Policy Brief

International Network of
Health Promoting Hospitals
& Health Services

Health promotion and climate change in health care organizations: mitigation and adaptation strategies

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The International Network of Health Promoting Hospitals and Health Services

The International Network of Health Promoting Hospitals and Health Services (HPH) is a network of over 600 hospitals and health services from over 30 countries that support the implementation of health promotion into the core organizational structure, culture, and decision-making processes of organizations. Initiated by the WHO in 1988, the institutions in our network advocate and assist in advancing health promotion by collaborating to develop structures, decisions, and policies that aim to obtain positive health outcomes for patients, staff, and populations served and support sustainable societies. The HPH network is a non-profit, non-governmental organization.

www.hphnet.org

Key Messages

› Health care systems are one of the major contributors to the climate crisis. Greenhouse gas (GHG) emissions of health care systems can be significantly reduced without impacting quality of care.

› Many health systems are starting to commit towards reducing greenhouse gas emissions, but further action is required now to accelerate this process. The healthcare sector can take a leading role in addressing the climate crisis as health professionals are among the most trusted professionals in society.

› Synergies exist between reducing the climate impact and improving people´s health by a stronger emphasis on health promotion. The International HPH Network has proposed standards that guide health care services in addressing the climate impact, aligned with the Sustainable Development Goals.

› Strategic initiatives include:

  o Energy-efficient practices, sustainable procurement, and waste reduction can collectively mitigate greenhouse gas emissions.

  o Integration of renewable energy sources and enhanced energy efficiency within healthcare facilities is a pivotal strategy.

  o Adopting sustainable procurement practices by prioritizing environmentally friendly products and services contributes to a lower overall carbon footprint.

  o Reducing unnecessary clinical investigations and inappropriate health care use, while reducing the need for physical travel and associated emissions.points

› Collaboration and knowledge-sharing within the healthcare sector are crucial for accelerating progress in sustainability efforts. Monitoring and reporting mechanisms help track the effectiveness of implemented strategies, refining and optimizing approaches over time.

› Health professionals and managers, as advocates for public health and environmental stewardship, play a pivotal role in championing policy changes. The Health Promoting Hospitals and Health Services Network is well-suited to address these challenges. Drawing on leading examples and exploiting synergies between health promotion and climate mitigation strategies we can drive progress.

Introduction

The well-established negative impacts of climate change on both human health and the environment are largely attributed to human activities, with the emission of greenhouse gases (GHG) being the primary driver. Notably, the healthcare sector significantly contributes to this, constituting approximately 5% of national carbon footprints.

Some countries, such as the UK's NHS, have pledged to attain a net-zero healthcare system by 2045. Accelerating decarbonization strategies is imperative to meet this goal. Importantly, the convergence of health promotion and climate mitigation strategies presents synergies that enable healthcare services to enhance health outcomes while simultaneously reducing their climate impact.

The adverse impacts of climate change on human health and the planet are widely acknowledged (Patz et al., 2014; Watts et al., 2021). Anthropogenic greenhouse gases (GHG) are a primary driver of climate change, primarily originating from the burning of fossil fuels for electricity, heat, and transportation, or, in the case of methane, produced by the livestock industry (FAO 2023).

While the focus has traditionally been on GHG emissions from these sources, there is a growing awareness of the carbon footprint generated by healthcare systems themselves, marking a recent subject of scrutiny (Ebi et al., 2021). Surprisingly, GHG emissions in healthcare surpass those in the aviation or shipping industry, more than doubling them.

Furthermore, there is significant variation in these emissions among countries. Pichler et al. (2019) conducted a comparative analysis of the health carbon footprints of OECD countries, China, and India, revealing a range from 3.3 per cent (Mexico) to 8.1 per cent (Netherlands), with Germany at 6.7 per cent. On average, the health sector contributes 5.5 per cent to the national carbon footprint (Pichler et al., 2019), with the majority attributed to Scope 3 activities, such as transportation and distribution, processing, and end-of-life treatment of products.

Some countries have taken a leading role in translating these measures into tangible actions with the objective of achieving climate neutrality. A notable example is the English NHS, which has set the ambitious target of establishing a net-zero healthcare system by 2045 (NHS England and NHS Improvement, 2020). Attaining the goal of a net-zero healthcare system necessitates a thoughtful consideration of how healthcare systems are evolving in response to the population's epidemiological profile, future healthcare needs, and advancements in medical technologies.

Decarbonization strategies can be enhanced by placing a greater emphasis on health promotion. This involves reducing avoidable hospital admissions, minimizing unnecessary tests and treatments, and generally promoting patient-centered care. Such a focus not only contributes to the climate goal but also aligns with optimizing healthcare delivery for the benefit of patients.

What is the impact of this issue?

Data on the climate impact of different healthcare services is emerging, helping to reduce greenhouse gas emissions (Alshqaqeeq et al., 2020; Rizan et al., 2020, Prasad et al. 2022, Somner et al., 2009, Thiel et al., 2015, Connor et al., 2010; Connor et al., 2011, Holmner et al., 2014). For example, carbon dioxide equivalents of several inpatient and outpatient services are as follows:

› An average hospitalization day in a general ward: around 45kg CO2e.

› An average hospitalization day in a more resource-intensive care unit (ICU): 138kg CO2e on one day.

› Anaesthetics (nitrous oxide and fluorinated gases sevoflurane, isoflurane, and desflurane): 130 kgCO2e/kg (sevoflurane) and 2,540 kgCO2e/kg (desflurane)

› Cataract surgery: 7.5–37.3kg CO2.

› Hysterectomy procedure: between 293-814kg CO2e.

› Haemodialysis: 22kg CO2e per patient appointment or 1.84-7.20 tons CO2e per patient per year.

› Teleconsultations replacing physical outpatient visits: a reduction of up to 262kg CO2e per visit.

› The propellants utilized in metered-dose inhalers (MDI) to treat asthma and COPD are 1,500 to 3,000 times more potent than CO2 in terms of global warming potential. (Wilkinsin A, 2021)

The emissions associated with healthcare services exhibit significant variability. For instance, emissions from Intensive Care Units (ICUs) in the USA are more than double those in Australian ICUs, with 178kg CO2e per patient day compared to 88kg CO2e per patient day (McGain et al., 2018). Emission estimates for the same medical procedure within a single country may also differ based on factors such as the procedure type (open or minimally invasive), its duration, and the use of narcotic gases. The greenhouse gas (GHG) output is notably influenced by contextual elements of care delivery, including throughput, building design, and efficiencies of scale (Thiel et al., 2017).

Simultaneously, in high-income countries, achieving high standards for access and quality of care does not inevitably result in unavoidable GHG emissions. Some countries manage to maintain similar or even higher levels of access and quality of care while accounting for lower GHG emissions than others (Watts et al., 2020, Figure 1).
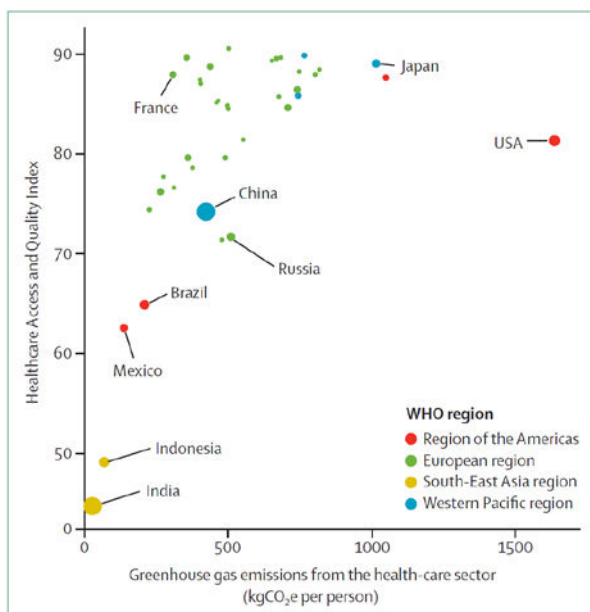
Figure 1: Relationship between health care access and quality of care and greenhouse gas emissions from the health-care sector

Where to start: evidence and perceived feasibility of action areas

Within hospitals, surgery is one on the areas with the highest climate impact, due to the high-intensity of the care setting and the necessity to use anesthesia to perform surgery. A recent study in the British Journal of Surgery assessed the evidence based of interventions to reduce the climate impact and then elicited responses from more than 3000 health professionals globally (in high and low and middle income countries) on the feasibility of implementing this evidence (NIHR 2023). Professionals had high lievel of agreements on shortlisting a wide range of evidence-based strategies in relation to the three Scopes of the Greenhouse Gas Protocol (Table 1).

Nonetheless, the study also identified barriers to green surgery initiatives, with the top three barriers being: lack of information about which green surgery initiatives should be priorities (77%), lack of guidance for how to implement green surgery initiatives (75.2%), and lack of support from hospital management for green surgery initiatives (59%).

The lack of guidance on implementation was perceived more of a barrier in LMICs compared to HICs, demonstrating that for effective climate mitigation implementation culture is as important than resources and information. In addition, while most climate mitigation strategies are considered safe, it is noteworthy that in some areas, professionals might have reservations because of safety concerns, in particular in relation to re-sterilization of 'single-use' consumables and reduction of gases for minimally invasive surgery. Safety concerns were generally higher in LMICs.

Table 1: climate mitigation strategies in surgery, according to Scope of the greenhouse gas protocol (in high income and low-and-middle income countries)

	Overall (%)	HICs (%)	LMICs (%)
Scope 1			
Reducing desflurane use	25.3	31.1	18.6
Removing desflurane from theatre	18.8	19.7	17.9
Reducing nitrous oxide use	32.4	33.4	31.3
Removing nitrous oxide from theatre	23.6	20.8	26.,3
Using low flow when using volatile anesthetics	39.4	40.5	38.2
Mandating total intravenous anesthesia	13.9	12.1	16.0
Scope 2			
Turning off lights in theatre at night/weekends	61.1	60.6	61.9
Motion-activated lights	14.8	14.3	15.7
Installing light-emitting diode (LED) lights	31.5	26.1	38.6
Switching off taps between hand washing	64.1	62.4	66.7
Turning down heating/air conditioning at night/weekends	40.5	31.5	52.0
Scope 3			
Recycling non-contaminated waste	34.0	38.0	27.5
Reducing plastic syringe use	13.2	12.7	13.9
Reducing unnecessary intravenous fluid use	35.4	30.7	42.1
Reducing unnecessary intravenous drug use	37.3	32.0	44.5
Using reusable surgical gowns	23.3	14.8	36.9
Using reusable surgical drapes	23.1	14.2	37.5
Reducing single-use instruments	23.1	15.7	34.6
Redesigning trays for efficiency	19.4	16.4	24.0
Reducing disposable glove use	16.5	11.0	24.9
Using reusable laparoscopy ports	26.8	13.7	45.2
Reserving laparoscopic and robotic surgery	37.0	33.6	42.1
Using reduced packaging	22.7	17.0	30.2
Switching blue sterile tray wraps to metal canister trays	23.4	18.4	31.6

How does this relate to the work of the HPH network?

Health professions and health managers, in charge of organizations emitting large amounts of GHG emissions, can draw on the asset of being among the most trusted professions and leveraging their influence to mitigate climate change. In addition to established strategies in relation to energy efficiency, emissions can be reduced by a stronger focus on health promotion and the reduction of unnecessary, avoidable or inappropriate care.

Health services research over the last decades has established that a large proportion of health care is harmful (up to 1 in 10 hospital admissions results in harm to the patient, with half of these incidents deemed preventable) (WHO 2023) and that a large number of procedures routinely conducted (such as ordering a CT scan for nonspecific back pain) are unnecessary and add no value to patient care.

The Choosing Wisely Initiative has explored practice guidelines and routine practices and together with 80 different medical specialties identified more than 700 tests and treatments which are overused and unnecessary (Choosing Wisely 2023). Only 60% of health care is delivered in line with evidence-based guidelines (and 10% harmful and 30% of low value), Barret et al. 2021 estimate the carbon footprint associated with these clinical care categories, which account for 80% of the total carbon footprint of health care in Australia, much more than the 20% associated with emissions from buildings, electricity, and gas. Given the evidence on harmful, low-value and inappropriate care, a patient-centred pathway approach as promoted by the HPH network should be adopted.

Adjusting to the impacts of climate change is essential for the healthcare sector, especially for health promoting hospitals that are key in formulating strong strategies for adaptation. This ensures the continued delivery of medical services during climate related events. Health Promoting Hospitals must be fortified against the immediate effects of climate change, like severe weather conditions, and also take an active stance in addressing public health issues.

Concentrating on preventative measures, educational initiatives, and community engagement, health-promoting hospitals can play a significant role in lessening the enduring health effects associated with climate change (Mashallahi A, 2022)

HPH Standards on health care and the environment

As part of an exhaustive process to develop standards and a self-assessment tool to help HPH member hospitals to implement the vision of HPH, the International Network of Health Promoting Hospitals and Health Services (HPH) collaborated with Health Care Without Harm to establish standards. The standards were developed in line with the Shanghai Declaration on promoting health in the 2030 Agenda for Sustainable Development and include seven specific standards addressing the role of hospitals and health services to reduce GHG emissions:

› advancing the use of safe chemicals, materials, and processes.

› reducing the volume and toxicity of waste.

› reducing the use of fossil energy and fostering energy efficiency.

› reducing hospital/health service water consumption and wastewater pollution.

› developing transportation and service delivery strategies that reduce the hospital/ health services' climate footprint.

› fostering healthy eating habits and accessing locally and sustainably sourced food.

› incorporating green building principles and practices.

For each standard, measurable elements facilitate assessing baseline and measuring progress in reducing GHG emissions (Figure 2):

5.3.1. Our organization improves the health of patients, staff, community, and the environment by advancing the use of safe chemicals, materials, and processes.
Measurable element(s): Safe chemicals, materials, and processes are defined, and their usage is confirmed through audit.

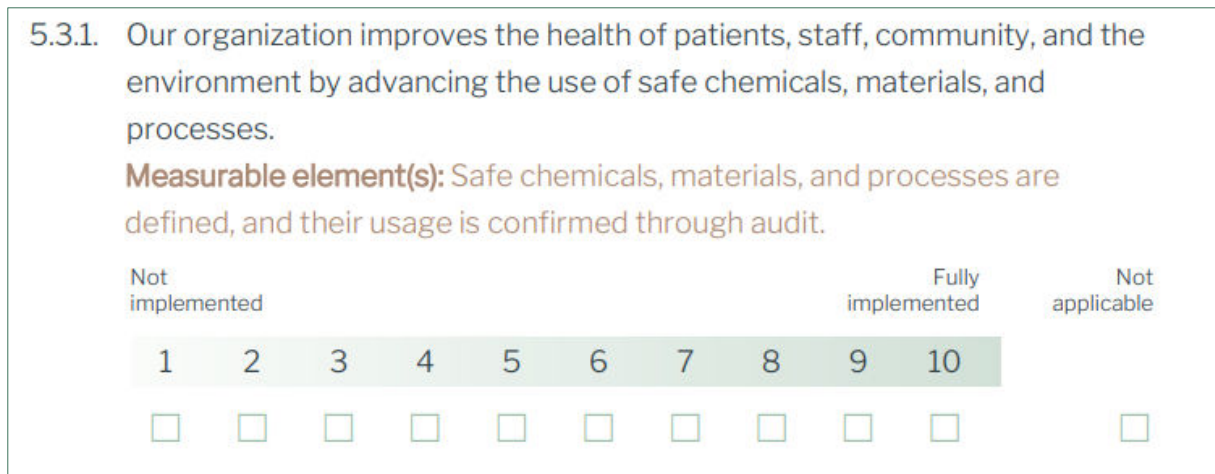| Not implemented								Fully implemented		Not applicable
1	2	3	4	5	6	7	8	9	10	
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Figure 2: example from a HPH standard

The standards address critical aspects of the environmental health impact of healthcare facilities and aim to facilitate prompt improvement activities. However, they do not offer guidance on the most effective long-term investments in healthcare to ensure significant impact across all three scope areas, as outlined in the Greenhouse Gas Protocol.

Current strategies primarily focused on reducing emissions from hospitals often overlook the fact that in many high-income countries, there may be an excess of hospitals, facilities, and services at current capacity levels. Additionally, a significant portion of hospital admissions is potentially avoidable (Sundmacher et al., 2015), and numerous health services can be provided at lower levels of care.

To effectively decrease greenhouse gas (GHG) emissions in the healthcare sector, it is crucial to consider evidence from decades of healthcare quality improvement research. This evidence can guide the development of healthcare systems that are person-centered, value-oriented, and sustainable.

Practical example 1

Greywater Procurement and Distribution System at Dalin Tzu Chi Hospital, Taiwan

Dalin Tzu Chi Hospital in Taiwan is committed to achieving water sustainability goals as part of the Global Green and Healthy Hospitals (GGHH) agenda. The hospital's primary aim is to reduce water consumption across its various activities while efficiently recycling and reusing water for non-critical needs.

Presently, the hospital outsources the treatment of approximately 371,304 tons of used water annually, sourced from both tap water and recycled water. The hospital purchases and utilizes an average of 82,369 tons of recycled water, leading to significant cost savings. The cost of recycled water is NT 2-3/ton compared to the NT 12-13/ton for freshwater, resulting in annual savings of USD $26,275 (NTD 127,682). Additionally, the hospital reduces the use of freshwater from tap water sources.

A Greywater Circulation System has been implemented, utilizing 82,369 tons of recycled grey water annually for purposes such as watering plants and toilet flushing. This initiative involves 631 toilets, including those in dormitory areas, contributing to monthly water savings. The hospital has implemented an intelligent system, the Intelligent Building Energy Management System (IBEMS), to control the Waste Water Blower efficiently. This has led to substantial electricity savings of 80227KWH/year.

Despite being surrounded by sea, Taiwan faces water shortage issues, and the hospital's initiative aligns with environmental protection goals. Currently, water consumption in hospitals is 742 liters per person per day, and the hospital aims to reduce it to 459 liters per day through water-saving equipment and strategies.

The hospital's sustainability strategy includes the use of water-permeable bricks, specially designed plumbing systems, and an environmental protection committee to promote water conservation habits among the public. Regular monitoring of electricity and water consumption has enabled the hospital to adopt efficient conservation measures. To engage and educate users, informative signs in toilet cubicles encourage water conservation and explain the use of recycled water. The hospital actively monitors the quality of purchased recycled water and ensures compliance with safety regulations.

Challenges include the lack of water quality standards for grey water, addressed through employee education during orientation and training. Looking ahead, the hospital plans to maintain current water consumption levels, monitor grey water quality daily, and explore further opportunities for recycling and energy-efficient wastewater treatment.

Dalin Tzu Chi Hospital, established in 2000, serves the Yunlin and Chiayi County areas with a patient-oriented approach. With 957 beds, 20 operating rooms, and 1756 employees, the hospital is dedicated to providing sustainable healthcare solutions while maintaining high-quality patient care.

Practical example 2

Systematic implementation of environmental programmes in a university teaching hospital

Cork University Hospital (CUH) presents a comprehensive approach to mitigating climate impact (Ryan-Fogarty, O'Regan & Moles, 2016). CUH demonstrated that tackling impact mitigation requires a whole system approach. The approach adopted by CUH brought together voluntary initiatives in particular those emanating from governmental and non-governmental organizations, peer supports and the adaptation of programmes designed originally for environmental education purposes.

Due attention was given to requirements for corporate social reporting. A comprehensive communications plan served as the foundation for CSR reporting. Standardizing environmental messages across various platforms such as monthly newsletters, hospital radio slots, public TV displays, and newspaper articles ensured consistent dissemination of information. Additionally, leveraging digital platforms like websites and staff payslips enhanced accessibility to environmental data and promoted transparency. Energy and waste reporting was crucial for monitoring the company's environmental impact. Detailed monitoring of energy and waste consumption, carbon dioxide emissions, and costs allowed for informed decision-making. Presenting this data in a digestible format, along with making it relevant to staff by contextualizing savings in tangible terms, fostered employee engagement.

Developing best practice checklists further empowered staff to contribute to sustainability efforts in their respective areas. Establishing a Green Home Hub and organizing energy and waste exhibitions with expert guidance encouraged staff to adopt sustainable practices both at work and home. Furthermore, involving the local community and engaging with national and international peers demonstrated a commitment to broader societal and environmental goals.

Partnerships with local organizations, schools, and universities fostered community engagement, while participation in national and international initiatives enhanced knowledge sharing and collective action towards sustainability. Effective corporate social reporting involved a multifaceted approach that encompassed transparent communication, active employee engagement, collaboration with stakeholders, and contributions to broader societal goals. A crucial attribute of the approach was that it retained flexibility and connectivity through time, thereby ensuring continual responsiveness to evolving regulation and best practice in green healthcare.

Return on investment analysis conducted for all technical solutions showed that payback periods varied between 9 months and 3 years.

Implementation in Cork resulted both in mitigation of existing impacts, but also a commitment to continual improvement.

Further information on case studies and best practices guides is available here: https://greenhealthcare.ie/guides/

Recommendations from the HPH Network

> › Prioritize Decarbonization Initiatives: Health professionals and healthcare managers should prioritize and actively engage in decarbonization initiatives within healthcare organizations. This involves identifying and implementing strategies to reduce greenhouse gas emissions associated with healthcare activities.

> › Adopt Sustainable Practices: Encourage the adoption of sustainable practices throughout healthcare facilities. This includes optimizing energy efficiency, reducing waste generation, incorporating environmentally friendly materials in operations, and addressing environmentally friendly nutrition and transportation practices.

> › Promote Energy Efficiency: Implement energy-efficient technologies and practices within healthcare facilities. This can involve upgrading to energy-efficient equipment, optimizing lighting systems, and adopting renewable energy sources where feasible.

> › Optimize Transportation Practices: Evaluate and enhance transportation practices within healthcare organizations to reduce carbon emissions. This may involve promoting public transportation for staff, utilizing electric or hybrid vehicles, and optimizing logistics for medical supply chains.

> › Integrate Climate Considerations in Procurement: Consider the environmental impact of products and services in procurement decisions. Prioritize suppliers and products with a lower carbon footprint, promoting sustainability across the supply chain.

> › Engage in Health Promotion: Recognize the synergy between climate mitigation and health promotion. Encourage initiatives that not only reduce the environmental impact of healthcare but also contribute to improved public health outcomes.

> › Implement Waste Reduction Strategies: Develop and implement waste reduction strategies, including proper waste segregation, recycling programs, and the reduction of single-use materials. This contributes to both environmental sustainability and cost-effectiveness.

> › Foster a Culture of Sustainability: Cultivate a culture of sustainability within healthcare organizations. Educate staff on the importance of reducing the climate impact of healthcare and empower them to contribute to sustainable practices in their daily operations.

› Utilize Technology for Telehealth: Embrace technology to facilitate telehealth services, reducing the need for physical visits and associated travel. This not only improves accessibility but also minimizes the carbon footprint of healthcare delivery.

› Reduce inappropriate health care use: Clinical investigations not based on evidence (Choosing Wisely indicators) or primary care or nursing home sensitive hospital admissions have a significant impact on the carbon footprint of the hospital while generating no value for patients.

› Regular Monitoring and Reporting: Establish robust monitoring and reporting mechanisms to track the carbon footprint of healthcare organizations. Regularly assess progress towards sustainability goals and adjust strategies as needed.

› Collaborate and Share Best Practices: Foster collaboration within the healthcare sector and share best practices for reducing climate impact. Learning from successful initiatives in other healthcare organizations can accelerate progress toward sustainability goals.

› Advocate for Policy Changes: Health professionals and healthcare managers should actively advocate for policy changes that support and incentivize sustainable practices within the healthcare sector. This may include promoting regulatory frameworks that prioritize environmental sustainability in healthcare operations.

Conclusions

Reducing the climate impact of healthcare organizations presents a critical opportunity to align the healthcare sector with global sustainability goals. As a substantial contributor to carbon footprints, healthcare organizations have the potential to significantly decrease their environmental impact through strategic initiatives. Decarbonization efforts, encompassing energy-efficient practices, sustainable procurement, and waste reduction, can collectively mitigate greenhouse gas emissions.

The integration of renewable energy sources and enhanced energy efficiency measures within healthcare facilities stands as a pivotal strategy. Additionally, adopting sustainable procurement practices by prioritizing environmentally friendly products and services contributes to a lower overall carbon footprint. Waste reduction initiatives, including proper segregation and recycling, not only address environmental concerns but also promote cost-effective practices.

Beyond internal operations, healthcare organizations can influence broader public health outcomes by embracing initiatives that align climate mitigation with health promotion. Telehealth services, powered by technology, offer a dual benefit by increasing accessibility while reducing the need for physical travel and associated emissions.

Collaboration and knowledge-sharing within the healthcare sector are crucial for accelerating progress in sustainability efforts. Monitoring and reporting mechanisms help track the effectiveness of implemented strategies, enabling organizations to refine and optimize their approaches over time. As advocates for public health and environmental stewardship, health professionals and managers play a pivotal role in championing policy changes that incentivize and support the transition to more sustainable healthcare practices. The convergence of climate-conscious measures with healthcare operations not only addresses the urgent need for environmental stewardship but also aligns with a broader commitment to improving global health outcomes.

The Health Promoting Hospitals and Health Services Network is well suited to address these challenges by drawing on leading examples from the network and exploiting the synergies that exist between health promotion and climate mitigation strategies.

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Annex

Key messages that can be used to communicate the environmental impact of health services to health professionals and staff:

Climate Crisis and Healthcare Systems:

› Emphasize: "Health care systems play a significant role in the climate crisis."

› Encourage: "Action is crucial now to fulfill commitments in reducing greenhouse gas emissions within health systems."

Climate Change Adaptation in Healthcare:

› Stress: "Advancing climate change adaptation in healthcare is essential."

› Highlight: "Addressing pressing challenges requires a proactive approach within the healthcare system."

Trust in Healthcare Professions:

› Acknowledge: "The healthcare sector is among the most trusted professions."

› Remind: "This trust is built on healthcare knowledge and expertise."

Synergies between Climate Impact and Health Improvement:

› Establish: "There are synergies between reducing climate impact and improving health."

› Advocate: "A stronger emphasis on health promotion can be a powerful tool in achieving both goals."

International HPH Network Standards:

› Inform: "The International HPH Network has proposed standards for addressing climate impact."

› Encourage: "These standards guide health care services toward environmentally responsible practices."

Urgency of Action:

› Stress: "The time to act is now."

› Motivate: "Immediate action is required to make a tangible impact on reducing climate impact within the healthcare sector."