kidney failure and immune disorders are conducive to pneumonia, and pertussis vaccination in pregnant women. Additionally, the communication described the safety rules for vaccination during the SARC-CoV-2 coronavirus pandemic, which was key information for parents/carers of children, providing a sense of security in this difficult, ever-changing pandemic situation, and for medical facilities providing ongoing vaccination and the resulting backlog.

In 2020, as in recent years, the downward trend in compulsory vaccination uptake has continued, with an increase in the number of vaccine evaders. It is noteworthy, however, that the dynamics of these trends (vaccination status and vaccination evaders) slowed

[4] Communication on the resumption of preventive vaccination: Communication on the implementation of preventive vaccination during the COVID-19 pandemic – Ministry of Health – Gov.pl Portal (www.gov.pl); accessed 10.11.2022.

down sharply in 2020, which is hopefully the beginning of a reversal of the observed unfavourable trend. Sources of information on the implementation of mandatory vaccinations in our country include data on the vaccination status of children and adolescents collected annually by employees of sanitary-epidemiological stations from all health care facilities in Poland. Data on the implementation of compulsory vaccination shows that, over the past years, 95% of children and adolescents have been vaccinated (in 2020– 94.9%) (Fig. 8.2, 8.3 and 8.4) and, for the majority of vaccinations in 2020 for children in year 3 (born in 2018) in relation to the requirements of the Preventive Vaccination Programme, an immunisation status of 98.6% was achieved, of which fully vaccinated children accounted for 85.0% and partially vaccinated children for 13.6%. In contrast, the percentage of children not vaccinated at all was 1.5%. The slight downward trend in vaccination status is still noteworthy, but given the epidemiological situation related to COVID-19, including the use of anti-epidemic measures, the vaccination status analysed should be considered favourable (Figs. 8.3, 8.4, 8.5). Based on preliminary data for 2020, vaccination coverage at the provincial level varied and was not lower than 87.0%, ranging from 87.3% to 99.4%. It is crucial to maintain the vaccination status of the population subject to mandatory vaccination at 90.0% – 95.0%, which is sufficient to achieve herd immunity to prevent epidemic spread of disease. However, it should be borne in mind that at regional (provincial) level, the implementation of some vaccinations (e.g. against measles-mumps-rubella) has dropped to an alarming level of 87.3%, which, in the perspective of the next few years, may result in a change of the currently observed favourable situation (Table 8.2).

Table 8.2. Vaccination coverage in Poland in 2020 (source: epidemiological surveillance data)

Type of vaccine	Average percentage vaccinated in the country	Min. and max. Percentage vaccinated by province	Age of children at which vaccination status was assessed
Diphtheria/tetanus	94.20%	89.5% – 97.9%	two years old
Pertussis	94.20%	89.5% – 97.9%	two years old
Polio	94.20%	89.4% – 98.0%	two years old
Measles/mumps/rubella	91.90%	87.3% – 97.6%	three years old
Rubella	95.60%	94.2% – 99.4%	fifteen years old
Hib	94.00%	89.3% – 98.0%	two years old
Streptococcus pneumoniae	93.30%	89.9% – 98.5%	two years old
Hepatitis B	97.40%	95.7% – 98.9%	two years old
Tuberculosis	97.80%	96.6% – 99.0%	two years old

It should be emphasised that the vaccination coverage against diphtheria, tetanus, pertussis, polio, measles and rubella has remained very high for most years, i.e. between 95% and 100%, resulting in the observed significant reduction or elimination of the incidence of diseases such as diphtheria, tetanus, polio, measles, rubella, hepatitis B, or caused by the microorganism *Haemophilus influenzae* and *Streptococcus pneumoniae*. Of the vaccinations used in Poland against many dangerous diseases and their complications, pneumococcal vaccination was introduced into the 2017 Mandatory Preventive Vaccination Schedule. In 2020, the vaccination status of children at 2 years of age was 93.3%, which, during the growing COVID-19 epidemic and the anti-epidemic measures introduced, translated into a less than threefold lower incidence of invasive disease caused by pneumococci, at 1.63 per 100,000 inhabitants in 2020, and a higher incidence of 2.38 per 100,000 inhabitants in 2021.

In the case of pertussis, the epidemiological situation is more complex, as after achieving a significant decrease in incidence and mortality from pertussis, there has been an increase in incidence since the second half of the 1990s to around 2000–3000 cases per year.

Since 2016, when 6,828 cases were registered, there has been a downward trend in pertussis cases to 3 067 cases with an incidence of 7.98 per 100,000 population in 2017, in the following years: in 2018–1 548 reports with an incidence of 4.0 per 100,000 population, in 2019 there was a slight increase in incidence i.e.: 1,630 with an incidence of 4.25 per 100,000 population, confirming the occurrence of pertussis epidemics in cycles of every 3–5 years and indicates the entrenched circulation of the bacteria in the environment and the continuing susceptibility of the population to infection. In 2020, there was a significant decrease in incidence, with 753 cases of pertussis registered, an incidence of 1.96 per 100,000 populations. Of those who were ill, 27.5% required hospitalisation (Fig. 8.2).

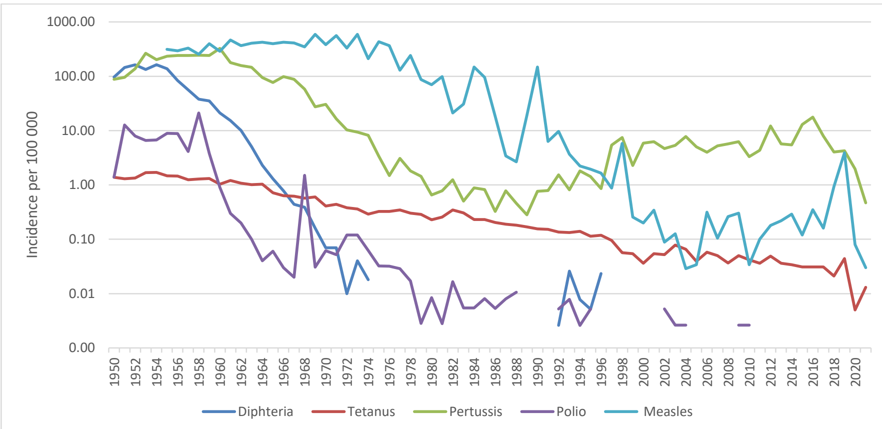


Fig. 8.2. Incidence of selected infectious diseases against which compulsory childhood and adolescent preventive vaccination is carried out, 1950–2020 (source: epidemiological surveillance data)

It should be noted that, as a result of ongoing vaccination, the last case of poliomyelitis caused by a wild strain of polio virus, was reported in Poland in 1984 (Fig. 8.2). Since then, despite an active search for poliovirus infections among people with symptoms of acute flaccid paralysis (which is compulsorily reported for surveillance), single cases of illness due to vaccine-derived virus have been registered (singe cases in 2009, 2010 and 2013). From the perspective of the Global Programme for the Eradication of Poliomyelitis coordinated by the World Health Organisation, Poland maintained its polio-free status, but due to emerging cases in countries of the WHO European Region and the possibility of virus importation – the WHO classified our country in areas of moderate risk of polio outbreak, which required strengthening of epidemiological and viral surveillance activities.

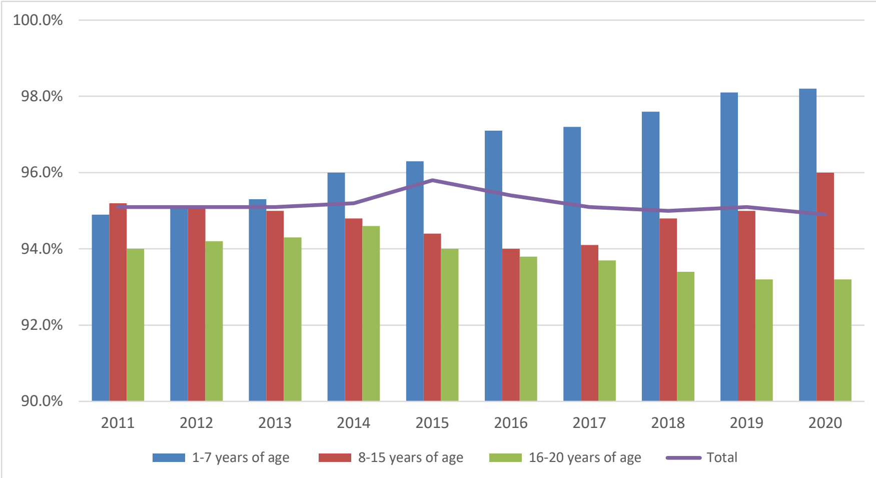


Fig. 8.3. Preventive Vaccination Programme 2006–2020. Percentage of children and young people covered by surveillance of implementation of the Programme (source: epidemiological surveillance data)

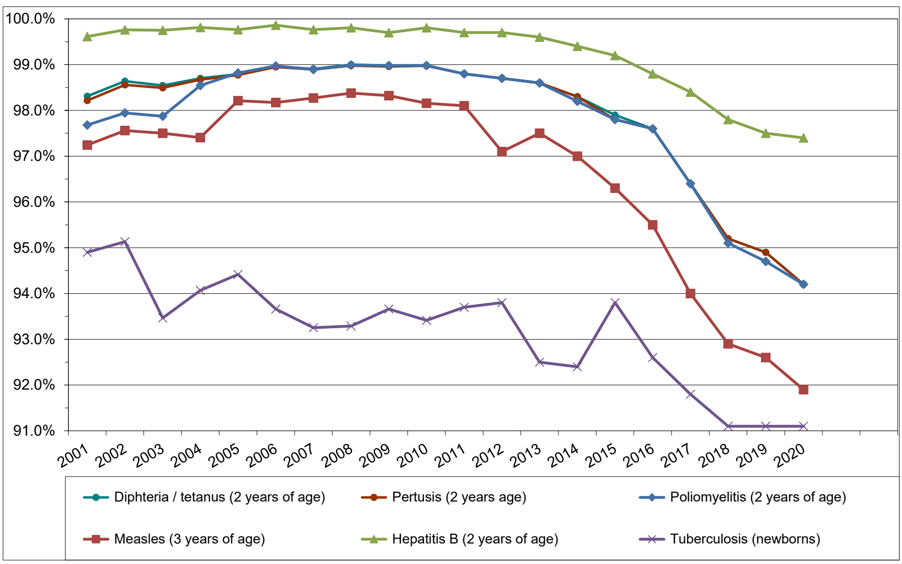


Fig. 8.4. Preventive Vaccination Programme 2001–2020. Percentage of children aged 1–3 vaccinated against selected diseases (source: epidemiological surveillance data)

The incidence of diphtheria in Poland after 1975 is very sporadic (Fig. 8.2) – the last case of diphtheria was imported from the former Soviet Union in 2000. It should be remembered that there is still a risk of diphtheria when there are susceptible individuals and non-vaccinated children in a population. Therefore, the diphtheria control strategy must be based on two basic elements:

- maintaining a high level of immunisation of children and adolescents in accordance with the current preventive vaccination schedule, and
- periodic, i.e. every 10 years booster doses with a vaccine with reduced diphtheria toxoid, the Td vaccine.

Since 1998, the number of tetanus cases has not exceeded 30 cases per year, and in recent years there has been a downward trend in the incidence to a dozen or so cases per year. In 2019, 17 people contracted tetanus and in 2020, two cases were reported. The incidence of the disease has not shown a clear downward trend in recent years, with the exception of 2020, and remains at or slightly above the average incidence in EU countries (Fig. 8.5).

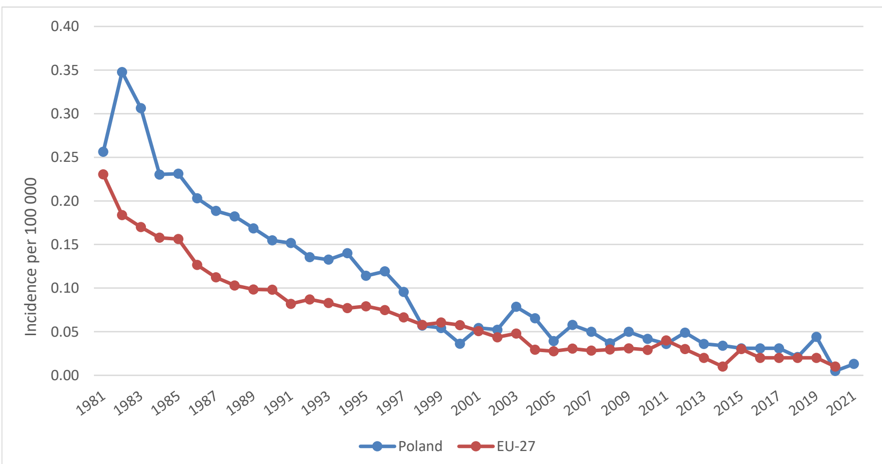


Fig. 8.5. Tetanus incidence in Poland and average in EU/EEA countries from 1981 to 2020 (source: epidemiological surveillance data, ECDC)

A huge success of the implementation of tetanus vaccination has been the non-occurrence of so-called neonatal tetanus for decades. The specificity of tetanus lies in the widespread distribution of *Clostridium tetani* bacteria in nature, as the spores are present in the soil, in the faeces of animals, humans, in the human environment, and in the lack of herd immunity. Therefore, the immunisation status of each person determines the susceptibility of the population to infection. As injuries have always remained a medical problem in urban and rural settings, continuously increasing immunisation remains the only effective way to prevent the disease. Exposure to spores of the micro-organism associated with the frequency of injuries and low levels of immunisation favours transmission of the infection. In Poland, tetanus is contracted almost exclusively by people over 50 years of age and the elderly. Age also plays an important role in the severity of the disease course and the likelihood of death.

After years of a steady decline in the incidence of the eradicable diseases: measles and rubella and congenital rubella syndrome, the epidemiological situation of these diseases has changed in recent years. After over a dozen years of registering around 100 measles cases (133 measles cases were registered in 2016 and 63 in 2017), the incidence was many times lower than the average incidence in EU countries (Fig. 8.6), while 2018 saw an increase in measles cases: 359 cases were registered with an incidence of 0.93/100,000 inhabitants. In 2019, Poland, like the rest of Europe, saw a significant increase in measles cases. The measles outbreak in Europe has affected both adults and children.[5] In our country, 1502 cases were registered, with an incidence of 3.91 per 100,000 inhabitants and a hospitalisation rate of one in every two sufferers. A significant increase in incidence was observed in the over-15 age group, with the highest incidence in those aged between 35 and 39 years (11.36 per 100,000). Analysis of the data from the individual reports indicated that, among the 1,502 patients, 952 (63.4%) were unvaccinated, 300 (19.9%) vaccinated according to the current preventive vaccination schedule and 250 (16.6%) with unknown vaccination status. No deaths from measles have been reported. In contrast, 2020 saw a decrease in measles cases. 29 patients were reported, with an incidence

[5] Siani A. Measles outbreaks in Italy: A paradigm of the re-emergence of vaccine-preventable diseases in developed countries. Prev Med 2019;121:99–104.

of 0.08 per 100,000 population (Fig. 8.6). The distribution of cases according to age and vaccination status was as follows: in the youngest age group, i.e. 0–4 years old, 8 children became ill, of which 5 children were vaccinated with 1 dose and 3 children were not vaccinated against measles; in the age group 5–9 years old, 5 children became ill, of which 4 children were vaccinated with 1 dose and 1 child was not vaccinated against measles; and in the age group 10–14 years old, 2 people became ill, of which 1 person was vaccinated with 2 doses and 1 person was not vaccinated against measles; in the age group 15–19 years, 1 person became ill, with no information on vaccination status. In the older age groups, i.e. > 20 years of age, a total of 13 people became ill, of which 6 people were unvaccinated, 2 people received two doses and no information on vaccination status was given for 5 people. According to the Preventive Vaccination Programme, the vaccine is administered twice, the first dose in the 2nd year of life (at 13–14 months of age) and, from 2019, the administration of the booster dose has been postponed from 10 to 6 years of age, the rationale being to give 2 doses before children go to school and the consistency of the measles vaccination schedule with other EU countries.

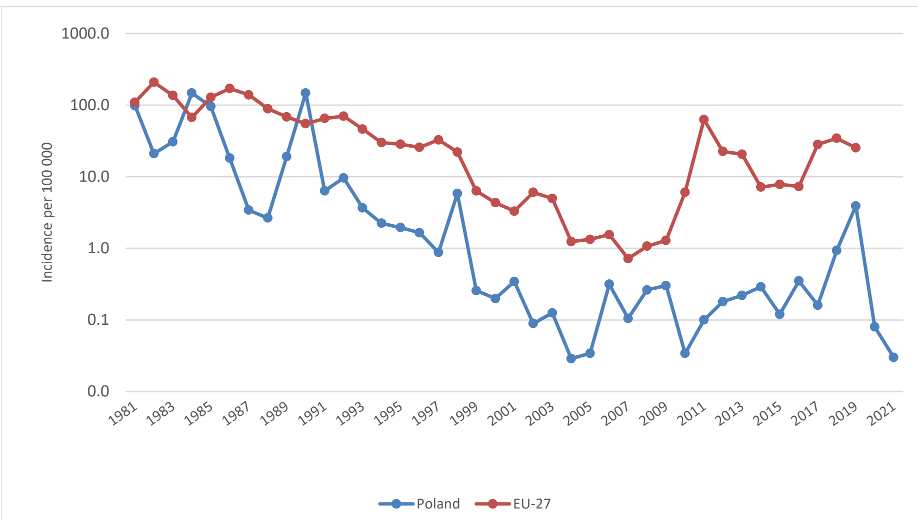


Fig. 8.6. Measles incidence in Poland and average in EU/EEA countries from 1981 to 2020 (source: epidemiological surveillance data, ECDC)

In order to achieve the target set by the World Health Organisation – the elimination of measles in Europe – it is necessary to achieve a two-dose vaccination rate of at least 97% and a measles preventive vaccination rate of at least 95% in children aged 1–9 years[6].

From the perspective of the implementation of the measles elimination programme coordinated by the WHO, the measles epidemiological situation observed in Europe has pushed the elimination goal further away, but still seems achievable in the coming years.

The number of rubella cases after a period of compensatory epidemics has decreased significantly since 2015 (Fig. 8.7). There was a decrease in the number of rubella cases in 2020. 98 rubella cases were registered, 187 fewer than in 2019 (285 cases). There was also a decrease in incidence to 0.26 per 100,000, compared to that recorded in 2019 (0.74 per 100,000). The highest incidence, irrespective of sex and environment, was recorded in the age group 0–4 years (2.98 per 100,000) (Fig. 8.8). Once again, no cases of congenital rubella syndrome were reported in 2020. In 2020, only 1 (1.02%) case was classified as a laboratory-confirmed case. The remaining cases were diagnosed on the basis of clinical symptoms. A correct diagnosis of rubella should be based on clinical symptoms and laboratory findings. The sensitivity and specificity of rubella diagnoses have remained quite low for many years, making it difficult to interpret the incidence among vaccinated people and to assess the actual number of cases.

6 Plans-Rubió P. Are the Objectives Proposed by the WHO for Routine Measles Vaccination Coverage and Population Measles Immunity Sufficient to Achieve Measles Elimination from Europe? Vaccines 2020;8(2):218.

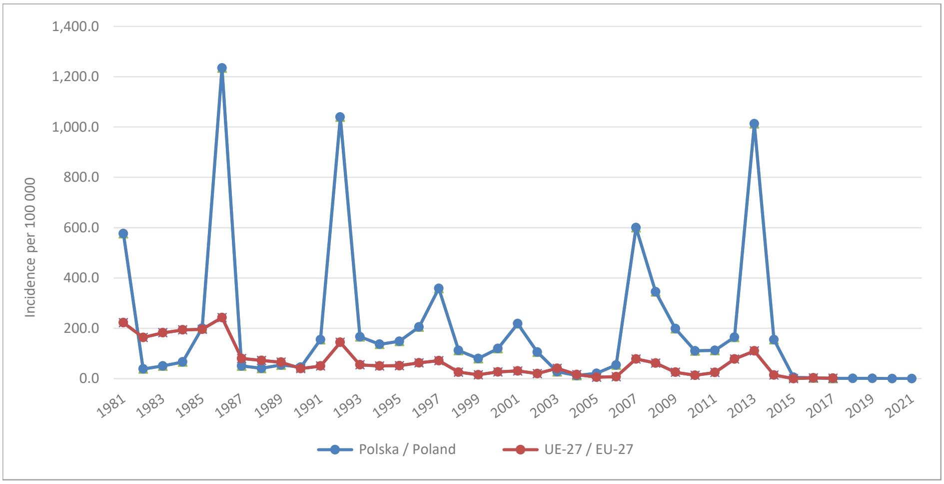


Fig. 8.7. Rubella incidence in Poland and average in EU/EEA countries from 1981 to 2020 (source: epidemiological surveillance data, ECDC)

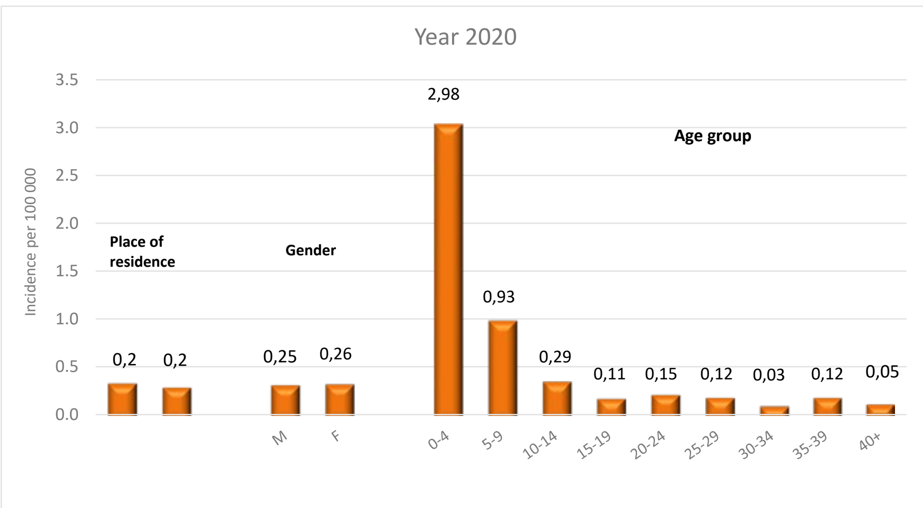


Fig. 8.8. Rubella incidence in 2020 by place of residence, sex and age (source: epidemiological surveillance data)

The implementation of compulsory preventive vaccination against measles, mumps and rubella in the following years will reduce the incidence of rubella and epidemic parotitis (mumps). Prior to the pandemic, around 1,500 people contracted mumps annually. In 2018, 1585 people became ill (incidence 4.1/100,000 population), 1338 in 2019 (3.5/100,000 population) and 582 in 2020 (incidence 1.5/100,000 population). The incidence of mumps before the pandemic showed a steady but slow downward trend, less spectacular than other infectious diseases, due to epidemics occurring cyclically every 3–4 years. The incidence of mumps in our country is still higher than the average incidence in EU countries, but the difference in incidence has changed significantly in recent years, i. e. it has come closer to the incidence in EU countries (Fig. 8.9).

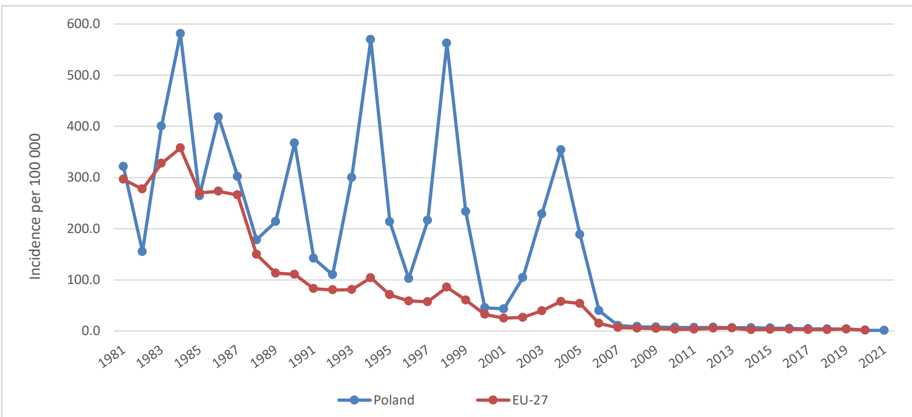


Fig. 8.9. Mumps incidence in Poland and average in EU/EEA countries from 1981 to 2020 (source: epidemiological surveillance data, ECDC)

The introduction of universal vaccination against measles, mumps and rubella was another important element in the improvement of the epidemiological situation of mumps, for which the decrease in incidence has reached a rate comparable to that of rubella, and similarly, the distribution of incidence by age is comparable to that of rubella (Fig. 8.10).

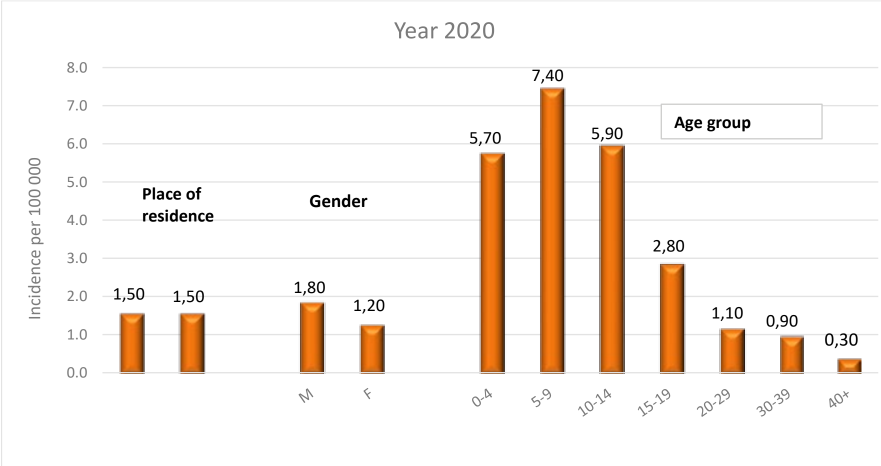


Fig. 8.10. Mumps incidence in 2020 by place of residence, sex and age (source: epidemiological surveillance data)

The introduction of compulsory vaccination of newborn infants against **hepatitis B** between 1994 and 1996 was a breakthrough in the control of hepatitis B in Poland, and since then there has been a steady decline in the incidence of the disease. Vaccination of children in the neonatal period, but also vaccination of medical professionals, vaccination of people before elective surgery and improvements in sterilisation in hospitals, has led to a rapid reduction in new acute cases – the incidence of acute hepatitis B has remained below 0.5/100,000 population since 2010. After 2005, the downward trend in the incidence of hepatitis B has halted, but the proportion of acute infections in the total number of registered hepatitis B cases has continued to decline and has not exceeded 2% in recent years. For over a decade, the overall incidence of hepatitis B in Poland has remained similar to that of the EU/EEA countries (Fig. 8.11) and includes mostly newly detected chronic infections acquired at an unknown time in the past, among people not vaccinated during the neonatal period.

The COVID-19 pandemic period significantly affected the number of hepatitis B cases detected in 2020–2021 in Poland and worldwide. In Poland, the total incidence of hepatitis B in 2020 was nearly three times lower than in 2019 (2.59/100,000 vs. 7.43/100,000). Further, there was an increase in 2021 compared to 2020, but the incidence was still almost 2 times lower than in the year before the pandemic (4.05/100,000 vs. 7.43/100,000) (Fig. 8.11). EU countries saw a similar decrease in the rate of detected HBV infections, from 7.5/100,000 in 2019 to 4.2/100,000 in 2020.

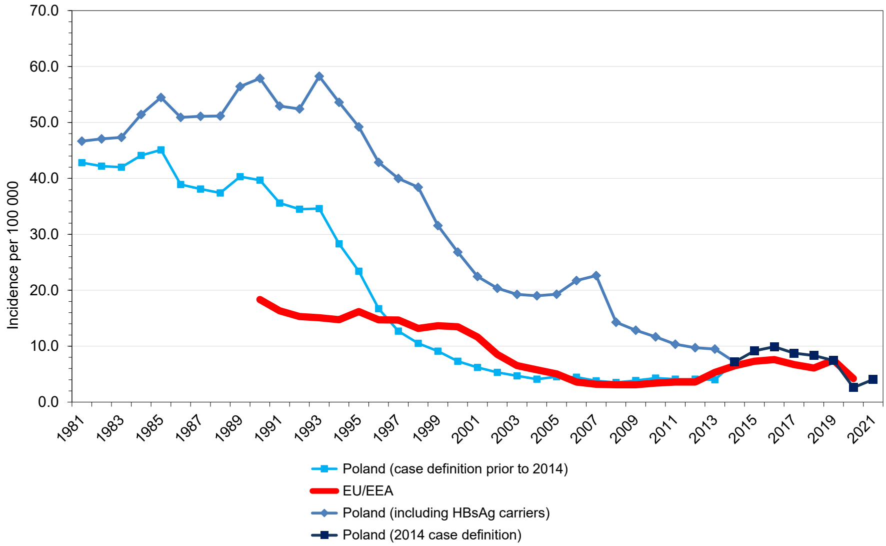


Fig. 8.11. Hepatitis B incidence in Poland and average in EU countries, 1981–2021 (source: epidemiological surveillance data and ECDC surveillance atlas)

Despite a significant decrease in the detection rate of hepatitis B in 2020 and 2021, the distribution of cases among urban and rural residents, women and men, and by age groups was similar to previous years – incidence was higher in urban areas (4.36 vs. 3.53 in rural areas) and higher among men than among women (4.81 vs. 3.3) (Fig. 8.12). The incidence of acute hepatitis B in 2020 and 2021 was 0.04 and 0.03/100,000 respectively (14 and 10 acute cases, no cases in cohorts vaccinated at birth i.e. among those born after 1995). Medical procedures remain the predominant route of transmission for both acute and chronic infections – in 2021 this was the likely route of infection for 80% of acute infections with an established route of transmission and 86% of chronic cases with a known route of transmission.

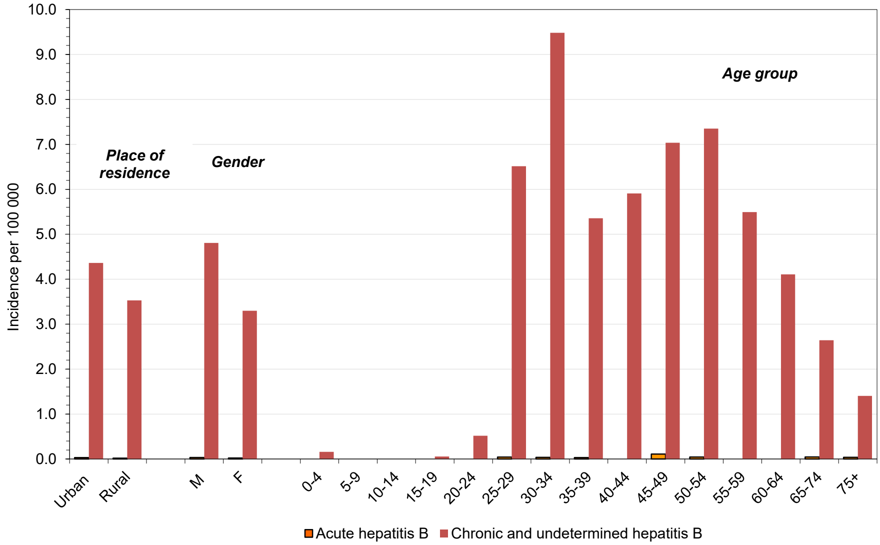


Fig. 8.12. Hepatitis B incidence in 2021 by place of residence, sex and age.

The impact of the COVID-19 pandemic on the detection and registration of new cases of hepatitis B was multidirectional: there was a reduction in the number of HBV tests performed due to a reduction in the implementation of prevention programmes and limited access to routine care for patients in primary care and specialist clinics; some medical staff working in the area of infectious diseases were redeployed to care for patients with COVID-19[7]. The capacity of sanitary-epidemiological stations (PSSE) to carry out epidemiological investigations and register detected infections has also been reduced due to the overloading of the PSSE with surveillance tasks for COVID-19 patients. The wide geographical variation in the incidence of hepatitis B during the pandemic, which has been observed for many years, has been exacerbated by the suspension or change in the HBV testing model.

[7] Monitoring of responses to the hepatitis B and C epidemics in EU/EEA countries – 2020 datahttps://www.ecdc.europa.eu/en/publicationsdata/surveillance-responses-hepatitis-b-and-cepidemics-eu-eea-countries-2020-data

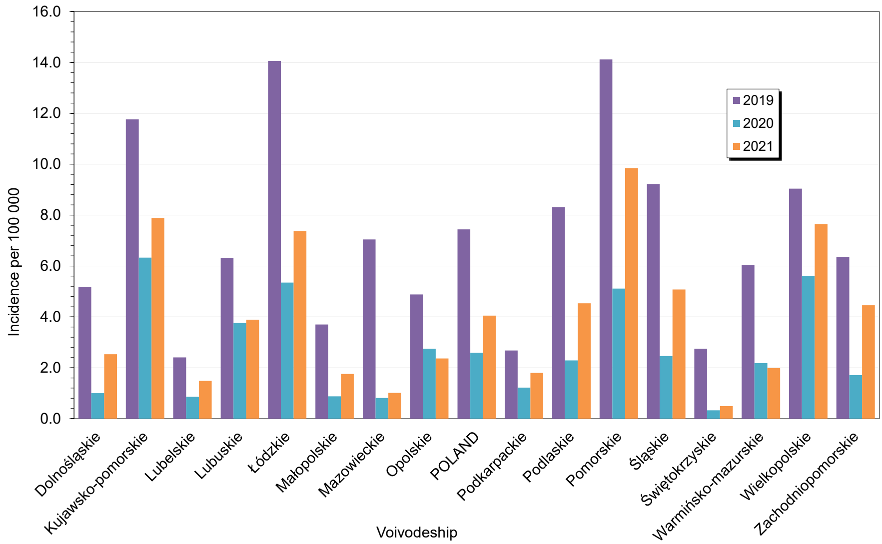


Fig. 8.13. Hepatitis B incidence in 2019–2021, by province

To a lesser extent, the pandemic has affected HBV screening of pregnant women and vaccination of newborns/infants.

Due to the introduction of the pandemic state, the Minister of Health and the Chief Sanitary Inspector, together with the national consultants in epidemiology, family medicine, neonatology and paediatrics and allergology, on 20 March 2020 recommended the postponement of compulsory preventive vaccination under the Childhood Preventive Vaccination Programme until 18 April 2020[8]. The one-month suspension of visits did not significantly affect the implementation of vaccination against hepatitis B in 2020. Status of vaccination with three doses of children in the second year of life in 2020 was 89.7% overall for Poland (compared to 90.5% in 2019) and 89.3% in 2021. Despite continued good vaccination performance against hepatitis B compared to other mandatory vaccinations, there

[8] Ministry of Health. Suspension of compulsory vaccination under the Preventive Vaccination Programme. 20.03.2020. https://www.gov.pl/web/zdrowie/wstrzymanie-szczepien-obowiazkowychw-ramach-prograa mu-szczepien-ochronnych

has been a slow downward trend in the vaccination rate of children since 2015, not only in the age of 2. This is influenced by the activities of anti-vaccination movements.

Declining vaccination coverage of children with three doses of hepatitis B vaccine and a reduction in the number of chronic HBV infections detected between 2020 and 2021 due to the COVID-19 pandemic will delay the achievement of the targets contained in the global strategy for the elimination of hepatitis B, particularly the detection of 90% of all infected people by 2030[9, 10].

Vaccination against ***Haemophilus influenzae* type B** infections was first introduced into the preventive vaccination schedule in 1997 as being recommended for children from 2 months of age in order to prevent meningitis and septicaemia, among others. As a compulsory vaccination for children in the first and second years of life, it appeared in 2004, initially for children from children's homes, from 2005 for children from large families (at least three children), and from 2007 for all children in the second year of life. And already in that year, a 42.6% drop in the incidence of invasive disease caused by *H. influenzae* was observed, while the incidence of meningitis and/or encephalitis fell by 40.6%. The number of cases of meningitis and/or encephalitis caused by *H. influenzae* type B remains low, with six cases in 2018, 10 cases in 2019 and 12 cases in 2020, with the same incidence in 2019 and 2020 of 0.03 per 100,000 population.

In 2020, the vaccination status of 2-year-olds (primary vaccination) against *H. influenzae* type B in each province ranged from 89.3% in Lubuskie province to 98.0% in Warmińsko-Mazurskie province, the total for Poland was 94.0%, lower compared to 2019 by 2.6 percentage points (Fig. 8.14).

9 World Health Organization. (2016). Global health sector strategy on viral hepatitis 2016–2021. Towards ending viral hepatitis. https://apps.who. int/iris/handle/10665/246177

10 Pley CM, McNaughton AL, Matthews PC, et al. The global impact of the COVID-19 pandemic on the prevention, diagnosis and treatment of hepatitis B virus (HBV) infection BMJ Glob Health 2021;6(1):e004275. doi: 10.1136/ bmjgh-2020–004275

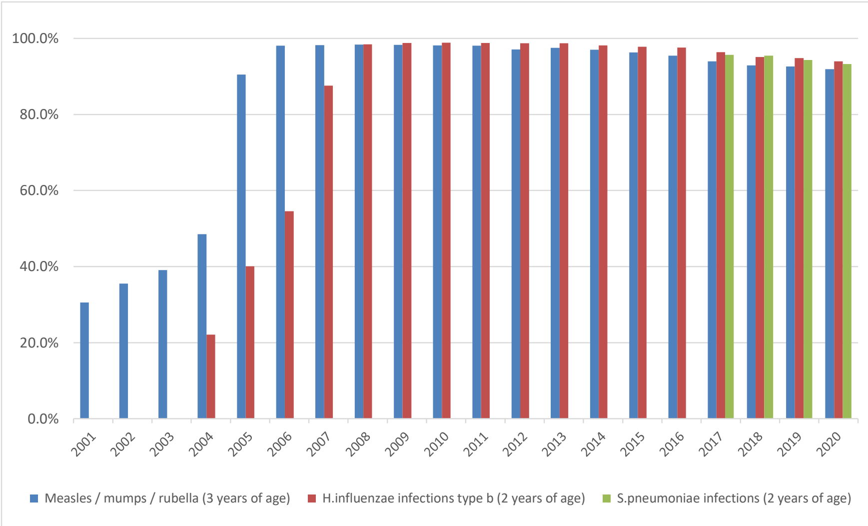


Fig. 8.14. Preventive Vaccination Programme 2001–2020. Percentage of children in year 2–3 vaccinated against measles-mumps-rubella and infections of Haemophilus influenzae type b (source: epidemiological surveillance data)

Tuberculosis[11] is a disease against which vaccination has been carried out for many years and vaccination uptake has remained high, despite an observed downward trend in recent years (Fig. 8.4). The effectiveness of this method of protecting the health of the population is relatively the lowest. The retention of TB vaccination on the schedule is due to its effect in preventing tuberculous meningitis and encephalitis and the WHO recommendations for countries with a higher incidence of TB. The epidemiological situation of tuberculosis in Poland is improving, but the process is quite slow (Fig. 8.15).

11 Gruźlica i Choroby Układu Oddechowego w Polsce w 2020 r. ed. Maria Korzeniewska-Koseła. Institute of Tuberculosis and Lung Diseases, Warsaw 2021, Bulletinn_2021.pdf (igichp.edu.pl), accessed 10.11.22.

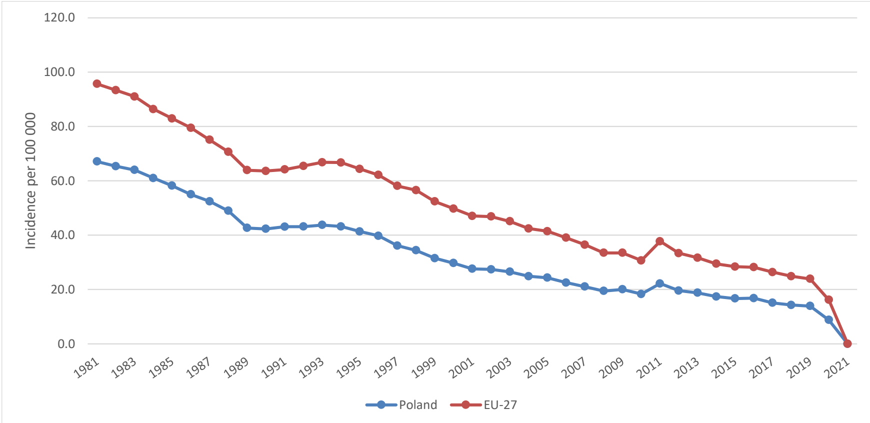


Fig. 8.15. TB incidence in Poland and average in EU/EEA countries from 1981 to 2020 (source: epidemiological surveillance data, ECDC)

Despite the continuing downward trend in tuberculosis incidence, Poland is still among the countries with a higher incidence of tuberculosis than the average for Western European countries. The TB incidence in 2020 in the EU/EEA averaged 7.4 cases per 100,000 population (Fig. 8.15). In Poland, the incidence of tuberculosis of all forms was lower in 2020 than in the previous year (8.8 vs. 13.9 per 100,000.) by over 36.7%, whereas new cases, without prior history of TB treatment in 2020 amounted to 86.0% of total cases. The most common form of TB was pulmonary TB, which accounted for 95.5% of all cases in 2019. The predominant forms were tuberculous pleuritis, tuberculosis of the peripheral lymph nodes, tuberculosis of the bones and joints, and tuberculosis of the genitourinary organs. In 2020, no cases of tuberculous meningoencephalitis and encephalitis were registered in children aged 0–14 years, but there were 4 cases in older age groups. In 2020, the incidence rate increased with age, but only up to the age of 45–64. Incidence rates ranged from 0.7 in children under 14 years of age and up to 15.0 in people aged 45 to 64 years. Patients aged 45 to 64 years accounted for the largest proportion of total TB patients (44.4%). In earlier years, the highest incidence rates were found in the oldest age group, i.e. people ≥65 years. Since 2015, the highest incidence rates have been in the 45– to 64-year-old group. In 2020, the incidence rate in people aged 65 and over was 12.1, lower than in the 45–64 age group. Thirty-nine cases of tuberculosis in children under 14 years of age were reported, accounting for 1.2% of the total cases. Thirty-seven cases of pulmonary tuberculosis and two cases of extrapulmonary tuberculosis were detected in children. In 2020, as in previous years, the incidence of tuberculosis among men was higher than among women. TB cases in men accounted for 74.0% of the total incidence, while the incidence was 13.5 per 100,000 population. In 2020, once again, the incidence of tuberculosis among urban residents was higher compared to the rural population. There were 2069 cases of tuberculosis registered in urban areas and 1319 cases in rural areas. The incidence rate in urban residents was 9.0; in rural residents – 8.6. Significant differences in tuberculosis incidence rates between provinces, which have been observed for years, also occurred in 2020. Among the TB patients registered in 2020, there were 116 foreigners, mostly – 88 people – aged between 20 and 44 years. Tuberculosis cases in foreigners accounted for 3.4% of all cases. Among the foreigners with TB, there were two teenagers, with no cases reported in children under 14 years of age. The largest group – 49 people – were newcomers from the Ukraine; the second largest group were Indians (14 patients), and Nepalese (seven patients). Foreigners diagnosed with TB came to Poland from 28 countries around the world. In eight cases, the country of origin was unknown. In 2020, as in previous years, the co-occurrence of TB and HIV was rare in Poland. TB was an indicator disease for AIDS in 5 HIV-infected people. Among the TB patients registered in 2020, 112 were reported to be in remand and correctional centres (incidence rate 158.4 per 100,000 inmates). MDR-TB cases accounted for 1.4% of all bacteriologically confirmed TB cases and 1.5% of cases with known drug susceptibility results (in 2020, drug susceptibility was available in 90.4% of patients with positive cultures). TB was the cause of death for 456 people in 2019. The mortality rate was 1.2 per 100,000 population. The main cause of death from tuberculosis, as in previous years, was pulmonary and extrapulmonary tuberculosis. Deaths due to tuberculosis accounted for 0.1% of total deaths in 2019 in Poland and 27.2% of deaths due to all infectious and parasitic diseases. The largest number of people who died from tuberculosis were aged between 45 and 64 years. In the last five years, one case of death due to tuberculosis in children was registered (2016). Information on how cases of pulmonary tuberculosis were detected in 2020 shows that in Poland, the most common method of detecting such cases was passive detection, i.e. due to symptoms in people who self-referred to a medical facility. Symptomatically, 95.2% of pulmonary TB cases were detected, including 96.2% of patients with bacteriologically confirmed pulmonary TB and 91.1% of patients with pulmonary TB without culture confirmation. In 2020, BCG vaccination was given to 323,567 newborns, which accounted for 91.1% of all live-born children in Poland. The highest incidence in 2020, as in previous years, was registered in the Lublin Province, with an incidence of 13.3 per 100,000. This is a worrying signal due to the known association of the incidence of tuberculosis with the socio-economic situation of the population and, in the case of the Lublin Province, also due to cross-border contacts with countries with a very high incidence of tuberculosis and the presence of multi-drug resistant strains of *M. tuberculosis* in these areas. Information on how cases of pulmonary tuberculosis were detected in 2020 shows that in Poland, the most common method of detecting such cases was passive detection, i.e. due to symptoms in people who self-referred to a medical facility. Symptomatically, 95.2% of pulmonary TB cases were detected, including 96.2% of patients with bacteriologically confirmed pulmonary TB and 91.1% of patients with pulmonary TB without culture confirmation. In 2020, BCG vaccination was given to 323,567 newborns, which accounted for 91.1% of all live-born children in Poland (Fig. 8.16).

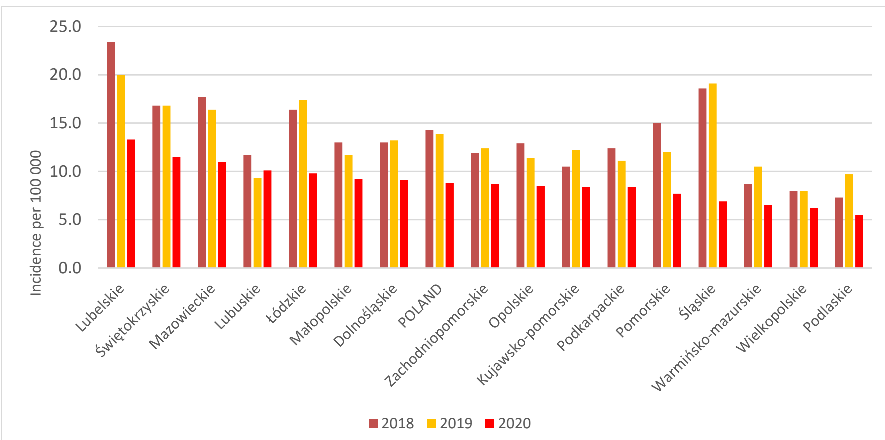


Fig. 8.16. Tuberculosis incidence by province in 2010, 2015 and 2020 (source: Institute of Tuberculosis and Lung Diseases)

It should be emphasised that the incidence of tuberculosis is higher in Poland than in most European countries, but adverse epidemiological phenomena such as tuberculosis in children, TB/HIV co-infection and MDR-TB occur in our country at a lower rate than in the EU/EEA as a whole.

Of the diseases subject to multi-year vaccination programmes, in the case of **pertussis**, after a decline of up to about 300 cases (320 cases in 1996), there was a resurgence of cases in the second half of the 1990s, involving mainly adolescents and people from older age groups. Pertussis is an example of a disease referred to as an reemerging disease, i.e. a reoccurring disease in the population. The reasons that have caused the re-emergence of pertussis in numbers far exceeding previous cases are thought to be: a progressive decline in specific immunity over a period of 5–10 years following the last dose of pertussis component vaccine, genetic changes in the escape mutans system, a decline in vaccine efficacy, the possibility of re-infection, diagnostic difficulties and a decline in vaccination levels, as well as an increase in vaccination refusals. It should be noted that the increase in the incidence of pertussis affects most countries in the world.

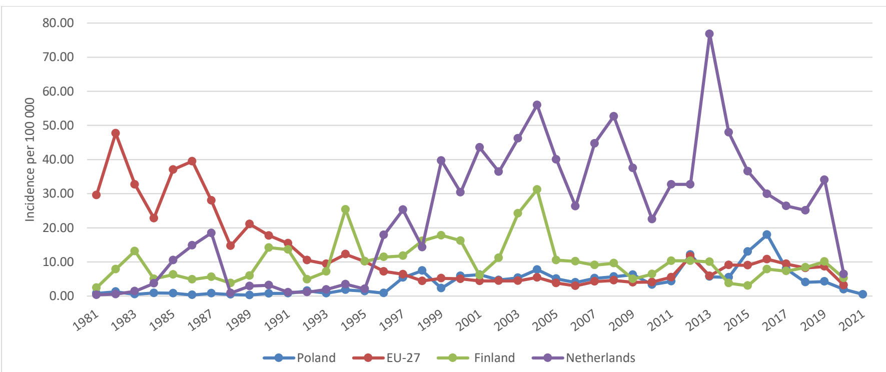


Fig. 8.17. Incidence of pertussis in Poland, the Netherlands and Finland and average in EU/EEA countries 1981–2019 (source: epidemiological surveillance data, ECDC)

In Poland, an increase in the number of cases has been observed since 1997, and already in 1998, the level of the average incidence in the EU countries was exceeded for the first time (Poland 7.4 per 100,000, EU 4.3 per 100,000). Due to the fact that the majority of cases were in children aged 5 to 14 years, a booster dose of pertussis-component vaccine for children at 6 years of age was introduced into the preventive vaccination schedule in late 2003 and early 2004, by replacing the DT vaccine with DTaP. As a result of ongoing vaccination, the incidence was expected to fall over the next few years to a level at least comparable to that in the 1980s, i.e. less than 1 case per 100,000 population. Unfortunately, the introduction of the DTaP vaccine booster did not fulfil the hopes. Still, only in the case of pertussis has there been a clear worsening of the epidemiological situation despite vaccination. This is not an isolated phenomenon, as many European and non-European countries are also reporting an increase in cases (Fig. 8.17). The increase in pertussis incidence that has occurred has been among adolescents and older adults, who represent a source of infection for the youngest children who have not yet completed a full vaccination course (Fig. 8.18). However, it is important to emphasise the fact that it remains the only option for pertussis prevention to maintain pertussis vaccination according to the current schedule until a new vaccine is developed.

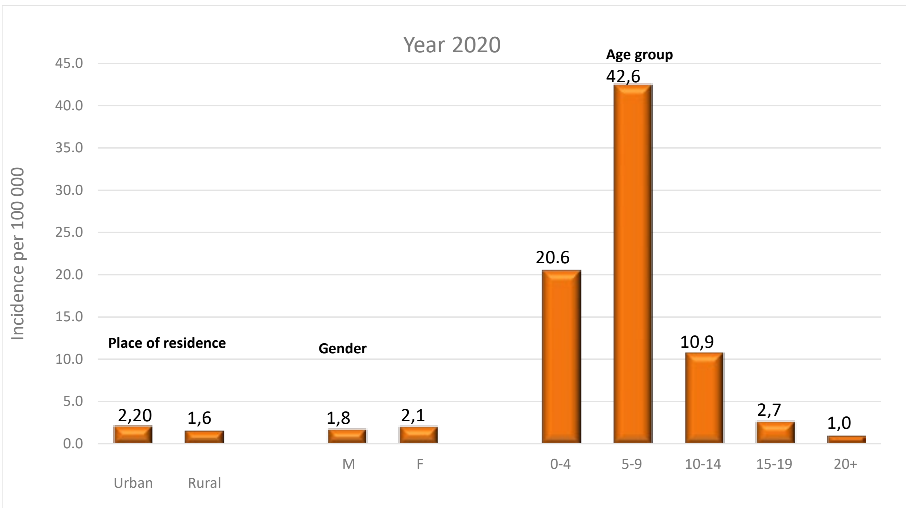


Fig. 8.18. Pertussis incidence in 2020 by place of residence, sex and age (source: epidemiological surveillance data)

Despite the spectacular success of the use of vaccination and the resulting favourable epidemiological situation, in recent years we have observed a highly worrying and growing problem of vaccination evasion and opting-out. An analysis of data from the periodic reports of health care facilities to the Sanitary Inspectorate shows that in 2020, approximately 50 575 children and adolescents have not been vaccinated (Fig. 8.19).

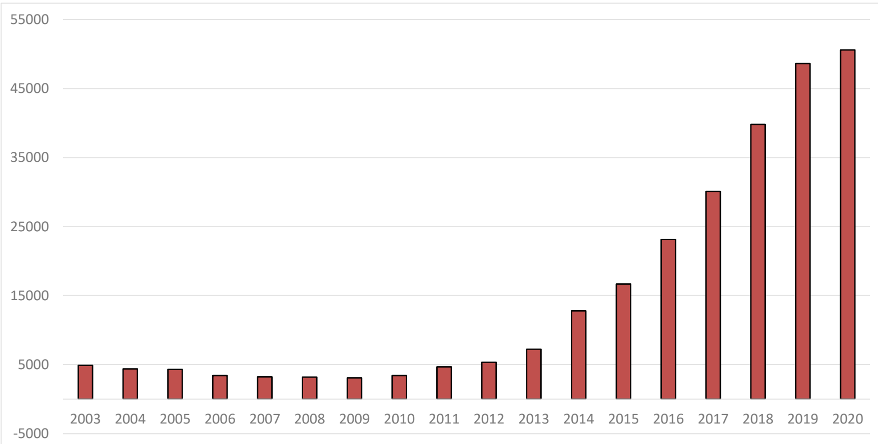


Fig. 8.19. Number of persons evading mandatory vaccinations between 2003 and 2020 (source: epidemiological surveillance data)

This situation is due, on the one hand, to the rise of proponents of anthroposophical philosophy, living in harmony with nature, religious views and to the empowerment of anti-vaccination movements and, on the other hand, to the pursuit by the said movements of aggressive and often false information about the harm and dangers of vaccination. It should be stressed that if this rate of increase in the number of people opting out of vaccinations continues, there is a risk of a return of epidemics of diseases that we have managed to eradicate by means of vaccination in the coming years.

Vaccine adverse events, the so-called VAEs[12], which have been subject to mandatory reporting and registration for more than 25 years (the reporting and registration system has been in place since 1996), are a key tool for assessing vaccine safety in our country. VAEs are derived from vaccinations performed with vaccines registered

[12] Department of Epidemiology of Infectious Diseases and Surveillance of the National Institute of Public Health NIH – National Research Institute

in Poland and on the market in 2020. In connection with the implementation of the National COVID-19 Preventive Vaccination Programme, from 27.12.2020, in addition to the VAEs reported so far to the EpiBaza system after vaccines carried out under the Preventive Vaccination Schedule, an electronic system for reporting VAEs after vaccines against COVID-19 has been introduced through the gabinet.gov.pl system directly to SEPIS (System of Records of the Chief Sanitary Inspectorate). However, the collection, verification, analysis and preparation of periodic reports, since the beginning of VAE surveillance, has been carried out by the National Institute of Public Health NIH – National Research Institute. From the beginning of registration to 2019, we have seen an increase in the number of reported VAEs. In 2020 and 2021, the upward trend was halted, with the total (including other notifications that do not meet the definition of VAE) reported to the surveillance system respectively: 1494 and 1609 cases. In 2020, of the 1492 cases classified as VAEs, there were 1342 mild events (i.e. 90%), 135 severe (i.e. 9.0%) and 15 heavy (i.e. 1.0% In 2021, doctors diagnosed and reported a total of 1603 VAEs (6 non-VAE reports) to the Sanitary Inspectorate, of which 1381 (i.e. 86.2%) were mild VAEs, 204 were severe VAEs (i.e. 12.7%) and 18 (i.e. 1.1%) were classified as heavy. In the annual study of adverse vaccination reactions in 2020 and 2021, it was assumed that in the case of simultaneous administration of several vaccines to a child, the reaction described was counted for each vaccine. The analysis of VAEs reported for surveillance is carried out by the staff of the Department of Epidemiology of the National Institute of Public Health NIH – National Research Institute and published once a year on the institute's website. The importance of adverse event surveillance is multifaceted: on the one hand to detect the occurrence of new, unusual and rare reactions, to monitor already known reactions and, on the other hand, to identify risk factors for specific types of reactions, to identify vaccine batches with an increased rate of reactions or to control the safety of newly introduced vaccines. It is therefore one of the most relevant tools influencing post-registration control of vaccination safety. This was of particular importance with regard to COVID-19 vaccination for the first time used in Poland and worldwide, based on modern and safe production technologies: m-RNA and vector. In 2020, no VAEs were registered after anti-COVID-19 vaccines. This situation should be interpreted by the fact of the introduction of vaccination on 27.12.2020 and the small number of people vaccinated. In total, from 27.12.2020 to 31.12.2021, a total of 46,962,321 doses (1, 2 and 3 doses), while 13,251 VAEs (0.05%) were registered, which translates into an average of 2.82 cases per 10,000 doses. This means that adverse events following COVID-19 vaccines are classified as rare. In 2021, the largest number of events of a mild nature were registered, i.e. 11,035 (0.045%), followed by severe events: 1847 (0.008%) and heavy: 389 (0.00087%) A total of 105 deaths (0.00022%) up to 30 days after vaccination, for which no causal relationship was investigated, but a temporal relationship was found.

8.2. Other infectious diseases

8.2.1. Human immunodeficiency virus (HIV) infections

The deadline for UNAIDS' first HIV incidence reduction targets has passed in 2020. In the plan adopted in 2015, it was assumed that by 2020 the so-called 90–90–90 target would be achieved[13], referring to the percent of infected people who are diagnosed, the proportion of diagnosed people who are treated and the proportion of treated people in whom viral load suppression is achieved. According to WHO estimates, the achievement of this goal should reduce HIV incidence by 90% and HIV-related mortality by 80% by 2030. The formulation of these targets was preceded by studies showing that people who are infected but successfully treated are not infectious to their sexual partners. Hence, effective detection and linkage to care and treatment is at the same time preventing the spread of the HIV epidemic. Even before the COVID-19 outbreak, the achievement of these targets had been observed in many Western European countries and, according to 2020 estimates, the Western European region as a whole had achieved the targeted indicators. As a result, it is estimated that in 2020

[13] 90–90–90 – An ambitious treatment target to help end the AIDS epidemic. UNAIDS 2014; Available at: http://www.unaids.org/sites/default/files/media_asset/90–90-90_en.pdf

in the Western European region, 78% of those infected had an undetectable viraemia, compared to 55% in Central Europe and 33% in Eastern Europe[14].

Successful treatment of more than three quarters of those infected, combined with the implementation of prevention in vulnerable groups such as injecting drug users or men who have sex with men, has contributed to the decline in incidence observed in Western Europe. Unfortunately, in other areas of Europe, particularly Eastern Europe, a worsening of the epidemiological situation was observed during the same period.

The impact of the COVID-19 pandemic on the HIV epidemic is currently the subject of intense research. As a result of epidemic control measures to reduce person-to-person contact, there could theoretically have been a decrease in new HIV infections. For example, behavioural studies indicate a reduction in the number of partners, compared to the period before the implementation of restrictions[15][16]. At the same time, however, during the COVID-19 pandemic, there was a partial or total reduction in prevention activities, especially low-threshold activities targeting high-risk populations. Studies in the USA and Canada show that, unfortunately, the cumulative effect was unfavourable in these countries, with faster HIV transmission during intensified epidemic restrictions[17, 18].

14 European Centre for Disease Prevention and Control. Continuum of HIV care. Monitoring implementation of the Dublin Declaration on partnership to fight HIV/AIDS in Europe and Central Asia: 2020 progress report. Stockholm: ECDC; 2021. doi: 10.2900/816839

15 Hong C, Huh D, Schnall R, Garofalo R, Kuhns LM, Bruce J, Batey DS, Radix A, Belkind U, Hidalgo MA, Hirshfield S, Pearson CR. Changes in high-risk sexual behavior, HIV and other STI testing, and PrEP use during the COVID-19 pandemic in a longitudinal cohort of adolescent men who have sex with men 13 to 18 years old in the United States. AIDS Behav. 2022 Sep 26:1–7. doi: 10.1007/s10461–022–03850-y. Epub ahead of print. PMID: 36156174; PMCID: PMC9511439.

16 Hyndman I, Nugent D, Whitlock GG, McOwan A, Girometti N. COVID-19 restrictions and changing sexual behaviours in HIV-negative MSM at high risk of HIV infection in London, UK. Sex Transm Infect. 2021 Nov;97(7):521–524. doi: 10.1136/sextrans-2020–054768. Epub 2021 Jan 18. PMID: 33462118.

17 Mitchell KM, Dimitrov D, Silhol R, Geidelberg L, Moore M, Liu A, Beyrer C, Mayer KH, Baral S, Boily MC. The potential effect of COVID-19-related disruptions on HIV incidence and HIV-related mortality among men who have sex with men in the USA: a modelling study. Lancet HIV. 2021 Apr;8(4):e206-e215. doi: 10.1016/S2352–3018(21)00022–9.

18 Miller RL, McLaughlin A, Montoya V, Toy J, Stone S, Harding J, Liang RH, Wong J, Barrios R, Montaner JSG, Joy JB. Impact of SARS-CoV-2 lockdown on expansion of HIV transmission clusters among key populations: A retrospective phylogenetic analysis. Lancet Reg Health Am. 2022 Sep 23:100369. doi: 10.1016/j.lana.2022.100369. Epub ahead of print. PMID: 36168656; PMCID: PMC9500205.

In addition, the availability of HIV testing has decreased dramatically[19]. A predictable consequence of poorer access to diagnosis is an increase in the incidence of AIDS, as well as an increase in the number of undiagnosed infections, which in turn may affect the increased number of new infections in the following years[20].

A survey by the European Centre for Disease Prevention and Control (ECDC) shows that at least half of the countries in the European Union/European Economic Area have seen a reduction in their ability to detect new infections in 2020 compared to 2019. In addition, about one-third of the countries also reported a disruption in the epidemiological surveillance system related to the workload of the epidemiological surveillance system staff in combating the COVID-19 outbreak. As a result of these problems, reporting of HIV infections during the pandemic years and especially in 2020 was incomplete. This resulted in a significant decrease in the number of new HIV diagnoses across the WHO European Region. In the European Union, this was a drop of around 30% to 40%. In this context, the 50% decrease in the number of new diagnoses registered in Poland in 2020 compared to 2019 is particularly worrying (Fig. 8.20). The Polish data show a slight decrease in the number of tests performed outside blood donation in general, but as much as a 44% decrease in the number of tests at Consultation and Diagnostic Centres targeting groups with increased levels of risk behaviour[21], which partly explains the decrease in the rate of new diagnoses. In addition, increased reporting delays were observed in 2020: more than 24% of infections detected in 2020 were not reported and registered until 2021, and, as a rule, in the preceding years, reports made in the following year after diagnosis accounted for about 10% of all diagnoses[22].

19 Simões D, Stengaard AR, Combs L, Raben D; EuroTEST COVID-19 impact assessment consortium of partners. Impact of the COVID-19 pandemic on testing services for HIV, viral hepatitis and sexually transmitted infections in the WHO European Region, March to August 2020. Euro Surveill. 2020 Nov;25(47):2001943. doi: 10.2807/1560–7917.ES.2020.25.47.2001943.

20 WHO: The cost of infection: COVID-19-related service disruptions could cause hundreds of thousands of extra deaths from HIV (from 11 May 2020) https://www.who.int/news-room/detail/11–05–2020-the-cost-of-inaction-covid-19-related-service-disruptions-could-cause-hundreds-of-thousands-of-extra-deaths-from-hiv

21 Niedźwiedzka-Stadnik M, Nowakowska-Radziwonka E, Rosińska M, Marzec-Bogusławska A. Changes in HIV testing trends in Poland during COVID-19 pandemic. Przegl Epidemiol. 2022;76(2):255–266. doi: 10.32394/pe.76.25. PMID: 36218184.

22 Niedźwiedzka-Stadnik M, Nowakowska-Radziwonka E, Marzec-BogusławskaA. Zakażenia HIV i zachorowania na AIDS w Polsce w 2020 roku. Przegl Epidemiol. 2022;76(3):

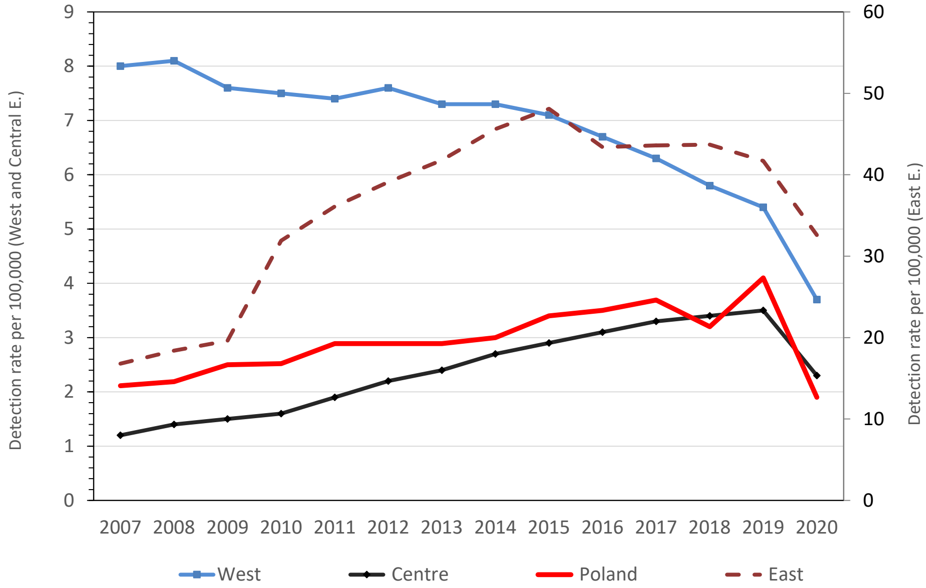


Fig. 8.20. HIV infection detection rate per 100,000 inhabitants in 2007–2020 in Poland and WHO European subregions (source: ECDC HIV surveillance report[23])

Prior to the pandemic period, Poland experienced a steady and fairly dynamic increase in the rate of newly diagnosed infections, which increased from 2.1 per 100 000 population in 2007 to 4.1 per 100 000 in 2019. The vast majority of diagnoses were made among men (Fig. 8.21). In the pandemic years, 2020–2021, the decline was mainly in men. The number of diagnoses among women remained at a similar level, with an increase possible in 2021. This may be due to women being tested in circumstances (e.g. during pregnancy) that were less affected by the pandemic. Such a difference is hardly to be expected for perturbations in reporting, and it is likely that the actual increase in diagnoses among women was even greater. However, the vast majority of infections still affect men. In 2019–2021, the proportion of women among

[23] European Centre for Disease Prevention and Control/WHO Regional Office for Europe. HIV/AIDS surveillance in Europe 2021–2020 data. Stockholm: ECDC; 2021.

newly diagnosed infections was just under 16% (up from about 12% in the preceding period), and varied in the provinces from 5.5% in Podkarpackie Province to 23% in Zachodniopomorskie Province (Table 8.3). As a general rule, the percentage of women correlated with the percentage of heterosexual infections per province, although data on routes of infection should be interpreted with caution due to the incompleteness of registration in this area.

The lack of a clear decrease during the pandemic period also affected the older age groups, while the number of diagnoses in the under-40 age group decreased markedly. This corresponds to the previously observed trend of HIV infection shifting to older age groups. Diagnoses among adolescents are rare, although the median age of sexual initiation is 18 years, which makes one wonder whether there is an adequate testing offer aimed at this age group in Poland.

Also notable is the significant increase in the percentage of people coming from outside Poland in recent years. The number of infections detected among foreigners increased from 23 in 2015 to 210 in 2021. (Fig. 8.21) Approximately 80% of the diagnoses made in foreign nationals where the country of origin is given are of Ukrainian origin. It should be emphasised that these are analyses relating to the period before the war in 2022, and therefore reflect the situation in the group of immigrants who had already arrived in our country.

It is noteworthy that there is a large variation in the trends of detection and registration of new infections in pandemic years by province (Table 8.3). In most provinces, the lowest rate per 100,000 inhabitants was recorded in 2020, when the most severe restrictions related to the COVID-19 pandemic took place. In the Mazowieckie, Śląskie, Świętokrzyskie, Warmińsko-Mazurskie and Zachodniopomorskie provinces, the value of the indicator remained at a lower level also in 2021. Large decreases in provinces with usually high diagnosis rates (Mazowieckie, Śląskie) have had an impact on national trends. In most provinces, the diagnosis rate in 2021 has returned to or exceeded pre-pandemic levels. In contrast, several provinces saw a steady increase despite the pandemic malfunctioning of surveillance: in the Kujawsko-Pomorskie Province from 1.4 in 2015–2019 to 3.0 in 2021, in the Łódzkie province – from 2.8 in 2015–2019 to 4.9 in 2021, in the Małopolskie province from 3.3 in 2015–2019 to 8.9 in 2021, which is the highest recorded diagnosis rate in Poland to date. It is important to bear in mind that high values of the indicator, although worrying, may indicate an improvement in the availability of testing and not just a worsening of the epidemic situation.

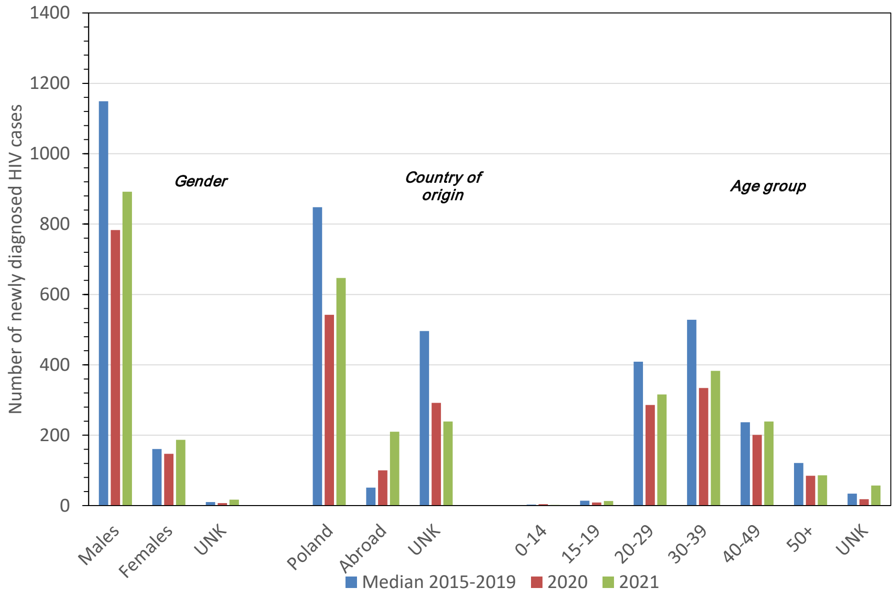


Fig. 8.21. Number of newly diagnosed HIV infections in Poland in 2015–2021, by sex, age group and country of origin

Table 8.3. Rate of newly detected HIV infections per 100,000 population in 2015–2021 and characteristics of infections detected in 2019–2021, by province

				Cases diagnosed in 2019–2021			
Province	2015–2019	2020	2021	%female	%MSM*	%PWID*	%MSW,WSM*
DOLNOŚLĄSKIE	4.9	3.2	4.9	19.0%	67.0%	9.6%	21.3%
KUJAWSKO-POMORSKIE	1.4	2.4	3.0	15.8%	68.9%	4.4%	24.4%
LUBELSKIE	1.4	1.1	1.6	17.6%	74.1%	3.7%	22.2%
LUBUSKIE	3.1	3.6	3.4	22.9%	62.5%	12.5%	25.0%
ŁÓDZKIE	2.8	3.3	4.9	20.5%	75.8%	5.3%	17.9%
MAŁOPOLSKIE	3.3	5.5	8.9	8.6%	81.1%	2.8%	14.7%
MAZOWIECKIE	5.1	3.1	1.7	13.8%	79.1%	2.2%	18.7%
OPOLSKIE	2.2	1.3	2.9	19.6%	52.9%	11.8%	35.3%
PODKARPACKIE	1.4	0.7	1.1	5.5%	50.0%	14.3%	28.6%
PODLASKIE	1.5	1.7	1.5	20.0%	51.6%	3.2%	45.2%
POMORSKIE	3.3	3.6	2.4	16.7%	63.6%	0.0%	34.1%
ŚLĄSKIE	4.2	0.5	0.1	18.0%	67.4%	9.3%	20.9%
ŚWIĘTOKRZYSKIE	1.1	0.0	0.0	6.7%	100.0%	0.0%	0.0%
WARMIŃSKO-MAZURSKIE	1.8	1.4	0.9	20.6%	26.3%	15.8%	57.9%
WIELKOPOLSKIE	3.8	2.4	3.5	15.6%	72.1%	7.0%	18.6%
ZACHODNIOPOMORSKIE	3.3	2.4	2.8	23.1%	60.0%	12.0%	28.0%
POLAND	3.5	2.4	2.9	15.8%	71.5%	4.8%	22.4%

*percentages for cases with a known route of transmission (27.4% of reports);
MSM – men having sex with men; PWID – people who inject drugs; MSW, WSM – men having sex with women, women having sex with men

Currently, 2022 figures are not yet available. However, it is already clear from the partial data that the number of new diagnoses in 2022 far exceeds the number of new diagnoses in the preceding years. This is partly due to the disruption of preventive measures during the pandemic period, but is mainly linked to Poland's hosting of a large number of refugees from Ukraine. The prevalence of HIV infection in the general population in Ukraine, according to UNAIDS estimates, is ten times higher than the general population in Poland[24]. Among the refugees were both people diagnosed with HIV infection

[24] UNAIDS. Country factsheets: Ukraine. Available at https://www.unaids.org/en/regionscountries/countries/ukraine, accessed 30.10.2022

in Poland and people with infection diagnosed in Ukraine, already receiving treatment. According to the National AIDS Centre, by 15.10.2022, 2,647 people fleeing Ukraine had been accepted for treatment in Poland.

8.2.2. Hepatitis C virus

Meeting the objectives of the global strategy to combat hepatitis C as a public health problem, as described in the "Health situation of the Polish population and its determinants 2020"[25], was significantly hampered during the COVID-19 pandemic. The detection rate of hepatitis C in EU countries in 2020 was more than two times lower compared to 2019 (3.9/100,000 vs. 8.8/100,000, according to data from 25 countries)[26], while in Poland, there was a 3.5-fold decrease in the detection rate in 2020 vs the previous year (2.49/100,000 vs. 8.71/100 000 in 2019). In 2021, the detection rate of hepatitis C in Poland increased slightly (3.26/100,000), but was still more than two times lower than in the pre-pandemic period (Fig. 8.22). As in previous years, there was a predominance of cases among men (in 2021: 3.49/100,000 vs. 3.04/100,000 among women) and among urban residents (3.88/100,000 vs. 2.34/100,000 in rural areas).

A comparison with the situation in other EU countries falls to Poland's disadvantage – a decrease in the number of reported cases was observed throughout Europe, but in no EU country was the decline so steep. It has already been pointed out in previous years that progress in the eradication of hepatitis C in Poland is limited by the availability of testing for HCV infection, and the number of new diagnoses recorded in previous years in the surveillance at around 3,000 per year – does not allow for a significant reduction in existing chronic HCV infections in the population[27]. During the pandemic period, previous inequalities in access to testing were exacerbated, with an increase in the number

[25] Sytuacji zdrowotna ludności Polski i jej uwarunkowania 2020, ed. Wojtyniak B i Goryński P. NIZP – PZH, Warszawa 2020. https://www.pzh.gov.pl/sytuacja-zdrowotna-ludnosci-polski-i-jej-uwarunkowania-raport-za-2020-rok/

[26] European Centre for Disease Prevention and Control. Hepatitis C. In: ECDC. Annual epidemiological report for 2020. Stockholm: ECDC; 2022. https://www.ecdc.europa.eu/sites/default/files/documents/AER-HEP-C-2020-final.pdf

[27] Zakrzewska K, Stępień M, Rosińska M. Hepatitis C in Poland in 2019. Przegl Epidemiol. 2021;75(3):379–389. doi: 10.32394/pe.75.35. PMID: 35170294

of counties where HCV infection was not detected in 2020. The limited availability of testing has particularly affected marginalised populations, including people who inject drugs, among whom HCV spreads particularly easily. The lack of systemic solutions for a differentiated and acceptable testing and treatment system for this group during the pandemic period resulted in a further reduction in the proportion of people who inject drugs among all HCV infected persons detected in 2020 and 2021–2.72% and 2.65%, respectively, compared with 5.9% in 2019 (Fig. 8.23).

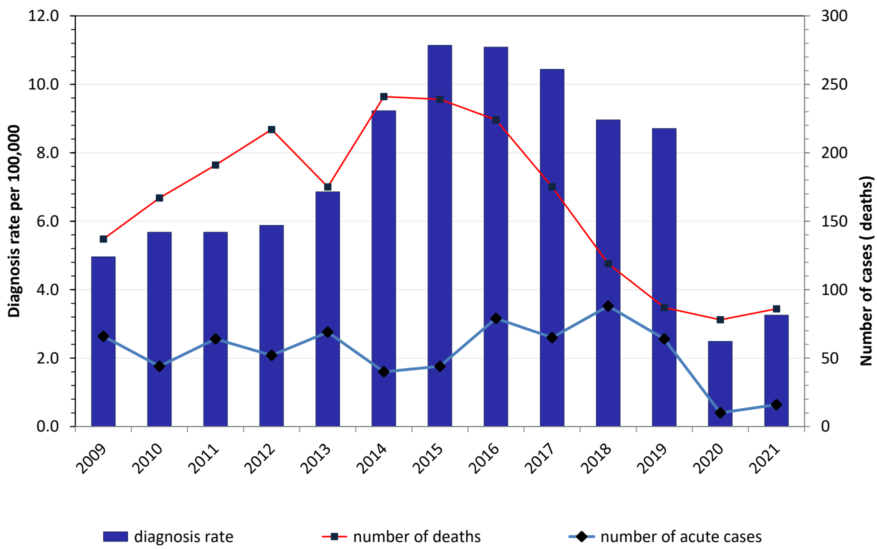


Fig. 8.22. Detection rate of HCV infections per 100,000 and number of acute cases and number of deaths due to hepatitis C, ICD-10 code B17.1, B18.2 (source: epidemiological surveillance data and Statistics Poland)

As in the case of hepatitis B, a multi-directional impact of the COVID-19 pandemic on hepatitis C control rates was observed. The reduction in the number of tests for HCV infection occurred mainly due to limited patient access to testing facilities, but also due to the suspension of prevention programmes offering testing and the redeployment of medical staff working in the field of infectious diseases to care for patients with COVID-19. There were also delays at sanitary and epidemiological stations in registering detected infections and in conducting epidemiological investigations, also due to redeployment of staff to carry out surveillance of patients with COVID-19, especially during periods of disease waves. Difficult patient access to care in specialist clinics and lower availability of infectious disease specialists have led to a reduction in the number of patients with chronic hepatitis C receiving treatment under drug programmes. According to preliminary data from the National Health Fund, the number of chronically HCV-infected patients starting DAAs (Direct Acting Antivirals) in 2020 represented only 50% of the number of patients starting treatment in 2019, despite the introduction in Poland, as in other countries, of new and innovative strategies, such as teleprescribing, increasing prescribing and alternative ways of delivering drugs[28]. In other EU countries, there was no significant impact of the COVID-19 pandemic on the treatment of chronically HCV-infected patients.

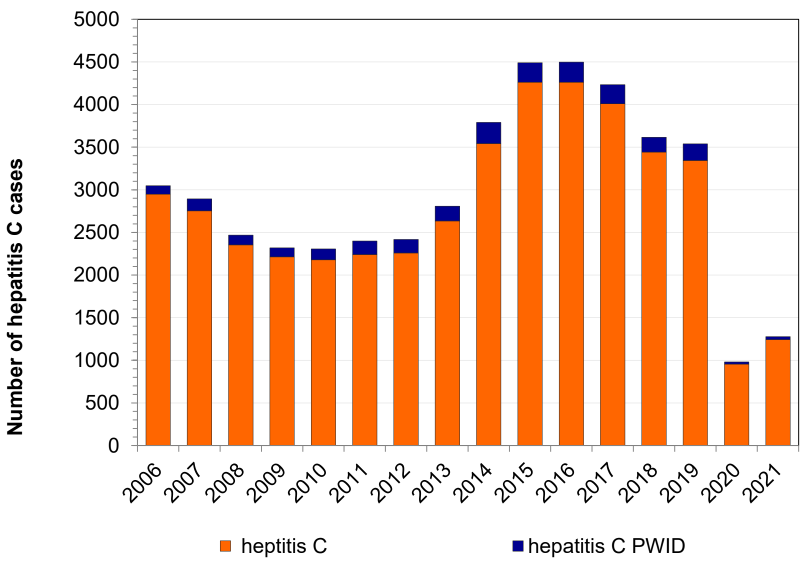


Fig. 8.23. Number of newly diagnosed HCV infections total and among people who inject drugs (PWID), Poland, 2009–2021

[28] European Centre for Disease Prevention and Control. Monitoring of responses to the hepatitis B and C epidemics in EU/EEA countries – 2020 data. Stockholm: ECDC; 2022

Limitations in access to HCV testing in the general population and lack of testing among people who inject drugs, as well as limitations in access to treatment due to addiction, may be the main reasons for delays in achieving the elimination goals of HCV infection in Poland.

8.2.3. Food poisoning and infections

Foodborne diseases are a broad group of disease entities that differ both in the pathogens causing them and in their clinical manifestations, with a common feature being the route of infection. This is a group of diseases with a very important role in public health. It is both a basic indicator of food safety and indicators of the level of sanitary and hygienic condition of households, places where meals are prepared and served in mass catering and places of food production, including primary production. The dynamics of the incidence of bacterial infections and food poisoning since 1981 are shown in Figure 8.24.

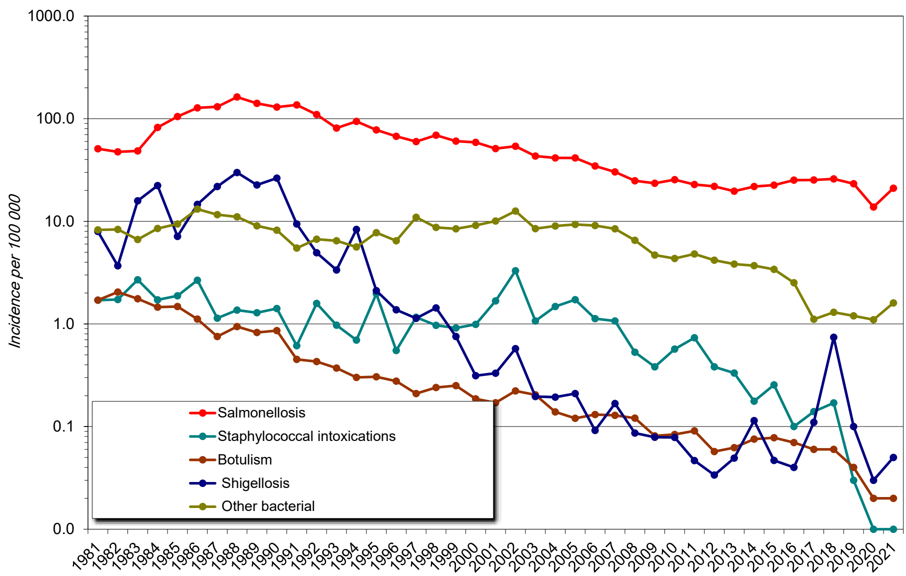


Fig. 8.24. Incidence of salmonellosis and other bacterial food poisoning and infections from 1981 to 2021

Curves on a logarithmic scale show huge differences in incidence between diseases illustrating decreasing trends in incidence of salmonellosis, bacterial dysentery, botulism and staphylococcal toxin. In 2020, the decline was even more dynamic, but in 2021, values in most disease units were again similar to those achieved in 2019. The only disease entity belonging to this group with a very strong upward trend is intestinal infections caused by *Clostridioides difficile*. In 2013, the year in which the registration of infections caused by these bacteria was first separated as a separate item, 4,738 cases were reported; subsequent years saw a steady increase in the number of cases registered, which in 2017 was already more than doubled to over 11,000 cases, and has since stabilised at this level, reaching 11,310 cases in 2019 (incidence of 29.5/100,000 population). In 2020, a slight decrease in the number of registered cases of *Clostridioides difficile* infection was registered, with a total of 10 139 cases (incidence 26.4/100 000 population). By contrast, in 2021, these rates more than doubled to 21 174 cases, translating into an incidence of 55.5/100 000

In Poland, bacteria of the genus *Salmonella* have been the dominant agent of foodborne infections for many decades. Among these, *S. Enteritidis* is the most common serotype. In 1991, the percentage of total food poisoning/infection outbreaks caused by this pathogen exceeded 90% (Fig. 8.25). However, the share of these pathogens among the agents responsible for outbreaks has been successively reduced and in recent years does not exceed 40%. At the same time, the proportion of foodborne infections caused by other diagnosed agents was increasing, among which there is an upward trend in infections caused by viruses. The situation has changed in 2020, in which outbreaks caused by *Salmonella* accounted for almost 48% of all reported outbreaks, although the number was still significantly lower than in the years preceding the pandemic. In 2021, the percentage of salmonellosis outbreaks was again below 40%. Between 2011 and 2021, the proportion of food poisoning and infection outbreaks in Poland in which the aetiological agent was not detected gradually decreased, although in some years it still reached almost 30%. This high percentage of undiagnosed gastrointestinal infections with regard to the pathogen is largely due to the deficiency of laboratory facilities and doctors' lack of interest in more accurate diagnosis of the cause of the gastrointestinal infections.

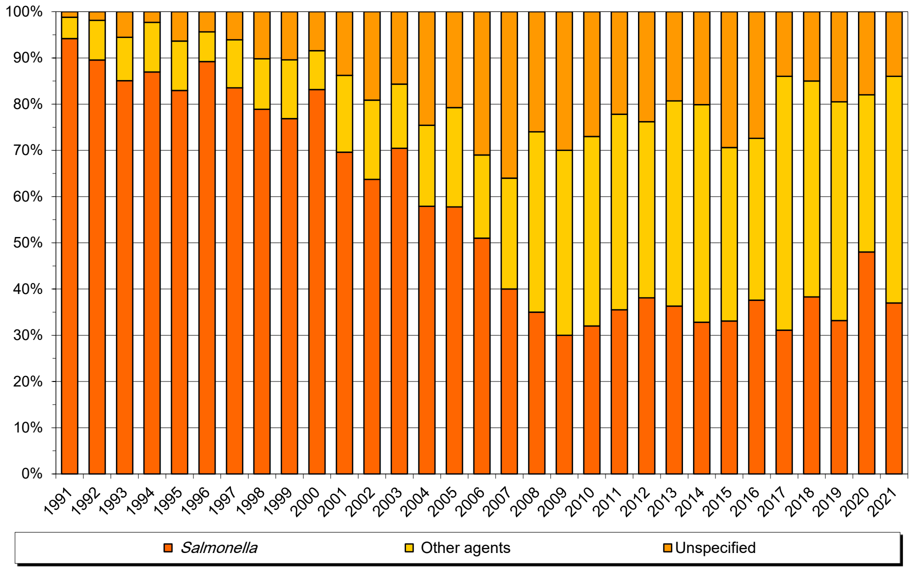


Fig. 8.25. Outbreaks of food poisoning and infections in Poland 1991–2021 by aetiological agent

Other than *Salmonella*, aetiological agents of foodborne diseases are found much less frequently, which is also a result of less frequent testing for them. A period of particular increase in the incidence of salmonellosis was the second half of the 1980s. In the 1990s, there was a marked decline in the incidence of *Salmonella* foodborne infections and, from the latter half of the last century, the incidence in Poland did not differ significantly from the average for EU countries (Fig. 8.26). However, since 2016, an increase in both the number and incidence of salmonellosis has been observed, which was mainly due to the introduction of eggs from Poland contaminated with *Salmonella* into the domestic and international market. The consequence was an international outbreak that persisted from 2016 to 2019, with an increase in incidence during the summer season in each of the following years. In 2020, the incidence of salmonellosis in Poland was even slightly higher than the average incidence in EU countries, but in 2021 it was again higher by more than 4 percentage points.

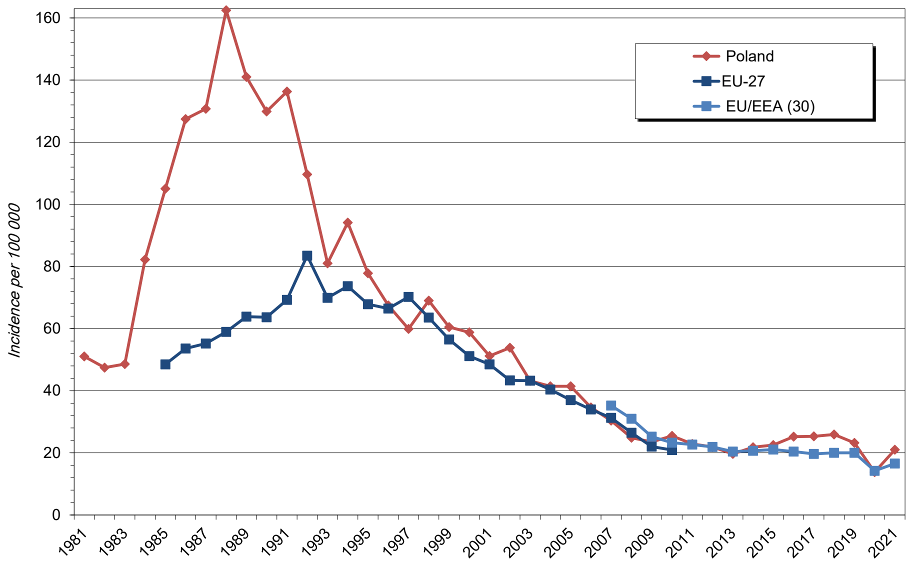


Fig. 8.26. Salmonellosis incidence in Poland and average in EU countries from 1981 to 2021 *(source: WHO HFA DB, ECDC Atlas)*

The incidence of *Salmonella* foodborne infections is, as with other aetiological agents, highest and most commonly reported in the youngest age groups. Among children aged 0–4 years in 2020 it was 125.4 per 100 000 and in 2021 already 189/100 000 assuming almost the same values as in 2019. It reached the highest values among children in their second and third years, with 240.5 and 203 per 100 000 respectively. The incidence values then decreased until they reached a low of 4.2 in the 45–49 age group, and increased slightly in subsequent age groups, reaching a value of 7.9 in those aged 75 and over. In groups of people over 65 years of age, incidence rates have decreased significantly compared to pre-pandemic years. Incidence rates were slightly higher among men than among women and slightly higher in rural areas than in urban areas (Fig. 8.27).

There is considerable territorial variation in the incidence of salmonellosis. In 2021, the incidence across the provinces ranged from 10.3 per 100 000 population in Świętokrzyskie province to 38.7 in Podkarpackie province (Fig. 8.28).

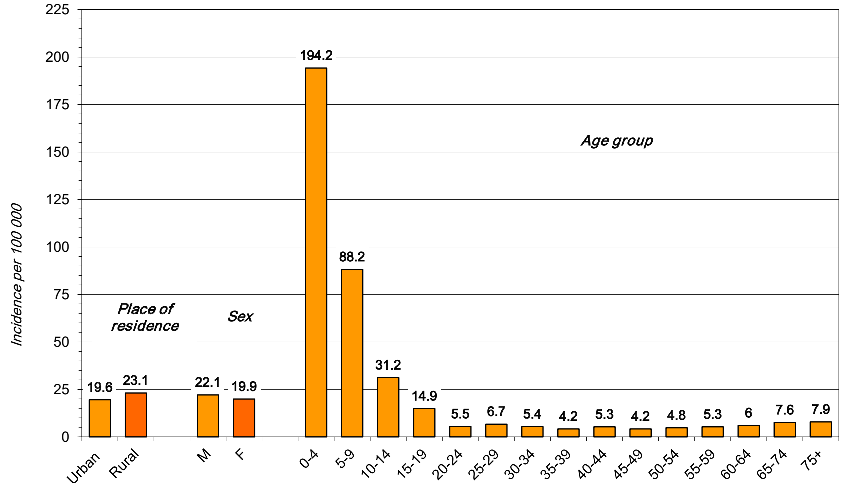


Fig. 8.27. Salmonellosis incidence by place of residence, sex and age in 2021.

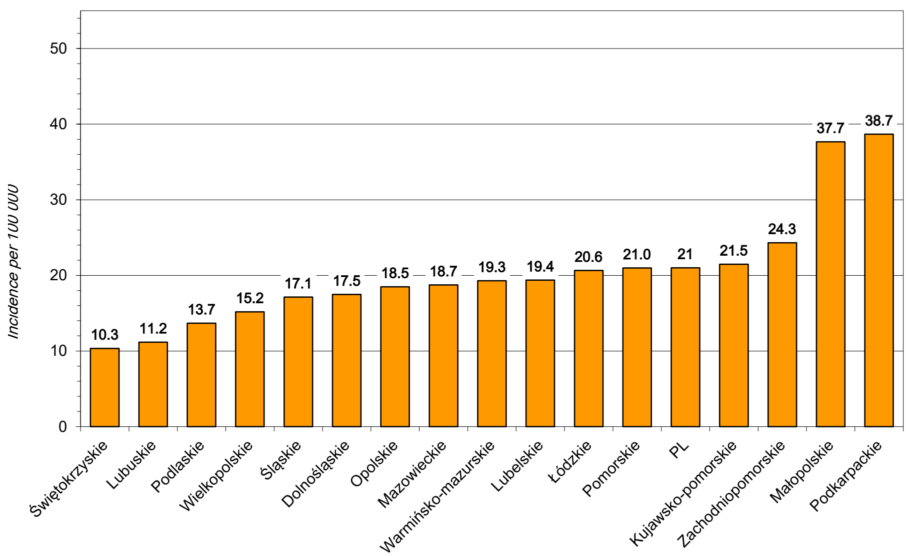


Fig. 8.28. Salmonellosis incidence in 2021 by province

Two very important types of bacteria that cause foodborne infections – *Campylobacter* and *Yersinia* – are being diagnosed with increasing frequency, although still much less frequently than in Western European countries. Since 2002, infections due to *Campylobacter spp.* have been reported as a separate entity under the communicable disease surveillance system. The number of diagnosed and reported cases of campylobacteriosis increased each year, and the areas in which the disease cases were identified and recorded were increasing. In 2003 and 2004, notifications came only from the provinces of Małopolskie and Mazowieckie. In subsequent years, other provinces were added, in which laboratories gradually introduced a method for detecting *Campylobacter* in clinical specimens. In 2017, the highest number of cases of campylobacteriosis so far was reported from all 16 provinces (two of which had only isolated cases), amounting to 877 cases. In the following two years, there was a decrease in registered cases amounting to 726 and 715, in 2018 and 2019 respectively. In 2020, only 494 cases were registered, while the number increased to 632 cases in 2021. The slow but steady increase in the number of case reports is likely to be a consequence of both an increase in the number of laboratories testing for these pathogens, an increase in doctors' awareness of the possibility of intestinal infections caused by this pathogen and the introduction of mandatory reporting of positive diagnostic results for these pathogens by laboratories. In 2003, the percentage of hospitalised people diagnosed with campylobacteriosis was almost 87%, in the following years it decreased and in 2010 it was 54.1%, but from 2013 it started to increase again and in 2019 it was 81.4%. In contrast, it began to decline slowly again in the following two years, reaching values of 76.8% in 2020 and 78.2% in 2021. Such high hospitalisation rates are indicative of significant under-reporting of campylobacteriosis and testing for it mainly in people who have been hospitalised for symptoms.

Yersinia infections are also increasingly being recorded. In the first two years (2003 and 2004) of reporting of this disease, the number of cases reported was 71 and 84, respectively. In 2005, 136 cases of the disease had already been reported to the surveillance system. In 2006, a similar number of 140 cases were recorded and in 2010, 206. From this year onwards, the number of cases of yersiniosis remained at a similar level until 2019. In 2020, there was a significant decrease in reported cases, with a total of 117 cases reported. Since the beginning of the reporting period for yersiniosis, the proportion of people hospitalised as a result of the disease has been high, ranging from 59.2% in 2003 to 83.1% in 2005. In recent years, there has also been a large territorial variation in hospitalisation rates.

Since 2004, cases caused by *Y. enterocolitica* have emerged among reported cases caused by serotype O8 (the so-called "American serotype"). Initially the incidence was limited to 2–3 provinces, then it was found almost all over the country. However, in 2014, the number of reported cases caused by it decreased significantly, with only four such cases reported. Due to the decreasing percentage of identified serotypes of isolated *Yersinia* spp. from year to year, it is becoming increasingly difficult to assess the situation of this disease in terms of circulating serotypes. In 2014–2015 and 2017, about 70% of isolates had no specific serotype, in 2016 almost 80%, in 2019 more than 75%, and in 2020 almost 90%

Other foodborne diseases that have been recorded in Poland for a number of years, such as botulism, staphylococcal toxin poisoning and bacterial dysentery, currently occur in Poland in small numbers and play a lesser role as public health threats. In the case of dysentery, there was a significant increase in the number of cases in 2018, with a total of 284 cases recorded. This figure is mainly made up of illnesses that occurred in two outbreaks – one outbreak took place within the country, although it involved the international community, while the other was related to the holiday stay of Poles in Albania. In 2020 and 2021, the number of cases dropped significantly and amounted to – 12 and 18 cases respectively.

Until 2016, a similar situation to the above-mentioned diseases was with hepatitis A. However, the increase in the incidence of hepatitis A in 2016 in Western European countries, which mainly affected a group of men who have sex with men, contributed to an epidemic increase in cases in our country as well. In 2017, there were a record number of hepatitis A cases – 3014. Paradoxically, the very good epidemiological situation in the country with regard to the incidence of hepatitis A (since 2002, Poland has been considered to have a very low endemicity of hepatitis A) has contributed to this rapid increase. The low endemicity is linked to the lack of circulation of the hepatitis A virus (HAV) in the population and the increasing proportion of susceptible people, especially in the under-45 age group. This translates into an increased risk of local or even larger national outbreaks, as we saw in 2017. In the following two years, the number of cases successively decreased, but it was still very high compared to the previous period, at 1455 in 2018 and 1066 in 2019. Between 2020 and 2021, the number of cases dropped significantly, amounting to 111 and 92 cases respectively, and reached similar values as recorded nationally before 2017.

8.2.4. Sexually transmitted diseases

According to the latest WHO estimates of 2020, the incidence of sexually transmitted diseases was not significantly reduced during the pandemic. There are still an estimated 374 million new cases of 4 monitored bacterial sexually transmitted diseases worldwide in 2020: chlamydia infections (129 million), gonorrhoea (82 million), syphilis (7.1 million) and trichomoniasis (156 million)[29]. In addition, chronic viral infections are widespread, such as herpes virus infection (prevalence of 490 million) or the oncogenic human papilloma virus, HPV (300 million women). The WHO report on progress in combating the epidemics of HIV, viral hepatitis and sexually transmitted diseases indicated that while for HIV and hepatitis even if not all targets are being met, global trends are favourable – for sexually transmitted diseases there is no clear improvement in the epidemiological situation[30]. It is stressed that in most countries there are not even systems in place to collect data of sufficient quality to develop and implement appropriate measures. These problems also exist in Europe, and also in Poland.

In the European Union, syphilis, gonorrhoea and chlamydiosis are monitored. It had already been assessed before the pandemic that European surveillance data were difficult to interpret because of differences in the way epidemiological surveillance for sexually transmitted diseases was carried out in different countries[31]. Currently, during the pandemic, surveillance for these diseases was not prioritised, so that at European level, the available data from 2019 were not published until 2022. These data indicate a continuation of the upward trend in incidence, particularly of gonorrhoea between 2007 and 2019 and, to a lesser extent, of syphilis (Fig. 8.29). The upward trend in syphilis cases slowed between 2017 and 2019, associated with a halt in incidence growth in

[29] WHO. Sexually transmitted infections (STIs). WHO 22.08.2022. Available at https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis). Accessed 10.11.2022

[30] Global progress report on HIV, viral hepatitis and sexually transmitted infections, 2021. Accountability for the global health sector strategies 2016–2021: actions for impact. Geneva: World Health Organization; 2021

[31] European Centre for Disease Prevention and Control. Annual epidemiological report for 2017 Surveillance systems overview for 2017 [Internet; Excel workbook]. Stockholm: ECDC; 2018

the MSM group[32]. In contrast, there was a marked increase in the incidence of gonorrhoea in the EU/EEA. The incidence increased most rapidly in the MSM group, but unlike syphilis, a marked increase is also observed in the group of men and women with only heterosexual contacts[33]. Trends in new diagnoses of chlamydial infections are quite variable, depending on the screening programmes implemented. The number of chlamydia infections in the EU/EEA increased between 2017 and 2019, with an increase particularly among men[34].

The registered incidence of syphilis, gonorrhoea and chlamydiosis in Poland remains significantly lower than the EU/EEA average (Fig. 8.29). There is a relatively smaller difference for syphilis, which is the most commonly recorded sexually transmitted disease in Poland. From the point of view of the epidemiology of transmission of these diseases, this is an unlikely situation. As a rule, the incidence of gonorrhoea, and especially the incidence of chlamydiosis, far exceeds the incidence of syphilis (cf. WHO estimates cited above). These extremely low rates with regard to gonorrhoea and chlamydiosis are therefore unfortunately indicative of diagnostic deficiencies (use of empirical treatment in symptomatic cases and lack of screening) and/or incomplete reporting. The low treatment rates reported by dermal-venereology outpatient clinics (Fig. 8.30) may indicate that the lack of diagnosis of sexually transmitted infections is a problem.

In 2020, there was a significant decrease in the number of sexually transmitted disease cases registered in Poland. This amounted to more than 50%: 53% for gonorrhoea, 56% for syphilis and 60% for chlamydiosis. It is worth noting that, in terms of numbers treated, there has been virtually no decrease in the number of people treated for gonorrhoea and syphilis. In contrast, there was a 33% decrease in the number of people treated for chlamydiosis. This points to reporting delays and underreporting as the main reason for the decrease in the number of cases recorded in epidemiological surveillance.

32 European Centre for Disease Prevention and Control. Syphilis. In: ECDC. Annual epidemiological report for 2019. Stockholm: ECDC; Sep 2022.

33 ECDC surveillance atlas. Available at https://www.ecdc.europa.eu/en/surveillance-atlas-infectious-diseases. Accessed 2.11.2022

34 European Centre for Disease Prevention and Control. Chlamydia infection. In: ECDC. Annual epidemiological report for 2019. Stockholm: ECDC; Sep 2022

In the case of chlamydiosis, as with HIV infection, less accessibility to testing may have been more important.

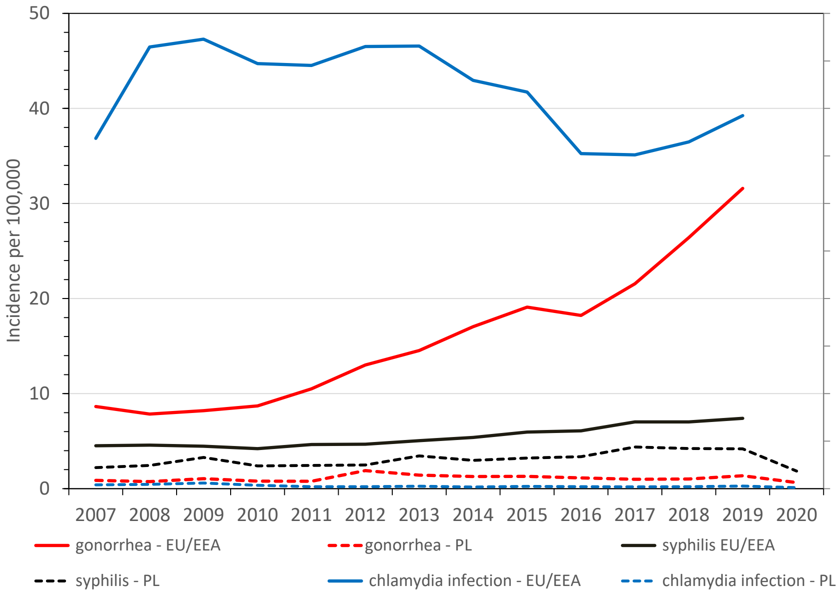
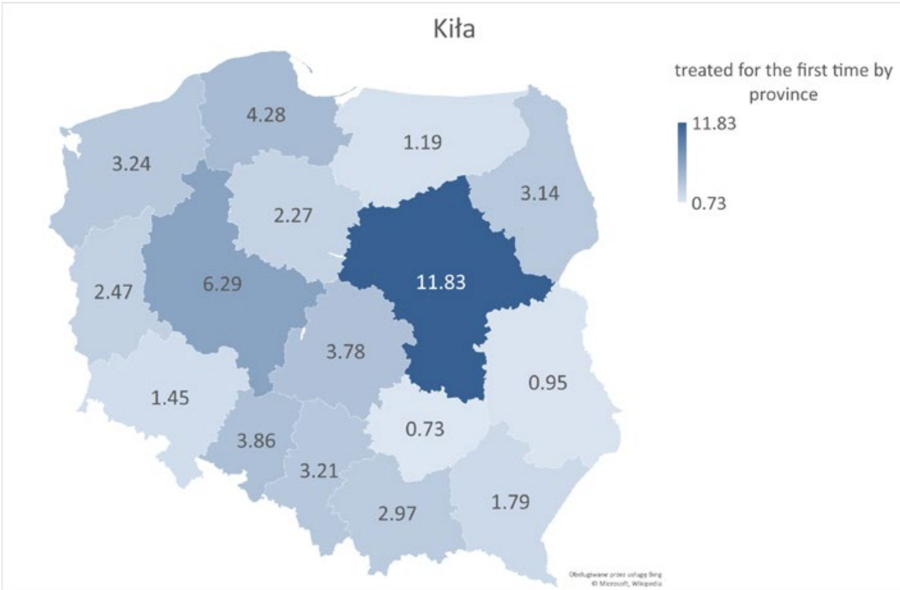
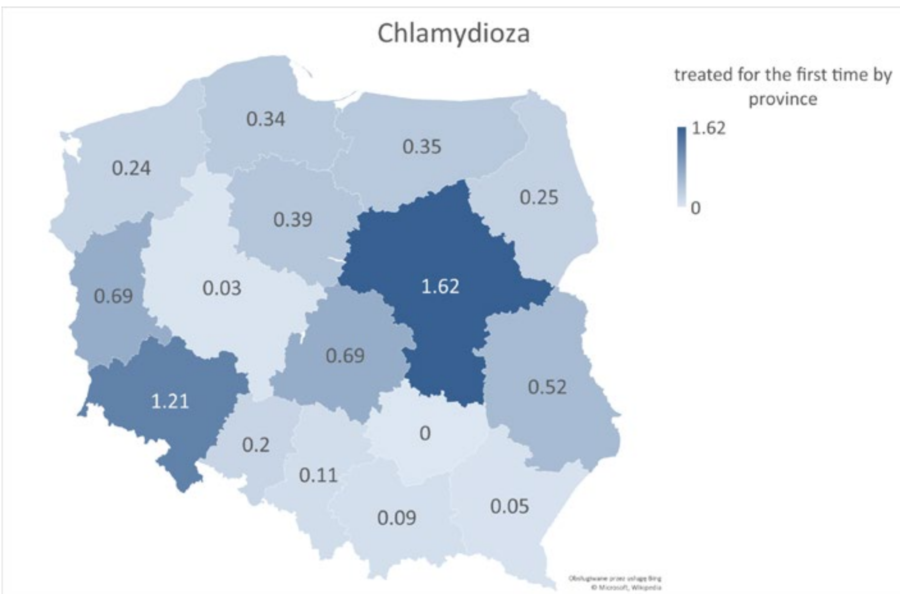


Fig. 8.29. Average incidence per 100,000 of syphilis, gonorrhoea and chlamydiosis in EU countries and Poland between 2007 and 2020 (source: CSIOZ data, presently e-Zdrowie Centre: MZ-14 and ECDC surveillance atlas)

The rate of inclusion in treatment of new patients of dermatology-venereology outpatient clinics in 2020 per 100,000 inhabitants showed significant differences between provinces (Fig. 8.30), with a similar distribution to that recorded in previous years. As in previous years, the highest rate was in the Mazowieckie province. In this province, 25% of all syphilis cases, 44% of chlamydiosis cases (non-gonorrhoeal urethritis) and up to 67% of gonorrhoea cases were treated. Such large differences indicate differences in diagnosis and disease reporting between provinces, especially as no case of gonorrhoea was reported in 2020 in Podkarpackie and Podlaskie provinces, and only single cases were reported in Lubelskie, Lubuskie, Opolskie, Śląskie, Świętokrzyskie and Warmińsko-Mazurskie provinces.


Kiła
treated for the first time by province
11.83
0.73
4.28
1.19
3.24
3.14
2.27
11.83
2.47
6.29
3.78
0.95
1.45
0.73
3.86
3.21
1.79
2.97


Chlamydioza
treated for the first time by province
1.62
0
0.34
0.35
0.24
0.25
0.39
0.69
0.03
1.62
0.69
0.52
1.21
0
0.2
0.11
0.05
0.09

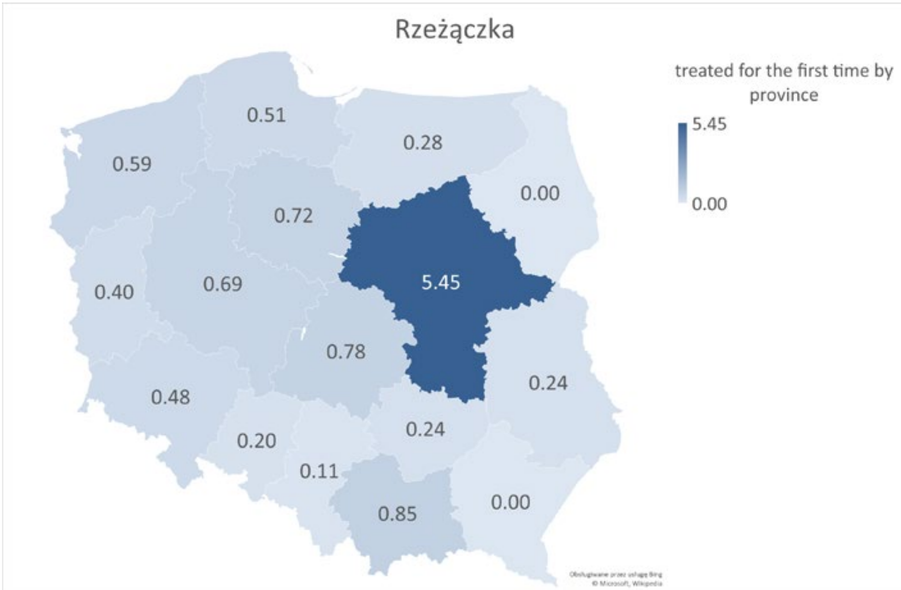


Fig. 8.30. Rates of newly treated syphilis, gonorrhoea and chlamydiosis per 100,000 inhabitants in individual provinces in Poland in 2020 (source: CSIOZ data, now e-Zdrowie Centre: MZ-54)

According to the European Surveillance System data cited earlier and made available in the Atlas by the ECDC, gonorrhoea is most prevalent among MSM in EU/EEA countries. In this group, too, there has been a sharp increase in recent years from about 5,000 cases between 2007 and 2009 to 49,229 cases in 2019, accounting for 48% of cases with a known route of transmission. Heterosexual men and women accounted for 22% and 29% of cases respectively. The proportion of cases among MSM was even higher for syphilis, where up to 68% of all cases with a known route of transmission were reported in this group. The situation is different for sexually transmitted chlamydioses, which were more than 84% transmitted by heterosexual contact.

Similar trends can also be observed in Poland. In 2019, 42% of syphilis cases are diagnosed in MSM[35], and both syphilis and gonorrhoea have significantly more cases

[35] Niedźwiedzka-Stadnik M, Rosińska M, Zakrzewska K. Syphilis in Poland in 2019. Przegl Epidemiol. 2021;75(4):613–625. doi: 10.32394/pe.75.58.

among men than among women[36]. In previous years, more cases of chlamydiosis were recorded among women than among men. In 2020, the distribution by sex was similar for syphilis and gonorrhoea (Fig. 8.31), while, in contrast to previous years, there was also a higher incidence of chlamydiosis among men than among women. It should be noted that, with a much lower registered incidence of sexually transmitted diseases than before the pandemic, the distribution by age and by place of residence in 2020 was comparable to earlier years. This is in line with the observation that the lower incidence recorded in 2020 is most likely related to worsening reporting as a result of the pandemic.

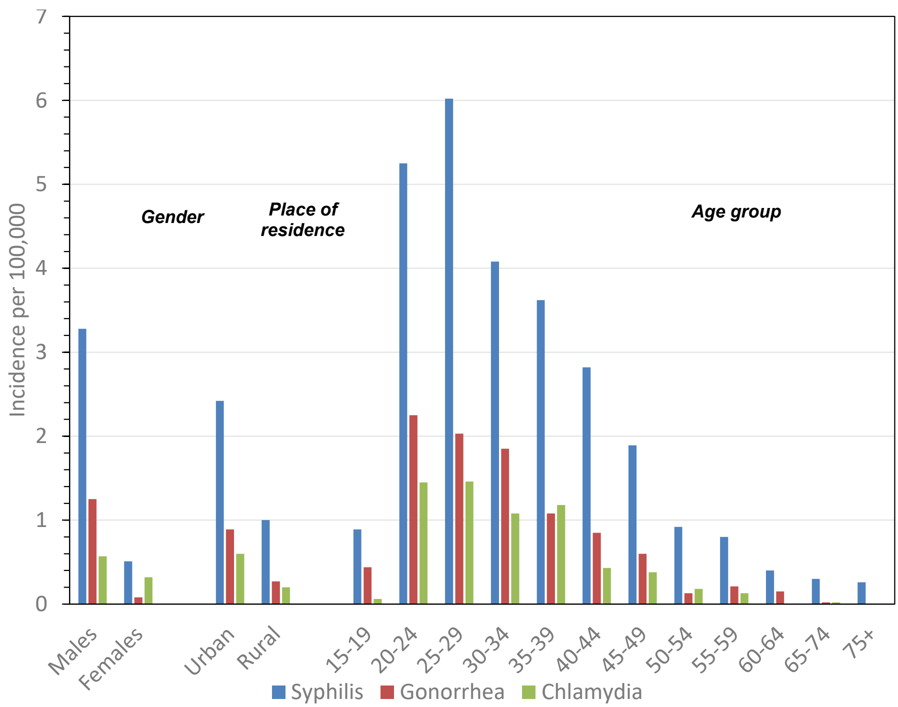


Fig. 8.31. Incidence of syphilis, gonorrhoea and chlamydiosis in 2020 by place of residence, sex and age

[36] Niedźwiedzka-Stadnik M, Zakrzewska K. Sexually transmitted infections in Poland in 2013–2018 in comparison to other European countries based on infectious diseases surveillance in Poland and in Europe. Przegl Epidemiol. 2021;75(4):502–514. doi: 10.32394/pe.75.47.

8.2.5. Influenza and influenza-like infections

Of all the infectious diseases under epidemiological surveillance in Poland, influenza and influenza-like infections caused the greatest number of cases each year. During the peak epidemic season, i.e. it is usually January to March, influenza and influenza-like illnesses have always caused severe overload on the healthcare system and become a major cause of sickness absenteeism, generating huge economic and social costs. In 2018, the year in which the highest number of cases was registered in the last three decades, more than 5 million people in Poland received medical advice in connection with influenza and influenza-like infections (Fig. 8.32). Although influenza cases rarely require hospitalisation (in 2018, primary care physicians referred 0.34% of patients to hospitals due to a more severe or complicated course of the disease, and 0.38% in 2019) and rarely lead to heavy complications and death, given the millions of cases of influenza, these small percentages lead to thousands of cases of people being hospitalised (17,858 in 2018 and 18,198 in 2019).

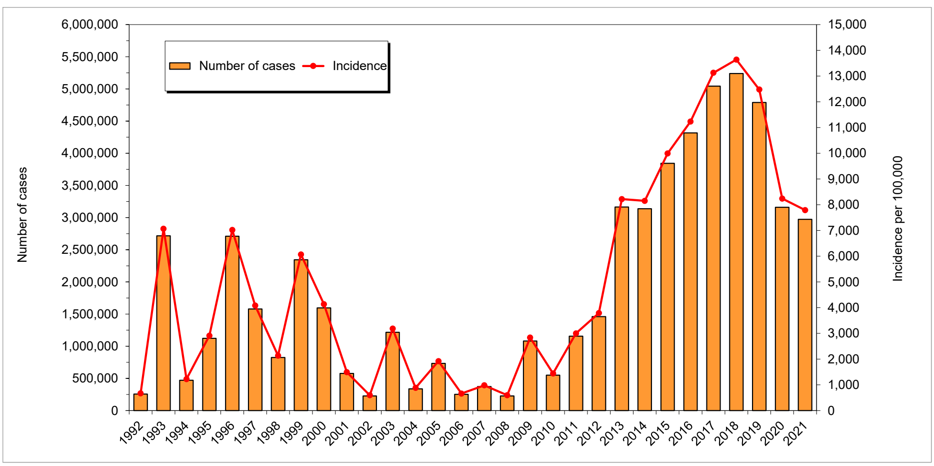


Fig. 8.32 Influenza and influenza-like infections in years 1992–2021. Number of cases and incidence per 100,000 population *(National Institute of Public Health NIH – National Research Institute data)*

In 2020–2021, despite the COVID-19 epidemic, influenza and influenza-like illnesses continued to represent the largest group of cases among infectious diseases. Since most of the pandemic's measures to reduce the transmission of SARS-CoV-2 infections also favoured weakening the transmission of any other infections, especially those transmitted in a similar manner, the number of influenza and influenza-like illnesses recorded by surveillance obviously decreased significantly. Compared to 2019, there were 34% fewer registrations in 2020 (3,160,711) and 37% fewer registrations in 2021 (2,973,793). The incidence in these years was (respectively) 8,240.9 and 7,792.5 per 100,000 population (Fig. 8.32). 15,407 people (0.49%) were referred to hospitals in 2020 and 7,992 people (0.27%) in 2021.

The decrease in the number of influenza and influenza-like cases reported for surveillance and registered during the 2020–2021 pandemic period occurred across the country, with, in individual provinces – comparing 2021 and 2019 – ranging from 24% (in Kujawsko-Pomorskie) to 64% (in Zachodniopomorskie). As a result, the considerable variation observed in earlier years in the amount of incidence rates recorded in a given year across the provinces has widened even further. While in 2019, the highest provincial incidence (36,034/100,000 in Pomorskie) was higher than the lowest incidence (3,716 in Podkarpackie) by almost 10 times, in 2021, the difference between the same provinces with the highest and lowest incidence was more than 13 times (respectively: 24,600 and 1,822). Such a large variation, which is not sufficiently justified in the light of other epidemiological data, is mainly the result of differences in the sensitivity of local surveillance rather than differences in the actual epidemiological situation of influenza and influenza-like infections, as already pointed out in other studies (Fig. 8.33). The COVID-19 outbreak may be thought to have further exposed the importance of interprovincial differences in the conduct of influenza surveillance.

As in the years prior to the COVID-19 epidemic, the highest incidence rates of influenza and influenza-like infections were recorded among children, especially the youngest children – those aged up to 5 years. The incidence in this age group in 2021 (45,449/100,000 children of that age) was almost six times higher than in the general population and more than twelve times higher than the incidence among the oldest people, aged over 64 years (Fig. 8.34). The proportion of cases of children and adolescents under 14 years of age accounted for (respectively) 39.9% and 48.2% of the total number of influenza and influenza-like illnesses registered in 2020–2021 and was within the range of values recorded in previous years (25% to 55%).

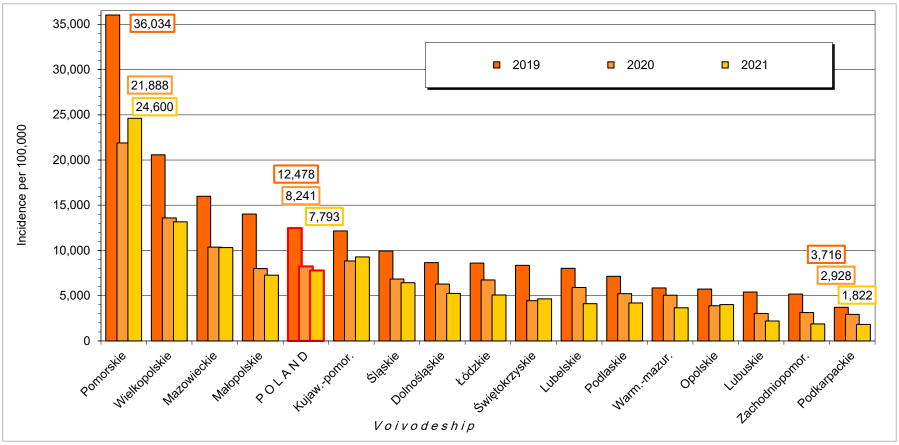


Fig. 8.33. Influenza and influenza-like infections 2019–2021. Incidence per 100,000 population by province *(National Institute of Public Health NIH – National Research Institute data)*

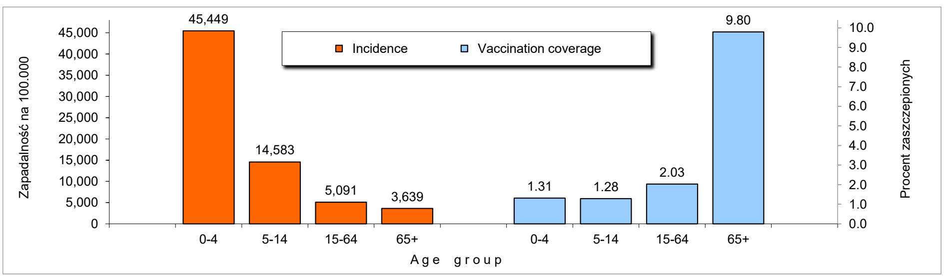


Fig. 8.34. Influenza and influenza-like infections in 2021 Incidence per 100,000 population and percentage vaccinated against influenza by age *(National Institute of Public Health NIH – National Research Institute data)*

The COVID-19 epidemic has clearly increased interest in influenza vaccination. Although – according to data collected by sanitary and epidemiological stations – only 2.5% more people were vaccinated against influenza nationwide in 2020 than in 2019, there were already 26.7% more people vaccinated in 2021 compared to 2020 (Fig. 8.35). The 1,293,653 people vaccinated in 2021, however, represent only 3.4% of the population, which is less than was vaccinated in the best year in this respect in 2005 (4.2%) and far too few for the vaccination carried out to have any significant impact on the influenza epidemiological situation in Poland. This is all the more so given that those most at risk from influenza (those aged 64 and over) were vaccinated most often (but also too rarely), and those most at risk from infection and transmission (the youngest) were vaccinated least often (Fig. 8.35). However, there is some optimism that, after 2015, there continues to be a clear upward trend in the number of people vaccinated against influenza in Poland

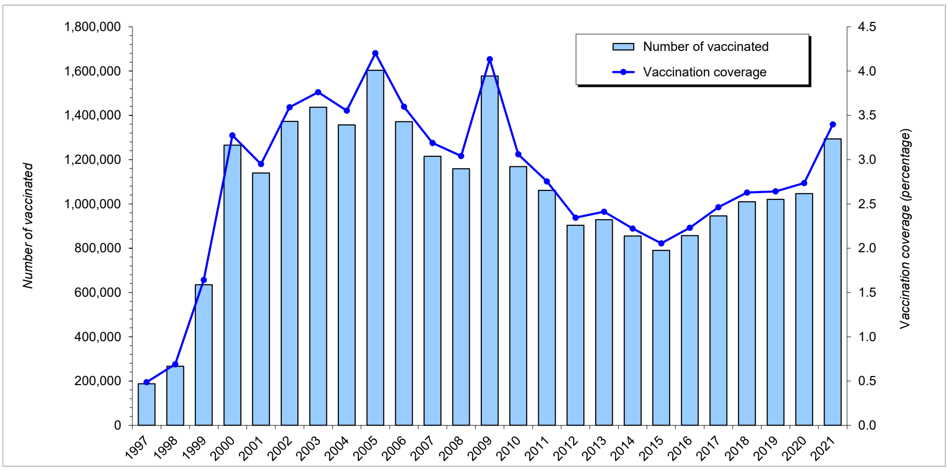


Fig. 8.35. Influenza vaccination in 1997–2021. Number of vaccinated and percentage of vaccinated population *(National Institute of Public Health NIH – National Research Institute data)*

It should be noted that with the occurance of SARS-CoV-2 and the COVID-19 pandemic, the possibilities to continue influenza surveillance in Poland in the current manner have essentially been exhausted. Over the past decades, epidemiological surveillance of this disease in Poland – as in many other countries – has been based (with minor modifications) on the recording of influenza and unspecified influenza-like infections, referred to in Poland as "suspected influenza cases", and including (according to the case definition adopted for surveillance purposes) both acute respiratory infections and influenza-like illnesses. The data collected provided a reasonably good indication of the burden on primary care facilities during the seasonal peak of the influenza wave, but among the symptomatic cases so identified and reported by doctors in aggregate form, laboratory-confirmed and unit-reported influenza cases were generally only a fraction of a percentage. In 2019, it was 0.10% (4,831 cases), in 2020 it was 0.13% (4,149) and in 2021 it was 0.002% (63 cases!). The low (after the 2009–2010 influenza pandemic) interest of the sanitary inspection in the proper functioning of the sentinel influenza surveillance system implemented in Poland and the low representativeness of this system made it practically impossible to correctly estimate the number of influenza cases among the total number of upper respiratory tract infections reported to surveillance. At present, not least because of the clinical similarities between some forms of COVID-19 and influenza, change is inevitable.

CONCLUSIONS

1. When interpreting data on the incidence of infectious diseases in Poland in 2020–2021 collected by epidemiological surveillance, underestimation of the number of cases should be taken into account. The degree of this underestimation can vary for different diseases, depending on their course and the risk they posed.
2. The downward trend in the vaccination status of children and adolescents that has been observed for several years continues, but the vaccination rate is still favourable and prevents epidemic increases in the vaccine preventable diseases.
3. The decision to postpone the vaccination of the Preventive Vaccination Schedule for one month during the initial period of the pandemic, in view of the assessment of the vaccination situation in 2020, did not significantly affect the vaccination status of children and adolescents.
4. Despite the continued increase in the number of vaccination evaders, a favourable trend of slowing down the growth rate of non-vaccinators was observed.

5. There is an ongoing need for educational activities on the benefits of so-called "mandatory" and recommended vaccinations, targeting different audiences.
6. The pandemic has adversely affected the ability to achieve the goals of combating chronic infectious diseases, particularly HIV, HCV and HBV infections. According to international consensus, one of the pillars of combating these diseases is early detection and treatment of infected individuals. During the pandemic period, especially in 2020, testing for the aforementioned infections was significantly reduced, resulting in a 50% decrease in HIV diagnoses, a 3-fold decrease in chronic HBV diagnoses and a 3.5-fold decrease in HCV diagnoses. This is a particularly worrying situation given that the situation was already in need of improvement before the pandemic. All the more so now that wider access to testing, the promotion of testing for HIV, HCV and the integration of testing (offering a package of tests) for these diseases and other sexually transmitted diseases remains a priority issue.
7. When it comes to the diagnosis and treatment of HCV, HIV and other STIs, it is important to take measures to include marginalised populations, such as people who inject drugs, homeless people or illegal immigrants, in the health care system. To this end, the diagnostic process in particular needs to be simplified, using rapid tests and testing outside of healthcare facilities by trained non-healthcare professionals.
8. The large decreases in foodborne disease incidence rates observed in the first year of the pandemic already started to return to the values recorded in the years before the pandemic in the following year.
9. Significant differences in recorded incidence rates of sexually transmitted diseases indicate gaps in the system of diagnosis and/or reporting of these diseases in most provinces. Measures will need to be taken to improve access to diagnostics, as well as to develop acceptable ways of surveillance of sexually transmitted infections in Poland.
10. Accurate recognition of the epidemiological situation of influenza, and thus the planning and implementation of a rational policy for the prevention of this disease on a national scale, requires a modification of the current influenza surveillance system to ensure that infections caused by influenza viruses and SARS-COV-2

are distinguished in general surveillance and that the way in which surveillance is carried out in the various provinces is standardised.

11. Given the enormous economic and social costs of influenza incurred each year, efforts should be stepped up to significantly increase the proportion of people in Poland vaccinated against the disease.

9. COVID-19 PANDEMIC EVOLUTION IN POLAND

Magdalena Rosińska, Małgorzata Sadkowska-Todys,
Małgorzata Stępień

Over the past two years, the COVID-19 epidemic has significantly affected the health of the population in Poland and worldwide. By mid-2022, almost 555 million cases have been observed, including 6.4 million deaths. However, the impact of the pandemic is much broader and it may only be a few years before its full extent can be estimated. The pandemic has caused an unprecedented strain on the healthcare system, resulting in the need to postpone less urgent services until the post-pandemic period. It is postulated that this has caused a health debt that is now difficult to quantify, especially in terms of chronic civilisation diseases. No less important are the social impacts, including the effects of long-term distance learning education, as well as the economic crisis.

Historically, the first cases were identified in the city of Wuhan, China, in late 2019[1]. The SARS-CoV-2 virus was identified as early as January 2020[2]. It was also quickly confirmed to have a high epidemic potential due to its potential for human-to-human spread[3]. As early as March 2020, COVID-19 cases were reported on several continents, with Europe becoming the epicentre of the new epidemic. Initially, the highest numbers of cases and deaths were reported in southern European countries, especially Italy and Spain[4].

1 Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. N Engl J Med. 2020 Mar 26;382(13):1199–207

2 WHO. Novel Coronavirus (2019-nCoV) situation report-1. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4 (Accessed on 28 Feb 2020) 2020.

3 Hu, B., Guo, H., Zhou, P. et al. Characteristics of SARS-CoV-2 and COVID-19. Nat Rev Microbiol 19, 141–154 (2021). https://doi.org/10.1038/s41579-020-00459-7

4 WHO Situation Report no. 67. Available at https://www.who.int/docs/default-source/coronaviruse/situeation-reports/20200327-sitrep-67-covid-19.pdf?sfvrsn=b65f68eb_4

The control of the 2020 epidemic was based on so-called non-pharmacutical interventions aimed at reducing physical social contact[5]. Various types of restrictions on the operation of schools, workplaces or trade were implemented. Remote working was recommended or mandated. In some countries, a total ban on movement was periodically implemented, termed "lockdown", the number of people who could congregate in one place was also restricted. Mandatory mouth and nose covering was also implemented, and medical masks were recommended or mandatory. Another strategy to combat the outbreak was mass testing and isolation of infected people and quarantine of their contact persons. It must be emphasised that the variation in methods and the timing of their implementation, as well as the level of implementation (recommendations, obligation), even across European countries was significant. In some countries, the number of amendments to existing restrictions was also significant, which could affect public confidence in the decisions of those in power, the acceptability of the restrictions introduced and the degree of public compliance with the regulations.

At the same time, intensive work was underway in 2020 to produce a vaccine against COVID-19. This has taken place at an unprecedented pace, with the first clinical trials already launched in July 2020[6,7]. The registration of the first vaccines took place in December 2020. Since then, vaccination has remained the main tool to combat the COVID-19 epidemic, but its availability outside of developed countries remained initially very low. In contrast, in many countries where the vaccine was and is available, insufficient vaccination rates were observed due to lack of interest or even opposition

5 ECDC. Non-pharmaceutical interventions against COVID-19. Available at https://www.ecdc.europa.eu/en/covid-19/prevention-and-control/non-pharmaceutical-interventions

6 Baden LR, El Sahly HM, Essink B, Kotloff K, Frey S, Novak R, Diemert D, Spector SA, Rouphael N, Creech CB, McGettigan J, Khetan S, Segall N, Solis J, Brosz A, Fierro C, Schwartz H, Neuzil K, Corey L, Gilbert P, Janes H, Follmann D, Marovich M, Mascola J, Polakowski L, Ledgerwood J, Graham BS, Bennett H, Pajon R, Knightly C, Leav B, Deng W, Zhou H, Han S, Ivarsson M, Miller J, Zaks T; COVE Study Group. Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine. N Engl J Med. 2021 Feb 4;384(5):403–416. doi: 10.1056/NEJMoa2035389.

7 Polack FP, Thomas SJ, Kitchin N, Absalon J, Gurtman A, Lockhart S, Perez JL, Pérez Marc G, Moreira ED, Zerbini C, Bailey R, Swanson KA, Roychoudhury S, Koury K, Li P, Kalina WV, Cooper D, Frenck RW Jr, Hammitt LL, Türeci Ö, Nell H, Schaefer A, Ünal S, Tresnan DB, Mather S, Dormitzer PR, Şahin U, Jansen KU, Gruber WC; C4591001 Clinical Trial Group. Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine. N Engl J Med. 2020 Dec 31;383(27):2603–2615. doi: 10.1056/NEJMoa2034577.

to vaccination. This also applies to our country, where almost 40% of people have not been vaccinated against COVID-19.

The development of the pandemic in Poland in 2020–2021 was shaped by several factors, including the control measures introduced, the development of protective vaccination and subsequent implementation programme, and the emergence of further variants of the virus and their spread in our population. The aim of this section is to provide a synthetic summary of the COVID-19 outbreak based on information from various sources, including data from other European countries for comparison.

9.1. Non-pharmaceutical interventions

An epidemic state was declared in Poland on 20.03.2020 and officially lasted until 12.05.2022[8], although the intensity of anti-epidemic measures in the period before the cancellation was low.

Figure 9.1 provides a simplified overview of the main non-pharmaceutical interventions implemented in Poland. Apart from the first outbreak period, in spring 2020, they were generally implemented reactively in response to an increase in cases that threatened the capacity of the health service. Attention is drawn to the months-long closure of educational facilities during pandemic years. Comparing data in European countries in the school year 2020/21, Poland has the longest period of remote learning[9], although the conditions for conducting learning in this form, including the availability of computers and an Internet connection, were at an average level compared to other European countries[10].

Remote working is not included in the figure. In Poland, remote working was recommended throughout the pandemic, while its implementation remained low. According

[8] Regulation of the Minister of Health of 12 May 2022 on the cancellation of an epidemic state in the territory of the Republic of Poland, Journal of Laws of 2022, item 1027

[9] UNESCO. Website: COVID-19 Education Response, https://covid19.uis.unesco.org/data/, accessed 29.10.2022

[10] Blaskó, Z., Costa, P. da, & Schnepf, S. V. (2022). Learning losses and educational inequalities in Europe: Mapping the potential consequences of the COVID-19 crisis. Journal of European Social Policy, 32(4), 361–375. https://doi.org/10.1177/09589287221091687

	grades IV-VIII and above	grades I – III	kindergartens	shopping malls	catering	medium and large assemblies	masks
2020-03	as of 12.03	as of 12.03	as of 12.03	up to 13.03	up to 13.03	as of 24.03	
2020-04							as of 9.04
2020-05		as of 25.05	as of 6.05	as of 4.05	up to 18.05	up to 29.05	up to 29.05
2020-06							
2020-07	//	//					
2020-08	//	//					
2020-09							
2020-10	as of 24.10			as of 17.10	as of 17.10	as of 17.10	as of 10.10
2020-11		as of 9.11		as of 7.11			
2020-12				up to 28.12			
2021-01		up to 17.01				up to 17.01	
2021-02							
2021-03		up to 22.03	as of 29.03	as of 27.03			
2021-04		up to 25.04	up to 18.04	up to 3.05			
2021-05	up to 16.05	up to 2.05			up to 14.05		up to 14.05
2021-06						up to 6.06	
2021-07	//	//					
2021-08	//	//					
2021-09							
2021-10							
2021-11							
2021-12							

closure or significant restriction (order to wear masks everywhere)

Limited restrictions or introduction in zones

Fig. 9.1. Simplified scheme for the implementation of anti-epidemic restrictions in 2020–2021 (source: Ministry of Education and Science. Summary of the 2020 / 2021 school year and Summary of the 2021/2022 school year. Available at: https://www.gov.pl/web/edukacja-i-nauka/podsumowanie-roku-szkolnego-20202021; https://www.gov.pl/web/edukacja-i-nauka/podsumowanie-roku-szkolnego-20192020; ECDC. Data on country response measures to COVID-19. Available at https://www.ecdc.europa.eu/en/publications-data/download-data-response-measures-covid-19)

to Eurostat data, the increase in the percentage of remotely working people in Poland was slightly below the European average and did not increase significantly during the pandemic except in its initial period.

COVID-19 vaccines were available in Poland almost as soon as they were approved by the European Medicines Agency, thanks to centralised purchasing for the EU. Table 1 summarises the main data on the implementation schedule of the vaccination programme in Poland. Prioritisation of groups for vaccination was comparable across European countries and included people at higher risk of severe COVID-19, including older people and those with chronic diseases and immunodeficiencies. In the first stage, medical workers were vaccinated, among whom cases were common in the early days of the pandemic and caused additional disruption to healthcare operations. During the course of the programme, recommendations regarding the interval between doses and also regarding the timing of vaccination of recovered patients were revised as new data became available. Nevertheless, it can be considered that at the end of 2021, adults and children over 4 years of age could be vaccinated with at least the primary course.

Table 9.1. Timetable for implementation of the COVID-19 immunisation programme in Poland

	Start date of vaccination availability:		
	Basic cycle	**1st booster dose**	**2nd booster dose**
health professionals	27.12.2020	24.09.2021 (after 3–6 months from the primary course)	17.08.2022
teachers	12.02.2021	2.11.2021 (after 6 months from the primary course)	16.09.2022 (after 3–4 months)
70+ persons	25.01.2021	24.09.2021 (after 3–6 months from the primary course)	22.07.2022 (after 3–4 months)
60+ persons	23.03.2021	24.09.2021 (after 3–6 months from the primary course, 50+)	22.07.2022 (after 3–4 months)
other adults	12–30.05.2021	2.11.2021 (after 6 months from the primary course)	16.09.2022 (after 3–4 months)
children >12 yrs.	07.06.2021	2.11.2021 (after 6 months from the primary course)	16.09.2022 (after 3–4 months)
children > 4 yrs.	13.12.2021	24.09.2021 (after 6 months of the primary course)	3.10.2022 (after 6 months)

Source: Vaccination Info Website https://szczepienia.pzh.gov.pl/aktualnosci/ and COVID-10 Vaccination Service, https://www.gov.pl/web/szczepimysie

9.2. Progress of the immunization programme

Figure 9.2 shows the progress of immunization in Poland compared to the European Union as a whole, indicating immunization status by number of doses received. In simple terms, the primary course was described as two doses, although initially a small group of people vaccinated with Janssen received only one dose.

In the first weeks of the vaccination programme, the vaccination status in Poland was comparable or even above the European average.

It should be considered unfavourable for the development of the epidemic in our country that, while on average in the EU the level of vaccination with the primary course stabilised at more than 70%, in Poland it was only 60%. An even greater discrepancy was observed for the first booster dose – 32% vs. 54%. Vaccination rates were slightly better among those aged 60 and more. In this group, there was also a smaller decrease in the percentage vaccinated between the primary course and the first booster dose. On average in the EU, it reached 90% for the primary course and more than 80% for the booster dose by mid-2022. In Poland, these percentages were 76% and 59%, respectively, despite the significant risk of hospitalisation and death in this group (Fig. 9.2B).

The primary course coverage at the end of 2021, when this vaccination was already available to all aged 5 years and over, varied between provinces, from 37.5% in Podlaskie province and 41.6% in Lubelskie province to 53.6% in Opolskie province (Fig. 9.3).

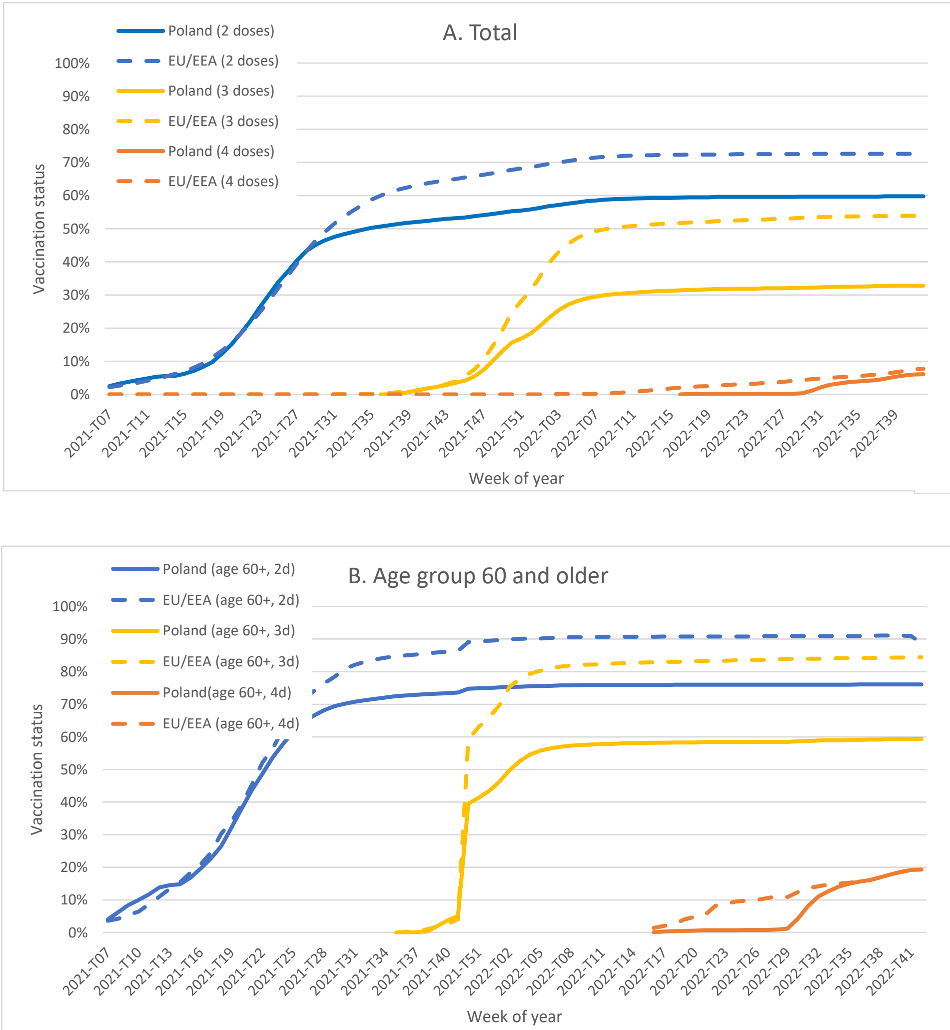


Fig. 9.2. Vaccination status with the primary course (2 doses), first booster (3 doses) and second booster (4 doses) overall (A) and in the age group 60 years and older (B), in Poland and in the European Union (source: ECDC COVID-19 Vaccine Tracker, available at https://www.ecdc.europa.eu/en/publications-data/covid-19-vaccine-tracker, accessed 28.10.2022)

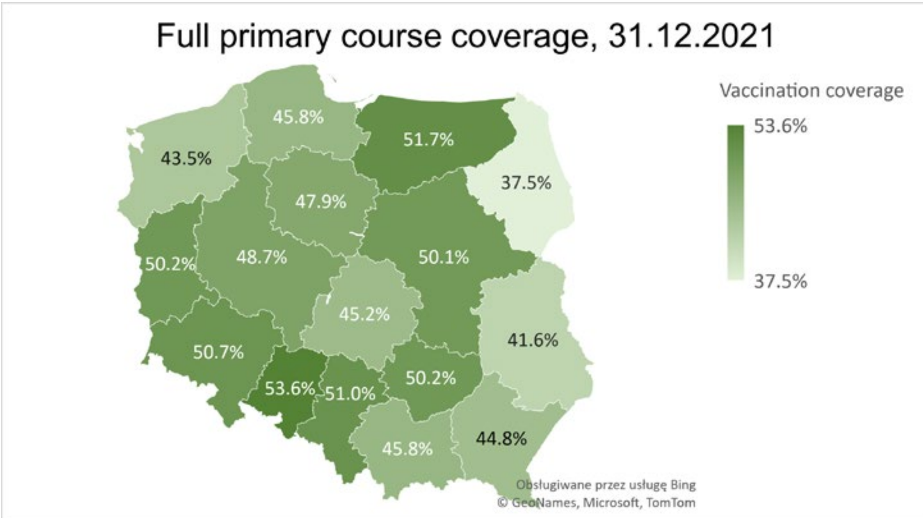


Fig. 9.3. Primary course coverage, by province as of 31.12.2021 (source: COVID-19 vaccination report, data available at https://www.gov.pl/web/szczepimysie/raport-szczepien-przeciwko-covid-19, accessed 29.10.2022)

9.3. Development of the COVID-19 epidemic in Poland based on data on registered cases

Three epidemic seasons (winter-spring 2020 / 2021 and 2021 / 2022) occurred in Europe between the start of the epidemic and mid-2022. In Poland, the so-called "first wave" was completely halted by the introduction of quite strong restrictions with a small number of cases. The number of diagnoses remained below the European average in subsequent seasons (Fig. 9.4).

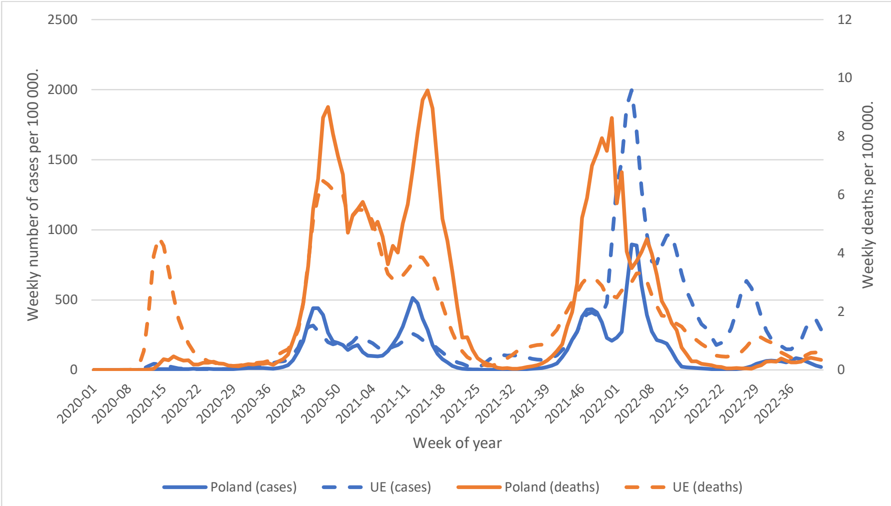


Fig. 9.4. Weekly COVID-19 registered incidence and weekly COVID-19-associated mortality per 100 000 population in Poland and the European Union overall (source: Data provided by ECDC at: https://www.ecdc.europa.eu/en/publications-data/data-national-14-day-notification-rate-covid-19, accessed 22.10.2022)

However, in the case of mortality, except for spring 2020, the rate was significantly above the EU average rate in peak waves. This was particularly pronounced at the end of 2021 and in the first half of 2022. This may indicate, on the one hand, a large under-reporting of cases in Poland and, on the other hand, a more severe course of disease in unvaccinated people. The former hypothesis is supported by a lower testing frequency per 100 000 population in Poland than the EU/EEA median (Fig. 9.5A). At the same time, the proportion of positive results during the epidemic waves was well above the EU/EEA median (Fig. 9.5B).

The annual registered incidence in 2021 in Poland was more than twice as high as in 2020, which could be observed in all provinces (Fig. 9.6). A relatively lower registered incidence was recorded in the south-eastern provinces. However, it should be taken into account that the incidence recorded is a product of the actual incidence, the availability of tests, and the propensity to test. Seroprevalence studies indicate that the actual provincial distribution of infections was different (cf. Fig. 9.12).

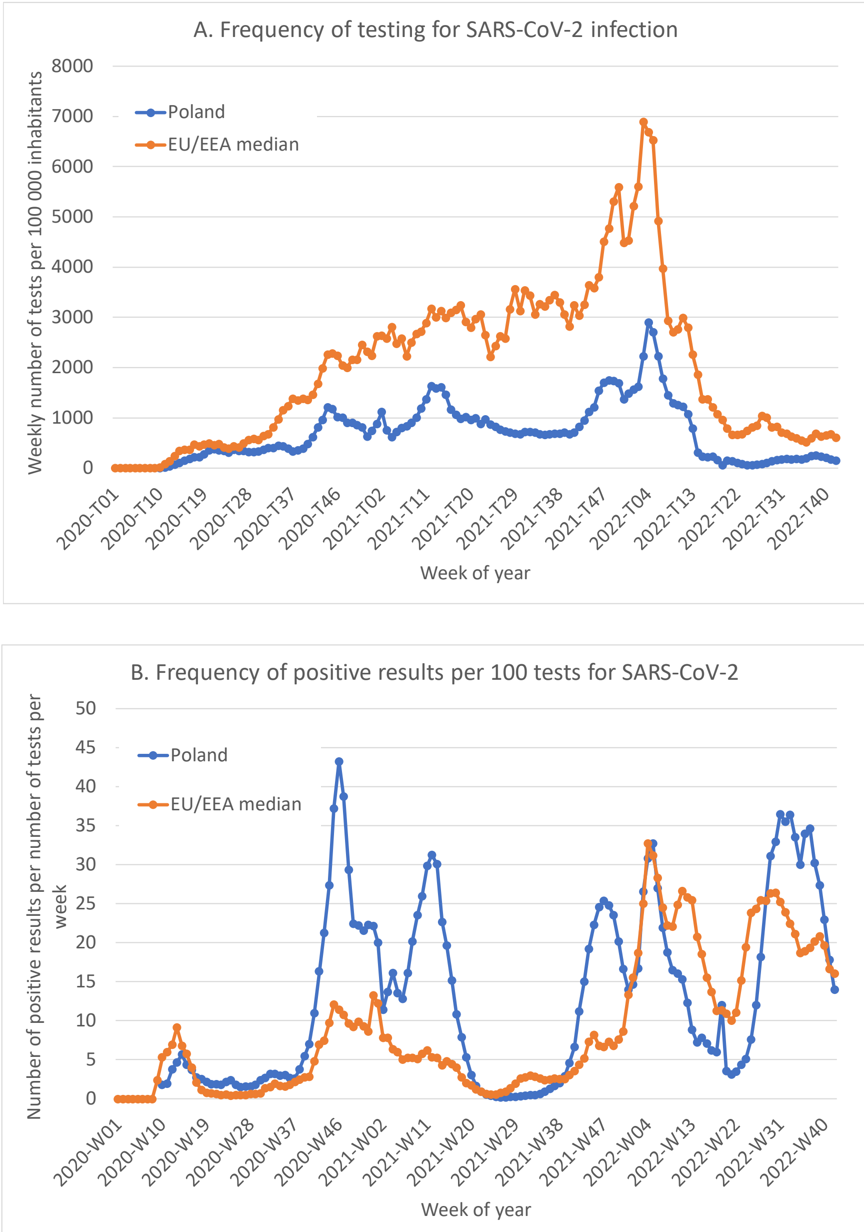
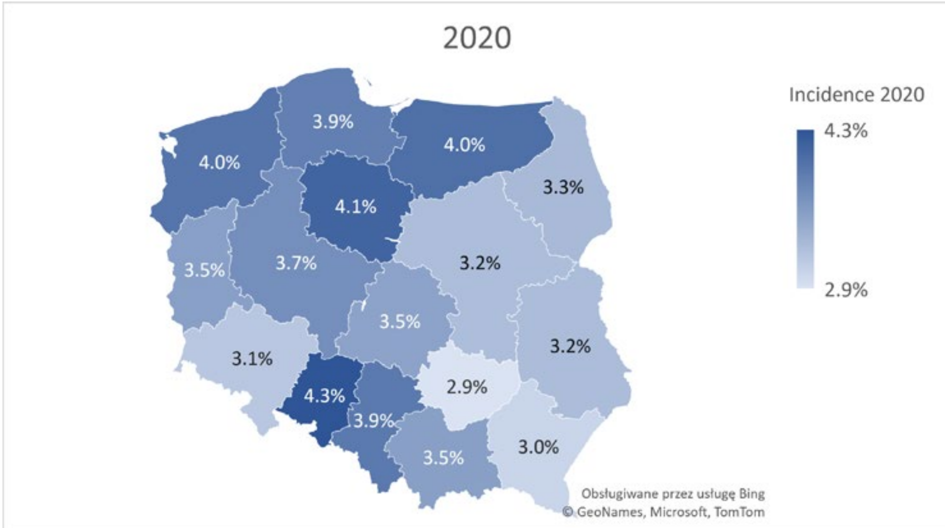


Fig. 9.5. Prevalence of testing per 100 000 population (A) and prevalence of positive results per 100 tests (B) in Poland in relation to the EU median.



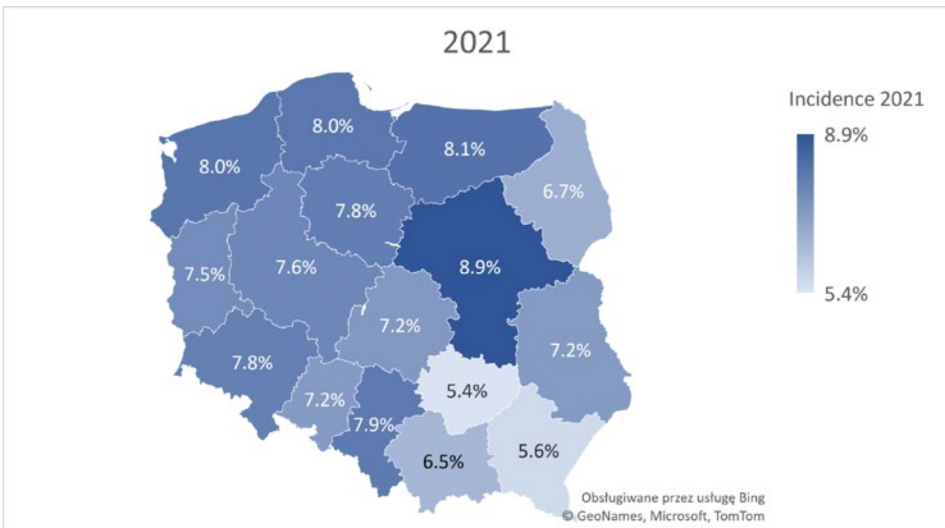
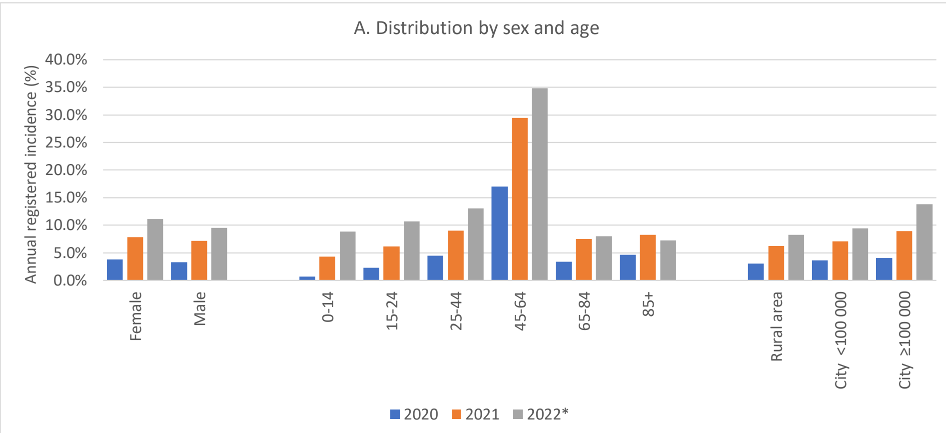
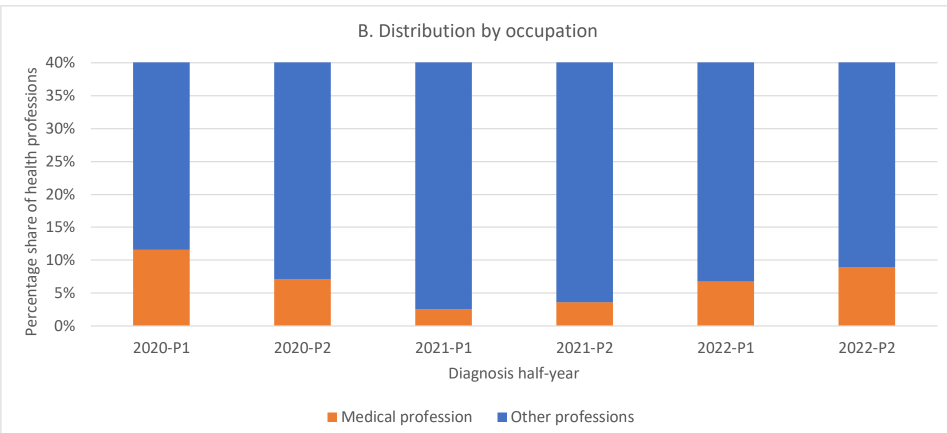


Fig. 9.6. Annual incidence registered for COVID-19 (%), by province in 2020–2021 (source: System for Registration of Epidemiological Diagnoses, National Institute of Public Health NIH – National Research Institute)

The distribution of incidence by demographic factors was comparable over the years (Fig. 9.7A), with the highest incidence recorded in the working-age adult group, particularly those aged 44–65 years. In all groups, incidence was highest in 2022, associated with the spread of the Omicron variant.





*annual incidence in 2022 has been estimated on the basis of the first half of the year

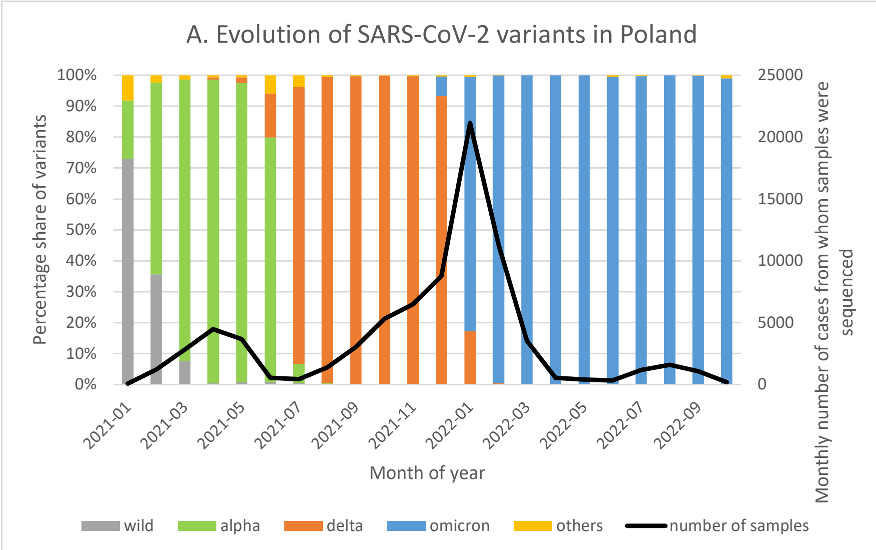
Fig. 9.7. Demographic characteristics of SARS-CoV-2 infections in 2020–2022. (A) Registered incidence by age group, by sex and by place of residence; (B) Percentage of medical workers among the registered diseases (source: System for Registration of Epidemiological Diagnoses, National Institute of Public Health NIH – National Research Institute 2022 figures by the end of September 2022).

Figure 9.7B shows the percentage of cases that occurred in the health care worker group. According to Statistics Poland, there will be approximately 600,000 nurses and midwives, doctors and dentists, as well as pharmacists and laboratory diagnosticians working in Poland in 2020[11], representing approximately 1.5% of the total population. However, in the first half of 2020, cases among health care workers accounted for 11.6% of all cases. This percentage has declined subsequently, especially after the introduction of vaccination, but still indicates that medical staff remain a risk group for infection. In addition, a decline in antibody levels with time since the last vaccination dose and the emergence of new variants of the virus are also factors contributing to a renewed increase in the proportion of this occupational group among infected people.

9.4. Evolution of SARS-CoV-2 virus variants present in Poland

For routine epidemiological surveillance, implementation of the SARS-CoV-2 virus variant monitoring system (molecular surveillance) began in the first quarter of 2021, with full roll-out in October 2021, in collaboration with the State Sanitary Inspectorate. The system is coordinated by the National Institute of Public Health NIH – National Research Institute. Sequencing is performed on an ongoing basis for a random sample of newly diagnosed SARS-CoV-2 virus infections and is assumed to cover at least 2.5% of diagnoses. In molecular surveillance, the replacement of individual virus variants can be traced, i.e. the wild-type variant was replaced by the Alpha variant in mid-2021, followed by the Delta variant in late 2021 and the Omicron variant, which has been dominant since early 2022 (Fig. 9.8). Further, subvariants BA.1, BA.2 and BA.5 were sequentially dominant for the Omicron variants.

[11] Agata Czekalska, Natalia Koehne, Michał Koziński, Krzysztof Nyczaj, Izabela Wilkińska, Małgorzata Żyra,Marzena Żytecka-Karolak, Maria Penpeska, Sylwia Duda, Andrzej Marcinkiewicz. Zdrowie i ochrona zdrowia w 2020 r. Statistics Poland / Statistical Office in Kraków Warsaw, Kraków 2021. ISSN 2084–0470



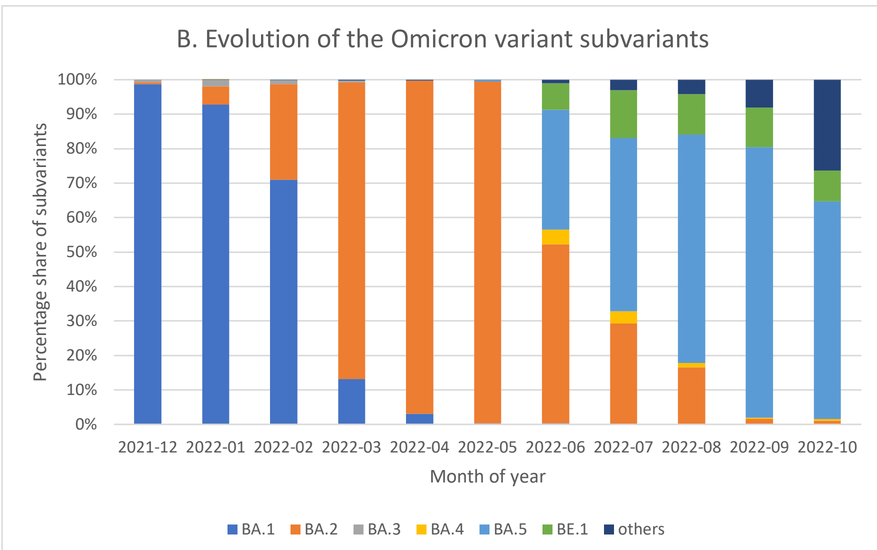


Fig. 9.8. Percentage of individual variants by month of diagnosis (A), with a focus on Omicron sub-variants (B) (source: System for Registration of Epidemiological Diagnoses, National Institute of Public Health NIH – National Research Institute).

9.5. Outbreak monitoring results of the Nationwide Seroepidemiological Study COVID-19 (OBSER-CO)

Available data also include the results of the OBSER-CO seroepidemiological study (Nationwide Seroepidemiological Study COVID-19) funded by the Medical Research Agency. OBSER-CO includes a survey and testing for the presence of antibodies to individual SARS-CoV-2 virus antigens. 4 rounds of the study took place (1st round: 29 March to 14 May 2021, 2nd round: 27 July to 10 September 2021, 3rd round: 16 November to 19 December 2021, fourth round: 14 March to 26 April 2022). These studies provide an understanding of the build-up of immunity in the population as a result of natural infection or vaccination.

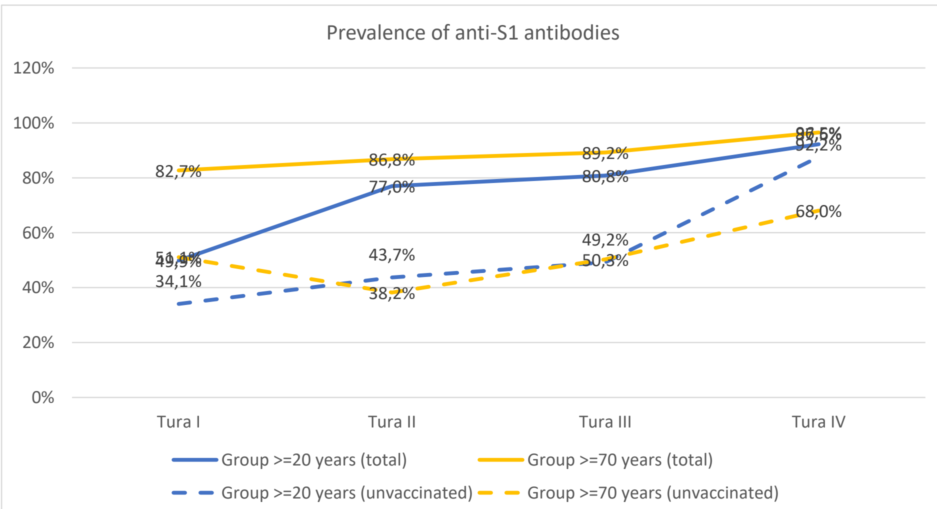


Fig. 9.9. Prevalence of anti-S1 antibodies in four rounds of the OBSER-CO study, in adults aged 20 years and over and in those aged 70 years and over

Figure 9.9 shows the prevalence of anti-S1 antibodies, which roughly corresponds to partial immunity against SARS-CoV-2, as a result of vaccination or natural infection. In the group of people aged 70 and over, the prevalence was already above 80% from the first round. In the fourth round, which was carried out at the end of the wave of cases caused by the Omicron variant, the prevalence of anti-S1 antibodies exceeded 90%. A much lower prevalence was observed in the unvaccinated group. Only after the wave induced by the Omicron variant did it reach levels above 90% in the total adult group. In the group of people over 70 years of age who have not been vaccinated, antibodies are not found in about 22%.

Given that anti-S1 antibodies can be formed as a result of both vaccination and natural infection, the OBSER-CO study also screened for anti-N antibodies formed during SARS-CoV-2 virus infection. The prevalence of markers of past infection was significantly higher in the unvaccinated group, both in adults aged 20 years and over and in those aged 70 years and over (Fig. 9.10).

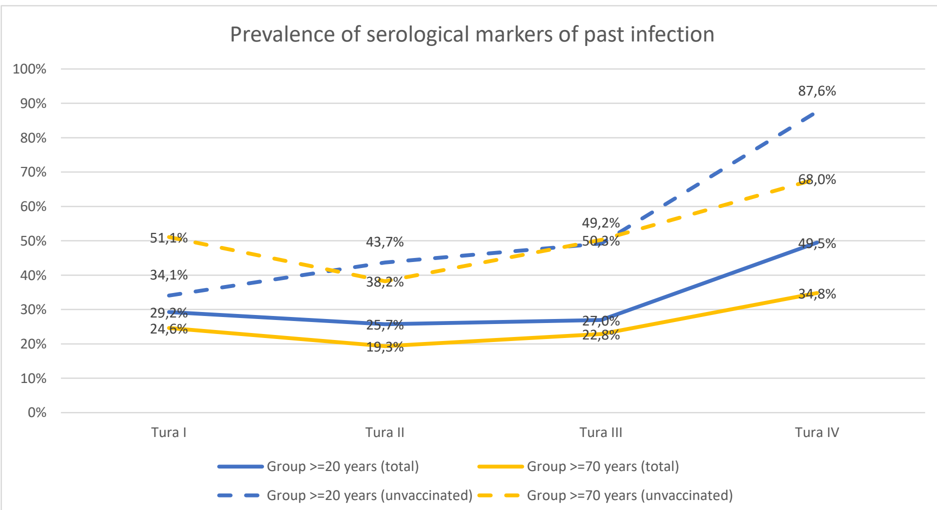


Fig. 9.10. Prevalence of serological markers of past infection in the four rounds of the OBSER-CO study, in adults aged 20 years and over and in those aged 70 years and over

In the fourth round, carried out in March-April 2022, the prevalence of serological markers of past infection ranged in the provinces from 42.7% in the Zachodniopomorskie province to 62.3% in the Podlaskie province.

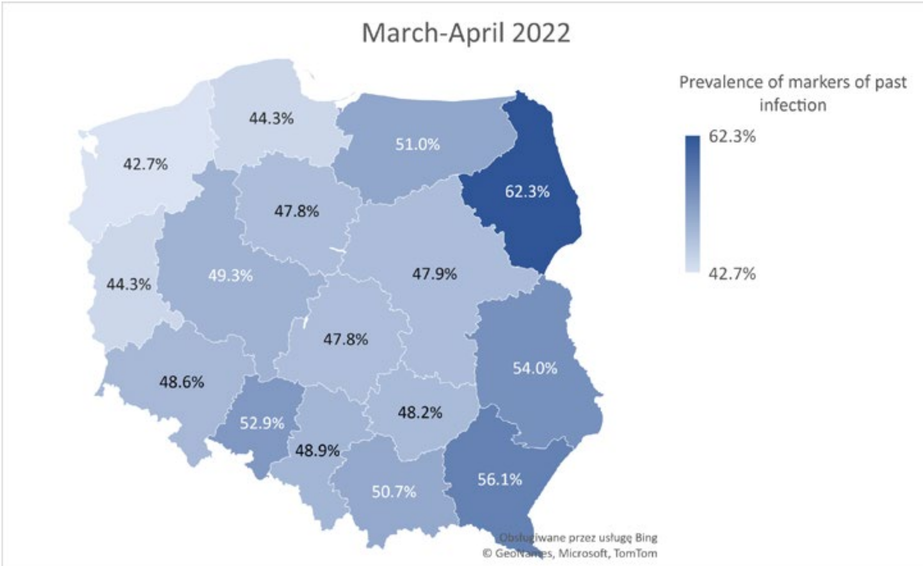


Fig. 9.11. Prevalence of serological markers of past infections by province

SUMMARY AND CONCLUSIONS

1. Available data confirm the high incidence of COVID-19 in Poland. Following the Omicron variant wave, more than 90 percent of people had been in contact with the SARS-CoV-2 virus or had been vaccinated. Although vaccination does not completely protect against infection, serological markers of past infection in Round IV of the OBSER-CO survey were significantly more common in unvaccinated individuals (87.6% vs 49.5%).
2. The high incidence in Poland confirmed by seroprevalence studies corresponds to a high mortality rate, which in Poland significantly exceeded the median in the EU/EEA countries. For example, at the peak of the alpha variant wave in early 2021, mortality was 2.4 times higher than the EU/EEA median, and at the peak of the delta virus wave, mortality was 3.4 times higher.
3. The level of testing in Poland per population remained much lower than the median in the EU/EEA countries. In addition, the significantly higher percentage

of positive results indicates that the level of testing was due more to accepted principles and availability than to fewer cases, which is also confirmed by the high mortality rate. Therefore, comparisons between countries based on registered incidence alone should be treated with caution.

4. Due to the heterogeneity of the testing system, data on registered cases do not provide reliable information on the geographical variation of the epidemiological situation. Ongoing monitoring of the situation requires systematic sentinel tests, seroprevalence studies and environmental surveillance, such as sewage testing.

10. ACCIDENTS AND THEIR HEALTH CONSEQUENCES – POTENTIAL IMPACT OF LIFESTYLE CHANGES DURING A PANDEMIC IN POLAND

Rafał Halik, Wojciech Seroka

10.1. Introduction

Accidents are a group of health problems of a sudden and unintentional nature that cause damage to human health as a result of external physical forces or chemical substances acting on a person. According to the existing WHO ICD-10 Classification of Diseases and Health Problems, accidents fall into the category of diagnoses V01-X59 and the most important categories of accidents according to this classification are: traffic accidents (V01-X59), falls (W00-W19), poisoning (X40-X49) and drowning (W65-W74). It should be emphasised that, according to the ICD-10 classification, accidents do not include other external causes of death or morbidity related to intentional acts, e.g.: suicide and suicide attempt, violence, criminal acts and complications of medical procedures. Accidents are also a serious public health problem due to the high economic and social costs they generate. They also contribute to premature mortality in the population. According to the latest estimates of the 2019 pre-pandemic GBD study, accidents caused 8.6% of all life years lost due to disability and mortality (DALY) in Poland. It is important to note that according to EUROSTAT, accidental deaths are classified as *preventable mortality* and therefore there is considerable potential for public health measures to reduce accidental deaths.

10.2. Accidents as a public health threat in Poland on the threshold of the COVID-19 pandemic

According to the periodical European Health Interview Survey (EHIS) in Poland, it can be seen that since 2009, when the survey was launched, there has been a slight decrease in the percentage of men declaring that they had been injured in an accident in the past 12 months, and a slight increase in women declaring that they had suffered an accident. Overall, more than one per 20 men and more than one per 25 women have an accident each year that results in a more or less serious injury (Fig. 10.1). It is important to bear in mind that surveys based on declarations have a lower diagnostic precision. For example, in a survey carried out by the National Institute of Public Health – National Hygiene Institute for the National Health Program (NHP) on a representative random sample of the Polish population in 2018, respondents were many times more likely to declare that they had suffered injuries in accidents than in the EHIS survey, which may indicate an underestimation of the actual accident rate in Poland. During pandemic in 2020, another edition of survey was carried out, in which the percentages of people reporting an accident requiring medical intervention were already significantly lower– 6.2% among men and 5.1% among women. Such result could reflect the much lower incidence of accidents in the first year of the pandemic which was most marked by changes in the population's lifestyle. The place where accidents most often occur according to the 2020 National Health Program survey was the home setting, where 39% of the accidents reported in the survey occurred. The second most common places for injuries were vehicles, roads and streets- 34.4 %. These results were similar to those from 2018 however it was observed that in the first year of the pandemic among seniors over 60 years of age, the home and its surroundings were clearly a more frequent place of accidents. In 2018, half of accidents in the oldest age groups occurred in the home setting, while during pandemic in 2020 the proportion of accidents at the home was 66%.

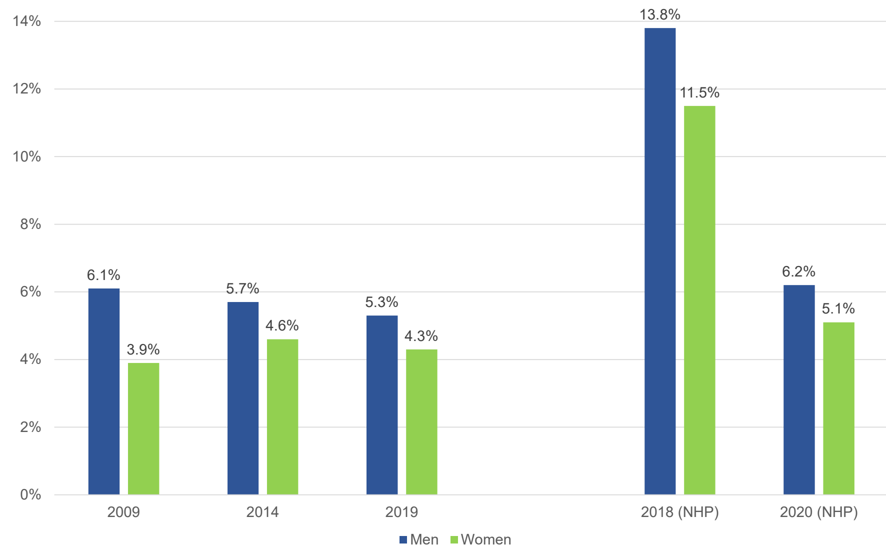


Fig. 10.1. Percentage of people declaring accident in recent year in Poland according to European Health Interview Survey and survey carried out by the National Institute of Public Health, National Hygiene Institute under National Health Program (NHP) (Statistics Poland, National Institute of Public

Since the 1990s, Poland has been a country in Europe with a fairly high risk of death from accidents however situation has been improving steadily over recent years. The decrease of mortality has particularly accelerated between years 2011 and 2015 (Fig. 10.2). In Poland from 2011 to 2017, the excess of mortality due accidents compared to the EU average decreased from 31% to 8%. It is worth mentioning that the fall in accident mortality in Poland has been particularly dynamic among men, who are also a group of high risk of having accidents and higher risk of death as a result of accidents. The level of female mortality in Poland due to the accidents has been similar to the EU average since 2011 and has also had a decreasing trend. From2017, risk of death by females in Poland due to accidents was nearly 14% lower than the average in EU countries. Despite these positive changes in mortality, it was observed unfavourable slow down of the downward trend in mortality due to all causes of accidents both in Poland and the EU after 2015. So far, it is difficult to find in the scientific literature evidence explaining what has caused tendency of slower dynamic of downward trend of mortality.

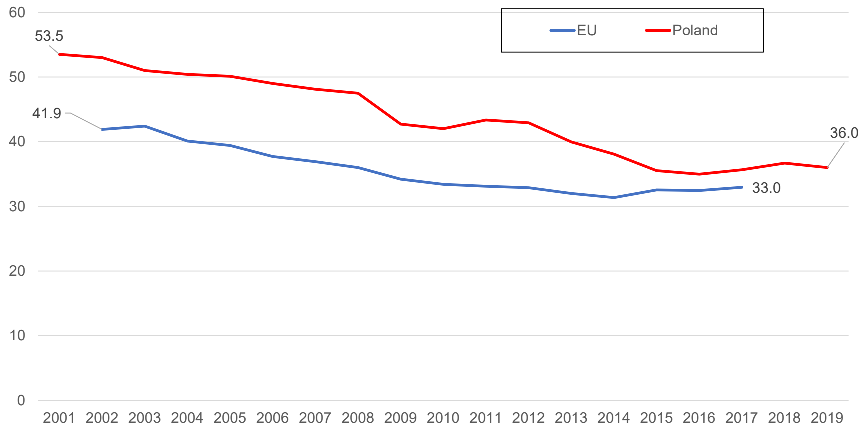


Fig. 10.2. Age-standardized mortality rate per 100 000 population due to accidents (V01-X59, Y85, Y86) in Poland and EU (*EUROSTAT*)

In Poland the category of accidents where is observed particularly higher risk of death comparing to EU before the COVID-19 pandemic was traffic accidents, in which the risk of death of Polish inhabitants was 60% higher than average in EU, the risk of death from drowning was also 50% higher than the EU average. It is worth mentioning that in Poland the phenomenon of a persistent excess mortality within mentioned above categories of accident has been observed for many decades.

10.3. Potential impact of lifestyle changes during the 2020 and 2021 pandemic on total in-hospital mortality and morbidity

The restrictions introduced during the 2020 and 2021 pandemics have led to changes in the lifestyles of the Polish population, which have also influenced the risks of the various accident categories. Changes in the lifestyles of Poles could be observed in the surveys carried out by the National Institute of Public Health – National Hygiene Institute within the framework of the National Health Program which have been conducted in 2018 and 2020, Surveys showed a decrease in the declared frequency of accidents among the population between 2018 and 2020. Researches also revealed other phenomena that could potentially have had an impact on the risks of different categories of accidents. One of them is an increase in the proportion of men declaring problem with alcohol use. -21.4% of men surveyed in 2020 declared such behaviours vs. 19.3% in 2018. Among women, on the other hand, the proportion reporting problematic alcohol use decreased from 8.9% to 6.1%, according to the surveys. Problematic alcohol use contributes to an increased risk of various types of accidents, and men are a particular risk group when it comes to accidents. According to the results of the aforementioned surveys, 34.3% of the population of Poland in 2020 decreased their physical activity, not only in terms of recreational activity, but also in terms of daily activities, i. e. work, activity at home, moving around. However, the impact of these changes on accident rates is more complex. Reducing mobility has the potential to reduce traffic congestion which may lead to decreased number of traffic accidents. Potentially, by reducing physical activity, the population's exposure to injuries from recreational activity could be also reduced. The introduction of remote working to a greater extent has made it possible to reduce the exposure to work-related hazards among workers in various branches of economy. On the other hand, reduced mobility has led to an increased exposure to accident risks in the home environment among which falls are the most important group. In this context, a particular risk group is the elderly people, who are at the highest risk of falls in home setting. It should be admit that survey from 2020 revealed an increase in the reporting home as an accident place among people 60+. Falls in the oldest demographic groups are particularly dangerous and are often complicated by injuries that are difficult to treat and have poor prognosis. Observational epidemiological studies indicate that older people, by limiting physical activity, have a higher risk of falls resulting serious injury[1]. It can also be seen in the scientific observations that the course of COVID-19 itself also increases the risk of falls by causing problems with attention, balance, and functions

1 Sherrington C, Fairhall N, Kwok W, Wallbank G, Tiedemann A, Michaleff ZA, Ng CACM, Bauman A. Evidence on physical activity and falls prevention for people aged 65+ years: systematic review to inform the WHO guidelines on physical activity and sedentary behaviour. Int J Behav Nutr Phys Act. 2020 Nov 26;17(1):144

of nervous sensory system. In indicating this circumstance, it is worth adding that the changes observed concerned the year 2020, when the strongest restrictions were introduced, resulting in a reduction in contacts and mobility of the Polish population. It is uknown impact of pandemic restrictions in 2021, when vaccination was implemented, and many restrictions were abandoned.

The useful, important tool to assess frequency accidents in the population is the Nationwide General Hospital Morbidity Survey. Comparing to the period before pandemic in years 2020 and 2021, can be observed clear change of in hospital morbidity and mortality due to accidents. To identify accidents resulting hospital treatment the ICD-10 classification requires two codes to be given in the diagnosis – the first describing the health effects, i. e. wounds, fractures, poisoning, and the second describing the external cause. In the case of the Nationwide General Hospital Morbidity Survey, a large proportion of reporting units in recent years have neglected to specify the code describing the external cause of accident and therefore the number of hospitalisations may also be underestimated. Data obtained from the three provinces with the best reporting quality (Opolskie, Podkarpackie and Śląskie voivodships) show that there was a serious reduction in the incidence of hospital treatment for accidents in 2020 compared to the average rate for the five years preceding the epidemic. For many years, the demographic groups most frequently hospitalised due to accidents have been the young people under 25 and the older population over 65. Overall, the hospitalisation rate in 2020 decreased by nearly 24% compared to the 5-year average before the pandemic. In 2020 the most evident decrease in the rate of hospital discharges per year due accident– was observed for people aged 65 and over – a decrease of nearly 30%. The lowest decrease was characteristic for young population under 25 years old in the same year – a decrease of 17%. It is worth noting that in 2021 hospital morbidity rates increased, but to a level slightly lower than before the pandemic (Fig. 10.3).

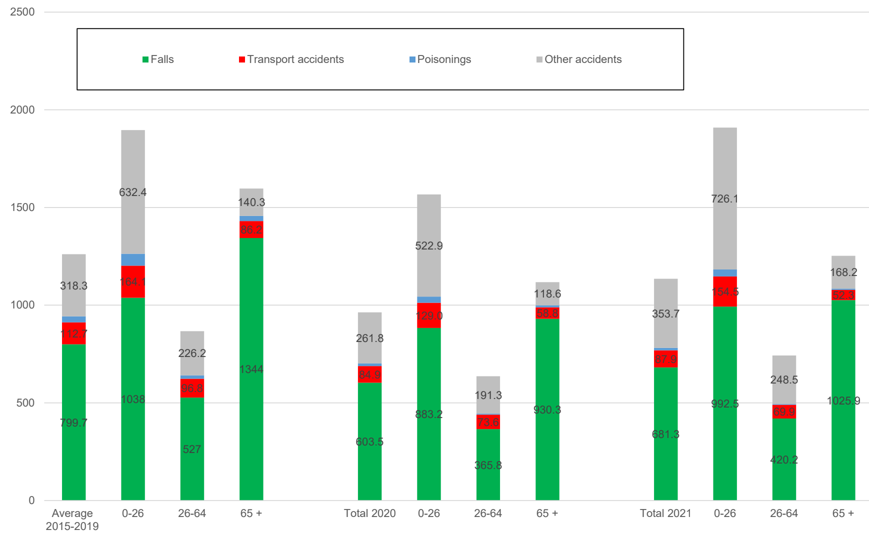


Fig. 10.3. Hospital morbidity rates due to accidents (V01-X59) per 100 000 population in Opolskie, Podkarpackie and Śląskie voivodships, 2018 *(Nationwide General Hospital Morbidity Study National Institute of Public Health – National Hygiene Institute*)

The observed changes in hospital morbidity in the three reference voivodships with the best data quality are difficult to interpret. The decrease in hospitalisation rates in 2020 may have been due both to the decrease in accident rates observed in the National Institute of Public Health – National Hygiene Institute study in 2020 and can be may have been caused by reduced hospital admissions of various categories of accidents because of restrictions on hospital admissions introduced during years 2020 and 2021. It is worth mentioning, that hospital fatality rate due to accidents in 2020 was slightly higher in the reference voivodships than the average recorded before the pandemic-1.4% in 2020 vs. 1.3% average before pandemic. In 2021 fatality rate was back to pre-pandemic average levels. This may indicate that the severity of injuries in accidents and the effectiveness of their treatment in hospitals was quite similar to that in the years preceding the pandemic. It should be admit that also the structure of hospital admissions did not change substantially compared to the years preceding the pandemic, and injuries caused by falls continued to dominate hospital morbidity, accounting for more than 60% of all registered hospital admissions.

More worrying trends were observed for accident mortality during the pandemic. While the mortality rate in 2020 was at the 5-year average before the epidemic, there was observed an increase in the incidence of accidental mortality in 2021. Increase was mainly affecting g people over 65 years old. The mortality level of people in the middle age group, aged 26–64, did not change much, while the mortality of the youngest people, aged 0–25, decreased (Fig. 10.4).

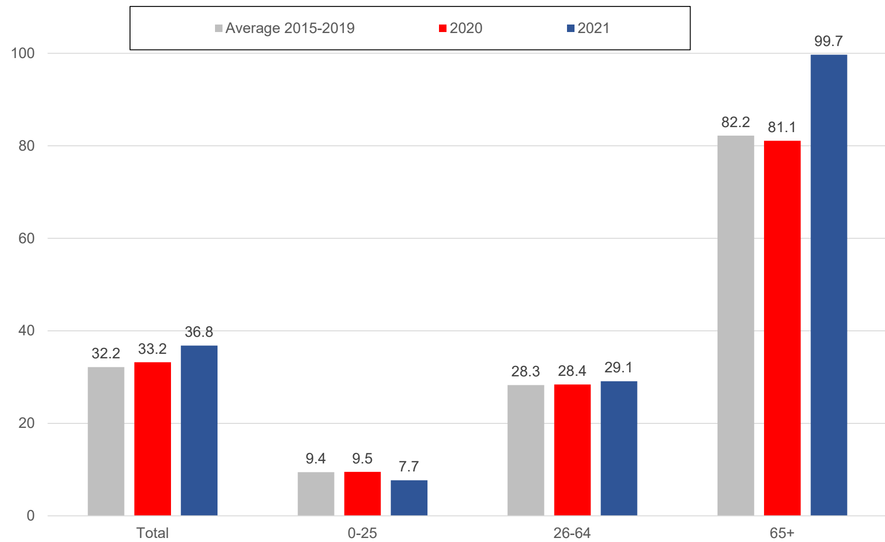


Fig. 10.4 Mortality rates due to accidents (V01-X59) per 100 000 population before pandemic and in the years 2020 and 2021 (Statistics Poland)

10.4. Changes in the frequency and determinants of road accidents in 2020 and 2021

As it was mentioned before during the epidemic, have been observed significant lifestyle modifications that have limited transport and communication activities which have been leading to reduced number of road accidents and people injured in them.

In the EU, there has been registered a large decrease in the number of road accidents fatalities in 2020. The number of fatalities fell by 17% compared to 2019. In 2021, there was observed rebound across the EU and 5% increase of road traffic casualties. Poland was a positive exception, where decreases in accident rates were observed in both 2020 and 2021. Introduced COVID-19 pandemic restrictions appear to have improved road safety, but this is a superficial belief, as numerous observational studies carried out around the world during the pandemic indicated that the reduction in traffic casualties was mainly due to a reduction in traffic congestion, while the behaviour of road users deteriorated – speeding and failure to comply with traffic rules were more common. These circumstances meant that, in many countries, with fewer accidents, their severity tended to be higher than the average before the epidemic[2].

Poland, despite gradual improvements, is still recognised as having some of the worse road safety conditions in the EU[3]. Between 2010 and 2021, Poland managed to reduce the number of fatalities by 42.5% (reduction in the number of fatalities from 3907 to 2245). The rate of decline in the EU as a whole was only slightly lower than in Poland – 33.1%. Taking into account unfavourable situation of Poland in the area of road safety which has persisted for many years, this circumstance should be regarded as a not fully satisfactory, indicating a slow reduction in the relative excess of mortality due to the road traffic accidents. However, it was observed positive phenomena o considering decrease of pedestrian fatalities of traffic accidents. The number of fatally injured pedestrians has declined by more than 57% since 2010.

The mortality rate due to road traffic accidents per 100 000 population fell during the two years of the pandemic from 7.7 in 2019 to 5.9 in 2021, while for whole EU the rate fell from 5.1 to 4.4. A positive tendency during the period of particular intensity of the COVID-19 pandemic was the improvement of pedestrian safety (Table 10.1) and the marked reduction in fatalities among these road users compared to other road users. Poland has been struggling for years with a particularly high proportion of pedestrian casualties. In 2021, 1.4 pedestrians per 100 000 population died in Poland, while on average in EU countries the rate of pedestrian causalities was 0.9 s per 100 000 population.

[2] Shaik ME, Ahmed S. An overview of the impact of COVID-19 on road traffic safety and travel behavior. Transportation Engineering. 2022 May 21:100119.

[3] https://transport.ec.europa.eu/2021-road-safety-statistics-what-behind-figures_en

Both before and during the pandemic, a similar demographic structure of road casualties was observed. The highest proportion of fatalities in 2020 and 2021 were people over 60 years– 30%. Among the injured, the age group 25–39 years has the highest proportion – 28 %. During the pandemic, there were registered some of e changes in the characteristics and causes of the road traffic accidents themselves in Poland.

Table 10.1. Fatalities of road traffic accidents according to mode of transport in Poland in years 2010, 2020, 2021 (Polish Road Safety Observatory)

Participants in road traffic	2010		2020		2021		Change 2021/2010
	number	% total	number	% total	number	% total	
Pedestrians	1236	31.6%	631	25.3%	527	23.5%	-57.4%
Cars	1853	47.4%	1162	46.6%	1094	48.7%	-41%
Bicycles	280	7.2%	249	10%	185	8.2%	-33.9%
Motorbikes	259	6 .6%	244	9.8%	215	9.6%	-17.0%
Mopeds	83	2.1%	71	2.9%	54	2.4%	-34.9%
Heavy goods vehicles	142	3.6%	104	4.2%	128	5.7%	-9.9%
Buses	14	0.4%	9	0.4%	11	0.5%	-21.4%
Total	3907		2491		2245		-42.5%

Contrary to popular belief that traffic volumes were particularly reduced during the pandemic, it should be pointed out that the trend of further increases in traffic volumes continued during these years. The General Directorate for National Roads and Motorways (carried out cyclical General Traffic Measurements in 2020 and 2021. According to the outcomes from these measurements, traffic volumes increased overall by 21% in 2020/2021 compared to the 2015 [4]. Many reports summarising the road safety situation worked out by Polic the Motor Transport Institute and the Road Safety Council mention the possible impact of temporary mobility restrictions on reducing the number of road accident casualties, while they do not indicate precisely which precisely mechanisms may have contributed to this. COVID-19 restrictions resulting in mobility limitations

[4] Tutka P, Kunikowski P, Szyszło A. Synthesis of the results of General Traffic Measurement 2020/21 on the overseas national road network, prepared by Heller Consult sp. z o.o. commissioned by the General Directorate for National Roads and Motorways, Warsaw, October 2021

had the greatest impact on accident reduction in April 2020 (52% reduction), and during the autumn 2020 -a 35% reduction in the number of accidents. Road safety experts have observed that the number of accidents due to the restrictions did not always lead to a decrease in the number of casualties, which confirms that accidents during the pandemic caused more severe injuries. Another phenomenon that road safety experts noticed in 2020 was the increase of bicycle traffic and a slight increase in the number of fatalities among cyclists compared to 2019 (an increase from 249 to 258). The increase of accidents severity during months marked by the introduction of restrictions is cause of concern. worrying. Phenomenon of high traffic accidents severity in Poland has remained unchanged for many years. The indicator most synthetically highlighting the severity of accidents, i. e. the number of fatalities per 100 road accidents, has not fallen below 9 for almost a decade in Poland, while in EU countries it has remained slightly above 2. In 2020 fatality rate increased to 10.6, while in the next pandemic year 2021 there was a slight decrease in the severity rate (Fig. 10.5)

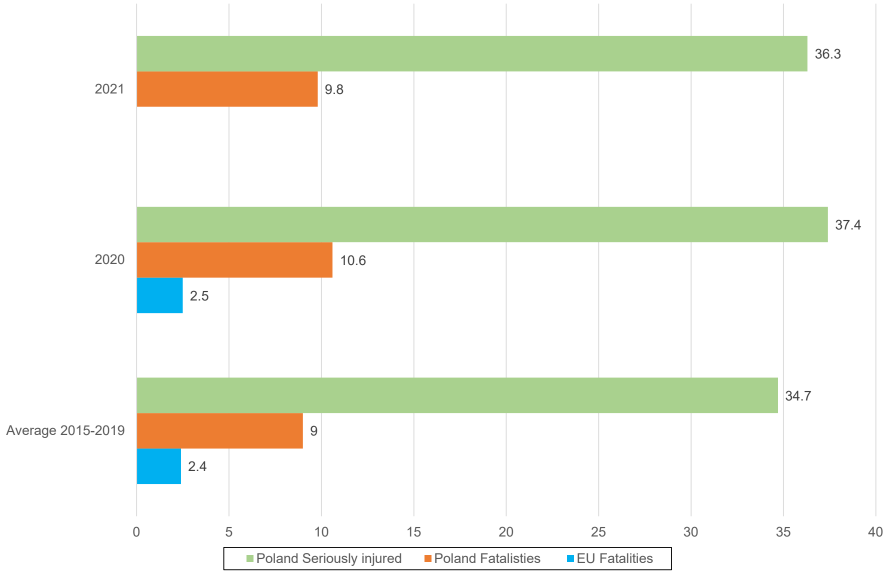
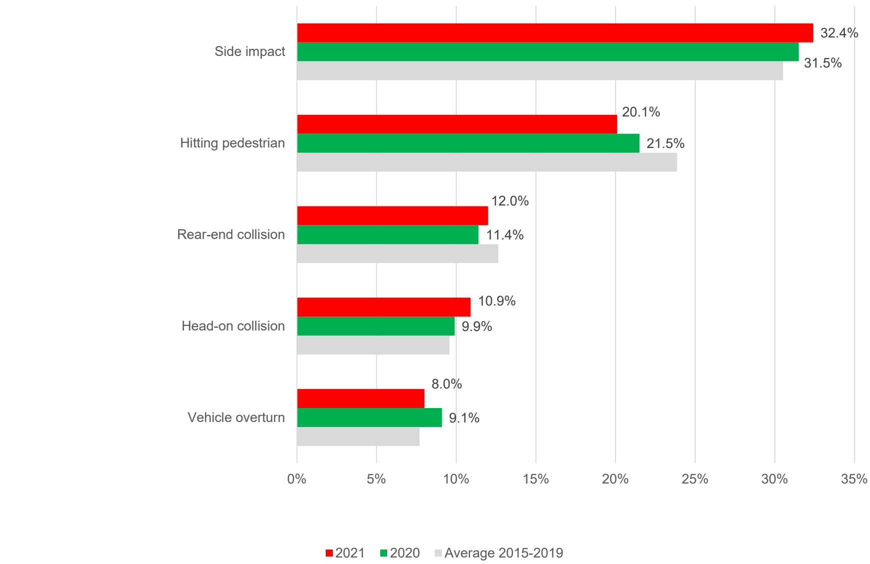


Fig. 10.5. The number of killed and severely injured per 100 road traffic accidents in Poland and in the EU (CARE database and Police Headquarters)

To some extent the severity of road accidents may be explained by Police data on the causes and types of accidents registered before and during the pandemic. Still, the most common type of accident both during and before the pandemic was a side impact, while slightly fewer pedestrian collisions were registered, which also explains the decrease of accidents with pedestrian casualties. On the other hand, in the years of intensification of the pandemic, it was observed an increase in the share of accidents caused by failure to adjust speed to traffic conditions. In the context of the public health the worrying phenomenon was the increase in the proportion of accidents involving unsober road users; this could indicate that an increase in the declaration of problematic alcohol use by men in 2020 may have influenced this circumstance (Fig. 10.6a and b)



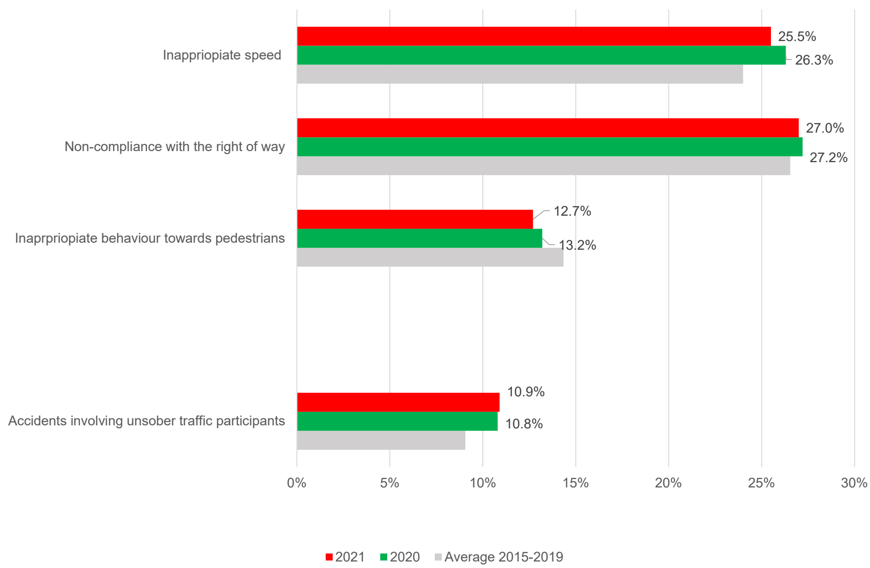


Fig. 10.6. a and b Types and causes and percentage of road traffic accidents with unsober road users before pandemic and in years 2020 and 2021 (Police Headquarters)

Summarising the road safety situation during the peak pandemic years, it should be emphasized that, in Poland as in most EU countries, there was a significant reduction in the number of road accidents and their casualties in 2020. Despite the rebound observed in most EU countries, the downward trend continued in Poland in 2021. The safety of pedestrians has particularly improved. On the one hand, there were declines in traffic volumes in months characterised by stronger COVID-19 restrictions and consequently a reduction in accident rates in these periods, however increasing traffic volumes trends continued in Poland in 2020 and 2021. Summarising the structure of the causes and types of road accidents, there have been slight modifications in behaviours of traffic participants in 2020 and 2021 relative to previous years. A reduction in the number of incidents of pedestrians casualties can be judged as a positive development, while a slight increased share of accidents caused by a failure to adapt speed to road conditions and an increase in the proportion of accidents involving intoxicated road users was a cause for concern. Another negative phenomenon that has been observed in Poland, but has also been observed in other countries, is the increase in the severity of accidents during the COVID-19 pandemic.

10.5. Potential impact of the pandemic on the incidence of falls

Falls are an growing serious public health problem in Poland due to the ageing population. In absolute numbers, nearly 4,700 people died in Poland in 2019 as a result of injuries sustained during a fall, which is more than in road accidents. The risk of falls resulting in serious life-threatening injuries or requiring hospitalisation, which are fractures, head injuries or embolism, increases greatly with age. The group of highest risk for this type of accident is people over 65. This does not mean that falls are only a health risk affecting older people. The hospital morbidity due to falls is also very high in young people but falls of younger people have different epidemiological characteristics (Fig. 10.3). For this demographic group, fall injuries tend to have a lighter course, fractures are simpler to treat and recovery is shorter. Falls in younger population are more likely to occur as part of physical activity[5]. The risk of falls also increases in young people under the influence of psychoactive substances – alcohol, drugs, legal highs. Among older people, on the other hand, the risk factors are somewhat more different and complex: falls are mainly associated with diseases of the musculoskeletal system, progressive reduction of muscle mass and osteoporosis, problems with the sensory organs, resulting in balance problems. The risk of falling is also increased by the course of certain chronic diseases, as a result of multimorbidity and malnutrition. In older people, falls most often occur in the home setting. Contrary to popular belief that physical activity makes people more vulnerable to falls, the evidence is different: physical activity improves skeletal function and the sense of balance, reducing the risk of falls in older people[6]. Before the pandemic in years 2018–2019 was carried out PolSenior2 study on the health situation of the older people in Poland. This study also estimated the prevalence of falls. According to the results 16% of people aged 60 and older experience at least one fall in a 12-month period. The most common circumstances associated with falls were walking -66.7% of all falls, 27.6% of falls were associated with sitting down or standing up, only 2.7% of falls were preceded by physical activity of seniors[7]. The reductions in people's mobility observed during the pandemic therefore had the potential to increase the risk of falls among older people by reducing their physical activity, who were staying longer in dwellings, which are the most common place for falls to occur[8, 9]. It is worth recalling here that in the National Institute of Public Health-National Hygiene Institute study

5 Cho H, Heijnen MJH, Craig BA, Rietdyk S. Falls in young adults: The effect of sex, physical activity, and prescription medications. Barbieri FA, editor. PLOS ONE. 2021 Apr 22;16(4):e0250360

6 WHO global report on falls prevention in older age. Geneva: World Health Organization; 2008.

7 Skalska A, Hajduk A, Mossakowska M, Wizner B, Wierzba K, Grodzicki T In: Study of individual areas of medical condition of older people, including health-related quality of life Błędowski P, Grodzicki T, MM, Zdrojewski T, Medical University of Gdańsk, Gdańsk 2021.

8 Hoffman GJ, Malani PN, Solway E, Kirch M, Singer DC, Kullgren JT. Changes in activity levels, physical functioning, and fall risk during the COVID-19 pandemic. J Am Geriatr Soc. 2022;70(1):49–59

9 Sherrington C, Fairhall N, Kwok W, Wallbank G, Tiedemann A, Michaleff ZA, Ng CACM, Bauman A. Evidence on physical activity and falls prevention for people aged 65+ years: systematic review to inform the WHO guidelines on physical activity and sedentary behaviour. Int J Behav Nutr Phys Act. 2020 Nov 26;17(1):144

showed in 2020 that higher proportion of accidents at home was observed in people aged 60 and over than in 2018. Limitations in physical activity was observed among younger, which may have reduced the risk of falls. On the other hand, in the aforementioned National Institute of Public Health – National Hygiene Institute study of 2020, revealed that particularly among young men who are more likely to undertake physical activity, was observed an increased share of people declaring problematic alcohol use in Poland, there have been not conducted yest studies about the prevalence and characteristics and risk factors of falls in younger age groups, so it is difficult to assess how the increased prevalence of problem drinking may have affected the incidence of falls.

During the years of the particular severity of the pandemic, was observed a decrease in the of hospital admissions due to falls in all age groups. Overall, the 3 reference voivodships with the highest precision of hospital morbidity data regarding accidents, registered a 24.5% decrease in the hospitalisation rate due to falls in 2020 compared to the pre-pandemic 5-year average In 2021 still hospital discharges were lower by 15% than the 5-year average before pandemic. The highest decreases in morbidity rate were observed in the 65+ demographic group among whom the decreases in the listed rates were close to 31% in 2020 and close to 24% in 2021. At the same time, it is difficult to assess whether such a change was due to reductions in hospital admissions or the circumstances of an general frequency reduction of falls in all age groups. It should be mentioned here that in the area of the voivodships included in the analysis, there was an increase in hospital fatality rate due to falls from 1.5% on average in years before the pandemic to 1.9% in 2020. In 2021, the fatality ate decreased slightly to 1.8%. The most noticeable increases were among older people over 65 years old – an increase from 4.3% before the pandemic to 5.3% in 2020 however fatality slightly decreased to 5% in 2021.

In parallel with the decrease in the frequency of hospital treatment, mortality rates due to falls decreased markedly in 2020 and 2021. Prior to the pandemic, nearly three quarters of all deaths due to falls involved older people over 65 years of age. The situation did not change fundamentally during the pandemic. On the other hand, the incidence of deaths due to falls fell markedly by nearly 40% in 2020, compared to the 2015–2020 average, (crude rate per 100 000 population). In 2021, the incidence of mortality due to falls in Poland remained at the same level as in 2020 (Fig. 10.7).

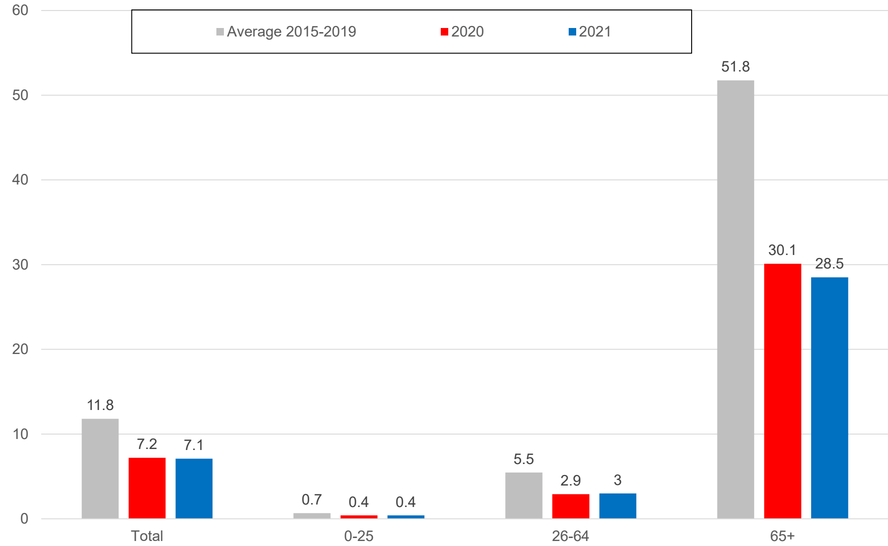


Fig. 10.7. Mortality rate due to falls (W00-W19) per 100 000 population before pandemic and in the years 2020 and 2021 (Statistics Poland)

The observed changes in mortality rates were most likely due to changes in the coding of causes of death due to falls by Statistics Poland. Prior to the pandemic, more than 40% of falls resulting in fatal injuries were falls due to slips and trips (ICD-10 classification code W01). The second rarer cause of death before the pandemic was falls from stairs and other inclines, which accounted for 6.3% of the identified deaths (code W10). However, it is important to mention that until 2019, for a further 40% of deaths, unspecified falls as underlying cause of death (code W19) were registered as underlying. The coding of causes of death within this category in the Statistics Poland death register has ceased in 2020 and 2021. It is worth noting that falls from slips and trips have already accounted for more than 60% of fall-related deaths between 2020 and 2021 and falls from stairs and inclines – for 12%. It is possible to formulate a hypothesis that medical coders from Statistics Poland were most likely to attribute other causes in cases of unspecified falls (code W19) and these deaths were not included in the falls criteria resulting in a significant reduction in the number of reported deaths within the falls category. It is difficult to identify to which categories of death according to the ICD-10 classification deaths have been assigned unspecified falls. It is possible that they have been assigned to other categories within accidents, and it is important to mention here that in 2021, mortality due to all of accidents has increased markedly compared to pre-pandemic years in the 65+ age group among which falls epidemiologically dominate as a cause of accidents. In this context, it is also worth to emphasize that in Poland are observed problems with proper determining the cause of death at the time of a fall-related death. Evidence from scientific literature indicates also underestimation or inaccurate coding of fall-related deaths in other countries[10]. Moreover, falls can also be result from other health problems, including COVID-19[11] which can also lead to inaccurate determination of underlying causes of the deaths during the pandemic.

10.6. Potential impact of the pandemic on the incidence of accidental drowning

Drowning from a medical point of view is defined as suffocation due to flooding of the respiratory tract with fluid. In the case of this type of accident, the risk of life in Poland has been significantly higher than the average in EU countries for many decades, although a clear downward trend has emerged since 2011 and the excess mortality is gradually decreasing. In 2017, the risk of life in the Polish population due to drowning was on average 50% higher than the EU (standardised mortality rate in Poland 1.8 vs. 1.2 in the EU). It is worth mentioning that in the five years preceding the pandemic, the standardised mortality rate due to drowning had fallen steadily from 1.8 in 2015 to 1.3 in 2019.

The COVID-19 pandemic period was characterized by reduced mobility and reduced physical activity, which may lead to the premise that there was a reduction in water activities of people and thus the risk of drowning may have decreased. On the other hand, an increase in the prevalence of problematic alcohol use has been observed among men,

10 Ellingsen CL, Ebbing M, Alfsen GC, Vollset SE. Injury death certificates without specification of the circumstances leading to the fatal injury – the Norwegian Cause of Death Registry 2005–2014. Popul Health Metr. 2018;16(1):20

11 Gawronska K, Lorkowski J. Falls as one of the atypical presentations of COVID-19 in older population. Geriatr Orthop Surg Rehabil. 2021;12:2151459321996619.

who also represent the highest risk group for drowning. Alcohol is one of the most serious contributors to drowning. It is worth mentioning that drownings are not only related to water leisure activity, but also can result from various types of accidental situations involving, for example, unintentional falling or slipping into water.

In the years of particular intensity of the COVID-19 pandemic in Poland, i. e. between 2020 and 2021, has been continued downward trend in mortality due to drowning comparing to the years preceding the pandemic. There was a particular decrease in mortality in the younger age groups, while there was a very slight reduction in mortality in the 65+ group. Contrary to the stereotype that young people have the highest risk of drowning – the highest mortality rates have been registered among those aged 26–64 and over 65 in Poland since decades (Fig. 10.8).

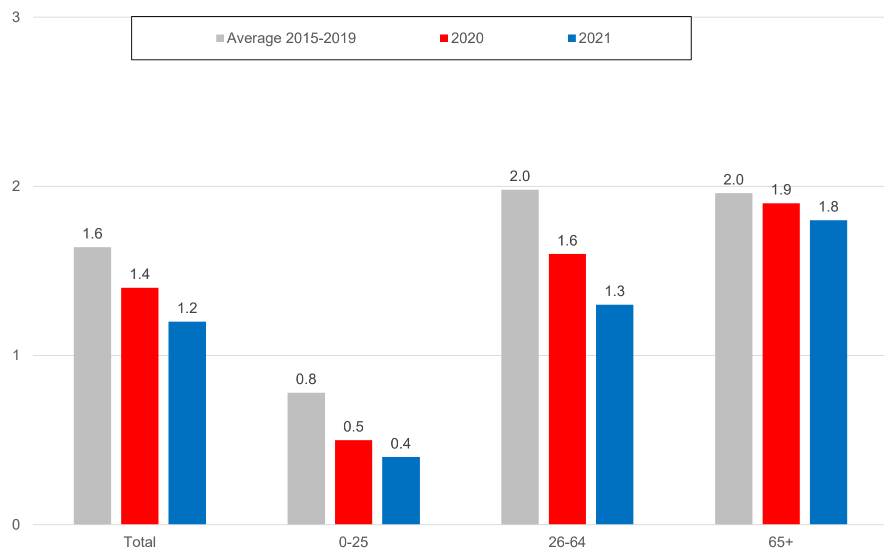


Fig. 10.8. Mortality rate due to drowning (W65-W74) per 100 000 population before pandemic and in the years 2020 and 2021 (Statistics Poland)

It should be noted that, as in the years preceding the pandemic, the risk of drowning in men was many times higher than in women. The standardised mortality rate for men was 2.1 per 100 000 in 2020 and 1.8 in 2021, while for women the rate was 0.4 in both 2020 and 2021. Similar to the years before the pandemic, the place of highest risk of drowning was rural areas. Men from rural areas show especially high risk although significant improvements are being observed in this social group since 2015. The standardised mortality rate due to drowning of men living in rural areas in 2020 was 3.0 per 100 000 and in 2021 it fell to 2.3. Among women living in rural areas, the mortality rate remained at 0.5 per 100 000 same time

The structure of the causes of drowning in the years of intensification of the pandemic remained similar in Poland to that observed between 2015 and 2020. In 2020 and 2021, drowning in natural waters (ICD-10 classification code W69) accounted for the largest share, representing more than 71% of drownings in 2020 and more than 58% of drownings in 2021. Falls into water (code W70) accounted for more than 14% in 2020 and nearly 17% in 2021. Similar variability in the pattern of drowning types was also observed before the epidemic.

The source of data on the causes of drowning are statistics from the Police, which collects information on the interventions they have been made to rescue accidents related to water. It is worth emphasising that not all incidents in which the Police intervene constitute drowning according to medical criteria, nor do the Police intervene in every case of drowning. Thus, the number of drownings reported to in death registry is higher than those reported by the Police. According to the National Police Headquarters data, 22% of drownings were confirmed to have been involving alcohol between 2015 and 2019. In 2020, there was a slight increase in the percentage of drowners who were intoxicated,-the presence of alcohol found in 25.4% causalities . This percentage decreased in 2021 to 19.1%, a lower level than observed before the pandemic. The police statistics did not show a clear change in the circumstances and causes of drowning compared to the years before the pandemic. Most drownings occurred in an unguarded unprotected place, with nearly 14% of cases in 2020 and 15% in 2021. The second cause of reported drownings was carelessness while during activity in the water, which accounted for more than 8% of drownings in both 2020 and 2021. Also similar to previous years, up to 50% of reported drownings occurred in lakes and rivers.

In summary, a the positive downward trend in drowning mortality was observed in 2020 and 2021. No specific changes in water safety behaviour were observed that could be linked to lifestyle changes during the pandemic. One exception in this case is the slight increase comparing to years prior to pandemic in the percentage of intoxicated drowning people in 2020.

SUMMARY:

1. In 2020, the accident mortality rate was similar to the 5-year average before the epidemic. However, in 2021 there was registered an increase in mortality rates. This increase was mainly observed among the people over-65 years old. The mortality level of people in the middle age group, aged 26–64, did not change much, while the mortality of the youngest people, aged 0–25, decreased.
2. The mortality rate due to road traffic accidents per 100 000 population fell during the two years of the pandemic from 7.7 in 2019 to 5.9 in 2021, while in the EU the rate fell from 5.1 to 4.4.
3. There have been slight modifications in traffic behaviour in 2020 and 2021 comparing to previous years. A reduction in the number of incidents involving pedestrians can be judged as a positive change, while a slight increase in accidents caused by a failure to adapt speed to roadway conditions and an increase in the proportion of accidents involving unsober road users were a causes for concern. Another observed negative phenomenon was visible increase in accident severity in 2020 and 2021 compared to pre-pandemic years.
4. The positive downward trend of drowning mortality was observed in 2020 and 2021. The improvement was mainly visible in the younger age groups. No specific changes in water safety behaviour were observed that could be linked to lifestyle changes during the pandemic. One exception in this case is the slight increase from previous years in the percentage of unsober drowning people in 2020.

11. SELECTED ASPECTS OF SICKNESS ABSENCE

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In the structure of social insurance expenditure on incapacity-related social services, the share of expenditure on sickness absence is growing significantly.

In 2021, expenditure on sickness absence financed from the Social Insurance Fund (FUS) and from the workplace fund amounted to PLN 24,527.0 million and was 7.0% higher than in the previous year. Sickness benefits financed from the FUS amounted to PLN 14,776.8 million (up by 4.9% compared to 2020), and PLN 9,750.2 million (up by 10.3%) was spent on remuneration for incapacity to work financed from the funds of workplaces and the Guaranteed Employee Benefits Fund (FGŚP).

Expenditure on sickness absence in the analysed period was covered in 60.2% by the Social Insurance Fund, with the remainder being borne by employers and the FGŚP. Compared to 2020, there has been a decrease of 1.3 percentage points in the share of benefits financed by FUS in total absenteeism expenditure (in favour of wages for incapacity to work financed by workplaces).

In 2021, the *Register of Medical Certificates* registered 24.6 million medical certificates of temporary incapacity for a total of 282.5 million days of sickness absence (due to own sickness, childcare and care of another family member).

Table 11.1. Sickness absence in 2020–2021

Description	Number of days of sickness absence		Number of medical certificates	
	Total	including: insured with the Social Insurance Institution	Total	including: insured with the Social Insurance Institution
	in millions			
2020	296.9	266.6	24.2	22.7
2021	**282.5**	**252.0**	**24.6**	**23.1**
	dynamics			
2020 = 100	95.1	94.5	101.7	101.6

Compared to 2020, we see a 4.9% decrease in the number of sickness absence days, with a 1.7% increase in the number of medical certificates. This has been the trend for several years. The number of certificates, compared to the previous year, is increasing, and so, in 2017 it increased by 2.6%, in 2018 by 1.2%, in 2019 by 0.9% with a decreasing trend in the number of sickness absence days, which was higher by 1.9% in 2017, but decreased by 1.2% in 2018, in 2019 it increased again marginally by 0.9%.

Table 11.2. Sickness absence in 2021

Description	Number of days of sickness absence	Number of medical certificates	Average length of medical certificate
	in millions		in days
TOTAL	**282.5**	**24.6**	**11.48**
of which on account of:			
own sickness	**270.1**	**21.9**	**12.32**
childcare	9.9	2.3	4.36
care of another family member	2.3	0.4	6.20

The above figures show that 95.6% of the number of days of sickness absence relate to so-called own sickness, with only 4.3% due to caring for a child or other family member. Also of note is the average length of medical certificate, which was more than 12 days in the case of own sickness in 2021.

In 2021, 2.3 million medical certificates for a total of 9.9 million days were issued to people with childcare responsibilities. Compared to 2020 the number of certificates increased by 37.9% and the number of days of sickness absence by 19.6%. This large increase in both the number of certificates and the number of childcare days is because 2020 was a pandemic year in which the additional childcare benefit for caring for a healthy child up to the age of eight was in force (by virtue of the Official Journal of 2 March 2020). As a result, insured persons were more likely to use this form of childcare rather than sick leave. In 2021, absenteeism due to childcare returned to 2019 levels, i.e., before the pandemic.

Most certificates were issued for a period of 1 to 5 days – 1,792.6 thousand certificates, and for a period of 6 to 10 days – 387.2 thousand. The average length of a medical certificate was 4.36 days. In general, the longest care was provided for children aged 3–4 years, absenteeism for this reason amounted to 2 877.5 thousand days, with the average length of certification being lower than the average overall, at 4.23 days. The percentage of absent days due to childcare for children under two was also high at 25.5%. On average, this care was provided for 4.45 days.

In the case of having to care for another family member, 0.4 million certificates were issued for 2.3 million days. Comparing 2021 with the previous year, we see a decrease of 1.1% in the number of days on this account and an increase of 8.3% in the number of certificates.

Most certificates were issued for a period of 1 to 5 days – 244.0 thousand certificates and for a period of 11 to 14 days – 85.9 thousand certificates. The average length of the certificate was 6.20 days. Interestingly, more than half of the certificates for caring for another family member were issued to women, but it was men who took 1.6 times longer to provide care.

In the following section, the sickness absence of people insured with the Social Insurance Institution will be analysed.

A total of 23.1 million (i.e., 93.6% of total certificates) of medical certificates for a total of 252.0 million days were issued to this group. Of this number, 20.5 million certificates are certificates issued for own sickness. The number of days of sickness absence from these certificates was 239.9 million days and the average length of the certificate was 11.73 days.

Table 11.3. Sickness absence in 2021 of people insured with the Social Insurance Institution

Description	Number of days of sickness absence in millions	Number of medical certificates in millions	Average length of medical certificate in days
Total	**252.0**	**23.1**	**10.93**
of which due to own sickness	239.9	20.5	11.73
Males	102.8	9.2	11.12
Females	137.1	11.2	12.24

The question arises as to how long, on average, insured persons, who have been issued with a certificate of incapacity at least once, are sick each year. This measure is called the cumulative (from the whole year) average length of sickness absence. In 2021, it was 36.66 days. With women's cumulative absence being more than six days higher than men's (33.49 days for men and 39.47 days for women).

Compared to 2020, in 2021, the number of days of sickness absence due to own sickness of the Social Insurance Institution insured persons was 6.3% lower and the number of medical certificates was 1.3% lower.

When analysing the number of days of sickness absence for Poland per health insured person, variation is noticeable. For Poland, this parameter was 14.29 days in 2021, slightly lower than the 2020 figure of 15.46 days. The highest value was recorded in the provinces:

- łódzkie 17.31 days,
- świętokrzyskie 16.14 days,
- wielkopolskie 15.77 days,
- śląskie 15.37 days,
- podkarpackie 15.21 days.

The lowest value in the provinces:

- podlaskie 12.33 days,
- mazowieckie 12.74 days,
- lubelskie 13.12 days.

Medical certificates, depending on the assessment of the sickness condition, are issued for periods of varying length.

In 2021, the largest number of medical certificates were issued for a period of 11 to 30 days, their share accounting for 34.6% of total medical certificates. Certificates issued for a period of incapacity of 1 to 5 days also accounted for a high proportion – 36.1% of own-sickness certificates, one-day certificates accounted for 5.4%, while certificates issued for 6 to 10 days accounted for 23.9% of the total certificates.

Compared to 2020, the share of leaves issued for 1 to 5 days increased (from 29.5% to 36.1%, one-day certificates from 3.2% to 5.4%). However, the proportion of leave of 6 to 10 days decreased, from 26.9% to 24.0%, and of absence of 11 to 30 days, from 38.5% to 34.6%.

This means that the percentage of medical certificates of up to 5 days' length has increased markedly, i.e., by 6.6 percentage points, in 2021. The number of single-day medical certificates also increased, from 668.0 thousand in 2020 to 1,114.5 thousand in 2021, an increase of 66.8%.

Table 11.4. Number of medical certificates issued in 2021 for own sickness to persons insured with the Social Insurance Institution by length of sickness absence and sex

Description	Number of medical certificates	number of certificates of recognised sickness absence on days:					
		1–5	including: 1 day	6–10	11–20	21–30	31 days and more
	in millions						
Total	**20.5**	**7.4**	**1.1**	**4.9**	**4.2**	**2.9**	**1.1**
Males	9.2	3.3	0.4	2.5	2.1	1.0	0.5
Females	11.2	4.1	0.7	2.4	2.1	2.0	0.6

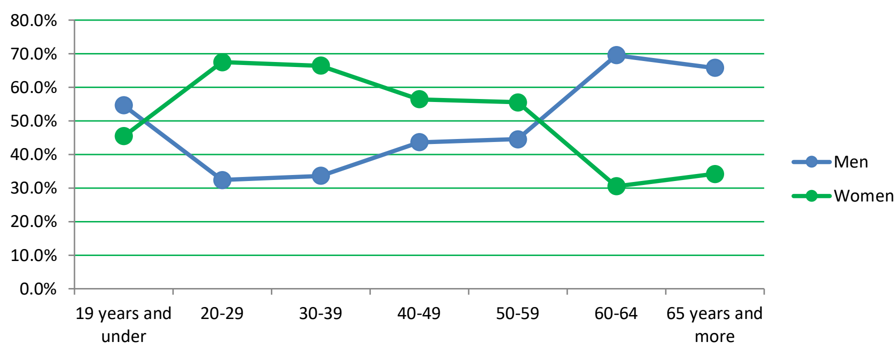

Fig. 11.1. Structure of the number of sickness absence medical certificates in 2020–2021.

For years, there has been a clear prevalence of certificates issued to women. In 2016 and 2017, they accounted for 54.6% of the total certificates issued for self-reported sickness. The percentage was 54.8% in 2018, 55.4% in 2019 and 55.3% in 2020.

In 2021, 11.2 million medical certificates were issued to women, which accounted for 54.6% of certificates issued, for more than half the number of days of sickness absence, i.e., 137.1 million days (representing 57.1% of the total number of days of absence).

When analysing the magnitude of sickness absence by sex and age of insured persons, it can be seen that in 2021, the highest percentage of the number of days of absence (14.6%) concerned insured persons in the 30 to 34 age group. In the case of male absenteeism, 13.5% of the number of days concerned insured persons with an age between 60 and 64 and between 35 and 39 with 12.0%. For women, 17.9 percent of absenteeism concerned insured persons aged between 30 and 34 years.

Table 11.4. Structure of sickness absence days in 2021 due to own sickness of persons insured with the Social Insurance Institution by age and sex

Age of insured person	Total	Males	Females
TOTAL	**100.0**	**100.0**	**100.0**
19 years and under	0.8	1.0	0.6
20–24	5.4	5.2	5.6
25–29	12.5	8.6	15.5
30–34	14.6	10.2	17.9
35–39	13.2	12.0	14.1
40–44	11.3	11.7	10.9
45–49	10.9	11.5	10.4
50–54	10.2	10.7	9.9
55–59	10.7	11.6	9.9
60–64	7.9	13.5	3.8
65 years and more	2.5	4.0	1.4

When analysing absenteeism by sex by age group, we see that the largest difference between male and female sickness absence is in the 20–39 age group, where female sickness absence was nearly two times longer than male. In the age groups 19 years and under and over 45 years, men's sickness absence significantly exceeds that of women.

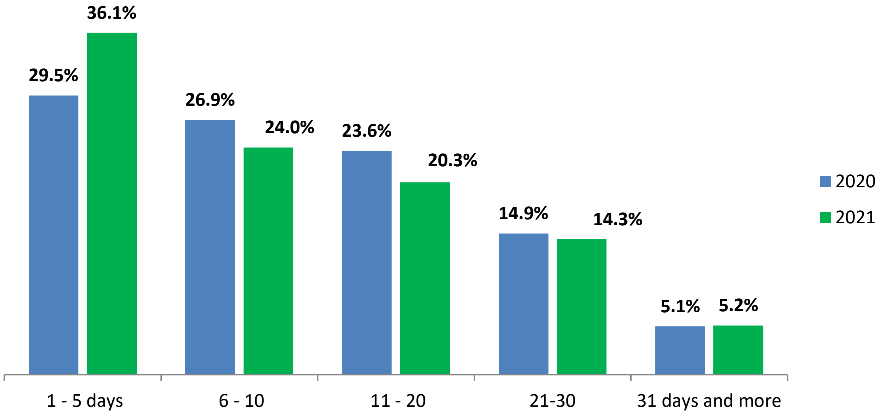

Fig. 11.2. Structure of the number of days of sickness absence in 2021 by age and sex

The question that arises is what the causes of this phenomenon are.

In the analysis of sickness absence, the aspect of the absenteeism of women whose incapacity to work falls during pregnancy appears to be relevant.

Women's incapacity to work occurring during pregnancy has a significant impact on both overall absenteeism and the absenteeism of the female population.

On the medical certificate, the information indicating incapacity during pregnancy is letter code B. It should be noted that code B, at the request of the insured person, is not included by the doctor on the medical certificate. According to the Act on Monetary Benefits from Social Insurance in Case of Sickness and Maternity, the indication of this code on the medical certificate is information that affects the right to sickness benefit and its amount.

In 2021, the number of women who had at least one day of sick leave with letter code "B" was 366.7 thousand (in 2020–392.0 thousand). The number of medical certificates issued for incapacity to work occurring during pregnancy to women insured with the Social Insurance Institution was 1.8 million, while the number of days of sickness absence was 41.8 million days.

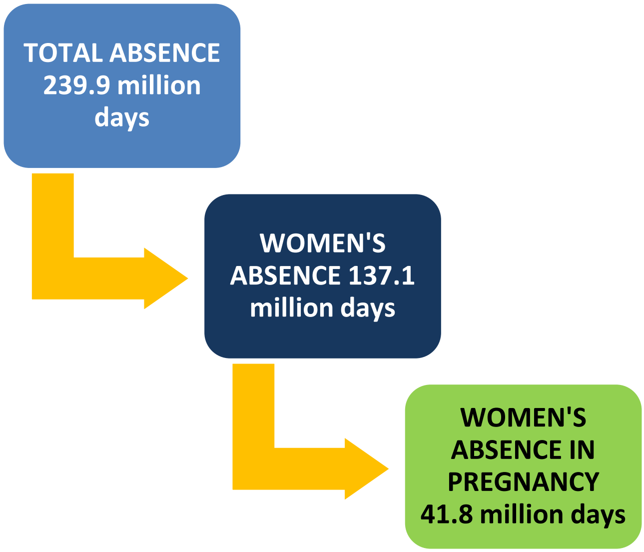

Fig. 11.3. Sickness absence of women due to own sickness insured with the Social Insurance Institution

Pregnant women's sickness absence as a proportion of total absenteeism was 17.4 percent in 2021 (18.0 percent in 2020), while pregnant women's sickness absence as a proportion of sickness absence for this sex was 30.5 percent (30.8 percent in 2020). Thus, one in 10 certificates was issued for incapacity occurring during pregnancy and one third of women's sickness absence days were due to incapacity occurring during pregnancy.

More than half, i.e., 58.0% of the medical certificates (with code "B") for incapacity to work falling during pregnancy of women insured with the Social Insurance Institution were issued for a period of 21 to 30 days. For the period between 11 and 20 days, 19.2% (19.0% in 2020) of the total certificates issued during pregnancy were issued. Certificates with a length of sickness absence of between 6 and 10 days accounted for 5.9% (5.7% in 2020) of the total number of medical certificates. In contrast, certificates of up to 5 days accounted for only 3.9% (3.3% in 2020) of certificates for incapacity occurring during pregnancy (including one-day certificates – 0.8%).

As can be seen in the table below, certificates short up to 5 days, and between 6 and 10 days, are most often issued to people whose incapacity is not related to pregnancy.

Table 11.5. Structure of medical certificates issued in 2021 due to own sickness to women insured with the Social Insurance Institution by length of sickness absence

Description	Number of medical certificates	number of certificates of recognised sickness absence					
		on days:					
		1–5	including: 1 day	6–10	11–20	21–30	31 days and more
	in percentage						
Total	100.0	36.1	5.4	24.0	20.3	14.3	5.2
women's incapacity to work	100.0	36.6	5.9	21.6	18.8	17.6	5.4
incapacity during pregnancy	**100.0**	**3.9**	**0.8**	**5.9**	**19.2**	**58.1**	**12.9**

Also, regarding the analysis of the number of days by age, apparent is the high share of incapacity to work among females during pregnancy in total absenteeism and female population absenteeism. The highest percentage of sickness absence days falling during pregnancy was recorded in the age group between 30 and 34 years, with 36.4%, and in the age group 25–29 years, with 33.0% of total sickness absence days falling during pregnancy. For female absenteeism and total absenteeism (counted together with male absenteeism), the highest percentage of days is recorded for the 50+ age.

Table 11.6. Structure of sickness absence days in 2021 due to own sickness of persons insured with the Social Insurance Institution by age

Age	Total	women's incapacity to work	incapacity to work arising during pregnancy
Total	**100.0**	**100.0**	**100.0**
19 years and under	0.8	0.6	0.4
20–24	5.4	5.6	8.4
25–29	12.5	15.5	33.0
30–34	14.6	17.9	36.4
35–39	13.2	14.1	17.8
40–44	11.3	10.9	3.7
45–49	10.8	10.4	0.2
50 years and more	31.3	25.0	0.0

What were the causes of incapacity resulting in sickness absence?

In 2021, sickness absence, in terms of the **number of days of absence**, was most frequently caused by the following sickness groups:

- pregnancy, childbirth, and puerperium – 16.5% of the total number of days of absence (in 2020–17.5%), 40.9 million days of sickness absence,
- diseases of the osteoarticular, muscular and connective tissue systems – 16.5% (16.1% in 2020), 39.5 million days,
- injuries, poisonings, and other specified effects of external agents – 13.1% (11.8% in 2020), 31.5 million days,
- respiratory diseases – 11.6% (in 2020–13.7%), 27.8 million days,
- mental and behavioural disorders – 10.5% (in 2020–10.8%), 25.2 million days,
- COVID-19 related disease entities – 2.3% (1.9% in 2020), 5.4 million days.

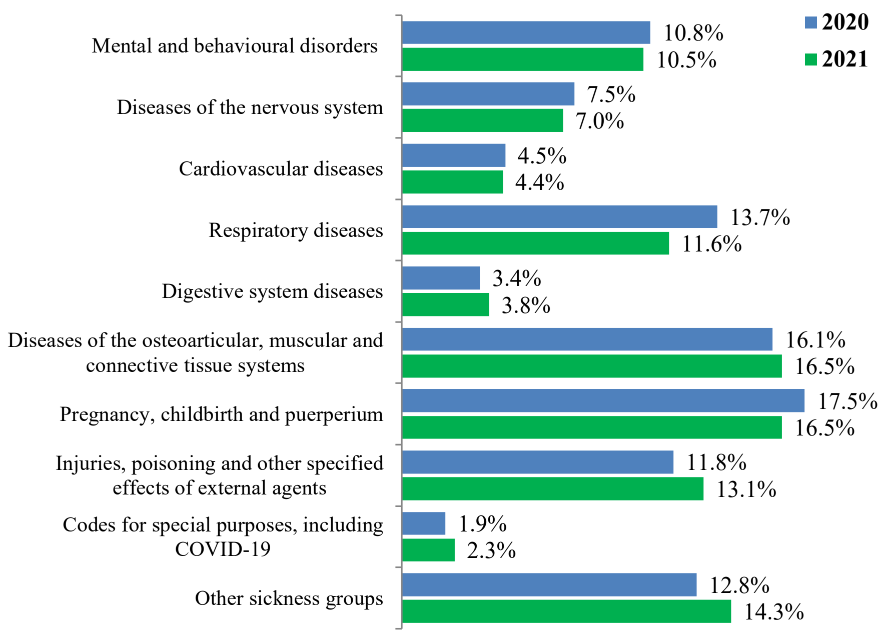

Fig. 11.4. Structure of sickness absence days in 2021 due to own sickness of persons insured with the Social Insurance Institution by sickness groups

The ranking of disease entities causing incapacity to work in 2021 (in terms of the number of days of sickness absence) developed differently according to sex.

In the male population, the longest absenteeism was caused by:

- spinal root and plexus disorders (G54) – 6.3% of the total number of days of sickness absence for men (in 2020–7.2%),
- back pain (M54) – 4.9% (2020–5.2%),
- acute upper respiratory tract infection of multiple or unspecified location (J06) – 4.4% (2020–5.4%).

The COVID-19 disease entity (U07.1) ranked eighth in this ranking, accounting for 2.0% of the total number of male sickness absence days.

In the female population, for years, the longest sickness absence has been caused by obstetric care due to conditions mainly related to pregnancy (O26) – 24.7% of the total number of days of sickness absence for women (in 2020 – also 24.7%).

These are followed by:

- severe stress reaction and adaptation disorder (F43) – 4.1% (in 2020–4.3%),
- acute upper respiratory tract infection of multiple or unspecified location (J06) – 4.0% (2020–4.7%).

In the ranking of disease entities causing the longest sickness absence, COVID-19 (U07.1) was ranked 11th, accounting for 1.3% of the total number of days of sickness absence for women.

The largest number of certificates (27.5%) were issued to people aged 30–39 years – in the female population this was 29.1%, in the male population 25.5%. In the case of 1–5-day sickness leaves, in addition to the largest age group of 30–39 year olds (to whom 29.2% of certificates were issued), 20–29 year olds were also a large group, with 24.9% of certificates issued, and in the case of 6–10 day leaves, 40–49 year olds (25.9% of certificates).

As mentioned earlier, 2021 was dominated by leaves issued for 1–5 days (36.1%) and for 11–30 days (34.7%). Certificates issued for 1–5 days prevailed among both men (accounting for 35.5% of certificates issued to men) and women (accounting for 36.6% of certificates issued to women).

In the female population, the disease entity generating the highest number of medical certificates issued in 2021 was *Obstetric care for conditions mainly related to* *pregnancy* – 12.5% of certificates. Another entity was *Acute upper respiratory tract infection of multiple or unspecified location* – 9.1%. One of these two entities predominated in each age group, while among women aged 20–39 years there was a predominance of leaves due to *Obstetric care for conditions mainly related to pregnancy*, while in the other age groups it was *Acute upper respiratory tract infection of multiple or unspecified location*. For each age group, *Acute upper respiratory tract infection of multiple or unspecified location* and *Acute nasopharyngitis (cold)* were the main reasons for short leaves, i.e., of 1–5 days and 6–10 days. In the case of long leaves, from 11 to 30 days, the main reasons for leaves for women aged up to 39 years *were Obstetric care for conditions mainly related to pregnancy* and *Severe stress reaction and adaptive disorders* and for women aged 40 years and more, *Osteoarthritis of the knee*.

COVID-19 ranks 8th in the ranking of disease entities giving rise to medical certificates for women. In 2021, 2.3% of all medical certificates were issued to women for this reason (in 2020, it was 3.1%). Medical certificates of 1–5 days' length were most issued to women aged 40–44, certificates of 6–10 days' length to women aged 45–49, exemptions of 11–30 days' length and more than 30 days' length to women aged 55–59.

In the male population, the disease entity generating the highest number of medical certificates in 2021 was *Acute upper respiratory tract infection of multiple or unspecified location (J06)* – 8.8% (2020–9.8%), of all certificates issued to men. Another entity was *Acute nasopharyngitis (cold) (J00)* – 6.4% (2020–7.8%). The entity *Spinal root and plexus disorders (G54)* ranked third with 6.4% (2020: 7.3%). Among men under 50 years of age, the predominant sicknesses were those resulting from upper respiratory tract infections and dyspepsia, while for those aged 50 years and more – *Spontaneous (primary) hypertension*. As in women, for each age group of men *Acute upper respiratory tract infection of multiple or unspecified location* and *Acute nasopharyngitis (cold)* were the main reasons for short leaves, i.e., of 1–5 days and 6–10 days, for men. For long leaves, from 11 to 30 days, the main reason for leaves issued to men aged up to 19 years was *Sprain, tear of the joints and ligaments of the ankle and level of the foot*, while for men in other age groups it was *Disorders of the spinal roots and nerve plexuses (G54)* and *Back pain (M54)*.

In the ranking of disease entities as the main reason for issuing medical certificates to men, COVID-19 is ranked 5th. In 2021, 2.7% of all medical certificates were issued to men for this reason (in 2020, it was 2.9%). Medical certificates of up to 5 days in length were most issued to men aged 35–39, certificates of 6–10 days in length to men aged 40–44, of 11–30 days in length and over 30 days in length to men aged 60–64.

Interestingly, tumour does not appear as a cause of incapacity in the ranking of the 30 disease entities generating the highest number of certificates.

The sickness reasons for one-day sickness certificates issued in 2021 are surprising. Among the most common reasons for one-day leave among both men and women were respiratory diseases and broadly defined stomach problems, COVID-19, but also malaise, fatigue.

Among women, the disease entity generating the highest number of short, 1-day medical certificates in 2021 was *Acute nasopharyngitis (cold)*, with 7.7% of certificates (8.6% in 2020). The next entities were:

- acute upper respiratory tract infection of multiple or unspecified location – 5.6% (2020–6.3%).
- malaise, fatigue – 4.3% (in 2020–1.1%),
- COVID-19 – 3.6% (in 2020–5.2%),
- other complications of surgical and medical care not elsewhere classified – 3.1% (2020–0.0%),
- other non-communicable gastroenteritis and colitis – 2.8% (in 2020–2.4%),
- abdominal and pelvic pain – 2.7% (2020–3.0%).

Among women, irrespective of age, two disease entities predominated – *Acute nasopharyngitis (cold)* and *Acute upper respiratory tract infection of multiple or unspecified location* – their combined proportion depending on age ranged from 8.6% to 20.0%.

Unlike in the case of long leaves, *Obstetric care of conditions mainly related to pregnancy* was not the main reason for single-day leaves. In the ranking of 20 sickness entities, it only appeared in women aged 20–29 years and 30–39 years and accounted for 2.2% and 2.8% of one-day leaves in these age groups, respectively.

Among women over 40, *Malignant breast tumour* appears in the ranking of the 30 disease entities generating the highest number of 1-day sickness certificates, with the disease ranking second for women aged 50–59 (it accounts for 2.4% of 1-day sick leave in this age group).

Among men, the main medical reason for 1-day medical certificates issued in 2021 was *Acute nasopharyngitis (cold)* – 8.7% of certificates (in 2020, it was 9.4%). The next entities were:

- acute upper respiratory tract infection of multiple or unspecified location – 6.1% (2020–6.4%).
- COVID-19 – 4.8% (in 2020–5.7%),
- malaise, fatigue – 3.9% (in 2020–1.0%),
- other non-communicable gastroenteritis and colitis – 3.4% (in 2020–3.1%),
- other complications of surgical and medical care not elsewhere classified – 2.9% (2020–0.0%),
- dyspepsia – 2.9% (in 2020–3.5%).

Among men before the age of 50, two disease entities – *Acute rhinosinusitis (cold)* and *Acute upper respiratory tract infection of multiple or unspecified location* – predominated among the reasons for day leave, with a combined proportion ranging from 6.9% to 22.1% depending on age.

Among men over the age of 40, COVID-19 is a significant cause of one-day sickness certificates, accounting for 6.2% of one-day sick leaves.

Prostate malignant tumour in the ranking of the 10 disease entities generating the highest number of 1-day medical certificates only appears in men over 60 years of age.

Sick leave issued for incapacity occurring during pregnancy also applies to all situations and ailments that require lifestyle changes and avoidance of stress for the pregnant woman.

Absence due to incapacity to work falling during pregnancy (certificates with code 'B') in 2021 were most often caused by:

- pregnancy, childbirth, and puerperium – 96.0% of the total number of days of absence (40.1 million days of sickness absence),
- factors affecting medical condition and contact with health services – 3.4% (1.4 million days),
- respiratory diseases – 0.1% (0.1 million days).
- The ranking of disease entities was dominated primarily by:

- obstetric care due to conditions mainly related to pregnancy (O26) – 80.5% of the total number of days of sickness absence for women unable to work during pregnancy (33.6 million days of absence), 79.4% in 2020, i.e., 36.6 million days of absenteeism,
- bleeding in early pregnancy (O20) – 6.0% (2.5 million days), in 2020–7.0%, i.e., 3.2 million days,
- high-risk pregnancy surveillance (Z35) – 2.4% (1.0 million days),
- diabetes in pregnancy (O24) – 1.8% (0.8 million days),
- preterm birth (O60) – 1.3% (0.6 million days).

2021 is the next year of the COVID-19 infectious disease, which was declared a pandemic by the World Health Organisation on 11 March 2020.

The sickness absence data reflect the successive stages (waves) of the development of the COVID-19 epidemic, which was shaped by infections in workplaces, health services, arising from social gatherings, holiday trips or students returning to school.

Further new disease entities related to COVID-19 have been introduced to the ICD-10 International Classification of Diseases and Health Problems into sickness group U00-U85, i.e.: *Patient history of COVID-19 (U08), Patient health after COVID-19 (U09), COVID-19-associated multisystem inflammatory syndrome (U10) and COVID -19 vaccines causing adverse effects during treatment (U12).*

In 2021, 528.3 thousand medical certificates issued for the COVID-19 entity were recorded, for a total of 4 244.8 thousand days of sickness absence. Compared to last year (period III-XII 2020), both the number of sickness certificates – down 17.8% – and the number of days of sickness absence – down 16.3% – decreased.

The highest number of COVID-19 own sickness certificates was issued in March 2021, with 123,400 certificates, representing 23.4% of all COVID-19 certificates issued in 2021 and nearly 3 times the number of certificates issued in the previous month. Another wave of increased sickness absence was recorded in November and December, with a total of 28.0% of sickness certificates and 25.2% of absence days.

Table 11.7. COVID-19 own sickness absence in 2021.

Description	Number of days of sickness absence		Number of medical certificates	
	Total	including: insured with the Social Insurance Institution	Total	including: insured with the Social Insurance Institution
	in thousands			
2021	**4 244.8**	**3 903.3**	**528.3**	**501.0**
I	422.3	389.4	50.4	47.7
II	339.5	314.3	43.5	41.3
III	943.5	878.8	123.4	117.7
IV	918.6	844.1	101.8	96.0
V	265.7	239.7	26.4	24.7
VI	66.4	58.7	6.1	5.7
VII	28.3	24.7	2.5	2.3
VIII	23.5	20.8	2.5	2.4
IX	49.7	46.2	7.5	7.3
X	117.7	108.6	16.2	15.6
XI	477.3	437.9	69.2	65.9
XII	592.3	540.3	78.7	74.6

Medical certificates for COVID-19 were most frequently issued in the Mazowieckie voivodship (13.8% of all certificates issued for this reason), the Śląskie province (12.8%), the Dolnośląskie voivodship (11.6%) and the Wielkopolskie voivodship (9.2%). This was also the territorial distribution of the number of medical certificates in most months of 2021. The exception was in October, when Wielkopolskie voivodship gave way to Lubelskie voivodship in the number of medical certificates issued for COVID-19 – 1.1 thousand were issued in Wielkopolskie voivodship and 1.9 thousand in Lubelskie voivodship, which accounted for 11.8% of all certificates issued for COVID-19 in October.

In 2021, more than half (i.e., 50.3%) of COVID-19 certificates were issued to men. For the number of days of sickness absence, the percentage was 54.6%.

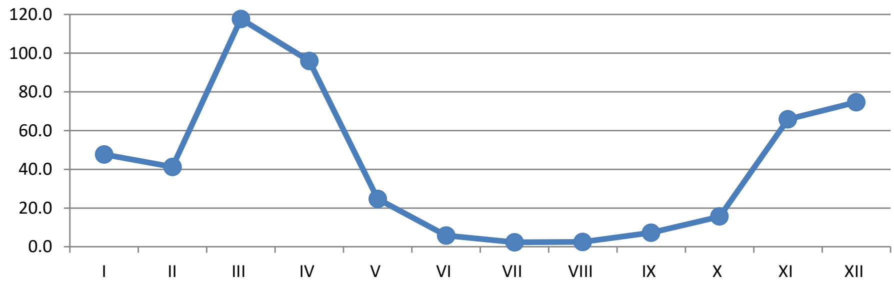

Fig. 11.5. Number of medical certificates issued to insured persons in the Social Insurance Institution for own sickness due to COVID-19 by month in 2021

The most common medical certificates issued due to COVID-19 in 2021 were for a period of incapacity of between 1 and 5 days. They accounted for 45.6% of all certificates, including 8.8% of same-day certificates. For a period of 6 to 10 days, 33.5% of COVID-19 medical certificates were issued. A relatively high proportion of certificates were issued for between 11 and 20 days – 14.1% of certificates. Above 20 days, 6.7% of medical certificates were issued. Compared to the period III-XII 2020, there was a significant increase – by 12 percentage points – in the number of short certificates – 1 to 5 days (one-day certificates by 3 percentage points). In contrast, the number of certificates issued for 6 to 10 days fell – by 12.7 percentage points.

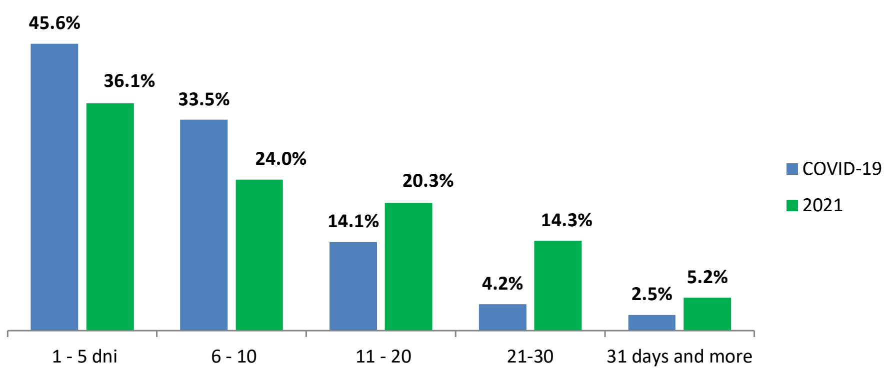

Fig. 11.6. Structure of the number of medical certificates issued in 2021 under COVID-19 with an adjudicated length of sickness absence

During the period analysed, the highest sickness absence due to COVID-19 was recorded for insured persons aged 60 and over, with 15.4% of sickness absence days. Male sickness absence was also highest in this age bracket, with 19.9% of absence days. Among women, insured women aged 55–59 years had the longest period of sickness absence, the percentage of days was 16.2%.

Compared to last year, there has been a change in the age distribution among those issued with a medical certificate for COVID-19. In the period III-XII 2020, the highest sickness absence was recorded among younger people, i.e., those aged 45–49 years (14.7% of sickness absence days).

Table 11.8. Structure of sickness absence days in 2021 due to COVID-19 by age and sex

Description	Total	Males	Females
Total	**100.0**	**100.0**	**100.0**
19 years and under	0.4	0.5	0.4
20–24	3.2	3.2	3.2
25–29	6.1	6.0	6.1
30–34	7.9	8.0	7.7
35–39	11.1	11.1	11.2
40–44	13.2	12.5	14.1
45–49	14.1	12.8	15.6
50–54	14.0	12.6	15.6
55–59	14.7	13.4	16.2
60 years and more	15.4	19.9	9.8

There was a significant increase in hospital sickness absence days in 2021 compared to the previous year. This is because absenteeism due to COVID-19 cases more than doubled. Incapacity due to COVID-19 accounted for 7.1% of the number of hospital absence days (in 2020, this was 3.9%). It should also be noted that in COVID-19 absenteeism, hospital absenteeism accounted for nearly 10% (in 2020 it was 3.7%).

In 2021, the number of sickness absence days related to hospitalisation of the Social Insurance Institution insured persons accounted for 2.3% of the total number of sickness absence days and amounted to 5 435.4 thousand days. Compared to 2020, it was 18.0% higher. In 2021, 1,067.9 thousand medical certificates related to hospital stays were issued, which accounted for 5.2% of the total certificates. Compared to the previous year, the number of these certificates increased by 19.0%. The average length of incapacity per hospital stay was 5.09 days in 2021 (5.13 days in 2020). According to an analysis of the certificates, it was men who stayed in hospital longer than women. Hospital absenteeism for men was 2 997.5 thousand days and for women 2 437.3 thousand days. In contrast, the proportions are reversed for the number of medical certificates issued, with 555.4 thousand medical certificates issued to women and 512.4 thousand certificates issued to men.

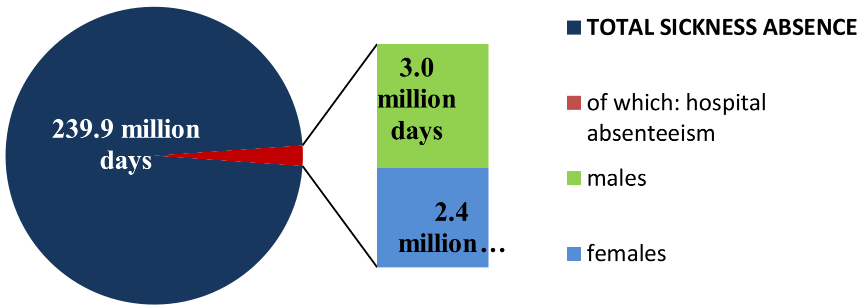

Fig. 11.7. Hospital sickness absence due to own sickness in 2021

Women's sickness absence due to hospitalisation was most commonly due to *COVID-19 U07.1* (117.5 thousand days of hospitalisation), *uterine smooth cell myoma D25* (84.5 thousand days), *obstetric care for conditions mainly related to pregnancy O26* (69.1 thousand days), *gallstones K80* (67.0 thousand days), *mental and behavioural disorders due to alcohol use F10* (53.3 thousand days). In contrast, men's hospital stays were most often due to *mental and behavioural disorders caused by alcohol use F10* (275.5 thousand days), *COVID-19 U07.1* (270.6 thousand days), *acute myocardial infarction I21* (66.9 thousand days), *inguinal hernia K40* (62.1 thousand days), *chronic ischaemic heart disease I25* (52.6 thousand days).

Spatial variation in sickness absence rates is influenced by many factors, including those related to the environment, e.g., air quality, its degradation due to the type of industry in the area or other human activities. Also important is the degree of urbanisation, infrastructure in the area, population concentration or labour market problems.

Table 11.9. Sickness absence in 2021 due to own sickness of persons insured with the Social Insurance Institution by province

provinces	Number of days of sickness absence		Number of medical certificates		Dynamics of the number of	
					days of medical absence	medical certificates
	in thousands	in %	in thousands	in %	previous year = 100	
TOTAL	**239 880.2**	**100.0**	**20 451.8**	**100.0**	**93.7**	**98.7**
including:						
Dolnośląskie	18 238.3	7.6	1 666.4	8.1	94.5	100.5
Kujawsko-pomorskie	12 707.4	5.3	1 020.2	5.0	93.9	99.4
Lubelskie	10 891.0	4.5	912.8	4.5	94.5	97.5
Lubuskie	5 884.7	2.5	491.5	2.4	96.2	102.2
Łódzkie	18 805.4	7.8	1 425.6	7.0	91.3	94.0
Małopolskie	19 380.6	8.1	1 686.4	8.2	91.1	95.1
Mazowieckie	32 351.9	13.5	2 756.7	13.5	94.8	101.2
Opolskie	5 565.8	2.3	503.8	2.5	96.0	100.6
Podkarpackie	12 662.2	5.3	996.7	4.9	91.1	93.2
Podlaskie	5 688.1	2.4	498.3	2.4	98.1	101.8
Pomorskie	14 453.6	6.0	1 208.9	5.9	95.8	102.1
Śląskie	30 175.0	12.6	2 799.6	13.7	92.1	97.1
Świętokrzyskie	7 618.3	3.2	588.3	2.9	91.3	92.0
Warmińsko-Mazurskie	7 892.2	3.3	643.3	3.1	98.1	102.9
Wielkopolskie	24 870.4	10.4	2 135.7	10.4	92.9	99.6
Zachodniopomorskie	9 932.0	4.1	868.5	4.2	97.8	105.0

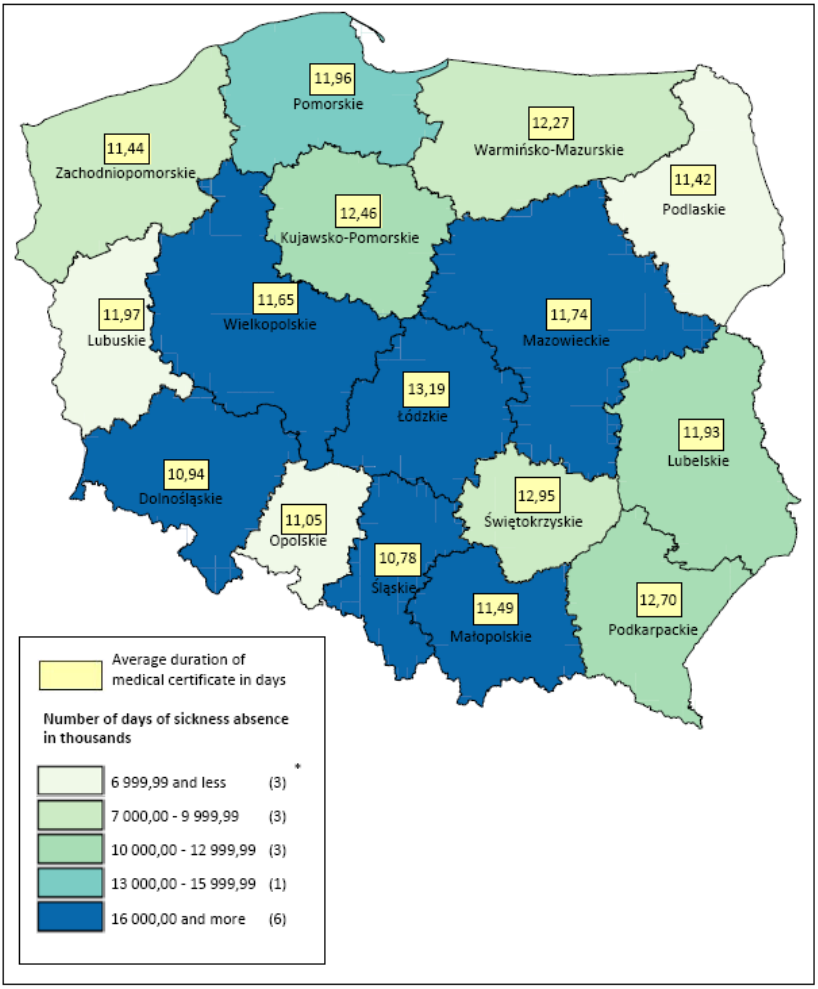

Fig. 11.8. Number of days of sickness absence in 2021 due to own sickness of persons insured with the Social Insurance Institution by province, together with the average length of medical certificate

In 2021, the highest proportion of sickness absence days due to own sickness of people insured with the Social Insurance Institution was recorded in the voivodships Mazowieckie (13.5% of the total number of sickness absence days), Śląskie (12.6%) and Wielkopolskie (10.4%). The average length of the medical certificate in these provinces was respectively: 11.74 days, 10.78 days, 11.65 days. Longer than the overall average (11.73 days), the following people were on sick leave: over 13 days in the Łódzkie voivodship, over 12 days in the Kujawsko-pomorskie, Warmińsko-mazurskie, Podkarpackie and Świętokrzyskie voivodships.

Table 11.10 and Figure 11.9 illustrate the distribution of the number of days of sickness absence due to incapacity to work due to selected sickness groups by province. These selected sickness groups generated 83.5% of total sickness absence days in 2021.

In 2021, the highest proportion of sickness absence days in most voivodships was recorded for diseases of the osteoarticular, muscular and connective tissue systems. Residents of the Warmińsko-mazurskie, Małopolskie and Świętokrzyskie voivodships had the longest absences, with 18.2%, 18.1% in each of these provinces respectively. Long sickness absence was caused by sicknesses related to pregnancy, childbirth, and puerperium. Women in the Lubelskie and Podlaskie voivodships were on sick leave the longest on this account.

The proportion of sickness absence days due to respiratory diseases in each of the provinces ranged from 9.8% to 12.6%, with the highest recorded in the Dolnośląskie and Śląskie voivodships at 12.6% of the number of sickness absence days in each of these provinces. For mental and behavioural disorders, the highest number of days of incapacity was recorded in the Kujawsko-pomorskie voivodship (13.8% of sickness absence days in that province) and in the Wielkopolskie voivodship (13.2%).

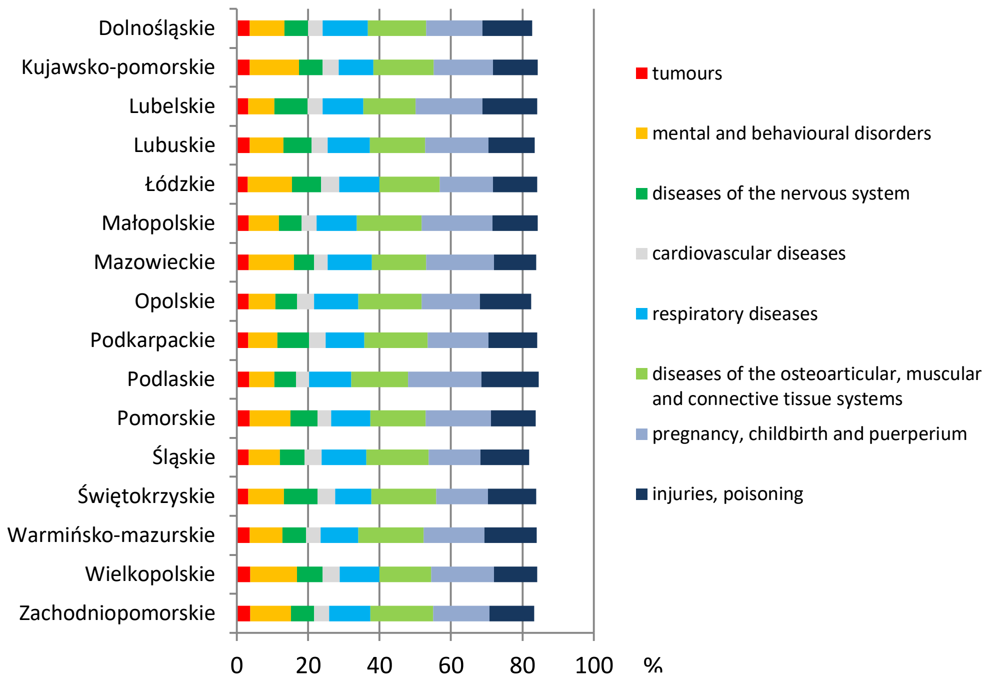

Fig. 11.9. Structure of the number of days of sickness absence in 2021 by voivodship and selected sickness groups

Table 11.10. Structure of the number of days of sickness absence in 2021 due to own sickness of persons insured with the Social Insurance Institution by selected sickness groups and provinces

Voivodships	including:								
	Total number of days absenteeism sickness	tumours	mental and behavioural disorders	diseases of the nervous system	diseases system circulations	respiratory diseases	systemic diseases		injuries, poisoning
							bone-joint, muscular and connective tissue	pregnancy, childbirth and puerperium	
TOTAL	**100.0**	**3.4**	**10.5**	**7.0**	**4.4**	**11.6**	**16.5**	**17.0**	**13.1**
Dolnośląskie	**100.0**	3.6	9.8	6.5	4.2	12.6	16.4	15.7	14.0
Kujawsko-pomorskie	**100.0**	3.6	13.8	6.7	4.4	9.8	16.9	16.5	12.6
Lubelskie	**100.0**	3.2	7.3	9.3	4.3	11.4	14.6	18.7	15.4
Lubuskie	**100.0**	3.6	9.5	7.8	4.6	11.8	15.4	17.8	13.0
Łódzkie	**100.0**	3.1	12.3	8.2	5.1	11.3	16.8	14.9	12.4
Małopolskie	**100.0**	3.3	8.5	6.3	4.2	11.3	18.1	19.9	12.7
Mazowieckie	**100.0**	3.4	12.6	5.6	3.9	12.4	15.1	19.1	11.8
Opolskie	**100.0**	3.3	7.5	6.1	4.8	12.4	17.7	16.3	14.3
Podkarpackie	**100.0**	3.2	8.2	8.8	4.7	10.8	17.7	17.1	13.7
Podlaskie	**100.0**	3.5	7.0	6.1	3.6	11.8	15.9	20.6	16.1
Pomorskie	**100.0**	3.6	11.4	7.6	3.8	11.0	15.5	18.3	12.5
Śląskie	**100.0**	3.3	8.8	6.8	4.8	12.6	17.5	14.4	13.7
Świętokrzyskie	**100.0**	3.2	10.0	9.4	5.0	10.1	18.1	14.6	13.5
Warmińsko-mazurskie	**100.0**	3.6	9.2	6.6	4.1	10.6	18.2	17.1	14.6
Wielkopolskie	**100.0**	3.7	13.2	7.1	4.8	11.1	14.5	17.7	12.0
Zachodniopomorskie	**100.0**	3.7	11.5	6.5	4.1	11.6	17.6	15.8	12.5

SUMMARY

1. For many years, there has been a predominance of own sickness certificates issued to women insured with the Social Insurance Institution, with a percentage of approximately 55% of all certificates issued. This also means a higher rate of sickness absence for women. In 2021, women's absenteeism certified by a medical certificate amounted to 137.1 million days, accounting for 57.1% of the total number of days of absenteeism.
2. This also translates into the amount of accumulated sickness absence per year. This measure in 2021 for women was more than six days higher than the average cumulative absenteeism for men, at 39.47 days (for men it was 33.49 days).
3. In the analysis of sickness absenteeism, an important element is the absenteeism of women whose incapacity to work falls during pregnancy, which has a significant impact on both overall absenteeism and the absenteeism of the female population. Pregnant women's sickness absence as a proportion of total absenteeism was 17.4 percent in 2021, while pregnant women's sickness absence as a proportion of sickness absence for this sex was 30.5 percent. One in 10 certificates was issued for incapacity occurring during pregnancy.
4. The most frequent sickness absence concerns insured persons in the age group of 30 to 34 years. In 2021, the percentage was 14.6% of the number of days of absence. In the case of male absenteeism, 13.5% of the number of days concerned insured persons with an age between 60 and 64 and between 35 and 39 with 12.0%. For women, 17.9 percent of absenteeism concerned insured persons aged between 30 and 34 years.
   - The longest sickness absence in **men** was caused by the following disease entities:
   - spinal root and plexus disorders (G54) – 6.3% of the total number of days of sickness absence for men,
   - back pain (M54) – 4.2%,
   - acute upper respiratory tract infection of multiple or unspecified location (J06) – 4.4%.

5. In the **female** population, for years, the longest sickness absence has been caused by obstetric care due to conditions mainly related to pregnancy (O26) – 24.7% of the total number of days of sickness absence for women. These are followed by:
   - severe stress reaction and adaptation disorder (F43) – 4.1%,
   - acute upper respiratory tract infection of multiple or unspecified location (J06) – 4.0%.
   - 2021 is the next year of COVID-19 infectious disease. The sickness absence data reflect the successive stages (waves) of the development of the COVID-19 epidemic.
6. In 2021, 528.3 thousand medical certificates issued for the COVID-19 entity were recorded, for a total of 4 244.8 thousand days of sickness absence. Compared to last year (period III-XII 2020), there was a decrease in both the number of sickness certificates, down 17.8%, and the number of days of sickness absence, down 16.3%.
7. The highest number of COVID-19 own sickness certificates was issued in March 2021, totalling at 123,400 certificates, representing 23.4% of all COVID-19 certificates issued in 2021 and nearly 3 times the number of certificates issued in the previous month. Another wave of increased sickness absence was recorded in November and December, with a total of 28.0% of sickness certificates and 25.2% of absence days.
8. There was a significant increase in hospital sickness absence compared to 2020. This is because absenteeism due to COVID-19 cases has more than doubled. Incapacity due to COVID-19 accounted for 7.1% of the number of days in hospital (in 2020, this was 3.9%). It should also be noted that in COVID-19 absenteeism, hospital stays accounted for nearly 10% of the total number of hospital absence days (in 2020, this was 3.7%).
9. Sickness absence is a significant financial challenge. In 2021, expenditure on sickness absence financed from the Social Insurance Fund (FUS) and from the workplace fund amounted to PLN 24.5 billion and was 7.0% higher than in the previous year.

12. SUBJECTIVE ASSESSMENT OF HEALTH AND LEVEL OF HEALTH NEEDS SATISFACTION BEFORE AND DURING THE COVID-19 PANDEMIC

Anna Smaga, Stefan Bogusławski,
Katarzyna Wróbel, Bogdan Wojtyniak

The COVID-19 pandemic has had a significant impact on the daily life of the Polish population, in particular on health-related behaviour and the use of medical services. The phenomena that have modified the views and behaviour of the Polish population particularly towards health and the health care system are classified in Fig. 12.1.

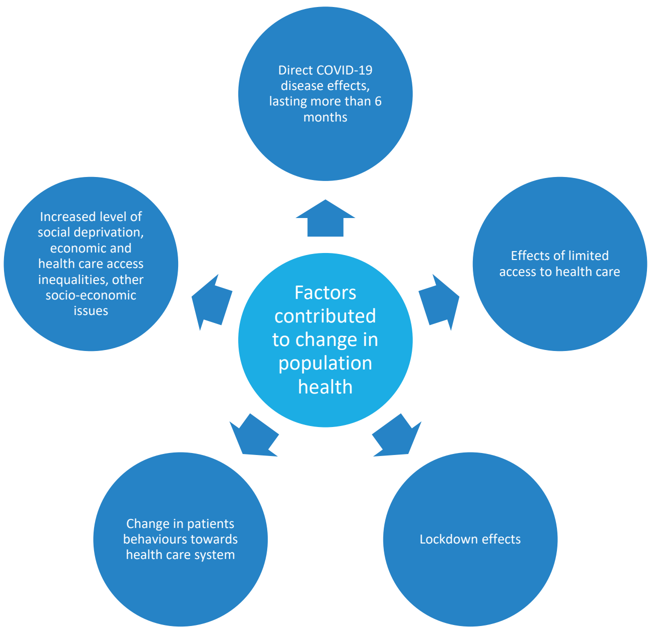

Fig. 12.1. Classification of sources of change in population health as a result of the COVID-19 pandemic *(own elaboration)*

Evolution of views and attitudes about health and the operation of the system that is taking place among the Polish population as a result of the COVID-19 pandemic, but also other phenomena, is a very interesting and important issue. These views and attitudes shape the demand for specific health services or the greater or lesser propensity to behave in a health-promoting manner, and thus influence the future healthiness of the Polish population. Cyclical surveys of the attitudes and views in question serve to anticipate trends, but also to point out deficiencies in the health system and areas where it should be corrected.

The National Institute of Public Health NIH – National Research Institute conducts such cyclical research in the form of surveys of the subjective and unmet health needs of the Polish population.

The subject of the analysis of the data collected is the subjective assessment of the state of health and the level of satisfaction of health needs, obtained during social surveys conducted on representative samples of adult inhabitants of Poland.

This section will discuss the following issues contained in the research surveys:

- general self-assessment of health
- existence of long-standing health problems or chronic sicknesses
- assessment of unmet health needs
- care for one's own health – in particular prophylactic behaviour
- use of health services financed by the National Health Fund and provided by private providers, financed outside of the National Health Fund

Respondents' attitudes resulting from the experience of the COVID-19 pandemic will also be analysed:

- compliance with sanitary regime recommendations,
- impact of pandemic-related restrictions on health, in particular possible mental health deterioration,
- abandonment, interruption or reduction of the treatment or rehabilitation process during the pandemic.

This section is therefore dedicated to trying to answer the key question: has the COVID-19 pandemic potentially contributed to the occurrence or changes in the scale of health inequalities and, if so, to what extent?

All age groups were affected by the pandemic, but older people in particular may have been more severely affected. This is a group that is characterised by lower levels of use of remote forms of communication such as the Internet and telephone, and is significantly dependent on the support of relatives and professional social support services. Studying the self-assessment of health condition and the level of satisfaction of health needs of this group is one of the specific objectives of this section.

The analysis is based on data obtained in two editions of studies carried out by the National Institute of Public Health, NIH – National Research Institute before the pandemic from 21.09–5.10.2018 and during the pandemic from 1–17.08.2022. The research was carried out using the face-to-face interview method (CAPI) on a representative random sample of the Polish population aged 20 and more.

In 2022, 2,000 people were surveyed. The sample was divided into five strata by age: 20–39 (N=500), 40–59 years (N=500), 60–74 (N=334), 75–84 (N=333), 85 years and over (N=333), was representative in terms of demographic variables (age, sex, place of residence – region and town size). The over-representation of the population over 60 years of age allowed a detailed analysis of the issue in groups potentially particularly affected by the pandemic.

In 2018, 3,000 respondents took part in the survey, the sample was divided according to the size of the towns in proportion to their population, the sample in each province maintained the proportion in terms of sex, age (20–39, 40–59, 60+). At the national level, the proportion of urban and rural residents by sex and age was additionally maintained.

The impact of the pandemic on the aspects studied was assessed in two ways – by means of a compilation of the results of two editions of the survey (conducted before and during the pandemic) and a direct assessment of the impact of the pandemic as expressed by respondents in the survey carried out in 2022.

12.1. Subjective assessment of health condition and how it has changed compared to before the pandemic

12.1.1. Subjective overall health assessment

One of the primary measures describing quality of life in the context of health is the subjective assessment of health condition. Respondents were asked to assess their health on a five-point scale, from "very good" to "very bad". It is an assessment made without the context of any reference (e. g. to other people of a certain age or expectations), nor is it objectivised – it is based on the respondent's feelings and is made by the respondent in relation to his or her own beliefs and attitudes. By default, it covers the various dimensions of health – physical, emotional, social – and refers to the state at the time of the assessment, but in the longer term (it is not burdened with short-term deterioration of health due to an ongoing infection, for example). Subjective assessment of medical condition is an accurate predictor of current or future health needs and mortality (in the older people group)[1].

In 2022, the overwhelming majority of Polish adults assess their health well or very well, with men more likely to do so than women (75.7% and 71.5% respectively). The percentage of negative opinions was higher among women (6.4% vs 3.9%) (Fig.12.2). The sex differences are a result of the different age structure of these subpopulations, as when standardised against age, the responses level off to a comparable level (approximately 73% of positive assessments and 4.8%-5.6% of negative assessments among men and women).

The percentage of people assessing their health well or very well remains at a similar high level compared to the assessments expressed in the previous 2018 survey (75.7% of men and 71.5% of women in 2022 and 75.2% of men and 69.0% of women in 2018). Comparing the period before the COVID-19 pandemic and the current period (2022), there was only a decrease in the best assessments (very good) among men (33.4%

1 Palladino, R. et al. (2016), "Associations between multimorbidity, healthcare utilisation and health status: Evidence from 16 European countries", Age and Ageing, Vol. 45/3, http://dx.doi.org/10.1093/ageing/afw044

vs 38.2%), in favour of a more frequent indication of a "good" assessment (42.2% vs 37.0%). Analysis of the data after standardisation of the demographic structure (by age, sex, place of residence) of the 2018 results, relative to the 2022 structure, additionally showed a significant increase in positive (good and very good combined) assessments of health among women (up 3.7 points).

In the survey conducted, an increase in very good health assessments is particularly evident among middle-aged and older women, i. e. in the age groups 40–59 and 60–74 (Fig. 12.5). In addition, when the extreme responses are added up, an increase in satisfaction with health is observed among those aged 40–59 of both sexes, as well as among women aged 60–74 and men aged 74+. However, despite the relatively large changes compared to 2018, these values are not statistically significant (Table 12.1, 12.2).

The data obtained in the survey allows us to look at subgroups with specific socio-demographic characteristics, defined by education, size of residence and economic conditions. Respondents were asked questions about whether their household had experienced – and if so, how often – a shortage of money for food (for the respondent and his or her immediate family), for clothing or if there were difficulties paying bills (rent, electricity, heating, etc.). On the basis of these three questions, sub-populations emerged, where the group with the most severe financial hardship was defined as those who had at least sometimes (sometimes, often or always) experienced one or more of these hardships, the group with a relatively good situation (none of these situations had ever happened to them in the last year), and the remaining group who had experienced financial hardship to a moderate degree.

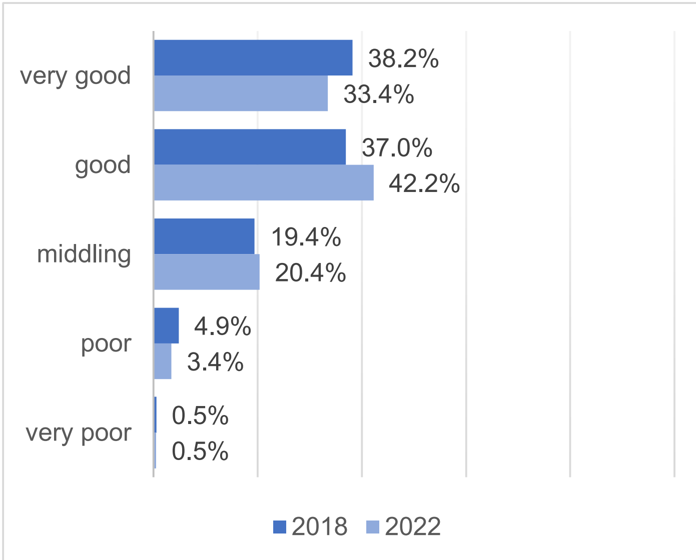

Fig. 12.2. Subjective assessment of health condition, men *(National Institute of Public Health NIH – National Research Institute study, 2018, 2022)*

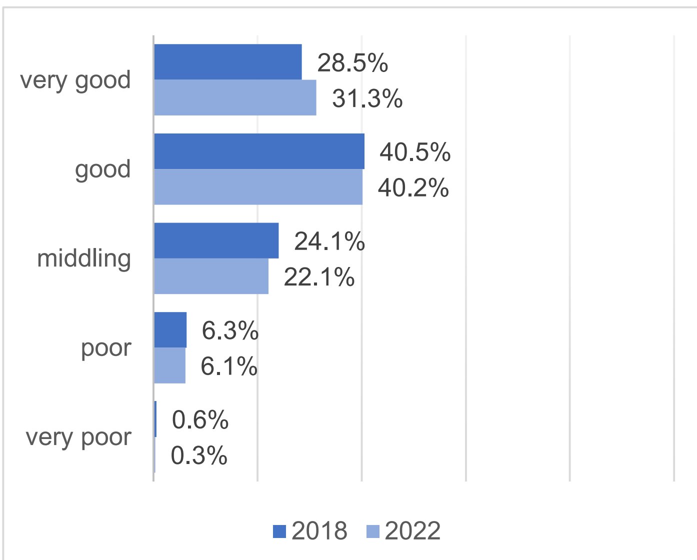

Fig. 12.3. Subjective assessment of health condition, women *(National Institute of Public Health NIH – National Research Institute study, 2018, 2022)*

Table 12.1. Overall health assessment in relation to socio-demographic characteristics, men *(National Institute of Public Health NIH – National Research Institute study, 2018, 2022)*

		Males			
		2018		2022	
		Very good/good assessment	Very poor/poor assessment	Very good/good assessment	Very poor/poor assessment
Age (years)	20–39	**94.7%**	**1.2%**	**93.2%**	**0.6%**
	40–59	80.6%	3.0%	85.7%	1.4%
	60–74	46.5%	9.1%	45.5%	7.5%
	75 +	13.8%	33.2%	22.2%	25.7%
Education	Primary	46.9%	14.8%	49.2%	9.7%
	Vocational	68.9%	7.4%	66.4%	5.8%
	Secondary	82.5%	3.0%	82.6%	3.3%
	Higher	87.7%	1.4%	86.9%	0.4%
Size of locality	Rural area	76.9%	4.7%	72.4%	4.5%
	up to 100 000	76.1%	5.3%	76.9%	4.5%
	100–500,000	69.7%	6.0%	75.4%	2.4%
	500+ thousand	74.3%	7.9%	83.0%	2.7%
Household economic situation	Most difficult economic situation	63.5%	10.7%	63.7%	6.8%
	Moderate economic difficulties	62.2%	10.2%	68.3%	7.3%
	Relatively good economic situation	82.0%	2.6%	80.6%	2.4%

Table 12.2. Overall health assessment in relation to socio-demographic characteristics, women *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

		Females			
		2018		2022	
		Very good/good assessment	Very poor/poor assessment	Very good/good assessment	Very poor/poor assessment
Age (years)	20–39	93.1%	0.7%	95.3%	0.3%
	40–59	75.2%	4.2%	80.5%	2.4%
	60–74	45.2%	10.3%	51.5%	7.7%
	75 +	22.3%	28.8%	20.8%	33.1%
Education	Primary	36.5%	20.9%	46.3%	19.5%
	Vocational	60.3%	7.2%	56.8%	8.0%
	Medium	74.6%	5.3%	74.5%	3.9%
	Higher	89.2%	0.9%	88.9%	2.5%
Size of locality	Rural area	71.3%	5.8%	71.2%	5.7%
	up to 100 000	69.8%	7.3%	70.7%	7.1%
	100–500,000	61.8%	9.3%	71.6%	5.9%
	500+ thousand	70.4%	5.9%	74.5%	7.9%
Household economic situation	Most difficult economic situation	56.6%	10.9%	61.0%	10.6%
	Moderate economic difficulties	64.1%	11.3%	59.1%	9.8%
	Relatively good economic situation	74.7%	4.4%	77.4%	4.5%

The analysis in terms of socio-demographic factors (Tables 12.1 and 12.2) shows that, compared to 2018, the percentage of people declaring satisfaction with their health increased markedly among women with primary education (by 9.8 p.p., a statistically insignificant result), women living in large cities with a population of 100 000 to 500,000 (an increase of 9.9 p.p., a statistically significant result), in the group of people with a poor financial situation (by 4.4 p.p., a statistically insignificant result). This effect persists after the 2018 standardisation of the demographic structure and is mainly related to an increase in "top" scores among women.

For men, the sum of good/very good assessments increased slightly among those with primary education, in large, 100–500,000 inhabitants and the largest cities, over 500,000. Changes in assessments between 2018 and 2022 were not correlated with respondents' assessment of their economic situation (defined as above). It should be noted that the aforementioned increases are not statistically significant and soften slightly when the

2018 results are standardised. For men, there was a decrease in very good assessments and an increase in good assessments, with no strong impact on the sum of these two response categories (Fig. 12.4).

A clear increase in good assessments (and a decrease in very good assessments) occurred among men with primary and secondary education, among men living in small towns (up to 100 000 inhabitants), as well as in the largest cities with more than 500,000 inhabitants (the result is statistically insignificant) and in a relatively good economic situation, i.e. with no financial difficulties in terms of basic needs.

Although Poles mostly assess their health well, the results of the comparisons show that there has been an increase in negative responses in certain subgroups since the last survey in 2018. This applies to women aged 75 and over, living in the largest cities, in the group with a higher education. The results are not statistically significant, but the upward trend continues after standardising the structure of the 2018 results by sex, age and size of residence.

The emerging picture of a better self-assessment of health condition made in 2022 than in 2018, in view of the changes in the health condition of the Polish population after the pandemic, described in other sections of this publication and shown in many publications based on analysis of data from medical records or the National Health Fund, as well as the expected negative impact of the COVID-19 pandemic on access to diagnosis and treatment, requires discussion in a broader context.

Poland's population structure in 2022 is altered compared to the hypothetical "no pandemic" scenario due to excess deaths, which were more likely to affect older people and within age groups with a higher burden of chronic diseases. Both characteristics – age and the presence of chronic diseases and long-term health problems – correlate with the subjective assessment of medical condition.

In addition, it is worth noting that the positive trend and structure of health condition assessments observed from the National Institute of Public Health NIH – National Research Institute study is in line with the results of EU-SILC on a group of people aged 16 and over. The annual editions of the study record an increase in the share of very good and good health condition assessments in European countries, including Poland, where positive assessments increased from 59% in 2018 to 64% in 2021 for the total population over 16 years of age.

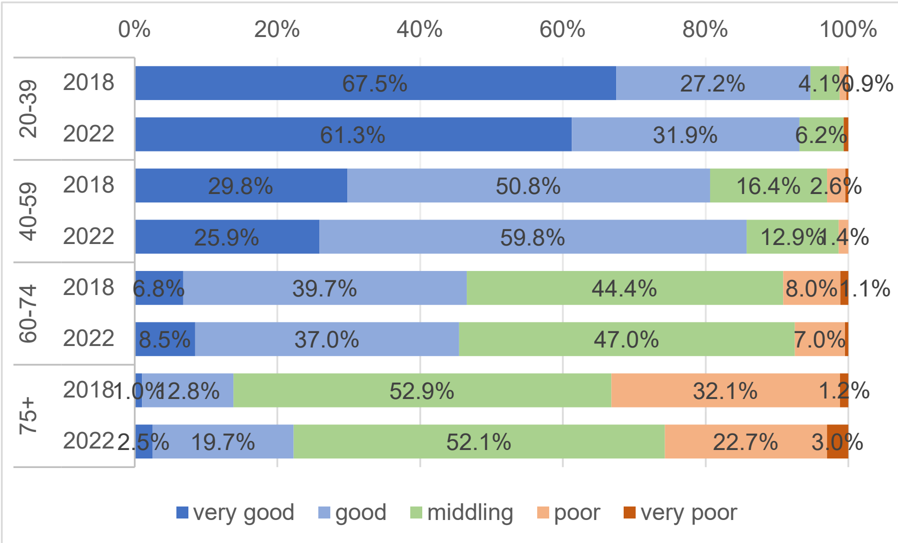

Fig. 12.4. Overall health assessment in age groups, men *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

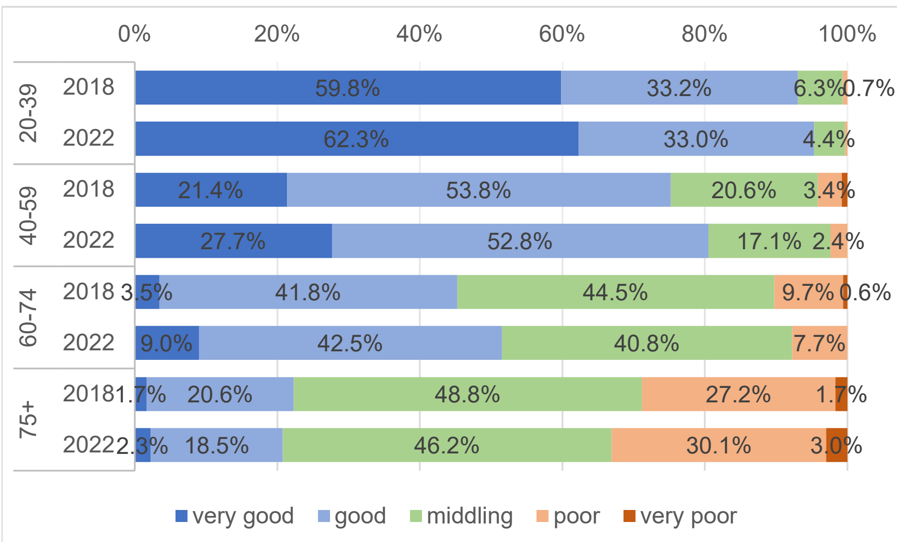

Fig. 12.5. Overall health assessment in age groups, women *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

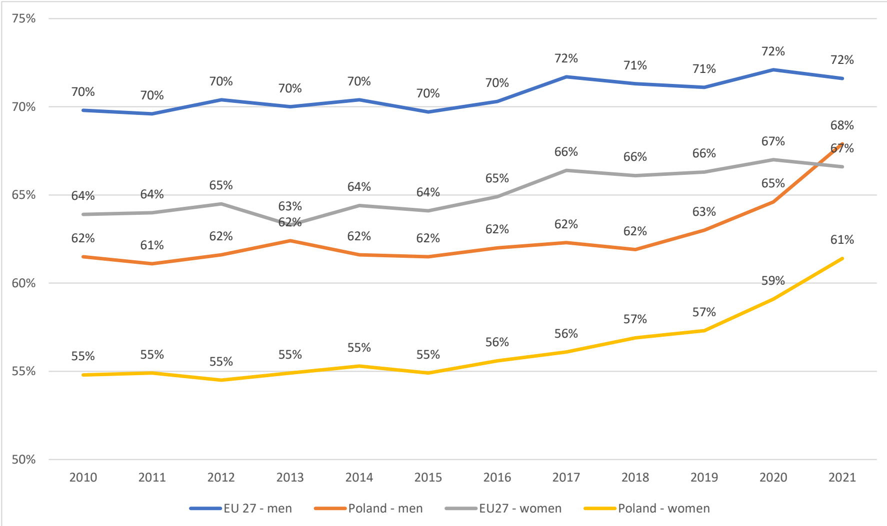

Fig. 12.6. Percentage of very good and good health assessment among people aged 16+ (*Eurostat EU-SILC study data)*[2]

Over recent years, there has been an increase in positive evaluations of both women and men. Still, the percentage of women and men who assessed their health as very good or good is in Poland below the corresponding figures in the European Union countries, but the rate of increase of the index for Poland is faster. It is worth noting that in the European Union countries, the proportion of positive assessments in 2021 is lower than in 2020, but still higher than before the pandemic. For Poland, not only was no decrease observed in 2021, but a significant increase.

12.1.2. Subjective assessment of change in health condition compared to before the pandemic

In a survey conducted by the National Institute of Public Health NIH – National Research Institute in August 2022, respondents were asked directly how they assessed their health today, compared to their health three years ago, in 2019, before the pandemic. The results for all adult women and men are presented in Fig. 12.7.

[2] HLTH_SILC_10 https://ec.europa.eu/eurostat/databrowser/view/HLTH_SILC_10/default/table?lang=en

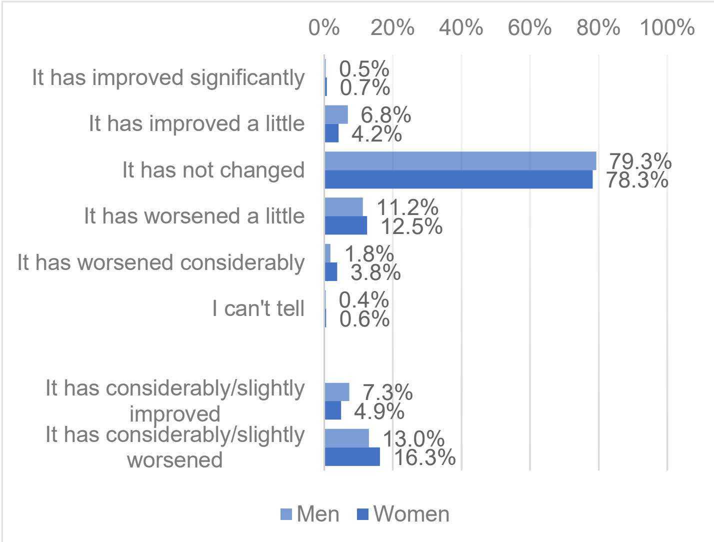

Fig. 12.7. Assessment of the change in health condition compared to the time before the pandemic *(National Institute of Public Health NIH – National Research Institute studies, 2022)*

As indicated in section 12.1.1, comparing the results of the pre-pandemic COVID-19 survey with the 2022 edition, there were no significant declines in the overall health score. Despite this, the results of the current edition of the survey indicate that there is a relatively large group of Polish residents who claim that their health has deteriorated since the pandemic. This is 13.0% males and 16.3% females. The sex gap in health deterioration is due to the different age structure in the two subgroups and disappears when the data are standardised by age (to 14.4% of men and 15.1% of women). These people were asked in a survey about the reasons why their health had deteriorated, given the opportunity to choose one or more reasons from a pre-created list, with the option to enter a different answer. (Table 12.3). In both the male and female groups, the most frequently indicated reason for deterioration in health was due to complications or exacerbations of a disease or diseases that the individuals in question had already had three years previously. About one-fifth of the women and men could not attribute a specific reason for the deterioration.

Table 12.3. Reasons for worsening of health condition compared to 3 years ago, respondents' assessment *(National Institute of Public Health NIH – National Research Institute studies, 2022)*

	Males	Females
As the result of an accident	6.4%	1.2%
Due to COVID-19 infection	16.4%	17.0%
Due to the onset of a new disease(s) (other than COVID-19) that I did not have 3 years ago	11.3%	15.7%
Due to complications or exacerbation of disease(s) I had 3 years ago	26.4%	32.5%
Due to incorrect treatment or misdiagnosis/non-diagnosis of the disease	2.3%	3.4%
Due to limited access to medical services during the pandemic	17.2%	12.7%
Due to lifestyle changes, cessation of physical activity during the pandemic	13.1%	13.6%
Other reasons	6.1%	9.7%
Without a specific reason	18.2%	20.9%

In the group that reports worse health compared to 2019 (Fig. 12.8), 39.9% of men and 35% of women link this condition, among others, directly or indirectly to the COVID-19 pandemic. When extrapolated to the Polish population level, this translates into a figure of 1.7 million adults, including 755.2 thousand men and 909.4 thousand women. Specifically, it is, according to respondents, the result of COVID-19 infection (16.4% of men and 17.0% of women perceiving deterioration), or the result of limited access to medical services during the pandemic (17.2% of men and 12.7% of women, respectively) or a change in lifestyle during the pandemic (13.1% and 13.6%, respectively). The percentages remain similar after standardisation against the age structure.

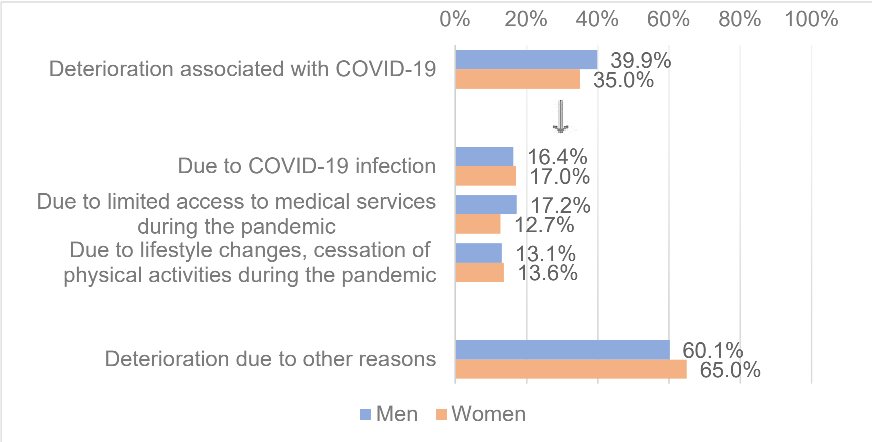

Fig. 12.8. Reasons for worsening health compared to pre-pandemic – multiple responses possible *(National Institute of Public Health NIH – National Research Institute studies, 2022)*

A further analysis was conducted on a subgroup of people who estimated that their health had deteriorated over the past three years and listed at least one reason for this deterioration related to the COVID-19 pandemic. The socio-demographic characteristics of this subgroup are shown in the table below (Table 12.4)

Table 12.4. Socio-demographic characteristics of people declaring deterioration in health for reasons related to the COVID-19 pandemic vs. the rest of the population *(National Institute of Public Health NIH – National Research Institute studies, 2022)*

		Males	Females
Age (years)	20–39	17.4%	14.8%
	40–59	23.5%	19.6%
	60–74	44.0%	34.4%
	75–84	11.2%	23.0%
	85 +	3.9%	8.2%
Education	Primary	17.0%	15.4%
	Basic vocational	25.9%	20.9%
	Secondary	26.0%	39.4%
	Higher	31.1%	24.3%
Size of locality	Rural area	34.0%	40.7%
	up to 100 000	26.4%	34.2%
	100–500,000	24.9%	19.9%
	500+ thousand	14.8%	5.1%
Household economic situation	Most difficult economic situation	15.0%	30.6%
	Moderate economic difficulties	24.7%	16.8%
	Relatively good economic situation	60.3%	52.6%

Table 12.5. Proportion of people declaring deterioration in health for reasons related to the COVID-19 pandemic, in a given subgroup defined by levels of age, education, size of locality and economic conditions *(National Institute of Public Health NIH – National Research Institute study, 2022)*

		Males			Females		
		Deterioration associated with COVID19	Remaining population	Total on line	Deterioration associated with COVID19	Remaining population	Total on line
Age (years)	20–39	2.5%	97.5%	100%	2.6%	97.4%	100%
	40–59	3.4%	96.6%	100%	3.4%	96.6%	100%
	60–74	10.5%	89.5%	100%	8.0%	92.0%	100%
	75–84	12.4%	87.6%	100%	17.5%	82.5%	100%
	85 +	13.5%	86.5%	100%	13.0%	87.0%	100%
Education	Primary	8.3%	91.7%	100%	6.2%	93.8%	100%
	Basic vocational	4.9%	95.1%	100%	6.4%	93.6%	100%
	Medium	3.7%	96.3%	100%	5.9%	94.1%	100%
	Higher	6.4%	93.6%	100%	4.7%	95.3%	100%
Size of locality	Rural area	4.7%	95.3%	100%	6.0%	94.0%	100%
	up to 100 000	3.9%	96.1%	100%	5.9%	94.1%	100%
	100–500,000	8.4%	91.6%	100%	6.9%	93.1%	100%
	500+ thousand	6.5%	93.5%	100%	2.5%	97.5%	100%
Household economic situation	Most difficult economic situation	4.2%	95.8%	100%	8.8%	91.2%	100%
	Moderate economic difficulties	8.8%	91.2%	100%	6.5%	93.5%	100%
	Relatively good economic situation	4.7%	95.3%	100%	4.6%	95.4%	100%

Analysis of the prevalence of pandemic-related health deterioration, as assessed by respondents, shows that it is clearly age-dependent and is more prevalent in the oldest age groups – those aged 75–84 years (in this subpopulation, among men, they account for 12.4%, among women, 17.5%) and those aged 85 years and older (in this group, they account for 13.5% of men and 13.0% of women).

The socio-demographic structure in the population under consideration (health deterioration due to the COVID19 pandemic) of men and women is of a slightly different nature. For women, the proportion linking the deterioration of their condition to the effect of the pandemic is at a similar level, regardless of their level of education, and it is significantly lower in large cities. The proportion of men declaring a decline in health due to the pandemic, on the other hand, is highest in large cities and is correlated (non-linearly) with the level of education: it is high among men with primary and higher education and lowest among those with secondary education.

The proportion of women and men with deteriorating health due to COVID-19 ranges from 4 to 8 percent, depending on their economic situation. Among women, the highest proportion of this group is among the most economically disadvantaged, while among men it is highest in the group with moderate economic problems.

In addition to socio-demographic characteristics, it was examined whether the subgroup of people experiencing deterioration in health, directly or indirectly due to COVID-19, differed from the rest of the population in terms of the prevalence of chronic diseases or other burden of health problems. There is a noticeable difference in the health profile of these people – both men and women. This is because they are far more likely to say that they suffer from long-term health problems or chronic sicknesses in general (which last, or are expected to last, 6 months or more), and from a long-term (minimum of the last 6 months) reduced ability to perform the activities people usually do, resulting from health problems.

In the subgroup under consideration, long-term health problems affect 76.7% of men and 85.0% of women (compared to approximately 25% for both sexes in the rest of the study population), and severe long-term activity limitations due to health problems affect 23.2% of men and 27.0% of women (compared to approximately 4% for both sexes in the rest of the population), non-serious limitations affect 35.6% of men and 43.2% of women (compared to 15–16% in the rest of the population, respectively).

When presented with a predefined list of diseases, the vast majority of the subpopulation analysed (those indicating deterioration in health as a result of the pandemic) say that they have had at least one of these diseases (asthma, chronic lung disease, myocardial infarction, ischaemic heart disease/coronary artery disease, hypertension, hypercholesterolaemia, stroke or myocardial infarction, diabetes, allergic diseases, cirrhosis or liver dysfunction, tumour, osteoporosis, permanent damage/defects caused by an accident) in the past months. This applies to 77.0% of men and 80.5% of women (while in the rest of the population, these diseases are indicated by 25.1% – 28.8% of men and women respectively).

The results of the survey also assessed the occurrence of depressive symptoms and their severity (over the past two weeks), based on questions from the PHQ-9 patient health survey. It turns out that in the analysed subgroup, depressive symptoms are more prevalent than in the others, according to subjective declarations (44.5% of men and 69.3% of women vs. 14.6% – 20.3% of men and women in the other population), including especially more frequent moderate depression (17.6% – 21.7% of men and women vs. about 3% in the other subgroup) as well as severe depression (10.6% -11.0% of men and women vs. less than 2% in the other).

In addition, those associating the deterioration of their health over 3 years with the effect of the pandemic are burdened with a high BMI to a much greater extent than others (obesity affects 39.6% of men and 24.5% of women – vs. 13.1% and 9.4% in the remaining subpopulation, respectively), and are also those who are more likely to report having passed COVID-19 infection, i.e. 49.3% of men and 62.4% of women (vs. about 25% among both sexes in the remaining subpopulation).

It is noteworthy that all of the above differences in the level of health burden of diseases and health problems, relative to the rest of the Polish population who do not experience deterioration in health or do not associate it with the COVID-19 pandemic, are statistically significant.

12.1.3. The impact of staying at home for a long time

A major issue during the COVID-19 pandemic was, due to restrictions and recommendations, the need to stay at home. The following is an analysis of the impact of prolonged residence at home on the health of adults in Poland, based on the subjective assessment given by respondents in a survey.

Those who did not stay at home for long periods of time due to the pandemic represent approximately one quarter of adults of both sexes and have been excluded from the analysis below.

The highest proportion of people staying at home for long periods of time is observed in the oldest groups – aged 85 and over (89.5% of men and 85.4% of women), and among those aged 75–84 (85.7% among men and 89.7% among women).

This was significantly less common for men in relatively good economic situation and men with a basic vocational education, while it was less common for women in small towns with up to 100 000 inhabitants and in the largest cities with more than 500 000 inhabitants (Table 12.6).

Table 12.6. Percentage of people declaring to stay at home for a long time during the pandemic *(National Institute of Public Health NIH – National Research Institute study, 2022)*

		Males		Females	
		Persons who have stayed at home for a long time	Persons who have NOT stayed at home for a long time	Persons who have stayed at home for a long time	Persons who have NOT stayed at home for a long time
Sex	Males	74.2%	25.8%	-	-
	Females	-	-	75.7%	24.3%
Age (years)	20–39	73.2%	26.8%	71.9%	28.1%
	40–59	69.6%	30.4%	71.6%	28.4%
	60–74	79.9%	20.1%	80.3%	19.7%
	75–84	85.7%	14.3%	89.7%	10.3%
	85 +	89.5%	10.5%	85.4%	14.6%
Education	Primary	88.6%	11.4%	77.5%	22.5%
	Basic vocational	66.2%	33.8%	77.1%	22.9%
	Medium	70.6%	29.4%	75.8%	24.2%
	Higher	82.1%	17.9%	73.9%	26.1%
Size of locality	Rural area	73.2%	26.8%	79.9%	20.1%
	up to 100 000	70.3%	29.7%	67.9%	32.1%
	100–500,000	82.2%	17.8%	87.6%	12.4%
	500+ thousand	78.5%	21.5%	67.0%	33.0%
Household economic situation	Most difficult economic situation	81.3%	18.7%	78.1%	21.9%
	Moderate economic difficulties	79.7%	20.3%	82.2%	17.8%
	Relatively good economic situation	71.0%	29.0%	73.5%	26.5%

In the group of people who stayed at home for long periods during the pandemic, women suffered significantly more negative consequences of the situation, compared to men. 16.0% of women, compared to 10.3% of men, noted a deterioration in physical health and 23.2% a deterioration in mental health (compared to 17.0% of men) (Fig. 12.9, 12.10). Sex differences maintain their strength when standardised against the age structure.

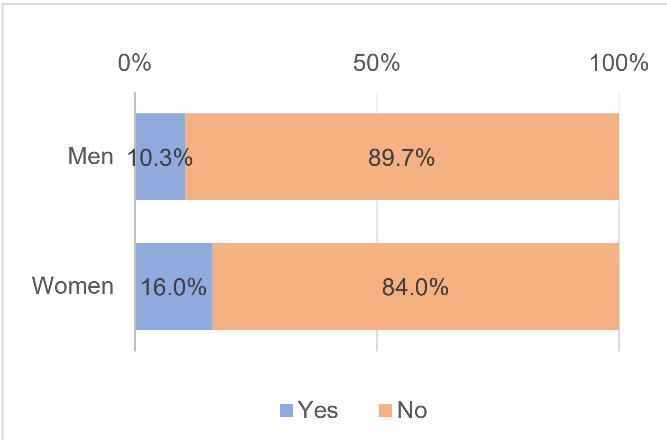

Fig. 12.9. Deterioration of physical health while staying indoors for long periods of time (100% = persons declaring staying indoors for long periods of time during the pandemic) *(National Institute of Public Health NIH – National Research Institute study, 2022)*

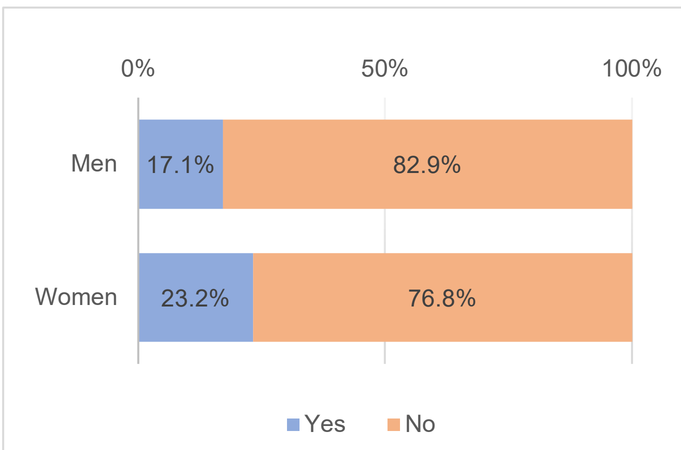

Fig. 12.10. Deterioration of mental health while staying indoors for long periods of time (100% = persons declaring staying indoors for long periods of time during the pandemic) *(National Institute of Public Health NIH – National Research Institute study, 2022)*

Declared health deterioration, including mental health deterioration, associated with prolonged residence increases with age, especially after 75 years of age, and with the size of the place of residence.

Deterioration in physical health was noted by 23.9% of men and women aged 75–84 years, and 26.8% of men and 22.5% of women aged 85 years and older (vs. 7–13% of men and around 15% of women in other age categories). This was mostly the case for residents of large and major cities.

Mood decline and other mental health problems were noted by 26.0% of men and 27.6% of women in the 75–84 age group and 24.2% of men and 25.7% of women aged 85 and more (vs. 14–18% of men and approximately 22–23% of women in the other subgroups). This phenomenon mainly affects residents of large and major cities.

In addition, mental deterioration is significantly correlated with poorer household material circumstances among men – it occurred among 28.7% of men with the most difficult material circumstances, while 14.3% of those in relatively better material standing saw such a decline. The above-described differences persist or are reinforced when results are standardised by age.

When the results of the study are extrapolated to the national population, it appears that the consequences of limiting home leaving during the pandemic affect a relatively large proportion of the population over 20 years of age. 1.1 million men and 1.9 million women are affected by a deterioration in physical health during a prolonged stay at home, while a decline in physical health affects 1.8 million men and 2.8 million women in Poland.

12.2. Incidence of long-term health problems and chronic diseases

A comparison of the 2022 and 2018 survey results showed significant changes in the prevalence of health complaints among adults in Poland (Fig. 12.11, 12.12). The decrease in health burden among women and the lack of a similar trend among men resulted in a levelling off of the sex differences that were observed before the pandemic (excluding depressive symptoms).

In the general population, women are more likely to be in good health in terms of both physical and mental health, compared to before the pandemic – fewer women say they have had long-term health problems lasting a minimum of six months, and have not had any sickness diagnosed by a doctor in the past 12 months that was asked about in the survey (down 4.3 and 4.7 points, respectively, to 28.7% and 31.8%). They are less likely to have long-term (at least 6 months) restrictions on their usual activities due to health problems (down 6.5 points to 23.4%). There was also a decrease in the number of women declaring symptoms that could indicate depression in the last 14 days (2.3 p.p. less, to 23.1%). All the changes described above are statistically significant, except for the changes in the prevalence of depression, which, after standardisation by age of the 2018 data, indicate a significant reduction in the prevalence of depression.

Among men, reported symptoms of depression are also less prevalent than before the pandemic, with a decrease of 4.8 p.p. (now 16.2%) compared to 2018. When it comes to health in general, however, the trend is the opposite in places, with more men (by 3.8 points, to 27.8%) saying they have long-term health problems or sicknesses that have lasted or will last at least six months. However, this is not a statistically significant difference after taking into account the standardisation of the 2018 results against the demographic structure.

In a comparative analysis of health condition before the pandemic and now, the middle-aged and older people group, which appears to be currently less burdened by health problems, is noted.

In the 60–74 age group, there have been significant changes: fewer people of both sexes report experiencing symptoms of a serious sickness in the past 12 months (down by 5.8 p.p. among men and 7.4 p.p. among women, to 6.7% and 5.6%, respectively), and restrictions in people's usual activities due to sickness (down by 8.9 p.p. among men and as much as 18.8 p.p. among women – now 36.3% and 32.5%, respectively). In addition, men aged 60–74 are less likely to mention symptoms indicative of depression in the past 2 weeks (down 9.8 points to 23.6%). In contrast, general long-term health problems are less common among women (down 12.1 p.p. to 45%). All differences are statistically significant and persist after standardising the 2018 data against the demographic structure.

It is worth noting that there have also been positive changes in health among the oldest group (75 and more). Although the differences are not statistically significant, it is noticeable that there is a decrease in the percentage of women talking about current long-term health problems (9.7 p.p. less in women / 72.4% – in men there was

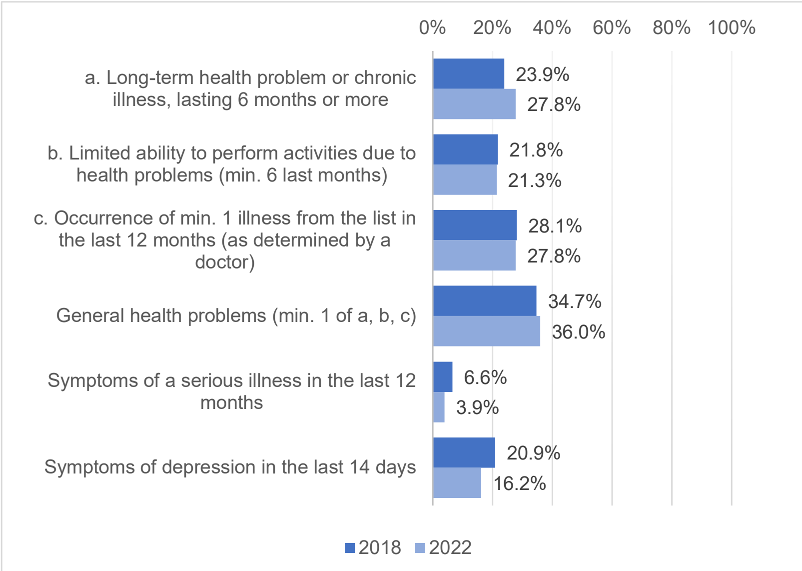

Fig. 12.11. Burden of diseases and health problems declared in the survey, men, 2022 *(National Institute of Public Health NIH – National Research Institute studies)*

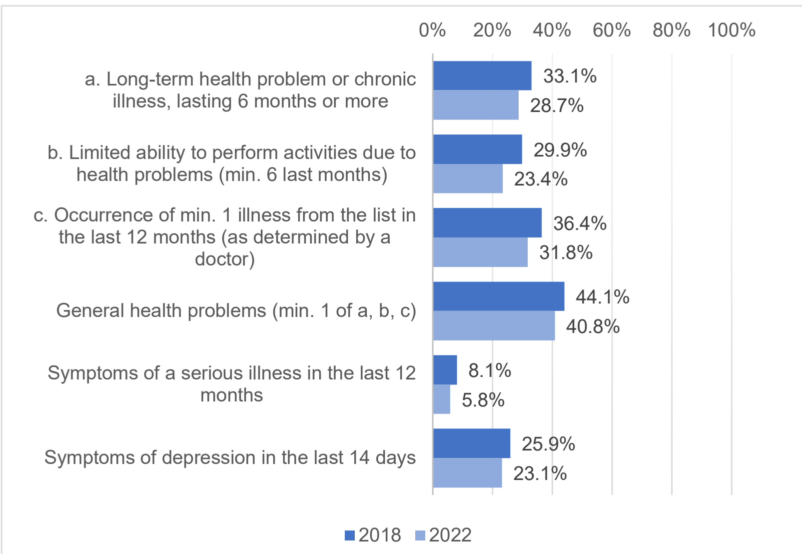

Fig. 12.12. Burden of diseases and health problems declared in the survey, women, 2022 *(National Institute of Public Health NIH – National Research Institute studies)*

an increase of 4.8 p.p. to 78%), fewer respondents indicate symptoms of a serious sickness in the last 12 months (down 6 p.p. in men to 14.3% and 3.6 p.p. in women to 14%) as well as symptoms of depression (down 11 p.p. in men / 52.4% and 6.8 p.p. among women / 54.4%).

Among middle-aged people (40–59), men are less likely to report symptoms of depression (down 4 p.p. to 12.9%), while there is an increase in the percentage of people with long-term health problems lasting at least six months or more (up 5.9 p.p. to 23.1%). In contrast, among women in this age category, there are now significantly fewer people experiencing such problems (-6.9 p.p. reduction to 18.7%) and restrictions in activities due to sickness (-5.6 p.p. / 16.9%), as well as declaring doctor-diagnosed sicknesses mentioned in the survey (– 11.3 p.p. / 18.8%). The above changes are statistically significant and persist after standardising the 2018 data against the demographic structure.

Analysis of other socio-geographical characteristics shows that the changes described above affect people living in rural areas and/or small towns most strongly, both women and men, most often women with primary education (in the case of men, the increase in health problems occurs clearly in those with a university education, and the decrease in depressive symptoms in those with secondary and higher education).

12.3. Unmet health needs

12.3.1. Access to health care

The following section presents an analysis of the results of the 2018 and 2022 surveys in terms of waiting times for health services and the financial feasibility of providing services in-house (privately). As a first step, the changes that have taken place in the percentage of people who say they have not needed a particular type of healthcare in the last 12 months were tracked (Table 12.6, Table 12.7). It appears that, compared to 2018, there has been a particular increase in the number of women who report that they did not need healthcare (in general) during this time, (up 5.5 p.p. to 28.2%), and in particular physician-led care (up 5.2 p.p. to 33%) and prescription drugs (+6.3 p.p. / 33.5%) – these are statistically significant increases, continuing after standardisation of the 2018 data. This phenomenon affects to the greatest extent the age groups 40–59 and 60–74, women with primary education, residents of large and major cities (100 000 to 500 000 and over 500 000 inhabitants) and women in the most difficult economic situation. Similar significant increases among those not needing services occurred for dental care, among women in the largest cities, in the group with basic vocational education and also among middle-aged women (high but not significant increase).

Among men, looking at their overall population, there has not been as much change as among women compared to 2018, but there has been a noticeable increase in the percentage of men declaring that they have not needed healthcare in the last 12 months, among the older people (60–74 years and 75+ years), and especially physician-led care among those aged 60–74 (statistically significant change). Significantly more of the most financially deprived respondents said they had no need for dental services, prescription medicines and medical care provided by a doctor; this also applies to men with a basic vocational education (medical care – a significant result after standardisation of the 2018 data), and residents of the largest cities (over 500,000), but in this case, the increases, although clear, are not statistically insignificant.

On the other hand, in some subpopulations of men, compared to 2018, fewer people say they did not need healthcare (so the need has increased): this is among middle-aged men, 40–59 years old and younger – in terms of medical care in general, among those in relatively good financial situations (a significant decrease), and a decreasing trend can be seen in small towns (up to 100 000) and in groups with primary and also higher education – although this is not statistically significant.

It is worth noting the change related to mental health care. Fewer men say there is no need for such services, in the higher educated group and among those in a relatively good economic situation. For women, the phenomenon is noticeable in the economically moderate group.

In both editions of the survey, despite the clear changes described above, it is still men who are more likely to report a lack of need for healthcare, by any measure considered.

Table 12.7. Percentage of people who did not need a particular type of health care in the last 12 months, by socio-demographic characteristics, men *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

		Men									
		Health care, in general		Medical care (provided by a doctor)		Dental care		Prescription drugs		Mental health care (e.g. psychologist or psychiatrist)	
		2018	2022	2018	2022	2018	2022	2018	2022	2018	2022
Men, total		35.3%	32.8%	40.7%	41.3%	53.1%	53.1%	40.9%	41.8%	74.9%	72.7%
Age (years)	20–39	47.2%	42.6%	52.0%	52.9%	53.0%	53.6%	53.8%	55.6%	78.0%	77.0%
	40–59	39.5%	34.1%	45.5%	43.1%	54.5%	53.2%	44.7%	44.9%	76.5%	73.8%
	60–74	13.7%	19.9%	19.1%	27.0%	48.9%	50.6%	18.2%	22.2%	68.4%	65.7%
	75 +	6.4%	13.2%	12.1%	13.8%	58.5%	58.3%	10.8%	12.3%	67.3%	66.7%
Education	Primary	27.1%	19.2%	31.4%	26.7%	61.6%	56.1%	27.5%	24.1%	67.8%	72.6%
	Vocational	32.1%	34.6%	35.6%	41.4%	51.9%	61.7%	35.6%	43.2%	71.4%	73.4%
	Secondary	38.9%	35.9%	44.1%	43.3%	54.5%	52.0%	45.8%	45.4%	77.4%	72.2%
	Higher	37.9%	32.0%	49.6%	44.4%	45.8%	44.1%	48.4%	42.3%	81.0%	72.8%
Size of locality	Rural area	37.1%	34.2%	41.8%	43.4%	56.1%	58.5%	42.0%	45.5%	73.8%	73.1%
	up to 100 000	37.0%	31.6%	43.1%	39.9%	57.7%	53.9%	43.7%	39.0%	77.7%	74.0%
	100–500.000	29.5%	29.7%	34.2%	33.4%	44.3%	39.4%	36.5%	36.0%	71.8%	67.1%
	500+ thousand	32.6%	35.6%	39.9%	48.9%	41.7%	51.3%	35.5%	45.6%	75.7%	75.4%
Household economic situation	Most difficult economic situation	20.2%	32.9%	27.3%	40.2%	37.7%	49.8%	25.8%	40.2%	54.8%	64.3%
	Moderate economic difficulties	33.2%	25.4%	36.9%	31.8%	56.3%	49.7%	35.5%	35.9%	76.3%	71.1%
	Relatively good economic situation	40.2%	34.3%	45.6%	43.7%	56.6%	54.7%	46.7%	43.5%	80.4%	75.5%

Table 12.8. Percentage of people who did not need a particular type of health care in the last 12 months, by socio-demographic characteristics, females *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

		Woman									
		Health care, in general		Medical care (provided by a doctor)		Dental care		Prescription drugs		Mental health care (e.g. psychologist or psychiatrist)	
		2018	2022	2018	2022	2018	2022	2018	2022	2018	2022
Women, total		22.7%	28.2%	27.8%	33.0%	41.3%	44.0%	27.2%	33.5%	68.9%	67.5%
Age (years)	20–39	34.3%	36.6%	41.5%	43.8%	41.7%	38.9%	42.5%	44.2%	70.8%	69.3%
	40–59	22.4%	31.6%	27.7%	36.2%	34.0%	43.3%	27.2%	38.5%	69.4%	69.8%
	60–74	11.8%	21.7%	16.2%	23.5%	44.6%	46.0%	13.3%	23.0%	65.7%	63.4%
	75 +	9.2%	8.2%	8.0%	13.6%	55.6%	56.0%	6.9%	11.2%	67.8%	64.9%
Education	Primary	9.0%	26.8%	12.0%	27.2%	50.2%	57.6%	11.0%	23.5%	59.2%	64.8%
	Vocational	19.2%	24.7%	22.5%	29.7%	41.8%	50.7%	23.9%	30.9%	69.7%	69.9%
	Secondary	25.4%	27.5%	33.4%	32.3%	42.4%	43.8%	32.5%	35.4%	69.9%	67.0%
	Higher	30.2%	31.9%	32.6%	38.6%	32.8%	33.5%	30.5%	37.4%	71.8%	68.0%
Size of locality	Rural area	25.2%	27.2%	29.7%	35.6%	43.4%	44.7%	29.4%	34.7%	70.5%	68.0%
	up to 100 000	25.1%	26.8%	31.3%	30.3%	44.9%	42.9%	29.9%	31.0%	68.7%	67.3%
	100–500.000	15.5%	27.4%	21.3%	31.7%	38.6%	44.9%	19.9%	34.9%	67.1%	68.8%
	500+ thousand	19.2%	36.6%	22.0%	33.8%	29.2%	43.4%	23.7%	34.7%	66.9%	64.5%
Household economic situation	Most difficult economic situation	16.0%	30.1%	18.4%	29.7%	32.8%	41.0%	19.9%	31.3%	51.5%	55.8%
	Moderate economic difficulties	23.1%	25.6%	30.7%	29.0%	46.0%	36.5%	29.9%	30.4%	75.6%	58.8%
	Relatively good economic situation	24.9%	28.2%	30.2%	34.9%	43.0%	46.5%	28.9%	34.8%	72.9%	73.0%

Individuals who had not needed a particular type of healthcare in the last 12 months were excluded from further analysis.

The results show an improvement in access to healthcare, with a decrease in the percentage of people who could not afford a particular type of care. Improvements are occurring among both men and women, in most intersections by socio-demographic characteristics, with a particular increase among the oldest group. Clearly burdened by problems of access to health care is the group of people who declare a deterioration in their health over the last 3 years and who link this deterioration to the effect of the COVID-19 pandemic (directly or indirectly).

In the general population of women and men, compared to the time before the COVID-19 pandemic, there were no statistically significant changes in the number of people experiencing delays in waiting for medical appointments, nor did access problems due to distance or transport difficulties increase (Fig. 12.13). What is noticeable, and statistically significant, is the increase in the number of people who have not experienced problems with the financing of individual services in the last 12 months (Fig. 12.14).

Among women, there was a decrease in the number of people declaring that they could not afford the forms of healthcare considered (medical care by 3.6 p.p., dental care by 6.7 p.p., prescription drugs by 5.1 p.p., mental health care by 5.7 p.p. Among men, the trend is slightly weaker, but there was a significant decrease in the inability to fund dental care and prescription drugs (by approximately – 7 p.p.). Differences persist after standardisation of the 2018 data due to the demographic structure.

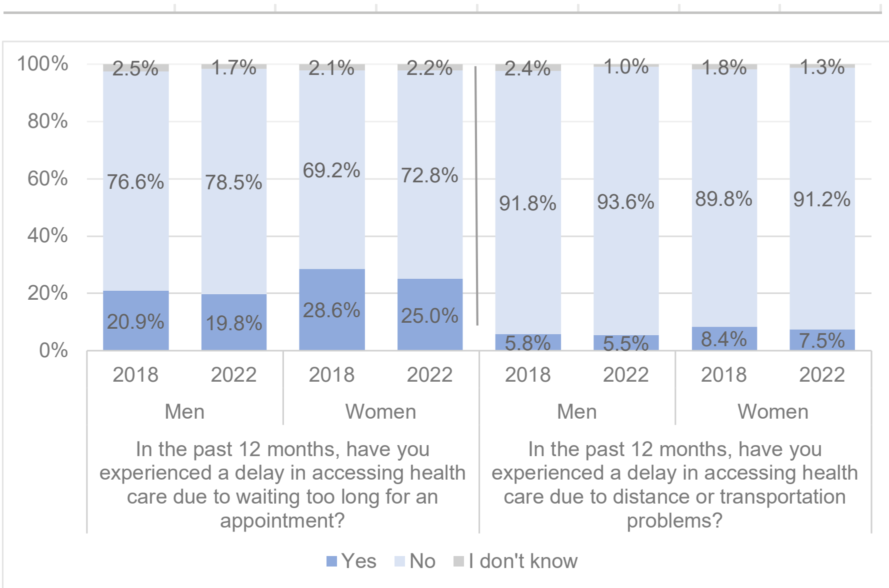

Fig. 12.13. Percentage of people who experienced delays in accessing health care, in the last 12 months – people who did not need health care were excluded *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

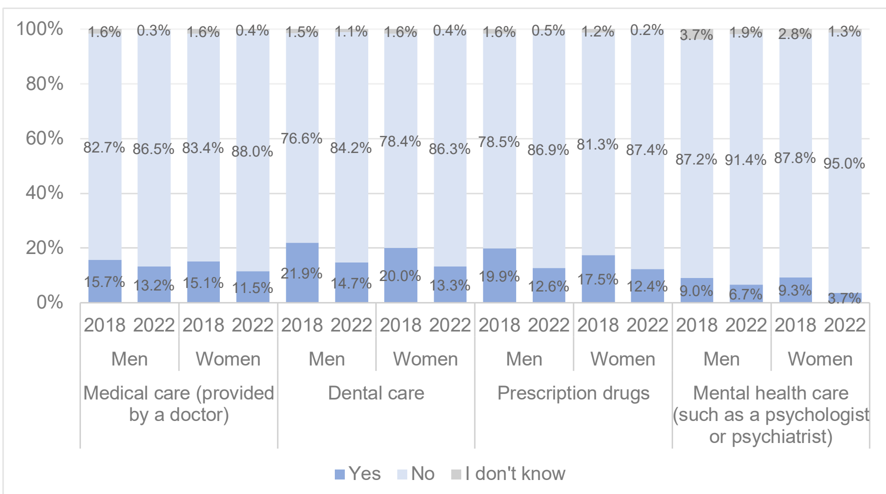

Fig. 12.14. Share of people who happened not to be able to afford particular types of health care in the last 12 months – people who did not need a particular type of care were excluded *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

For men, the positive changes are clearly taking place in the youngest group (20–39 years) and consist of a decrease in the percentage of people who happen not to be able to afford prescription drugs (currently 7%), dental care (12.3%), as well as psychological/mental health care (1.5%). This is a decrease of, respectively, 9.2, 8.5 and 11.1 p.p., compared to 2018. For women, the differences are more apparent among middle-aged and older people; among 40–59-year-olds, for example, the number of women who struggled to pay for each of the services considered fell by around 5–6 p.p. (currently 9.4% for medical care, 16% for dental care, 11% for prescription drugs, 3.5% for mental health care). Similar declines, excluding medical care, are observed in the 60–74 and 75+ age groups, as discussed in more detail below.

It is worth noting that clear changes are being observed in the oldest group, i.e. those aged 75 and more. Although not statistically significant for men, the decrease in those who could not afford dental care, prescription drugs or psychological care reaches 14–15 percentage points (this is 15.1%, 25.4% and 19.2% of men respectively).

The group of oldest women (75+ years) is significantly less affected nowadays by not being able to buy prescription drugs (11.3 p.p. less, down to 18.2%), and a smaller percentage of them happened not to be able to afford medical, dental or psychological care (down by 5–7 p.p., to 15%, 9.9%, 6.4% respectively / values not statistically significant).

Similarly, those aged 75 and over were significantly less likely (than in the 2018 survey) to have experienced problems in accessing healthcare in the past 12 months due to long waiting times (-7.9 p.p. among men and -11.4 p.p. among women, i.e. now 28.6% and 29.7% respectively) or due to distance/transportation problems (-6.2 p.p. among men and -10.7 p.p. among women, to 11% and 10.4% respectively, a statistically significant difference). The trend continues after the standardisation of the demographic structure of the 2018 data.

When other socio-demographic characteristics are considered, it is noteworthy that there is a statistically significant improvement in the ability to finance healthcare of a given type among women living in rural areas, and with the poorest material standing (excluding medical care).

Further analysing the limitations in accessing healthcare, a specific group of people were targeted – those who declared that their health had deteriorated compared to 2019 and link this deterioration directly or indirectly to the COVID-19 pandemic. As for the total, people who have not used a particular form of care in the last 12 months were excluded (Fig. 12.15, 12.16).

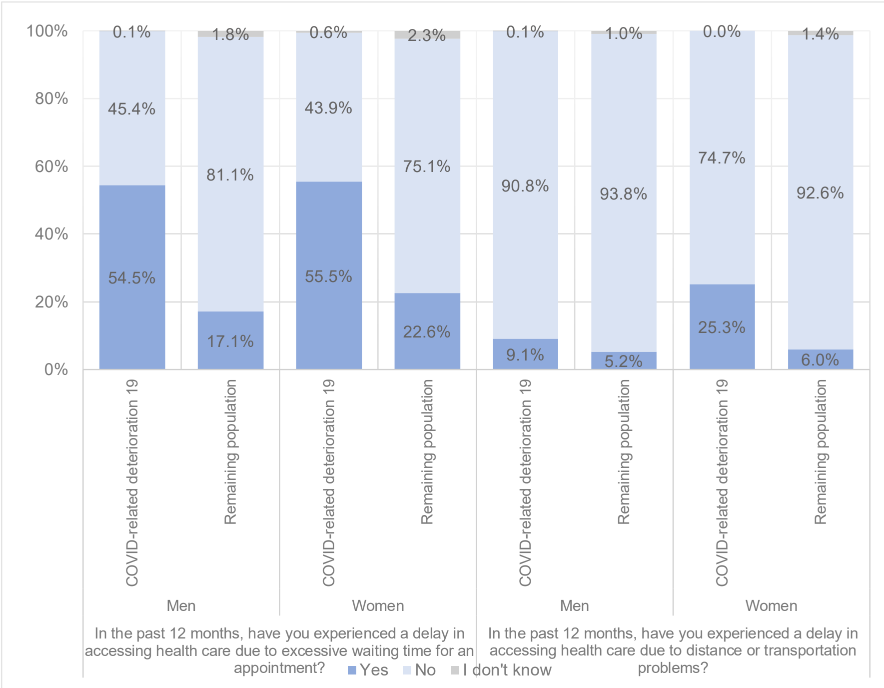

Fig. 12.15. Percentage of people who experienced delays in accessing health care, in the last 12 months – people who did not need health care were excluded. Comparison of people associating deterioration in health with the COVID-19 pandemic vs. the rest of the population *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

Compared to the rest of the adult population, those people (irrespective of sex) are significantly more likely to talk about problems resulting from long waits for appointments – 37.4 p.p. more often among men and 32.9 p.p. more often among women. In addition, women were significantly more likely to experience delays related to distance or transport problems (+ 19.3 p.p. compared to women in the other population).

In the population linking the deterioration to the COVID-19 pandemic, it is far more common for respondents to declare that it happened that they could not afford the listed types of healthcare in the last 12 months. For men, statistically significant differences were reported for medical care, diagnostic tests (both 11 p.p. more often) and the ability to buy prescription drugs (13.6 p.p. more often). In the women's group, statistically significant differences relate to diagnostic examinations (13 p.p. difference), dental care (21.5 p.p. difference) and the ability to purchase prescription drugs (10.6 p.p. difference).

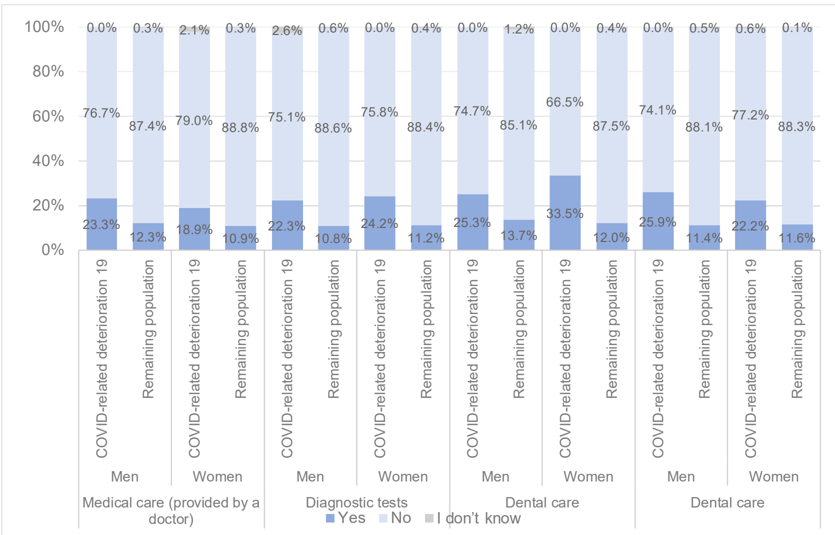

Fig. 12.16. Share of people who happened not to be able to afford particular types of health care in the last 12 months – people who did not need a particular type of care were excluded. Results for mental health care are not shown in the chart due to the small group size – less than 30 *(National Institute of Public Health NIH – National Research Institute study, 2022)*

12.3.2. Abandonment of treatment

An important aspect of the impact of the COVID-19 pandemic on the ability to meet health needs was the need to limit contact with health services, as a result of personal fears of infection, as well as limited access to treatment as a result of existing procedures taking place in health care facilities. The results of the previously cited survey, carried out in August 2022, make it possible to trace this phenomenon.

It appears that the greatest impact of the restrictions was felt by the older people groups and the group declaring deteriorating health and linking this condition to pandemic-related effects – these people were more in need of healthcare, but on the other hand, they had to forgo or limit the treatment/rehabilitation process more often than others, and were more likely to delay appointments while waiting until it was safer.

About one-third of women and men say they were not undergoing treatment or rehabilitation during the pandemic. Similarly, about one-third had no need to go to a doctor, examination or hospital during this time. These individuals were excluded from the analyses below.

Giving up, limiting or interrupting treatment or rehabilitation as a result of the COVID-19 pandemic affected 10.0% of men and women who needed this type of care. 15.5 percent of men and 21.1 percent of women (significantly more) of those who needed it delayed going to the doctor, hospital or for tests, waiting until it was safer.

Older people were particularly affected, more pronouncedly in the male subpopulation than in the female subpopulation. Men aged 60–74 (16.4%), 75–84 (20%) and 85 and more (21.4%) were more likely than others to have had to interrupt, reduce or abandon the treatment/rehabilitation process (compared to 5–9% in the other age groups). Among women, the prevalence of these problems is slightly lower, i.e. only 9.4% among women aged 60–74, 15.3% in the 75–84 age group and 19.1% after the age of 85. Instead, the group of middle-aged women, 40–59 years old, stands out with 13.6%.

Delaying an appointment, waiting until it is safer, is admitted by 21.5% of men and 29.8% of women aged 60–74, 30.3% of men and 28% of women aged 75–84, and 34% of men and 32.5% of women among those over 84 years old (vs. 9–14% of men and 12–19% of women from younger subgroups). The above differences with respect to the youngest subgroup are statistically significant, except for the data for men aged 85+.

It is noteworthy that the percentage of people giving up or interrupting the treatment/rehabilitation process, as well as delaying going to medical facilities, increases among men as the degree of education decreases (the effect diminishes when the data are standardised with respect to age) and economic conditions. In contrast, the percentage of women declaring that they are delaying visits increases with the size of their place of residence.

Dropping out of treatment or limiting the use of services is particularly concerning for the group of people who feel their health has deteriorated compared to 2019 and link this deterioration directly or indirectly to the COVID-19 pandemic. These people had a greater need for healthcare during the pandemic than the others: only 3% of men and 15.4% of women in this subgroup say they were not undergoing any treatment or rehabilitation during the pandemic, and about 8.5% of people of both sexes had no need for medical visits, hospital or tests. This is significantly less than in the rest of the study population (37.8% – 34.5% men and 34.6–30.5% women respectively).

Despite the declared more frequent needs, the group linking deterioration in health to the COVID-19 pandemic was far more likely to abandon, reduce or discontinue treatment/rehabilitation (among those receiving the care in question, this was 35.4 percent of men and 41.2 percent of women vs. about 8 percent for both sexes in the other population). They were also significantly more likely to delay going to appointments, hospitals or tests (45.2% of men and 60.2% of women vs. 13–18% in the remaining population).

12.4. Taking care of your own health – prophylactic behaviour

The frequency of preventive examinations or vaccinations (for flu, pneumococcus, etc.) has not changed significantly since the last edition of the 2018 survey. The scale also remains similar after standardising the 2018 data against the demographic structure (Fig.12.17).

Differences in prophylactic behaviour between men and women are still noticeable – women, more often than men (51.3% vs. 40.2%), were performing laboratory tests, although the gap is no longer as large as in 2018 (a discrepancy of 16 percentage points in 2018 and 11 percentage points in 2022).

It is noteworthy that, compared to the time before the pandemic, more older people have chosen to be vaccinated (e.g. for influenza or pneumococcus, other than for COVID-19). This is a change from 8.9% to 14.4% of men in the 60–74 age subgroup, and from 11.0% to 24.1% of men over 75. For women, there is a clear change only for the oldest group (75+ years): from 15.1% in the 2018 declarations to 23.8% in the 2022 survey (statistically significant increases after standardising the structure of the 2018 results). In the youngest group, 20–39 years, there was a significant increase in the frequency of laboratory tests: from 25.6% to 33.3% for men (a statistically significant

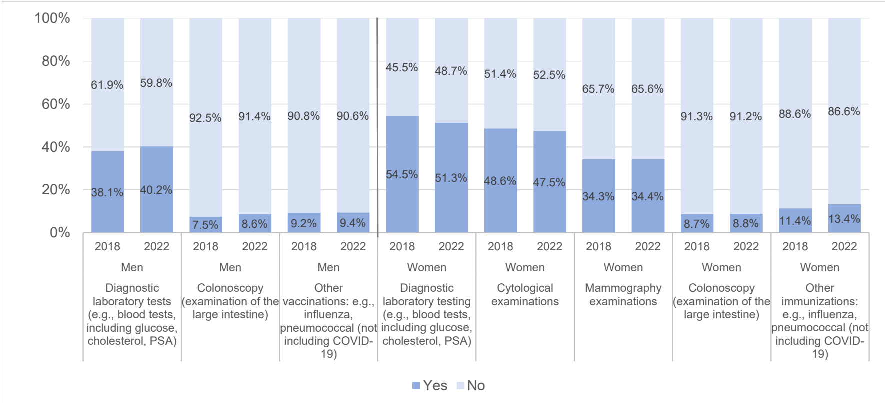

Fig. 12.17. Self-initiated prophylactic activities in the last 3 years *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

difference, by 7.7 p.p.) and a slightly smaller increase among the youngest women (from 41% to 45.1%, a non-significant difference, by 4.2 p.p.)

The opposite phenomenon, although not statistically significant, (i.e. a decrease) occurred among older people when laboratory tests were performed on their own initiative. In the 60–74 age group, this is a decrease in frequency from 56.6% to 49.9%, and in women from 62% to 56.5%. Apparently (and statistically significantly), middle-aged women, i.e. those aged between 40 and 59, were also less likely to carry out this type of examination (a decrease of approximately 11 p.p. from 60.8% to 49.4%).

Changes in preventive screening and vaccination rates compared to the pre-pandemic period also depend on other socio-demographic factors. Mammograms, as well as vaccinations, were significantly more frequent among women with higher education (36.8% of these women had mammograms and 17.4% had vaccinations; an increase of 8–7 p.p.). In contrast, laboratory tests were performed less frequently (a decrease of about 17 p.p., from 62.9% to 45.4%) by women with primary education. In men, it is noteworthy that there was a significant decrease in the percentage of preventive vaccinations in the group with higher education (down 8.1 p.p. from 16.7% to 8.5%). The results hold after standardisation of the demographic structure.

In large (but not the largest) cities of 100 000 to 500,000 inhabitants, there was a significant decrease in the proportion of people who underwent colonoscopy, both among men and women (a decrease of approximately 7–6 p.p. to 1.9% in men and 2.8% in women in this subpopulation). In addition, although not a statistically significant difference, the number (by about 4 p.p.) of women who have had a cytology or mammogram has decreased (51% and 31.2% respectively). In contrast, in the largest cities, above 500,000, there was a marked increase in the incidence of vaccination (other than for COVID-19) – by 7 p.p. among men (from 7.6% to 14.8%) and 4 p.p. among women (from 13.2% to 17.5%). Men from the largest cities were more likely to opt for laboratory tests (43.7% in 2018 vs. 51.4% now), while in women from the largest cities the frequency of these tests fell from 64.1% to 58.0% (by 6 p.p.)

When comparing the 2018 and 2022 data, it can be seen that poor household material situation is statistically significantly associated with an increase in the proportion of people undergoing preventive laboratory tests (an increase of approximately 13 p.p. among men, from 38.2% in 2018 to 51.5% currently, and 14.7 p.p. among women, from 45.9% to 60.6%).

The results of the survey make it possible to trace the reasons why people have not chosen to have particular preventive examinations in the last 3 years. The main, most frequently cited reason, among both men and women, is the feeling of being healthy. In the current edition of the survey, around 77% of people of both sexes respond in this way when it comes to laboratory tests. For other examinations, this reason is mentioned by about 71% of men (colonoscopy) and about 60% of women (57–64% depending on the examination – mammography, cytology, colonoscopy). In the case of vaccinations, probably due to their nature, the feeling of health is less strong, but still the most common stated reason for not vaccinating (indicated by 58–55% of men and women)

Perceived good health, as a reason for not performing preventive examinations, is significantly more frequently mentioned compared to the pre-pandemic period (2018). These are increases of 9–10 percentage points among men (depending on the survey) and 12–16 percentage points among women.

Indeed, most of the other reasons mentioned earlier have lost relevance, and particularly less common in 2022 are reasons related to lack of time, lack of belief that the test can help in any way, fear of a bad result, or that it is not necessary at the age of the person (varying according to the type of preventive measure).

One important aspect of self-care and preventive action during the COVID-19 pandemic was compliance with recommendations related to the sanitary regime. The survey conducted by the National Institute of Public Health NIH – National Research Institute in August 2022 asked to what extent people complied with the recommendations introduced in relation to COVID-19, and the assessment had to be made on the basis of the situation in the second half of 2021, a time when restrictions were still widely in force (Fig. 12.18).

Overall, the vast majority of adults report that they followed (always or usually) the above recommendations (more than 80%). There is a noticeable sex difference – women were more likely to comply with the sanitation regime than men. Indeed, more – almost half of the women and only 35% of the men say they have always followed COVID-19-related recommendations during this time. Men, on the other hand, are significantly more likely than women to admit that they have occasionally failed to comply (14.5% vs 9.1%, 5 percentage points more often). The differences maintain their statistical significance after standardisation of the results against age.

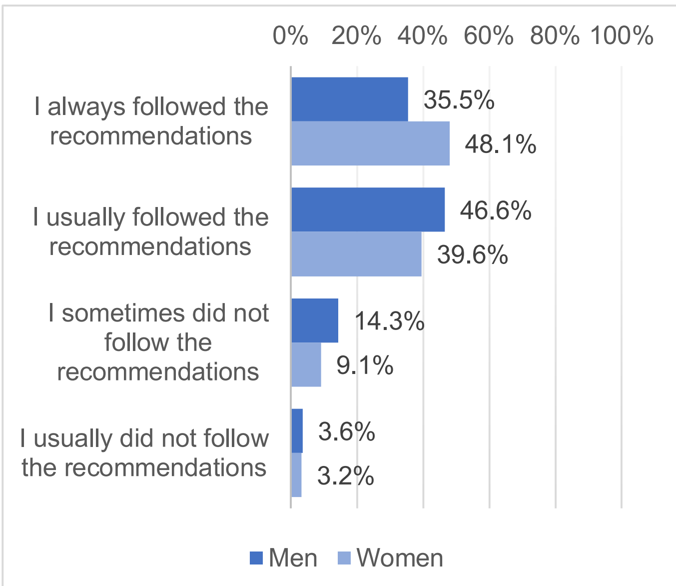

Fig. 12.18. Degree of compliance with recommendations related to the sanitary regime introduced in connection with the COVID-19 pandemic, assessment based on the situation in the second half of 2021 *(National Institute of Public Health NIH – National Research Institute study)*

The propensity to comply completely with the sanitation regime increases with age (reaching around 50% of men and 58.7–67.5% of women in the 75–84 and 85+ age groups), and with material situation, particularly in women (33% in the most economically disadvantaged vs. 54.7% in a relatively good situation). In contrast, those who admit that they usually or sometimes did not follow recommendations are often young or middle-aged (up to 59 years of age) – in the age subgroups mentioned, this applies to about 20% of men (vs. 7–13% of elders) and 14% of women (vs. around 9% in older subpopulations).

Residents of the smallest towns (up to 100 000 inhabitants) had trouble complying with the recommendations – both compared to larger cities and the countryside. The differences in the percentage of those always complying reach 14 percentage points compared to other places of residence: in small towns 30% of men and 39.1% of women always complied with the recommendations, while in the largest cities it was 43% of men and 50.5% of women, in large cities 41.4% and 52.9% respectively, in rural areas 35.7% and 53%.

The trends described above mostly persist after applying the standardised demographic structure to the 2018 data.

12.5. Use of health services financed by the National Health Fund and private providers, financed outside of the National Health Fund

Compared to the previous survey conducted before the COVID-19 pandemic, there was an increase in the number of people who do not use private health services. This is mainly due to fewer people paying for individual services out of pocket. However, there is a group of people who are particularly frequent users of both subscriptions and individual private services – these are people whose health has deteriorated as a result of the COVID-19 pandemic.

It is noteworthy that the reported waiting times for Primary Health Care services (waiting for appointments / phone consultation / prescriptions) were well rated. It therefore appears that shorter waiting times are no longer an advantage of private forms of healthcare.

Compared to 2018, there has been a slight increase in the proportion of people who do not use private services (by 3.6 p.p., among men and women); in particular, fewer people are now using single services paid out of pocket (Fig. 12.19, 12.20).

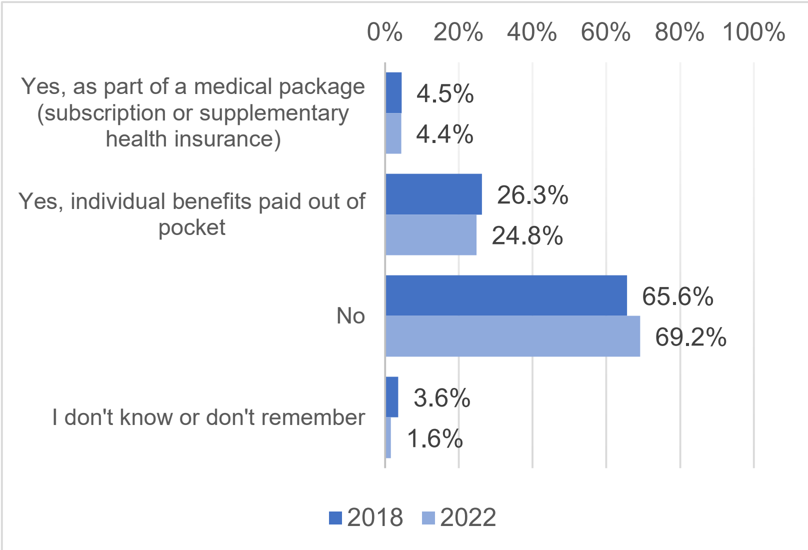

Fig. 12.19. Use of medical services not financed by the National Health Fund, men *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

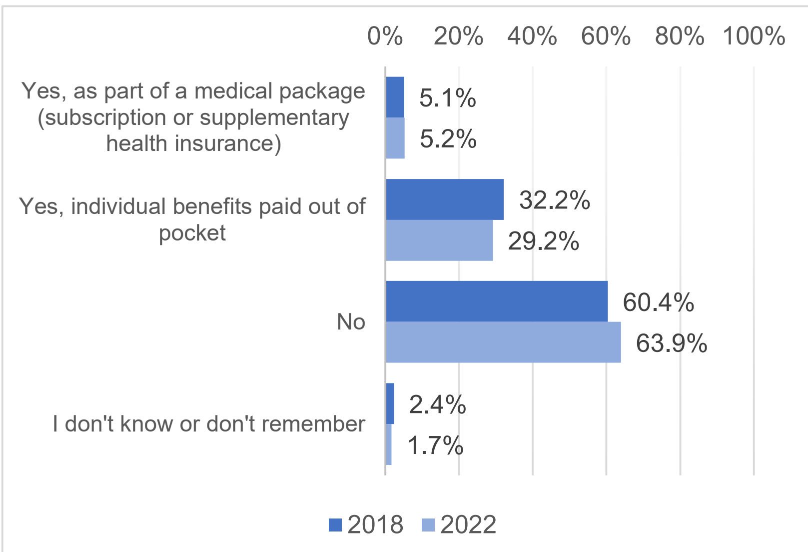

Fig. 12.20. Use of medical services not financed by the National Health Fund, women *(National Institute of Public Health NIH – National Research Institute studies, 2018, 2022)*

The largest increase in the percentage of respondents who do not use private healthcare was observed among middle-aged respondents, i.e. an increase of 5.6 p.p. among men (to 72.8%) and 7.7 p.p. among women (to 64.3%), aged 40–59 years, and is associated with a decrease in those who purchase single services (a result that is significantly statistical for women, persisting after standardisation of the 2018 data structure).

The aforementioned decrease in the frequency of use of individual private services, in favour of an increase in the proportion of people not using private care at all, occurs significantly more often among people with primary and secondary education (+15.2 p.p. for men/now 86% and +13.5 p.p. for women/ 89.2% with primary education; +7.8 p.p. for men/now 70.8% and +6.9 p.p. for women with secondary education/ 64.1%), among inhabitants of rural areas with 1,000 (+8.8 p.p. for men/now 74.6% and +13.5 p.p. for women/ 72.7% living in rural areas)

The use of private services, on the other hand, increased in large cities of between 100 000 and 500,000 (up from 32.2% to 44.1% among men and from 34.7% to 46% among women).

Analysing the data in terms of household economic conditions, there is a noticeable decrease in the percentage of respondents using medical subscriptions in the group of men in the most difficult financial situation (down -4.9 percentage points, to 3.4%) and a significant increase in the number of men not using private medical services in the group of those in a relatively good situation, not experiencing basic financial difficulties (+ 6 percentage points to 69.3% currently). The results, except for men from large cities, are statistically significant and persist after standardisation of the 2018 data.

An important conclusion regarding the impact of the COVID-19 pandemic on the pattern of use of National Health Fund and private services is provided by looking at the population of people who experience deterioration in health over the last three years and associate it with its effects.

This subpopulation is characterised by a significantly higher level of use of private services, compared to the other respondents (these are statistically significant differences). The proportion of people covered by private packages is 12.3 p.p. higher among men (16.1%) and 6 p.p. higher among women (10.8%) compared to the rest of the population, and the proportion paying for single services out of pocket is 14.6 p.p. higher among men (38.6%) and 13 p.p. higher among women (41.5% experiencing deterioration due to COVID-19). Overall, within the subpopulation analysed, the difference in the proportion using privately financed medical services, regardless of the type of funding, compared to pre-pandemic (2018) levels is greater for men than for women (overall, for men it is 54.7% vs. 30.8% in the 2018 population and for women the total is 52.3% vs. 37.2% in the 2018 population).

An interesting perspective is the comparison to the pattern of health service use in the general population in the pre-pandemic period, in 2018. The high proportion of users of private forms of care, by those who feel the effect of the epidemic on their health, is even more pronounced. The proportion of people using private medical packages is more than three times higher among men (16.1% in the subgroup under consideration vs. 4.5% in the general population in 2018) and twice as high among women (10.8% vs. 5.1% in the total population in 2018). The share of those paying for private services is around 10 p.p. higher (38.6% of men and 41.5% of women in the subpopulation under consideration vs. 26.3% of men and 32.2% of women, overall, in 2018).

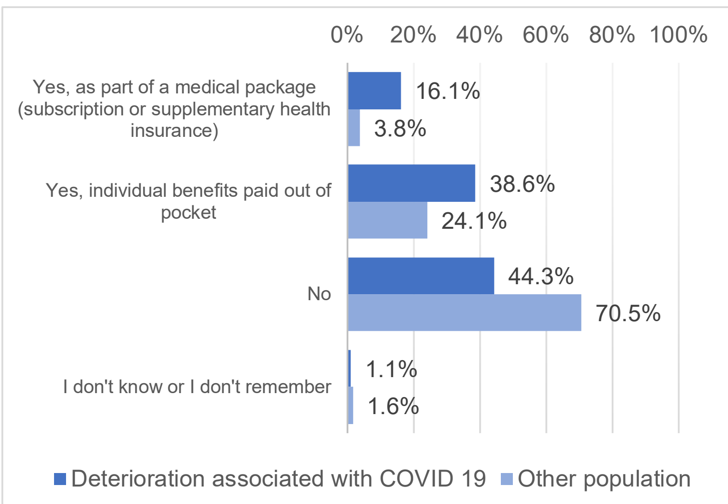

Fig. 12.21. Use of medical services not funded by the National Health Fund. Comparison of individuals associating deterioration in health with the COVID-19 pandemic vs. the rest of the population, men *(National Institute of Public Health NIH – National Research Institute study, 2022)*

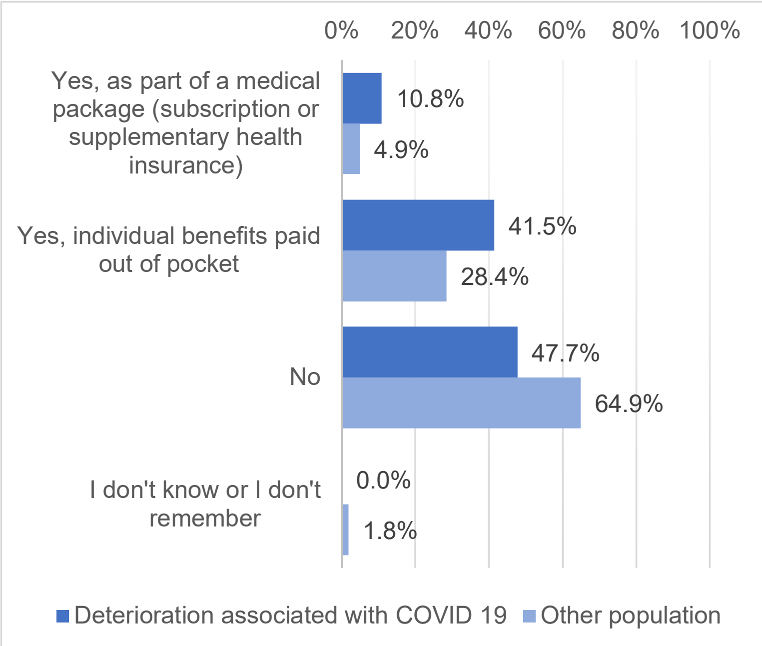

Fig. 12.22. Use of medical services not funded by the National Health Fund. Comparison of individuals associating deterioration in health with the COVID-19 pandemic vs. the rest of the population, women *(National Institute of Public Health NIH – National Research Institute study, 2022)*

The results of the cited survey allow to identify changes in perceptions of private health care and National Health Fund care.

Returning to the general population of adult Poles, the data collected in the two editions of the survey indicate that shorter waiting times for services are no longer an advantage of private forms of healthcare. Although, as in 2018, this is the argument mentioned most frequently, it was mentioned by significantly fewer respondents – now by 46% of men and 47.6% of women (down 8.4 and 9.2 points respectively). Interestingly, this phenomenon does not apply to respondents from the largest cities.

The above-mentioned change is occurring in every age group except the oldest women (75+), and most strongly among the youngest, 20–39 and older, 60–74 year-olds (a decrease of 11–12 p.p. for both sexes, to the current level of 41.6% of men and 47% of women 20–39; 46.1% of men and 43.6% of women aged 60–74).

Among residents of the largest cities (over 500,000), on the other hand, the opposite is true – shorter waiting times are now an advantage of private healthcare for significantly more people than in 2018 (up 7.3 p.p. to 61.4% of men and up 14.4 p.p. to the current level of 68.2% of women in the largest cities).

With regard to the advantages of National Health Fund care, there was clearly not much change in opinion between the survey editions, but it is worth noting that for the most frequently mentioned argument, both in 2018 and 2022 – i.e. low cost for patients – there is a statistically significant increase among women, by 4 p.p. (48.2% in 2018 and 52.2% in 2022).

In the cited survey, in the edition carried out in 2022, questions were asked about the evaluation of waiting times for specific services within the Primary Health Care, on a scale from 1 (very bad) to 5 (very good). The questions were asked only for those who had received Primary Health Care in the last 12 months.

The results clearly indicate a high level of satisfaction in this respect among Polish adults (men and women). Approximately 30 percent of men and women give the highest, very good assessment to the waiting time, both for a face-to-face appointment and for a phone consultation appointment with a GP from the time of the appointment. The waiting time for an ordered prescription is rated very good by around 42% of both sexes. There were no sex differences in assessments.

Considering the general population, respondents most often believed that the waiting time for a face-to-face appointment with a Primary Health Care GP in the period before and during the pandemic did not change (46–45% of men and women), however, there is a relatively large group, 25% of men and 27% of women who claim that this time has increased (slightly or significantly) (Fig. 12.23)

Analysing the demographic characteristics of those who say that waiting times are significantly longer than before the pandemic, it can be seen that this applies more clearly to people of both sexes in the 75–84 age group, men with primary education, but less so to men from the largest cities with more than 500 000 inhabitants (among women the differences are not so pronounced) and in the most economically deprived areas, of both sexes. It should be noted that in the case of a negative evaluation of waiting times, the differences in demographic structure are not statistically significant.

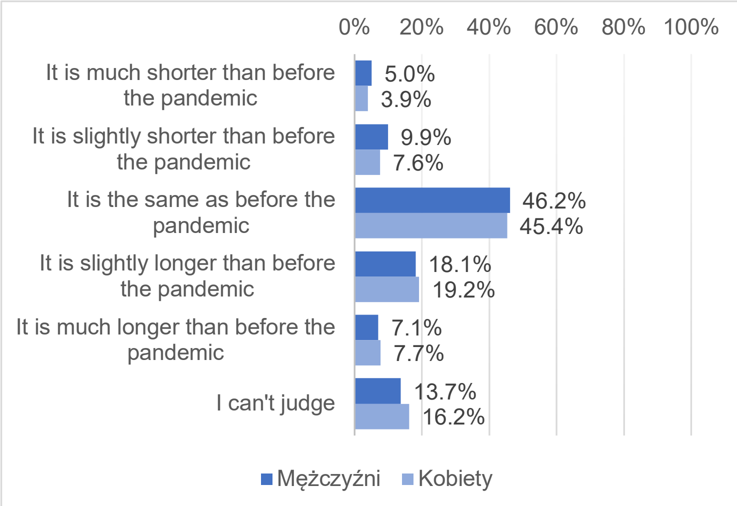

Fig. 12.23. Evaluation of the waiting time for a face-to-face appointment with a Primary Health Care GP during the COVID-19 pandemic, compared to the pre-pandemic period *(National Institute of Public Health NIH – National Research Institute study, 2022)*

12.6. Self-assessment of health among older people

A particularly vulnerable group during the COVID-19 pandemic are the elderly, so the following analysis focuses only on the possible effects felt by those over 60.

As expected, the overall self-assessment of health decreases with age and this is noticeable in both the pre-pandemic survey and the 2022 survey, with no clear change in the 60+ group.

In the subpopulation considered, health was perceived as good/very good by approximately 38% of men and women in 2018, and by 40.3% and 41.9% of men and women in 2022. A bad/very bad assessment was given by 15.1%-16.1% of men and women in 2018 and 11.5%-15.7% of men and women in 2022, respectively.

Despite the slight shifts in the overall health assessment, as measured by points before and during the pandemic, the results of the study nevertheless clearly indicate negative changes occurring during this period among older people.

When asked directly how they assess their health now, compared to their health in 2019, before the pandemic, people over 60 are much more likely to express negative views than other respondents from younger groups. Overall, 29.2 percent of men and 31.4 percent of women aged 60 and more believe that their health has deteriorated (either a lot or a little) since the pandemic broke out. In comparison, a similar opinion is expressed by 6.7% – 7.9% of men and women aged 20 to 59 (the differences are statistically significant).

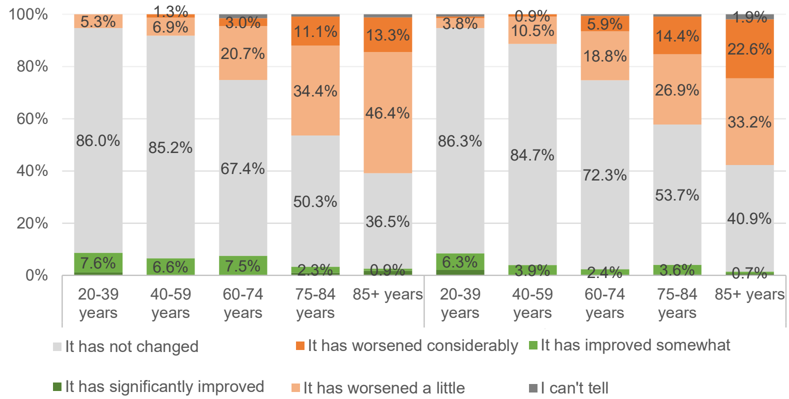

Fig. 12.24. Assessment of health condition compared to 4 years ago, in 2019, before the pandemic by sex and age *(National Institute of Public Health NIH – National Research Institute study, 2022)*

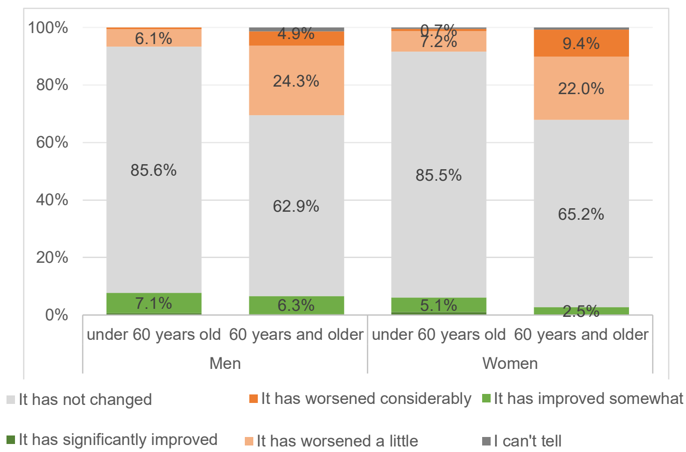

Fig. 12.25. Assessment of health condition compared to 4 years ago, in 2019, before the pandemic – comparison of people aged 60 and more with the rest of the population *(National Institute of Public Health NIH – National Research Institute study, 2022)*

The proportion of people who say their health has declined since the pandemic outbreak increases with age, a noticeable spike occurring from the age of 60, peaking in the oldest subpopulation, those aged 85 and over (59.7% of men and 55.5% of women, 85+ years).

Approximately one third of people over 60 declaring a deterioration in their health over the past three years, place the cause of this change directly or indirectly on the COVID-19 pandemic. That is, 37.5% of men and 33.5% of women feeling a deterioration. In particular, this includes COVID-19 virus infection (15.2% of men and 16.7% of women), limited access to medical services during the pandemic (21.4% of men and 14.2% of women) or lifestyle changes, cessation of physical activity during the pandemic (10% of men and 11.2% of women).

Analysing the subpopulation of older people, it is apparent that both men and women over 85 years of age are relatively least likely to associate health deterioration with the COVID19 effect (around 23%). This is probably due to the overall age-related burden on their health.

It should be noted that reasons related to the COVID-19 pandemic are mentioned by a very similar, and even slightly higher, proportion of people in the younger subgroup (under 60 years of age) – 44% of men and 38.3% of women (a statistically insignificant difference). Thus, the markedly higher proportion observing a reduction in their health among those aged over 60 is most likely related more to the age of the respondents, rather than to significant exposure to the consequences of the COVID-19 pandemic.

In terms of the negative effects of the pandemic currently being experienced (as of August 2022), respondents noted the deterioration in health, including mental health, that occurred while staying at home for long periods during the pandemic.

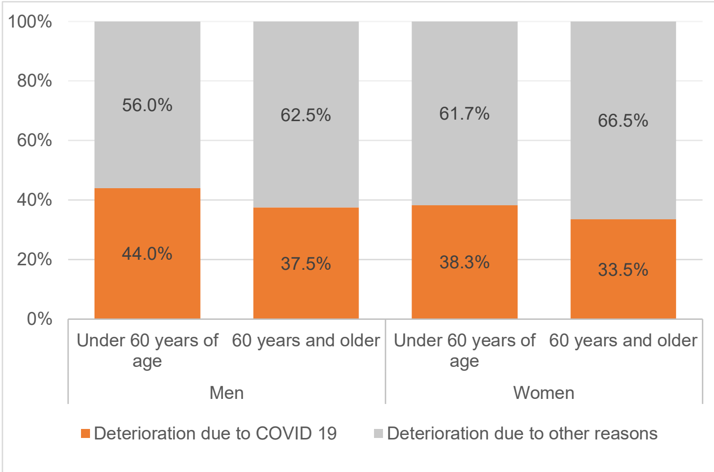

Fig. 12.26. Reasons for deteriorated health, compared to the time before the pandemic among those aged less than 60 years and 60 years and more, 100% = those with deterioration *(National Institute of Public Health NIH – National Research Institute study, 2022)*

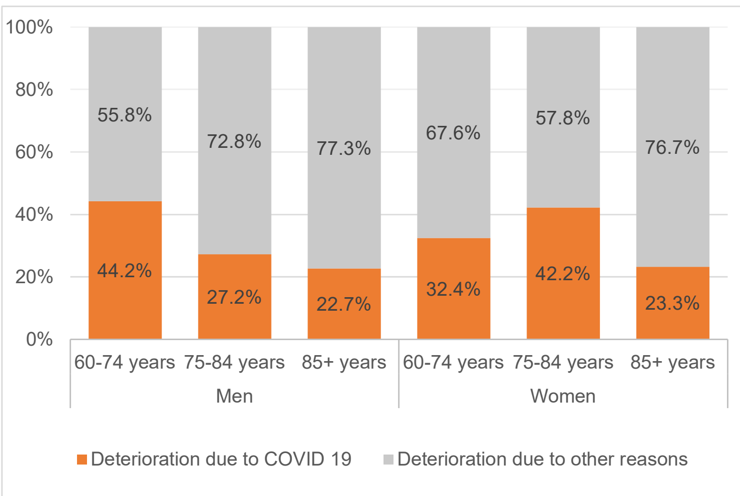

Fig. 12.27. Reasons for deteriorated health, compared to before the pandemic, 100% = people with deterioration, in age groups over 60 years *(National Institute of Public Health NIH – National Research Institute study, 2022)*

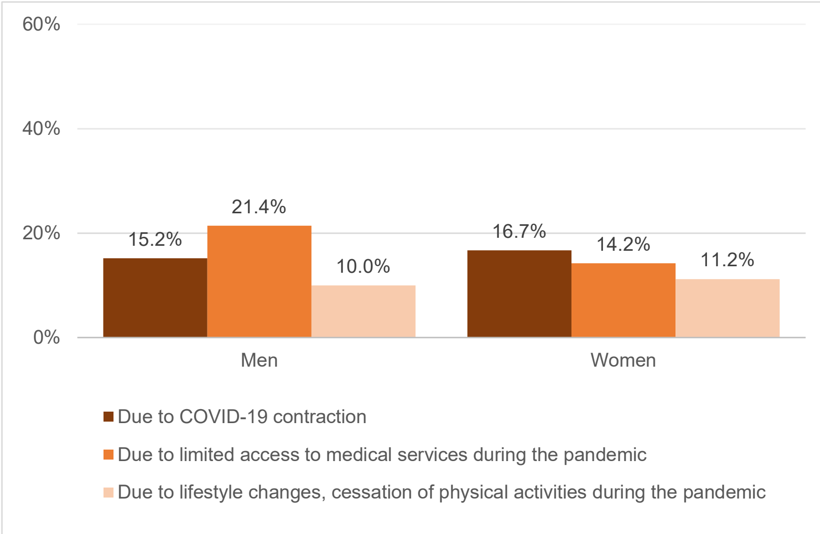

Fig. 12.28. Reasons associated with COVID-19, considered a cause of health deterioration since before the pandemic, 100% = people aged 60 and more only *(National Institute of Public Health NIH – National Research Institute study, 2022)*

Older people were more likely to have experienced having to stay at home for long periods of time – approximately: 80% of men and women in the general group over 60 years of age (significantly more than younger subpopulations) (Fig. 12.26).

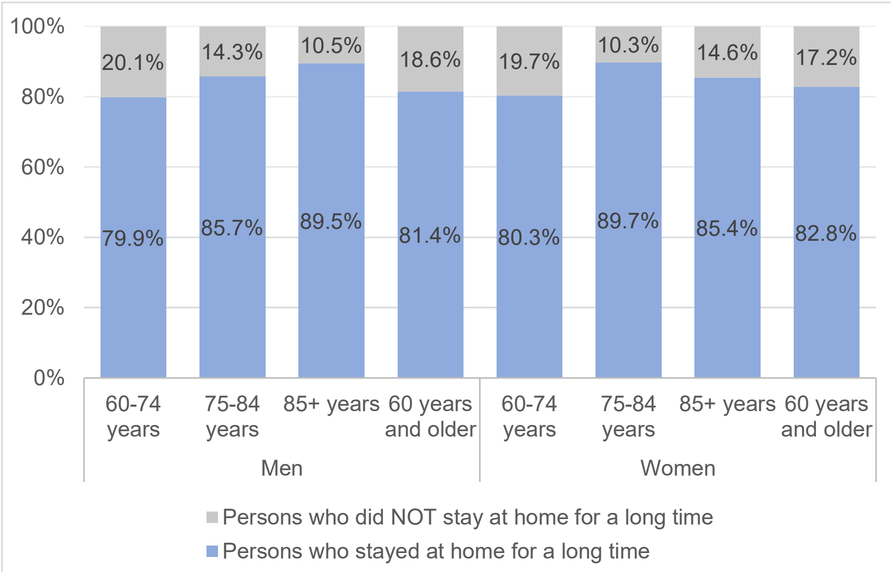

Fig. 12.29. Percentage of people in age groups above 60 years who declare that they stayed at home for a long time during the pandemic *(National Institute of Public Health NIH – National Research Institute study, 2022)*

Of these, 18% of men and 15% of women perceived a deterioration in physical health (this is particularly evident among those aged 85 and more – 26.8% of men and 22.5% of women, as well as in the 75–84 age group -23.9%) and even more, 20% of men and 24% of women suffered from a deterioration in mental health (this is most pronounced in the 75–84 age group, i.e. 26% of men and 27.6% of women).

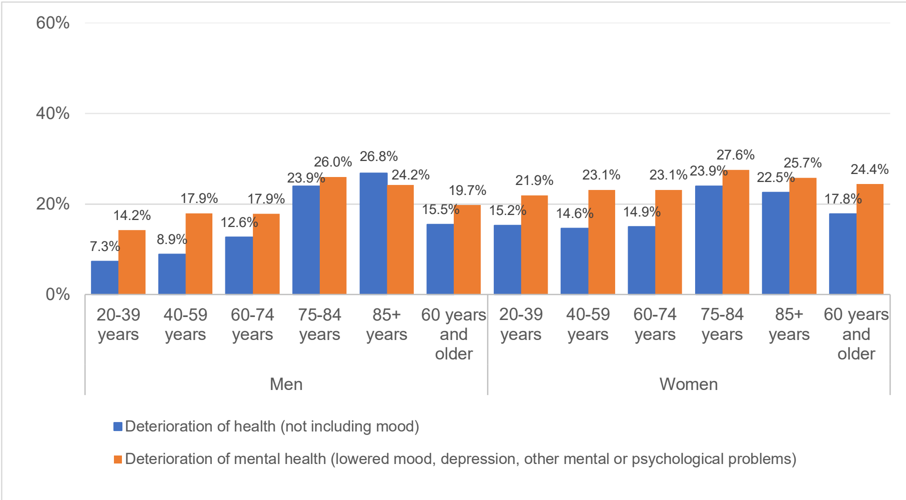

Fig. 12.30. Percentage of people who observed a deterioration of their health (physical and mental) while staying at home for a long time during the pandemic by sex and age *(National Institute of Public Health NIH Research Institute study, 2022)*

SUMMARY

1. An overwhelming proportion of adults, both men and women, assess their health well. The proportion of good/very good assessments remains at a similar level (and even increases for women) compared to the results of the survey carried out before the COVID-19 pandemic. This is a trend in line with the results of the EU-SILC European Survey of Living Conditions.
2. Despite the predominance of good health assessments in the population, certain subpopulations showed an increase in the proportion of responses suggesting subjective deterioration in health (e.g. women over 75), and a shift from the highest (very good) to slightly lower (good) assessments is evident for men.
3. In a comparative analysis of health condition before the pandemic and now, the middle-aged and older people group, which appears to be currently less burdened by health problems, is noted.

4. When asked about the perceived change compared to the time before the pandemic, 14.4 percent of men and 15.1 percent of women (after standardising the data by age) report that their health has worsened since then. Notably, among these individuals, approximately 40% of men and 35% of women associate deterioration directly or indirectly with the effect of the COVID-10 pandemic – i.e. due to infection with the virus or reduced access to medical services or lifestyle changes during the pandemic – which translates into a total of approximately 1.7 million adults in Poland.
5. Deterioration of health due to the pandemic is more frequently declared by women from smaller towns and rural areas; among men, such indications are higher in large cities and among those with primary and higher education.
6. Persons of both sexes indicating post-pandemic deterioration in health are, declaratively, significantly more likely than the population average to be burdened with chronic diseases (76.7% of men and 85.0% of women in the population of persons declaring deterioration in health versus approximately 25% in both sexes in the rest of the population). These people have a higher BMI and are also significantly more likely to report symptoms of depression.
7. Approximately ¾ of respondents of both sexes stayed at home for long periods of time as a result of the restrictions imposed and concerns about their own health. Of these, large groups report that they have experienced a resulting deterioration in health – 16.0% of women compared to 10.3% of men noted a deterioration in physical health and 23.2% of women compared to 17.0% of men a deterioration in mental health.
8. The results of the surveys show an improvement in access to healthcare, with a decrease in the percentage of people who could not afford a particular type of care. Improvements are occurring among both men and women, in most intersections by socio-demographic characteristics, with a particular increase among the oldest group.
9. People aged 75 and over were significantly less likely (than in the 2018 survey) to have experienced problems in accessing healthcare in the past 12 months due to long waiting times (-7.9 p.p. among men and -11.4 p.p. among women, i.e. now 28.6% and 29.7% respectively) or due to distance/transportation problems (-6.2 p.p. among men and -10.7 p.p. among women, to 11% and 10.4% respectively,

a statistically significant difference). The trend continues after the standardisation of the demographic structure of the 2018 data.

10. Clearly burdened by problems of access to health care is the group of people who declare a deterioration in their health over the last 3 years and who link this deterioration to the effect of the COVID-19 pandemic (directly or indirectly). Compared to the rest of the adult population, those people (irrespective of sex) are significantly more likely to talk about problems resulting from long waits for appointments – 37.4 p.p. more often among men and 32.9 p.p. more often among women. In addition, women were significantly more likely to experience delays related to distance or transport problems (+19.3 p.p. compared to women in the other population).
11. In the population linking the deterioration to the COVID-19 pandemic, it is far more common for respondents to declare that it happened that they could not afford the listed types of healthcare in the last 12 months. For men, statistically significant differences were reported for medical care, diagnostic tests (both 11 p.p. more often) and the ability to buy prescription drugs (13.6 p.p. more often). In the women's group, statistically significant differences relate to diagnostic examinations (13 p.p. difference), dental care (21.5 p.p. difference) and the ability to purchase prescription drugs (10.6 p.p. difference).
12. Giving up, limiting or interrupting treatment or rehabilitation as a result of the COVID-19 pandemic affected 10% of men and women who needed this type of care. 15.5 percent of men and 21.1 percent of women (significantly more) of those who needed it delayed going to the doctor, hospital or for tests, waiting until it was safer. Older people were particularly affected, more pronouncedly in the male subpopulation than in the female subpopulation.
13. The percentage of people giving up or interrupting the treatment/rehabilitation process, as well as delaying going to medical facilities, increases among men as the degree of education decreases (the effect diminishes when the data are standardised with respect to age) and economic conditions. In contrast, the percentage of women declaring that they are delaying visits increases with the size of their place of residence.
14. Despite the declared more frequent needs, the group linking deterioration in health to the COVID-19 pandemic was far more likely to abandon, reduce or discontinue treatment/rehabilitation (among those receiving the care in question, this was 35.4

percent of men and 41.2 percent of women vs. about 8 percent for both sexes in the other population). They were also significantly more likely to delay going to appointments, hospitals or tests (45.2% of men and 60.2% of women vs. 13–18% in the remaining population).

15. A comparison of the results of the two editions of the survey showed an increase in the frequency of declarations of vaccination uptake (other than for COVID-19) by older people.
16. On the other hand, there has been a decrease in the number of older people who have opted for preventive laboratory tests in the last three years. Interestingly, the main reason cited for not performing such tests is the subjective feeling that one is healthy.
17. In large (but not the largest, between 100 000 and 500,000) cities, there was a significant decrease in the proportion of people who underwent colonoscopy, both among men and women (a decrease of approximately 7–6% to 1.9% in men and 2.8% in women in this subpopulation). In addition, although not a statistically significant difference, the number (by about 4 p.p.) of women who have had a cytology or mammogram has decreased (51% and 31.2% respectively).
18. Compared to the previous survey conducted before the COVID-19 pandemic, there was an increase in the number of people who do not use private health services. This is mainly due to fewer people paying for individual services out of pocket.
19. It is noteworthy that the reported waiting times for Primary Health Care services (waiting for appointments / phone consultation / prescriptions) were well rated. In the general population, those surveyed most often felt that the waiting time for a face-to-face appointment with a Primary Health Care GP in the period before and during the pandemic did not change (46–45% of men and women), however, there is a relatively large group, 25% of men and 27% of women who claim that this time has increased (slightly or significantly).
20. The decrease in the frequency of use of individual private services, in favour of an increase in the percentage of people not using private care at all, occurs significantly frequently among people with primary and secondary education and among rural residents.

21. The use of private services, on the other hand, increased in large cities, between 100 000 and 500,000.
22. However, there is a group of people who are particularly frequent users of both subscriptions and individual private services – these are people whose health has deteriorated as a result of the COVID-19 pandemic, and these are statistically significant differences.
23. The data collected in the two editions of the survey indicate that shorter waiting times for services are no longer an advantage of private forms of healthcare. Although, as in 2018, this is the argument mentioned most frequently, it was mentioned by significantly fewer respondents – now by 46% of men and 47.6% of women (down 8.4 and 9.2 points respectively). Interestingly, this phenomenon does not apply to respondents from the largest cities.
24. Approximately one third of people over 60 declaring a deterioration in their health over the past three years, place the cause of this change directly or indirectly on the COVID-19 pandemic. In particular, this includes COVID-19 virus infection (15.2% of men and 16.7% of women), limited access to medical services during the pandemic (21.4% of men and 14.2% of women) or lifestyle changes, cessation of physical activity during the pandemic (10% of men and 11.2% of women).
25. The increase and/or lack of decrease in self-assessment after the pandemic in most of the subpopulations studied is non-obvious and non-intuitive. The hypotheses that can be considered are as follows:
    a. excess deaths during the pandemic were mostly in the older people and/or those burdened by disease. The reduction in the number of such people has had the effect of increasing the relative proportion of "healthier" people in the population.
    b. The fact that the sense of threat of a pandemic has receded and that anti-epidemic restrictions have been lifted in practice has led to a reduction in social stress and an improvement in the emotional state of many people, which has raised their self-assessment of their health.
26. A large subpopulation of people who indicate a deterioration in health as a result of the pandemic rate the performance of the health care system, including the

availability of services and the need for co-payments, significantly worse (than the rest of the population).

27. This group, more often than those who reported no deterioration in health after the pandemic, indicated difficulties in accessing services during the pandemic – both for organisational reasons and due to fears of infection.

Conclusions:

28. There is a large subpopulation of people who indicate deterioration in health as a result of the pandemic. These people seem to require dedicated support programmes by the public health system.
29. Declining interest and/or accessibility to prophylactic health care is a bad sign for public health and requires rapid corrective action.
30. Consideration should be given to conducting such surveys annually on a representative sample of the Polish population in order to identify changes in attitudes towards one's own health and the health care system, with particular emphasis on the issue of preventive measures taken.

13. PREVALENCE OF BEHAVIOURAL HEALTH RISK FACTORS AND ITS CHANGES DURING THE COVID-19 PANDEMIC

Anna Poznańska, Daniel Rabczenko, Bogdan Wojtyniak

Many lifestyle elements are essential for health and, consequently, for quality and length of life. The importance of diet and exercise was already known to ancient physicians – Herodicus (5th century BC), Hippocrates (5th-4th century BC), and Galen (2nd century AD). The adverse effects of smoking on life expectancy were proven much later – it was not until the 1950s that the results of the British Doctors' Study showed that it increased the risk of death from lung cancer and coronary thrombosis[1]. Today, the importance of behavioural factors for particular diseases (likelihood of sickness, severity of course, or risk of death), overall health, and life expectancy is still being learned.

In 2008, researchers from the Harvard School of Public Health estimated the impact of a combination of behavioural risk factors on mortality among women in the Nurses' Health Study, one of the most important cohort studies in the USA. Based on 24 years of observation of nearly 80,000 participants, it was shown that 28% of deaths in women aged 34–59 years could be attributed to smoking, and as many as 55% to a combination of smoking, overweight, low physical activity and an incomplete diet[2].

Analyses for 2019 from the Global Burden of Disease Study *(GBD)* attributed behavioural risk factors (overweight and obesity not included) to 38% of all-cause deaths, 49%

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1 Doll R, Hill AB (1954). *The mortality of doctors in relation to their smoking habits*. BMJ 328 (7455): 1529–33; doi:10.1136/bmj.328.7455.1529

2 Van Dam et al. (2008). *Combined impact of lifestyle factors on mortality: prospective cohort study in US women*. BMJ 337:a1440; doi:10.1136/bmj.a1440

due to cardiovascular disease, and 37% caused by cancers. For Poland these percentages were higher at 44%, 52% and 42% respectively.[3].

As knowledge of the importance of behavioural risk factors has increased, educational activities have been undertaken by national authorities and international organisations. As early as 1894, the United States Department of Agriculture announced its first recommendations for a healthy diet[4]. Over time, similar recommendations have emerged in many countries. In subsequent years, the dietary recommendations were modified and supplemented with recommendations on undertaking physical activity, weight control, limited alcohol use, and dietary supplementation. In 2004, the WHO adopted the Strategy on Diet, Physical Activity and Health, a document with recommendations for action in the field of promoting healthy lifestyles[5]. Based on this, many more detailed studies and guidelines have been prepared on, among others, physical activity[6], consumption of selected products[7, 8, 9], or their availability to children[10]. The current WHO General Programme of Work 2019–2023[11], in the section on the prevention of non-communicable diseases, mentions that reducing tobacco smoking, harmful alcohol consumption, unhealthy diet, and physical inactivity may prevent many sicknesses and most premature deaths from these causes worldwide.

In Poland, reducing the prevalence of many lifestyle-related risk factors is written into the National Health Programme 2021–2025, the basic public health policy document setting out its objectives and key tasks[12]. In order to achieve the Program's strategic goal

3 Institute for Health Metrics and Evaluation, GBD Results, https://vizhub.healthdata.org/gbd-results/, accessed: 12.10.2022

4 Atwater WO *Foods: Nutritive Value and Cost*. U.S. Department of Agriculture, Farmersí Bulletin No. 23, 357 pp.

5 WHO (2004). *Global Strategy on Diet, Physical Activity and Health*, Geneva

6 WHO (2010). *Global recommendations on physical activity for health*

7 WHO (2010). *Global strategy to reduce the harmful use of alcohol*

8 WHO (2016). *Fiscal policies for diet and the prevention of noncommunicable diseases*

9 WHO (2016). *SHAKE the salt habit. The SHAKE technical package for salt reduction*

10 WHO (2012). *A framework for implementing the set of recommendations on the marketing of foods and non-alcoholic beverages to children*

11 WHO (2019). *Promote health. Keep the world safe. Serve the vulnerable. Thirteenth General Programme of Work 2019–2023*

12 Regulation of the Council of Ministers of 30 March 2021 on the National Health Programme for 2021–2025 (Journal of Laws of 2021, item 642), https://dziennikustaw.gov.pl/ D2021000064201.pdf (accessed: 10.10.2022)

of "increasing the number of years lived in health and reducing social health inequalities", two operational goals were defined that directly relate to improving health behaviour, i. e. overweight and obesity prevention and addiction prevention. The first includes tasks related to promoting good nutrition and increasing physical activity in the population and the second to reducing smoking and alcohol consumption.

The analysis of the prevalence of behavioural health risk factors among the Polish population and its changes during the COVID-19 pandemic, presented in this section, is based on the results of surveys conducted by National Institute of Public Health NIH – National Research Institute (formerly National Institute of Public Health – National Institute of Hygiene) in 2018 (9–15 October) and 2022 (1–17 August). Both surveys were carried out using the CAPI technique (computer-assisted personal interviews) on representative samples of 3,000 and 2,000 people, respectively, of Polish residents aged 20 and more. In 2018, respondents were drawn from the PESEL register; in 2022, the sample was drawn from the Statistics Poland address register.

13.1. Smoking

Since the previous edition of the report Health Situation of the Polish Population – 2020, no new data has emerged to update Poland's rank in relation to the European Union countries. The prevalence of smoking in Poland, according to data available in 2020, was at the European average level, with men slightly above and women below the respective average level. Overall, 35.8 percent and 29.8 percent of men and 20.5 percent and 17.6 percent of women, respectively, used nicotine products regularly in 2018 and 2022. At the same time, occasional smoking in 2018 and 2022 was declared by a further 3.0% and 2.5% of men and 1.9% and 1.9% of women, respectively. Summaries of people declaring to be regular smokers by sex and age are presented in Figure 13.1. It is noted that the overall favourable trend is downwards in the 30–39 age group and to a slightly lesser extent in the 80+ group and among women in the 20–29, 30–39 age groups and to a lesser extent among those older than 70. At the same time, the markedly unfavourable changes among men between the ages of 40 and 59 and in the 70–79 age group and among women aged 60–69 are noteworthy.

A decrease in the frequency of people declaring themselves to be regular smokers can be seen in all educational groups – interestingly marked especially by the group of people with basic vocational education, which has traditionally presented the most unfavourable health attitudes (Figure 13.2).

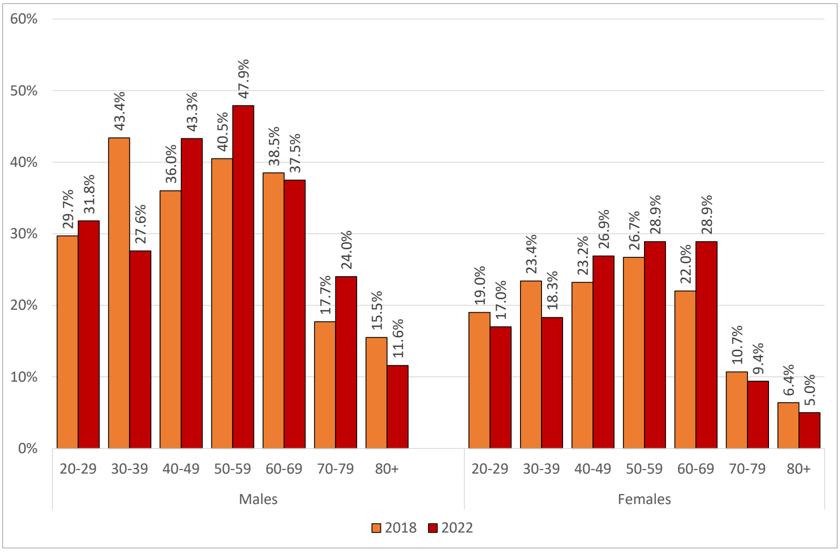

Fig. 13.1. Percentage of regular tobacco or electronic cigarette smokers among the Polish population aged 20 and more in 2018 and 2022 by sex and age (data: National Institute of Public Health NIH – National Research Institute)

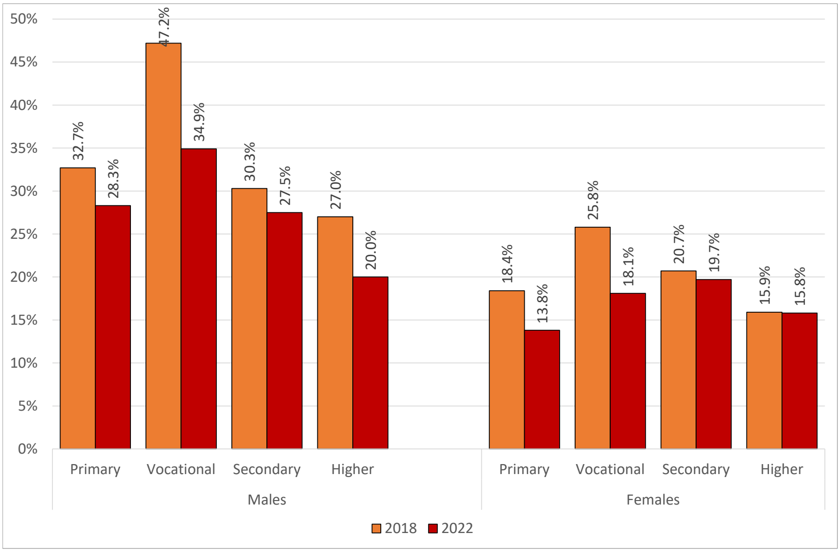

Fig. 13.2. Percentage of regular tobacco or electronic cigarette smokers among the Polish population aged 20 and more in 2018 and 2022 by sex and education (data: National Institute of Public Health NIH – National Research Institute)

13.2. Alcohol consumption

Alcohol consumption data presented on the website of the National Agency for the Solution of Alcohol Problems[13] indicate that overall consumption measured by litres of pure alcohol per capita has remained almost unchanged (9.55 litres/person in 2018 vs 9.70 litres/person in 2021). However, it is noteworthy that calculations made by PAPRPA show an increasing share of spirits consumption in general – from 34.6% in 2018 to 39.2% in 2021, accompanied by a decrease in the share of beer from 57.9% to 52.5%.

In both studies conducted by the National Institute of Public Health NIH – National Research Institute questions were asked about risky drinking. The respondent answered three questions about thoughts related to consuming too much alcohol, the occurrence of guilt about drinking, and the occurrence of critical comments about the respondent's

[13] https://www.parpa.pl/index.php/badania-i-informacje-statystyczne/statystyki, accessed 02.11.2022

drinking. A respondent answering affirmatively to at least one of the questions was treated as a risky drinker. Among both men and women, the percentage was lower in 2022 than 2018 (16.7% in 2022 vs 21.3% in 2018 for men and similarly 4.3% vs 6.0% for women). Analysis of changes by age group shows that the favourable trend was stronger in the 30–39 and 70–79 male and 20–29 female groups. In women, it is also worth noting the almost twofold decrease in the proportion of risky drinkers in older age groups (70 years and more).

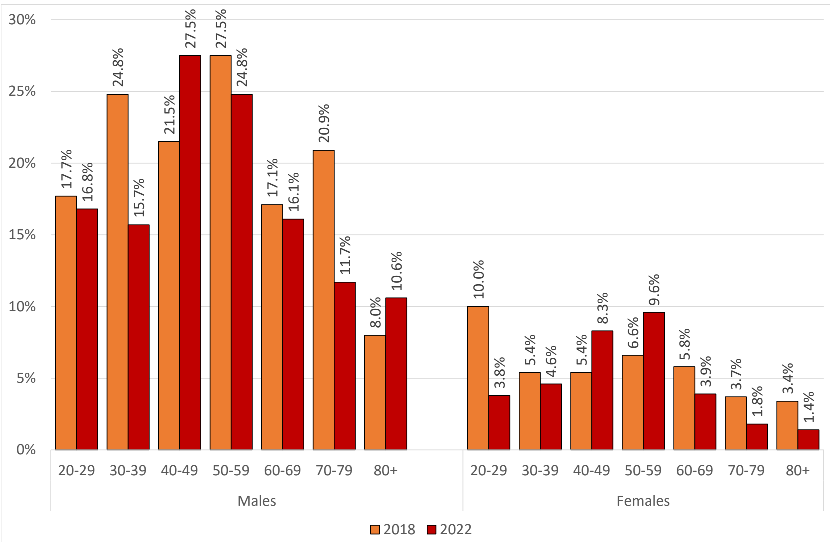

Fig. 13. 3. Percentage of risky drinkers among the Polish population aged 20 and more in 2018 and 2022 by sex and age (data: National Institute of Public Health NIH – National Research Institute)

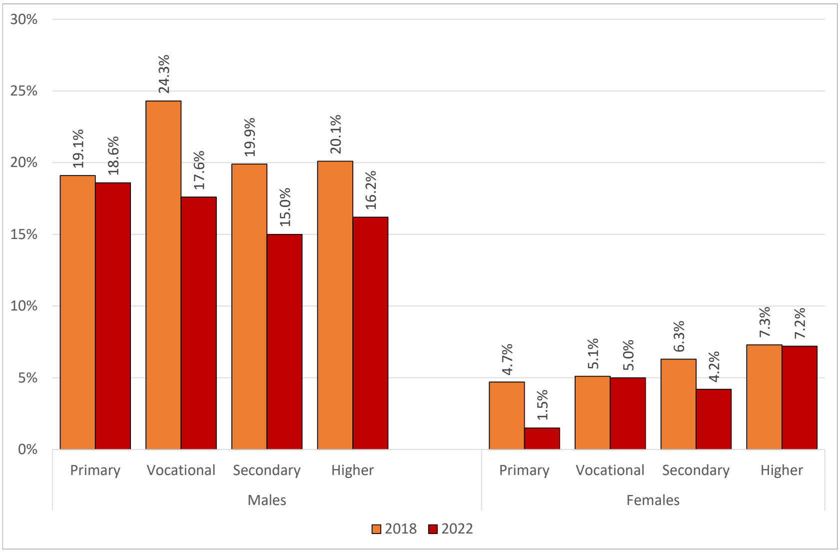

Fig. 13. 4. Percentage of risky drinkers among the Polish population aged 20 and more in 2018 and 2022 by sex and education (data: National Institute of Public Health NIH – National Research Institute)

13.3. Overweight and obesity

The results of the Health Status and Risk Factors Study carried out by the National Institute of Public Health NIH – National Research Institute in August 2022 indicate that 52.0 percent of Poles aged 20 years or over were overweight (BMI ≥ 25), while 13.6 percent were obese (BMI ≥ 30).

Men were much more likely to be affected than women (prevalence of overweight: 62.1% vs 42.6%, and obesity: 15.7% and 11.7%). Considering the age structure of the sex subpopulations hardly changes these proportions, the age-standardised rates being 62.7% and 41.4% for overweight and 16.1% vs 11.2% for obesity.

Compared to before the COVID-19 pandemic, the situation has worsened – the prevalence of overweight and especially obesity has increased, which is not the result of an ageing population. After converting the age-specific prevalence rates of overweight and obesity from 2018 to the current age structure of the population, it turns out that overweight would then affect 50.4 percent and obesity 11.8 percent of Poles. The prevalence of these problems increased mainly among men – overweight by 2.6 percentage points (p.p.) and obesity by 3.0 p.p. Among women, the prevalence of overweight increased by 0.5 p.p., and obesity decreased marginally (by 0.1 p.p.).

For both sexes, the prevalence of overweight and obesity increases with age, reaching a maximum for the 75–84-year-old category (Figure 13.5). In all age groups analysed, the proportion of overweight people is significantly higher among men, with the most remarkable differences (28 p.p. each) in the 20–39 and 40–59 age categories. Obesity is also more common in men, except for the 75–84-year-old group. At this age, obesity affects more than a quarter of Polish women (25.5%), which is clearly above the percentage observed among men (18.8%).

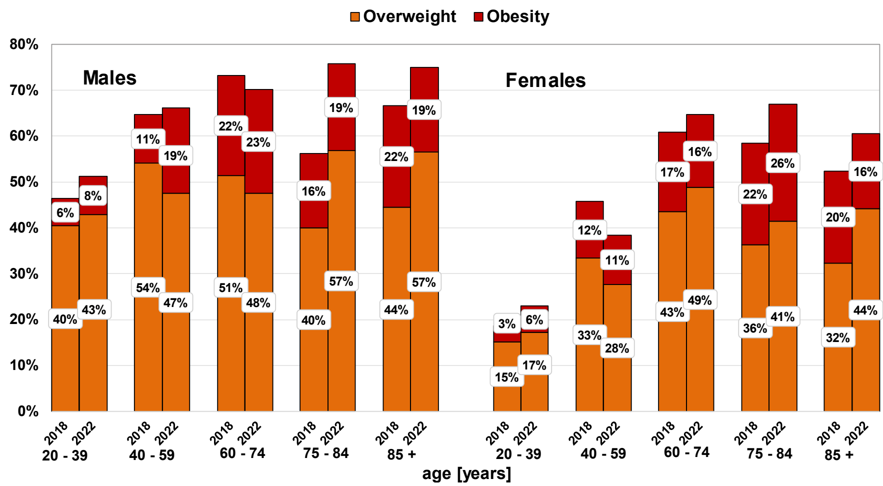

Fig. 13.5. Prevalence of overweight and obesity among the Polish population aged 20 years and more in 2018 and 2022 by sex and age (data: National Institute of Public Health NIH – National Research Institute); the values on the labels are rounded off to 1%

There was an increase in the prevalence of overweight in almost all age groups analysed compared to 2018 (after eliminating differences in age structure) – Figure 13.5. The exceptions are the 60–74-year-old category among men (down 3.1 p.p.) and the 40–59-year-old category among women (down 7.3 p.p.). For both sexes, the greatest increase in the prevalence of overweight was observed in the oldest age groups, i. e. 75–84 years (by 19.5 p.p. among men and 8.5 p.p. among women) and 85+ (by 8.4 p.p. and 8.1 p.p. respectively). However, regarding obesity, an increase in prevalence was noted only in the 75–84-year-old category (by 2.6 p.p. in men and 3.5 p.p. in women); among the oldest Poles of both sexes, the percentage of obese people decreased (by 3.7 p.p. and 3.8 p.p. respectively). It can be assumed that this effect is not due to weight loss in seniors but is rather the result of a higher mortality rate among obese people. Among men, a decrease in the prevalence of obesity was only observed in this age category; in women, it still occurred in the 40–59-year-old and 60–74-year-old groups (both by 1.5 p.p.).

The study results show a clear relationship between overweight and educational level in women only (Fig. 13.6). A settled correlation has been observed among them for many years – overweight most often characterises less educated people. In 2022, these were Polish women with basic vocational (56.9% of whom were found overweight and 16.1% percent obese) and lower secondary or below education (55.7% and 15.9%, respectively). Among women with higher education, these percentages were significantly (more than double for obesity) lower – 31.1% and 6.7%. After standardising the coefficients by age, the differences between the categories analysed decrease. However, the more educated Polish women are still in a more favourable situation (the prevalence of overweight is 36.3% and of obesity 7.5% among those with tertiary education, compared with 43.3% and 11.7% for females with lower secondary education or below, and 49.3% and 16.4% for those with basic vocational education).

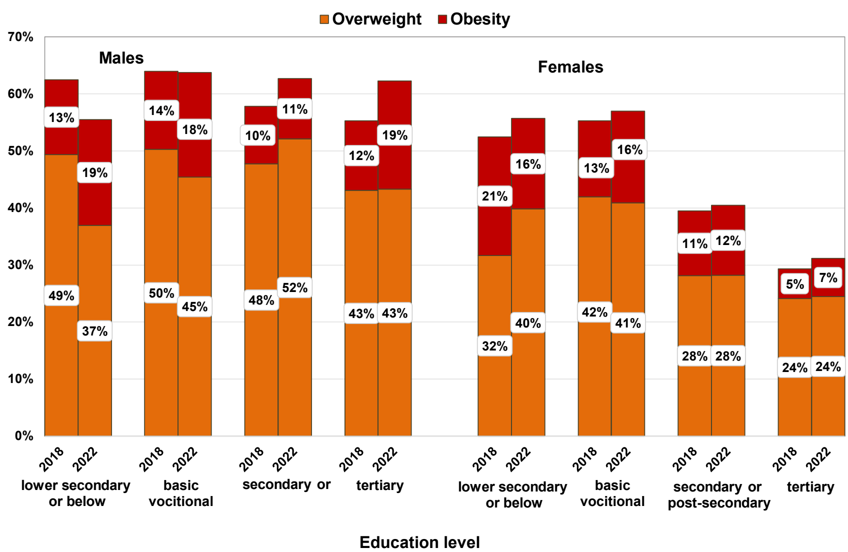

Fig. 13.6. Prevalence of overweight and obesity among the Polish population aged 20 years and more in 2018 and 2022 by sex and education (data: National Institute of Public Health NIH – National Research Institute); the values on the labels are rounded off to 1%

The situation is different among men – in 2022, being overweight was the least common among Poles with lower secondary education or less (55.5%). The percentages for the other levels were similar, ranging from 62.3% for those with tertiary to 63.7% with basic vocational education. After considering differences in the age structure of the categories being compared, the discrepancy is even greater. The standardised coefficient for the least educated is 40.7%, while for the other groups, it ranges from 60.5% (basic vocational) to 64.7% (secondary or post-secondary). For obesity, the picture is different; it was the least common characteristic of men with secondary or post-secondary education (10.6%). In the other categories, the prevalence of obesity was similar, ranging from 18.3% percent (for those with basic vocational education) to 19.0% (with tertiary education). Differences between the two only emerged when the age structure of the groups analysed was considered. Men with tertiary education (age-standardised coefficient of 19.5%) were at the highest risk of obesity, followed by those with basic vocational (16.9%) and lower secondary or less (14.3%), with 12.6% for secondary or post-secondary education.

The results presented here show that the prevalence of overweight and obesity among men is significantly higher than among women in almost all educational categories analysed. The most significant differences are among those with a university education. In this group, the prevalence of overweight in men is twice as high as in women (62.3 vs 31.1%), and obesity is almost three times as high (19.0% vs 6.7%).

Compared to 2018, the proportion of women with overweight increased in all educational categories analysed, most notably (by 3.2 p.p.) among Polish women with lower secondary education or less (Figure 13.6). It is important to emphasise, this is the resultant effect of a significant increase in the prevalence of overweight in the BMI range below 30 (by 8.1 p.p.) and, not observed in the other categories, a marked reduction in the prevalence of obesity (by 4.9 p.p.), possibly due to increased mortality among the least educated and therefore oldest obese women. The percentage of overweight men increased only among the better educated, i. e. at tertiary (by 7.0 p.p.) and secondary or post-secondary level (by 4.9 p.p.). For those with lower secondary or less education, the percentage decreased by as much as 7.0 p.p. An increase in obesity prevalence in males was observed in all educational categories, the strongest for tertiary education (by 6.7 p.p.) and lower secondary education or less (by 5.4 p.p.). The pattern of weight change in men depended on the level of education. Among the less educated, the prevalence of obesity increased, but the proportion of overweight people in the BMI range <30 decreased, while among the better educated, the prevalence of both slight overweight (especially in those with secondary or post-secondary education) and obesity increased (especially markedly so in those with higher education) – Figure 13.6.

The prevalence of overweight and obesity is also linked to material wealth. These problems are more likely to affect people belonging to households where, in the last year at least, money for food, clothing, or housing charges has sometimes been in short supply. Concerning overweight, this correlation is stronger in women. The problem affects 47.0% having financial difficulties and 41.4% being better off. This effect is largely due to differences in the age structure of the groups compared (age-standardised rates are 43.8% and 40.7%, respectively). In contrast, material status-related differences in obesity prevalence are more pronounced among men (it affects 18.4% of poorer versus 15.1% of wealthier Poles) and remain evident when the rates are standardised by age – 18.6% *vs* 15.7%.

Compared to 2018, among women with financial difficulties, the prevalence of overweight increased by 2.5 p.p., and obesity decreased by 1.2 p.p. For better-off Polish women, these values remained virtually unchanged. Among men, for both levels of material status, an increase in the prevalence of overweight (more in those with financial difficulties – 5.4 p.p. *vs*. 2.0 p.p.) and obesity (more in the better-off 4.3 p.p. *vs*. 3.0 p.p.) was observed.

The percentage of overweight men was higher among urban than rural residents (63.4% vs 59.9%). This fact was not due to differences in age structure – the standardised rates were 64.2% and 59.9%. It was a consequence of the significant difference in the prevalence of obesity, observed in 17.4% of urban residents and 12.9% of those living in rural areas (age-standardised rate values were 17.9% and 12.9%, respectively).

Among women, the opposite was observed, with overweight and obesity more common among rural residents – 46.3% vs 40.5% and 12.9% vs 11.0%, respectively. These differences are also apparent after considering the differences in the age structure of the comparison groups (age-standardised rates of 44.9 *vs* 39.3% and 12.5% *vs* 10.5%, respectively).

Compared to the pre-pandemic period, it is noteworthy that the prevalence of obesity among urban men increased by as much as 5.9 p.p. (in rural areas, it was an increase of 1.0 p.p.).

13.4. Physical activity

Information on physical activity among Europeans is provided, among others, by the Eurobarometer surveys conducted on behalf of the European Commission's Directorate-General for Education, Youth, Sport, and Culture. The results of the latest one[14], carried out in spring 2022, indicate that the situation in Poland is unfavourable compared to most EU countries (Fig. 13.7). Regularly (5–7 times a week) 2% and fairly systematically (1–4 times a week) 20% of residents exercise; for other forms of activity, the percentages are 6% and 32%. As many as 65% of Poles do not participate in sports. This value is the third-highest percentage among the 27 EU countries (after Portugal and Greece). It increased by 9 percentage points (p.p.) over the past five years, the highest among all countries compared. Other forms of physical activity are never undertaken by 45% of Poles.

The Health Status and Risk Factors Survey carried out by the NIPH NIH – PIB in August 2022 assessed the recreational physical activity causing accelerated breathing or heart rate (e.g. sports, gymnastics, brisk walking, dancing, gardening) lasting at least 30 minutes without a break but excluding work duties and locomotor activity. It is taken up in the spring, summer, and autumn seasons by 36.4% Poles (38.4% of men and 34.5% of women). Almost all of these people (94.3% of men and 93.3% of women) perform these activities at least once a week. Active people spend an average of 2 hours and 4 minutes per week on recreation.

This result means that 63.6% of Poles (61.6% of men and 65.5% of women) aged 20 or over do not engage in recreational physical activity. The higher percentage of inactive women is due to differences in the age structure among the subpopulations of both sexes – women in the population are, on average older than men. After standardisation against age, the rates are 64.3% and 62.9%, respectively.

Compared to 2018, the percentage of Poles not undertaking recreational physical activity increased by 3.8 p.p., similarly for both sexes (3.9 p.p. among men and 3.8 p.p. among women).

14 Kantar for the European Commission's Directorate-General for Education, Youth, Sport and Culture (2022), Special Eurobarometer 525, Sport and Physical Activity

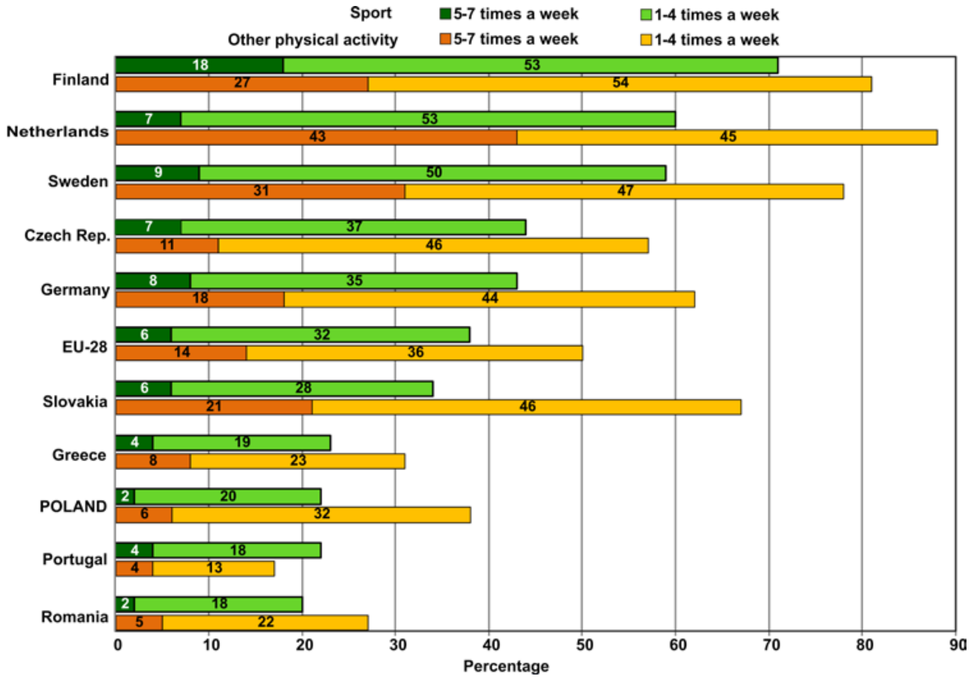

Fig. 13.7. Percentage of people aged 15 or over playing sports and undertaking other forms of recreational physical activity in selected EU countries (source: *Eurobarometer*, 2022)

The frequency of taking up recreation decreases steadily with age (Fig. 13.8). 47.7% of Poles aged 20–39 and 90.5% of those aged 75 or over are inactive. It is important to emphasise that although, in general, women exercise less frequently than men, Polish women are more active at the age of 40–59 (the percentage of persons not practising recreational activities is 57.6% *vs.* 66.0%).

The proportion of inactive people of both sexes in almost all age categories analysed has increased compared to the pre-pandemic COVID-19 period (Fig. 13.8). A significant exception is the 1.8 p.p. decrease in the percentage of non-exercising women aged 40–59. As shown in the subsection on overweight, only in this age category did the prevalence of overweight decrease among Polish women.

The prevalence of recreational exercise by both sexes increases with educational level. 91.2% of men with primary education and 42.1% with higher education were inactive. For women, these percentages vary from 91.3% to 48.8% (Fig. 13.9). This effect is only to a small extent attributable to differences in the age structure of the groups being compared, although older people are less educated. According to Statistics Poland, in 2021, 32.0% of Poles aged 70 or more had primary and 13.3% tertiary education, while for people aged 25–39, these percentages were 3.3% and 45.1%, respectively. After standardising the rates by age, their values for the different levels of education still vary considerably and are in ascending order (i.e. lower secondary or less, basic vocational, secondary, tertiary) as follows: 85.3%, 71.4%, 60.3%, and 48.5% for men and 85.0%, 71.9%, 64.8% and 54.8% for women.

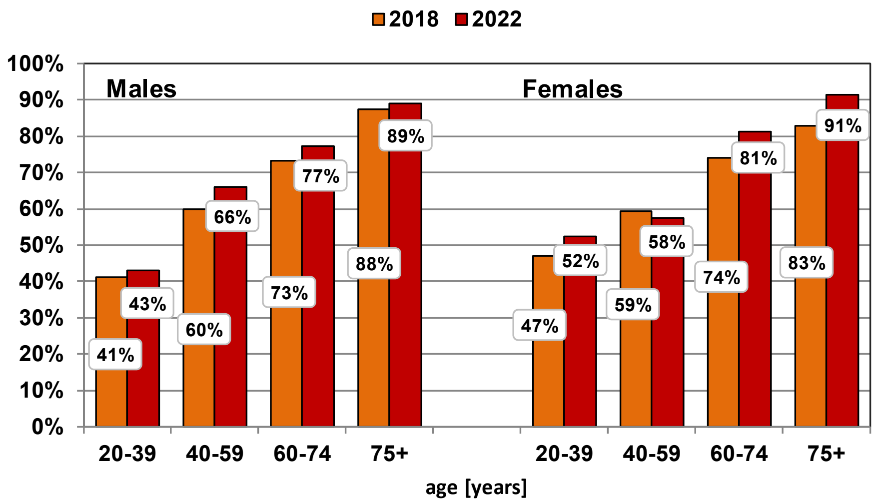

Fig. 13.8. Percentage of Poles aged 20 or over not undertaking any recreational physical activity in 2018 and 2022 by sex and age (data: National Institute of Public Health NIH – National Research Institute)

The activities of people of both sexes with primary and basic vocational education are similar (Fig. 13.9), among the better-educated women are more likely not to engage in recreational activities (63.6% vs 56.0% for secondary and 48.8% vs 42.1% for tertiary education).

Compared to 2018, the percentage of inactive people increased in almost all education categories, the only exception being the group of women with basic vocational education, where it remained virtually unchanged. The largest reduction in activity was for women with lower secondary education or less – an increase in non-exercisers by 14 p.p.

As shown above, this is the education category of women in which the prevalence of overweight increased most strongly. The percentage of the inactive increased significantly also for people with tertiary education – by 11 p.p. for men and 8 p.p. among women.

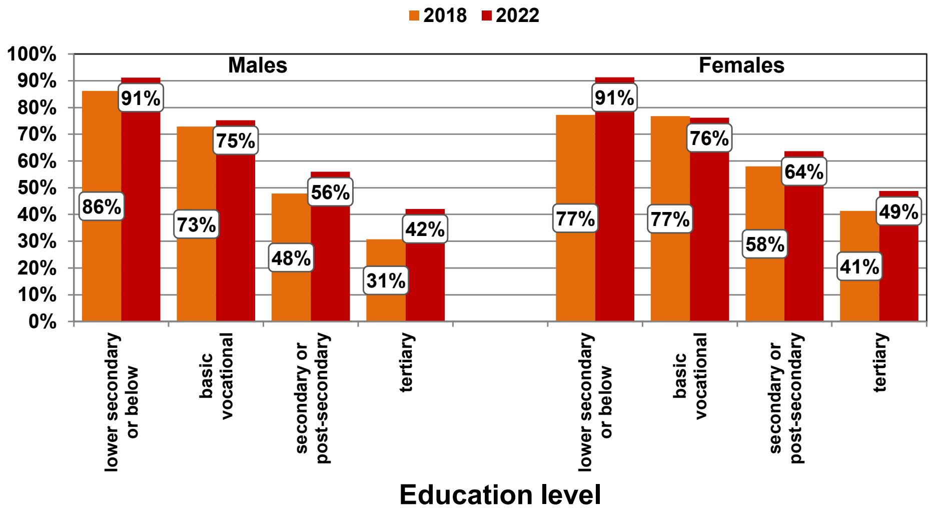

Fig. 13.9. Percentage of Poles aged 20 and more not undertaking any recreational physical activity in 2018 and 2022 by sex and education level (data: National Institute of Public Health NIH – National Research Institute); the values on the labels are rounded off to 1%

Poles' physical activity also shows a correlation with their material standing. People from households that have at least sometimes lacked money for food, clothing, or housing costs in the past year are significantly more likely than others not to engage in recreational activities (75.6% vs 60.8%). This difference is not due to the age structure of the groups compared – the age-standardised rates are 74.2% and 61.5%. Financially deprived men are more likely than women to drop out of physical activities (77.7% vs 73.8%); after standardisation of the rates, this difference widens slightly (77.4% vs 71.5%). Among the better-off, men are more active (proportions of non-exercisers 57.9% and 63.4% respectively); once the effect of age structure is removed, the difference is smaller (standardised rates: 59.9% vs 63.0%).

Compared to 2018, the decrease in activity for Poles with financial difficulties was much greater than for the better-off. In the former group, the percentage of people not taking up recreational physical activities increased by 7.2 p.p. (among men by 7.4 p.p. and women by 6.1 p.p.), and in the latter group by 3.1 p.p. for people of both sexes.

Rural residents exercise less frequently than urban residents (percentage of people not taking up physical recreation – 67.2% vs 61.4%). Men are more affected by the phenomenon, with 57.9% of those living in urban areas and as many as 67.6% in rural areas being inactive in 2022. The effect remains evident when the comparison groups' age structure is considered, with age-standardised rates of 60.2% and 67.8. Among women, the differences between urban and rural residents are smaller, with inactivity rates of 64.6% and 66.9%, respectively (after age standardisation – 63.4% and 65.7%). The activity of rural residents of both sexes is, therefore, similar.

Compared to 2018, a greater increase in the percentage of inactive people was observed for the urban population (by 6 p.p. among women and 5 p.p. among men), while for rural residents, the changes were 1 p.p. and 2 p.p., respectively.

SUMMARY

1. In 2022, the percentage of regular smokers of tobacco or electronic products was 29.8% of men and 17.6% of women respectively – values lower than in 2018 by 6 p.p. and 2.9 p.p. It is difficult to identify age-related downward trends, but a positive change among people with basic vocational education – traditionally presenting worse health attitudes – is noteworthy.
2. Alcohol consumption in 2021 remained almost unchanged compared to 2018 at 9.7 litres of pure alcohol per person. Between 2018 and 2021, the share of spirits in total consumption increased (from 34.6% in 2018 to 39.2% in 2021) and the share of beer decreased (from 57.9% in 2018 to 52.5% in 2021). The survey results showed a positive trend with a decrease in the percentage of people whose answers would indicate risky drinking (from 16.7% in 2022 to 21.3% in 2018 for men and from 4.3% to 6.0% for women).
3. In 2022, the prevalence of overweight (BMI ≥ 25) among the Polish population aged 20 years or more was 62% for men and 43% for women, while obesity was 16% and 12%, respectively. For both sexes, the prevalence of overweight and obesity

increases with age, peaking between 75 and 84 years. These problems are much more common among men, except for the 75–84 age group, where obesity affects more than a quarter of Polish women and significantly exceeds the percentage observed for men (19%). Among women, the risk of being overweight, as well as obesity, strongly depends on the level of education – for those with higher education, the risk is approximately two times lower than for those with basic vocational or lower education. Among men, these patterns do not occur. As a result, the biggest differences in the prevalence of these problems between people of both sexes are among Poles with a university education – among them, overweight in men is twice as common as in women (62% vs 31%) and obesity almost three times as common (19% vs 7%). Being overweight is more likely to affect people of lower economic status who have, at least periodically, difficulty paying their daily bills. Women living in rural areas and men in urban areas are more likely to fail to maintain normal body weight.

4. Compared to the period before the COVID-19 pandemic, the proportion of overweight men (after adjustment for change in age structure) increased by almost 3 p.p., while women only increased by 0.5 p.p. For both sexes, the increase was strongest in the oldest age groups, i. e. 75–84 years (by 19 p.p. among men and 9 p.p. among women) and 85+ (8 p.p. each). The greatest increase in the prevalence of overweight was observed in men with higher education (by 7 p.p.) and women with lower secondary education or less (by 3 p.p.), the categories with the most significant reduction in physical activity. The prevalence of obesity among men increased by 3 p.p. (most strongly among those with higher education – by 7 p.p. and among urban residents – by 6 p.p.). At the same time, among women as a whole, it remained virtually unchanged. The decrease in obesity prevalence was mainly observed among the most vulnerable population groups i. e. aged over 85 years (down 4 p.p.), women with primary or lower secondary education (down 5 p.p.), and those with financial difficulties (down 1 p.p.). This effect may be linked to an increased risk of death for obese people in these population categories.
5. Compared to the inhabitants of most EU countries, Poles are not physically active. As many as 64% of Poles (62% of men and 65% of women) aged 20 or over do not undertake recreational physical activity. Overall, females engage in such activities

less frequently than men; the exception is the age group of 40–59, in which women exercise more often than men (percentages of non-practising recreational activities are 58% vs 66%, respectively). The frequency of physical activity consistently decreases with age. Well-educated and better-off Poles are much more likely to exercise, and in the case of men, also urban residents.

6. Compared to 2018, the percentage of Poles not engaging in recreational physical activity, both men and women, increased by nearly 4 p.p. This increase was observed for almost all age categories and education levels analysed. The exception is the decrease in the percentage of non-exercising women aged 40–59 years by almost 2 p.p. (the prevalence of overweight and obesity also decreased in this group). The greatest reduction in activity was observed among Polish women with lower secondary education or less (the proportion of non-exercisers increased by 14 p.p.) and both sexes with higher education (an increase in the proportion of non-exercising men by 11 p.p. and women by 8 p.p. The proportion of inactive people increased more among urban than rural residents. The decrease in activity for Poles with financial difficulties was much greater than for the better-off (by 7 p.p. vs. 3 p.p.).

14. SELECTED ASPECTS OF THE DIET OF POLES, WITH REFERENCE TO THE COVID-19 PANDEMIC PERIOD

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The constraints of the COVID-19 pandemic, such as lockdown, social distance, home working, among others, with often less income and extra leisure time, have led to many changes in consumer behaviour. Shopping habits, the type of products bought and consumed, and the way meals are prepared have changed[1]. This may have had an impact on food consumption and energy and nutrient intake.

Social isolation during the pandemic had a particularly negative impact on the degree of loneliness and quality of life of older people. People who were in social welfare institutions, those living alone and those with low socio-economic status were particularly vulnerable[2]. Social isolation had an impact on both the physical and mental health of older people. They often felt anxious, suffered from depression, their sleep quality deteriorated, and they did not do any physical activity[3].

The elderly are a group particularly vulnerable to the influence of poor nutrition. Restricting food consumption or a diet of low nutritional value can lead to malnutrition. On the other hand, too high energy intake with lower energy requirement in the elderly is a cause of overweight and obesity.

1 COVID-19 STUDY: European food behaviours. COVID-19 impact on consumer food behaviours in Europe. 2020. https://www.eitfood.eu/media/news-pdf/COVID-19_Study_-_European_Food_Behaviours_-_Report.pdf

2 Sayin Kasar K, Karaman E. Life in lockdown: Social isolation, loneliness and quality of life in the elderly during the COVID-19 pandemic: A scoping review. Geriatr Nurs. 2021;42(5):1222–1229. doi: 10.1016/j.gerinurse.2021.03.010.

3 Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, Ganz F, Torralba R, Oliveira DV, Rodríguez-Mañas L. Impact of Social Isolation Due to COVID-19 on Health in Older People: Mental and Physical Effects and Recommendations. J Nutr Health Aging. 2020;24(9):938–947. doi: 10.1007/s12603–020–1469–2.

A nationwide survey conducted by the National Institute of Public Health NIH – National Research Institute in 2019–2020 found that overweight or obesity was common among older people, found in 75.6% of men and 61.8% of women aged 65 years and more[4]. These individuals were often characterised by abdominal obesity, which increases the risk of metabolic complications. At the same time, 1.3 percent of men and 4.3 percent of women were found to be underweight, increasing the risk of protein-energy malnutrition.

Both overweight and obesity, as well as underweight, promote the development of many diseases that can impair the quality of life in the elderly. The pandemic period and the change in eating habits may have increased this risk.

This chapter presents the results of an analysis of food consumption and energy and nutrient intake in 2019 and 2020 based on household budget survey in Poland, including retirees' households. In addition, the results of studies on the frequency of consumption of selected food groups, certain eating habits and other parameters related to the diet of Poles in 2018 and 2022 are described.

14.1. Material and methodology

14.1.1. Material and methodology for household budget survey

The analysis of food consumption in Poland was based on data obtained by the National Institute of Public Health NIH – National Research Institute from Statistics Poland from the 2019 and 2020 household budget survey.

Under Statistics Poland's survey a total of 35,923 households were covered in 2019 and 33,529 in 2020, with the following number of residents respectively: 93,674 and 87,603 people. The share of urban households was 58.1% and 58.5% respectively. For the

[4] Rychlik E, Woźniak A, Stoś K, Ołtarzewski M. Nutritional status of the elderly in Poland. Rocz Panstw Zakl Hig 2022;73(3):275–283. doi: 10.32394/rpzh.2022.0219.

purposes of this chapter, retirees' households were identified, which in 2019 and 2020 were respectively: 33.6% and 32.8% of the households surveyed[5, 6].

The household budget survey method, in relation to food consumption, consists of a drawn household recording the number of food items purchased in a given month with cash, with a payment card, on credit or otherwise obtained by the household (from the household's own farm or allotment, home garden, own business, received as a gift, etc.)[6, 7].

The advantage of this survey is that it is conducted annually on a representative sample of households in Poland, while its disadvantage is that it refers to the average person in a given household and not to individuals in that household. Furthermore, this survey does not take into account food consumed in mass catering facilities.

In order to calculate the energy and nutrient intake, the above-mentioned food consumption data obtained from Statistics Poland were linked, using conversion factors developed at the National Institute of Public Health, NIH – National Research Institute, with data on the energy and nutrient content of individual food products from the Food Composition Tables[8].

14.1.2. Methodology for researching the dietary habits of Poles in 2018 and 2022

The method for surveying the dietary habits of Poles is described in the chapter "Subjective assessment of health and level of health needs satisfaction before and during the COVID-19 pandemic". Respondents were asked about the frequency of consumption of vegetables, fruit, marine fish, fast food, sweet carbonated and still drinks and sweets. Data on the frequency of consumption of these products were analysed for the general population and by sex, age (in 2 age groups: 20–49 years and 50 years and more) and place of residence (urban, rural).

Selected dietary habits of Poles were also analysed, such as the type of bread consumed, the type of fat used to spread bread and the removal of fat from meat and skin

[5] Statistics Poland. Household budgets 2019. Statistics Poland Warsaw 2020

[6] Statistics Poland. Household budgets 2020. Statistics Poland Warsaw 2021

[7] Statistics Poland. Statistical Yearbook of the Republic of Poland 2021. Statistics Poland Warsaw 2021

[8] Kunachowicz H., Przygoda B., Nadolna I., Iwanow K. Food Composition Tables. PZWL Wydawnictwo Lekarskie. Warsaw 2018

from poultry. Respondents also declared whether they follow a diet and, if so, what kind of diet. The survey also included questions about sources of nutritional knowledge and the application of this knowledge in practice, as well as factors that hinder healthy eating.

The differences between 2018 and 2022 regarding socio-demographic characteristics, as well as the frequency of consumption of individual product groups in the general population and in selected population groups, were tested using the chi-square test (α=0.05).

14.2. Analysis of food consumption and energy and nutrient intake in Poland in 2019–2020 based on household budget survey

14.2.1. Analysis of food consumption from household budget survey

Food consumption in total household

The results of total household food consumption in 2019 and 2020 are shown in Table 14.1.

Analysis of the data in the years compared, specially 2019 (before the COVID-19 pandemic) and 2020, when the pandemic began, showed that the differences in consumption of most product groups did not exceed 10%.

Within the group of cereal products, bread consumption decreased by 8% between 2019 and 2020 (respectively: 2.98 vs 2.75 kg/person/month). Other bakery products (crisp bread, rice wafers, biscuits, wafers and all kinds of cakes and pastries produced by the food industry) showed a slight increase of 1% in their consumption. During the period under review, there was a 19% increase of the consumption of flour (0.59 vs 0.70 kg/person/month), a 7% increase of the consumption of groats, rice and flakes (0.42 vs 0.45 kg/person/month) and a 5% increase of the consumption of pasta and pasta products (0.40 vs 0.42 kg/person/month).

The consumption of potatoes and their products in 2019–2020 was characterised by a slight decrease of 2%.

Vegetables and processed vegetables, which included vegetable-based juices, had a 3% increase in consumption over the two years under consideration (4.77 vs 4.91 kg/person/

month). In the group of fruit and preserves, including fruit juices, there was an increase in consumption of 4% in 2020 (4.92 kg/person/month) compared to 2019 (4.75 kg/person/month). The consumption of vegetables, fruit and their products in Poland in 2019–2020 ranged between 313–322 g/person/day and was below the World Health Organisation (WHO) recommendations[9] that the consumption of vegetables and fruit, excluding potatoes, sweet potatoes and starchy roots, should be at least 400 g per day.

[9] World Health Organization (WHO), Fruit and Vegetable Promotion Initiative – report of themeeting, Geneva, 25–27 August 2003; https://www.who.int/news-room/fact-sheets/detail/healthy-diet

Table 14. 1. Average monthly consumption[a]/ of food in total households in 2019 and 2020; per capita

Description	Unit	2019	2020	
				2019=100
Bread	kg	2.98	2.75	92
Other bakery products	kg	0.98	0.99	101
Wheat flour and other flours	kg	0.59	0.70	119
Groats and cereals, rice	kg	0.42	0.45	107
Pasta and pasta products	kg	0.40	0.42	105
Potatoes and products[b]/	kg	3.02	2.96	98
Vegetables and products	kg	4.77	4.91	103
Fruit and products	kg	4.75	4.92	104
Meat, offal, products	kg	5.08	5.09	100
of which: meat	kg	2.87	2.90	101
of which: pork	kg	1.22	1.24	102
beef and veal	kg	0.12	0.11	92
poultry	kg	1.53	1.55	101
processed meat	kg	2.21	2.19	99
of which: cold cuts excluding poultry[c]/	kg	1.44	1.42	99
Fish and preserves[d]/	kg	0.27	0.27	100
Fats: total	kg	1.04	1.08	104
animal (without butter)	kg	0.07	0.07	100
vegetable	kg	0.69	0.69	100
butter	kg	0.28	0.32	114
Liquid milk and milk-based beverages[e]/	1	3.38	3.61	107
Cheeses	kg	0.90	0.95	106
Cream	kg	0.35	0.36	103
Eggs	pcs.	10.99	11.04	100
Sugar	kg	0.80	0.84	105
Confectionery	kg	0.49	0.52	106
Table salt	kg	0.15	0.16	107
Non-alcoholic beverages	1	3.86	3.89	101

[a]/ – without consumption in catering facilities; [b]/ – with potato crisps; [c]/ – premium meats: sirloin, ham, gammon and long-life sausages; other cold cuts; [d]/ – without tinned fish, salted herring and other fish and seafood preparations; [e]/ – without dairy desserts and dairy drinks such as: kefir, buttermilk, with yoghurt.

Analysis of the average monthly consumption of meat, offal and their products, taken together, showed that there was no change in the consumption of products from this group between 2019 and 2020. Considering the different types of raw meat, an 8% decrease in beef and veal consumption should be indicated.

According to the recommendations of National Institute of Public Health NIH – National Research Institute[10], the consumption of red meat and processed meat should not exceed 0.5 kg per week. Considering the results of the household budget survey, the consumption of pork, beef and veal and all processed meat in 2019–2020 was, respectively: 819 and 812 g/person/day, which significantly exceeded these recommendations.

Consumption of fish and processed fish remained unchanged in both years studied, at 0.27 kg/person/month.

A comparative analysis of the consumption of visible fats (vegetable oils, margarine, butter, lard) showed an increase of 4% between 2019 and 2020 (1.04 vs 1.08 kg/person/month). Considering the different types of fat products, the high increase in their consumption – by 14% – related to the butter (0.28 vs 0.32 kg/person/month). There was no change in other animal fats and vegetable fats.

Consumption of liquid milk and yoghurt increased by 7% between 2019 and 2020 (3.38 vs 3.61 litres/person/month). In contrast, there was a 6% increase in cheese consumption (0.90 vs 0.95 kg/person/month) and 3% for cream.

The number of eggs consumed in 2019 and in 2020 was 11 eggs per person/month.

The amount of sugar consumed in 2020 was 0.84 kg/person/month, 5% higher than that recorded in 2019 (0.80 kg/person/month), while the consumption of confectionery products increased by 6% over the period (from 0.49 to 0.52 kg/person/month).

The consumption of table salt in 2019 was 0.15 kg/person/month, while in the following year it was 0.16 kg/person/month. These values represented respectively: 4.9 and 5.3 g/person/day.

The amount of non-alcoholic drinks consumed, excluding water, tea and coffee, dairy drinks and juices, has not changed significantly.

[10] Wolnicka, K. Talerz zdrowego żywienia. https://ncez.pzh.gov.pl/abc-zywienia/talerz-zdrowego-zywienia/

Product consumption in retirees' households

This section specifically refers to food consumption in 2019 and 2020 in retirees' households (Table 14.2), i. e. primarily the older people. It is worth noting that in 2019, people aged 60 and more accounted for 82.9% of the members of retirees' households and in 2020 for 83.5%[11, 12].

Analysis of data on the consumption of cereal products in retirees' households showed that the consumption of bread decreased by 7% between 2019 and 2020, while there was a 13% increase in the consumption of flour, a 6% increase in the consumption of groats, rice and flakes and a 4% increase in the consumption of pasta and pasta products.

Consumption of potatoes and potato products in 2019–2020 was characterised, as for all households, by a slight decrease of 3%.

In the group of vegetables and products, there was no noticeable change over the two years in question (6.52 and 6.54 kg/person/month). Consumption of fruit and products decreased by 1% in 2020 (5.91 kg/person/month) compared to 2019 (5.99 kg/person/month).

The daily intake of fruit, vegetables and products was 411 g/person/day in 2019 and 408 g/person/day in 2020. However, it should be noted that juice consumption is included in these quantities. Juice consumption was 27.3 ml/person/day in 2019 and 29.2 ml/person/day in 2020, so fruit and vegetable consumption was 383.7 g/person/day in 2019 and 378.8 g/person/day in 2020, below the amounts recommended by WHO experts (at least 400 g/day).

Analysis of the average monthly consumption of meat, offal and their products, taken together, showed that there was no noticeable change in the consumption of products from this group between 2019 and 2020. The analysis of the amount of pork, beef and veal and all processed meat consumed in 2019–2020 exceeded the recommendations of the National Institute of Public Health NIH – National Research Institute[13]; according to which the consumption of red and processed meat should be a maximum of 0.5 kg/person/week.

Consumption of fish and processed fish products remained unchanged in the years under study, similar to total households, at 0.40 kg/person/month.

Within the visible fats group, there was a noticeable increase in butter consumption – up 12% in 2020 vs. 2019.

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11 Statistics Poland. Household budgets 2019. Statistics Poland Warsaw 2020

12 Statistics Poland. Household budgets 2020. Statistics Poland Warsaw 2021

13 Wolnicka, K. Talerz zdrowego żywienia. https://ncez.pzh.gov.pl/abc-zywienia/talerz-zdrowego-zywienia/

Table 14.2. Average monthly consumption[a]/ of food in retirees' households in 2019 and 2020; per capita

Description	Unit	2019	2020	
				2019=100
Bread	kg	3.79	3.53	93
Other bakery products	kg	1.25	1.25	100
Wheat flour and other flours	kg	0.82	0.93	113
Groats and cereals, rice	kg	0.49	0.52	106
Pasta and pasta products	kg	0.46	0.48	104
Potatoes and products[b]/	kg	4.01	3.90	97
Vegetables and products	kg	6.52	6.54	100
Fruit and products	kg	5.99	5.91	99
Meat, offal, products	kg	6.77	6.74	100
of which: meat	kg	3.87	3.87	100
of which: pork	kg	1.67	1.68	101
beef and veal	kg	0.17	0.17	100
poultry	kg	2.03	2.02	100
processed meat	kg	2.90	2.87	99
of which: cold cuts excluding poultry[c]/	kg	1.84	1.81	98
Fish and preserves[d]/	kg	0.40	0.40	100
Fats: total	kg	1.45	1.49	103
animal (without butter)	kg	0.14	0.14	100
vegetable	kg	0.90	0.89	99
butter	kg	0.41	0.46	112
Liquid milk and milk-based beverages[e]/	1	3.98	4.05	102
Cheeses	kg	1.09	1.14	105
Cream	kg	0.52	0.51	98
Eggs	pcs.	14.77	14.51	98
Sugar	kg	1.11	1.13	102
Confectionery	kg	0.58	0.61	105
Table salt	kg	0.24	0.24	100
Non-alcoholic beverages	1	2.88	3.02	105

[a]/ – without consumption in catering facilities; [b]/ – with potato crisps; [c]/ – premium meats: sirloin, ham, gammon and long-life sausages; other cold cuts; [d]/ – without tinned fish, salted herring and other fish and seafood preparations; [e]/ – without dairy desserts and dairy drinks such as: kefir, buttermilk, with yoghurt.

Liquid milk and yoghurt consumption increased by 2% between 2019 and 2020, while cheese consumption increased by 5%.

The number of eggs consumed in 2019 and in 2020 was 15 eggs per person/month.

Sugar consumption in 2020 was 1.13 kg/person/month, 2% higher than that found in 2019, while the consumption of confectionery products increased by 5% (from 0.58 to 0.61 kg/person/month) during the period under review.

The amount of table salt consumed in 2019, as in 2020, was 7.9 g/person per day.

In retirees' households, the amount of non-alcoholic drinks drunk in 2020 was 5% higher than 2019.

Food consumption in urban and rural households

The analysis on food consumption using the household budget survey method for 2019 and 2020 also concerned the differences in consumption of specific food groups between urban and rural households (Table 14.3).

In the group of cereal products, it was shown that urban residents were characterised in 2019 and 2020 by lower consumption of cereal product groups such as bread (by 21% and 19% respectively) and flour (by: 48% and 35%), respectively, while there was a 13% (in 2019) and 14% (in 2020) higher consumption of other bakery products, which include cakes and pastries. The consumption of pasta and pasta products did not differ between urban and rural households.

Within the group of potatoes and products, higher consumption was recorded for those living in rural areas in 2019: 3.41 vs 2.75 kg/person/month and in 2020: 3.26 vs 2.77 kg/person/month.

Consumption of vegetables and processed vegetables among urban residents was 6% higher (4.88 kg/person/month) in 2019 and 12% higher (5.17 kg/person/month) in 2020.

Consumption of fruit and products in 2019 was 20% higher among urban residents (5.18 kg/person/month) than among rural residents (4.13 kg/person/month). One year later, the difference was 21% (5.39 vs 4.23 kg/person/month).

The consumption of vegetables, fruit and their products was in urban households in 2019 and 2020, respectively: 331 and 346 g/person/day, while in rural households in the corresponding years it was equal to: 287 and 288 g/person/day. Thus, regardless of place of residence, they were below the recommended amounts of at least 400 g per day.

An analysis of the consumption of meat, offal and processed products showed that the majority of types of meat were consumed in greater quantities by rural residents in both 2019 and 2020. In the case of pork, the differences were in the range of 25–30%. Only higher meat consumption among urban residents was recorded for beef and veal, for which the differences between urban and rural households were 27% in 2019 and 36% in 2020. Poultry meat consumption among rural residents was 16% higher in both 2019 and 2020, while processed meat consumption was 12% higher in 2019 and 9% higher in 2020.

Table 14.3. Average monthly consumption[a]/ of food in urban and rural households in 2019 and 2020; per capita

Description	Unit	2019		2020	
		Urban area	Rural area	Urban area	Rural area
Bread	kg	2.75	3.34	2.56	3.05
Other bakery products	kg	1.03	0.90	1.05	0.90
Wheat flour and other flours	kg	0.50	0.74	0.62	0.84
Groats and cereals, rice	kg	0.41	0.41	0.45	0.44
Pasta and pasta products	kg	0.40	0.40	0.42	0.42
Potatoes and products[b]/	kg	2.75	3.41	2.77	3.26
Vegetables and products	kg	4.88	4.59	5.17	4.56
Fruit and products	kg	5.18	4.13	5.39	4.23
Meat, offal, products	kg	4.78	5.56	4.84	5.51
of which: meat	kg	2.67	3.20	2.73	3.20
of which: pork	kg	1.09	1.42	1.13	1.41
beef and veal	kg	0.13	0.10	0.13	0.08
poultry	kg	1.44	1.67	1.47	1.70
processed meat	kg	2.11	2.36	2.11	2.31
of which: cold cuts excluding poultry[c]/	kg	1.35	1.56	1.35	1.52
Fish and preserves[d]/	kg	0.27	0.25	0.29	0.24
Fats: total	kg	1.00	1.11	1.03	1.14
animal (without butter)	kg	0.06	0.08	0.06	0.08
vegetable	kg	0.64	0.79	0.62	0.78
butter	kg	0.30	0.24	0.35	0.28
Liquid milk and milk-based beverages[e]/	l	3.27	3.56	3.50	3.82
Cheeses	kg	0.96	0.79	1.03	0.83
Cream	kg	0.33	0.37	0.34	0.38
Eggs	pcs.	10.78	11.31	11.00	11.10
Sugar	kg	0.65	1.03	0.70	1.05
Confectionery	kg	0.51	0.46	0.54	0.49
Table salt	kg	0.14	0.18	0.14	0.18
Non-alcoholic beverages	l	3.68	4.15	3.68	4.23

[a]/ – without consumption in catering facilities; [b]/ – with potato crisps; [c]/ – premium meats: sirloin, ham, gammon and long-life sausages; other cold cuts; [d]/ – without tinned fish, salted herring and other fish and seafood preparations; [e]/ – without dairy desserts and dairy drinks such as: kefir, buttermilk, with yoghurt.

The daily consumption of red meat (pork, beef, veal) and processed meat in the urban population group in 2019 and 2020, was: 109 and 110 g/person/day, while among rural residents the values were: 128 and 125 g/person/day. This means that the recommendations of the National Institute of Public Health NIH – National Research Institute[14] were exceeded in each of the cases in question.

In the group of fish and processed fish, higher consumption values were shown in urban residents than among rural residents, by 7% in 2019 (0.27 vs 0.25 kg/person/month) and by 17% in 2020 (0.29 vs 0.24 kg/person/month).

Consumption of total fat products, in both 2019 and 2020, was 11% higher in rural residents. Considering the different types of visible fats, only butter consumption was higher in those living in the city – by 20%.

Within the group of dairy products, the consumption of milk and yoghurt was 9% higher in rural households in 2019 and 2020. Consumption of cream was also found to be higher in rural residents by 12%. On the other hand, in the case of cheese consumption, higher consumption was shown in urban households (in 2019 and 2020 by respectively: 18% and 19%).

Egg consumption in urban and rural households was 11 eggs per person/month.

Sugar consumption in rural households surveyed in 2019 and 2020 was respectively: 1.03 and 1.05 kg/person/month and was higher than the amounts consumed in urban households, by respectively: 58% and 50%. However, for confectionery products, higher consumption was shown among urban households, up 10% in 2019 and 9% in 2020.

In 2019–2020, rural households' consumption of table salt per day was 5.9 g/share, 28% higher than urban households (4.6 g/share/day).

Consumption of non-alcoholic beverages, mainly soft drinks, was 4.15 litres/person/month in rural households in 2019 and 4.23 litres/person/month in 2020, higher than the amount consumed in urban households by respectively: 13% and 15%.

[14] Wolnicka, K. Talerz zdrowego żywienia. https://ncez.pzh.gov.pl/abc-zywienia/talerz-zdrowego-zywienia/

14.2.2. Energy and nutrient intake based on household budget survey

Energy and nutrient intake in total households

Data from household budget survey show that during the pandemic, the energy intake increased on average from 1674 kcal to 1715 kcal/person/day (by 2%) (Table 14.4). The largest increase was in dietary fat intake (by 3%), with the majority being animal fat. The increase in protein and carbohydrates intake was slightly less (by 1% and 2% respectively). There was some change in the proportion of energy from individual macronutrients: there was a higher proportion of energy from fat and less from protein and carbohydrates.

Increased intake of animal fat was associated with an increase in saturated fatty acids (by 4%) and cholesterol (by 3%) in the diet. There was a slight increase in the proportion of energy from saturated fatty acids and a decrease in the ratio of polyunsaturated to saturated fatty acids. In contrast, fibre intake was similar.

The higher energy intake in 2020 relative to 2019 was associated with an increase in the intake of most minerals and vitamins. There was a slight increase in the intake of the following minerals: calcium (by 5%) and magnesium (by 3%), as well as vitamins: beta-carotene (by 4%), vitamin C (by 3%) and B_2 (by 3%).

Table 14.4. Average daily intake of energy and selected nutrients in total households in 2019 and 2020 per person

Energy and nutrients	Unit	2019	2020	
				2019=100
Total energy	kcal	1674	1715	102
	kJ	7009	7180	102
Energy from animal products	kcal	526	546	104
Energy from plant products	kcal	1148	1168	102
Macronutrients:				
Protein: total	g	61.7	62.6	101
animal	g	41.1	41.8	102
vegetable	g	20.6	20.9	101
Fat: total	g	69.0	71.4	103
animal	g	36.2	38.0	105
vegetable	g	32.7	33.4	102
Digestible carbohydrates	g	195	199	102
Percent of energy derived from:				
Protein	%	15.0	14.8	-
Fat	%	36.5	36.8	-
Digestible carbohydrates	%	47.4	47.2	-
Fatty acids:				
Saturated	g	25.1	26.2	104
Monounsaturated	g	27.6	28.5	103
Polyunsaturated	g	12.0	12.2	102
Percent of energy from saturated fatty acids	%	13.5	13.7	-
Ratio of polyunsaturated to saturated fatty acids (P:S)		0.48	0.46	-
Cholesterol	mg	228	234	103
Fibre	g	13.4	13.5	101
Minerals:				
Sodium	mg	3395	3516	104
Potassium	mg	2939	3015	103
Calcium	mg	529	553	105
Phosphorus	mg	957	978	102
Magnesium	mg	288	296	103
Iron	mg	9.0	9.1	101
Zinc	mg	7.8	7.9	101
Copper	mg	1.3	1.3	100
Manganese	mg	2.7	2.8	104
Iodine	µg	141	150	106

Energy and nutrients	Unit	2019	2020	
				2019=100
Vitamins:				
Vitamin A	µg	929	943	102
Beta-carotene	µg	2229	2320	104
Vitamin D	µg	2.86	2.85	100
Vitamin E	mg	10.0	10.1	101
Vitamin B1	mg	1.20	1.22	102
Vitamin B2	mg	1.37	1.41	103
Niacin	mg	18.0	18.3	102
Vitamin B6	mg	1.52	1.55	102
Folates	µg	189	194	103
Vitamin B12	µg	3.06	3.10	101
Vitamin C	mg	77.0	79.5	103

In relation to current Polish Dietary Reference Values (DRVs)[15], the diet of Poles in both 2019 and 2020 was characterised by an excessively high percentage of energy from fat, including saturated fatty acids, while its fibre content was very low. In addition, Poles consumed too little calcium and vitamin D. There was a very high intake of sodium, which clearly exceeded the DRVs for this mineral ([15]). The sodium content of the diet of Poles in 2019 corresponded to 8.5 g/person/day of salt (the total amount of table salt and salt contained in the products consumed), and in 2020 to 8.8 g, which were therefore much higher than the World Health Organisation's recommended maximum value of 5 g[16].

Energy and nutrient intake in pensioner households

The energy intake in retirees' households in 2019 and 2020 was similar and was respectively: 2131 kcal/person/day and 2155 kcal (Table 14.5). Of the macronutrients, only fat intake increased (by 2%), primarily animal fat, resulting in a slightly higher proportion of dietary energy from this nutrient in 2020 compared to before the pandemic. There was some increase in saturated fatty acids intake and the percentage of energy derived

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15 Jarosz M., Rychlik E., Stoś K., Charzewska J. (ed.): Normy żywienia dla populacji Polski i ich zastosowanie. Warsaw, National Institute of Public Health – National Institute of Hygiene, 2020

16 World Health Organization. Guideline: Sodium intake for adults and children, World Health Organization, 2012.

from them. There was little change in the intake of minerals and vitamins, with only a slight increase in calcium intake (by 2%).

As in total households, the proportion of fat in the diet, including saturated fatty acids, was also too high in retirees' households. Sodium and therefore salt intake was high (12.2–12.3 g/person/day). In contrast, the calcium and vitamin D content of the diet in particular was too low.

Table 14.5. Average daily intake of energy and selected nutrients in retirees' households in 2019 and 2020; per person

Energy and nutrients	Unit	2019	2020	
				2019=100
Total energy	kcal	2131	2155	101
	kJ	8922	9023	101
Energy from animal products	kcal	700	714	102
Energy from plant products	kcal	1431	1441	101
Macronutrients:				
Protein: total	g	79.4	79.7	100
animal	g	53.0	53.2	100
vegetable	g	26.3	26.4	100
Fat: total	g	90.3	92.0	102
animal	g	49.5	50.9	103
vegetable	g	40.8	41.1	101
Digestible carbohydrates	g	242	244	101
Percent of energy derived from:				
Protein	%	15.1	15.0	-
Fat	%	37.5	37.8	-
Digestible carbohydrates	%	46.2	46.0	-
Fatty acids:				
Saturated	g	32.9	33.9	103
Monounsaturated	g	36.0	36.7	102
Polyunsaturated	g	15.6	15.6	100
Percent of energy from saturated fatty acids	%	13.9	14.2	-
Ratio of polyunsaturated to saturated fatty acids (P:S)		0.47	0.46	-
Cholesterol	mg	305	309	101
Fibre	g	17.2	17.1	99

Energy and nutrients	Unit	2019	2020	
				2019=100
Minerals:				
Sodium	mg	4904	4884	100
Potassium	mg	3868	3906	101
Calcium	mg	638	651	102
Phosphorus	mg	1214	1223	101
Magnesium	mg	377	382	101
Iron,	mg	11.8	11.9	101
Zinc	mg	10.1	10.1	100
Copper	mg	1.7	1.7	100
Manganese	mg	3.5	3.5	100
Iodine	µg	218	218	100
Vitamins:				
Vitamin A	µg	1308	1318	101
Beta-carotene	µg	2996	3016	101
Vitamin D	µg	3.86	3.82	99
Vitamin E	mg	12.9	12.9	100
Vitamin B1	mg	1.54	1.54	100
Vitamin B2	mg	1.76	1.77	101
Niacin	mg	24.1	24.3	101
Vitamin B6	mg	1.95	1.96	101
Folates	µg	248	250	101
Vitamin B12	µg	4.17	4.20	101
Vitamin C	mg	100	101	101

Energy and nutrient intake in urban and rural households

Analysis of household budget survey data by place of residence (Table 14.6) showed that the increase in energy intake in 2019–2020 occurred mainly in urban areas; in urban households, energy intake in 2020 was 54 kcal/person/day (3%) higher than the year before. In rural households, energy intake did not vary significantly over the period. The content of all macronutrients in the diets of urban residents increased, while the diets of those living in rural areas were only characterised by an increase in fat content. In both urban and rural areas, more saturated fatty acids were consumed in 2020 than in 2019, and the proportion of energy from these fatty acids in the diet also increased. Among urban dwellers, the intake of most minerals and vitamins increased, while in the rural areas there were mostly no major differences in this respect.

In both 2019 and 2020, the diet of rural residents was characterised by a higher energy value than that of urban residents. These differences were 153 kcal (9%) and 119 kcal/person/day (7%) respectively. In rural areas, the intake of all macronutrients was higher, and there was a higher proportion of energy from carbohydrates and less from fat, including saturated fatty acids compared to urban areas.

In the case of minerals and vitamins, only some were consumed in higher amounts in the countryside than in the city. These mainly included sodium, iodine, vitamin E and niacin. In contrast, the diets of urban dwellers contained more calcium, beta-carotene and vitamin C. This was associated with a markedly higher consumption of fruit and vegetables and cheese in the city.

Table 14.6. Average daily intake of energy and selected nutrients in urban and rural households in 2019 and 2020; per person

Energy and nutrients	Unit	2019		2020	
		Urban area	Rural area	Urban area	Rural area
Total energy	kcal	1614	1767	1668	1787
	kJ	6758	7400	6985	7482
Energy from animal products	kcal	515	537	542	553
Energy from plant products	kcal	1099	1230	1126	1233
Macronutrients:					
Protein: total	g	59.9	64.2	61.7	64.4
animals	g	39.8	42.8	41.0	43.0
vegetable	g	20.1	21.4	20.6	21.4
Fat: total	g	67.4	71.7	69.9	73.4
animal	g	35.6	36.7	37.9	38.2
vegetable	g	31.8	35.0	32.0	35.3
Digestible carbohydrates	g	186	210	192	211
Percent of energy derived from:					
Protein	%	15.1	14.8	15.0	14.6
Fat	%	36.9	35.9	37.0	36.3
Digestible carbohydrates	%	46.8	48.2	46.8	48.0
Fatty acids:					
Saturated	g	24.9	25.1	26.3	26.1
Monounsaturated	g	26.9	29.0	27.7	29.6
Polyunsaturated	g	11.4	13.0	11.6	13.1

Energy and nutrients	Unit	2019		2020	
		Urban area	Rural area	Urban area	Rural area
Percent of energy from saturated fatty acids	%	13.9	12.8	14.2	13.1
Ratio of polyunsaturated to saturated fatty acids (P:S)		0.46	0.52	0.44	0.50
Cholesterol	mg	224	234	232	237
Fibre	g	13.3	13.5	13.6	13.3
Minerals:					
Sodium	mg	3224	3829	3238	3805
Potassium	mg	2947	2940	3055	2983
Calcium	mg	537	513	566	534
Phosphorus	mg	944	974	977	984
Magnesium	mg	288	291	298	296
Iron	mg	8.9	9.1	9.2	9.1
Zinc	mg	7.7	8.1	7.9	8.0
Copper	mg	1.3	1.3	1.4	1.3
Manganese	mg	2.7	2.8	2.8	2.8
Iodine	µg	134	163	135	163
Vitamins:					
Vitamin A	µg	915	955	950	951
Beta-carotene	µg	2284	2154	2424	2205
Vitamin D	µg	2.77	2.94	2.82	2.90
Vitamin E	mg	9.7	10.6	9.8	10.6
Vitamin B1	mg	1.17	1.23	1.21	1.23
Vitamin B2	mg	1.38	1.35	1.44	1.37
Niacin	mg	17.6	18.7	18.1	18.8
Vitamin B6	mg	1.50	1.54	1.56	1.55
Folates	µg	188	192	195	192
Vitamin B12	µg	3.00	3.14	3.12	3.12
Vitamin C	mg	80.4	72.0	84.3	72.5

14.2.3. Summary of data on food consumption and energy and nutrient intake in 2019 and 2020 based on household budget survey

The analysis of food consumption in 2019 and 2020 showed a slight increase in the consumption of most food groups in 2020, the start of the COVID-19 pandemic. It is noteworthy that there was a slight increase in the consumption of vegetables and fruit and their products, which, however, was still below the amounts recommended by the WHO. In addition, the consumption of red meat and processed meat, as well as table salt, exceeded expert recommendations.

'Retirees' households were characterised, both in 2019 and 2020, compared to the total households surveyed, by the highest consumption of almost all food products, with the exception of non-alcoholic beverages (mainly soft drinks).

These differences may be related to the fact that retirees' households in Poland typically consist of two persons (49%) and one person (32%)[17]. This situation determines expenditure on food products, as smaller households spend more on food per person than households with more people[18].

Taking into account the place of residence, it was found that households located in rural areas had a higher consumption of most of the food products analysed, in particular bread, flour, potatoes, meat and products, milk, eggs and sugar. In contrast, households in urban areas consumed larger quantities of fruit and vegetables. However, regardless of place of residence, their intake was less than the amounts recommended by the WHO. Urban households, it should be noted, were characterised by a lower consumption of red meat and processed meat, but in both urban and rural areas, the consumption of these products was too high compared to the recommendations.

During the pandemic period, there was an increase in the energy 'intake, which was mainly associated with an increase in fat intake, especially animal fat and saturated fatty acids and, to a slightly lesser extent, with a higher intake of protein and carbohydrates. This increased the percentage of energy from total fat and saturated fatty acids, which was already too high before the pandemic. However, some changes in the diet of Poles

[17] Statistics Poland. Statistical Yearbook of the Republic of Poland 2021. Statistics Poland Warsaw 2022, p. 306

[18] Gutkowska K., Piekut M.: Consumption in rural households. Rural and Agricultural Affairs 2014;165(4): 159–178

during the pandemic were beneficial, due to increased intake of nutrients such as calcium, magnesium and vitamin C.

Increases in the energy and most nutrients intake occurred mainly in urban areas. There was little change in the diet of rural residents during the pandemic. The same was true for the diet of those living in retirees' households.

However, it should be noted that changes in the diet of Poles observed during the pandemic based on the results of household budget survey may have been partly related to the fact that this survey does not take into account food consumption outside the household (mass catering sector). Prior to the pandemic, significantly more people were eating out or ordering takeaway meals than during the pandemic[19].

Both before and during the pandemic, the diet of Poles was characterised by an excessive proportion of fat, including saturated fatty acids. Fibre intake was low. The calcium and vitamin D content of the diet was insufficient in relation to the recommendations. These anomalies also characterised the diet of retirees' household members. In addition, salt intake, especially in retirees' households was significantly above the amount considered to be the maximum by the World Health Organisation.

14.3. Eating habits of Poles in 2018 and 2022

14.3.1. Characteristics of the studied population

The survey of eating habits was conducted with 3,000 participants in 2018 and 2,000 in 2022. Persons aged 20 years or more were included. This was a group representative of the country's age-matched population.

The majority of respondents (52.4%) were female (Table 14.7). The average age was 48.4 years in 2018 and 49.6 years in 2022 and was slightly higher in women than in men in both studies. Urban residents predominated among the respondents: in 2018, they

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[19] Błaszczyk-Bębenek E, Jagielski P, Bolesławska I, Jagielska A, Nitsch-Osuch A, Kawalec P. Nutrition Behaviors in Polish Adults before and during COVID-19 Lockdown. Nutrients 2020;12(10):3084. doi: 10.3390/nu12103084.

represented 61.2%, four years later 61.8% of the population. The largest number came from the Mazowieckie and Śląskie voivodships. In terms of education, those with primary, lower secondary or vocational education and those with secondary or post-secondary education predominated. The educational structure of men and women was different. Men were more likely to have primary, lower secondary or vocational education, while women were more likely to have higher education.

Table 14.7. Socio-demographic characteristics of studied population

Features	Total population			Males			Females		
	2018	2022	2018 vs 2022	2018	2022	2018 vs 2022	2018	2022	2018 vs 2022
	%	%	p*	%	%	p*	%	%	p*
Sex									
Males	47.7	47.6	0.956						
Females	52.4	52.4							
Age (years)									
Average age	48.4	49.6	0.556	46.9	48.1	0.329	49.8	51	0.941
20–49	53.9	53.2		57.3	55.7		50.81	50.9	
50 and more	46.1	46.8		42.7	44.3		49.19	49.1	
Place of residence									
Urban area	61.2	61.8	0.001	59.8	62.2	0.0013	62.52	61.3	<0.001
Rural area	38.8	38.3		40.2	37.8		37.48	38.7	
Voivodship									
Dolnośląskie	7.7	7.3	<0.001	7.9	7.2	<0.001	7.45	7.3	<0.001
Kujawsko-pomorskie	5.4	5.3		5.2	4.8		5.56	5.7	
Lubelskie	5.6	5.8		5.6	5.6		5.51	5.9	
Lubuskie	2.6	3		2.6	3.3		2.7	2.8	
Łódzkie	6.6	7.3		6.6	7.3		6.53	7.3	
Małopolskie	8.7	8.5		8.7	8.8		8.68	8.2	
Mazowieckie	13.9	13.5		14	13.9		13.73	13.1	
Opolskie	2.7	2.5		2.6	2.8		2.69	2.3	
Podkarpackie	5.5	5.5		5.8	5.5		5.25	5.5	
Podlaskie	3.1	3		3.1	3.1		3.07	2.9	
Pomorskie	5.9	5.5		6	5.3		5.87	5.7	
Śląskie	12	12.3		11.9	11.7		12.19	12.8	
Świętokrzyskie	3.3	3.5		3.2	3.2		3.41	3.8	
Warmińsko-Mazurskie	3.7	4		3.7	4.4		3.75	3.7	
Wielkopolskie	8.9	8.8		8.8	8.6		9	8.9	
Zachodniopomorskie	4.5	4.5		4.4	4.6		4.59	4.4	
Education level									
Primary/lower secondary vocational	40.7	35.3	<0.001	43.9	38.2	<0.001	37.76	32.7	0.006
Secondary or post-secondary education	42	37.2		41.8	36.7		42.26	37.7	
Higher	17.3	27.4		14.3	25.1		19.98	29.6	

*chi-square test

14.3.2. Frequency of vegetable consumption

Compared to 2018, Poles were more likely to eat vegetables (not including potatoes) in 2022 (Table 8). The percentage of people who did not eat products from this group every day was twice as low in 2022 (11.5% vs 5.6%). More people reported consuming 2–3 portions (39.7% vs 43.8%) and 4 or more portions (6.7% vs 7.8%) of vegetables per day. More frequent consumption of vegetables in 2022 was observed among both men and women. Compared to 2018, in 2022 more men consumed 2–3 portions of vegetables per day (35.5% vs 42.3%), while men who did not eat vegetables daily were twice as likely to do so (respectively: 15.2% and 7.4%). In contrast, compared to 2018, significantly more women in 2022 consumed four or more portions of vegetables per day (7.6% and 10.1%), while women not consuming vegetables daily were twice as likely as men to do so (8.1% and 4.0%).

Changes in the frequency of vegetable consumption were also observed taking age into account. The percentage of Poles who did not eat vegetables every day decreased by 2.3 times in those aged 20–49 and 1.9 times in those aged 50 and more. There was a slight increase in the proportions of 20–49-year-olds consuming 1, 2–3, 4 or more portions of products from this group per day. In contrast, among Poles aged 50 and more in 2022, the proportion consuming 2–3 portions of vegetables per day increased (from 37.3% to 43.2%).

Changes in the frequency of vegetable consumption were also influenced by place of residence. Compared to 2018, in 2022, 2.4 times fewer Poles living in the city declared that they do not eat vegetables every day (11.3% vs. 4.8%). However, the number of people who consumed 2–3 portions per day of these products increased (from 40.0% to 45.1%). In the countryside, the frequency of vegetable consumption in 2018 and 2022 has not changed significantly.

14.3.3. Frequency of fruit consumption

Fruit was consumed slightly more frequently in 2022 than four years earlier (Table 14.8). More Poles ate one portion of products from this group daily (40.3% vs 45.3%) and 2–3 servings (37.2% vs 40%). The percentage of people who did not eat fruit every day decreased by 2.3 times.

Compared to 2018, men were more likely to reach for fruit in 2022. In particular, the proportion of men who declared consuming one portion of products from this group per day increased (39.3% vs 47.9%). The percentage of men who did not eat fruit every day doubled (22.4% vs 10%). In 2022, women were also more likely to consume products from this group than in 2018. In particular, the proportion of women consuming fruit 4 or more times a day increased (from 5.9% to 8.4%). In contrast, the percentage of women who did not eat fruit every day fell from 11.9% to 4.9%.

Considering the age of Poles, a favourable change in the frequency of fruit consumption was also noticeable. In 2022, more than twice as many people in both the 20–49 and 50+ age groups will not eat products from this group on a daily basis. Among younger Poles, the number of people consuming 2–3 portions of fruit per day increased in particular (from 39.3% to 44.1%), and among older Poles, the number consuming 1 portion increased (from 42.3% to 50%).

Among both urban and rural residents in 2022, more than twice as many people declared that they do not eat fruit every day. Among those living in urban areas, the proportion consuming 1 portion of products from this group per day increased notably (from 38.8% to 46.2%), while those living in rural areas consumed 2–3 portions per day (from 35.0% to 40.1%).

14.3.4. Frequency of consumption of marine fish

In 2018 and 2022, the consumption of marine fish (e. g. herring, tuna, mackerel, salmon, sardines) was not significantly different (Table 14.8). Fish was most often eaten less than once a week (respectively: 47.1% and 49.4%). They were consumed once a week by around a third of those surveyed. In contrast, only 7.8 percent of Poles in 2018 and 8.1 percent in 2022 consumed according to dietary recommendations, i. e. at least twice a week. There were also no differences in the frequency of fish consumption between 2018 and 2022 among men or women. Fish consumption in the years analysed also did not differ between those aged 20–49 and those aged 50 and more, as well as between urban and rural residents.

14.3.5. Frequency of consumption of fast food

Compared to 2018, in 2022 the percentage of Poles who did not consume fast food (such as pizza, burgers, hot dogs, for example) was lower (40.6% vs 31.4%) (Table 14.9). These types of products were eaten slightly more often in 2022 than in 2018. The percentage of people eating fast food less than once a week increased the most (from 32.7% to 38.9%). There was also a slight increase in the percentage of people who declared consuming such products once a week (from 13.3% to 15.5%) or twice a week (from 10.3% to 11.5%).

Compared to 2018, the number of people consuming such products has increased among both men and women in 2022. The percentage of people who chose the answer "I don't eat" for fast food was 1.3 times lower in 2022 in both sexes than four years earlier and was in men: 35.2% in 2018 and 26.7% in 2022, and in women: 45.6% in 2018 and 35.6% in 2022. The percentage of people eating fast food less than once a week increased the most (from 30.9% to 37.1% in men and from 34.3% to 40.6% in women).

The frequency of fast food consumption in 2018 and 2022 among Poles aged 20–49 has not changed. Most often, people in this age group consumed products of this type less than once a week (respectively: 43.4% and 46.1%). A significant percentage of people reported consuming these products once a week (19.9% and 20.7%). Poles aged 50 and more rarely ate fast food, but compared to 2018, the proportion who did not eat fast food was lower in 2022 (64.8% vs 52.1%). Most people consumed these products less than once a week, with a significantly higher proportion of such people in 2022 compared to 2018 (21.4% vs 30.8%).

Differences in the frequency of fast food consumption between 2018 and 2022 also depended on the place of residence. Among urban dwellers, more people were reaching for these products in 2022 than four years earlier. The percentage of people who did not eat these products at all decreased from 43.0% to 28.4%. In contrast, the proportion of people who consumed this type of product once a week (from 10.1% to 16.4%) or less than once a week (from 33.7% to 40.3%) increased. In people living in rural areas, there were no significant differences in the frequency of fast food consumption considering 2018 and 2022.

14.3.6. Frequency of consumption of sweet carbonated and still drinks

Sweet carbonated and still drinks were consumed slightly less frequently in 2022 than in 2018 (Table 14.9). In 2018, 10.1% of Poles consumed it daily, while in 2022, 4.4%, or 2.3 times less. Slightly fewer declared drinking such drinks 3–6 times a week (15% vs 12.3%). In contrast, more people declared consuming carbonated and still drinks 2.1 and less than once a week.

Compared to 2018, in 2022 both fewer men and fewer women consumed carbonated and still drinks daily or three to six times a week, while more people of both sexes drank such drinks twice, once or less than once a week.

Less frequent consumption of carbonated and still beverages in 2022 could also be observed among Poles of different ages. Compared to 2018, in 2022, twice as many (12.5% vs. 6.1%) Poles aged 20–49 and three times fewer (7.7% vs. 2.5%) Poles aged 50 and more consumed such drinks on a daily basis. In 2018, younger people were most likely to drink carbonated and still drinks twice a week (22.3%) or three to six times a week (19.4%), while in 2022 it was twice a week (26%) or less than once a week (21.2%). The percentage of non-consumers was similar in both years (14.3% and 13.8%). Among Poles aged 50 and more in both 2018 and 2022, the highest number of people declared that they do not drink such beverages (respectively: 33.6% and 29.5%) or consume them less than once a week (respectively: 19.3% and 23.8%).

City dwellers in 2022 were less likely to drink sweet carbonated and still drinks than four years earlier. The percentage of people consuming such products on a daily basis has halved (from 10.0% to 4.9%). There was also a decrease in the percentage of people declaring to drink such drinks 3–6 times a week (from 17.0% to 12.2%), while more people declared drinking them: once a week (13.3% vs 18.2%) or less (17.3% vs 21.1%). Among Poles living in rural areas, it was also noted that, in 2022, fewer people consumed carbonated and still drinks daily (10.2% vs 3.7%) and more consumed them less than once a week (19% vs 24.5%). However, there were more people drinking such drinks twice a week in 2022 (18.7% vs 24.8%). In addition, fewer people declared that they do not consume such drinks at all (25.4% vs 20.3%).

14.3.7. Frequency of consumption of sweets

Compared to 2018, Poles were slightly more likely to reach for sweets (e.g. candies, chocolates, bars, cakes, wafers, etc.) in 2022 (Table 14.9). In 2018, 9.9% of people declared that they did not consume them, compared to 5.9% four years later. The number of people who consumed sweets twice a week increased the most (29.8% vs 32.8%). At the same time, slightly fewer Poles ate such products every day (7.3% vs 5.2%).

The frequency of sweets consumption in men did not differ significantly between 2018 and 2022. Men were most likely to consume this type of product twice a week (31.0% and 31.8%). These were consumed daily by respectively: 6.2% and 6.6% of them and were not eaten at all by: 9.6% and 5.7%. Compared to 2018, in 2022 significantly fewer women consumed sweets on a daily basis (8.3% vs 3.9%), while the percentage of women consuming these products twice a week (from 28.8% to 33.6%) and once a week (from 19.2% to 22.0%) increased. At the same time, fewer women declared in 2022 that they do not eat sweets (10.1% and 6.0%).

Among Poles aged 20–49, no differences were observed in the frequency of sweet consumption in 2018 and 2022. They were most often consumed by people in this age group twice a week (respectively: 31.9% and 32.5%). However, a significant proportion ate them 3–6 times a week (respectively: 19.3% and 20.5%). Compared to 2018, among Poles aged 50 and more in 2022, there was mainly an increase in the percentage of people consuming sweets twice a week (from 27.6% to 33.1%), as well as once a week (from 18.5% to 21.3%). In addition, the number of people who do not eat sweets has decreased significantly (from 12.2% to 7.1%).

Considering the place of residence of Poles, no significant changes in the frequency of sweet consumption were observed in both urban and rural residents.

Table 14.8. Frequency of consumption of vegetables, fruits and marine fish among Poles in 2018 and 2022.

Frequency of consumption	Vegetables			Fruit			Frequency of consumption	Marine fish		
	2018	2022	2018 vs 2022	2018	2022	2018 vs 2022		2018	2022	2018 vs 2022
	%	%	p*	%	%	p*		%	%	p*
Total										
1 serving a day	42.2	42.8	<0.001	40.3	45.3	<0.001	At least twice a week	7.8	8.1	0.155
2-3 servings a day	39.7	43.8		37.2	40		Once a week	32.8	33.2	
4 and more servings a day	6.7	7.8		5.6	7.4		Less than once a week	47.1	49.4	
I do not eat every day	11.5	5.6		16.9	7.4		I do not eat marine fish	12.4	9.3	
Males										
1 serving a day	43.5	45	<0.001	39.3	47.9	<0.001	At least twice a week	8	8.7	0.734
2-3 servings a day	35.5	42.3		33	35.8		Once a week	32.6	32.3	
4 and more servings a day	5.7	5.3		5.3	6.3		Less than once a week	47.1	48.4	
I do not eat every day	15.2	7.4		22.4	10		I do not eat marine fish	12.4	10.5	
Females										
1 serving a day	40.9	40.9	0.014	41.2	42.8	<0.001	At least twice a week	7.6	7.5	0.07
2-3 servings a day	43.4	45.1		41	43.9		Once a week	32.9	34.1	
4 and more servings a day	7.6	10.1		5.9	8.4		Less than once a week	47.1	50.3	
I do not eat every day	8.1	4		11.9	4.9		I do not eat marine fish	12.4	8.2	
20-49 years										
1 serving a day	38.9	41.7	0.003	38.4	41.1	<0.001	At least twice a week	8.6	9.4	0.225
2-3 servings a day	41.9	44.2		39.3	44.1		Once a week	33.3	31.9	
4 and more servings a day	7.7	9		6.4	8.1		Less than once a week	45.7	49.4	
I do not eat every day	11.5	5.1		16	6.7		I do not eat marine fish	12.4	9.3	
50 years and more										
1 serving a day	45.7	44.1	0.006	42.3	50	<0.001	At least twice a week	6.9	6.5	0.304
2-3 servings a day	37.3	43.2		35.1	35.3		Once a week	32.2	34.7	
4 and more servings a day	5.6	6.5		4.8	6.6		Less than once a week	48.5	49.4	
I do not eat every day	11.5	6.1		17.9	8.1		I do not eat marine fish	12.4	9.4	
Urban area										
1 serving a day	42.4	43.4	0.004	38.8	46.2	<0.001	At least twice a week	6.3	8.3	0.007
2-3 servings a day	40	45.1		40.9	40		Once a week	30.6	33.1	
4 and more servings a day	6.3	6.7		4.9	6.7		Less than once a week	49.7	51.3	
I do not eat every day	11.3	4.8		15.5	7.1		I do not eat marine fish	13.4	7.3	
Rural area										
1 serving a day	42,0	41.9	0.057	41.2	43.8	<0.001	At least twice a week	8.7	7.7	0.924
2-3 servings a day	39.5	41.7		35	40.1		Once a week	34.1	33.5	
4 and more servings a day	7	9.7		6	8.5		Less than once a week	45.4	46.3	
I do not eat every day	11.6	6.8		17.8	7.7		I do not eat marine fish	11.8	12.5	

*chi-square test

Table 14.9. Frequency of consumption of fast food, sweet carbonated and still drinks and sweets among Poles in 2018 and 2022

Frequency of consumption	Fast food			Sweet carbonated and still drinks			Sweets		
	2018	2022	2018 vs 2022	2018	2022	2018 vs 2022	2018	2022	2018 vs 2022
	%	%	p*	%	%	p*	%	%	p*
Total									
Daily	0.4	0.2	<0.001	10.1	4.4	<0.001	7.3	5.2	0.001
3–6 times a week	2.7	2.6		15	12.3		18.5	19.2	
2 times a week	10.3	11.5		19.8	23.1		29.8	32.8	
1 time per week	13.3	15.5		13.1	16.6		18	19.9	
Less than once a week	32.7	38.9		18.4	22.4		16.6	17.1	
I never eat or drink it	40.6	31.4		23.7	21.2		9.9	5.9	
Males									
Daily	0.6	0.4	0.010	13.5	6.8	0.001	6.2	6.6	0.188
3–6 times a week	4.1	3.8		17.2	15.3		18.9	21	
2 times a week	13.4	15.1		21.3	25.1		31	31.8	
1 time per week	15.8	16.9		12.8	16.5		16.8	17.7	
Less than once a week	30.9	37.1		17.3	20.1		17.6	17.1	
I never eat or drink it	35.2	26.7		17.9	16.3		9.6	5.7	
Females									
Daily	0.3	0	0.001	7.1	2.3	<0.001	8.3	3.9	<0.001
3–6 times a week	1.4	1.5		12.9	9.6		18.1	17.4	
2 times a week	7.4	8.2		18.3	21.2		28.8	33.6	
1 time per week	11.1	14.1		13.4	16.7		19.2	22.0	
Less than once a week	34.3	40.6		19.4	24.5		15.6	17.1	
I never eat or drink it	45.6	35.6		28.9	25.6		10.1	6.0	
20–49 years									
Daily	0.4	0.2	0.161	12.5	6.1	0.001	7.5	5.1	0.079
3–6 times a week	4.2	4		19.4	16		19.3	20.5	
2 times a week	14.3	16		22.3	26		31.9	32.5	
1 time per week	19.9	20.7		14	16.9		17.6	18.7	
Less than once a week	43.4	46.1		17.5	21.2		16.1	18.5	
I never eat or drink it	17.8	13.1		14.3	13.8		7.7	4.8	
50 years and more									
Daily	0.4	0.2	<0.001	7.7	2.5	0.003	7.1	5.2	0.071
3–6 times a week	1.0	1.0		10.2	8.1		17.6	17.7	
2 times a week	6.0	6.3		17	19.8		27.6	33.1	
1 time per week	6.4	9.5		12.3	16.3		18.5	21.3	
Less than once a week	21.4	30.8		19.3	23.8		17	15.6	
I never eat or drink it	64.8	52.1		33.6	29.5		12.2	7.1	

Frequency of consumption	Fast food			Sweet carbonated and still drinks			Sweets		
	2018	2022	2018 vs 2022	2018	2022	2018 vs 2022	2018	2022	2018 vs 2022
	%	%	p*	%	%	p*	%	%	p*
Urban area									
Daily	0.4	0	<0.001	10	4.9	0.003	6.3	5.4	0.071
3–6 times a week	2.3	2.6		17	12.2		20.5	19.4	
2 times a week	10.4	12.3		21.6	22		30.8	32.1	
1 time per week	10.1	16.4		13.3	18.2		18.9	20.8	
Less than once a week	33.7	40.3		17.3	21.1		14.8	17.4	
I never eat or drink it	43	28.4		20.9	21.7		8.7	4.9	
Rural area									
Daily	0.4	0.5	0.6	10.2	3.7	<0.001	7.9	4.9	0.088
3–6 times a week	2.9	2.5		13.7	12.6		17.2	18.7	
2 times a week	10.2	10.1		18.7	24.8		29.2	33.8	
1 time per week	15.3	14		13	14.1		17.4	18.6	
Less than once a week	32.1	36.8		19	24.5		17.6	16.7	
I never eat or drink it	39.2	36.1		25.4	20.3		10.6	7.3	

*chi-square test

14.3.8. Selected eating habits

In addition to the frequency of consumption, information was also collected on the type of bread consumed, the fat used to spread it and the removal of fat from meat and cold cuts and poultry skin (Table 14.10).

In 2022, nearly half of Poles consumed plain wheat-rye bread. Four years earlier, this type of bread was more frequently chosen. After the pandemic period, the proportion of people consuming wholemeal bread and light rye bread increased. Wholemeal bread was more often consumed by women, while men were more likely to choose plain wheat-rye and light wheat bread.

Poles usually (69.4% in 2022) chose butter for bread spreads. In 2022, compared to 2018, more people spread butter on bread and fewer spread margarine and mixed fats. Butter was more often used by women and margarine by men.

Almost half (47.2%) of Poles in a recent survey declared that they remove fat from meat and cold cuts and skin from poultry. Before the pandemic, the percentage of people with this habit was more than 3 percentage points higher. Women were more likely to remove fat or skin from the listed products than men.

Table 14.10. Selected eating habits

Eating habits	Total population		Males		Females	
	2018	2022	2018	2022	2018	2022
	%	%	%	%	%	%
Type of bread consumed						
Wheat-rye bread	58.3	49.6	63.2	52.8	53.9	46.7
Light wheat bread	30.8	28.3	34.0	30.9	27.8	25.9
Light rye bread	14.8	25.3	13.7	25.1	15.7	25.5
Wholemeal wheat or rye	28.3	33.5	20.5	26.7	35.5	39.7
Speciality breads, e. g. gluten-free	1.3	0.9	0.9	0.7	1.7	1.1
Others	1.7	1.0	1.3	1.0	2.0	1.1
Type of fat for spreading on bread						
Butter	62.5	69.4	61.0	66.8	63.8	71.7
Margarine	30.2	27.1	32.3	29.0	28.2	25.3
Mixed	22.1	19.2	23.3	18.9	21.1	19.5
Lard	4.5	2.0	6.5	2.7	2.6	1.3
Others	1.0	0.7	0.8	1.0	1.2	0.5
I don't use	5.2	3.8	3.9	4.1	6.4	3.5
Removal of fat from meat and cold cuts and skin from poultry						
Yes, often	21.0	20.0	12.8	13.6	28.5	25.9
Yes, rarely	29.5	27.2	24.6	22.9	34.0	31.1
Rather not	49.5	52.8	62.7	63.5	37.5	43.0

14.3.9. Application of the diet

The majority of Poles (85.7%) were not following any diet in 2022 (Table 14.11). Before the pandemic it was similar, although at that time slightly more people declared they were following the diet. Women were more likely to be on a diet than men. The most common diets were diabetic and low-fat or low-cholesterol, with weight loss and low-salt diets slightly less common. A very small percentage of Poles declared that they follow a vegetarian or vegan diet and these were usually women.

14.3.10. Nutritional knowledge

Respondents were asked about sources of nutritional knowledge and the application of this knowledge in practice (Table 14.11).

In 2022, the majority of Poles (55.3%) declared that they do not use any sources of nutritional knowledge. Compared to the pre-pandemic period, this percentage has increased. Different sources of nutritional knowledge were used more often by women than men. The most common source of nutritional knowledge was the Internet, seen a good source of information by women in particular. Poles also often used knowledge on the subject obtained from family or friends. Unfortunately, information from a doctor or nurse was used less in 2022 than 4 years earlier. The proportion of people deriving nutrition knowledge from TV programmes, the press and guidebooks and books has also decreased.

Poles in 2022 were most likely (53.7%) to declare that they do not apply knowledge about healthy eating in their daily lives. This situation before the pandemic was similar. More women than men applied nutritional knowledge in practice and more of them declared that they did so frequently. Men, on the other hand, if they did make use of such knowledge in everyday life, mostly did so rarely.

14.3.11. Factors hindering healthy eating

In 2022, only 24.0% of Poles had no difficulties with healthy eating (Table 14.11). This percentage was 4.5 percentage points lower than four years earlier. Various factors hindering healthy eating were indicated more often by men than by women. Healthy eating was most often hindered by the high price of healthy food, with more people mentioning this factor in the latest survey than in 2018. Difficulties were also often cited as being due to the excessive time required to prepare a healthy meal and the fact that such meals are not tasty. A significant proportion of Poles (29.6%), especially men, felt that there was no need to eat healthily. The situation in this respect before the pandemic was similar.

Table 14.11. Other parameters related to nutrition

Parameters tested	Total population		Males		Females	
	2018	2022	2018	2022	2018	2022
	%	%	%	%	%	%
Use of diet and types of diet						
Slimming	3.1	2.8	1.4	2.2	4.6	3.4
Vegetarian	1.0	0.4	0.3	0.0	1.6	0.8
Diabetes	5.7	4.1	4.0	3.0	7.3	5.2
Low-fat or low-cholesterol	5.2	4.8	3.5	4.4	6.8	5.1
Gluten-free	0.9	0.9	0.9	0.5	0.9	1.2
With low salt content	4.2	2.9	3.2	2.7	5.2	3.0
Related to food allergies (allergies to nuts, milk, shellfish)	0.5	0.4	0.3	0.0	0.6	0.7
Lactose-free	0.7	0.4	0.2	0.3	1.2	0.5
Vegan	-	0.2	-	0	-	0.4
Other	2.1	1.0	2.1	0.6	2.0	1.4
I do not follow a diet	81.0	85.7	86.4	89.5	76.1	82.3
Sources of knowledge on healthy eating						
Doctor or nurse	14.0	9.7	11.6	7.5	16.1	11.7
Nutritionist	3.9	3.3	2.2	2.5	5.4	4.0
Family/friends	17.5	20.2	16.3	19.9	18.6	20.5
Lessons at school	0.5	1.0	0.3	1.0	0.6	1.1
TV programmes	17.5	10.4	11.2	7.1	23.2	13.4
Press	7.7	2.8	3.4	1.8	11.5	3.6
Internet	23.7	24.8	16.8	19.5	30.0	29.5
Guides, books	7.3	4.6	3.9	2.6	10.4	6.4
Others	1.1	0.3	1.0	0.1	1.2	0.4
I do not use	49.0	55.3	60.8	62.4	38.3	48.9
Applying knowledge on healthy eating in everyday life						
Yes, often	21.2	23.1	13.1	16.3	28.7	29.2
Yes, rarely	26.1	23.2	21.7	20.6	30.2	25.6
Rather not	52.6	53.7	65.3	63.1	41.1	45.1

Parameters tested	Total population		Males		Females	
	2018	2022	2018	2022	2018	2022
	%	%	%	%	%	%
Factors hindering healthy eating						
I eat healthy, I don't see any difficulties	28.1	24.0	24.6	19.1	31.3	28.4
High prices for healthy food	24.3	31.3	19.8	25.6	28.4	36.5
Small selection of healthy foods in the shop where I most often shop	8.3	5.8	7.6	4.3	9.0	7.2
Preparing a healthy meal takes too much time	13.4	13.0	12.2	12.0	14.5	14.0
Small selection of healthy food in restaurants/ canteens/food vending machines	5.2	4.9	4.9	4.3	5.5	5.6
No information on healthy meals in restaurants/canteens	3.4	2.9	3.0	3.7	3.8	2.1
I don't know how to cook healthily	8.7	7.4	8.5	8.1	8.8	6.9
I was never taught how to eat healthily	10.1	8.8	11.2	9.9	9.2	7.8
I don't like healthy food	12.0	14.3	14.7	17.2	9.5	11.7
Other people discourage me	4.5	3.6	4.9	3.4	4.1	3.8
I have no need to do so (I have no desire to)	29.1	29.6	37.0	36.3	22.0	23.6
Other reasons	4.9	6.1	4.3	5.7	5.5	6.4

14.3.12. Comparison on the eating habits of Poles in 2018 and 2022

Compared to 2018, both favourable and unfavourable changes in the frequency of consumption of selected product groups were observed in 2022. A positive change was more frequent consumption of vegetables (except in rural areas) and fruit and a reduction in drinking carbonated and still drinks (cola type) among Poles. In contrast, unfavourable differences included, in particular, more frequent consumption of fast food, with the exception of those aged 20–49 and rural residents, in whom no such changes were observed, and more frequent consumption of sweets, mainly in those aged 50 and more. No differences were observed in the frequency of fish consumption. In both 2018 and 2022, only a minority of Poles consumed them as recommended (at least twice a week).

After the pandemic period, the proportion of Poles consuming wholemeal and light rye bread and butter as a bread spread increased, while the proportion consuming plain wheat-rye bread and margarine or mixed spreads decreased.

Women were more likely to practice the beneficial eating habits of eating wholemeal bread and removing visible fat from meat and skin from poultry than men.

Poles rarely followed special diets, and the proportion of people following such diets decreased during the pandemic. Diets were more often used by women.

After the pandemic, the proportion of Poles not using any sources of nutritional knowledge increased. Women were more likely to use such sources, and the Internet was the most popular source. In addition, more than half of Poles did not put nutritional knowledge into practice.

Most Poles had difficulties with healthy eating, which were exacerbated after the pandemic period. Most often, they were due to the high price of healthy food. Some people, especially men, declared a lack of interest in healthy eating.

14.4. Studies by other authors on changes in dietary behaviour of Poles during the COVID-19 pandemic

Studies in other centres indicate that some of the eating habits of Poles changed during the pandemic.

Changes in dietary behaviour as a result of the COVID-19 pandemic in ten European countries, including Poland, were the subject of a study carried out by a consortium including scientific institutions collaborating with EIT Food (an organisation that is part of the European Institute of Innovation and Technology, an EU institution tasked with creating an environment in Europe that fosters innovation and entrepreneurship) and coordinated by Aarhus University in Denmark. From Poland, the University of Warsaw participated in the study. The study covered 5,000 consumers (approximately 500 in each country), aged 18 years or more. Data was collected online in September 2020[20].

The pandemic was associated with much more frequent online shopping. In Poland, the increase was less than the European average, although still significant. All countries saw a large increase in wholesale purchases. A significant proportion of consumers have started to plan their purchases more carefully. There has been a decline in the number of people buying expensive products, and Poland was among the 3 countries where this

20 COVID-19 STUDY: European food behaviours. COVID-19 impact on consumer food behaviours in Europe. 2020. https://www.eitfood.eu/media/news-pdf/COVID-19_Study_-_European_Food_Behaviours_-_Report.pdf

was greatest. Consumers have started to check the prices of food products more frequently, even relatively cheap ones.

During the pandemic, as a result of lockdown and frequent remote working, people spent more time at home, which also affected the amount of food consumed. Consumers declared that they were consuming larger quantities of almost all product groups. The consumption of fruit (32% declared an increase, 9% a decrease) and vegetables and pulses (27% increased, 8% decreased) increased in particular. Large increases were recorded for flour, dairy products and confectionery. Compared to other countries, Poland stood out mainly due to an increase in the consumption of fruit, dairy products and herbs and spices. Products for which consumers declared lower consumption included ready meals and alcohol. In Poland, the decline in the consumption of ready meals was particularly pronounced: 41% of consumers said they consume less and only 15% said they consume more.

Cooking and eating together was more common during the pandemic. In the countries studied, 36% of respondents said they did so more often, 13% less often. In Poland, these percentages were close to the average for all countries.

At the start of the pandemic, a study of the eating behaviour of adult Poles was carried out at the Jagiellonian University in April and May 2020. The study was conducted online, via social media. The majority of respondents were women and urban residents[21].

Compared to before the pandemic, 18.3 percent of those surveyed increased the amount of food they ate, but ate the same products. In contrast, 14.4% increased their consumption and changed the range of products consumed. In contrast, 19.5% declared a reduction in consumption. More than half – 51.6% at the start of the pandemic – did not eat out or order takeaway. Similar behaviour before the pandemic was declared by 15.7%.

In addition, respondents declared an increase in the number of meals, with 31.1% eating five meals or more. Eggs, potatoes, sweets, tinned meat and alcohol were consumed more frequently, while fast food and instant soups were eaten less frequently. During the pandemic, more respondents consumed snacks; the frequency of salty snacks in particular increased, although fruit remained the most commonly consumed snack.

[21] Błaszczyk-Bębenek E, Jagielski P, Bolesławska I, Jagielska A, Nitsch-Osuch A, Kawalec P. Nutrition Behaviors in Polish Adults before and during COVID-19 Lockdown. Nutrients 2020;12(10):3084. doi: 10.3390/nu12103084.

In two-thirds of the study participants, body weight changed – in 45.9% it increased, in 21.7% it decreased.

Changes in the diet of Poles during the pandemic were also studied by researchers from the Warsaw University of Life Sciences in April and May 2020. The study was conducted online and involved people aged 18 or over, a large proportion of them women[22].

Some people – 32.2% – had problems accessing food during the pandemic. Changes in eating behaviour were assessed as health-promoting in 27.6% and as health-unfriendly in 19.4%. 34.3 percent of respondents reported eating more food and 14.1 percent said they were eating less. It was common to consume larger quantities of dairy products, wholegrain cereals, lean meat and eggs, legumes, but also sweets. Similar percentages declared an increase and decrease in vegetable intake, while fruit was more likely to be consumed in smaller quantities. A lot of people have reduced their fish consumption. In addition, higher alcohol consumption was more often declared (18.1%) than lower (10.7%).

At the start of the pandemic, a study conducted online via social media by researchers from the Poznan University of Medical Sciences was implemented in April/May 2020. Adults participated in the study. The majority of them were aged 18–25; moreover, the majority were women. Those still in on-premises employment were excluded from the study[23].

43.5% of respondents said they increased their food intake during quarantine and 51.8% admitted to eating more between meals. Increased food intake and more frequent snacking tended to be reported by those with a higher BMI. During the quarantine period, respondents usually consumed three or four meals and one or two snacks. Respondents were also more likely to cook than before the pandemic, as declared by 62.3%.

During quarantine, fruit and vegetables, cereal and dairy products were the most commonly consumed, with 67.2%, 64.2% and 49.1% of respondents respectively declaring that they consumed them at least once a day. Sweets were consumed frequently, at least once a day, by 32.8% of respondents, and never or occasionally by only 7.7%.

[22] Górnicka M, Drywień ME, Zielinska MA, Hamułka J. Dietary and Lifestyle Changes During COVID-19 and the Subsequent Lockdowns among Polish Adults: A Cross-Sectional Online Survey PLifeCOVID-19 Study. Nutrients 2020;12(8):2324. doi: 10.3390/nu12082324.

[23] Sidor A, Rzymski P. Dietary Choices and Habits during COVID-19 Lockdown: Experience from Poland. Nutrients 2020;12(6):1657. doi: 10.3390/nu12061657.

Some respondents – 14.6% declared increased alcohol consumption, but in some cases these were addicts.

In some respondents – 29.9 percent – body weight increased during quarantine, while 18.6 percent declared a decrease.

A study conducted on behalf of Upfield by MRW (Market Research World) in June 2000 involving a representative sample of Polish adults found that 40.6% of people had changed their eating habits during isolation. 47.9 percent said they were eating more healthily and 46.3 percent said they were eating more regularly. Respondents who thought they were eating healthier were most likely to indicate that they were eating more vegetables, fruit, seeds and grains, products that were sources of omega-3 fatty acids, and less meat[24].

While some of the changes in dietary behaviour outlined in the above studies should be viewed positively, some of the dietary habits during the pandemic may be detrimental to the health of Poles.

Members of the Human Nutrition Committee of the Polish Academy of Sciences have developed nutritional recommendations for the COVID-19 pandemic. They concluded that dietary changes during the first three months of the pandemic, when many Poles increased their food intake, should be considered a major public health risk, especially in the context of overweight and obesity[25]. In turn, a reduction in intake by previously normal or underweight individuals can exacerbate the problem of underweight and malnutrition and anorectic behaviour.

Committee members recommended that, during the pandemic, nutrition should be in line with previously developed dietary recommendations for the general population and groups with special needs. They stressed the importance of eating a balanced diet with adequate amounts of water, a high proportion of plant-based products (vegetables, fruit, whole-grain cereals, legumes, nuts, seeds) and adequate amounts of animal-based

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[24] Upfield. Report: Food habits of Poles during social isolation during the 2020 coronavirus epidemic. https://pliki.portalspozywczy.pl/i/12/17/46/121746.pdf

[25] Wądołowska L, Drywień M, Hamułka J, Socha P, Borawska M, Friedrich M, Lange E and other Members of the Human Nutrition Science Committee of the Polish Academy of Sciences. Dietary recommendations during the COVID-19 pandemic. Statement of the Committee of Human Nutrition Science of the Polish Academy of Sciences. Rocz Panstw Zakl Hig 2021;72(2):209–220.

products (fish, dairy products, eggs, meat products). They pointed out that sugar, salt and products that are sources of saturated fatty acids should be avoided in order to reduce the risk of overweight, obesity, cardiovascular diseases, diabetes and certain tumours.

CONCLUSIONS

1. Household budget survey shows that there was little change in the consumption of food items during the pandemic. Consumption of fats, primarily butter, and sugar and confectionery increased. A positive development was an increase, albeit small, in the consumption of fruit and vegetables, as well as milk and cheese. These changes affected the energy intake, which increased slightly, mainly due to a higher fat intake.
2. The consumption of fats, mainly butter, as well as sugar, confectionery and milk and cheese increased in households. There was no increase in the consumption of fruit and vegetables.
3. Literature studies indicate changes in eating behaviour during a pandemic. Some eating habits during the pandemic may have been detrimental to the health of Poles. Many people have increased their intake of certain foods, including sweets, alcohol, among others, resulting in weight gain. Members of the Human Nutrition Committee of the Polish Academy of Sciences indicated that this could pose a major threat to public health in Poland. However, some of the changes were viewed positively, including increased consumption of fruit and vegetables, dairy products and whole-grain cereal products.
4. A comparison of selected aspects of the dietary behaviour of Poles before the pandemic (2018) and in 2022 shows that the frequency of consumption of fruit and vegetables has increased, while the frequency of consumption of sweetened beverages has decreased. The proportion of people consuming wholemeal and light rye bread has increased. At the same time, however, fast food and sweets were consumed more frequently.

5. Given that many unfavourable aspects of Poles' diets, including insufficient consumption of vegetables and fruit, fish, and a high proportion of animal fats, red and processed meat and sweets in the diet, were observed both before the pandemic and in the following years, it is extremely important to take comprehensive action to change this situation. They should be aimed primarily at changing the nutritional attitudes of Poles, as a significant proportion of them do not use any sources of knowledge on proper nutrition, do not apply this knowledge in practice and do not even see the need to eat healthily.

15. IDENTIFICATION OF THE MOST IMPORTANT HEALTH PROBLEMS AND NEEDS OF THE POPULATION OF POLAND AND ITS VOIVODSHIPS BASED ON THE CURRENT RESULTS OF THE GLOBAL BURDEN OF DISEASE (GBD) STUDY

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Given the ever-increasing demand for health care and the increasing cost of health care, health policy makers at both central and local levels are obliged to set their priorities effectively. The relevance of these activities stems from the need to make key investment decisions in the area of health care and, consequently, the need to define the scope of health interventions targeted at designated population groups.

Information about which diseases pose the greatest threat to the health and wellbeing of the population helps to decide how to use limited resources to maximise the benefits – those of health as well as those of economics. With this knowledge, health system stakeholders of the healthcare system can plan actions leading to more effective prevention, control of the spread of infectious diseases, improvements in the detection and treatment of chronic diseases and, more broadly, the reduction of inequalities in access to healthcare for different population groups. A comprehensive and exhaustive burden of disease report must be based on reliable estimates of population-epidemiologically relevant measures of health (i. e. morbidity, mortality). A consistent, comparable and standardized tool describing the health status of a population makes a key contribution to improving decision-making and operational processes in the field of health care. One

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such internally homogeneous source of information on the global burden of disease, which combines morbidity and mortality information and provides a basis for comparison, is the Institute for Health Metrics and Evaluation's iterations of the Global Burden of Disease Global Burden of Disease and Risk Factors Study (GBD)[6].

Until the publication of this report, the most up-to-date version of this study is the 2020 published edition of GBD 2019, which analysed the health status of the world's population in the period 1990–2019. The current edition is particularly relevant in the Polish context, as it contains, for the first time ever, detailed estimates describing the regional (voivodships) health situation of our country. These data also formed the basis of the review and analysis of the epidemiological and demographic situation within the current edition of the Maps of Health Needs.

This section is devoted to a broad description of the most up-to-date estimates of the health condition of the Polish population, including the identification of the main problems and risk factors at the voivodship level. The content included in this section will illustrate in detail not only the magnitude and reasons for health loss by age, sex and 16 regions of Poland, but will also allow the characteristics of this loss to be identified (share of deaths and years lived with disability, relationship between exposure to risk factors and health loss). The data presented for different time periods (e. g. 30-year, 10-year) will make it possible to analyse health trends and identify areas that have improved and those that require more intensive action to improve the health of the population. Analysis of the comprehensive and objective DALY (Disability-Adjusted Life Year) indicator will enable comparisons to be made not only within the country, but also at international level.

6 Weszka A., Filipowicz K., Siwiec J., TopórMądry R.: Health expenditure from 1995 to 2050 in global terms – Global Burden of Disease estimates. Med. Prakt., 2019; 9

15.1. Measures of disease burden – meanings of the DALY's indicator and its components

As defined, the DALY is a measure of health loss resulting from reduced life expectancy of individuals and reduced quality of life caused by disease or injury.[7] The health interventions created and managed by the health system aim to avoid DALY and thereby increase the number of years an individual – and consequently a community – lives in good health. This rate is often referred to as "disease burden" because it combines two components in the form of sub-rates: YLL (Years of Life Lost) and YLD (Years Lived with Disability), allowing to analyse to what extent a particular health problem "burdens" the health of the population.

Analysing the main categories of causes of health loss in both sexes in Poland in 2019, some noticeabledifferences can be observed with regard to the percentage of the listed sub-rates in DALYs. Leading health problems – i. e. cardiovascular diseases (CVD) and cancer s are overwhelmingly burdened by a high proportion of premature deaths (CVD: 6,743.8 YLLs/100 000 population; cancer: 6,827.7 YLLs/100 000 population), over years lost due to reduced well-being (CVD: 776.1 YLDs/100 000 population; cancer: 191.0 YLDs/100 000 population). This suggests that these diseases have a high mortality rate, have an acute/rapid course, or are detected at a late, often irreversible stage. A high share of more than 75% of premature deaths in the disease burden of the Polish population in 2019 could also be observed in the context of digestive diseases (1,148.4 YLLs/100 000 population and 359.1 YLDs/100 000 population). For the other groups of health problems, i. e. musculoskeletal disorders, injuries, diabetes and kidney disease, mental disorders, other non-communicable diseases and sense organ diseases, the loss of population health is mainly due to a reduction in the quality of life of the population (YLD). Details of the value of the rate for the reasons indicated are provided in the figure below (Figure 15.1).

Information on which sub-rate is the leading component of health years lost is an important piece of data to better identify the unmet health needs of the population.

[7] Protocol For The Global Burden Of Diseases, Injuries, And Risk Factors Study (GBD), vol.4.0, IHME, Seattle, 2020

For health problems with high mortality rates, health sector actions should focus on intensifying health prevention programmes and changing negative lifestyle habits of the population, strengthening the scale and quality of diagnostics and increasing access to highly specialised therapies. In contrast, for conditions burdened by loss of life years due to disability, the guiding axis of systemic action should be the creation of reference centres and social-care mechanisms to reduce the negative consequences of ongoing health problems (e. g. coordinated Primary Health Care, Outpatient Healthcare, pain management medicine and others).

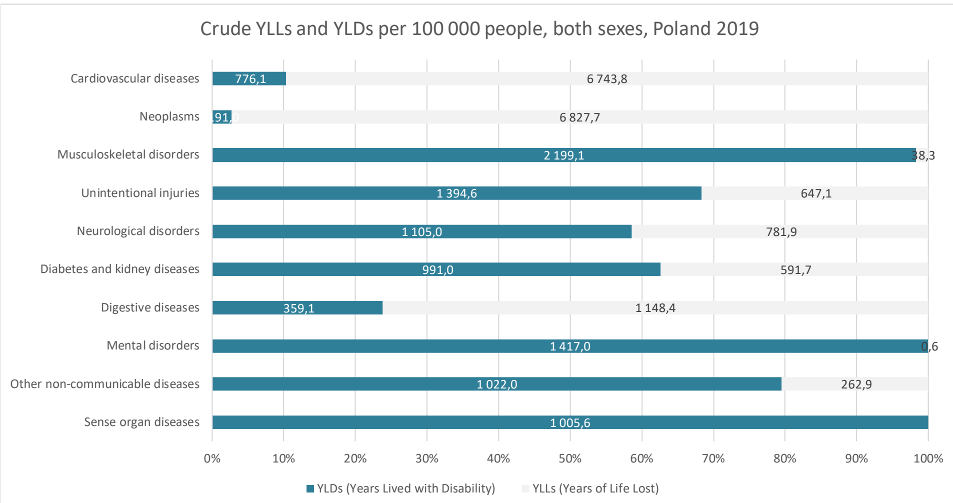

Fig. 15.1. Share of years of life lost due to premature deaths (YLL) and years lived with disability (YLD) expressed as a percentage of DALYs for the 10 major health problems in Poland, in both sexes in 2019.

15.2. Main causes of health impairment (DALYs) among women and men in Poland and 16 voivodships

In 2019, the value of disability-adjusted life years lost due to all causes in men in Poland was 37,114.2 DALYs/100 000 men. The highest regional level of the overall disease burden was recorded in the Łódzkie voivodship at 43,368.7 DALYs/100 000, while the lowest in the Podkarpackie voivodship at 33,124.6 DALYs/100 000. In 10 voivodships, cardiovascular diseases were the main cause of the burden of disease in the male population, with the maximum value in the Łódzkie voivodship at 10,001.1 DALYs/100 000, which accounted for 23.1% of the region's burden, and the lowest level of DALYs/100 000 in the Pomorskie voivodship at 7,064.7 DALYs/100 000–20.6% of the local burden. In comparison, the nationwide rate for this cause was: 8,480.5 DALYs/100 000 (i. e. 22.9%). Considering only the percentage of health loss accounted for by cardiovascular diseases in the total burden of disease of a given voivodship, mention should be made of the Opolskie voivodship, where this health problem was responsible for as much as 25.1% of the total loss of years of life in full health, compared to the above-mentioned Pomorskie voivodship and the Warmińsko-Mazurskie voivodship, where the percentage oscillated around 20%.

Cancer in men were the main cause of premature death and reduced quality of life resulting from disability in 6 voivodships: Kujawsko-Pomorskie, Lubuskie, Pomorskie, Warmińsko-Mazurskie, Wielkopolskie and Zachodniopomorskie. This compares to a national average of 8,453.9 DALYs/100 000. (22.8% of the total burden), the highest rate in Poland was observed in the Łódzkie voivodship 9 766.8 DALYs/100 thousand. (22.5% of the region's burden), the lowest in the Małopolskie voivodship 6 968.2 DALYs/100 thousand. (20.8% of the region's burden). Among the voivodships listed, for which cancer were the leading cause of health loss, the highest rate was recorded for the Kujawsko-Pomorskie voivodship – 8 941.6 DALY/100 000 (this represented 25.9% of the regional burden); the lowest was in the Pomorskie voivodship – 7 722.8 (22.5% of the local burden of disease).

Injuries were the third leading cause of health loss for men in Poland and the voivodships in 2019. This cause was least acute in the health of men from the Kujawsko-Pomorskie voivodship – 2,472.8 DALYs/100 000 population (6.7% of the local burden of disease), while the problem was most pronounced in the Podlaskie voivodship – 3,133.5 DALYs/100 000 (8.4% share of the total voivodship burden), and in the Śląskie voivodship 3,025.7 DALYs/100 000 (7.6% of the local load). In comparison, the national average of burden of disease due to this cause was – 2,749.2 DALYs/100 000, which, in the context of the total years lost in health of Polish men constituted 7.4%. A high proportion of injuries among causes of ill health in men was also recorded for the Pomorskie voivodship – 7.8%, Małopolskie voivodship – 7.7% and Podkarpackie voivodship – 7.7%.

Other important causes of health loss among men in Poland included musculoskeletal disorders, digestive diseases, diabetes and kidney disease, or neurological disorders. A detailed list of these and other health problems that had the greatest impact on health loss in men in Poland and the voivodships in 2019 can be found in the table below (Table 15.1).

Table 15.1. Burden of disease by cause category in men in Poland and voivodships in 2019 expressed by raw DALY/100 000 population and in relation to the percentage of causes in the total burden. (Cause ranking from 1–15).

No.	Cause	Poland	Dolnośląskie	Kujawsko-Pomorskie	Lubelskie	Lubuskie	Łódzkie	Małopolskie	Mazowieckie	Opolskie	Podkarpackie	Podlaskie	Pomorskie	Śląskie	Świętokrzyskie	Warmińsko-Mazurskie	Wielkopolskie	Zachodniopomorskie
	Total	37 114.2 (100.0%)	38 836.8 (100.0%)	36 983.5 (100.0%)	37 485.8 (100.0%)	38 107.6 (100.0%)	43 368.9 (100.0%)	33 442.6 (100.0%)	36 691.4 (100.0%)	38 274.0 (100.0%)	33 124.5 (100.0%)	37 227.1 (100.0%)	34 259.9 (100.0%)	39 679.9 (100.0%)	38 727.9 (100.0%)	37 600.7 (100.0%)	34 618.2 (100.0%)	38 105.8 (100.0%)
		Including:																
1	Cardiovascular diseases	8480.5 (22.9%)	9307.2 (24.0%)	7976.6 (21.6%)	8611.5 (23.0%)	8796.4 (23.1%)	10001.1 (23.1%)	8292.7 (24.8%)	8214.8 (22.4%)	9595 (25.1%)	7664 (23.1%)	8020.9 (21.6%)	7064.7 (20.6%)	9561.2 (24.1%)	9453.1 (24.4%)	7592.2 (20.2%)	7434.4 (21.5%)	8398.7 (22.0%)
2	Neoplasms	8453.9 (22.8%)	8941.6 (23.0%)	9572.1 (25.9%)	8519.2 (22.7%)	9134.7 (24.0%)	9766.8 (22.5%)	6968.2 (20.8%)	7846.1 (21.4%)	8971 (23.4%)	7345.8 (22.2%)	7738.8 (20.8%)	7722.8 (22.5%)	8971.5 (22.6%)	9121.3 (23.6%)	8943.5 (23.8%)	8238 (23.8%)	9573.2 (25.1%)
3	Unintentional injuries	2749.2 (7.4%)	2931 (7.6%)	2472.8 (6.7%)	2860.8 (7.6%)	2784.6 (7.3%)	2902.9 (6.7%)	2587.9 (7.7%)	2686.3 (7.3%)	2816.5 (7.4%)	2561.7 (7.7%)	3133.5 (8.4%)	2667.6 (7.8%)	3025.7 (7.6%)	2815.7 (7.3%)	2705.5 (7.2%)	2517.5 (7.3%)	2699.6 (7.1%)
4	Musculoskeletal disorders	1948.8 (5.3%)	1985.1 (5.1%)	1941.1 (5.3%)	1954 (5.2%)	1943.8 (5.1%)	2009.7 (4.6%)	1904.1 (5.7%)	1928.2 (5.3%)	2029.5 (5.3%)	1920.8 (5.8%)	1948.1 (5.2%)	1894 (5.5%)	2002.8 (5.1%)	2007.3 (5.2%)	1905.6 (5.1%)	1897.4 (5.5%)	1982.7 (5.2%)
5	Digestive diseases	1942.4 (5.2%)	2081.6 (5.4%)	1764.9 (4.8%)	1915.2 (5.1%)	1966.3 (5.2%)	2734.3 (6.3%)	1574.8 (4.7%)	1940 (5.3%)	1883.4 (4.9%)	1503.3 (4.5%)	1983.2 (5.3%)	1728.8 (5.1%)	2398 (6.0%)	1763.2 (4.6%)	1883.2 (5.0%)	1684.9 (4.9%)	1926.5 (5.1%)
6	Diabetes and chronic kidney diseases	1668.9 (4.5%)	1707.5 (4.4%)	1508.2 (4.1%)	1558.5 (4.2%)	1709.5 (4.5%)	1967.7 (4.5%)	1263.4 (3.8%)	1543.3 (4.2%)	1827.9 (4.8%)	1318.9 (4.0%)	1790.4 (4.8%)	1751.4 (5.1%)	2077.5 (5.2%)	1515.7 (3.9%)	1889 -5.00%	1703.2 (4.9%)	1621.7 (4.3%)
7	Neurological disorders	1507.5 (4.1%)	1465.5 (3.8%)	1432.9 (3.9%)	1535.2 (4.1%)	1418.9 (3.7%)	1626.7 (3.8%)	1463.1 (4.4%)	1576 (4.3%)	1502 (3.9%)	1492.2 (4.5%)	1620.1 (4.4%)	1441 -4.20%	1579.6 (4.0%)	1556.2 (4.0%)	1476.2 (3.9%)	1390.3 (4.0%)	1471.9 (3.9%)
8	Self-harm and violence	1461.4 (3.9%)	1544.5 (4.0%)	1392.9 (3.8%)	1611.1 (4.3%)	1643.7 (4.3%)	1899.5 (4.4%)	1228.4 (3.7%)	1521.6 (4.2%)	1330.3 (3.5%)	1255.6 (3.8%)	1445.8 (3.9%)	1291.7 (3.8%)	1382.2 (3.5%)	1575.7 (4.1%)	1743.4 (4.6%)	1184.2 (3.4%)	1805 (-4.7%)
9	Substance use	1428.9 (3.9%)	1381.6 (3.6%)	1425.7 (3.9%)	1323.8 (3.5%)	1332 (3.5%)	1980.4 (4.6%)	1198 -3.60%	1488 -4.10%	934.1 (2.4%)	1177.6 (3.6%)	1883.4 (5.1%)	1538.7 (4.5%)	1403.8 (3.5%)	1315.5 (3.4%)	1912.2 (5.1%)	1306.1 (3.8%)	1322.5 (3.5%)
10	Mental disorders	1310.1 (3.5%)	1319.1 (3.4%)	1314.2 (3.6%)	1314.6 (3.5%)	1316.5 (3.5%)	1307.9 (3.0%)	1302.7 (3.9%)	1296.7 (3.5%)	1330.2 (3.5%)	1318.9 (4.0%)	1314.5 (3.5%)	1302.2 (3.8%)	1312.1 (3.3%)	1325.4 (3.4%)	1313.9 (3.5%)	1301.5 (3.8%)	1323.1 (3.5%)
11	Transport injuries	1277.6 (3.4%)	1210.7 (3.1%)	1338.6 (3.6%)	1418.8 (3.8%)	1368.3 (3.6%)	1543.6 (3.6%)	1041.4 (3.1%)	1410.4 (3.8%)	1248.8 (3.3%)	1153.4 (3.5%)	1381.9 (3.7%)	1128.3 (3.3%)	1117.4 (2.8%)	1488.5 (3.8%)	1379.5 (3.7%)	1293.6 (3.7%)	1220.3 (3.2%)
12	Chronic respiratory diseases	1120.1 (3.0%)	1169.8 (3.0%)	1096.5 (3.0%)	1207.6 (3.2%)	1107.5 (2.9%)	1314.3 (3.0%)	1178 (3.5%)	1216.5 (3.3%)	1119.2 (2.9%)	949.9 (2.9%)	1185.3 (3.2%)	991.4 (2.9%)	961.4 (2.4%)	1178 (3.0%)	1159.4 (3.1%)	1046.9 (3.0%)	1113 (2.9%)
13	Other non-communitable diseases	940.1 (2.5%)	961.2 (2.5%)	907.3 (2.5%)	934.6 (2.5%)	930.2 (2.4%)	1015.3 (2.3%)	911.9 (2.7%)	944.9 (2.6%)	944.5 (2.5%)	931.5 (2.8%)	919.5 (2.5%)	931.8 (2.7%)	907.1 (2.3%)	900.8 (2.3%)	896.6 (2.4%)	1024.2 (3.0%)	905.2 (2.4%)
14	Sence organ diseases	884.3 (2.4%)	899.9 (2.3%)	880.8 (2.4%)	892.4 (2.4%)	867 (2.3%)	920.7 (2.1%)	861 (2.6%)	872.4 (2.4%)	934.8 (2.4%)	866.2 (2.6%)	897 (2.4%)	856.5 (2.5%)	924.6 (2.3%)	932.7 (2.4%)	845.6 (2.3%)	840.2 (2.4%)	899.3 (2.4%)
15	Respiratory infections and tuberculosis	861.2 (2.3%)	839.9 (2.2%)	913.7 (2.5%)	792.4 (2.1%)	712.5 (1.9%)	1194.3 (2.8%)	578.1 (1.7%)	1117.9 (3.1%)	706.3 (1.9%)	571.4 (1.7%)	892.3 (2.4%)	850.8 (2.5%)	954 (2.4%)	776.1 (2.0%)	900.7 (2.4%)	726.4 (2.1%)	809.4 (2.1%)

Legend

Higher rate per 100,000 — Lower rate per 100,000

Table 15.2. Burden of disease by cause category in women in Poland and voivodships in 2019 expressed by raw DALY/100 000 population and in relation to the percentage of causes in the total burden. (Cause ranking from 1–15).

No.	Cause	Poland	Dolnośląskie	Kujawsko-Pomorskie	Lubelskie	Lubuskie	Łódzkie	Małopolskie	Mazowieckie	Opolskie	Podkarpackie	Podlaskie	Pomorskie	Śląskie	Świętokrzyskie	Warmińsko-Mazurskie	Wielkopolskie	Zachodniopomorskie
	Total	29002.5 (100.0%)	30069.4 (100.0%)	28841 (100.0%)	28266.2 (100.0%)	28516.6 (100.0%)	33623.1 (100.0%)	26516.8 (100.0%)	28754.7 (100.0%)	30549.8 (100.0%)	26361.1 (100.0%)	28168.7 (100.0%)	27364.3 (100.0%)	31364.3 (100.0%)	29884.9 (100.0%)	28720.3 (100.0%)	27761.7 (100.0%)	28573.8 (0.0%)
		Including:																
1	Cardiovascular diseases	6618.3 (22.8%)	7112.9 (23.7%)	6306 (21.9%)	7137.1 (25.3%)	6303.9 (22.1%)	8228.5 (24.5%)	6224.4 (23.5%)	6323 (22.0%)	7557.5 (24.7%)	6183.3 (23.5%)	6506.1 (23.1%)	5337.3 (19.5%)	7354.1 (23.5%)	8046.8 (26.9%)	5966.7 (20.8%)	5814.8 (21.0%)	6070.6 (21.3%)
2	Neoplasms	5671.7 (19.6%)	6116.9 (20.3%)	6470.8 (22.4%)	5019.1 (17.8%)	5915.6 (20.7%)	6629.1 (19.7%)	4613.9 (17.4%)	5453.5 (19.0%)	5753.2 (18.8%)	4467.6 (17.0%)	4786.6 (17.0%)	5506.6 (20.1%)	6327.7 (20.2%)	5565.3 (18.6%)	6056.5 (21.1%)	5742 (20.7%)	6152.1 (21.5%)
3	Musculoskeletal disorders	2508.4 (8.7%)	2511.5 (8.4%)	2420.5 (8.4%)	2479 (8.8%)	2389.3 (8.4%)	2835.2 (8.4%)	2527 (9.5%)	2550.5 (8.9%)	2645.9 (8.7%)	2519.4 (9.6%)	2522.6 (9.0%)	2442.5 (8.9%)	2484.4 (7.9%)	2520.5 (8.4%)	2381.7 (8.3%)	2395.4 (8.6%)	2443.7 (8.6%)
4	Neurological disorders	2243 (7.7%)	2244.8 (7.5%)	2176.5 (7.6%)	2299.4 (8.1%)	2156.3 (7.6%)	2383 (7.1%)	2157.4 (8.1%)	2364.6 (8.2%)	2290.6 (7.5%)	2239.2 (8.5%)	2356.5 (8.4%)	2130.8 (7.8%)	2234.6 (7.1%)	2353.6 (7.9%)	2212.4 (7.7%)	2091.3 (7.5%)	2208.5 (7.7%)
5	Other non-communitable diseases	1608.5 (5.6%)	1596.8 (5.3%)	1539.1 (5.3%)	1578.2 (5.6%)	1554.9 (5.5%)	1774.4 (5.3%)	1607.8 (6.1%)	1627.3 (5.7%)	1673.4 (5.5%)	1639.5 (6.2%)	1606.8 (5.7%)	1632.7 (6.0%)	1535.7 (4.9%)	1549.8 (5.2%)	1549.7 (5.4%)	1667.4 (6.0%)	1537.4 (5.4%)
6	Mental disorders	1518.7 (5.2%)	1532.1 (5.1%)	1524.5 (5.3%)	1520 (5.4%)	1524.2 (5.3%)	1516.7 (4.5%)	1508 (5.7%)	1511 (5.3%)	1540.6 (5.0%)	1515.8 (5.8%)	1518.5 (5.4%)	1501.4 (5.5%)	1526 (4.9%)	1529.3 (5.1%)	1519 (5.3%)	1510 (5.4%)	1536.9 (5.4%)
7	Diabetes and chronic kidney diseases	1501.7 (5.2%)	1484.8 (4.9%)	1401.5 (4.9%)	1356.5 (4.8%)	1590.2 (5.6%)	1671.8 (5.0%)	1135.8 (4.3%)	1376.9 (4.8%)	1759.7 (5.8%)	1124.7 (4.3%)	1642 (5.8%)	1603.7 (5.9%)	1929 (6.2%)	1347.8 (4.5%)	1742.3 (6.1%)	1558.9 (5.6%)	1398.8 (4.9%)
8	Unintentional injuries	1377.7 (4.8%)	1436.4 (4.8%)	1237.3 (4.3%)	1324.4 (4.7%)	1355.9 (4.8%)	1458.7 (4.3%)	1296.6 (4.9%)	1417.2 (4.9%)	1395.4 (4.6%)	1229.9 (4.7%)	1369.1 (4.9%)	1358.9 (5.0%)	1542.8 (4.9%)	1307.1 (4.4%)	1217.6 (4.2%)	1399.8 (5.0%)	1346 (4.7%)
9	Sense organ diseases	1119.4 (3.9%)	1153.7 (3.8%)	1107.7 (3.8%)	1162.8 (4.1%)	1093.8 (3.8%)	1212.8 (3.6%)	1081.9 (4.1%)	1113.1 (3.9%)	1171.2 (3.8%)	1086.3 (4.1%)	1155.4 (4.1%)	1053.9 (3.9%)	1145.4 (3.7%)	1194.5 (4.0%)	1074.9 (3.7%)	1048.8 (3.8%)	1128.5 (4.0%)
10	Digestive diseases	1099.2 (3.8%)	1142.1 (3.8%)	1008.6 (3.5%)	931.5 (3.3%)	1028.8 (3.6%)	1508.8 (4.5%)	933.3 (3.5%)	1123.5 (3.9%)	1052.6 (3.5%)	867.2 (3.3%)	1013.9 (3.6%)	1092.9 (4.0%)	1363.7 (4.4%)	923.2 (3.1%)	1078.5 (3.8%)	991.5 (3.6%)	1079.5 (3.8%)
11	Chronic respiratory diseases	857.4 (3.0%)	870 (-2.9%)	794.3 (2.8%)	789.1 (2.8%)	805.9 (2.8%)	943 (-2.8%)	802.7 (3.0%)	861.7 (3.0%)	951.9 (3.1%)	846.2 (3.2%)	773.9 (2.8%)	804.7 (2.9%)	1002.3 (3.2%)	825.5 (2.8%)	883.2 (3.1%)	790.7 (2.9%)	837.7 (2.9%)
12	Transport injuries	498.6 (1.7%)	494.4 (-1.6%)	517.1 (1.8%)	466.3 (1.7%)	519.3 (1.8%)	593.5 (1.8%)	403.9 (1.5%)	539.8 (-1.9%)	490.9 (1.6%)	455.3 (1.7%)	483 (1.7%)	447.4 (1.6%)	493.4 (1.6%)	534.5 (1.8%)	525.5 (1.8%)	518.6 (1.9%)	491.2 (1.7%)
13	Respiratory infections and tuberculosis	491.5 (1.7%)	445.7 (1.5%)	530.9 (1.8%)	419.9 (1.5%)	389 (1.4%)	717.1 (2.1%)	348.2 (1.3%)	638.5 (-2.2%)	402.1 (1.3%)	339.9 (-1.3%)	519.4 (1.8%)	520.8 (1.9%)	496.8 (1.6%)	408.8 (1.4%)	551.8 (1.9%)	435.5 (1.6%)	446.5 (1.6%)
14	Skin diseases	489.2 (1.7%)	470.1 (-1.6%)	454.9 (1.6%)	467.5 (1.7%)	437 (1.5%)	568.6 (1.7%)	529.3 (2.0%)	519.5 (-1.8%)	514.4 (1.7%)	517.2 (2.0%)	493.7 (1.8%)	501.8 (1.8%)	465.7 (1.5%)	460.6 (1.5%)	443 (1.5%)	458.6 (1.7%)	441.6 (1.6%)
15	Substance use	457.2 (1.6%)	474.8 (1.6%)	445.1 (1.5%)	413.3 (1.5%)	464.9 (1.6%)	524.7 (1.6%)	415.8 (1.6%)	440.9 (-1.5%)	421.5 (1.4%)	405.2 (1.5%)	465.2 (1.7%)	494.8 (1.8%)	501.6 (1.6%)	410.4 (1.4%)	507.3 (1.8%)	438.9 (1.6%)	467.2 (1.6%)

Legend

Higher rate per 100,000 — Lower rate per 100,000

In 2019, due to all causes, Polish women lost a total of 29,002.5 DALYs/100 000 women, with the value of the overall disease burden varying between voivodships. Regions with the lowest rate of DALYs/100 000 of all causes in Poland were Podkarpackie voivodship – 26,361.1 DALYs/100 000 and Małopolskie voivodship – 26,516.8 DALYs/100 000, while the highest rate was recorded in Łódzkie voivodship – 33,623.1 DALYs/100 000. Similarly, to men, the leading cause of loss of life years in full health was cardiovascular diseases – the rate for Poland in total was 6,618.3 (22.8% of the total burden of disease). This health problem was recorded as the first cause of premature death or living with disability in 12 voivodships, of which the highest values of DALYs/100 000 were recorded in the Łódzkie voivodship 8,228.5 DALYs/100 000, and the Świętokrzyskie voivodship 8,046.8 DALYs/100 000, where CVD accounted for 24.5% and 26.9% of the local burden of disease among women, respectively. Although in terms of DALYs per 100 000, regional variations were not clearly visible, in the Lubelskie voivodship too, cardiovascular disease had a huge impact on the health years lost by its female residents – according to the data, approximately ¼ of women's health loss in the region is attributed to this group of causes.

In the remaining voivodships, i.e. Kujawsko-Pomorskie, Lubuskie, Pomorskie and Warmińsko-Mazurskie, the leading cause of the burden of disease among women was cancer; in these locations, the highest DALY rate was recorded for Kujawsko-Pomorskie – 6,470.8 DALYs/100 000 (22.4% of the region's disease burden); interestingly, the highest value of this indicator in Poland, despite the fact that cancer were not the dominant cause of the disease burden, was recorded in the Łódzkie voivodship – 6,629.1 DALYs/100 100 000 (19.7% of the region's disease burden). The lowest number of years of health lost due to cancer was recorded in the Podkarpackie voivodship 4,467.6 DALYs/100 000 (16.9% of the region's disease burden). In comparison, the nationwide burden of disease rate due to tumours among women was 5,671.7 DALYs/100 000 (19.6% of the disease burden of Polish women).

The third cause generating the greatest loss of life years due to premature deaths and years lived with disability in women in Poland was musculoskeletal disorders. This health problem nationwide contributed to a loss of 2,508 DALYs/100 000 (8.6% of the disease burden of Polish women). The greatest differences in DALY in relation to regions were recorded between the Łódzkie voivodship, with a rate of 2,835.2

DALYs/100 000 (8.4% of the region's burden) and the Warmińsko-Mazurskie voivodship 2,381.7 DALYs/100 000 (8.3% of the region's load). When analysing the share of musculoskeletal disorders in the burden in the regions of Poland, the highest percentage was recorded in the voivodships of Podkarpackie (9.6%) and Małopolskie (9.6%) and the lowest in the Śląskie voivodship (7.9%).

Further down the list of the most important health problems for Polish women were neurological disorders, other infectious diseases, mental disorders, as well as diabetes and kidney disease. All information on the level of the DALY/100 000 rate in women as well as its percentage of the total burden in a given voivodship can be found in the table below (Table 15.2).

15.3. Risk factors related to population health loss in Poland – analysis of the burden by sex and voivodshipsvoivodship

The all-cause attributable disease burden for all risk factors in men in Poland was 78,657.6 DALYs/100 000 population. The main risk factor nationwide was smoking, which contributed 6.03% to the total burden (4,743.8 DALYs/100 000), followed by alcohol use and high systolic blood pressure (4.53%, i. e. 3,565.0 DALY/100 000 and 4.11%, i. e. 3,230.2 DALY/100 000). The proportion of risk factors varied from voivodship to voivodship. In the case of smoking, the highest proportion was observed in the Łódzkie (6.85%), Kujawsko-Pomorskie (6.76%) and Zachodniopomorskie (6.70%) voivodships, and the lowest in the Śląskie (5.20%), Małopolskie (5.63%) and Podkarpackie (5.73%) voivodships. Alcohol use was most responsible for the health burden of men in the voivodships of Podlaskie (5.42%), Łódzkie (5.26%) and Mazowieckie (4.99%), and least in the voivodships of Opolskie (3.83%), Małopolskie (3.84%) and Podkarpackie (4.14%). The voivodships with the highest proportion of high systolic blood pressure were Świętokrzyskie (4.58%), Podkarpackie (4.37%) and Opolskie (4.32%), while those with the lowest were Warmińsko-Mazurskie (3.76%), Pomorskie (3.85%) and Dolnośląskie (3.93%). Details of the other major risk factors for total disease burden in men are presented in the table below (Table 15.3).

Table 15.3. Burden of disease due to major risk factors among men in Poland and voivodships in 2019 expressed in age-standardized DALY/100 000 population, for all causes.

No.	Risk factor	Poland	Dolnośląskie	Kujawsko-Pomorskie	Lubelskie	Lubuskie	Łódzkie	Małopolskie	Mazowieckie	Opolskie	Podkarpackie	Podlaskie	Pomorskie	Śląskie	Świętokrzyskie	Warmińsko-Mazurskie	Wielkopolskie	Zachodniopomorskie
	Total:	**78657.6 (100.0%)**	**81831.8 (100.0%)**	**78949.6 (100.0%)**	**78146.3 (100.0%)**	**82842.9 (100.0%)**	**89793.1 (100.0%)**	**75199.0 (100.0%)**	**76457.3 (100.0%)**	**80106.9 (100.0%)**	**70196.2 (100.0%)**	**73313.2 (100.0%)**	**72731.6 (100.0%)**	**83578.4 (100.0%)**	**79823.3 (100.0%)**	**80624.7 (100.0%)**	**75989.3 (100.0%)**	**79301.8 (100.0%)**
1	**Smoking**	4743.8 (6.03%)	5147.3 (6.29%)	5336.2 (6.76%)	4823.3 (6.17%)	5186.0 (6.64%)	5352.9 (6.85%)	4397.3 (5.63%)	4526.0 (5.92%)	4740.9 (5.92%)	4025.3 (5.73%)	4267.1 (5.82%)	4505.8 (6.20%)	4343.8 (5.20%)	4859.0 (6.09%)	5312.4 (6.59%)	4853.1 (6.39%)	5314.9 (6.70%)
2	**Alcohol use**	3565.0 (4.53%)	3649.2 (4.46%)	3350.8 (4.24%)	3563.3 (4.56%)	3566.6 (4.31%)	4724.0 (5.26%)	2884.7 (3.84%)	3816.1 (4.99%)	3065.7 (3.83%)	2906.1 (4.14%)	3973.2 (5.42%)	3318.5 (4.56%)	3820.6 (4.57%)	3397.5 (4.26%)	3905.8 (4.84%)	3316.4 (4.36%)	3395.8 (4.28%)
3	**High systolic blood pressure**	3230.2 (4.11%)	3217.8 (3.93%)	3113.6 (3.94%)	3263.8 (4.18%)	3456.2 (4.17%)	3699.8 (4.12%)	3059.5 (4.07%)	3239.8 (4.24%)	3457.7 (4.32%)	3064.6 (4.37%)	2907.3 (3.97%)	2800.7 (3.85%)	3497.3 (4.18%)	3655.1 (4.58%)	3032.6 (3.76%)	3021.3 (3.98%)	3178.3 (4.01%)
4	**High body-mass index**	2935.7 (3.73%)	3149.4 (3.85%)	2804.2 (3.55%)	2865.4 (3.67%)	3099.3 (3.74%)	3198.4 (3.56%)	2770.6 (3.68%)	2988.3 (3.91%)	3125.3 (3.90%)	2616.3 (3.73%)	2658.3 (3.63%)	2708.4 (3.72%)	3142.5 (3.76%)	2863.4 (3.59%)	2862.9 (3.55%)	2900.8 (3.82%)	2889.6 (3.64%)
5	**High fasting plasma glucose**	2549.1 (3.24%)	2513.6 (3.07%)	2298.9 (2.91%)	2401.1 (3.07%)	2676.9 (3.23%)	3135.8 (3.49%)	2229.2 (2.96%)	2285.1 (2.99%)	2757.4 (3.44%)	1824.3 (2.60%)	2609.2 (3.56%)	2706.8 (3.72%)	3117.7 (3.73%)	2117.3 (2.65%)	3021.3 (3.75%)	2592.2 (3.41%)	2378.4 (3.0%)
6	**High LDL cholesterol**	1658.4 (2.11%)	1824.9 (2.23%)	1599.8 (2.03%)	1593.6 (2.04%)	1742.6 (2.10%)	1711.2 (1.91%)	1876.3 (2.50%)	1577.5 (2.06%)	1852.7 (2.31%)	1582.0 (2.25%)	1345.2 (1.83%)	1448.7 (1.99%)	1811.5 (2.17%)	1738.0 (2.18%)	1497.2 (1.86%)	1486.6 (1.96%)	1700.7 (2.14%)
7	**Ambient particulate matter pollution**	1334.9 (1.70%)	1364.1 (1.67%)	1105.8 (1.40%)	1247.5 (1.60%)	1220.3 (1.47%)	1693.9 (1.89%)	1569.2 (2.09%)	1346.7 (1.76%)	1409.5 (1.76%)	1189.7 (1.69%)	1011.3 (1.38%)	832.9 (1.15%)	1767.1 (2.11%)	1400.9 (1.76%)	1021.9 (1.27%)	1228.7 (1.62%)	962.3 (1.21%)
8	**Diet high in sodium**	853.5 (1.09%)	877.0 (1.07%)	831.0 (1.05%)	871.6 (1.12%)	914.1 (1.10%)	949.8 (1.06%)	849.6 (1.13%)	826.0 (1.08%)	912.1 (1.14%)	829.0 (1.18%)	777.9 (1.06%)	742.4 (1.02%)	909.3 (1.09%)	937.1 (1.17%)	812.4 (1.01%)	801.3 (1.05%)	843.7 (1.06%)
9	**Diet low in whole grains**	752.3 (0.96%)	823.1 (1.01%)	747.0 (0.95%)	733.8 (0.94%)	806.7 (0.97%)	788.3 (0.88%)	821.9 (1.09%)	690.0 (0.90%)	836.3 (1.04%)	710.7 (1.01%)	638.1 (0.87%)	675.8 (0.93%)	808.3 (0.97%)	781.0 (0.98%)	713.8 (0.89%)	700.2 (0.92%)	777.7 (0.98%)
10	**Kidney dysfunction**	646.1 (0.82%)	669.6 (0.82%)	617.0 (0.78%)	638.4 (0.82%)	688.4 (0.83%)	707.9 (0.79%)	614.6 (0.82%)	607.5 (0.79%)	689.5 (0.86%)	620.1 (0.88%)	598.4 (0.82%)	604.7 (0.83%)	713.0 (0.85%)	699.6 (0.88%)	643.4 (0.80%)	596.3 (0.78%)	684.7 (0.86%)

Table 15.4. Burden of disease due to major risk factors among women in Poland and voivodships in 2019 expressed in age-standardized DALY/100 000 population, for all causes.

No.	Risk factor	Polska	Dolnośląskie	Kujawsko-Pomorskie	Lubelskie	Lubuskie	Łódzkie	Małopolskie	Mazowieckie	Opolskie	Podkarpackie	Podlaskie	Pomorskie	Śląskie	Świętokrzyskie	Warmińsko-Mazurskie	Wielkopolskie	Zachodniopomorskie
	Titak	**37950.8 (100.0%)**	**39080.1 (100.0%)**	**38623.4 (100.0%)**	**35498.6 (100.0%)**	**38981.4 (100.0%)**	**41907.9 (100.0%)**	**35140.9 (100.0%)**	**36055.7 (100.0%)**	**40186.6 (100.0%)**	**33730.5 (100.0%)**	**33814.2 (100.0%)**	**36394.4 (100.0%)**	**42776.8 (100.0%)**	**37926.7 (100.0%)**	**39437.1 (100.0%)**	**37687.0 (100.0%)**	**37596.5 (100.0%)**
1	**High body-mass index**	1893.7 (4.99%)	1954.5 (5.00%)	1865.4 (4.83%)	1748.0 (4.92%)	1923.2 (5.42%)	2021.8 (5.70%)	1728.6 (4.87%)	1890.8 (5.24%)	2037.4 (5.07%)	1664.0 (4.93%)	1741.9 (5.15%)	1843.9 (5.07%)	2106.06 (4.92%)	1840.3 (4.85%)	1935.9 (4.91%)	1932.2 (5.13%)	1800.5 (4.79%)
2	**Smoking**	1858.4 (4.90%)	2018.8 (5.17%)	2092.7 (5.42%)	1651.0 (4.65%)	1951.9 (5.50%)	2038.8 (5.74%)	1622.4 (4.57%)	1808.7 (5.02%)	1827.5 (4.55%)	1455.02 (4.31%)	1490.7 (4.41%)	1926.5 (5.29%)	1974.3 (4.62%)	1731.4 (4.57%)	2074.7 (5.26%)	1868.8 (4.96%)	2045.8 (5.44%)
3	**High systolic blood pressure**	1582.7 (4.17%)	1455.08 (3.72%)	1582.3 (4.10%)	1584.7 (4.46%)	1616.5 (4.55%)	1789.8 (5.04%)	1406.8 (3.96%)	1540.3 (4.27%)	1764.2 (4.39%)	1521.5 (4.51%)	1420.2 (4.20%)	1430.3 (3.93%)	1790.2 (4.18%)	1766.7 (4.66%)	1540.6 (3.91%)	1576.5 (4.18%)	1506.1 (4.01%)
4	**High fasting plasma glucose**	1549.4 (4.08%)	1552.9 (3.97%)	1482.0 (3.84%)	1383.9 (3.90%)	1610.9 (4.54%)	1691.7 (4.77%)	1220.4 (3.44%)	1443.7 (4.00%)	1742.3 (4.34%)	1217.2 (3.61%)	1544.0 (4.57%)	1648.1 (4.53%)	1924.3 (4.50%)	1414.4 (3.73%)	1816.1 (4.61%)	1613.7 (4.28%)	1406.5 (3.74%)
5	**High LDL cholesterol**	720.1 (1.90%)	776.7 (1.99%)	727.5 (1.88%)	682.3 (1.92%)	709.9 (2.00%)	758.5 (2.14%)	791.3 (2.23%)	641.5 (1.78%)	852.8 (2.12%)	689.7 (2.04%)	543.3 (1.61%)	641.4 (1.76%)	818.2 (1.91%)	791.8 (2.09%)	676.9 (1.72%)	674.0 (1.79%)	689.9 (1.83%)
6	**Ambient particulate matter pollution**	625.9 (1.65%)	640.0 (1.64%)	522.8 (1.35%)	535.6 (1.51%)	544.9 (1.54%)	786.7 (2.22%)	691.1 (1.95%)	611.6 (1.70%)	683.4 (1.70%)	536.8 (1.59%)	448.3 (1.33%)	413.3 (1.14%)	895.4 (2.09%)	628.1 (1.66%)	492.9 (1.25%)	598.6 (1.59%)	435.9 (1.16%)
7	**Alcohol use**	523.5 (1.38%)	558.8 (1.43%)	500.3 (1.30%)	437.1 (1.23%)	519.4 (1.46%)	675.8 (1.90%)	421.6 (1.19%)	544.5 (1.51%)	448.1 (1.11%)	411.5 (1.22%)	476.3 (1.41%)	526.4 (1.45%)	637.4 (1.49%)	449.0 (1.18%)	537.8 (1.36%)	496.0 (1.32%)	516.7 (1.37%)
8	**Kidney dysfunction**	405.1 (1.07%)	418.5 (1.07%)	394.1 (1.02%)	386.4 (1.09%)	415.0 (1.17%)	444.5 (1.25%)	370.7 (1.04%)	364.4 (1.01%)	458.4 (1.14%)	384.3 (1.14%)	348.0 (1.03%)	390.3 (1.07%)	471.3 (1.10%)	440.6 (1.16%)	416.0 (1.05%)	387.7 (1.03%)	408.1 (1.09%)
9	**Diet low in whole grains**	333.8 (0.88%)	362.7 (0.93%)	337.6 (0.87%)	316.3 (0.89%)	334.7 (0.94%)	353.3 (1.00%)	345.9 (0.97%)	294.8 (0.82%)	376.2 (0.94%)	308.9 (0.92%)	270.7 (0.80%)	304.7 (0.84%)	378.6 (0.88%)	357.1 (0.94%)	334.8 (0.85%)	324.3 (0.86%)	329.3 (0.88%)
10	**Low birth weight**	330.7 (0.87%)	338.1 (0.87%)	346.3 (0.90%)	321.8 (0.91%)	363.8 (1.02%)	353.8 (1.00%)	267.6 (0.75%)	297.1 (0.82%)	351.9 (0.88%)	354.5 (1.05%)	359.8 (1.06%)	303.6 (0.83%)	376.3 (0.88%)	360.4 (0.95%)	356.5 (0.90%)	314.0 (0.83%)	388.2 (1.03%)

In women, the corresponding all-cause disease burden attributable to all risk factors was 37,950.8 DALYs/100 000 population. The main risk factors were high BMI (contribution to the total burden of 4.99%, 1,893.7 DALYs/100 000), followed by smoking and high systolic blood pressure (4.90%, i. e. 1,858.4 DALYs/100 000 and 4.17%, i. e. 1,582.7 DALYs/100 000). The proportion of risk factors varied from voivodship to voivodship. For high BMI, the highest proportion was observed in the Łódzkie (5.70%), Lubuskie (5.43%) and Mazowieckie (5.24%) voivodships, and the lowest in the Zachodniopomorskie (4.79%), Kujawsko-Pomorskie (4.83%) and Świętokrzyskie (4.85%) voivodships. Smoking was most responsible for the health burden of women in the voivodships of Łódź (5.74%), Lubuskie (5.50%) and Zachodniopomorskie (5.44%), and least in the voivodships of Podkarpackie (4.31%), Podlaskie (4.41%) and Opolskie (4.55%). The voivodships with the highest proportion of high systolic blood pressure were Łódzkie (5.04%), Świętokrzyskie (4.66%) and Lubuskie (4.55%), while those with the lowest were Dolnośląskie (3.72%), Warmińsko-Mazurskie (3.91%) and Pomorskie (3.93%). Details of the other major risk factors for total disease burden in women are presented in the table (Table 15.4).

15.4. Risk factors related to population health loss in Poland – analysis of the burden by sex and age group

The table 15.5 shows the rankings of the 10 risk factors responsible for the total disease burden by sex and age groups.

In men under 40 years of age, the total burden of disease attributable to all risk factors was 4,922.63 DALYs/100 000 population, and the most important risk factors included alcohol use (1,532.2 DALYs/100 000; 31.13% of the total burden), high BMI (328.6 DALY/100 000; 6.67% of the total burden) and low birth weight (313.8 DALYs/100 000; 6.38% of the total burden). In the age group 40–64 years, the total disease burden attributed to all risk factors was 56,761.4 DALYs/100 000 population, and the most important risk factors were smoking (10,451.3 DALYs/100 000 population; 18.41% of the total burden), alcohol use (8,074.4 DALYs/100 000; 14.23% of the total burden) and a high BMI (6,526.9 DALYs/100 000; 11.50% of the total burden). In the oldest age group (65 years and more) in men, the total disease burden attributable to all risk factors was 138,914.9 DALYs/100 000 population, and the most important risk factors included smoking (25,212.8 DALYs/100 000; 18.15% of the total burden), high systolic blood pressure (18,781.5 DALYs/100 000; 13.52% of the total burden) and high fasting plasma glucose levels (15,963.0 DALYs/100 000; 11.49% of the total burden).

In women under 40 years of age, the total burden of disease attributable to all risk factors was 2,634.5 DALYs/100 000 population, and the most important risk factors included alcohol use (365.7 DALYs/100 000; 13.88% of the total burden), low birth weight (269.7 DALYs/100 000; 10.24% of the total burden) and a short gestational age for birth weight (264.9 DALYs/100 000; 10.05% of the total burden). In the age group 40–64 years, the total disease burden attributed to all risk factors was 21,478.6 DALYs/100 000 population, and the most important risk factors were smoking (4,405.1 DALYs/100 000 population; 20.51% of the total burden), high BMI (3,454.5 DALYs/100 000; 16.08% of the total burden) and high fasting plasma glucose levels (2,094.4 DALYs/100 000; 9.75% of the total burden). In the oldest age group (65 years and more) in women, the total disease burden attributable to all risk factors was 84,210.4 DALYs/100 000 population, with the most important risk factors being high systolic blood pressure (13,763.4 DALYs/100 000; 16.34% of the total burden), fasting glucose levels (12,204.9 DALYs/100 000; 14.49% of the total burden) and high BMI (11,473.3 DALYs/100 000; 13.62% of the total burden).

Table 15.5. Burden of disease due to major risk factors in Poland in 2019 expressed in DALY/100 000 population, by sex and age groups.

Males								
No.	<40 years		No.	40–64 years		No.	65+ years	
	Total:	4922.63 (100.0%)		Total:	56761.4 (100.0%)		Total:	138914.9 (100.0%)
1	Alcohol use	1532.2 (31.13%)	1	Smoking	10451.3 (18.41%)	1	Smoking	25212.8 (18.15%)
2	High body-mass index	328.6 (6.67%)	2	Alcohol use	8074.4 (14.23%)	2	High systolic blood pressure	18781.5 (13.52%)
3	Low birth weight	313.8 (6.38%)	3	High body-mass index	6526.9 (11.50%)	3	High fasting plasma glucose	15963.0 (11.49%)
4	Short gestation	305.6 (6.21%)	4	High systolic blood pressure	5892.0 (10.38%)	4	High body-mass index	13875.0 (9.99%)
5	Smoking	296.9 (6.03%)	5	High fasting plasma glucose	4322.1 (7.61%)	5	High LDL cholesterol	8108.4 (5.84%)
6	Drug use	294.7 (5.99%)	6	High LDL cholesterol	3543.2 (6.24%)	6	Alcohol use	7808.5 (5.62%)
7	Occupational injuries	274.4 (5.57%)	7	Ambient particulate matter pollution	2636.3 (4.64%)	7	Ambient particulate matter pollution	7080.8 (5.10%)
8	High systolic blood pressure	230.1 (4.68%)	8	Diet low in whole grains	1424.0 (2.51%)	8	Diet high in sodium	5356.7 (3.86%)
9	High fasting plasma glucose	171.9 (3.49%)	9	Diet high in sodium	1361.0 (2.40%)	9	Diet low in whole grains	4203.8 (3.03%)
10	Occupational ergonomic factors	171 (3.47%)	10	Diet high in red meat	1216.3 (2.14%)	10	Kidney dysfunction	4098.6 (2.95%)

Females								
No.	<40 years		No.	40–64 years		No.	65+ years	
	Total:	2634.5 (100.0%)		Total:	21478.6 (100.0%)		Total:	84210.4 (100.0%)
1	Alcohol use	365.7 (13.88%)	1	Smoking	4405.1 (20.51%)	1	High systolic blood pressure	13763.4 (16.34%)
2	Low birth weight	269.7 (10.24%)	2	High body-mass index	3454.5 (16.08%)	2	High fasting plasma glucose	12204.9 (14.49%)
3	Short gestation	264.9 (10.05%)	3	High fasting plasma glucose	2094.4 (9.75%)	3	High body-mass index	11473.3 (13.62%)
4	High body-mass index	226.6 (8.60%)	4	High systolic blood pressure	1802.7 (8.39%)	4	Smoking	8621.3 (10.24%)
5	Smoking	214.8 (8.15%)	5	Alcohol use	1123.2 (5.23%)	5	High LDL cholesterol	6226.3 (7.39%)
6	Occupational ergonomic factors	162.1 (6.15%)	6	Ambient particulate matter pollution	1005.7 (4.68%)	6	Ambient particulate matter pollution	4071.5 (4.83%)
7	Iron deficiency	137.8 (5.23%)	7	High LDL cholesterol	893.2 (4.16%)	7	Kidney dysfunction	3292.7 (3.91%)
8	Drug use	129.5 (4.92%)	8	Diet high in red meat	590.1 (2.75%)	8	Diet low in whole grains	2759.2 (3.28%)
9	High fasting plasma glucose	107.2 (4.07%)	9	Occupational ergonomic factors	520.2 (2.42%)	9	Diet high in sodium	2505.3 (2.98%)
10	High systolic blood pressure	75.0 (2.85%)	10	Unsafe sex	516.4 (2.40%)	10	Low temperature	2404.2 (2.85%)

15.5. Dynamics of change in disease burden from 1990 to 2019 and 2010 to 2019 by SDI index for selected locations

The socio-demographic index (SDI), developed by GBD researchers and used to produce these estimates, is a composite index of development status, strongly correlated with health performance (including mortality, life expectancy and DALY) and is used as a basis for estimating the aforementioned epidemiological-demographic indexes and also comparing them across different regions of the world. This index is a geometric mean with a distribution of 0 to 1. It incorporates the results of the analysis of the total fertility rate under 25 (TFU25), secondary education for those aged 15 and over (EDU15+) and per capita income distributed over time (LDI). Under the assumption of the index, locations with an SDI of 0 would have a theoretical minimum level of health-relevant development, while locations with an SDI of 1 would have a theoretical maximum level[8].

The SDI index classifies countries and regions of the world according to the following classes:

1. countries with a low SDI (SDI = 0–0.45),
2. countries with a medium-low SDI (SDI = 0.45–0.61),
3. countries with a medium-high SDI (SDI = 0.61–0.81),
4. countries with a high SDI (SDI = 0.81–1).

According to the results of the GBD 2019 study, countries in Europe have been assigned to the last two categories of the SDI index, and the exact information on the specific values of this measure is shown in the figure below. In Europe, the index value ranged from 0.68 in Albania to 0.93 in Switzerland. In Poland, the value of the SDI index was estimated to be 0.80, but intracountry observations indicated that this index can vary considerably between voivodships, reaching a maximum value of 0.84 in the Mazowieckie voivodship and a minimum value of 0.77 in the Warmińsko-Mazurskie voivodship (Fig. 15.2).

8 Global Health Data Exchange,Global Burden of Disease Study 2019 (GBD 2019) Socio-Demographic Index (SDI) 1950–2019, IHME, Seattle, 2022, (29.09.2022 r.) [Accessed: https://www.healthdata.org/taxeonomy/glossary/socio-demographic-index-sdi]

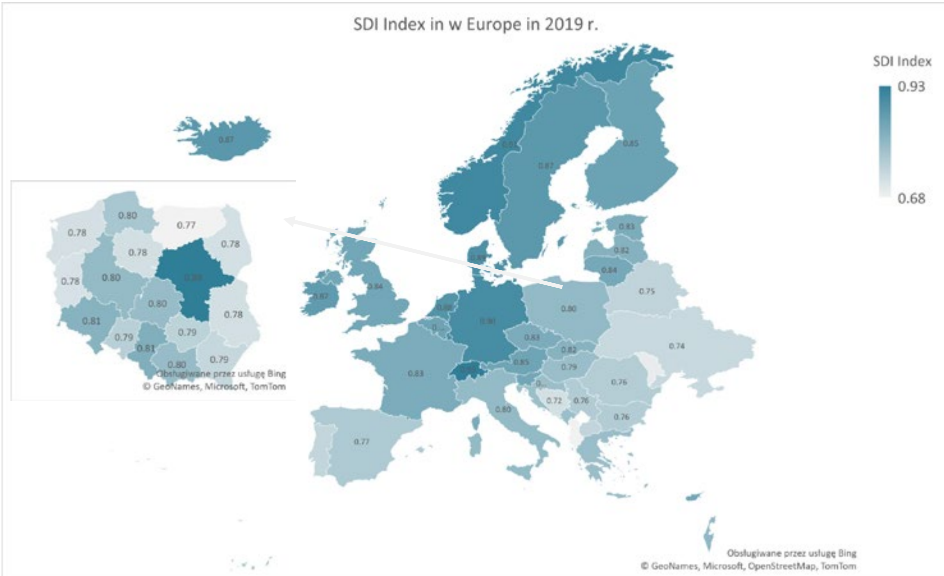

Fig. 15.2. Socio-Demographic Index (SDI) in Europe according to GBD 2019 study results.

An analysis of the health situation of the burden of disease with the SDI index can be helpful in assessing health differences between regions and tracking their health progress. By comparing age-standardized health indexes between countries with similar SDIs, it is possible to analyse the results and infer whether the health situation in a country could be better than that actually observed. As part of the application of this method, this study compares estimates of disease burden (age – standardized DALYs/100 000 population) in Poland and in several selected European countries with similar SDI levels to Poland as well as its voivodships. Data on the dynamics of change in the DALYs/100 000 population rate for the leading causes of health loss for both sexes combined (i. e. cardiovascular diseases and tumours) and for all causes combined over a 30– and 10-year period were analysed. The following countries were selected for the compilation: Czech Republic (SDI=0.83), France (SDI=0.83), Greece (SDI=0.79), Spain (SDI=0.77), Slovenia (SDI=0.84), Hungary (SDI=0.79), Great Britain (SDI=0.84), Italy (SDI=0.80).

Between 1990 and 2019, the age-standardized rate of disability-adjusted life years lost (DALYs) decreased significantly in all locations analysed. Of the countries included, the highest reduction was in the Czech Republic (-35.7%) and the lowest in Greece (-17.3%). Poland was at the forefront of countries with the greatest progress in reducing the national burden of disease (a reduction of – 34.4%); moreover, in some voivodships the decrease was greater than the average for Poland [e.g. Pomorskie voivodship – (-39.2%), Mazowieckie voivodship – (-37.0%), Wielkopolskie voivodship – (-36.3%)], while the lowest reduction in Poland was recorded in the Świętokrzyskie voivodship (-28.4%), which is similar to countries such as Spain (-28.6%) and Italy (-28.5%).

With regard to the 10-year comparison period, the highest national average reduction in disease burden was recorded in Hungary (-9.8%) and the lowest in the UK (-2.6%); Poland again had one of the highest declines (-8.7%). In the Lubelskie, Zachodniopomorskie and Kujawsko-Pomorskie voivodships, the burden of disease due to all causes decreased by an average of 1% per year, eventually reaching values of (-11.8%, -10.1% and -10.0%) (Fig. 15.3).

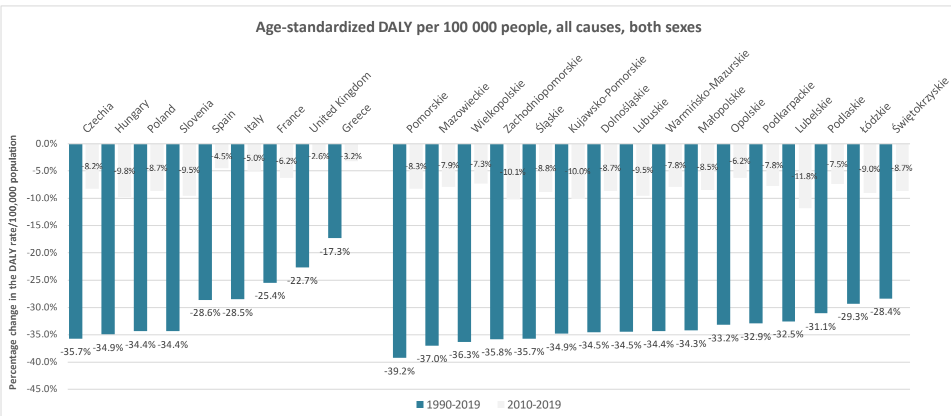

Fig. 15.3. Dynamics of change in the all-cause DALY rate in Poland and 16 voivodships in relation to other countries with a similar socio-demographic index (SDI) (for the last 30 and 10 years).

Over the past three decades, the burden of disease due to cardiovascular diseases has been more than halved in Poland (-55.8%). The greatest success in this context was achieved in the Pomorskie voivodship (-60.5% decrease) and the least in the

Świętokrzyskie voivodship (-46.2%), which is a better result than that achieved in Greece (only -39.4% decrease). In Slovenia and the Czech Republic, the improvement in population health was at a similar level to that of the Pomeranian voivodship – (-60.8%) in Slovenia, (-60.7%) in the Czech Republic, respectively.

For the period 2010–2019 only, the highest decrease in burden of disease among all analysed locations was recorded in Lubelskie voivodship (-21.2%), followed by Kujawsko-Pomorskie voivodship (-19.8%) and Zachodniopomorskie voivodship (-19.6%), which corresponds with a high national average (-17.4%), which, like the Czech Republic (-17.4%), allowed Poland to record the best health progression in European countries with a similar SDI (Fig. 15.4).

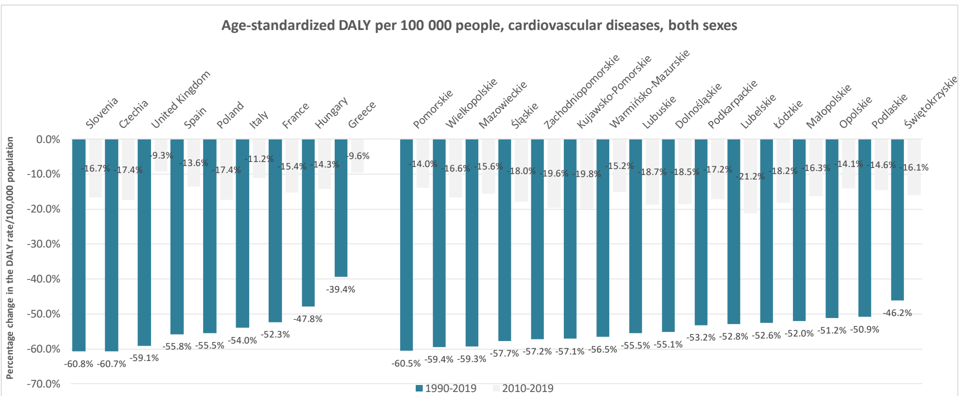

Fig. 15.4. Dynamics of changes in DALY due to cardiovascular diseases in Poland and 16 voivodeships in relation to other countries with a similar socio-demographic index (SDI) (for the last 30 and 10 years).

The 30-year dynamics of change in the burden of disease rate due to cancer is noticeably lower than that of the previously mentioned cardiovascular diseases, which means that oncological diseases remain a major public health problem and a key cause of health loss among the aforementioned populations. The greatest improvement in disability-adjusted life years lost for the countries analysed was for the Czech Republic (-35.8%), the worst for Greece (-11.4%). As if in contrast to previous analyses, this time Poland is the penultimate country in the international ranking, with a decline of (-17.5%) in relation to the base year, i.e. 1990. The best performance in terms of reducing the burden of disease was in the Pomeranian voivodship, where the age – standardized DALYs rate/100 000 population decreased by more than a third between 1990 and 2019. A clear positive trend was also recorded for Małopolskie (-24%) and Mazowieckie (-23.6%) voivodships. At the other extreme was the Świętokrzyskie voivodship, where the DALYs rate increased minimally (+0.1%) in the period 1990–2019, which is unusual for a summary of the health situation in the locations taken into account in the analysis.

Among the locations analysed, the smallest improvement in population health associated with a decrease in cancer burden between 2010 and 2019 was recorded for Greece (-2.6%), followed by the UK (-3.2%) and the Podkarpackie voivodship (-3.6%), with the Czech Republic (-15.5%), Hungary (-14.2%) and Slovenia (-12%) performing best, and of the Polish voivodships, again the Pomorskie voivodship (-11.7%), followed by the Lubelskie voivodship (-9.3%) and the Małopolskie voivodship (-8.2%). In comparison, the Polish national average for the 10-year period was (-7%) (Fig. 15.5).

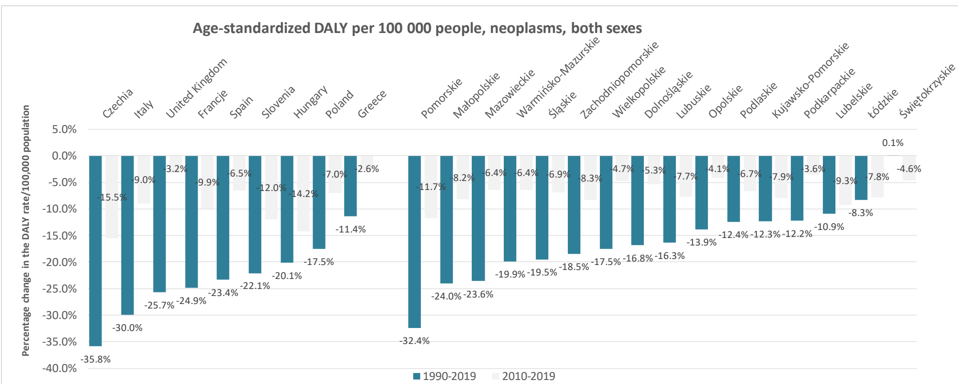

Fig. 15.5. Dynamics of changes in DALY due to tumours in Poland and voivodships in relation to other countries with a similar socio-demographic index (SDI) (for the last 30 and 10 years).

Figures 15.6A – 15.7L show the distribution of the proportion of individual causes of burden of disease in DALYs for the ten health problems that most burden Poles by sex and age groups and by voivodship.

In men in all age groups, the value attributed to the ten most burdensome health problems was 3,153,527.46 DALYs. Both in Poland and in individual voivodships, the most important health problem was ischaemic heart disease (share value for the whole of Poland: 27%). The burden of this disease varied by voivodship, accounting for more than 30% in the case of Małopolskie and Opolskie voivodships and the smallest share (at 23%) in Warmińsko-Mazurskie and Podlaskie voivodships. Tracheal, bronchus and lung cancer ranked second, with a share of nearly 16% in the characterised burden nationwide and was highest in the Kujawsko-Pomorskie (over 19%) and Zachodniopomorskie (18%) voivodships, and lowest in the Podlaskie and Śląskie voivodships – about 14%. Lower back pain ranked third among the health problems most burdening men in Poland (more than 8% share in the listed health burden), reaching the highest percentage values in the Podkarpackie (9%) and Pomorskie (nearly 9%) voivodships, and the lowest in the Łódzkie (7%) and Dolnośląskie (nearly 8%) voivodships. The distribution of the proportion of other health problems that most burden Polish men in all age groups combined is shown in Figure 15.6 7A. In women in all age groups, the value attributed to the ten most burdensome health problems was 2,499,840.17 DALYs. As in men, the most burdening health problem in women was ischaemic heart disease, which accounted for nearly 25% of the burden of the ten most important health problems in Poland. The most burdened voivodships were Małopolskie and Świętokrzyskie (over 29%), and the least burdened were Pomorskie and Wielkopolskie (21%). Lower back pain took second place in the ranking of health problems that burden Polish women the most (share of nearly 13%), with the highest percentages in the Podkarpackie and Podlaskie voivodships (nearly 14%) and the lowest in the Łódzkie and Śląskie voivodships (less than 12%). This was followed by the burden of ischaemic stroke (12% for Poland), with the highest percentage for the Łódzkie voivodship (over 14%) and the Świętokrzyskie voivodship (over 13%), and the lowest for the Pomorskie voivodship (under 10%) and the Zachodniopomorskie voivodship (just over 10%). The distribution of the proportion of other health problems that most burden women in all age groups combined is presented in Figure 15.6 7B.

Among men in the youngest age group (less than 5 years), more than one third of the burden due to the ten most important health problems in Poland, amounting to 59,215.74 DALYs, was due to neonatal preterm birth. Regional variation showed the highest share of this burden in the Zachodniopomorskie (over 40%) and Śląskie (close to 40%) voivodships, and the lowest in the Małopolskie (around 29%) and Wielkopolskie and Dolny Śląsk voivodships (33%). Next in line was the burden of congenital heart anomalies (16% for Poland), with the highest percentages for Wielkopolskie (over 19%) and Opolskie (over 18%) and the lowest for Mazowieckie (14%) and Łódzkie and Świętokrzyskie (15%) voivodships. The third position in the ranking was occupied by other congenital birth anomalies with a burden of nearly 11% for Poland, the highest in the Kujawsko-Pomorskie and Lubelskie voivodships (12%) and the lowest in the Lubuskie, Pomorskie and Śląskie voivodships (less than 10%). The proportion of other major health problems is shown in Figure 15.6 7C. In women in the youngest age group (under 5 years), the burden due to the 10 most important health problems was 48,377.94 DALYs for the whole of Poland. Both the same top three health problems as for males under five years old were noted, as well as similar percentages of the proportion of these problems. The burden of neonatal preterm birth accounted for more than 32% of the DALYs in this age group, assuming the highest values in the Zachodniopomorskie (more than 40%) and Śląskie (more than 37%) voivodships, and the lowest in the Małopolskie (more than 25%) and Wielkopolskie (nearly 28%) voivodships. Next, congenital heart anomalies were responsible for nearly 16% of the burden, with a share of nearly 20% in the Wielkopolskie and Opolskie voivodships and about 14% in the Łódzkie and Małopolskie voivodships. Other congenital birth anomalies, ranked third in this classification, accounted for approximately 10% of the burden in Poland; the voivodship variation in its values was not substantial, with the highest percentage observed in Wielkopolskie voivodship (over 12%) and the lowest in Zachodniopomorskie voivodship (under 9%). The distribution of the proportion of other major health problems is presented in Figure 15.6 7D.

In the group of men aged 5–14 years, the value attributed to the burden of the ten most important health problems in Poland was 38,174.38 DALYs. Among the causes with the highest burden in this group were conduct disorders (nearly 19% of the indicated burden), asthma (nearly 15%) and dietary iron deficiency (over 10%). Burden values were very similar across the voivodships. The distribution of the proportion of other major health problems in this age group is shown in Figure 15.6 7E. In women aged 5–14 years, the burden of the ten most important health problems was estimated at 37,471.76 DALYs, with low back pain (over 14%), migraine (over 13%) and conduct disorders (12%) contributing the most. As with men in this age group, there were no substantial differences in terms of share between voivodships. The distribution of the percentages of other major health problems is shown in Figure 15.6 7F.

Figure 15.6 7G shows the proportion of the ten health problems most burdening men aged 15–49 years, for which the DALYs value totalled 798 912.78. The most important cause of burden in this age group was self-harm by other means, accounting for just over 20% of the reported burden. This was followed by alcohol use disorders (over 16% of the burden) and low back pain (nearly 14%). Voivodship differentiation showed that the highest burden for self-harm was recorded in the Zachodniopomorskie (almost 25%) and Lubelskie (almost 23%) voivodships, and the lowest in the Wielkopolskie (almost 18%) and Podlaskie (just over 18%) voivodships. For alcohol use disorders, the most burdened voivodships were Łódzkie and Warmińsko-Mazurskie (with a value of around 20%), and the least burdened were Opolskie (11%) and Lubuskie (14%). The proportion of low back pain was highest in the Małopolskie and Podkarpackie voivodships (around 15%) and lowest in the Łódzkie voivodship (over 11%) and the Podlaskie and Warmińsko-Mazurskie voivodships (13%). Notably, in the Podlaskie voivodship, the proportion of alcohol-related disorders was higher than that of self-harm by other specified means (nearly 20% and just over 18%, respectively). Analogous data for women are presented in Figure 15.6 7H. The DALYs value for women was 494,966.58, and the causes with the highest burden on the health of Polish women included low back pain (more than 26% of the burden), migraine (18%) and alcohol-related disorders (nearly 9%). There was no variation in these values between the voivodships.

In men aged 50–69 years, the value attributed to the ten most burdensome health problems was 1, 495,962.62 DALYs. The most important health problem was ischaemic heart disease (over 26%). The burden of this disease varied by voivodship, accounting for a share of nearly 34% in the case of the Małopolskie voivodship and over 29% in the Opolskie voivodship, and the lowest shares in the Podlaskie voivodship (over 21%) and the Lubelskie voivodship (over 23%). Tracheal, bronchus and lung cancer came second, with a national burden of 22%, being highest in the Kujawsko-Pomorskie (over 26%) and Zachodniopomorskie (over 25%) voivodships and lowest in the Małopolskie (over 18%) and Śląskie (over 19%) voivodships. Diabetes mellitus type 2 ranked third (close to 9% share), with the highest percentages in the Śląskie and Warmińsko-Mazurskie voivodships (close to 10%) and the lowest in the Świętokrzyskie (close to 7%)

and Malopolskie voivodships (over 7%). Noteworthy, in the Kujawsko-Pomorskie and Warmińsko-Mazurskie voivodships, the proportion of tracheal, bronchus and lung cancer was slightly higher than that of ischaemic heart disease. The distribution of the proportion of other health problems in men in this age group is shown in Figure 15.6 7I. In women aged 50–69 years, the value attributed to the ten most burdensome health problems was 825 882.15 DALYs. The share values for the three most aggravating causes were quite similar, indicating that the most aggravating health problem was tracheal, bronchus and lung cancer (over 16%), followed by ischaemic heart disease (over 14%) and low back pain (nearly 14%). With regard to tracheal, bronchus and lung cancer, the most burdened voivodships were the Kujawsko-Pomorskie voivodship (20%) and the Warmińsko-Mazurskie and Zachodniopomorskie voivodships (nearly 20%), and the least burdened were the Podkarpackie voivodship (12%), as well as the Małopolskie and Pomorskie voivodships (nearly 13%). Ischaemic heart disease burdened female residents of the Małopolskie (over 18%) and Opolskie (over 16%) voivodships to the greatest extent, and the Podlaskie (over 11%) and Lubelskie and Warmińsko-Mazurskie (over 12%) voivodships to the least extent. Low back pain reached the highest percentages in the Podkarpackie and Podlaskie voivodships (over 17% and over 16% respectively) and the lowest in the Łódzkie and Śląskie voivodships (over 12%). In several voivodships (Małopolskie, Opolskie, Podkarpackie, Śląskie and Świętokrzyskie), the proportion of tracheal, bronchus and lung cancer was slightly higher than that of ischaemic heart disease. The percentage distribution of the burden of other health problems in women aged 50–69 is presented in Figure 15.6 7J.

Figure 15.6 7K shows the proportion of the ten causes most burdening men aged 70 years and more, for which the DALYs value reached 1,127,391.50. The most important cause of burden in this age group was ischaemic heart disease, accounting for nearly 35% of the reported burden. This was followed by tracheal, bronchus and lung cancer (almost 13% of the burden) and ischaemic stroke (just over 11%). Voivodship differentiation showed that the highest burden for ischaemic heart disease was recorded in the Małopolskie (over 42%), Opolskie and Podlaskie voivodships (over 38%), and the lowest, at just over 30%, in the Mazowieckie, Pomorskie, Warmińsko-Mazurskie and Wielkopolskie voivodships. For tracheal, bronchus and lung cancers, the most burdened voivodships were Kujawsko-Pomorskie and Warmińsko-Mazurskie (over 15%), and the least burdened were Małopolskie and Podlaskie (nearly 11%). The proportion of ischaemic stroke was highest in Lubuskie (over 12%) and Łódzkie (over 13%) and lowest in Kujawsko-Pomorskie (over 9%) and Małopolskie (nearly 10%). Corresponding data for women are presented in Figure 6L. The DALYs value in women was 1,401,104.79, and the causes with the highest burden on the health of Polish women included ischaemic heart disease (nearly 35% of the burden), ischaemic stroke (nearly 17%) and Alzheimer's disease and other dementias (over 12%). Voivodshipdifferentiation showed that the highest burden for ischaemic heart disease was recorded in the Małopolskie (nearly 41%) and Świętokrzyskie (nearly 40%) voivodships, and the lowest in the Podlaskie and Wielkopolskie voivodships (slightly above 30%). In the case of ischaemic stroke, the most burdened voivodships were Lubelskie and Łódzkie (close to 20%), and the least burdened were Pomorskie and Zachodniopomorskie (around 15%). The proportion of Alzheimer's disease and other dementias was highest in the Mazowieckie and Podlasie regions (around 14%) and lowest in the Opolskie and Śląskie voivodships (just over 11%).

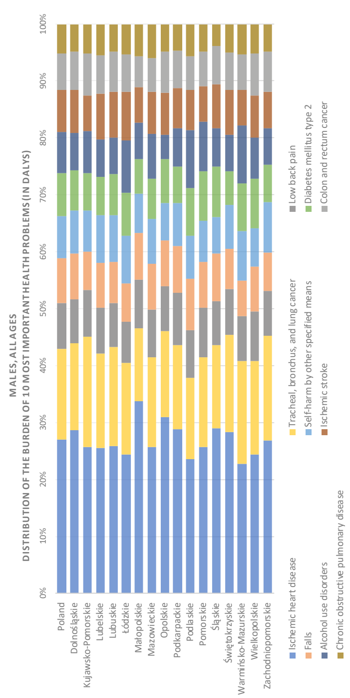

Fig. 15.6a

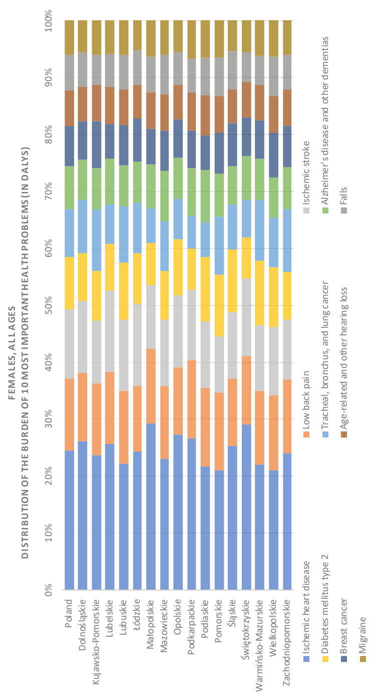

Fig. 15.6b

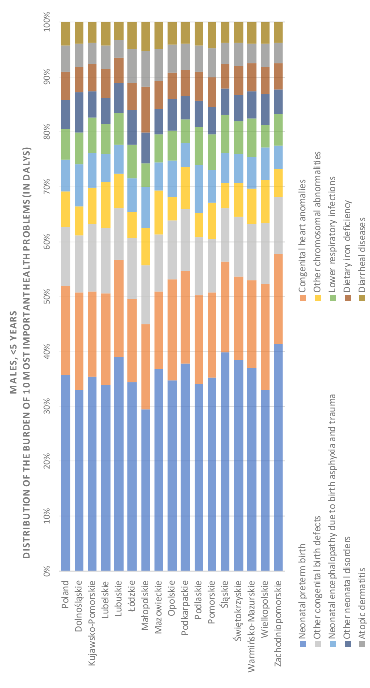

Fig. 15.6c

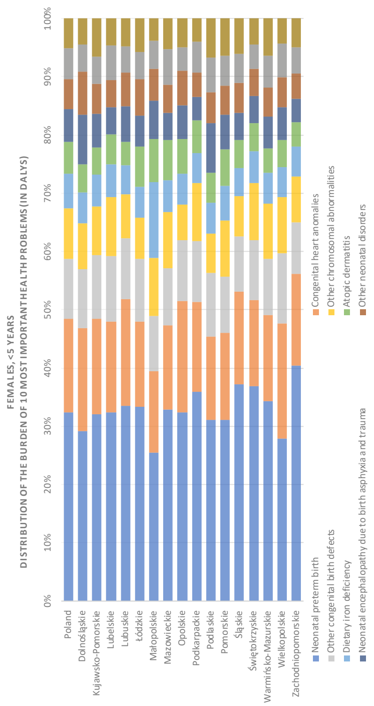

Fig. 15.6d

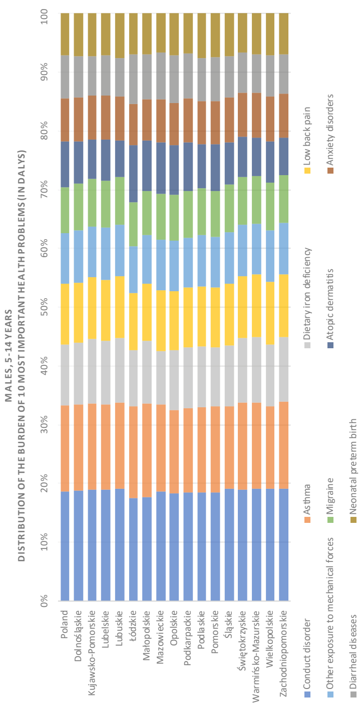

Fig. 15.6e

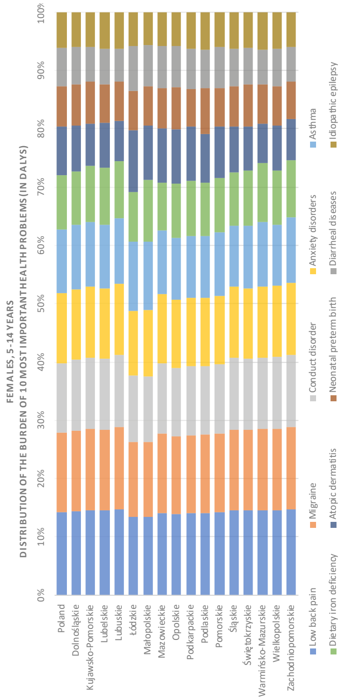

Fig. 15.6f

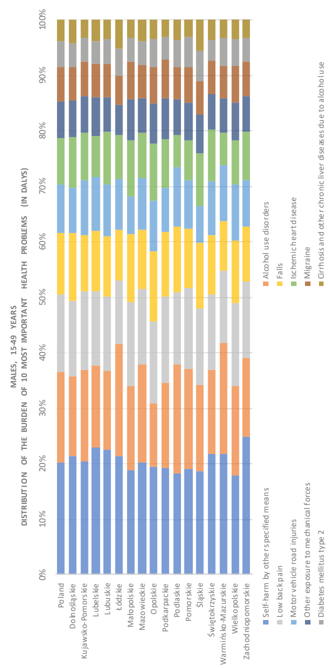

Fig. 15.6g

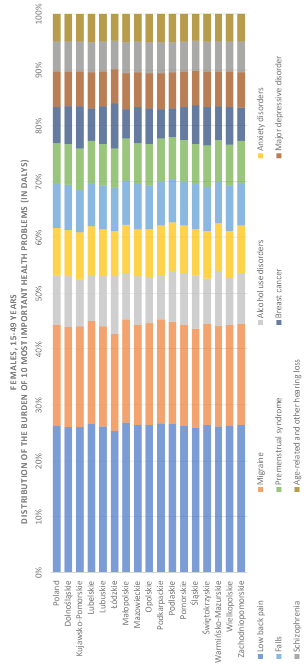

Fig. 15.6h

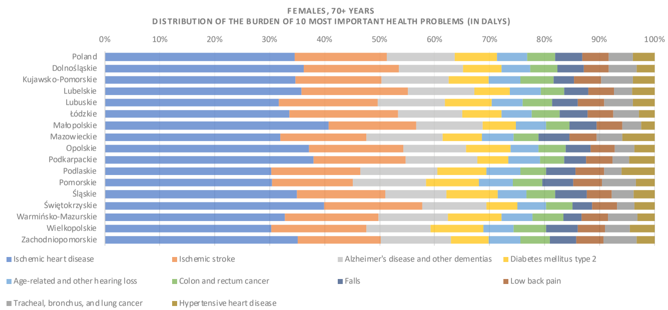

Fig. 15.6i

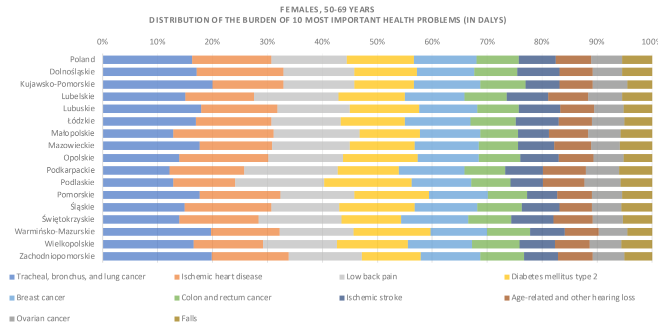

Fig. 15.6j

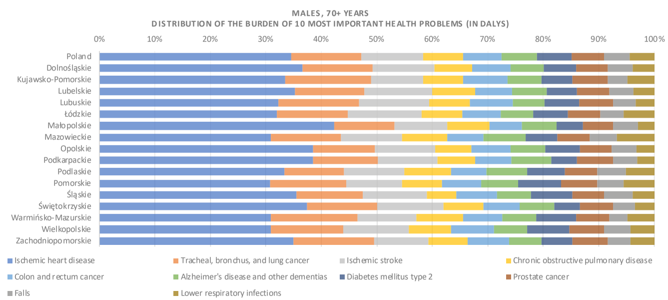

Fig. 15.6k

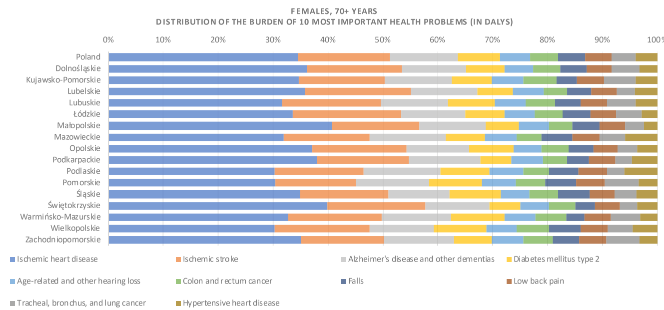

Fig. 15.6l

Figure 15.6. Distribution of the level of burden of disease in relation to the 10 most important health problems in women and men in Poland and voivodships by age group: all age groups; <5 years; 5–14 years; 15–49 years; 50–69 years, 70+ years.

SUMMARY

1. The leading public health threats for Poles are cardiovascular diseases and cancer, which are responsible for more than 90% of health loss expressed as premature population deaths (YLL). More than half of the disease burden resulting from injuries, neurological disorders and diabetes and kidney disease is due to living with disability (YLD).
2. The level of health loss in Poland differed by sex and by voivodshipsvoivodship. In 2019, the value of disability-adjusted life years lost due to all causes in men in Poland was 37,114.2 DALYs/100 000 men. The highest regional level of the overall burden of disease was recorded in the Łódzkie voivodship at 43,368.7 DALYs/100 000, while the lowest was in the Podkarpackie voivodship at 33,124.6 DALYs/100 000.
3. In women, the total burden was 29,002.5 DALYs/100 100 000 women, the regions with the lowest rate of DALYs/100 100 000 of all causes in Poland were Podkarpackie voivodship – 26,361.1 DALYs/100 100 000 and Małopolskie voivodship – 26,516.8 DALYs/100 thousand, while the highest rate was recorded in Łódzkie voivodship – 33,623.1 DALYs/100 thousand.
4. Analysing the health situation of the burden of disease taking into acoount the SDI index can be helpful in assessing health disparities between regions and tracking their progress in improving population health. The SDI index for Poland was calculated at 0.80; with the locally highest value for the Mazowieckie voivodship SDI= 0.84 and the lowest for the Warmińsko-Mazurskie voivodship SDI=0.77. An analysis of the dynamics of burden declines (30-year and 10-year) due to all causes and CVD placed Poland among the countries with the best reduction in DALY. However, the situation was not so positive when considering changes in the burden of cancer – Poland ranked at the bottom of the list of countries, with the Świętokrzyskie voivodship even showing a 0.1 % increase in the DALYs/100 000 rate between 1990 and 2019.
5. The most important health problems in men overall were ischaemic heart disease, followed by tracheal, bronchus and lung cancer and low back pain. In women, these were, in turn, ischaemic heart disease, low back pain and ischaemic stroke.

In the under-5 age group in both sexes, the highest health burden was caused by the effects of neonatal preterm birth, congenital heart anomalies and other birth anomalies. The loss of health in males aged 5–14 years was mainly due to the consequences of conduct disorders, asthma and dietary iron deficiency, while in females it was due to low back pain, migraine and conduct disorders. In the 15–49 age group, the highest health burden was due to self-harm by other specified means, alcohol use disorders and low back pain (in men) and low back pain, migraine and alcohol use disorders (in women). The most important health problems in men aged 50–69 years were ischaemic heart disease, tracheal, bronchus and lung cancer and diabetes mellitus type 2, and in women, tracheal, bronchus and lung cancer, ischaemic heart disease and low back pain. In the oldest age group (70 years and more), men's health loss was primarily due to the burden of ischaemic heart disease, tracheal, bronchus and lung cancer and ischaemic stroke, while women's health loss was due to the burden of ischaemic heart disease, ischaemic stroke and Alzheimer's disease and other dementias. The burden of the most important health problems showed voivodship variation in all age groups considered, with the exception of men and women aged 5–14 and women aged 15–49.

6. In Polish men, the main risk factors responsible for the disease burden were smoking (contributing 6.03% to the total burden), alcohol use (4.53%) and high systolic blood pressure (4.11%). In women, the main risk factors were high BMI (contribution to the total burden 4.99%), smoking (4.90%) and high systolic blood pressure (4.17%). For both sexes, the proportion of risk factors in each voivodship showed some variation.
7. In men under 40 years of age, the most important risk factors responsible for the total disease burden included alcohol use, high BMI and low birth weight. In the 40–64 age group, these were mainly smoking, alcohol use and high BMI, while in the 65 and more age group, the main risk factors were smoking, high systolic blood pressure and high fasting plasma glucose. In women under 40 years of age, the most important risk factors responsible for the total disease burden included alcohol use, low birth weight and short gestational age for birth weight. In the

40–64 age group, these were mainly smoking, high BMI and high fasting plasma glucose, while in the 65 and more age group, the most important risk factors were high systolic blood pressure, high fasting plasma glucose and high BMI.

16. IMPACT OF COVID-19 ON THE EFFECT OF CHANGING THE WAY OPHTHALMIC SERVICES ARE FUNDED

Barbara Więckowska (Warsaw School of Economics), Dariusz Dziełak, (NFZ); Filip Urbański (NFZ); Tomasz Stachurski (NFZ), Marek Rękas (National Consultant in Ophthalmology)

For several years, the National Health Fund, in conjunction with the ophthalmology community, has been taking steps to improve access to services related to the diagnosis and treatment of eye diseases. In particular, reducing waiting times for elective cataract surgery was identified as one of the main challenges. Increased funding and changes in the organisation of the provision of these services have contributed to a dramatic improvement in the situation. Nevertheless, ophthalmic services are still under active monitoring and evolution of their funding model.

Significant changes to the funding of ophthalmic hospital services for adults were introduced in July 2018. These included, in particular:

- redefinition of billing products related to cataract treatment,
- equalisation of service valuations regardless of the length of hospitalisation,
- introduction of incentives to centralise glaucoma treatment and vitrectomy.

In addition, there was also a "tidying up" of this treatment group by eliminating groups with few executions, shifting procedures also dedicated to open medicine to lower-funded groups (along with an increase in funding for some treatment groups in Outpatient Healthcare (unification of valuations).

Activities related to countering and combating the COVID-19 pandemic, the concentration of treatment capacity on the problem, restrictions on population movements and difficult access to health care facilities may have had a significant impact on the structure and level of availability of services, in particular scheduled ophthalmology services.

The aim of this article is to present and quantify changes in the functioning of ophthalmic care as a result of organisational changes and funding rules, including the conditions of the ongoing COVID-19 pandemic, in the context of selected ophthalmic services.

The biggest changes in the way funding is provided have been for groups related to cataract treatment. Instead of the product "complicated cataract" (B18G), the product "cataract category I" was introduced with strictly defined eligibility criteria for settlement. These are either (1) a pre-operative condition or intra-operative complications requiring use during surgery of:

- vitrectome from anterior access,
- anterior capsular bag pigments, retractors or pupillary rings,
- capsular tension rings,
- aniridic rings and lenses,
- toric lenses of 2 diopters and more,
- or (2) treatments for persons under 18 years of age.

These measures clearly affected the structure of complicated and uncomplicated cataracts resulting in a decrease in the share of the B18(G) group from 30% (Q4 2018) to 5% (Q1 2022) with a concomitant decrease in the number of cataract services provided (cf. H2 2018 and Q1 2022; Fig. 16.1). It is worth noting that, after a dramatic reduction in volume and share of B18(G) groups in 2019, the situation has stabilised in subsequent quarters and the increase in share to 5% in 2022 should be considered negligible, also during the COVID-19 pandemic period. Nevertheless, it is important to note a significant decrease in the volume of services during this period, particularly in Q2 2020. The reasons for the decline were tightening and restrictions on access to healthcare facilities and patients' fears of possible infection with a new, dangerous pathogen and the resulting cancellations or postponements of treatments. The situation improved in subsequent quarters, but by Q1 2022 the pre-pandemic level of service delivery had not been reached.

Comparing these values with the proportions of complicated cataracts in England, it is important to state that defining the B18G group with strictly defined activities has now resulted in a proportion close to the values observed in England (5% in 2017–2018).

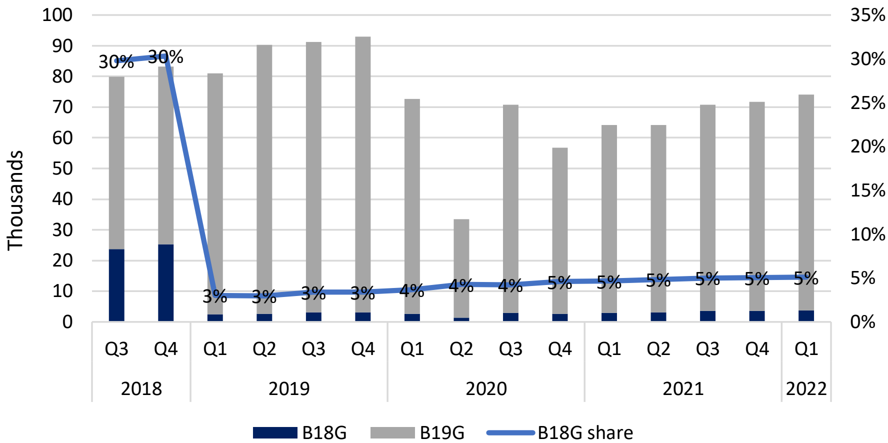

Fig. 16.1. Number and structure of services in groups B18(G) and B19(G) (Q3-Q4 2018-Q1 2022) (Source: own compilation based on the National Health Fund data).

The shape of the products themselves has also changed, i.e. modularity has been introduced. Currently, cataract treatment consists of the following billing products:

Qualifying advice (40 pts) + **DRG** (B18G – 2237 pts or B19G – 1916pts) + **follow-up advice** (465 pts)

Thus, in total, cataract treatment from the provider's point of view is worth 2400–2700[1] points. These amounts are slightly higher than those in force before 1 July 2018.

Analysing the reporting data for the first 1.5 years after the introduction of the changes, it should be noted that in the first period the ratio of qualifying advice to treatments was 20% (July 2018). However, this share has gradually increased to reach 69% (Q1 2020). Currently, the value of this parameter is 100% because the qualifying consultation is a compulsory element of cataract treatment for those newly enrolled in

[1] As of the date of this article, i.e. prior to the introduction of changes resulting from the recommendation of the President of Agency For Health Technology Assessment and Tariff System regarding the valuation of services and the inclusion of so-called "*rate increase streams*" in the valuation of services.

the queue. The COVID-19 pandemic did not have a significant impact on the percentage of services preceded by qualifying advice.

It has been observed that the proportion of control advice is increasing significantly. Follow-up advice was given to 81% of patients operated on in Q3 2018, while the percentage for those operated on in Q1 2022 was already 92% (Fig. 16.2). During the pandemic, Q1 2020 saw a decrease in control advice to 87%, while subsequent quarters saw a significant increase to 93%.

Analysing this indicator at the level of individual hospitals, it should be noted that in many cases it is above the average value, which is significantly influenced by the zero shares observed in 5 hospitals. However, it should be emphasised that this is a "reporting error" – almost all patients supplied by these units had a follow-up advice that was reported as an Outpatient Healthcare benefit, rather than a dedicated product under catalogue 1b. It is therefore reasonable to infer a further increase in the indicator in the coming period. In H2 2018, a share of 95% or more of post-treatment follow-up advice was reported by 73 operators (i.e. 28% of all entities), and 144 entities (i.e. more than half of all entities) in Q1 2022.

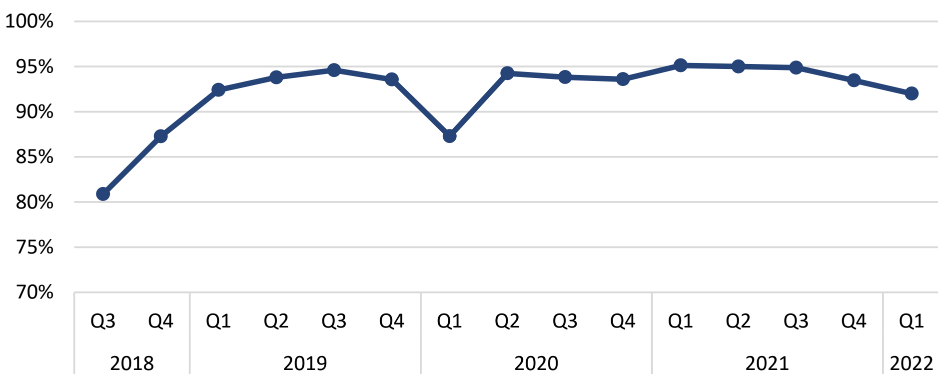

Fig. 16.2. Share of follow-up advice after cataract surgery (Q1-Q2 2018 – Q1 2022)

(Source: own compilation based on the National Health Fund data).

In order to increase the quality of the services provided within the dedicated cataract treatment products, 3 quality measures have been introduced:

- intraoperative rupture of the posterior capsule,
- intraocular inflammation and
- visual acuity (before and after surgery).

Analysing the data in this area, it should be noted that they are well below the expected values (the first two in the mentioned indicators do not exceed 0.2%), which may indicate low information quality.[2] Similar problems are observed in the assessment of visual impairment (defined as the negative value of the difference between the visual acuity assessed at follow-up advice and the visual acuity assessed before surgery). The average value for Poland is around 4–5%, which is significantly higher than the value indicated by national consultant Professor Marek Rękas (1.5% based on foreign data). Perhaps it is also a data quality issue at this stage. Due to reporting gaps, assessing the difference in visual acuity is not always possible. During the first year of the pandemic, the application of the regulations on detailed reporting obligations was suspended (deferred), which undoubtedly had an impact on the quality of the data submitted to the Fund. Efforts should continue to improve the informative value of qualitative indicators, particularly in the post-pandemic COVID-19 period. With this approach, it will be possible to introduce an outcome-based part of funding in the future, which is consistent with the vision of so-called *value-based medicine* currently being raised in the health sector.[3]

[2] The exceptions are the Dolnośląskie and Podkarpackie provinces.

[3] Providers may argue that using administrative data to measure quality can be misleading, but it should be noted that there are studies indicating that this solution is also applied in countries with a long tradition of quality measurement (Measuring, Reporting, and Rewarding Quality of Care in 5 Nations: 5 Policy Levers to Enhance Hospital Quality Accountability, The Milbank Quarterly, Vol. 95, No. 1 (March 2017), ss. 136–183).

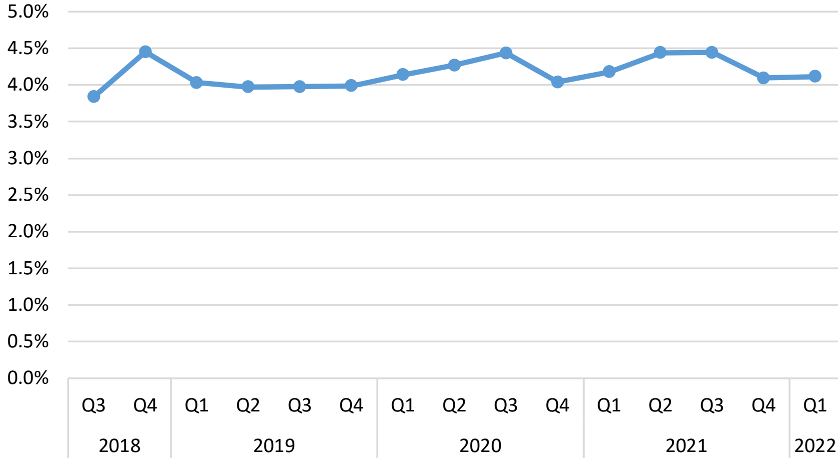

Fig. 16.3. Proportion of hospitalisations followed by worsening acuity (Q1-Q2 2018 – Q1 2022) (Source: own compilation based on the National Health Fund data).

Adjustment factors were also conducted within the DRG groups related to cataract treatment. They are used in the case of simultaneous bilateral cataract surgery[4] or when a toric or aniridic lens is used[5]. In the case of cataracts, the number of bilateral procedures is sporadic, with approximately 50 cases reported during Q1 2022. Perhaps the reason is patients' fear of complications that will cause (temporary) loss of vision. The national consultant requested that the PTO and SCOP develop guidelines for this type of management. It seems that both actions – the increase in the index (to 2.0 from January 2019) and the publication of the guidelines – may contribute to an increase in bilateral operations.

In contrast, there has been a steady increase in the number of implants for toric lenses (from 334 in the second half of 2018 to 3456 in 2021, Fig. 16.4). After a significant increase in implantations of this type of lens in 2019, 2020 brought a slowdown due to the impact of the COVID-19 pandemic. A further increase is seen in 2021. Perhaps the reason for this is precisely the ability to fund the cost of the lens – implanting a toric lens increases funding by over 45% (from PLN 1,860 (B19G valuation)

[4] Index of 1.54 as of July 2018 and increased to 2.0 as of January 2019.

[5] Index of 1.25 as of July 2018.

to PLN 2,71561.25*B18G valuation). Such an increase in the number of implantations is not observed in the case of aniridic lenses (approximately 30 per month are implanted), which is as expected and related to the more restrictive medical indications. However, it is important to emphasise that the change introduced has allowed for increased availability of aniridic lenses.

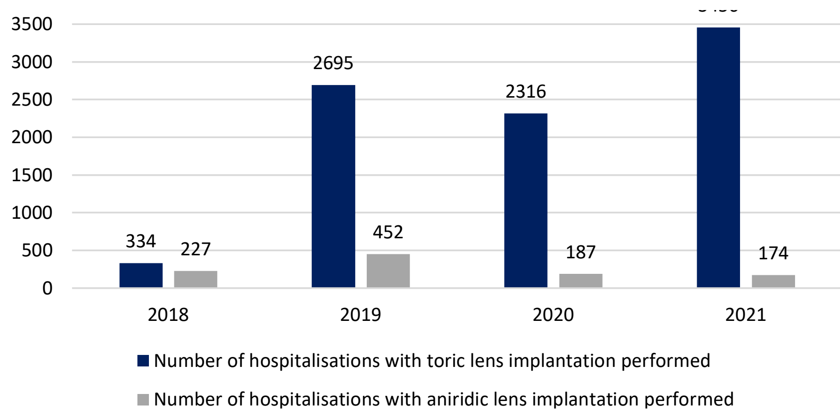

Fig. 16.4. Number of hospitalisations with toric and aniridic lens implantation (H1 2018–2021) (Source: own compilation based on the National Health Fund data).

Comparing the length of cataract hospitalisation in Poland with other countries, it should be noted that the proportion of one-day hospitalisations was significantly lower. Despite a significant increase from 62%[7] in 2018 to 70% in Q1 2019, it was still below the OECD average of 86.8% (Health at a glance 2017, p. 183). Hence, the payer has decided to implement another funding mechanism from 1 April 2019 – a reduction in the valuation of hospitalisations with a duration of more than 1 day in those providers where the proportion of same-day hospitalisations is less than 80%[8] (still significantly less than the OECD average). This indicator is calculated on a quarterly

6 The current value of this service is 2796 points

7 Values calculated based on the National Health Fund data. It should be noted that the OECD data for Poland are underestimated (34.6%), as only hospitalisations under a contract for the so-called one-day mode are treated as one-day hospitalisations, without including one-day hospitalisations reported under the hospitalisation mode.

8 The value of the indicator in the first period was 60%.

basis. If, in a given provider's quarter, the share of same-day services is below the cut-off value, in the following quarter all hospitalisations lasting more than 1 day will be covered by a funding ratio of 0.9 (same-day hospitalisations will be funded unchanged). In Q1 2020, the proportion of same-day hospitalisations among cataract hospitalisations in Poland was already around 95%, while it increased to 98% by the end of 2021 and in Q1 2022.

The COVID-19 pandemic did not have a significant impact on the above trend. Over the course of its life, the share of same-day services, after a spike in mid-2019, has continued to increase successively to its current high level.

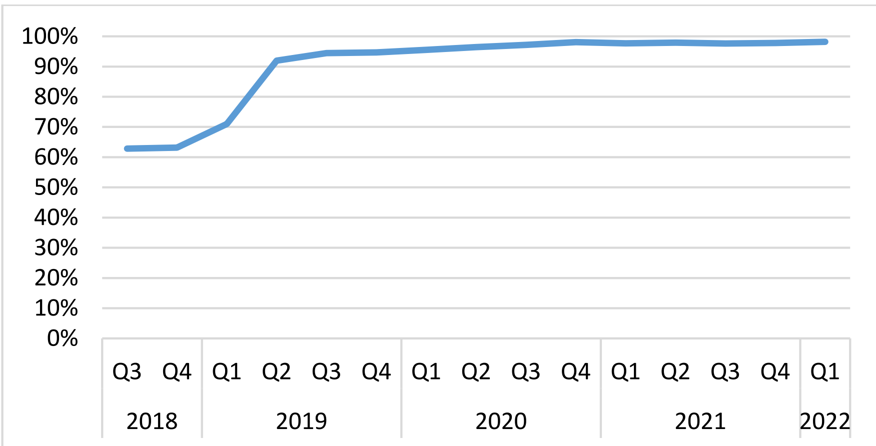

Fig. 16.5. Share of same-day cataract services (2018 – Q1 2022) (Source: own compilation based on the National Health Fund data).

Based on preliminary data for the first quarter of the above-described mechanism, of the 52 providers who may have had their funding reduced, 2 performed all services on a same-day basis. For the remaining providers, funding was reduced for 17.4 percent of services (3,630 reported DRG). What's more, for the next period (Q3 2019) reduced funding may be given to 24 providers. Thus, it can be inferred that providers are adapting the structure of the services provided to the funding requirements.

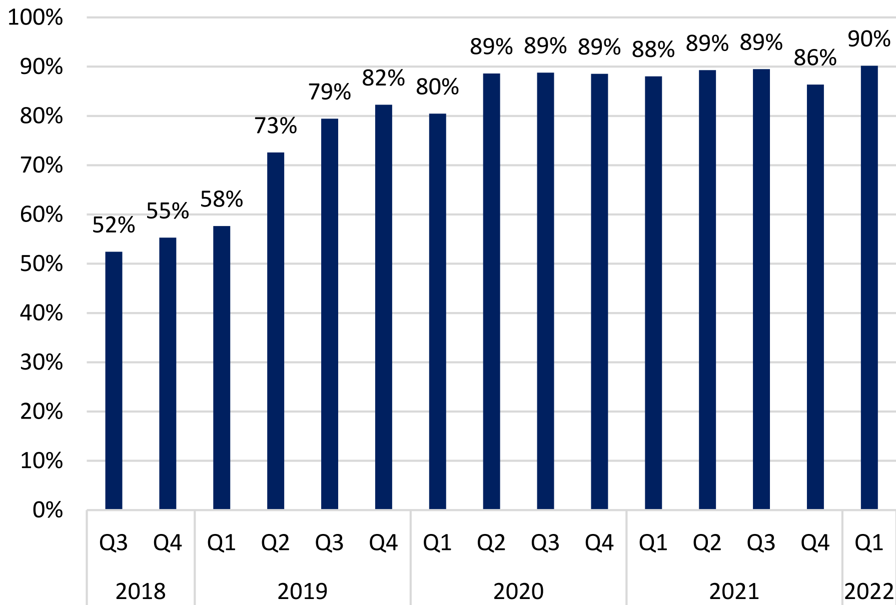

Fig. 16.6. Proportion of same-day hospitalisations for cataracts among entities at 95% or more by quarter (Source: own compilation based on the National Health Fund data).

The length of ophthalmic hospitalisations was undoubtedly influenced by the differential valuation of services depending on the number of days of hospitalisation. In order to reduce the incentives for prolonged hospitalisations, the decision was taken to standardise the valuation of DRG regardless of whether the hospitalisation lasted less than 3 days or more than 3 days. Eleven DRG groups (B16, B16G, B17, B17G, B18, B32, B33, B42, B43, B84, B94) were included in this change. Undoubtedly, these measures have contributed to a change in the structure of the length of hospitalisation, with the changes in the B18(G) group having the greatest impact, due to its significant contribution to the DRG structure. The share of same-day hospitalisations across Section B increased from 50% (2018) to 90% (Q1 2022, Fig. 16.7).

The COVID-19 pandemic did not have a significant impact on the change in hospitalisation patterns, although a slight spike in the proportion of "same-day" cases in Q2 2020, the start of the pandemic, is discernible – the COVID-19 pandemic has therefore perpetuated the organisation of same-day provision.

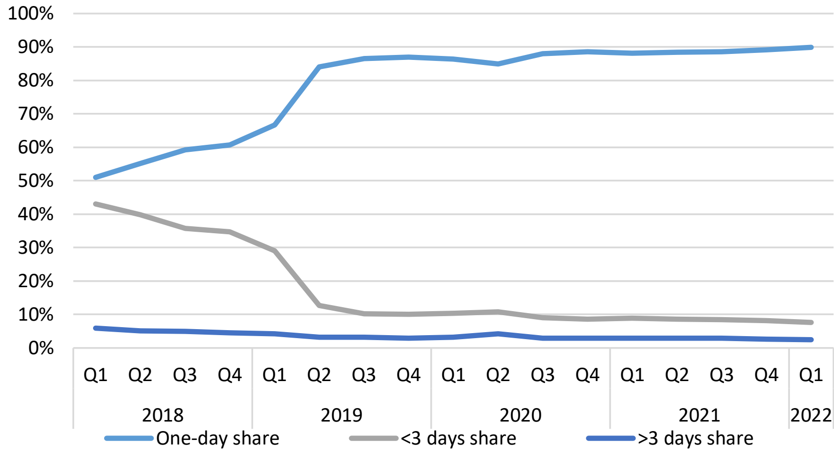

Fig. 16.7. Share of services by length of hospitalisation in Section B (2018 – Q1 2022) (Source: own compilation based on the National Health Fund data).

For the "conservative treatment" group B98, the principle of differential pricing has been maintained while limiting the list of ICD-10 referrals to the group. To date, H35.8 (other specified retinal disorders, 20% of services) and diagnoses dedicated to suspected diseases indicating inpatient diagnostic services have dominated among the main causes of conservative hospitalisation. According to information obtained from the national consultant, it can be concluded that these diagnoses should mainly be provided in the outpatient clinic. This may have been the reason for the disparity in the proportion of conservative hospitalisations in Poland compared to England, where such hospitalisations account for 4% of all ophthalmic hospitalisations (Hospital Episode Statistics 2017–2018), or to Australia, where the proportion is 4.4% (AR-DRG, 2017–2018). When analysing the share of conservative hospitalisations following the changes to the group definition, its share decreased from 6.4% (Q1 2018) to 2.1% (Q1 2022, Fig. 16.8). During the pandemic period, the proportion of hospitalisations classified as conservative did not change significantly. There was a noticeable increase in the share of "other" hospitalisations, which is due to a reduction in the volume of treatment services. With the increase in the number of cataract operations (Q1 2022) this share has started to decline. However, the share still exceeds 10% of all hospitalisations for eye diseases in 10 providers. In order to bring about a further gradual reduction in the number of conservative hospitalisations in these hospitals, it would be necessary to involve the provincial consultants in assessing the functioning of individual wards, including verification of their organisational efficiency (access to outpatient clinics and assessment during admission).

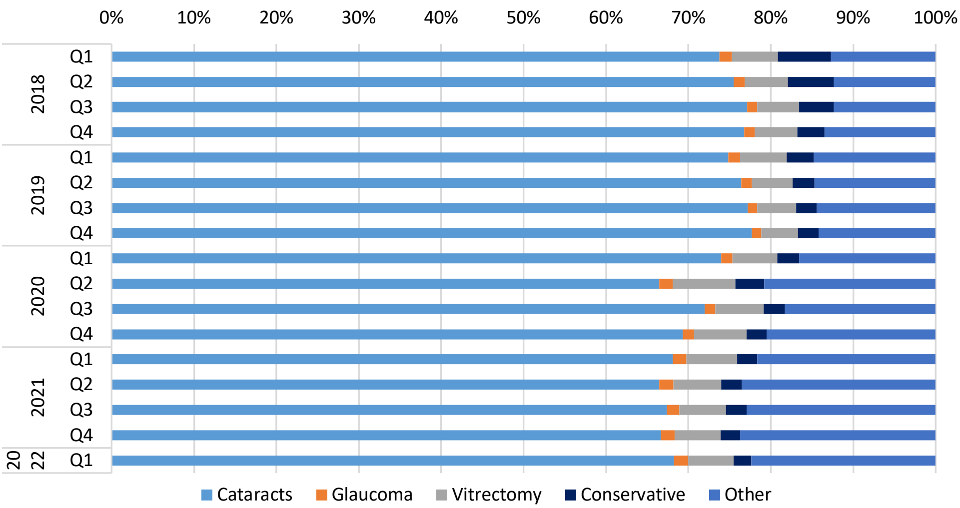

Fig. 16.8. Share of conservative hospitalizations in the section by quarter (Source: own compilation based on the National Health Fund data).

Another major change in ophthalmology was the introduction of indicators to centralise services in the area of glaucoma treatment and vitrectomy. The introduction of indicators to promote increased vitrectomy performance (B16, B16G, B17, B17G) identified 12 providers meeting the cut-off threshold (400 procedures) in the first period. This represented approximately 42% of all vitrectomies performed in Q1 2018 (Fig. 16.9). No significant impact of factors related to the COVID-19 pandemic is perceived in this respect. It is worth noting, however, the cyclically decreasing share of entities potentially ready to exceed the limit thresholds during each year, which, however, did not transform into actually reaching them. Based on the analysis of the data, it can therefore be hypothesised that a positive incentive in the form of increased pricing once a numerical threshold of treatments is reached does not affect the structure of the services provided.

This is in contrast to same-day services, where the opposite mechanism was applied, i.e. a reduction in reimbursement when the assumed threshold was not met.

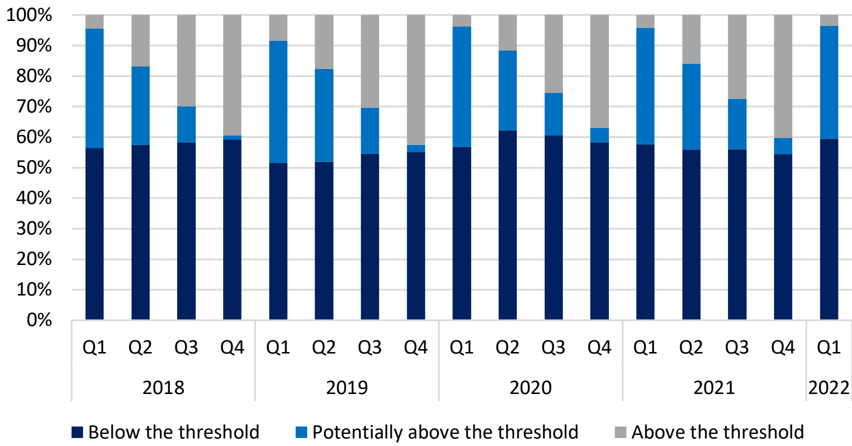

Fig. 16.9. Proportion of services that meet the cut-off thresholds for vitrectomy (Source: own compilation based on the National Health Fund data).

In the case of glaucoma treatments (B11, B72), the cut-off threshold (250 hospitalisations) was met by only five centres, which together performed around 29% of all services in this area (Fig. 16.10). Over the course of the COVID-19 pandemic, there has been a slight decrease in the proportion of services that meet the glaucoma cut-off thresholds, particularly in 2021. The same is true for vitrectomy. It is possible to see a cyclically declining share of actors potentially ready to exceed the threshold limits during each year, which, however, did not result in adequate implementation. Again, as with the analysis of the provision of vitrectomy services, no significant changes were observed due to the mechanism introduced

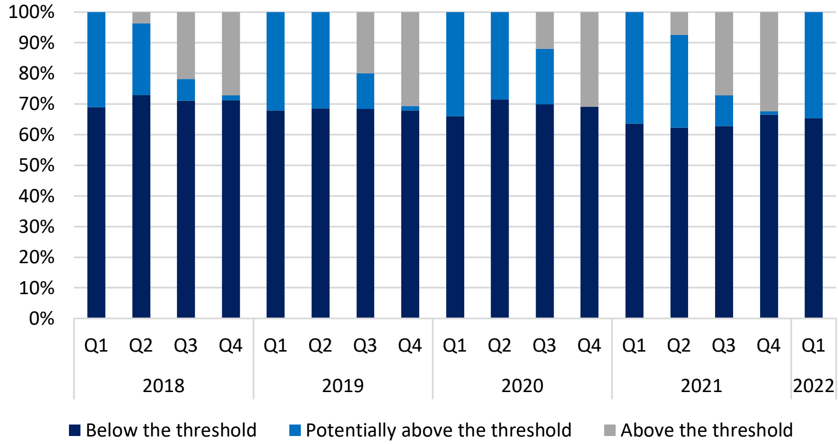

Fig. 16.10. Proportion of services that meet glaucoma cut-off thresholds (Source: own compilation based on the National Health Fund data).

The introduction of the indicators, although it reduced the number of providers where the aforementioned services were provided sporadically, did not change significantly the share of services provided by the largest providers (Table 16.1, Table 16.2). The likely reason was that it was not possible to directly[9] increase the budget allocated to ophthalmology in these facilities, while the increased funding paradoxically resulted in the risk of reduced accessibility. For this reason, in order to be able to effectively bring about the centralisation of services, the possibility of unlimited funding in the aforementioned area is being considered. However, it should be emphasised that there were no changes in the number of entities providing vitrectomy and glaucoma treatment under contract with the National Health Fund in the period under review, in particular no reduction in the number of providers, which could result in a worsening of the level of accessibility to ophthalmology services.

[9] The introduction of the coefficient has translated into an increase in the lump sum calculated for the future period (planning period) of the basic hospital healthcare system introduced from 1 October 2017, which includes a lump sum for all hospital profiles qualified for this system called the "hospital network". So, the funds were in the hospital budget, but not necessarily allocated to the ophthalmology departments.

Table 16.1. Number of providers performing vitrectomies by number of services per year

Number of services	Number of entities 2018	Number of entities 2019	Number of entities 2020	Number of entities 2021	Number of entities 1st quarter 2022
< 10	57	58	52	99	46
< 50	85	78	71	74	165
< 100	98	94	96	91	192
< 200	119	112	111	110	213
< 300	131	126	138	126	219
<= 400	143	138	150	137	222
> 400	82	87	75	88	3
Total number of entities	**225**	**225**	**225**	**225**	**225**

(Source: own compilation based on the National Health Fund data).

Table 16.2. Number of glaucoma providers by number of services per year

Number of services	Number of entities 2018	Number of entities 2019	Number of entities 2020	Number of entities 2021	Number of entities 1st quarter 2022
< 10	105	99	112	101	167
< 50	134	137	146	141	205
< 100	155	159	172	167	218
< 200	173	172	184	177	221
< 300	181	182	191	184	221
<= 400	187	190	197	185	224
> 400	38	35	28	40	1
Total number of entities	**225**	**225**	**225**	**225**	**225**

(Source: own compilation based on the National Health Fund data).

SUMMARY

1. In conclusion, the use of the DRG system to stimulate changes in the structure of adult ophthalmology services in Poland has had the expected effect, although still not as much as anticipated. It is likely that one of the reasons may have been the restrictions on access to healthcare facilities and the postponement of planned treatments by the patients themselves as well, which was related to the ongoing COVID-19 pandemic, although this was mainly relevant to the volume of services provided. This problem, moreover, did not only concern ophthalmology, but also other elective services, especially those provided on an outpatient or same-day basis. The impact of the pandemic on changes in the structure of the services provided or the mode of delivery was not perceived to be significant compared to the induced changes in the organisation of service provision. There has also been no change in the number of providers performing ophthalmic procedures under contract with the National Health Fund. It is to be hoped that periodic, "pandemic" reductions in the number of procedures performed will be quickly recovered in subsequent quarters, resulting not only in an improvement in availability, but also in the quality of services provided.
2. The public payer regularly monitors changes in the structure of services provided on a national scale and publishes regular reports providing information on the situation in Section B (see the "Active Monitoring" project on the National Health Fund website and the "Healthy Data" platform). This allows providers to assess their "market position" relative to other providers operating in the area (currently on a six-monthly basis), which can help to change their behaviour. At the same time, patients will be able to assess the provider not only on the basis of the so-called word of mouth, but also on the basis of data collected in the system.
3. In the authors' opinion, further close cooperation between the National Health Fund and the ophthalmologists' community, especially national specialists, is necessary to evaluate the changes introduced and to effectively implement further organisational and financial solutions to improve the availability and quality of diagnostics and treatment of eye diseases.

17. IMPACT OF THE COVID-19 PANDEMIC ON HEALTH FINANCING MECHANISMS IN THE CONTEXT OF CHANGES IN THE STRUCTURE OF HEALTH NEEDS

Dorota Dudek-Godeau, Olga Partyka,
Monika Pajewska, Aleksandra Czerw

The SARS-CoV-2 pandemic has caused significant changes in the functioning of all areas of the economy and social life. The economic impact of the pandemic, as well as the direct infection control measures and expenditure associated with the sudden increase in the need for specialised equipment and medical care, has had and continues to have an impact on both the revenue and expenditure of the public health system[1]. The Polish healthcare system is 70% publicly funded. The most important element of its financing is the health insurance premium, which accounts for 59% of total health financing and 85% of public sector health revenues. The other sources of funding for the public health system are the central budget and, to a much lesser extent, local governments. The COVID-19 pandemic is a challenge for the Polish health and welfare system. The structure of health care has changed since the start of the pandemic and therefore affects how the public payer spends its money. The National Health Fund, local authorities, as well as the Ministry of Health, which is the holder of part of the central budget for health, are forced to adapt healthcare financing models to the impact of the pandemic. In addition, an additional challenge is the adaptation of health care financing policies, which require gradual adjustments as the SARS-CoV-2 emergency evolves. A report made available by Eurostat[2] summarises the expenditure allocated to health and social care in 2020, community countries, comparing 2019 and 2020 with each other. It shows that Poland allocated the least resources (4.8% of GDP) to *social protection sickness and*

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1 Bukowski H., Czech M., Kozłowski Ł. Wpływ COVID-19 na polski system ochrony zdrowia. Innowo, Warszawa 2020

2 Eurostat. Sickness/Healthcare Benefits up in 2020. [24.08.2022] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20211123-1.

healthcare in 2020 of all EU countries. In addition, only in Poland in 2020, out of all EU countries, outlays on this category as a proportion of GDP were lower than in 2019 (-0.3 p.p.). However, it should be borne in mind that, in general, the higher share of GDP transferred to health care in the European Union was associated with a nominal decrease in GDP as a result of COVID-19.

17.1. Expenditure on health care services

The role of public payer is performed by the National Health Fund (NHF), whose main task is to finance health services provided to insured persons. The NHF negotiates and signs service contracts with providers (setting their value, size and structure), monitors the fulfilment of the contract terms and conditions and is responsible for their settlement. Spending on health care is usually kept at a higher level than suggested by the National Health Fund's spending plans, made available in advance[3]. Since 2006, the NHF has had a reserve fund, which is financed by previous NHF profits as well as central budget contributions, usually for specific tasks. The capital reserve functions as a financial buffer. Therefore, during periods of economic downturn, the NHF can realise a pre-planned level of expenditure and record a deficit, which is covered by the reserve fund. In this way, the implementation of health expenditure can support financially stable operations on a long-term scale and be malleable as long as long-term economic solvency is ensured.

The budget of the NHF in the following years grew steadily until 2020[4]. The beginning of the pandemic, just before and during the pandemic in the main expenditure categories (costs for healthcare services and reimbursement for medicines and speciality foodstuffs) was shaping as in Fig. 17.1.

[3] Bukowski H., Czech M., Kozłowski Ł. Wpływ COVID-19 na polski system ochrony zdrowia. Innowo, Warszawa 2020

[4] National Health Fund. Public Information Bulletin. NHF Finances – Financial Plans 2017 – 2022 (Final Plans, Current After Changes As of 24.07.2022)

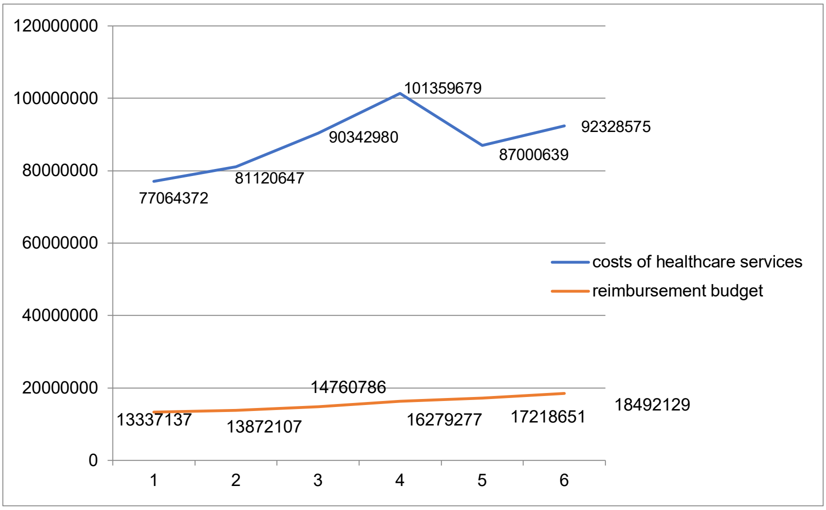

Fig. 17.1. National Health Fund expenditures on health services in 2017 – 2022* (*NHF data, www.Nfz.Gov.Pl/Bip/Finanse-Nfz*)

*Status as at July 2022

The differences between the pre-pandemic period 2018-2019 and the years 2020-2021 illustrate the adaptation of the NHF to the healthcare needs caused by COVID-19 (Figures 17.1, 17.2, 17.3).

On the basis of the Act of 31 March 2020 amending the Act on Special Arrangements for the Prevention and Eradication of COVID-19, Other Communicable Diseases and Crisis Situations Caused by Them and Certain Other Laws[5], the so-called COVID-19 Prevention Fund was established, from which the inpatient treatment of COVID-19 patients in traditional hospitals and temporary hospitals was financed until 31 March 2022. Currently, the costs of COVID-19 vaccination and post-COVID rehabilitation are still covered by this fund, while the treatment of COVID-19 patients is already provided under standard contracts with the National Health Fund.

5 Act of 31 March 2020 on Specific Solutions Related to the Prevention, Counteraction and Eradication of COVID-19, Other Infectious Diseases and Crisis Situations Caused By Them and Certain Other Acts (OJ 2020 item 568)

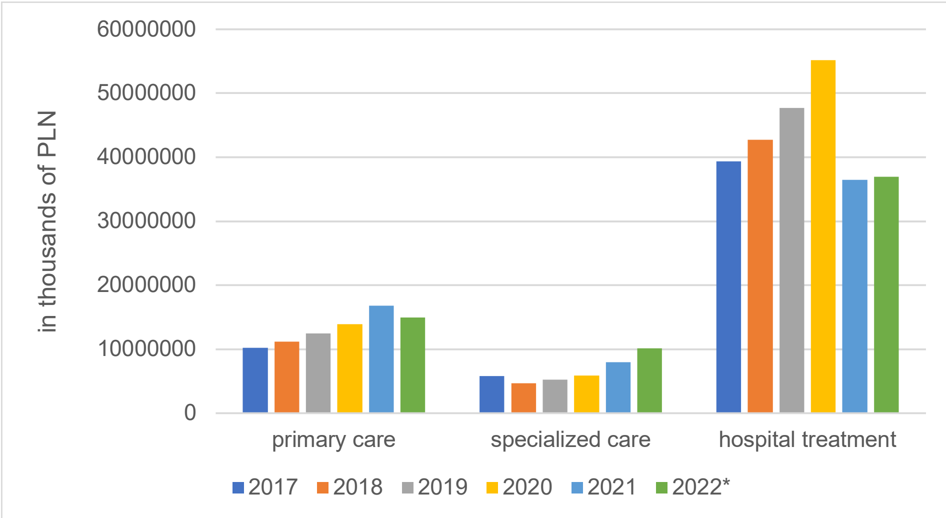

Fig. 17. 2. NHF budget by type of health care (*NHF data, https://www.nfz.gov.pl/bip/finanse-nfz/*)

Hospital care is the largest cost category in Polish healthcare. Therefore, the changes caused by the pandemic observed in this area are most relevant to the overall picture. In 2021, the realisation of this category was lower compared to the plans of the National Health Fund (PLN 64,216,341,000 was planned for hospital care and the realisation was PLN 36,494,381,000). The reduced number of services performed was largely due to a reduction in some procedures (mainly elective procedures) in hospitals. Diagnostic tests – whether imaging or laboratory – have also been halted. There was a reduction in the performance of life-saving procedures, which was indirectly due to the lack of sufficient blood supplies. This applied to both emergency and elective admissions. Dedicated hospitals were created, with the result that selected facilities had to abandon their core business altogether. In the first 12 months of the pandemic, the rate of unmet medical care needs in Poland was 28%, 6% higher than the OECD average[6]. The lowest rate was recorded in Denmark (12%) (Fig. 17.3).

[6] OECD. Health at a Glance 2021: OECD Indicators, Health at a Glance (OECD, 2021), https://doi.org/10.1787/ae3016b9-en.

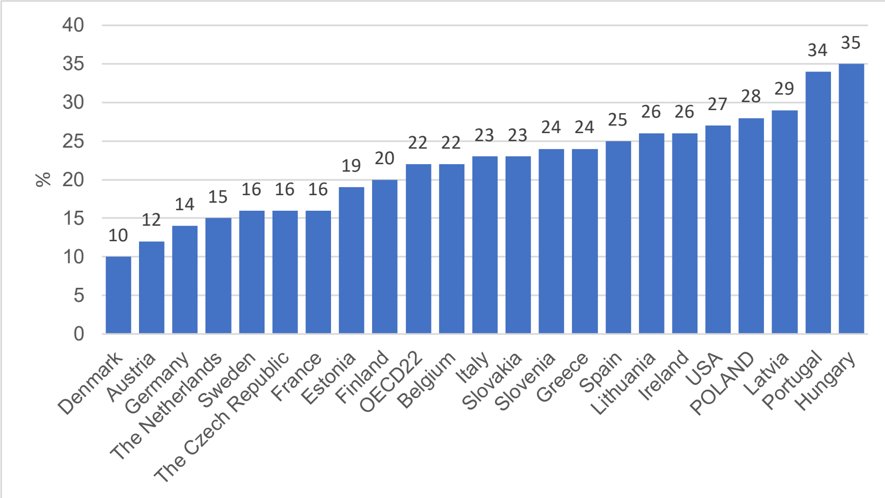

Fig. 17.3. Unmet medical care needs during first 12 months of the pandemic COVID-19, 2020-21 *(Eurofound Living, Working and COVID-19 Survey; Household Pulse Survey from the United States Census Bureau, https://stat.link/qsafm3).*

The limitation of access to hospital (planned) care was further exacerbated by a number of psychological factors. As the pandemic unfolded, public anxiety increased, which may have translated into fear of using health system infrastructure due to possible exposure to SARS-CoV-2 virus infection. Patients chose not to use services due to fears of COVID-19 contamination, concerns about breaking pandemic restrictions or not knowing how to get help at the facility of choice[7]. The structure of health care funding from the NHF budget has clearly changed – in 2021-22, the budget for hospital care has decreased by around 10%. In 2020, the budget for inpatient treatment was 5.5 billion, falling to 3.7 billion in 2021 (Fig. 17.4).

7 Employers of Poland. The World After the Pandemic. Roadmap for Thawing the Health System with Recommendations for Expected Changes. Webinar report, July 6, 2020.

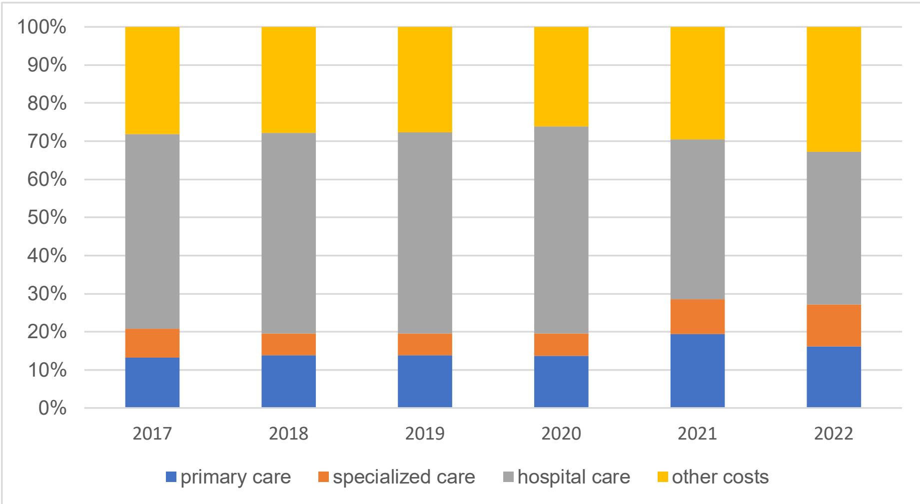

Fig. 17.4. Structure of costs of healthcare services financed from the NHF budget distinguished 3 main categories: outpatient specialised care, primary care, hospital care (*NHF Data, Www.Nfz.Gov.Pl/Bip/Finanse-Nfz/*)

Within the Primary Health Care and Outpatient Specialist Care, some doctors have moved to new forms of contact with the patient – phone consultation, via telephone or the Internet – which has had an impact on the lower cost of delivery in the Primary Health Care field. However, while this form was justified during successive waves of pandemics, at present the reduced availability of GPs is not a favourable situation and may result in the deterioration of the health of many patients. The amended regulations give preference to clinics that will primarily diagnose and treat patients on site, i.e. directly in the office of the GP[8]. In addition, an additional PLN 5 billion is planned to go to hospitals in 2022, with more than PLN 2 billion going to Outpatient Specialist Care.

[8] Order of the President of the National Health Fund (NHF) No. 112/2021/DSOZ, National Health Fund (NHF) – we finance the health of Poles, https://www.nfz.gov.pl/zarzadzenia-prezesa/zarzadzenia-prezesa-nfz.

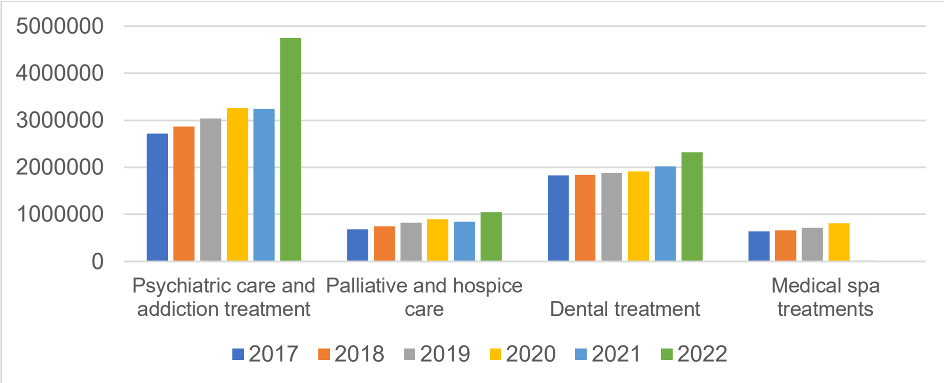

Fig. 17.5. NHF's budget by type of healthcare *(NHF data www.nfz.gov.pl/bip/finanse-nfz/)*

The increased investment in psychiatric care (Fig. 17.5) is a response to the sharp increase in the number of people reporting mental health problems and substance abuse. There was an increase in sickness absenteeism for mental and behavioural disorders in 2020 (up nearly 37% in the number of days and 25.3% in the number of medical certificates compared to 2019)[9]. As early as the first year of the pandemic, it was pointed out that the most common methods used to combat the pandemic focused on physical health at the expense of mental health, which could lead to a serious disorder called "Post-Coronavirus Stress Syndrome". The lack of facilities in psychiatric care, particularly for children and adolescents (both staff shortages and previous financial neglect in this area) has made this problem at least as big a public health challenge as COVID-19[10] itself.

In April 2022, the Ministry of Health released the current health expenditure plan. An amount of PLN 133.6 billion (5.75% of GDP) has been planned for the financing of health care. Domestic budget expenditure (in the Health section and in the Health Protection section) has increased by nearly PLN 1,138.9 million on a per balance basis compared to 2021.

9 Social Security Institution. Sickness absenteeism https://www.zus.pl/baza-wiedzy/statystyka/opracowania-tematyczne/absencja-chorobowa

10 Masic I., Naser N., Zildzic M., et al. Public Health Aspects of COVID-19 Infection with Focus on Cardiovascular Diseases. Mater Sociomed. 2020 Mar;32(1):71-76. doi: 10.5455/msm.2020.32.71-76.

In April, the NHF amended the financial plan for 2022, which was dictated, among other things, by a higher forecast of premium income. The budget managed by the NHF has increased by more than PLN 9 billion. The appropriation is fully planned for the provision of health and medical treatment[11]. According to the new spending plan, outlays for medical services will increase by a total of almost 13% over what was originally planned. The next amendment to the NHF financial plan for 2022 was approved by the Minister of Health in consultation with the Minister of Finance on 14 July 2022.

In 2022, the NHF forecasts an increase in the amount of the total budget for reimbursement of medicines and speciality foodstuffs compared to the previous year at PLN 1.2 billion (in 2021, the total amount for reimbursement (the sum of funding for categories Bn and 2.13) was PLN 17 218 651 000, and on 14 July 2022 it was already PLN 18 492 129 000. The Ministry of Health justifies the increase in the amount, among other things, with a plan to increase the number of positive reimbursement decisions for medicines that have not entered the reimbursement list so far for financial reasons. There is also a higher projected value of healthcare overruns for children up to 18 years of age financed by the Medical Fund for medicines under drug programmes and medicines under chemotherapy, as well as the value of reimbursement for medicines for Ukrainian citizens. The value of the total reimbursement budget for 2022 is planned at more than PLN 18 billion, which means that the share in the current draft amendment to the NHF financial plan for 2022 is approximately 16%.

According to Statistic Poland data, in 2020, there were 115 hospices and 78 palliative and hospice care units operating outside the hospital structure or within the structure of general hospitals. In total, these facilities had a base of 3,600 beds and provided care for 32,900 patients (18.9% less than in 2019)[12]. It should be noted, however, that, at the same time, hospice and palliative care units are among those with

[11] The National Health Fund has amended the financial plan. Higher premium revenue forecast, more money for treatment, National Health Fund (NHF) – we fund the health of the Polish people, https://www.nfz.gov.pl/aktualnosci/aktualnosci-centrali/nfz-zmienil-plan-finansowy-wyzsza-prognoza-wplywu-srodkow-ze-skladki-wiecej-pieniedzy-na-leczenie,8186.html.

[12] https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5513/27/2/1/wydatki_na_ochrone_zdrowia_w_latach_2019-2021.pdf [13.10.2022 r.]

a consistently higher number of beds year on year, reaching 662 beds in 2020 (9.6% more beds than the previous year).

In the category of palliative and hospice care, funding is 24% higher in 2022 compared to 2021, and 17% higher compared to 2020 (PLN 896,990 thou. – 2020, PLN 846,243 thou. – 2021, and PLN 1,046,637 thou. – 2022 respectively[13]). Expenditure on palliative and hospice care accounts for approximately 1% of the costs of healthcare services in the NHF budget and can be assessed as insufficient, especially in the post-pandemic period. Following a decline in the number of first-time provider contacts, diagnostic tests and hospitalisations of oncology patients particularly during the autumn surge in 2020 – oncologists anticipate an increase in late cancer diagnoses, more advanced, more difficult to treat and with poorer prognosis[14]. For this reason, it is important to increase funding and resources for palliative care.

A similarly low share, less than 3% of the NHF budget, is the expenditure on nursing and care services provided as part of long-term care in 2022, which was also affected by the COVID-19 pandemic. With similar availability (the number of facilities providing palliative and hospice care, as well as long-term care and nursing care, remained virtually unchanged between 2019 and 2020), a decrease in the number of patients provided with these services was observed, as presented in Table 17.1. This may have been driven by the need to minimise the risk of transmission of COViD-19 infection by limiting contact with patients in their homes. In a communication of March 2020[15], the NHF headquarters indicated the possibility of performing and settling doctor's and psychologist's advice and nurse's visits, carried out within the framework of contracts for the provision of healthcare services in the following types: nursing and caring services within the framework of long-term care and palliative and hospice care, with the use of ICT systems or other communication systems. At the same time, it was recommended, for reasons of epidemiological safety, to suspend home visits provided in the palliative medicine outpatient clinic. In March 2022, the Ministry of Health announced

13 Based on data from the Department of Analyses and Strategies of the National Health Fund

14 https://www.termedia.pl/mz/Prezentacja-raportu-Wplyw-pandemii-COVID-19-na-system-opieki-onkologicznej-,43109.html [14.10.2022]

15 https://www.nfz.gov.pl/aktualnosci/aktualnosci-centrali/komunikat-dotyczacy-realizacji-i-rozliczania-swiadczen,7652.html [15.10.2022]

recommendations that the primary form of delivery of palliative and hospice care services provided by the home palliative care/hospice team and the palliative medicine outpatient clinic should be face-to-face visits/advice[16]. At the same time, recommendations for home palliative care/hospice teams and palliative medicine outpatient clinics during the COVID-19 outbreak were suspended. However, the possibility of delivering these services via phone consultations still remains.

Table 17.1. Number of hospices and palliative care wards over protected medical care homes and nursing homes in 2019-2020*

Year	Facilities	Beds	Inpatients during a year	Beddays	Average length of stay in days
			in thousand		
			HOSPICE		
2019	115	2288	22.54	681.15	30.20
2020	115	2226	18.17	619.67	34.10
			PALLIATIVE CARE WARDS		
2019	39	669	9.2	200.1	21.8
2020	39	662	7.2	162.8	22.7
			CHRONIC MEDICAL CARE HOMES		
2019	371	21323	41	7033.7	171.2
2020	379	21246	39	6686.8	171.1
			NURSING HOMES		
2019	162	7342	14	2266.5	164.9
2020	166	7531	13	2316.6	179.0

*Excluding care and treatment as well as mental nursing and care facilities.

Own elaboration, based on Statistic Poland, Health and health care in 2020 (as of 31 December)

The table above (Table 17.1) shows the number of hospices and palliative care units. According to Statistic Poland data, as of 31 December 2020, long-term care and hospice and palliative care facilities had (including wards operating within the structure of general hospitals) 38.4 thousand beds and this was 0.5% more than in 2019. This provided

16 https://www.gov.pl/web/zdrowie/komunikat-o-zawieszeniu-zalecen-dla-zespolow-domowej-opieki-paliatywnejhospicjow-domowych-oraz-poradni-medycyny-paliatywnej-w-okresie-epidemii-covid-19 [14.10.2022]

inpatient care to 92.5 thousand people (10.3% less than in the previous 2019)[17]. Among patients, those aged 65 and over accounted for 77.9%, which was 1.2 p.p. lower than in the same period in 2019. There were fewer patients in all age groups among these facilities than a year ago, and the share of each age group was similar. The largest decrease concerned patients in the so-called "late old age" (80 years and over), who, as in previous years, constituted the largest group (13.8 thousand people) and who were recorded by 16.7%, i.e. by 2020. 2,800 fewer than in the previous year. There were 6.0% fewer residents aged 65-79 years (10.0 thousand) in these facilities (i.e. 0.6 thousand people).[18]

According to OECD data, Poland ranks among the last of European countries in terms of the ratio of long-term care bed availability per 1,000 population aged 65 and older, which decreased from 11.8 in 2017 to 10.7 during the pandemic, as shown in Table 17.2. The leading countries are those with a ratio between 50 and 79 beds (Slovenia, Finland, Belgium, the Netherlands and Sweden). In most countries, the rate fell slightly during the pandemic (2020) (Table 17.2).

Current expenditure on long-term healthcare, based on the National Health Accounts, has increased steadily since 2017 (6.0% – PLN 7879,414 million) reaching 8.3% (PLN 12547,803 million) in 2020, while remaining much lower than expenditure on treatment services, whose share in expenditure from 2017 (58.2%) remains at a similar level (2020 – 58%)[19]. We note a similarly large difference when looking at current expenditure on inpatient long-term care facilities, which ranges from 1.2% (2017) to 1.4% in 2020, and expenditure on hospital care (2017 – 39.3% and 2020 40%). The disparity in current expenditure between the very low outlay on long-term care and the high outlay on hospitals from the NHF budget has awakened criticism from long-term care stakeholders speaking out against financing care mainly in terms of hospital services[20]. The demand for higher spending on long-term care is justified on the grounds that the longer patients are provided with good long-term care in the home environment, the lower the payer's expenditure associated with their potential hospital stay. Improving long-term

17 https://www.mp.pl/kurier/288470,o-15-mniej-pacjentow-w-hospicjach[accessed 14.10.2022]

18 Ibidem.

19 https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5513/27/2/1/wydatki_na_ochrone_zdrowia_w_latach_2019-2021.pdf [13.10.2022]

20 https://www.medexpress.pl/nie-zgadzamy-sie-na-szpitalocentryzm/85528 [13.10.2022]

care requires action in various fields. The division of the competences of the Ministry of Health and Welfare in 1991 between two ministries, Health and Labour and Social Policy, resulted in the disintegration of medical and social services. As a result, two separate pillars of long-term care – medical and social – began to emerge, often inadequate[21]. Joint discussions are underway to integrate activities in this area[22].

Table 17.2. Beds in residential long-term care facilities per 1000 population aged 65 years old and over in selected OECD countries.

Country	2017	2018	2019	2020	2021
Austria	46.8	46.4	45.9	46	
Belgium	69.6	69.2	68.8	67.5	66.8
Czech Republic	36.6	36	35.6	35.3	
Denmark	39.4	38.6	37.7	37.1	34.5
Estonia	35.2	35.8	39.3	39.7	
Finland	57	56	54.2	54.8	
France	50.9	50	49.1	48	
Germany	54.4		54.2		
Greece	1.8	1.8	1.8		
Hungary	45.7	45.3	44.5	43.6	
Ireland	47.5	46.7	46.4	44.8	43.1
Italy	18.6	18.6	18.8	18.9	18.7
Latvia	13.7	13.3	13.4	12.5	
Lithuania	37.3	37.7	38.5	38.5	
Luxembourg	82.8	81.9	80.8	79.4	78.9
Netherlands	74.3	73.2	72.1	70.6	
Norway	46.2	44.8	43.5	42.1	40.7
Poland	11.8	11.6	11.3	10.7	
Slovakia	50.3	49.9	48.6	46.9	
Slovenia	53.1	52.5	51.2	50.3	
Spain	43.9	43.7	43.9	43.1	
Sweden	70.6	70.3	68.1	64.8	

Own elaboration based on OECD Statistics https://stats-1.oecd.org/index.aspx?DatasetCode=HEALTH_LTCR accessed 12.10.2022

Healthcare services provided as part of geriatric care and financed by the NHF are reported under one of 5 scopes: geriatrics – hospitalisation, geriatric phone consultation, geriatric psychiatric day services, psychogeriatric services and geriatric services

[21] https://oipip.opole.pl/wp-content/uploads/2014/04/pod_strategia.pdf [15.10.2022]

[22] https://www.rynekzdrowia.pl/Polityka-zdrowotna/Opieka-dlugoterminowa-w-Polsce-jest-w-zapasci-Az-90-proc-rodzin-opiekuje-sie-swoimi-seniorami-bo-alternatywy-brak,222679,14.html [15.10.2022]

(including primary care). During the pandemic, the elderly was particularly vulnerable to the effects of COVID-19. In a study involving people aged 65 years and older, COVID-19 was associated with excess mortality among people with dementia and among nursing home residents[23]. This may be related to the particular vulnerability of older people with dementia to worsening health care during "lockdowns" and other pandemic constraints. Although COVID-19 posed a serious risk for patients in all age groups, the elderly is at much higher risk of death and severe disease. It is estimated that 66% of people aged 70 years and older have at least one underlying disease, putting them at increased risk of being severely affected by COVID-19, and people over 80 years of age die five times more often[24]. The pandemic has reduced the number of geriatric services provided by 30%. Seniors over 65 years of age received 54 million services in primary care in 2019; 51.4 million in 2020[25]. The following table (17.3.) shows the reimbursement costs for services at the different levels (primary health care, outpatient specialist care, hospital care, psychiatric care and prevention costs) in total and with a special focus on geriatrics. The decrease in funding for geriatric care services was clearly visible in the NHF budget settlement, where in 2019 the implementation of services for seniors amounted to 0.22% of healthcare service costs and in 2020 to 0.14% of service costs. (Tab. 17.3.). The largest decrease in the proportion of the costs of realised services was observed during the pandemic in hospital care: geriatric care accounted for 0.27% of the total costs of the "hospital treatment" benefit in 2017 – 2019 and 0.16% in 2020 and 0.30% in 2021 and psychiatric care and addiction treatment: from 2.19% in 2019; the proportion of the costs of geriatric care in the realisation of this benefit was 1.58% in 2021. It seems that the pandemic has only highlighted the problems of underfunding and lack of a holistic strategy in geriatric care, which in many ways are similar to those in long-term care, the recipients of which are predominantly seniors. These figures show that the costs of geriatric care accounted for in the cost of healthcare services financed by the National

23 Gilstrap L, Zhou W, Alsan M, Nanda A, Skinner JS. Trends in Mortality Rates Among Medicare Enrollees With Alzheimer Disease and Related Dementias Before and During the Early Phase of the COVID -19 Pandemic. JAMA Neurol 2022. doi:10.1001/jamaneurol.2022.0010

24 Clark A. ,Jit. M., et al., Global, regional, and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2020: a modelling study, The Lancet Global Health,2020, Vol 8 (8), e1003 – e1017

25 https://www.rynekzdrowia.pl/Polityka-zdrowotna/Skutki-pandemii-najbardziej-odczuwaja-pacjenci-w-starszym-wieku-Wiemy-jak-im-pomoc,220801,14.html [15.10.2022]

Health Fund between 2017 and 2021 did not exceed 0.22%. According to Statistic Poland data, there were fewer patients in all 51 geriatric wards in 2020 due to the COVID-19 pandemic than in 2019 – by 32.7%, i. e. by 10.6 thousand patients (from 32.5 to 21.9 thousand in 2020)[26]. Also, the number of inpatient beds in geriatric wards decreased from 1.1 thousand in 2019 to 1.0 thousand in 2020, which could be due to the reclassification of these beds as dedicated beds for COVID-19 patients. At the same time, the average length of patient stay increased slightly from 8.1 in 2019 to 8.4 days in 2020.

[26] Central Statistical Office (Statistic Poland). Health and health care in 2020 Warsaw, Kraków 2022.

Table 17.3. The sum of reimbursement costs for services reported in geriatrics in the period 01.2017 – 31.2021 compared to the overall cost of healthcare services.

Kategoria świadczenia	2017		2018		2019		2020		2021	
	Total	of which geriatrics	Total	of which geriatrics	Total	of which geriatrics	Total	of which geriatrics	Total	of which geriatrics
	in thousands of PLN (%)									
Costs of healthcare services (B2.1+...+B2.22)	77064372 (100)	163222.3 (0.21)	81120647 (100)	180541.3 (0.22)	90342980 (100)	200048.9 (0.22)	101359679 (100)	140459.6 (0.14)	87000639 (100)	172387.7 (0.20)
Outpatient specialist care	5769300 (100)	3253.5 (0.06)	4712293 (100)	3601.7 (0.08)	5212517 (100)	4000.7 (0.08)	5870683 (0.05)	3070.5 (0.05)	7996739 (100)	4266.8 0.05
Hospital care	39339145 (100)	105399.4 (0.27)	42715390 (100)	116179.3 (0.27)	47673924 (100)	129490.2 (0.27)	55172809 (100)	85785.6 (0.16)	36494381 (100)	109692.3 (0.30)
Psychiatric care and addiction treatment	2717890 (100)	54569.4 (2.01)	2867443 (100)	60759.1 (2.12)	3036151 (100)	66558 (2.19)	3264881 (100)	51603.5 (1.58)	3244009 (100)	58428.6 (1.80)
Costs of preventive health programmes financed by the Fund's own resources	187672 (100)	-	181697 (100)	1.2	199007 (100)	-	215469 (100)	-	247346 (100)	-

Own analysis based on NHF data https://www.nfz.gov.pl/bip/dzialalnosc-nfz/

17.2. COVID-19 pandemic social services expenditure

One of the statutory tasks of the Social Insurance Institution is the granting and payment of social security services. The phenomenon of sickness absenteeism is a measure of the population's health situation and an important indirect cost of illness. The scale of absenteeism demonstrates, among other things, the effectiveness of the health system and the labour market situation. The sickness absenteeism data reflect the successive stages (waves) of the development of the COVID-19 epidemic, which was shaped by infections in workplaces, health services, arising from social gatherings, holiday trips or students returning to school. In the International Classification of Diseases ICD-10, further new disease entities related to COVID-19 have been introduced into the disease group U00-U85, i.e.: patient's history of COVID-19 (U08), patient's post-COVID-19 health (U09), COVID-19-associated multisystem inflammatory syndrome (U10) and COVID-19 vaccines causing adverse effects during treatment (U12).

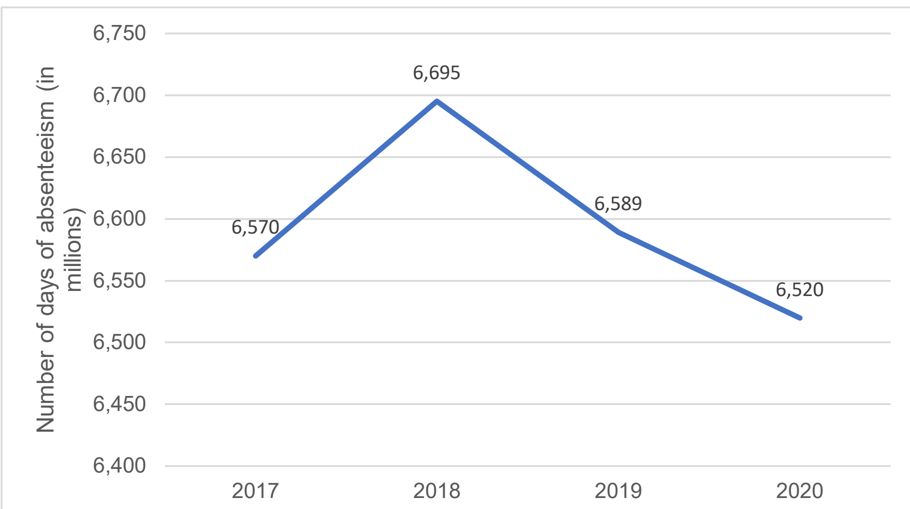

Fig. 17. 6. The number of people insured with social security who were issued a medical certificate due to their own illness at least once during the year (2017 – 2020) (*social security data www.zus.pl/baza-wiedzy/statystyka/opracowania-tematyczne/absencja-chorobowa*)

The number of people insured with ZUS who were issued a medical certificate for their own illness at least once during 2020 was 6.5 million (Fig. 17.6). Compared to the previous year, there was a decrease of 1.1% in the number of these people. Although there were 100,000 more people with sick leave in 2018 than in 2020, the total number of days of absenteeism was highest in the first year of the pandemic (256.1 million days in 2020 vs. 243.1 million days in 2018)[27]. The average length of sickness absenteeism per insured person in ZUS in 2020 was the highest, at 39.27 days, in the years respectively: 2018 – 36,31, 2019 – 36,23 and in 2021- 36,66).

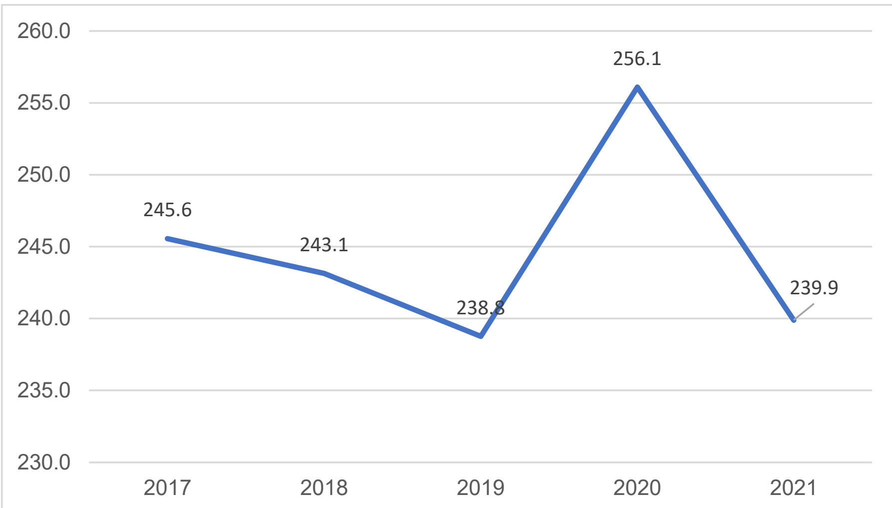

Fig. 17.7. Number of total days of absenteeism (in mil) due to own sickness (*ZUS data www.zus.pl/baza-wiedzy/statystyka/opracowania-tematyczne/absencja-chorobowa*)

In 2020, a total of 22.7 million medical certificates were issued in the Register of Medical Certificates to persons insured with ZUS for a total of 266.6 million days of sickness absenteeism (due to own sickness, child care and care of another family member). Of this number, 20.7 million certificates are certificates issued for own sickness.

[27] Social Security Institution. Sickness absenteeism https://www.zus.pl/baza-wiedzy/statystyka/opracowania-tematyczne/absencja-chorobowa

Compared to the previous year, an increase of 4.1% was observed. The number of days of sickness absenteeism from these certificates was 256.1 million days, 7.2% higher than that recorded in 2019 (Figure 17.7). The average length of a medical certificate issued to ZUS insured persons in 2020 was 12.97 days, increased by 8.2% compared to 2019. In 2021, 20.5 million certificates were issued for own sickness. The number of days of sickness absenteeism from these certificates was 239.9 million days, and the average length of the certificate was lower than in 2020, at 11.73 days.

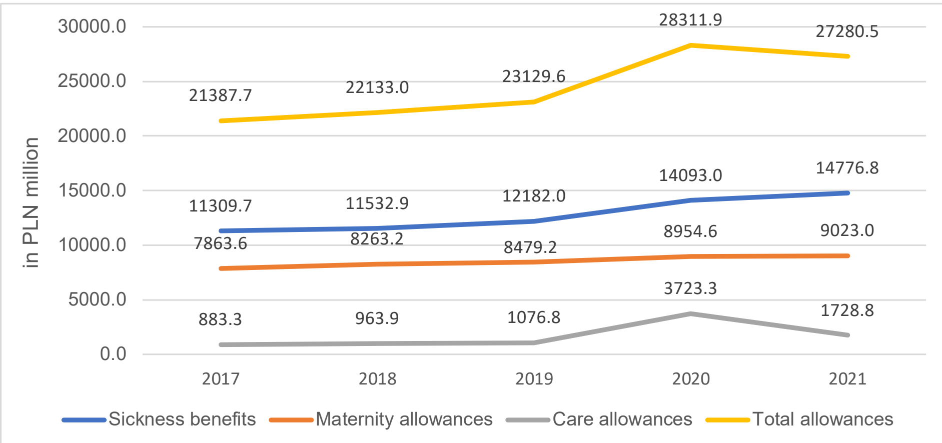

Fig. 17.8. Amounts paid by the social insurance institution in particular years according to service category *(ZUS data, www.zus.pl/baza-wiedz/statystyka/opracowania-tematyczne/wydatki-na-swiadczenia-z-ubezpieczen-spolecznych-zwiazane-z-niezdnoscia-do-pracy)*

Expenditure on cash services from the sickness fund in 2021 amounted to PLN 27,039.4 million (4.3% less than in 2020, when expenditure amounted to PLN 28,257.8 million). Among the cash services financed from the sickness fund, the largest proportion was expenditure on sickness services. In January-December 2021, expenditure on sickness services accounted for 52.2% of total expenditure on cash services from the sickness fund. Expenditure on maternity benefits amounted to PLN 9,023.0 million, accounting for 33.4% of expenditure, while the share of expenditure on care benefits accounted for 6.4%. For comparison – in 2020, the amount of sickness benefits paid was PLN 13,468.3 million and accounted for 47.7%, but in 2018, as in 2021, the share of sickness benefits was 52%. The largest difference in the proportion of expenditure from the sickness fund was for carer's allowance, which accounted for 13.2% of expenditure in 2021 (4.3% in 2018 and 4.6% in 2019) (Fig. 17.8)[28].

As mentioned earlier, spending on care benefits more than doubled in 2021 compared to 2020. This was correlated with a large increase in both the number of certificates and the number of childcare days due to the fact that 2020 was a pandemic year with a periodic additional childcare allowance for caring for a healthy child up to the age of eight. Consequently, insured persons used this form of receiving care services more often than sick leave. In 2021, absenteeism due to childcare returned to 2019 levels, i.e. before the pandemic.

In the ranking of disease entities causing the longest absenteeism in 2020-2021, COVID-19 (U07.1) ranked in the top 10. For men in 2021 – COVID-19 (U07.1) was in eighth place, accounting for 2.0% of total male sickness absenteeism days. For women, COVID-19 (U07.1) was ranked 11th, accounting for 1.3% of the total number of days of sickness absenteeism for women[29].

17.3. Economic activity of the population

According to preliminary estimates, current expenditure on health care in 2020 amounted to PLN 165.7 billion and was higher than in 2019 by around PLN 17.8 billion (preliminary data)[30]. Current expenditure consists of public expenditure (including general government schemes and compulsory contribution-based health insurance schemes) and private expenditure, the analyses of which distinguish direct household expenditure (Fig. 17.9).

28 Social Security Institution. Expenditure on incapacity-related social security services; own study, https://www.zus.pl/baza-wiedzy/statystyka/opracowania-tematyczne/wydatki-na-swiadczenia-z-ubezpieczen-spolecznych-zwiazane-z-niezdolnoscia-do-pracy?p_p_id=com_liferay_asset_publisher_web_portlet_AssetPublisherPortlet_INSTANCE_RgvRsZm7E2aL&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&_com_liferay_asset_publisher_web_portlet_AssetPublisherPortlet_INSTANCE_RgvRsZm7E2aL_delta=10&p_r_p_resetCur=false&_com_liferay_asset_publisher_web_portlet_AssetPublisherPortlet_INSTANCE_RgvRsZm7E2aL_cur=1.

29 Social Security Institution. Sickness absenteeism https://www.zus.pl/baza-wiedzy/statystyka/opracowania-tematyczne/absencja-chorobowa

30 Central Statistical Office. Health expenditure 2018-2020 https://stat.gov.pl/obszary-tematyczne/zdrowie/zdrowie/wydatki-na-ochrone-zdrowia-w-latach-2018-2020,27,1.html, accessed 25 July 2022

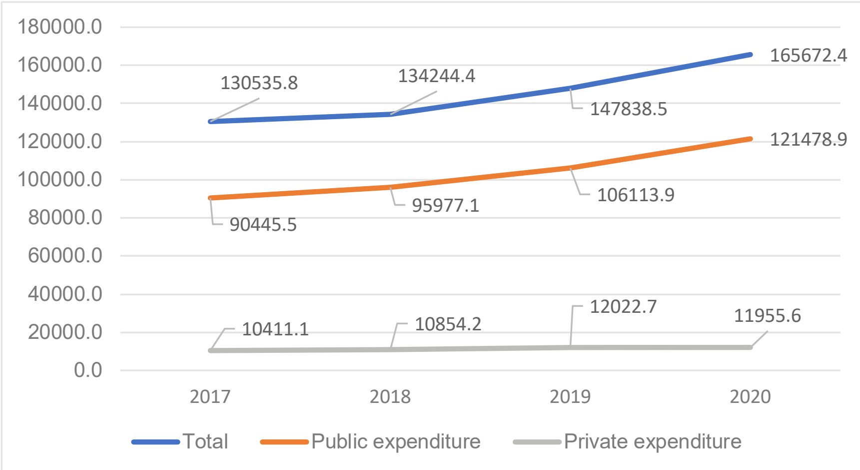

Fig. 17.9. Current expenditure on health care in 2017 – 2020* by funding patterns *(Statistics Poland data, based on National Health Accounts; estimates for 2019 and 2020 https://stat.gov.pl/obszary-tematyczne/zdrowie/zdrowie/wydatki-na-ochrone-zdrowia-w-latach-2018-2020,27,1.html)*[31]

*Preliminary data for 2020.

Overall, the estimated increase in current health expenditure in 2020 relative to 2019 was 12% (2019 saw an increase of 10.1% over 2018). The share of health expenditure in gross domestic product (GDP) in 2020 was 7.1%, 0.7 p.p. higher than in the previous year. Public current expenditure on health care amounted to PLN 121.5 billion in 2020 – PLN 15.4 billion higher than in 2019 – and its share of GDP was 5.2% (i.e. 0.6 p.p. higher than in the previous year). Current private expenditure also increased by PLN 2.5 billion to PLN 44.2 billion in 2020. The increase was driven by an increase in direct household expenditure, which amounted to PLN 32.2 billion, 2.5 billion (8.5%) more than in 2019[32]. Direct household expenditure is a burden on household budgets. For this reason, the World Health Organisation (WHO) recommends that direct household expenditure should not represent a significant percentage of total health funding

[31] a – without direct household expenditures; 2019 – preliminary data from the National Health Account; 2020 – preliminary estimates.

[32] Central Statistical Office. Healthcare expenditors in 2018-2020. https://stat.gov.pl/obszary-tematyczne/zdrowie/zdrowie/wydatki-na-ochrone-zdrowia-w-latach-2018-2020,27,1.html, accessed 25 July 2022

(maximum 15%)[33]. In Poland, the figure is 23% and these are mainly (60%) expenditures on medicines (both prescription and over-the-counter drugs), which are a heavy burden on the budgets of particularly less affluent households.

Household spending on health care increased to PLN 32.2 billion in 2020, compared to 2019 (PLN 29,701.9 million) and 2018 (PLN 27,413.2 million). After the high unemployment rate in 2020 and 2021 resulting from the lockdown, economic activity in the labour market is steadily improving (Fig. 17.10)[34]. In addition to the improvement in the material situation of citizens, the decrease in unemployment is important because of the structure of the NHF's income, an analysis of which indicates that around 71.7% of income from health insurance premiums is related to income from employment or business, while the remaining 28.3% is related to various types of state and social services – mainly pensions.

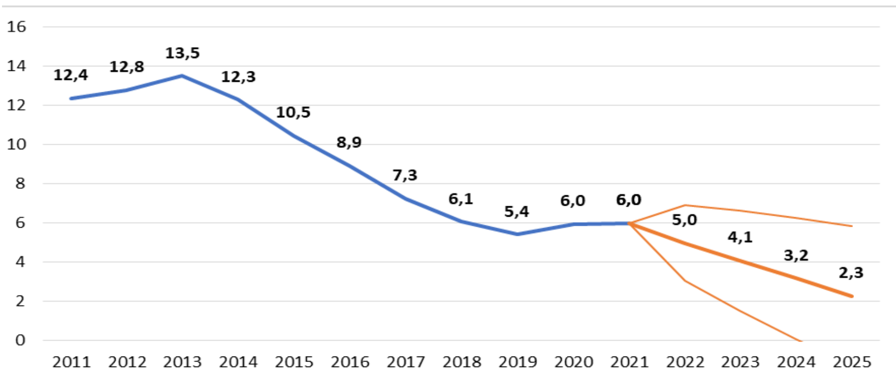

Fig. 17.10. Average values of the registered unemployment rate in 2011-2021 with a forecast for 2022-2025 *(own analysis based on Statistics Poland data https://stat.gov.pl/obszary-tematyczne/rynek-pracy/bezrobocie-rejestrowane/liczba-bezrobotnych-zarejestrowanych-w-latach-1990-2021,6,1.html)*

33 Kutzin J., Cashin C., Jakab M. Implementing Health Financing Reform: Lessons from Countries in Transition, Observatory Studies Series, no. 21 (Brussels: European Observatory on Health Systems and Policies, 2010).the social and economic policies of the transition countries of central and eastern Europe, the Caucasus and central Asia have diverged, including the way they have reformed the financing of their health systems. This book analyses this rich experience in a systematic way. It reviews the background to health financing systems and reform in these countries, starting with the legacy of the systems in the USSR and central and eastern Europe before 1990 and the consequences (particularly fiscal

34 Pajewska M., Partyka O., Czerw A. Dostępność ekonomiczna prywatnych ubezpieczeń zdrowotnych. NIZP-PZH, Warszawa, 2021

17.4. Private health insurance in the public system

In addition to public funding for health, citizens make use of private sources of funding, such as private health insurance, which can be purchased voluntarily. In Poland, private health insurance is becoming more common, especially among the more affluent, but it is not a significant source of funding for healthcare. The second major private source of funds for health is household direct charges (out-of-pocket), i.e. any charges that are incurred at the time of using services (e.g. a private visit to a doctor), or by paying for prescription drugs (in which case only part of the price of the drug is usually covered) or for drugs purchased without a prescription. In Poland, it is most common to pay out of pocket for medicines (69%) and consultations and treatment provided outside the hospital (15%), with dental care (11%) in third place (Fig. 17.11).

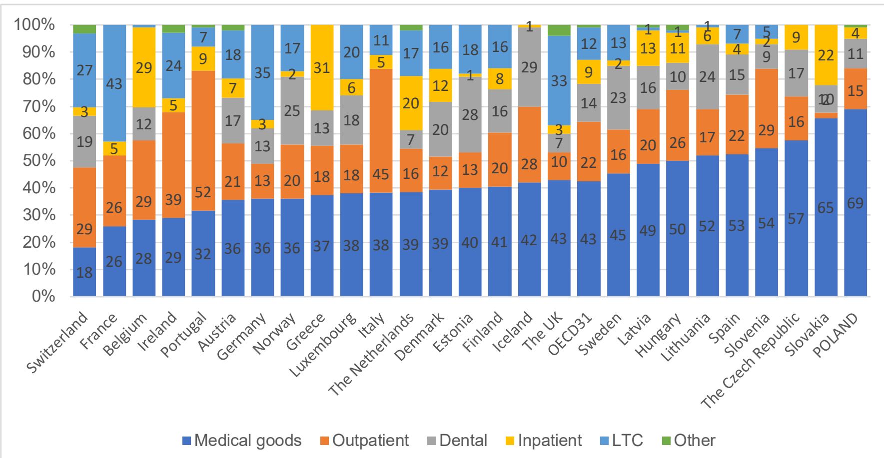

Fig. 17.11. Composition of OOP spending on health, by type of service in selected European countries, 2019 (or nearest year); (*OECD Health Statistics 2021, https://stat.link/8a9hp1*)[35]

Among the distinguished medical services in Poland, the most common "private" services are dentist and prosthodontist (35%) and specialist doctor (28%) (Fig. 17.12).

[35] The "Medical supplies" category includes pharmaceutical products and therapeutic devices. The "Other" category includes preventive care, administrative services and other benefits of an unknown nature.

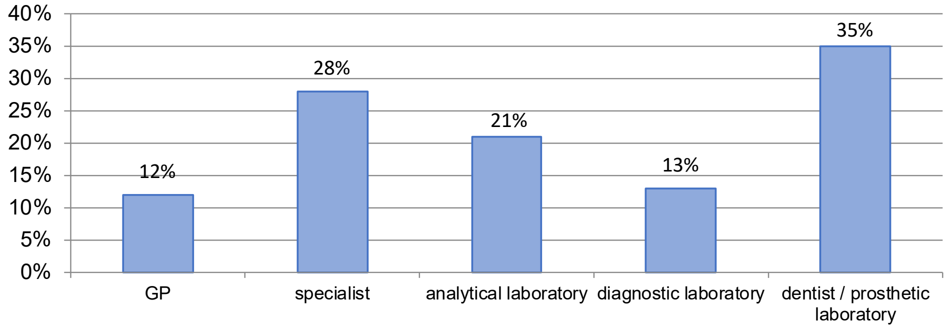

Fig. 17.12. Percentage of beneficiaries of each category of medical services outside the system of universal health insurance *(own compilation based on CBOS research release No. 105/2021. Https://www.cbos.pl/en/search/open_file.php?url=2021/k_105_21.pdf&title=use+of+ze+;347;wiad-cze;324;+and+insurance;324;+healthcare*)

In the following years (2022-2025), the upward trend in the use of health services outside the public health insurance system observed in 2016-2021 is projected. Using the example of GP and specialist appointments, it is possible to observe significant differences in the need for and ability to provide medical advice to doctors in these two specialities in 2020 and 2021 – the beginning and continuation of the epidemic. While there was a difference of around 1% for visits to a GP, the share of visits to a specialist in 2020 were significantly lower compared to 2019 and 2021 (Figures 17.13, 17.14).

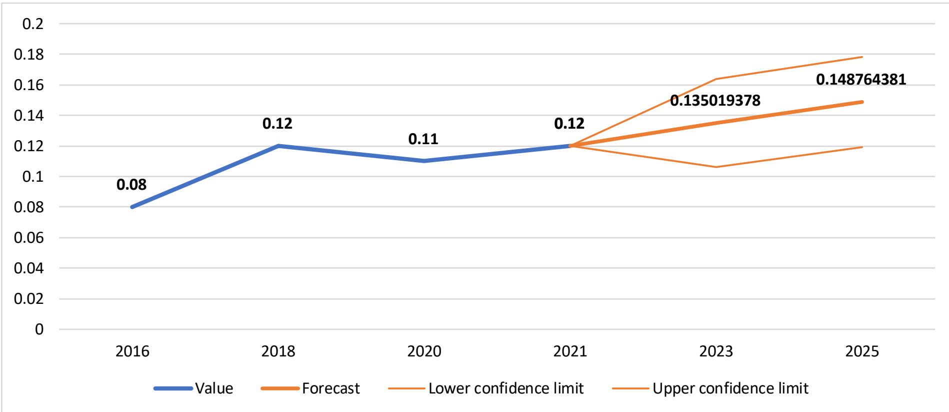

Fig. 17.13 Percentage of people receiving advice from a general practitioner outside the public health insurance system in 2016-2021, along with a projection for 2022-2025 *(own compilation based on CBOS poll release no. 105/2021. https://www.cbos.pl/PL/szukaj/open_file.php?url=2021/K_105_21.PDF&tytul=Korzystanie+ze+;347;wiadcze;324;+and+insurance;324;+health)*

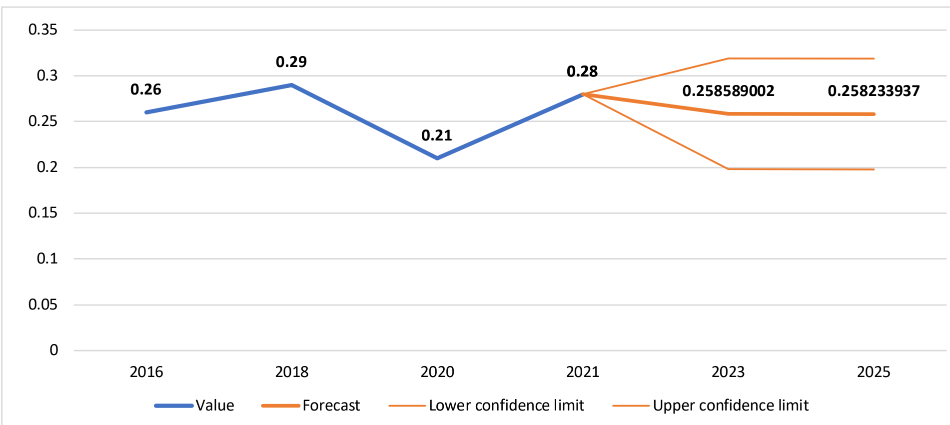

Fig. 17.14. Percentage of people using visits to a specialist outside the public health insurance system in 2016-2021, with a forecast for 2022-2025 (*own analysis based on CBOS survey release No. 105/2021. https://www.cbos.pl/PL/szukaj/open_file.php?url=2021/K_105_21.PDF&tytul=Korzystanie+ze+;347;wiadcze;324;+and+insurance;324;+healthcare*)

The decrease in the proportion of people who received at least one of the groups of services, i.e. visits to a general practitioner, specialist doctor, analytical laboratory, diagnostic laboratories, visits to a dentist or prosthetic clinics outside the public health insurance system at the beginning of the epidemic in 2020 was most often due to difficult access and the time needed to work out the safety rules resulting from the sanitary regime put in place (for dental procedures, among others). From 2021 onwards, the share of visits made outside the public insurance system has returned to the range of values from 2019 (29%) and is projected to settle at around 26% (Fig. 17.15).

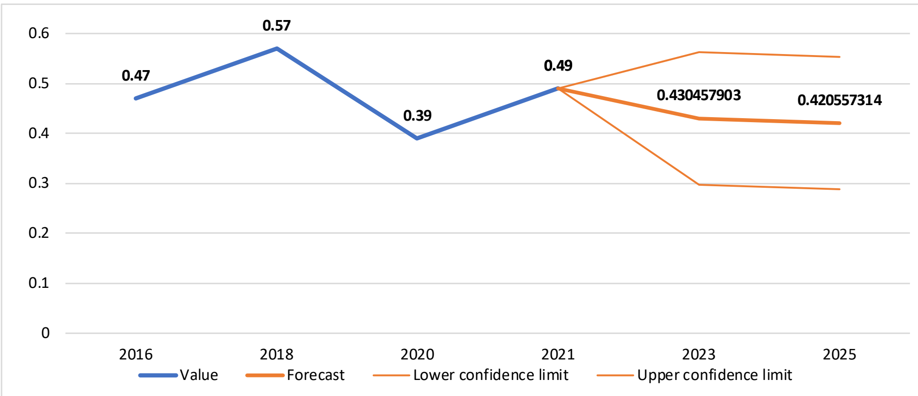

Fig. 17.15. Percentage of people using at least one of the analyzed groups of services, i.e. visits to a general practitioner, a specialist, an analytical laboratory, diagnostic laboratories, visits to a dentist or prosthetic clinics outside the public health insurance system in 2016-2021, along with a forecast for 2022-2025 (*own compilation based on CBOS survey announcement no. 105/2021. https://www.cbos.pl/PL/szukaj/open_file.php?url=2021/K_105_21.PDF&tytul=Korzystanie+ze+;347;wiadcze;324;+and+insurance;324;+Health*)

17.5. Situation in EU countries and in the world

A systematic review of data from 20 countries showed that healthcare utilisation decreased on average by 37% of total services, 42% for visits, 31% for diagnostics or 28% for hospitalisation[36]. Health and lock down procedures introduced to varying degrees around the world have accelerated the development of phone consulting and digital tools and the implementation of these solutions to ensure continuity of health care for all and to support the most vulnerable[37]. In many countries, people with mild symptoms have been able to access medical consultations from home, avoiding potential contagion to others and reserving the resources of health units for critical cases and people with serious medical conditions. In Norway, the proportion of digital consultations in primary care increased from 5% before the pandemic to almost 60% during the pandemic. Similarly, in France, the number of phone consultations reached nearly 1 million per week in April 2020, compared to around 10000 per week before March 2020. In Germany, approximately 19500 phone consultations were carried out in March, compared to 1700 phone consultations per month in January and February 2020.

In total, phone consultation services were made available in 23 countries during the COVID-19 pandemic (as of June 2020). Several strategies have been used to scale up phone consultation use during the first wave of the COVID-19 pandemic, ranging from providing new regulations (Estonia, Poland[38]), extending payments to providers (Canada, Estonia, Slovakia, Poland, Japan, Belgium, Australia), designing new phone consultation services (Canada, Slovakia, Greece, Israel, Turkey, Luxembourg, Spain), to developing new guidelines and regulations (Belgium, Canada, France, United States

[36] Moynihan R., Sander S., Michaleff Z. Pandemic Impacts on Healthcare Utilisation: A Systematic Review. medRxiv 2020.10.26.20219352; doi: https://doi.org/10.1101/2020.10.26.20219352.

[37] Furlepa K., Śliwczyński A., Kamecka K., et al. The COVID-19 Pandemic as an Impulse for the Development of Telemedicine in Primary Care in Poland. J Pers Med. 2022 Jul 18;12(7):1165. doi: 10.3390/jpm12071165.

[38] Order No. 132/2020/DSOZ, National Health Fund (NHF) – We finance the health of Poles, https://www.nfz.gov.pl/zarzadzenia-prezesa/zarzadzenia-prezesa-nfz/zarzadzenie-nr-1322020dsoz,7225.html.

and Japan)[39]. A number of examples of financial compensation to primary care teams for telephone or video consultations can be found in the OECD (Table 17.4).

Tab. 17.4. Funding rules for phone consultation services in primary care during COVID-19 period

Country	Funding rules for phone consultation
Belgium	The cost of a phone consultation is €20, and there is a limitation to a maximum of four times per month per patient. These services can be provided by primary care physicians.
Germany	Public insurance reimbursement if the phone consultation is provided by a primary care physician within the public health service.
Italy	Public insurance reimbursement if the phone consultation is provided by a primary care physician within the public health service. There are also private insurance companies that provide this service.
Spain	Public insurance reimbursement if the phone consultation is provided by a primary care physician within the public health service. Private insurance companies also provide the service.
Switzerland	Controlled by a central pricing system. Public insurance reimbursement if the phone consultation is provided by a primary care physician within the public health service. Private insurance companies also provide the service.
United Kingdom	Public insurance reimbursement if the phone consultation is provided by a primary care physician within the public health service.

Source: *OECD 2020 data, Country Policy Tracker, https//www.oecd.org/coronavirus/country-policy-tracker/*

In Denmark, regional representatives and GP organisations have agreed on a fee for phone consultations with patients with mild symptoms to encourage primary care teams to deal with these cases over the phone.

In the Netherlands, GPs are now allowed to treat home visits to people who may be infected with the virus as "intensive care visits", which means a valuation of €44 instead of €15 when the visit lasts less than 20 minutes, and €77 instead of €25 when it lasts longer than 20 minutes. In addition, GPs receive a one-off payment of €10 for each registered patient in primary care practices and an additional €15 per hour for services provided outside of GP practice hours. In Germany, additional compensation for hygiene and safety is included. For example, in the case of treatment of patients under private health insurance, a new item "hygiene" (€14.75) has been introduced into the table of charges,

39 'Beyond Containment: Health Systems Responses to COVID-19 in the OECD', OECD, accessed 27 July 2022, https://www.oecd.org/coronavirus/policy-responses/beyond-containment-health-systems-responses-to-covid-19-in-the-oecd-6ab740c0/.

which is billed once per personal consultation and includes all types of equipment and costs incurred to maintain sanitary and epidemiological safety [40].

A particularly innovative solution seems to be the one recently introduced in Germany[41]. The new Digital Healthcare Act ('Digitale-Versorgung-Gesetz' – DVG) passed by the German Bundestag on 7 November 2019 allows doctors and psychotherapists in Germany – as the first country in the world – to prescribe health apps that can be reimbursed by statutory insurance. In addition, the Digital Healthcare Act introduced a fast-track procedure for the approval of digital health applications for standard provision by health insurance.

Patients covered by health insurance are entitled to reimbursement for digital health apps. This includes health apps that, for example, support diabetics, pregnant women or hypertensive patients in their daily lives, such as medication reminders or digital diaries. Applications that accompany psychotherapy can also go through the approval procedure for reimbursement.

Consulting the scope of care with patients and allowing patients and doctors to access data and information about their health at any time is a key element of a *patient-centred* healthcare system. Patients and providers alike are increasingly interested in using digital tools to monitor their health and help them use the healthcare network. Furthermore, the digitisation of documentation is fundamental in the provision of phone consultation services. Given the low proportion of GP practices providing services based on electronic records in Poland in the years before the pandemic (15% in 2012 and 30% in 2016,)[42], the popularity of phone consultation in 2020 and 2021 demonstrates patients' willingness to use this type of service. More than 60%

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40 OECD. Strengthening the Frontline: How Primary Health Care Helps Health Systems Adapt during the COVID-19 Pandemic – OECD https://read.oecd-ilibrary.org/view/?ref=1060_1060243-snyxeld1ii&title=Strengthening-the-frontline-How-primary-health-care-helps-health-systems-adapt-during-the-COVID-19-pandemic.

41 Germany Introduces New Digital Healthcare Act: Health Apps Now Available on Prescription https://www.osborneclarke.com/insights/germany-introduces-new-digital-healthcare-act-health-apps-now-available-prescription.

42 OECD, *Health at a Glance 2021.*

of adult patients used the phone consultation service during the pandemic, putting Poland in the lead of European countries (Fig. 17.16).

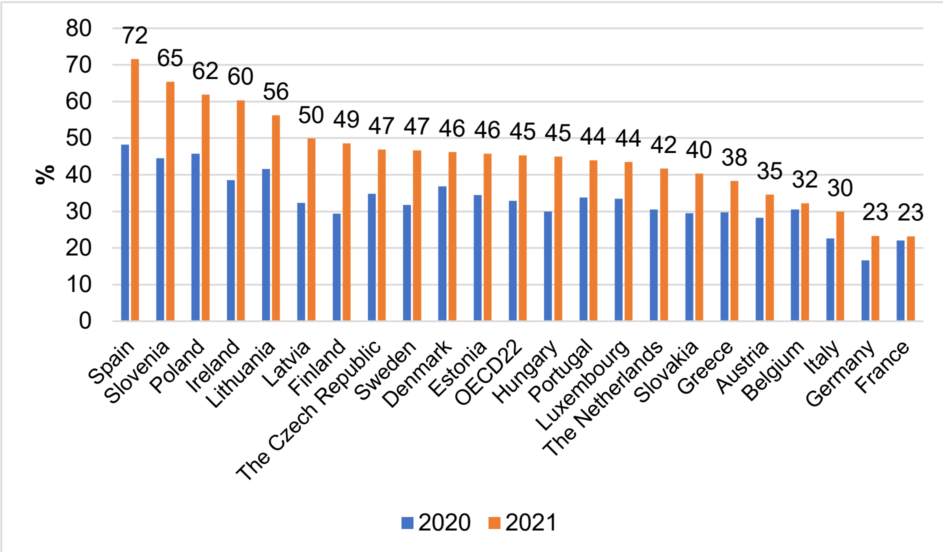

Fig. 17.16. Share of adults who received services from a doctor via telemedicine since the start of the pandemic, 2020 and 2021 (*Eurofound (2020), "Living, working and COVID-19," http://eurofound.link/COVID-19data*)

17.6. Selected health challenges

During the pandemic period, oncology saw a significant decrease in the number of cancer diagnoses. In 2020, there could be a decline of up to 20%. The reduction in the number of new colorectal cancer diagnoses between April and May 2020 was 26%, and for the whole of 2021, the reduction was 13.5%. For lung cancer, there was a 14% reduction, and for breast cancer, the reduction in new hospital admissions was 11%. In addition to clinical diagnosis, a halt in screening programmes has been observed in practice (Table 17.5).

Table 17.5. Number of DiLO cards issued before and during the pandemic over a comparable 8-month period

Period	Number of patients who received services with principal diagnosis C00-C99 according to ICD-10 and principal diagnoses Z51.0, Z51.1, Z51.2 with concomitant diagnoses C00-C99	Number of patients who received services with ICD-10 diagnosis C00-C99 and principal diagnoses Z51.0, Z51.1, Z51.2 with concomitant diagnoses C00-C99 within the framework of inpatient care	Number of oncology diagnosis and treatment cards (DILO) issued
March – October 2019	913 958	280 080	175 481
March – October 2020	843 592	265 106	153 810

Source: E-Zdrowie.gov.pl

According to available analyses, the announcement by the President of the National Health Fund on 15 March 2020 to limit screening to avoid the risk of spreading COVID-19 infection had a key impact on the reduction of screening in Poland. The number of cytologies performed, the primary screening test for cervical cancer, has decreased the most. In the period April – May 2020, 85% fewer cytological examinations and 94% fewer mammograms were performed than expected based on the number of examinations performed during a similar period in 2019. Considering the period of March – September 2020, however, the reduction in the number of cytological examinations was 50% compared to the previous year, while the reduction in mammograms was 39%[43].

Apart from prevention, oncology rehabilitation was the hardest hit, as most rehabilitation centres were out of action. In those situations where the patient already had a diagnosis – treatment was not delayed, only in surgery was a significant reduction in the number of procedures observed (e.g. the number of surgical procedures for patients diagnosed with lung cancer in 2020 was 1380 fewer procedures than in 2019 (6774 and 8154 lobectomies respectively)[44]. For the treatment of oncology patients with high-cost

[43] Report 2021: Impact of the Covid-19 pandemic on the oncology care system. Maria Skłodowska-Curie National Institute of Oncology – National Research Institute, Warsaw 2021 https://medtechpolska.org/wp-content/uploads/2021/08/2021_07_14_NIO_Raport-Wplyw-pandemii-COVID-19-na-system-opieki-onkologicznej.pdf.

[44] Ibid.

treatments, drug programmes have generally seen an increase in funding (apart from October 2020). The process of creating drug programmes takes into account the need to make modern treatments available to patients and, at the same time, the possibilities of financing from the NHF budget (Fig. 17.17).

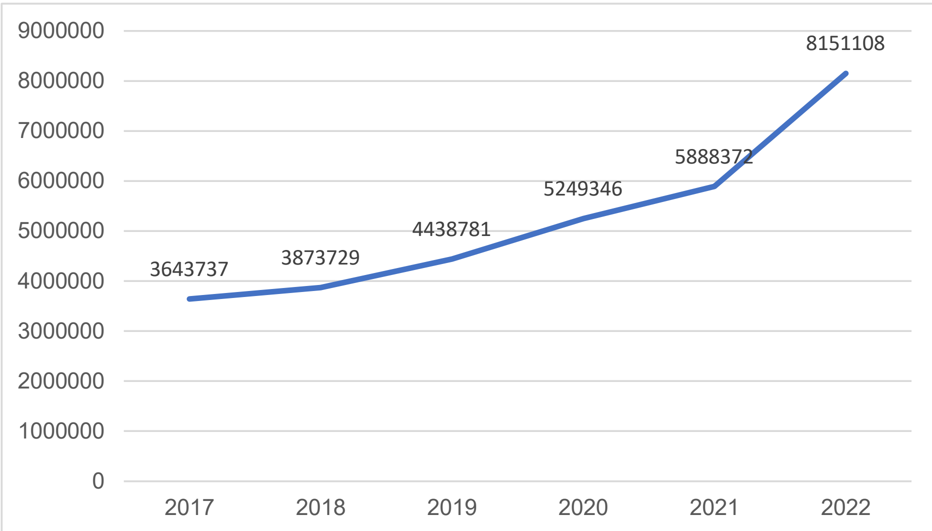

Fig. 17.17. Funding of Drug Programs in total (including for treatment of other diseases like, for example, diabetes, schizophrenia, etc.) (*NHF data, Own compilation, https://www.nfz.gov.pl/bip/finanse-nfz/)*

By the end of 2020, the number of mammograms had returned to levels comparable to those before the pandemic. Early data from 2021 shows an increase in the number of cancers diagnosed to the level at the end of 2019, and a similar trend was noted for DiLO cards issued[45].

45 Ibidem

SUMMARY

1. The COVID-19 pandemic has contributed to a change in the structure of health care financing. It has also led to changes in the structure of service provision – a reduction in planned hospitalisations, outpatient advice in favour of the creation of temporary hospitals dedicated to the treatment of COVID-19 patients.
2. The structure of healthcare funding from the NHF budget has clearly changed. Between 2021 and 2022, the budget for hospital care has decreased by around 10%.
3. In particular, the decrease in funding can be seen in the areas of geriatrics, palliative, hospice and long-term care. Geriatric services accounted for 0.14% of the cost of all services in 2020, and the largest decrease was in hospital care – during the pandemic, geriatric care accounted for 0.27% of total hospital costs.
4. The largest patient group in long-term care is the elderly. The healthcare system needs to prepare for an increased demand for care that takes into account the age structure of the population and the profile of chronic diseases.
5. The estimated increase in current health expenditure in 2020 relative to 2019 was 12%. In 2020, the budget for inpatient treatment was 5.5 billion, falling to 3.7 billion in 2021.
6. Current private spending on healthcare also increased in 2020 to PLN 44.2 billion.
7. In 2020, there will be a decrease in cancer diagnoses of around 20%. The reduction in the number of new colorectal cancer diagnoses in 2021 was 13.5%. There was a 14% decrease in lung cancer diagnoses and an 11% decrease in breast cancer diagnoses.
8. As a result of the 2020 pandemic, there was an increase in sickness absenteeism related to mental and behavioural disorders by approximately 37% in the number of days (compared to 2019).
9. Measures should be taken to prevent the negative long-term effects of a pandemic primarily in terms of the availability of screening and other preventive services.