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Why should we teach about sustainability in medical schools? The MedInTo initiative

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Why a medical student should learn about sustainability? Sustainability is the practice of meeting current needs without compromising the ability of future generations to meet their own needs. It involves maintaining a balance between economic growth, environmental protection, and social wellbeing. In recent years, sustainability has transcended its traditional environmental, economic, and social boundaries, becoming a critical component of global health and healthcare education (Wanyenze et al., 2023). As the medical community grapples with the wide-reaching impacts of climate change, resource depletion, and environmental degradation, integrating sustainability into medical curricula has never been more urgent (Gandhi et al., 2020; Brown et al., 2024; Bahattab et al., 2024).

The relationship between environmental sustainability and health is both profound and multifaceted. Climate change, air and water pollution, and the loss of biodiversity significantly affect human health, which is contributing to an increase in respiratory and cardiovascular diseases, vector-borne illnesses, and mental health disorders (Landrigan et al., 2024). Educating medical students about these connections prepares future physicians to understand and address the environmental and social determinants of health, thereby fostering a more holistic approach to patient care (Gandhi et al., 2020; Brown et al., 2024; Bahattab et al., 2024). Understanding the link between environmental factors and disease allows medical students to identify and address the root causes of various health conditions. Many diseases, including respiratory and, cardiovascular issues, among others, are influenced by factors like pollution, climate change, and exposure to toxins. By integrating this knowledge, students are equipped to not only treat but also anticipate and mitigate health risks through targeted public health initiatives. They may advocate for policies aimed at reducing pollutants, promote lifestyle changes to minimize exposure to harmful substances, and/or support sustainable urban planning to improve overall community health. These preventative strategies can significantly lower the incidence of environmentally driven diseases, thus reducing the demand for acute and chronic care services. This proactive approach helps decrease the economic and resource burden on healthcare systems, making them more sustainable and resilient in the long run. For instance, promoting clean air initiatives can decrease the incidence of asthma and other respiratory conditions in a given area (Manisalidis et al., 2020). Embedding sustainability in medical education empowers future doctors to advocate for and implement preventive measures that benefit both individual patients and public health.

Physicians occupy a unique position of trust and influence in society, bearing an ethical responsibility to advocate for practices that protect and promote the wellbeing of current and future generations. Teaching sustainability in medical schools equips future physicians with the knowledge and skills to champion policies and practices that mitigate environmental harm. This advocacy extends beyond clinical settings, influencing broader societal changes necessary for sustainable development. Moreover, healthcare systems themselves are vulnerable to the impacts of climate change and environmental degradation. Natural disasters, pandemics, and resource shortages can disrupt medical services, underscoring the need for resilient healthcare infrastructures. Sustainability education provides medical students with the tools to design and support healthcare systems that are adaptable and resilient in the face of environmental challenges. This includes understanding sustainable practices in hospital management, waste reduction, and energy efficiency (GBD 2019 Risk Factors Collaborators, 2020).

Aligning with global health priorities is another compelling reason for integrating sustainability into medical education. Global health organizations, including the World Health Organization (WHO), have recognized the critical importance of sustainability. The WHO's Global Strategy on Health, Environment, and Climate Change outlines the need for health systems to be environmentally sustainable. By incorporating sustainability into medical education, we align with these global health priorities and contribute to a unified, international effort to improve health outcomes through sustainable practices (GBD 2019 Risk Factors Collaborators, 2020; Amorós Molina et al., 2023).

This paper aims to present the work conducted in the MD program in Medicine and Surgery of University of Turin-MedInTo to advance the sustainability goals set by the United Nations, particularly SDG 13 (Climate Action), SDG 3 (Good Health and Wellbeing), and SDG 15 (Life on Land). By integrating these objectives into a unified framework, we not only address critical global health and environmental challenges but also contribute to SDG 17 (Partnership for the Goals), demonstrating how interdisciplinary partnerships can enhance the collective impact toward sustainable healthcare and environmental preservation.

Since its launch in the academic year 2017–2018, the MD program-MedInTo has been dedicated to integrating innovative teaching approaches at the early stages into the medical curriculum. Over the past academic years, dedicated elective classes have been held with the aim of providing students with the key principles of: (I) an overview of sustainability, (II) healthy and sustainable diets, and (III) sustainability and greenwashing.

Table 1 describes the main characteristics of the activities currently in place at the MedInTo exploring the cross-talk between health and sustainability.

The activities include a workshop where students were asked to create a pamphlet that could potentially be disseminated among general practitioners and healthcare facilities in the area to increase awareness on the topic. The task required students to integrate their knowledge by focusing on a specific SDG. Examples are provided as Supplementary material S1.

The pamphlets will be used as an educational and practical guide to encourage sustainable habits among individuals, students, and communities. They provide actionable tips on nutrition, hydration, reducing unhealthy habits, and enhancing mental health while linking these to broader sustainability goals, such as reducing waste and conserving resources. Additionally, the pamphlets address critical issues like water conservation, sustainable transportation, and managing food waste, aiming to inspire individuals to adopt eco-friendly practices in their daily lives. They are meant to be effectively utilized in settings like universities, community centers, and public health campaigns, offering a comprehensive overview of small, sustainable actions that contribute to long-term health and environmental wellbeing.

TABLE 1 Activities included in the medical curriculum of the MedInTo exploring the cross-talk between health and sustainability.

Activity	Description
Health, food and sustainability	
Type: Elective Credits/recognition: 1 (25 h, five in person teaching, five workshop activity, 10 individual study) Workshop topic: how can we link the SGD and the topic Health, Food And Sustainability?	Teaching objective: the primary teaching objective of the course "Health, Food, and Sustainability" is to equip students with the knowledge to identify and promote healthy dietary patterns while understanding the environmental impact of food choices. The course aims to develop critical thinking skills regarding nutrition and sustainability, enabling students to apply this knowledge in their professional practice. Learning outcomes and program: upon completion, students will be able to: - Define and differentiate between healthy and unhealthy diets. - Evaluate the role of different foods in disease prevention. - Understand the environmental implications of food production and consumption. - Apply evidence-based knowledge to promote sustainable and healthy eating practices.
Introduction to health and sustainability	
Type: Elective Credits/Recognition: 1 (25 h, five in person teaching, five workshop activity, 10 individual study) Workshop topic: how can we link the SGD and the topic Health And Sustainability?	Teaching Objective: the primary objective of the "Introduction to Health and Sustainability" course is to familiarize students with the fundamental concepts of sustainability in health care. The course aims to develop an understanding of how environmental, social, and economic factors influence health outcomes and the sustainability of health systems. Learning outcomes and program: by the end of the course, students will be able to: - Explain key concepts in sustainability and their relevance to health. - Analyze the impact of environmental and social factors on public health. - Apply sustainability principles to health care practices and policies. - Evaluate the long-term effects of health interventions on communities and ecosystems.

Those activities have confirmed our confidence in the concept that teaching sustainability fosters a culture of innovation for the healthcare providers of tomorrow. Medical students exposed to sustainability concepts in their curricula are more likely to develop creative solutions to complex health problems.

This can lead to advancements in medical technology, sustainable pharmaceuticals, and eco-friendly medical materials and practices. Encouraging innovation in sustainability not only benefits the environment but also improves the efficiency and effectiveness of healthcare delivery.

Our initiative is in line with a growing number of programs and activities ongoing around the world. Among others, the recently launched European Network on Climate & Health Education (ENCHE), founded by leading medical schools from France, Germany, Ireland, Italy, Poland, Portugal, Slovenia, Sweden, Spain, Switzerland and the UK, aims to integrate climate and health teaching into curricula to help medical students recognize, prevent, and treat the increasing burden of the climate crisis on public health, as well as deliver sustainable healthcare solutions. Similar initiatives have also been launched in prestigious institutions in the U.S., including at the Carle Illinois College of Medicine, Harvard University's Medical School and T.H Chan School of Public Health, Columbia University's Mailman School of Public Health, and the University of Washington's Center for Health and the Global Environment (CHanGE).

Future research is needed to explore specific aspects of implementing sustainable practices in healthcare and to monitor the impact of educational activities.

In conclusion, the integration of sustainability into medical education is not merely a forward-thinking ideal; it is a necessity for the future of healthcare. As we confront the growing challenges posed by environmental changes, medical professionals must be equipped with the knowledge and skills to respond effectively. Teaching sustainability in medical schools ensures that future physicians are prepared to provide comprehensive, preventive, and resilient care, ultimately safeguarding the health of both people and the planet.

Author contributions

GG: Conceptualization, Writing – original draft, Writing – review & editing, Supervision. DL: Conceptualization, Supervision, Writing – original draft, Writing – review & editing. FR: Conceptualization, Supervision, Writing – original draft, Writing – review & editing. SS: Conceptualization, Writing – original draft, Writing – review & editing, Visualization.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fclim.2024.1483198/full#supplementary-material

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