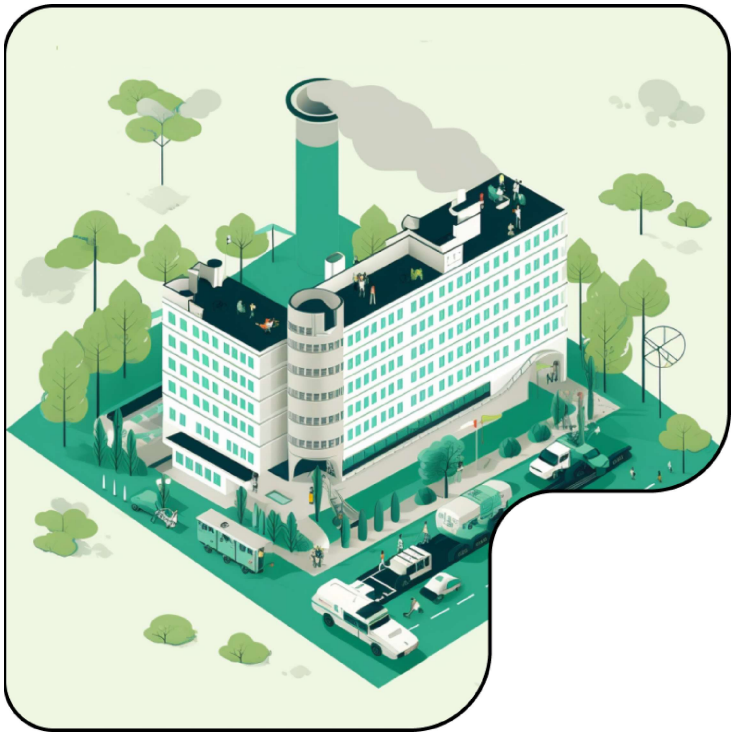
Quambio April 2023

Prescribing Sustainability: How Hospitals Can Reduce their Carbon Footprint



"Tackling climate change could be the greatest global health opportunity of the 21st century"

(The Lancet Commissions, 2015)

In this article, we explore the emissions from hospital systems using the Scope 1, 2, and 3 framework defined by the Greenhouse Gas (GHG) Protocol. We seek to provide a comprehensive understanding of the issue, as well as to offer actionable insights for hospitals to adopt sustainable practices.

Introduction:

If the healthcare industry were a nation, it would be ranked fifth in the world for climate pollution, with a contribution of more than 4.4% of all global greenhouse gas emissions (*Protecting Planet and People*, 2021).

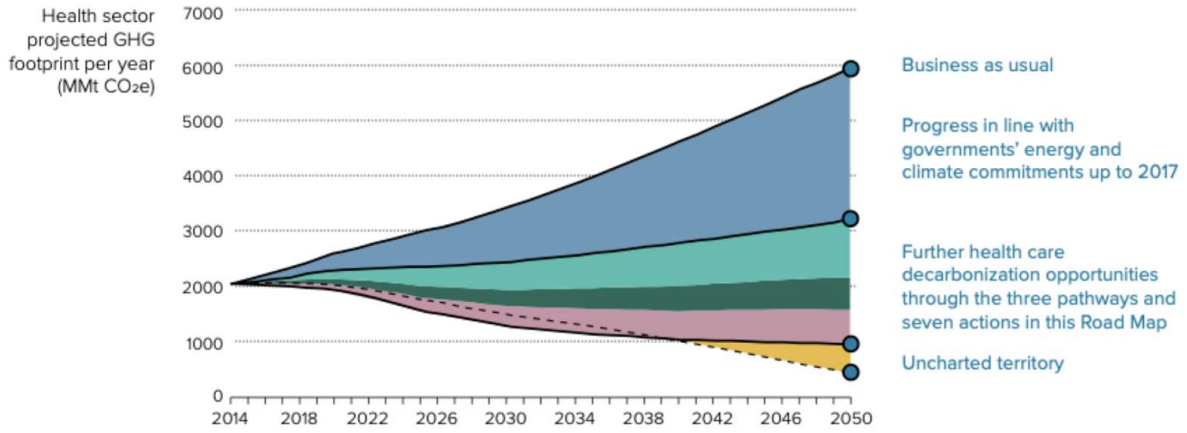


Fig 1.

According to the *Health Care Climate Footprint Report* (2019), Switzerland, along with the US, Canada and Australia, is among the countries with the highest health care-related emissions per capita. Within the health care sector, hospital care is considered the most carbon-intensive. For instance, hospitals consume two-and-a-half times more energy than other commercial buildings. (Nansai et al., 2020; Weisz et al., 2020; Wu, 2019). Thus, changes in health care infrastructure and practices can be critical to our collective efforts to counter climate change. Yet, Lenzen and his colleagues have shown that less attention is paid to the environmental impacts of health care activities than to how environmental deterioration might affect human health (2020).

“Primum non nocere”

Health care professionals are trained to limit any unintended harmful effects of their medical practice by adhering to the principle of "first, do not harm”. In doing so, climate protection should be a major concern for hospitals.

The health care sector faces significant opportunities to reduce its carbon footprint, and therefore contribute to mitigating the projected negative effects of climate on people’s health. Beyond the long-term environmental benefits, there are numerous other positive effects of achieving net-zero healthcare including money saving, health benefits and improving local communities (Storz, 2018). But before reducing emissions, one first needs to measure them. Below, we introduce the Scope framework from the GHG protocol, a practical way to sort out important contributors and to start quantifying their impact.

Scopes

To comprehensively address the emissions from hospital systems, it is essential to understand the distinction between Scope 1, 2, and 3 emissions, as defined by the GHG Protocol. This framework categorizes emissions based on their origin and an organization’s level of direct control, enabling hospitals to identify and prioritize reduction efforts.

Scope 1

Scope 1 emissions are the direct emissions resulting from sources owned or controlled by the hospital. In a hospital setting, these emissions primarily arise from:

- On-site fossil fuel combustion for heating, cooling, and power generation, such as boilers, furnaces, and generators.
- Transportation emissions from hospital-owned or -controlled vehicles, such as ambulances and maintenance vehicles.

Scope 2

Scope 2 emissions are the indirect emissions associated with the generation of purchased electricity, steam, heating, and cooling consumed by the hospital.

Scope 3

Scope 3 emissions encompass all other indirect emissions that occur in a hospital's value chain, both upstream and downstream. These emissions are not directly controlled by the hospital but are influenced by its choices and activities.

Examples of Scope 3 emissions in hospitals include:

- Supply chain emissions from the production, transportation, and disposal of goods and services purchased by the hospital, such as medical equipment, pharmaceuticals, and food.
- Waste generated by the hospital, including solid waste, hazardous waste, and wastewater.
- Business travel and employee commuting emissions.
- Emissions related to the construction, maintenance, and eventual decommissioning of hospital facilities.

Hospital sector 3 Scopes analysis

Several carbon footprint analyses have been performed in the health care sector. Below are 2 examples concerning the U.S.:

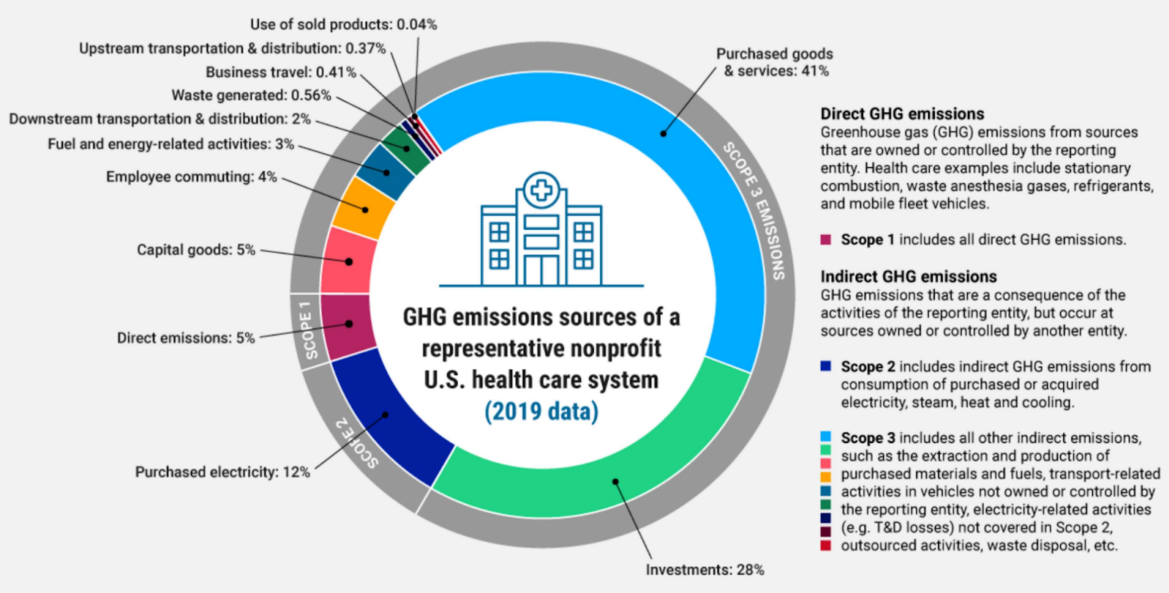


Fig 2. A GHG inventory from a U.S. nonprofit health care system.

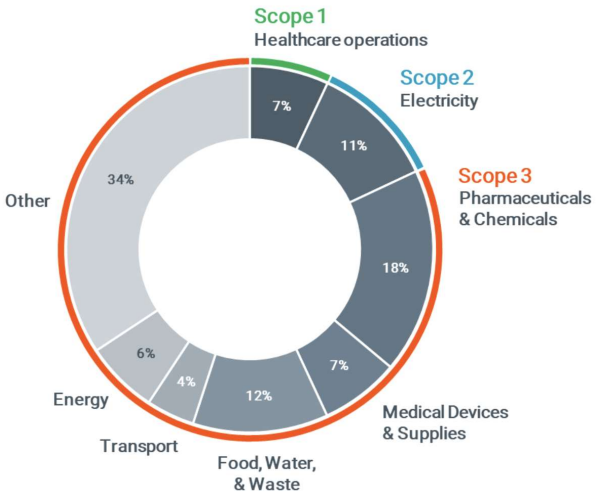


Fig 3.

Proportion of U.S. healthcare sector GHG emissions by GHGP Scopes

Both of these analyses highlight the fact that Scope 3 accounts for the largest portion of the health care footprint. Emissions in the hospital sector are mostly caused by the supply chain, direct patient care, staff travel, patient and visitor travel, and private health and care services commissioned by healthcare systems. For example, according to the IPCC, the UK's National Health Service (NHS) found that 62% of its emissions came from the supply chain, 24% from the direct delivery of care, 10% from staff commute and patient and visitor travel, and 4% from private health and care services (2022).

Scope 3 emissions for healthcare in the European Union are even higher reaching 71%, according to the The World Economic Forum (2022). Thus, it is important to keep in mind that the most carbon intensive aspects of healthcare are not happening at the hospital itself.

"Green Hospital" researched the climate footprint of 33 Swiss hospitals to identify key climate levers and improve environmental efficiency without compromising healthcare quality. Their 2021 findings revealed that almost 50% of hospitals could double efficiency without decreasing output. This represents an encouraging call for action.

Practical Solutions for Lowering Hospital Emissions

Planning for CO2 neutrality follows the same steps in the healthcare sector as in other sectors, and that's the core of our work at Quambio. We begin by evaluating a hospital's carbon footprint, either by establishing a new baseline or using an existing one. From there,

we develop a comprehensive strategy for achieving CO2 neutrality. This includes identifying and implementing practical solutions to reduce emissions, engaging staff in the process, and offsetting emissions that cannot be avoided.

Building on this approach, a number of scientific articles have suggested practical ways for hospitals to reduce their carbon footprint.

In his article *Reducing the carbon footprint of hospital-based care*, Thomson proposes seven paths to climate friendly hospitals (2015):

1. **Energy efficiency**. Reduce hospital energy consumption and costs through efficiency and conservation measures.

2. **Green building design**. Build hospitals that are responsive to local climate conditions and optimized for reduced energy and resource demands.

3. **Alternative energy generation**. Produce and/or consume clean, renewable energy onsite to ensure reliable and resilient operation.

4. **Transportation**. Use alternative fuels for hospital vehicle fleets; encourage walking and cycling to the facility; promote staff, patient and community use of public transport; site health-care buildings to minimize the need for staff and patient transportation.

5. **Food**. Provide sustainably grown local food for staff and patients.

6. **Waste.** Reduce, re-use, recycle, compost: employ alternatives to waste incineration.

7. **Water**. Conserve water; avoid bottled water when safe alternatives exist.

In a recent study on primary care in Switzerland, Nicolet and colleagues found that heating and transportation are the main areas where mitigation efforts should be focused (2022). In fact, over half (55.5%) of the carbon footprint of primary care practices was due to mobility. The study showed that a staggering 63% of staff and 75% of patients traveled to their appointments by car, which accounted for more than 99% of the mobility footprint. It's clear that reducing emissions from transportation is critical, and this is where our mobility challenges at Quambio can make a significant difference.

Another example include Fortis Hospital, a multispecialty hospital in Kolkata (India) that was able to considerably reduce the carbon footprint without compromising quality health care to patients . It has accomplished this mainly by reducing consumption of energy for lighting and HVAC (Heating, Ventilation and Air-Conditioning). Other strategies employed by Fortis include the introduction of vegetarian food and eco-friendly travel (Bhattacharya et al., 2014).

These efforts are echoed by several other healthcare organizations around the world. In fact, the UK's National Health Service (NHS) is aiming to become the first healthcare system in the world to achieve net-zero emissions, while institutions like Kaiser Permanente and Gundersen Clinics in the United States and the Green Hospital Initiative in New Delhi are also making strides in reducing their carbon footprint (Cissé et al., 2022).

Closer, Basel University Hospital has reduced its food waste, switched to environmentally friendly reusable utensils for take-out food, and relies entirely on renewable energy sources for its electricity.

Conclusion

The healthcare industry significantly contributes to global greenhouse gas emissions, with hospitals consuming 2.5 times more energy than other commercial buildings. To reduce its carbon footprint, healthcare must implement practical solutions, including energy efficiency, sustainable transportation, waste management, and water conservation.

Many healthcare organizations worldwide are reducing their carbon footprint, with some aiming for net-zero emissions, but there is still a long way to go. Hospital managers can adopt sustainable practices and encourage environmentally responsible behavior among staff and patients to reduce their organization's carbon footprint and demonstrate their commitment to the planet.

Measuring remains the first step. We would gladly accompany you on that journey. Email us at support@quambio.com if you want to learn more.

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Images

Fig 1: *Health care climate footprint report*. (2019, September 10). Health Care Without Harm. https://noharm-global.org/documents/health-care-climate-footprint-report

Fig 2: Eckelman, M. J., Huang, K., Lagasse, R., Senay, E., Dubrow, R., & Sherman, J. D. (2020). Health Care Pollution And Public Health Damage In The United States: An Update: Study examines health care pollution and public health damage in the United States. *Health Affairs*, *39*(12), 2071–2079. https://doi.org/10.1377/hlthaff.2020.01247

Fig 3: *Reducing Healthcare Carbon Emissions*. (n.d.). Retrieved 28 April 2023, from https://www.ahrq.gov/healthsystemsresearch/decarbonization/index.html

Appendix

Health care emissions per capita by country				
Top emitters: (over 1t per capita)	**Major emitters** (between the 0.50t and 1t per capita)	**Higher than average emitters** (between global average 0.28t and 0.50t per capita)	**Lower than average emitters**	**Unknown**
Australia	Austria	Bulgaria	Brazil	Rest of World (ROW)
Canada	Belgium	Cyprus	China	
Switzerland	Denmark	Czech Republic	Croatia	
United States	Estonia	France	Hungary	
	Finland	Greece	India	
	Germany	Italy	Indonesia	
	Ireland	Malta	Latvia	
	Japan	Poland	Lithuania	
	Korea	Portugal	Mexico	
	Luxembourg	Slovenia	Romania	
	Netherlands	Spain	Slovak Republic	
	Norway	Sweden	Turkey	
	Russia	European Union		
	Taiwan			
	United Kingdom			

Table 2: Health care emissions per capita by country