Prescribing Change: The Dire Need to Address Climate and Health in Graduate Medical Education

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In an era marked by the ever-increasing challenges of climate change,[1,2] it is imperative that the graduate medical education (GME) community prepare this generation of physicians to address the profound implications on patients' health and well-being. Climate change also has considerable effects on trainees, faculty, communities, and health care systems. These effects interact with social determinants of health and threaten to worsen health inequities.[3] For this reason, a myriad of health care organizations has called for governmental and private entities to prioritize action on climate health and policy.[4,5] While the American Medical Association endorsed the need to meet this challenge through the creation of educational curricula,[6] guidance is not yet consistently available in US medical education programs.[7,8]

The *Journal of Graduate Medical Education* (JGME) Editorial Board called for this supplement because of the urgent need to address the vital role of GME in preparing physicians to address climate-related health risks, advocate for sustainability, and integrate environmental stewardship into clinical practice. As physicians, educators, and researchers, our community is uniquely situated to begin modifying GME by driving climate health curricular initiatives, advocating for decarbonizing the hospitals and health systems in which we work, lobbying our government leaders for stronger climate practices on behalf of the patients we serve, and engaging in climate and health education research.

To address this gap within GME, in 2023 JGME issued a call for articles in all publication categories.[9] The supplement was led by JGME editors and invited guest editors with expertise in climate change and health, and submissions went through JGME's peer-review process. We were thrilled to receive over 40 submissions that demonstrate initiatives in curriculum development, learner assessment, and faculty development, which provide diverse perspectives on how to move the field forward (TABLE).

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Scoping reviews by Cois et al and Selvam et al offer explorations of the literature concerning climate health education within US GME programs.[10,11] The reviews demonstrate that climate health educational research efforts are relatively nascent in GME, with few studies in the GME population and mostly observational and survey data collected on outcomes.

The articles in the Educational Innovation and New Ideas categories highlight early, but important work in the area. Many submitted manuscripts described leveraging use of existing frameworks to incorporate climate health education and assessment. These included adding climate health–related content to existing curricula and assessing competence relative to climate health–specific entrustable professional activities. Attitudinal and self-reported behavioral change data suggest that climate health curricula in various residency programs are well received and may have effects on residents' proficiency regarding the impacts of climate change on health.

The Perspectives presented in this supplement span a range of evidence-based approaches and insights from GME leaders. The scale and scope of the articles represent a wide spectrum of contributions, which range from practice improvement initiatives, resident-led curricular innovations, and proposed revisions to competency-based educational frameworks. For example, Marcus et al's exploration of residency program planning for hurricanes underscores the critical need for GME preparedness to address effects of climate change.[12] Nwanaji-Enwerem et al's article on assessing physician competency in climate change via medical licensing and board examinations highlights the importance of embedding climate health within foundational medical assessments.[13] Kalwaney and Cerceo's article outlines actions which faculty can take to incorporate plant-based nutrition into curricula and highlights contributions to environmental sustainability.[14]

The Original Research and Brief Report articles provide empirical evidence that underscore the efficacy and impact of educational interventions and assessments. For example, McShane et al's research on incorporating climate change's health implications

TABLE
Summary of Characteristics of Supplement Articles[a]

Variable	n (%)
Article categories represented	
Brief Report	11 (33.3)
Educational Innovation	2 (6.1)
New Ideas	4 (12.1)
Original Research	2 (6.1)
Perspectives	12 (36.4)
Reviews	2 (6.1)
Total	33 (100)
Topics	
Advocacy	5 (15.2)
Assessment of the GME institution	1 (3.0)
Competency-based medical education (eg, EPAs)	2 (6.1)
Curricular evaluation	6 (18.2)
Curriculum development	12 (36.4)
GME program planning and infrastructure	2 (6.1)
Interprofessional education	1 (3.0)
Learner assessment	2 (6.1)
Quality improvement	4 (12.1)
Review articles	2 (6.1)
Sustainability	8 (24.2)
Specialties represented	
Aerospace medicine	1 (3.0)
Anesthesiology	2 (6.1)
Emergency medicine	2 (6.1)
Family medicine	4 (12.1)
Gastroenterology	1 (3.0)
Internal medicine	4 (12.1)
Obstetrics and gynecology	1 (3.0)
Occupational and environmental medicine	2 (6.1)
Multispecialty (>3 specialties)	14 (42.4)
Pediatrics	7 (21.2)
Preventative medicine	1 (3.0)

[a] Manuscripts often covered multiple topics and had more than one specialty represented; thus, percentages add up to >100%.
Abbreviations: GME, graduate medical education; EPA, entrustable professional activity.

into educational curricula improved participants' self-reported knowledge.[15] This supplement also highlights the importance of quality improvement sustainability initiatives in GME, as found in Chen and Fuentes-Afflick's article on financial incentives for environmentally friendly clinical practices.[16] A number of articles also report on the current impact on climate of GME, which include Clegg et al's analysis of greenhouse gas emissions produced from travel for board examinations.[17] The commitment to reducing medical waste and greenhouse gas emissions as described by Gottesman et al and Collins et al demonstrates practical steps that can be taken to mitigate health care's environmental footprint.[18,19] As a final example, Schear et al report on a multinational, multispecialty modified Delphi panel survey regarding agreed upon metrics for a GME institutional "Planetary Health Report Card."[20]

The Editorial Board hopes that this supplement provides an entree to available resources, curricula, faculty development, and assessment methods to incorporate climate health into GME training. The time is now for every GME program to define and implement key specialty- or subspecialty-specific competencies that will equip current trainees to sustainably care for patients with climate-related health problems.

We invite you to examine your own initiatives within climate and health and send what you have learned to JGME for future issues.

References

1. Abbass K, Qasim MZ, Song H, Murshed M, Mahmood H, Younis I. A review of the global climate change impacts, adaptation, and sustainable mitigation measures. *Environ Sci Pollut Res Int*. 2022;29(28): 42539-42559. doi:10.1007/s11356-022-19718-6
2. Romanello M, Di Napoli C, Green C, et al. The 2023 report of the Lancet Countdown on health and climate change: the imperative for a health-centered response in a world facing irreversible harms. *Lancet*. 2023;402(10419): 2346-2394. doi:10.1016/S0140-6736(23)01859-7
3. Sherman JD, MacNeill AJ, Biddinger PD, Ergun O, Salas RN, Eckelman MJ. Sustainable and resilient health care in the face of a changing climate. *Ann Rev Public Health*. 2023;44:255-277. doi:10.1146/annurev-publhealth-071421-051937
4. National Academy of Medicine. Grand Challenge on Climate Change, Human Health, and Equity. Accessed September 7, 2024. https://nam.edu/programs/climate-change-and-human-health/
5. Climate Health Action. U.S. call to action on climate, health, and equity: a policy action agenda. Accessed September 7, 2024. https://climatehealthaction.org/cta/climate-health-equity-policy/#org_signers
6. American Medical Association. Climate Change Education Across the Medical Education Continuum H-135.919. Accessed September 7, 2024. H-135.919 Climate Change Education Across the Medical Education | AMA (ama-assn.org)
7. Philipsborn RP, Sheffield P, White A, Osta A, Anderson MS, Bernstein A. Climate change and the practice of medicine: essentials for resident education. *Acad Med*. 2021;96(3):355-367. doi:10.1097/ACM.0000000000003719
8. Maeshiro R, Jarris YS, Prunuske J, et al. Public and population health in U.S. medical education: a review of guidance in extraordinary times. *Acad Med*. 2023;98(12):1366-1380. doi:10.1097/ACM.0000000000005208
9. Sullivan GM, Simpson D, Yarris LM, Artino AR Jr, Deiorio NM. A call for articles on climate and graduate medical education—JGME supplement issue. *J Grad Med Educ*. 2023;15(2):143-145. doi:10.4300/JGME-D-23-00162.1
10. Cois A, Kirkpatrick S, Herrin R. Climate change curricula in US graduate medical education: a scoping review. *J Grad Med Educ*. 2024;16(suppl 1):69-77. doi:10.4300/JGME-D-24-00086.1
11. Selvam R, Séguin N, Zhang L, et al. International planetary health education in undergraduate and graduate medical curricula: a scoping review. *J Grad Med Educ*. 2024;16(suppl 1):58-68. doi:10.4300/JGME-D-24-00027.1
12. Marcus EN, Mai C, Brown S, Littles A, St. Onge JE. Residency program planning for hurricanes and beyond: lessons learned from 3 Florida institutions. *J Grad Med Educ*. 2024;16(suppl 1):15-18. doi:10.4300/JGME-D-23-00923.1
13. Nwanaji-Enwerem JC, Ayankola OJ, Avakame EF. Assessing physician climate change competency via medical licensing and board examinations: lessons from integrating ultrasound topics in emergency medicine. *J Grad Med Educ*. 2024;16(suppl 1):22-24. doi:10.4300/JGME-D-24-00072.1
14. Kalwaney S, Cerceo E. Plant-based diets: a vital component of graduate medical education programs on climate and health. *J Grad Med Educ*. 2024;16(suppl 1): 40-44. doi:10.4300/JGME-D-23-00913.1
15. McShane M, Kumar S, Zuniga L. Implementing and assessing climate change education in a pediatrics residency curriculum. *J Grad Med Educ*. 2024;16(suppl 1): 92-98. doi:10.4300/JGME-D-24-00053.1
16. Chen EH, Fuentes-Afflick E. Sustainability in action: a financial incentive for trainees embracing environmentally friendly quality improvement projects. *J Grad Med Educ*. 2024;16(suppl 1):135-139. doi:10.4300/JGME-D-24-00059.1
17. Clegg A, Mastrantonio S, Pearson JF. Estimation of air travel–related greenhouse gas emissions for the in-person anesthesiology oral board examination. *J Grad Med Educ*. 2024;16(suppl 1):149-151. doi:10.4300/JGME-D-23-00804.1
18. Gottesman S, Mensah B, Jagannathan P, Hyman C, Agrawal D. Reducing waste at the bedside: a resident-led project to decrease waste and cost from diagnostic paracentesis. *J Grad Med Educ*. 2024;16(suppl 1): 145-148. doi:10.4300/JGME-D-24-00034.1
19. Collins J, Karim M, Akcay B, Palaniappa N, Wong J. Implementing a clinical decision support tool to reduce operating room anesthetic fresh gas flow: a resident-led, sustainability-focused quality improvement initiative. *J Grad Med Educ*. 2024;16(suppl 1):140-144. doi:10.4300/JGME-D-24-00074.1
20. Schear S, Hampshire K, Diedrich T, Waters I, Barber A. Adapting the planetary health report card for graduate medical training programs. *J Grad Med Educ*. 2024; 16(suppl 1):104-110. doi:10.4300/JGME-D-24-00065.1

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