

Sustainability transitions in university hospitals: Contextualising research incentives and ethical responsibilities

While there is agreement on the need to improve sustainability in university hospitals, there are strong differences of opinion on how such goals interact with responsibilities of the medical profession, including research activities. To facilitate sustainability transitions in university hospitals, we need to gain a better understanding of the multiple incentive structures and ethical responsibilities related to sustainability that influence the physicians working there. Furthermore, there needs to be greater awareness and systematic consideration of the health co-benefits of sustainability transitions. Both are necessary to prevent the sustainability agendas in hospital settings from becoming deadlocked due to disagreements over priorities and implementation, despite initial consensus in principle.

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The case of sustainability in university hospitals

The strong influence of the environment and climate change on health has led physicians to take a key role in climate action (Mai-bach et al. 2021). One reason is that the health sector accounts for approximately 5.2% of all global greenhouse gas emissions, offering significant opportunities for reductions (Romanello et al. 2022). Consequently, starting to implement changes at one's own institutions sets an example and enhances the credibility of climate advocacy. Hence, university hospitals around the world are beginning to form and join alliances for hospital sustainability to promote and implement the idea of “green hospitals” (Health Care Without Harm n. d.). Hospital staff can contribute to environmental sustainability goals by increasing their own carbon literacy, demanding better access to public transportation and setting an example by using such systems, working with communities to procure food and energy from more sustainable sources, cooperating in waste reduction and energy conservation, promoting health prevention to reduce rehospitalisation rates, informing people about the environmental dimension of health, or engaging in environmental health advocacy (NHS England 2022, Keller et al. 2023). Furthermore, through alliances, hospital staff can exchange knowledge on sustainability transitions, engage in

partnerships to facilitate innovation that reduces environmental impact, make sustainability practices more cost-effective, gain greater visibility for their environmentally positive action leading to replication of green initiatives in other sectors, and even encourage a sense of community when fighting to advance environmental protection (Pierce and Jameton 2004, Howard et al. 2023).

However, the transition to more environmentally sustainable university hospitals can have both economic and social implications. It should not jeopardise equitable access to and provision of adequate healthcare because the provision of health care remains the primary obligation of physicians and is essential to the global *Sustainable Development Goal 3* “Good Health and Well-Being”. Therefore, while the “green hospital” label places a clear emphasis on environmental sustainability, many alliances seeking to introduce and improve sustainable practices in hospitals recognise that sustainability has social and economic dimensions that need to be addressed as well.

University hospitals are often places where physicians gain their first professional experience. As such, they are crucial places to install norms and practices, including those related to sustainability, that can influence the further professional paths of physicians. In this sense, medical faculties, too, have begun to develop and revise curricula to improve knowledge on the impact of the environment on human health and the need to reduce the environmental footprint of the health sector (Nieberle et al. 2023).

One way to critically discussing whether and how to transition toward sustainability that has been less explored is to assess the different incentives that influence research and interdisciplinary cooperation on sustainability transitions in hospitals, and to examine how they interact with ethical responsibilities with-

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in the medical profession. This is what this paper does. Our rationale for choosing university hospitals is their strong pressure and motivation to engage in research, their influence on the professional development of physicians, and their capacity and epistemic authority to introduce new sustainability standards into the health sector.

We argue that if sustainability transitions are to be successful, incentives are a critical element to consider and must be aligned with sustainability goals. Furthermore, sustainability policies need to be compatible with professional values. This is, however, not an easy task to put into practice. Using university hospitals as an example, we show that the shift towards “green hospitals” faces substantial challenges, but also valuable opportunities. We focus on three factors: incentives that favour complex technological solutions, incentives that lead to an overemphasis on cure at the expense of prevention, and conflicts within the medical profession arising from special duties to patients.

How innovation incentives and complexity bias undermine sustainability aims

Alliances to improve sustainability in hospitals vary significantly in how narrowly or broadly they understand sustainability as well as in their commitment to a holistic assessment of their practices (Weisz et al. 2011). Efforts to introduce and expand sustainability practices need to be backed by scientific evidence to avoid situations where ineffective measures are implemented or where such interventions pose health risks. In general, a very wide range of research and innovation initiatives are being undertaken to advance sustainability transitions. These efforts can take different directions, depending on how they involve other natural sciences and engineers, cooperate with social scientists, or involve nurses, technicians, and facility management. For instance, after decades of favouring single-use products, materials scientists and medical researchers are again developing materials that can be safely recycled to reduce the carbon footprint of transport and the health risks of inadequate waste disposal (Greene et al. 2022). Others are working on innovative business strategies to cooperate with local farmers for their food procurement, thus combining environmental sustainability with social responsibility while providing fresh and healthy food (Klein 2015). Another perspective has looked more closely at institutional values and found that a positive work environment where employees are involved in decision-making can lead to a commitment to sustainability with high levels of compliance (Borges de Oliveira and de Oliveira 2022).

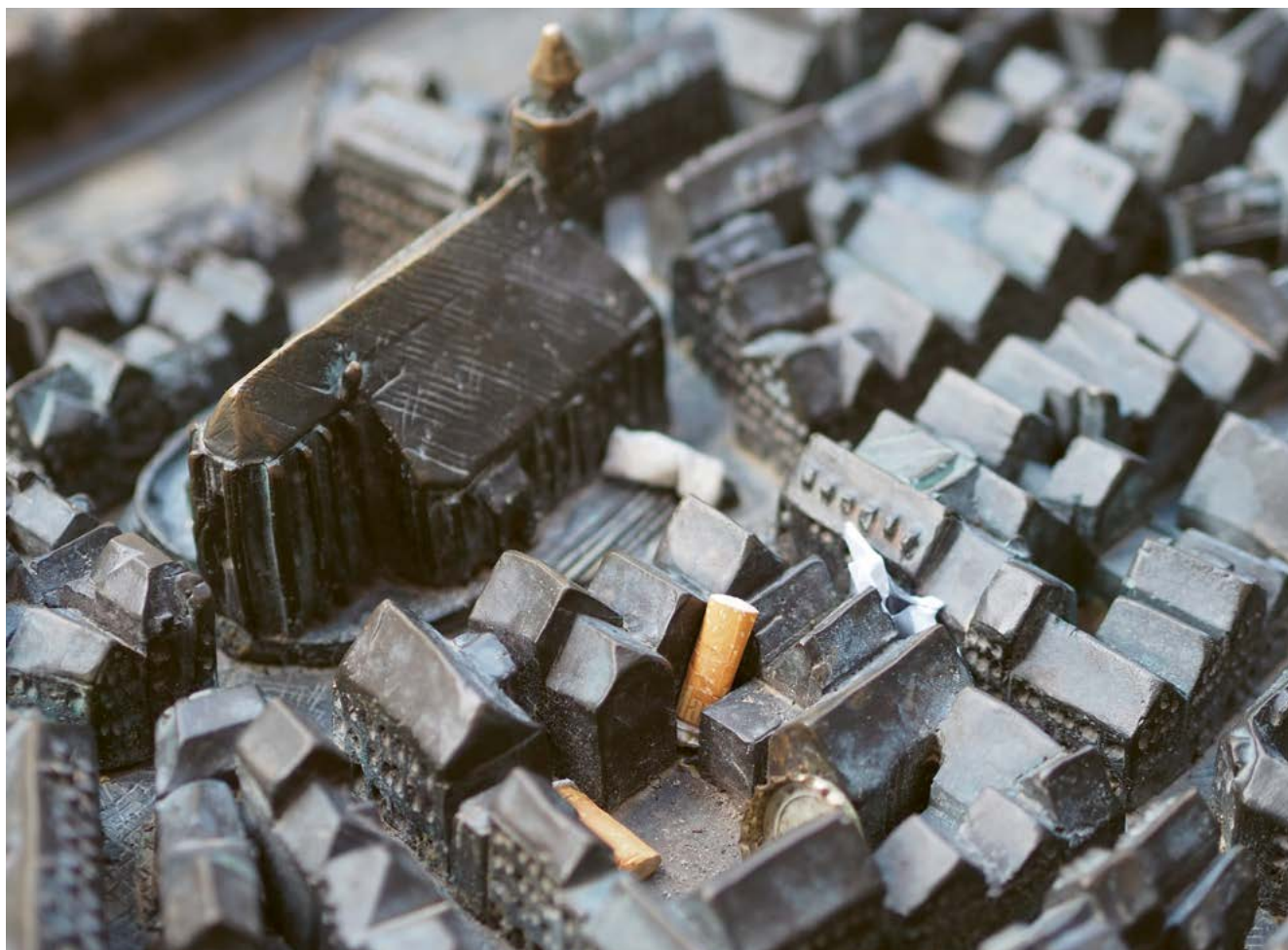
While these are laudable efforts in many cases, we proceed by examining the problem of incentives at the structural, research, and clinical levels that strongly favour overly narrow interpretations of sustainability by seeking quick technological solutions resulting from breakthrough science. This is to the detriment of incremental innovation which is more likely to focus on continuously assessing and experimenting with small improvements.

At the structural level, for example, there are a number of incentives dictated by industry and politics which favour breakthrough science. Universities and other types of research institutes are usually evaluated based on measurable outputs, focusing on *quantifiable* items such as the number of patents, the volume of funding acquired through industry collaborations, or the impact factors of the peer-reviewed journals where their researchers publish (Stephan 2012). All three variables tend to favour fast, breakthrough science. Patents – which are also a key to attracting industry partners – can only be obtained for inventions that have an “inventive step” and therefore do not cover incremental innovation. Furthermore, it does not make sense to seek patents for inventions that can be easily replicated, as it would be too costly to monitor whether people are actually buying the product from the exclusive rights holder (Timmermann 2020). Research on interventions that involves observations over longer periods of time, which are key to assessing long-term sustainability, is therefore penalised for not producing rapid scientific outputs in peer-reviewed journals (Geertsema et al. 2016). The higher the cost of research and development – which is substantial in the medical field due to safety protocols and testing – the harder it is for individual scientists and departments to deviate from this trend.

In addition, at the research level, institutions with a strong scientific base, which include university hospitals, tend to overemphasise the importance of advanced technological innovation (“complexity bias”, see Hofmann 2020) and overestimate the ability to improve their own practices through technological fixes (“solutionism”, see Wehling 2022 and Nutas 2024, in this issue). Such tendencies are often associated with the hype surrounding a new complex technological tool. This bias may lead researchers to insist on the use of a new tool as a universal solution, without first examining the root causes of the problem and assessing whether the use of such a tool is an adequate response to the problem at hand (Wehling 2022).

A strong enthusiasm for technological solutions in research may also lead to overlooking the potential of measures that are not based on advanced technologies, such as advocating better access to public transportation or the availability of showers for employees who want to cycle to work. Research has shown that such measures can significantly reduce carbon footprint while adding the health benefits of a more active lifestyle (NHS England 2022). Without a major change in lifestyle, insisting on technological solutions may only lead to temporary relief that does not address the root causes of our environmental crises (Stein 2024). Furthermore, as some physicians from the Global South are trained in university hospitals in wealthy countries, where hierarchical structures often prevail, it is likely that many of them will take this bias with them to hospitals where the socioeconomic conditions are even less suitable for such preferences.

We argue that research on how to make hospitals more sustainable requires an appreciation of the complex individual, social, political and environmental circumstances. It requires short-, medium- and long-term research designs, also aiming at low-



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tech solutions, including interdisciplinary exchange, for example between engineering, social sciences, health sciences, psychology, and many others. Moreover, hospitals need to collaborate effectively at local and global levels to share knowledge and experience. However, this can be a difficult, slow, and even burdensome process. Nevertheless, it is worth trying, as the alternative is the introduction of technologies that fail to advance environmental sustainability goals, have little social value, and are economically inefficient.

Therefore, at the clinical level, awareness needs to be raised that interventions that have been shown to be effective in small trials may not deliver the promised results if evidence from more complex organisational studies is ignored. University hospitals often have highly hierarchical work structures that may lead to oppressive work environments. These also make it likely that people will not participate in advancing institutional goals, show high levels of absenteeism, and even commit small acts of sabotage (cf. Chullen et al. 2010). Such work environments are also socially unsustainable because they discourage health workers from continuing to work in larger institutions, particularly in the lower-paid public sector. In contrast, work environments with high levels of employee satisfaction encourage workers to make

suggestions and to use and share their knowledge to make hospitals more sustainable (Borges de Oliveira and de Oliveira 2022).

In terms of teaching, working towards hospital sustainability requires not only critically scrutinising the environmental footprint of current practices and alternatives, but also reviewing the design of medical curricula and continued education. In becoming physicians, medical students should be open to the possibility that simple innovations can be more effective in reducing the environmental footprint in the health sector, thereby reducing health hazards, while also being economically and socially sustainable. Medical training should also emphasise the need to facilitate and welcome cognitive diversity to advance sustainability goals that require broad commitment and multiple forms of expertise, including the social and political dimensions (cf. Pratt et al. 2020) needed for sustainability transitions. Otherwise, the new generation of physicians will continue to make the same mistakes as the previous, failing to recognise that the transition to sustainability requires the participation and recognition of sustainability as a value by everyone working in an institution. >

The drawbacks of overemphasising curative over preventive approaches

Public health researchers have long criticised the priority given to funding and research to curing rather than preventing health ailments. We argue that emphasising preventive measures, like encouraging and facilitating physical activity, can not only support physicians in their professional commitment to preventing harm, but also have a range of environmental and health co-benefits, making them more economically and socially sustainable (Frank et al. 2010). Physicians working in university hospitals need to be aware of their important and influential position within the health sector. By continuing to overemphasise the curative role of medicine, they may help to undermine efforts to strengthen preventive approaches. Their voice in support of preventive approaches can help to advance public health interventions and thereby improve health.

Again, there are obstacles to placing greater emphasis on research and evaluation of preventive measures. In terms of accounting, physicians can measure in detail the number of surgeries and consultations, but only give a very vague picture on how specific interventions have improved health and reduced overall environmental impact. In medical practice, this can result in difficulties in securing adequate remuneration for preventive work, while in research, it can have the effect described above of not aligning with the paradigm of fast, breakthrough

science. Similarly, it is difficult to gain recognition and support for preventive work, such as extensive patient communication to reduce the risk of rehospitalisation.

In terms of cost-effectiveness, some sustainability measures, such as creating green spaces around hospitals, may have only a marginal impact on carbon reduction, but play a key role in prevention by facilitating physical activity and improving mental health (NHS England 2022). University hospitals, as science-based institutions, are often seen as role models, making it likely that good practices, such as greening facilities, will be replicated by hospital visitors and other industries.

Special duties to patients and ethical responsibilities in promoting sustainability

While hospitals in general are managed by a range of different professionals, physicians remain key stakeholders and have considerable bargaining power as a professional group. To understand the potential role that physicians can play in sustainability transitions, in this final section we examine how sustainability goals are compatible with their professional identity, particularly in relation to their medical ethos, and how advancing such goals in medical practice affects trust.

Some physicians have expressed hesitancy in assuming a role in environmental protection. As members of the medical profession, physicians have well-defined duties to their individual patients that may conflict with broader social obligations towards sustainability, thereby undermining trust (Wiesing 2022). Nevertheless, there is fairly broad consensus that providing health care for some should not harm others. However, what at first glance appears to be a straightforward extension of the bio-ethical principle of non-maleficence is far from settled when it comes to assessing how harm minimisation is to be interpreted and whether it applies to other species and ecosystems (cf. Wardrope 2020). An appeal to harm reduction has motivated measures to limit the release of toxic substances and reduce greenhouse gas emissions, as promoted by alliances such as Health Care Without Harm (Weisz et al. 2011). Another position argues that the negative impact of climate change on global health obliges physicians to broaden their social mandate and redefine their profes-



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sional ethos (van Gils-Schmidt and Salloch 2024). Physicians have not only obligations to attend to the needs of individual patients, but also ethical responsibilities to ensure that people are able to live healthy lives now and in the future. It would therefore be their responsibility to support efforts towards institutional sustainability.

In assessing professional responsibilities, it could be argued that while the environmental footprint of the health sector is considerable, there are other industries from which far more urgent action could be demanded before health services are jeopardised. This line of reasoning may discourage emphasising issues of sustainability within the medical profession, as others can do the job. However, as the environment has a massive impact on people's health, there is a strong case for the health sector, and those working within it, to do more than their "fair environmental share" to reduce their environmental footprint (Whitmee et al. 2015). Furthermore, if physicians as health experts have already implemented high environmental standards in their own institutions, they are leading by example and this may have a resonance far beyond the health sector and trigger broader environmental action (Maibach et al. 2021).

There are steps that can be taken to avoid undermining trust. For a start, physicians need to be aware that there is a lot of disinformation about the costs and benefits of "greening" hospitals. Issues of cost-effectiveness in times of austerity and high inflation are a sensitive topic for patients and their relatives. Disinformation needs to be addressed through effective communication campaigns that clearly explain to hospital visitors and staff the importance of implementing sustainability measures, along with their costs, future savings, and social and ecological benefits. Building public acceptance requires involving neighbouring communities in sustainability transition processes, listening to their concerns and working jointly towards developing solutions where feasible (Macpherson and Hill 2017). University hospitals and their staff are in a unique position to build public acceptance. Through their strong role in medical education and research, and their links with other disciplines, particularly ethics and social sciences, university hospitals and their staff have the re-



sources to take a pioneering role in developing effective communication and public engagement strategies on sustainability transitions.

Conclusion

To facilitate sustainability transitions in university hospitals, we need to gain a better understanding of the multiple incentives and ethical responsibilities that university hospital health professionals face, including in their role as researchers. We discussed three factors complicating sustainability transitions: incentives that favour scientific or technological breakthrough solutions at the expense of low-tech (or non-technological) solutions without prior systematic assessment of their social value, a continued focus on curative approaches at the expense of preventive strategies, >

and different ethical positions regarding the place of sustainability in the medical ethos.

In order to cooperate in advancing sustainability transitions, it is important to understand the impact of multiple ethical responsibilities and incentives on the way health professionals pursue their work in university hospitals. Ethical values and misaligned incentives related to sustainability in health care need to be identified so that sustainability becomes much more than a buzzword, and the urgent transformation of the health sector towards sustainability can be successful.

Despite the difficulties of driving sustainability transitions in university hospitals, these university hospitals are both a necessary and fortuitous starting point, as good and bad habits learned at the first work environment often persist throughout people's professional career.

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