A Quick Overview On Sustainable Healthcare

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About this publication:

About the project:

DesHealth (A Systemic Design approach to education and training on Sustainable Healthcare) project brings together an experienced cross-sector partnership to develop, through design- and systems-thinking methods, interdisciplinary training tools addressed to students and professionals working in the healthcare sector.

Project partners are: Politecnico di Torino, TU Delft, ESCI-UPF, Bioindustry Park "Silvano Fumero", Erasmus Medical Center, Fundació Unió Catalana d'Hospitals, TEM Foundation / Nordic Center for Sustainable Healthcare.

The project and the team are committed to promoting activities that enhance knowledge and awareness about sustainability in the healthcare field.

"A comprehensive approach with a long-term focus and a need to balance economic, social, and ecological interests needs to be used in the discussion of sustainable healthcare systems."

(Fischer, 2015, p. 298).

A QUICK OVERVIEW ON SUSTAINABLE HEALTHCARE

Sustainability and impact of the healthcare sector.

According to the "Healthcare's climate footprint: how the health sector contributes to the global climate crisis and opportunities for action" (HCWH, 2019). These emissions primarily come from healthcare facilities and vehicles (17%), energy sources for electricity and heating (12%), and the supply chain (71%), including the production, transport, and disposal of goods and services. The sector produces 4.4% of global greenhouse gas emissions and the United States, China, and European Union countries themselves account for 56% of the sector's climate footprint.

The emission of the healthcare sector is equivalent to those of 514 coal-fired power plants.

But let's take a step back. When we talk about emissions from a productive sector, we can divide the production of greenhouse gases into three categories:

Scope 1:
direct emissions from sources owned or controlled by the organisation, such as fossil fuels burned in company vehicles or production plants.

Scope 2:
indirect emissions from the energy purchased and consumed by the organisation, such as electricity.

Scope 3:
Indirect emissions in the value chain: business travel, operational waste, and product usage.

Through this type of analysis, as mentioned earlier, most of the sector's emissions come from the production chain involving the manufacturing of hospital products, such as equipment and tools, or the production of drugs and other chemicals. Additionally, transportation, heating, and the disposal of hazardous products contribute significantly. This is because the healthcare sector has a very complex supply chain involving many stakeholders. In environmental policies and particularly in new sustainability strategies for the health sector, the climate impact serves as the primary metric for environmental issues.

While it is a useful criterion for prioritising actions, various types of environmental impacts affect the sector (NCSH, 2019). Some have a very high carbon footprint, while others, though less critical in this regard, are equally important:

1. Chemical Use:
Chemicals that disrupt natural systems and cycles present significant environmental and health risks. Large quantities of chemicals are utilised in the production of medical goods and devices, as

Figure 1: percentage of total emission for each scope (adapted from HCWH, 2019)
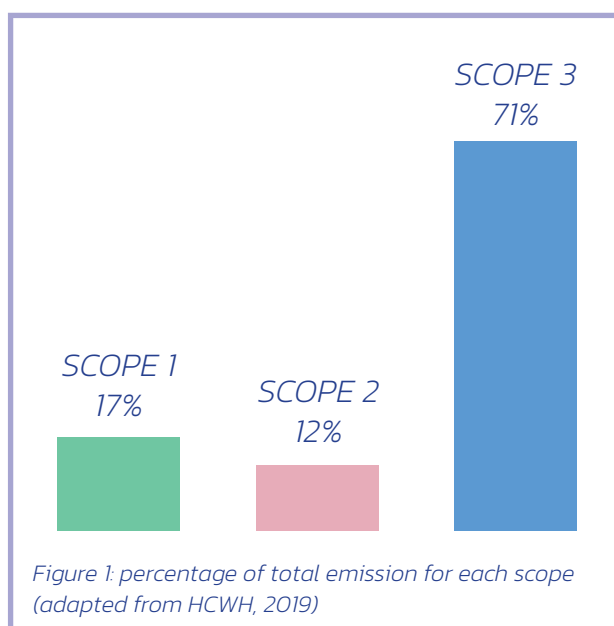
well as in healthcare practices, including sanitisation and medical treatments.

2. Waste Generation:

Waste entails substantial economic and environmental costs for healthcare facilities, particularly concerning the disposal of hazardous or infectious waste. The issue is intensified by the prevalent use of disposable products and devices in the health sector, driven by infection control standards and regulatory complexities.

3.Water Resources:

Water issues in the health sector are two-fold: on one hand, certain healthcare treatments and disinfection processes require vast amounts of water; on the other hand, the release of pollutants through wastewater is a significant environmental and health problem, especially with pharmaceutical substances present in the water.

Distribution of the healthcare sector emissions

Each scope showed in Figure 1 includes a set of activites impacting the production of GHG emissions. Below is the detail.
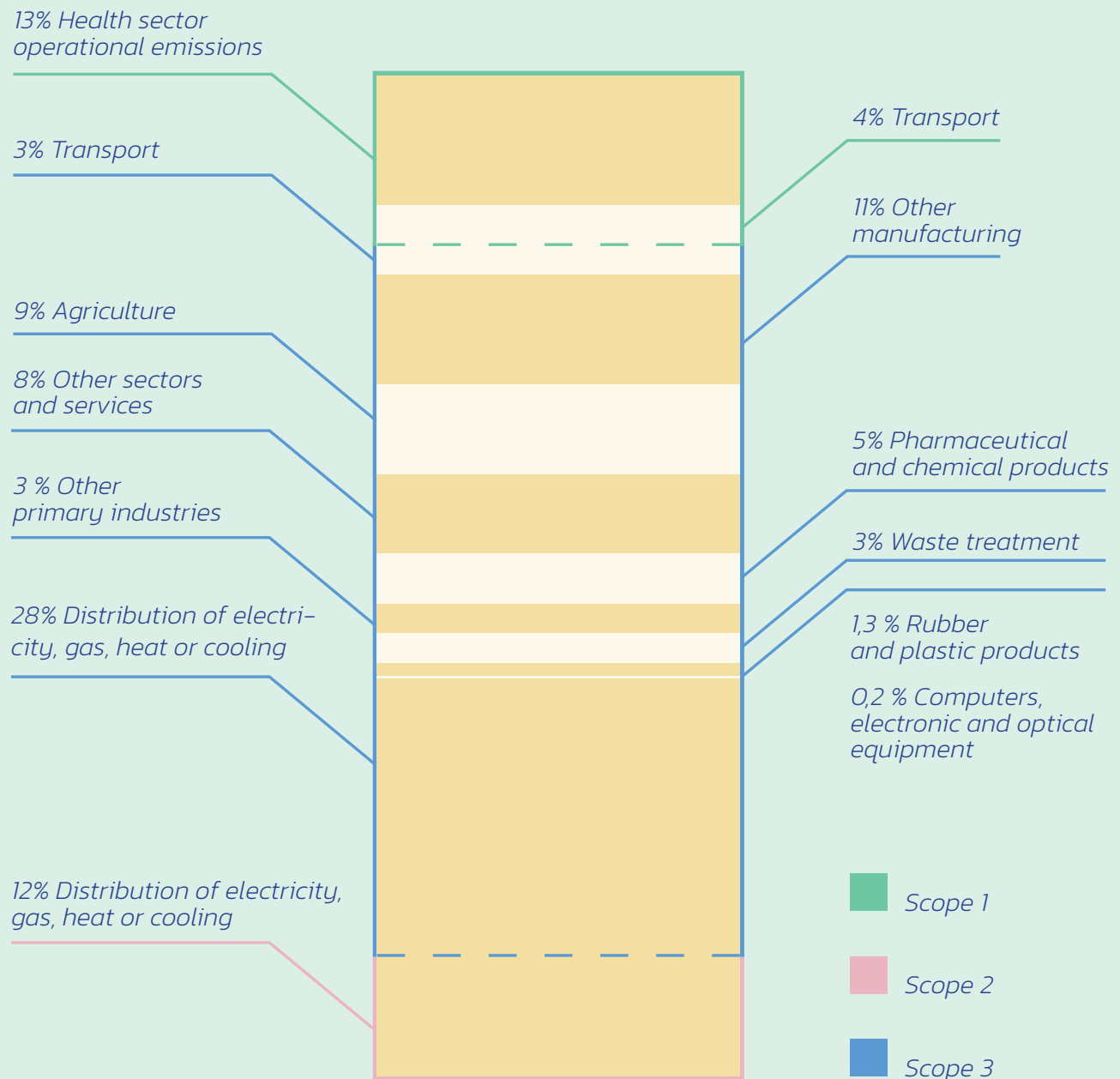
13% Health sector operational emissions

3% Transport

9% Agriculture

8% Other sectors and services

3 % Other primary industries

28% Distribution of electri–city, gas, heat or cooling

12% Distribution of electricity, gas, heat or cooling

4% Transport

11% Other manufacturing

5% Pharmaceutical and chemical products

3% Waste treatment

1,3 % Rubber and plastic products

0,2 % Computers, electronic and optical equipment

Scope 1

Scope 2

Scope 3

Figure 2: deconstruction of each impacting activity (adapted from HCWH, 2019)

4. Energy Resources:

Healthcare facilities consume vast amounts of energy, even more so when considering the energy impact of the entire supply chain. Overall, energy distribution accounts for 40% of the sector's greenhouse gas emissions. These macro-problems are pervasive for stakeholders in the health sector, impacting health facilities as well as manufacturers and industries within the supply chain.

The state of sustainable healthcare

Although sustainability has gained increasing traction over the past thirty years, current research is moving towards a more systemic approach to sustainable healthcare. This approach leverages the driver of the circular economy to rethink the sector as a whole. It proposes new design and economic models that consider the technological, environmental, and social complexity of healthcare processes and products. Therefore, new policy strategies are needed to foster connections between different sectors and introduce innovative technological and organisational solutions derived from other industries. Despite the positive and feasible evolution towards sustainable and circular healthcare, there is still a fragmented view of sustainability issues in healthcare. Currently, hospital organisations and international associations are leading the sustainable transition of the healthcare sector, while the industry is embracing change at a slower pace. Significant disparities also exist between different

A silo mentality may hinder collaborative innovation towards sustainable healthcare

countries, with healthcare systems in the UK, Sweden, the Netherlands, the United States, Canada, and Australia being more advanced in terms of policies and innovations. In contrast, other countries in Europe and globally show isolated good practices but lack a structural approach to sustainability in healthcare.
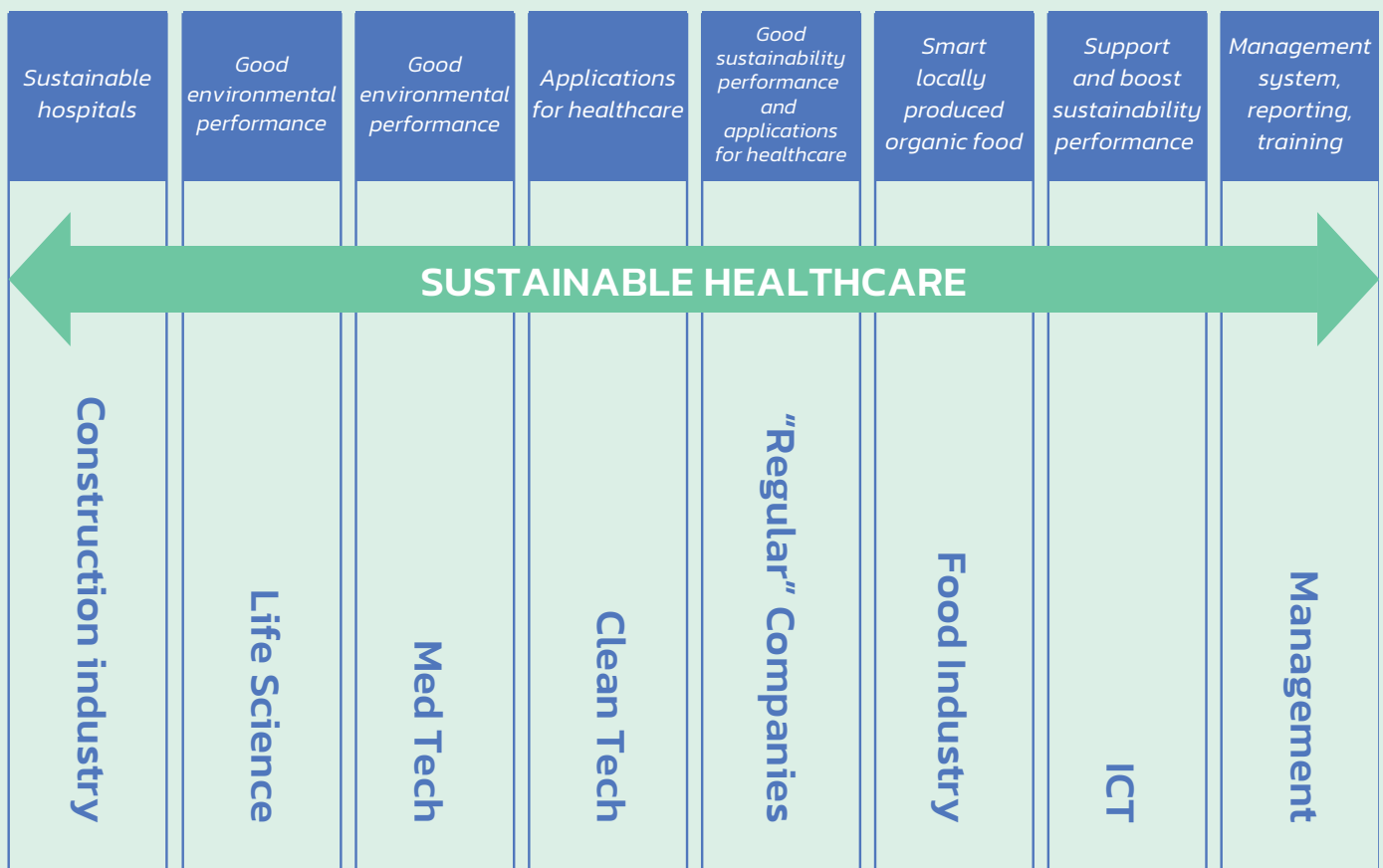

Sustainable hospitals	Good environmental performance	Good environmental performance	Applications for healthcare	Good sustainability performance and applications for healthcare	Smart locally produced organic food	Support and boost sustainability performance	Management system, reporting, training
Construction industry	Life Science	Med Tech	Clean Tech	"Regular" Companies	Food Industry	ICT	Management

SUSTAINABLE HEALTHCARE

Figure 3: conceptualisation of the silo approach and how Sustainable healthcare must spread to all fields (NCSH, 2019)

Bridging healthcare silos

To promote widespread and sustainable change in the healthcare system, it is essential to overcome the silo organisation of health systems. This fragmented model has often led to communication and collaboration issues, limiting the effectiveness and sustainability of care. In contrast, a broad intervention is needed, involving and collaborating with various healthcare sector stakeholders, including service providers, local professionals, large healthcare centres, and emerging green technology companies. Only through close collaboration and continuous dialogue among all stakeholders can we develop sustainable healthcare models that meet current and future needs. This change is already underway thanks to the shift in focus towards people. What is called a "patient-centred" or "humanity-centred" approach is redefining healthcare organisation, shifting services from a hospital-based model to a distributed care model. New models of home and community care are emerging, improving care quality and reducing hospitalisation costs. Technology plays a crucial role in this change, with digital solutions connecting hospitals, staff, and patients, facilitating telemedicine and mobile care services. The ongoing transformations require a greater spread of healthcare services through local units and professionals supporting community and home care. At the same time, large healthcare centres are centralising expertise and improving the management of acute and non-chronic diseases, merging individual hospitals to increase cost efficiency and provide high-quality care to a larger number of people. Simultaneously, attention to environmental sustainability is driving significant transformations. Healthcare providers are implementing strategies for staff training and facility management, with an increasing number of programmes dedicated to environmentally sustainable behaviours. Resource management focuses on issues such as energy efficiency and waste management, as well as adopting sustainable procurement strategies like Green Public Procurement. The integration of biomedical, digital, and clean technologies is supporting the dematerialisation of products, reducing the environmental impact of physical goods,

and better meeting the demand for distributed healthcare services. More accurate data collection and monitoring will allow for the evaluation of the long-term impacts of substances and materials used in healthcare, adopting a holistic approach to lifecycle design. This will enable a significant reduction in the carbon footprint of the healthcare industry, promoting a climate-smart healthcare approach.

Competencies for building sustainable healthcare

Hospital and professional associations have pioneered training on sustainable medical routines, from resource consumption to waste management, also driven by a patient-centred vision that leads to planet-centred care. However, a systemic approach is often lacking, and issues risk being addressed in a fragmented manner. On the industrial side, the educational landscape for sustainability in healthcare is extremely deficient, and professionals often lack the skills to develop new sustainable products and services. Investing in professional training for sustainability improves employee satisfaction and performance and builds internal competencies to seize market opportunities. Effective sustainability training must raise awareness, provide skills to identify and manage environmental issues, and enable employees to achieve the organisation's

Design and management training on healthcare sustainability can raise awareness and provide skills to address environmental issues.

environmental objectives.

Therefore, the lack of comprehensive and integrated training prevents healthcare professionals from fully understanding the impact of their activities on the environment and adopting more sustainable practices.

However, today presents a unique opportunity to structure positive change, starting from skills development in those areas that, as described above, are the most impactful within a health system. Hence, design and management disciplines can play a key role, as they can offer specific knowledge and tools for designing and managing health products/services/systems and their supply chains.

Providing present and future professionals with fundamental skills in design and management can effectively support them to boost the sustainable transition of the healthcare sectors. Implementing a training program with a specific agenda on sustainable design, sustainability management, and systemic design, along with intensive and practical courses, would allow students to collaborate with colleagues from different sectors and backgrounds. This interdisciplinary and practical approach would not only improve learning and engagement but also have tangible positive impacts on the network of professional organisations involved.

Developing skills in these key areas would enable addressing the significant emissions of the healthcare sector, promoting sustainability in a systemic and integrated way.

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