

Global Health and Climate Disasters in the Medical Curriculum: An Urgency for the 21st Century

Saúde Global e Catástrofes Climáticas no Currículo Médico: Uma Urgência para o Século XXI

Salud global y desastres climáticos en el currículo médico: una urgencia para el siglo XXI

Rafael Antônio Galante Gasparini¹, Gabriella Bagatini Primaz², Letícia Marchi Kieling³, Luísa dos Santos Furquim⁴, Fabíola Andrezza Leal Nickel⁵, Juliana da Rosa Wendt⁶.

Como citar: Gasparini RAG, Primaz GB, Kieling LM, Furquim LS, Nickel FAL, Wendt JR. Global Health and Climate Disasters in the Medical Curriculum: An Urgency for the 21st Century. REVIS. 2026; 15(Esp.4): 34-40. Doi: <https://doi.org/10.36239/revisa.v15.nEsp4.p34a40>

REVISA

1. Universidade Federal de Santa Maria (UFSM). Santa Maria, Rio Grande do Sul, Brasil. <https://orcid.org/0000-0001-8952-5468>

2. Universidade Federal de Santa Maria (UFSM). Santa Maria, Rio Grande do Sul, Brasil. <https://orcid.org/0009-0007-0121-5491>

3. Universidade Federal de Santa Maria (UFSM). Santa Maria, Rio Grande do Sul, Brasil. <https://orcid.org/0009-0004-7159-6777>

4. Universidade Federal de Santa Maria (UFSM). Santa Maria, Rio Grande do Sul, Brasil. <https://orcid.org/0009-0007-7789-657X>

5. Universidade Federal de Santa Maria (UFSM). Santa Maria, Rio Grande do Sul, Brasil. <https://orcid.org/0009-0007-3130-5631>

6. Universidade Federal de Santa Maria (UFSM). Santa Maria, Rio Grande do Sul, Brasil. <https://orcid.org/0000-0003-2014-6288>

Recebido 27/01/2026
Aprovado: 22/03/2026

RESUMO

Objetivo: As mudanças climáticas representam uma das maiores ameaças à saúde global no século XXI, afetando as populações por desastres naturais e por alterações nos padrões de doenças. Nesse contexto, a formação médica enfrenta o desafio de integrar saúde global e crise climática em seus currículos. Esta revisão narrativa, realizada a partir da base *PubMed*, incluiu nove artigos, publicados entre 2021 e 2025, que discutem a interface entre educação médica e saúde global. Os resultados evidenciam que apenas uma minoria das escolas médicas inclui esse tema em seus currículos, embora haja crescente demanda de estudantes e docentes. Entre as barreiras, destacam-se a falta de recursos institucionais, sobrecarga docente, fragmentação curricular, ausência de liderança formal e a distribuição regional desigual. Os estudantes reforçam a preferência por integrar o conteúdo em cursos clínicos e práticos, visto que essas mudanças climáticas impactam a saúde física e mental, mobilidade populacional e comportamento, aumentando riscos de doenças, suicídio e violência. Conclui-se que a inclusão do tema em políticas educacionais é fundamental para preparar profissionais conscientes, resilientes e comprometidos com os desafios sanitários contemporâneos e a proteção de populações vulneráveis.

Palavras-chave: Educação Médica; Mudanças Climáticas; Saúde Ambiental.

ABSTRACT

Objective: Climate change represents one of the greatest threats to global health in the 21st century, affecting populations through natural disasters and changes in disease patterns. In this context, medical education faces the challenge of integrating global health and the climate crisis into its curricula. This narrative review, based on *PubMed*, included nine articles published between 2021 and 2025 that discuss the interface between medical education and global health. The results show that only a minority of medical schools include this topic in their curricula, despite a growing demand from students and faculty. Reported barriers include lack of institutional resources, faculty overload, curricular fragmentation, lack of formal leadership, and unequal regional distribution. Students emphasize their preference for integrating the content into clinical and practical courses, as these climate changes impact physical and mental health, population mobility, and behavior, increasing the risks of disease, suicide, and violence. It is concluded that including this topic in educational policies is essential to prepare professionals who are aware, resilient, and committed to contemporary health challenges and protecting vulnerable populations.

Keywords: Education, Medical; Climate Change; Environmental Health.

RESUMEN

Objetivo: El cambio climático representa una de las mayores amenazas para la salud global en el siglo XXI, afectando a las poblaciones mediante desastres naturales y cambios en los patrones de enfermedades. En este contexto, la educación médica enfrenta el desafío de integrar la salud global y la crisis climática en sus planes de estudio. Esta revisión narrativa, realizada a partir de *PubMed*, incluyó nueve artículos, publicados entre 2021 y 2025, que discuten la interfaz entre la educación médica y la salud global. Los resultados muestran que solo una minoría de las escuelas de medicina incluye este tema en sus planes de estudio, aunque existe una creciente demanda de estudiantes y docentes. Entre las barreras señaladas se encuentran la falta de recursos institucionales, la sobrecarga docente, la fragmentación curricular, la ausencia de liderazgo formal y la distribución regional desigual. Los estudiantes refuerzan la preferencia por integrar el contenido en cursos clínicos y prácticos, ya que estos cambios climáticos impactan la salud física y mental, la movilidad poblacional y el comportamiento, aumentando los riesgos de enfermedades, suicidio y violencia. Se concluye que la inclusión de este tema en las políticas educativas es fundamental para preparar profesionales conscientes, resilientes y comprometidos con los desafíos sanitarios contemporáneos y la protección de poblaciones vulnerables.

Descriptores: Educación Médica; Cambio Climático; Salud Ambiental.

Introduction

The 21st century, since its beginning, has been characterized by one word: ecology. The effects of human actions on nature, and the cascade of harms they cause, are part not only of present material reality but also of the collective imagination for the future. Younger generations, born into this perspective, face what is called “eco-anxiety,” characterized by fear and uncertainty about the future¹.

Across the globe, various climatic events are occurring with increasing regularity and destructive power. The official term for this phenomenon has become “climate change.” Floods, droughts, severe winters and summers, fires, typhoons – a long list of events that devastate entire populations. Survivors are forced to face not only the material consequences but also health impacts, which are neither instantaneous nor limited to the duration of the event, often lasting for years^{1,2}.

In Brazil, for example, recent high-intensity events have included floods and droughts, such as the floods in Rio Grande do Sul and Maranhão, and the droughts in the Midwest, along with fires in the Pantanal and Amazon³.

From this perspective, it is essential to understand how climate change affects human health, directly or indirectly. It is also necessary to understand that both the causes and effects of this environmental scenario are not limited by political borders, requiring health professionals to adopt a revolutionary vision of health and be prepared to defend it.

Objectives

The objectives of this study are to investigate how the theme of Global Health is addressed in Medical Education, as well as the potential and barriers to including the study of climate change and its impacts on human health in medical curricula.

Method

This is a literature review based on a search of articles indexed in the PubMed (MedLine) database, using the terms: “Medical Education,” “Climate Change,” and “Global Health,” as well as their equivalents. Inclusion criteria: articles in Portuguese or English published between 2021–2025 addressing global health in relation to climate disasters or discussing the training of health professionals in this context. Exclusion criteria: opinion articles, editorials, theses, and texts that did not align with the objectives of this review.

Results

Among the 33 articles found, nine were selected for inclusion based on relevance and compatibility.

The selected studies indicate that only a small fraction of medical schools include climate change in their curricula, despite efforts from students and faculty to implement this subject as continuing education.

The International Federation of Medical Students' Associations (IFMSA) found that only 15% of medical schools worldwide teach climate change, and in 12% of these, students are leading the educational initiatives⁴.

Challenges include lack of institutional resources⁴ – both financial, to support professionals in developing new courses or adapting existing ones to include environmental content, and organizational, due to lack of formalized leadership⁴. Without proper coordination, it becomes difficult to engage participants in curricular development without overburdening or neglecting prior academic and clinical responsibilities. There is also a lack of faculty training⁴, as many professors feel unprepared to teach about climate change and health due to limited knowledge of the topic.

Additionally, curricular fragmentation, although it provides distinct perspectives within disciplines, is inadequate for global health, as it lacks the connective reasoning between the physical scientific basis of climate change and the aspects of vulnerability, adaptation, and mitigation of its impacts on health⁵.

The importance of including the climate crisis in education lies in its direct and indirect effects on physical health – due to changing disease patterns, migration, forced indoor confinement, and altered environments – and mental health, as climate exposure leads to increased rates of suicide, violence, heat-related deaths among those with mental illness, greater psychotropic use, and reduced working memory, reaction time, and attention⁶.

A review of 21 studies involving 9,205 health students showed that over 75% believe human activity is the main cause of climate change and are concerned about its health impacts. However, they cited lack of information, lack of preparedness to address climate change, and poor or inadequate curricular coverage as major challenges. Students support integrating global health and climate change into curricula, preferably in clinically focused and practical courses. This view was stronger among nursing students (71.7%) than among medical students (57.4%).

Medical students also showed less belief and personal interest in addressing climate change compared to peers in other health fields. Furthermore, one-third of studies mentioned that there is insufficient time to learn about climate change in medical curricula due to academic overload^{7,8}.

In addition, 70% of public health education institutions surveyed reported offering some type of climate- and health-related instruction between 2023 and 2024. However, only 39% included it as a mandatory component. Mandatory inclusion was more common in Europe (80%), followed by the Western Pacific (72%), the Americas (68%), Africa (63%), and the Eastern Mediterranean (50%). Among academic programs, 57% made climate and health education mandatory, especially in master's programs. An estimated 78% of enrolled students were in institutions that offered such content, but only 47% had it as a required subject⁹. These data indicate that despite recent advances, there remain significant gaps in health education on the impacts of climate change – particularly in medical training⁹.

Another study interviewed 15 final-year medical students (ages 24–35). They recognized that climate change has major impacts on health, increasing risks and causing natural disasters. Reported effects included higher temperatures, ecosystem damage, population displacement, deteriorating living conditions, malnutrition, infectious diseases, and mental disorders – reinforcing the need to include global health in the medical curriculum¹⁰.

Final-year medical students also reported limited and superficial contact with climate change topics during their education. While they acknowledged the relevance of the subject, especially for clinical practice related to extreme weather events, some expressed resistance to creating new exams solely for this topic. Challenges included differences in prior knowledge, doubts about practical applicability, and varying perceptions of importance depending on chosen specialties¹¹.

Discussion

The World Health Organization (WHO) lists climate change as the greatest health threat facing humanity⁷. However, data show persistent challenges in implementing effective education on this topic in medical curricula.

Although only a small fraction of medical schools include climate change in their curricula due to lack of institutional resources, insufficient formal leadership, and inadequate faculty training^{4,7}, there is an urgent need to include the climate crisis in medical education. The impacts of this topic, both direct and indirect, go beyond the often-discussed dynamics of migration, pulmonary and systemic diseases, and destruction of the surrounding ecosystem and atmosphere, also affecting mental health by aggravating preexisting mental disorders and mood changes in individuals⁶. All these factors culminate in alterations to healthcare system functioning, making it essential to prepare future professionals for the scenarios they will face when entering the workforce.

Students' receptiveness to including global health topics in the curriculum¹⁰ provides an excellent opportunity to restructure undergraduate courses. However, due to already overburdened health curricula⁵ and limited or absent faculty training to teach and conduct workshops on the subject, this potential for preparing future health professionals is diminished^{4,5}. These are obstacles that, although not insurmountable, have a level of difficulty inversely proportional to local institutional and political interest in addressing this topic, considering generational conflicts, private interests, and community experiences with this type of approach^{1,2}.

Final Considerations

Integrating global health into medical curricula within the context of climate change is urgent to train professionals adapted to these demands. Although students understand the relevance of this topic, persistent gaps remain regarding professional responsibility and the capacity to manage increasingly common scenarios of extreme environmental events, as well as the health impacts on populations. Institutions must therefore invest in educational policies aligned not only with students' needs but also

with the evolving needs of communities, particularly those most vulnerable to climate-related disasters. The future of medical training in the country depends directly on efforts to make professionals more aware, well-prepared, and engaged with their responsibility toward global health.

References

1. Ecoansiedade: pesquisadora explica como mudanças climáticas podem afetar a saúde mental [Internet]. Agência Fiocruz de Notícias. 2024 [citado 2025 Sep 8]. Disponível em: <https://agencia.fiocruz.br/ecoansiedade-pesquisadora-explica-como-mudancas-climaticas-podem-afetar-saude-mental>
2. Cidacs» Mudanças Climáticas, Segregação e Vulnerabilidades no Brasil [Internet]. Fiocruz.br. Cidacs; 2025 [citado 2025 Sep 8]. Disponível em: <https://cidacs.bahia.fiocruz.br/2025/05/mudancas-climaticas-segregacao-e-vulnerabilidades-no-brasil>
3. Brasil teve 10 eventos climáticos extremos em 2024 [Internet]. ONU News. 2025. Disponível em: <https://news.un.org/pt/story/2025/03/1846766>
4. Blanchard OA, Greenwald LM, Sheffield PE. The Climate Change Conversation: Understanding Nationwide Medical Education Efforts. *The Yale Journal of Biology and Medicine*. 2023 Jun 30;96(2):171–84. [citado 2025 Sep 8]. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/37396984/>
5. Ogunseitan OA. Broad spectrum integration of climate change in health sciences curricula. *Frontiers in Public Health*. 2022 Jul 25;10 [citado 2025 Sep 8]. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/35958832/>
6. Costin A, Fisher D, Harper B, Nahhas RW, Sullenbarger J. Climate Change and Mental Health: An Interactive Educational Session. *MedEdPORTAL*. 2024 Apr 19 [citado 2025 Sep 8]. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/38645713/>
7. Liu I, Rabin B, Manivannan M, Laney E, Philipsborn R. Evaluating strengths and opportunities for a co-created climate change curriculum: Medical student perspectives. *Frontiers in Public Health*. 2022 Oct 24;10 [citado 2025 Sep 8]. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/39845713/>

em: <https://pubmed.ncbi.nlm.nih.gov/36353273/>

8. Ccami-Bernal F, Barriga-Chambi F, Quispe-Vicuña C, et al. Health science students' preparedness for climate change: a scoping review on knowledge, attitudes, and practices. *BMC Medical Education*. 2024 Jun 11;24(1)[citado 2025 Sep 8]. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/38862905/>
9. Sorensen C, Danielly Magalhães, Hamacher N, Sullivan JK, Weinstein HNW, et al. Climate and health education in public health schools worldwide during 2023–24: a survey. *The Lancet Planetary Health*. 2024 Dec 1;8(12):e1010–9[citado 2025 Sep 8]. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/39674191/>
10. Heydari A, Partovi P, Zarezadeh Y, Yari A. Exploring medical students' perceptions and understanding of the health impacts of climate change: a qualitative content analysis. *BMC Medical Education* . 2023 Oct 1; 23(1):1–13[citado 2025 Sep 8]. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/37853406/>
11. Flock C, Boekels R, Herrmann A, Beig I, Lamkemeyer L, Friederich HC, et al. Final year medical students' expectations for medical education on climate change and planetary health – a qualitative study. *Medical Education Online*. 2025 Mar 21;30(1) [citado 2025 Sep 8]. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/40116041/>

Correspondent Author

João Pedro Fabris Ruiz
Rua Waldir Sebastião Carreiro, 148, bairro Jardim Itapemirim, CEP:
29315-725.
Cachoeiro de Itapemirim, Espírito Santo, Brasil.
joaofruiz2@gmail.com.