

Climate change in Master of Healthcare Administration curriculum: An untapped opportunity

Attila J. Hertelendy, Cheryl L. Mitchell, Polina Durneva, Jane Banaszak-Holl, Ann Dadich, Tracy H. Porter, Jennifer Gutberg, John G. Richmond, Eric McNulty, Ying Zang, & Sara Singer
2025

Peter B. Gustavson School of Business

Faculty Publications

© 2025 The Author(s). This is an open access article distributed under the terms of the Creative Commons license CC BY-NC-ND:
<https://creativecommons.org/licenses/by-nc-nd/4.0/>

Original citation:

Hertelendy, A., Mitchell, C., Durneva, P., Banaszak-Holl, J., Dadich, A., H. Porter, T., Gutberg, J., G. Richmond, J., McNulty, E., Zang, Y., & Singer, S. (2025). Climate change in Master of Healthcare Administration curriculum: An untapped opportunity. *Journal of Health Administration Education*, 41(1), 63–80.

Downloaded from UVicSpace Research & Learning Repository
dspace.library.uvic.ca



**University
of Victoria**

Libraries

CLIMATE CHANGE IN MASTER OF HEALTHCARE ADMINISTRATION CURRICULUM: AN UNTAPPED OPPORTUNITY

ATTILA J. HERTELENDY, PhD¹✉, CHERYL L. MITCHELL, PhD², POLINA DURNEVA, PhD³, JANE BANASZAK-HOLL, PhD⁴, ANN DADICH, PhD⁵, TRACY H. PORTER, PhD⁶, JENNIFER GUTBERG, PhD(C)⁷, JOHN G. RICHMOND, PhD, MBA, FHEA⁸, ERIC McNULTY, MA⁹, YING ZANG, MBBS, PhD¹⁰ & SARA SINGER, MBA, PhD¹¹

ABSTRACT

Extreme weather events fueled by climate change are intensifying. Our study found a paucity of accredited graduate healthcare or health service administration programs in the United States, Canada, and Australia that teach climate change and healthcare administration. We used a mixed-methods approach that included a website audit and program director interviews. Our website audit found that only three (.02%) of 156 accredited programs mentioned climate change in their programs or course descriptions.

Course content focused on the societal impacts of climate change but did not address the leadership or managerial implications of how to mitigate and manage through climate crises. Interviews clarified factors that shaped course content, with five themes constructed—namely, curriculum integration and accreditation influence; student-driven curriculum evolution; faculty interest and an interdisciplinary approach; competency knowledge and integration; and the influence of sociopolitical contexts. Based on these findings, accredited programs would benefit from the integration of climate change and healthcare administration education. To be successful, students, faculty, program directors, university executives, and accreditation agencies will need to align their approach to address the climate crisis.

Correspondence to:

Atilla J. Hertelendy,
Department of Information
Systems and Business
Analytics, College of
Business, Florida International
University, 11200
Southwest 8th St., Miami,
FL 33199

ahertele@fiu.edu

Author Affiliations:

¹Florida International University, ²University of Victoria, ³University of Memphis, ⁴University of Alabama Birmingham, ⁵Western Sydney University, ⁶Cleveland State University, ⁷University of Toronto, ⁸The University of Sheffield, ⁹Harvard University, ¹⁰The University of Sydney, ¹¹Stanford University

INTRODUCTION

The climate crisis is a health emergency that affects health systems at all levels. The most recent report of the Intergovernmental Panel on Climate Change (IPCC) reiterated alarming messages, anticipating more frequent and intense heatwaves, wildfires, floods, and other climate-related disasters, worldwide (Lee et al., 2023; United Nations Framework Convention on Climate Change [UNFCCC], 2015). Meanwhile, the transition to zero emission has been too slow to meet the target of the Paris Agreement—a legally binding, international treaty on climate change. The compounding impacts of unprecedented climate change on health systems (Hertelendy et al., 2024; Hertelendy & Ciottone, 2024; Hess et al, 2023; Romanello et al., 2023) have resulted in more death, (r)emerging infectious disease, mental illness, malnutrition, cardiovascular disease, and other chronic conditions that exacerbate global public health inequities. Health professionals have a key role in mitigating the risks of climate change and adapting to its consequences. Increasingly, there is a call for the healthcare community to urgently act to reduce its impact on greenhouse gas emissions. It is estimated that globally healthcare contributes 4–5% of total greenhouse gas emissions, exacerbating weather extremes caused by climate change (Lenzen et al., 2020; van Daalen et al., 2024). Health professionals deal with increased demand for healthcare resulting from climate change; however, their capacity to deliver quality care has been compromised. Interruptions to healthcare due to extreme weather events have challenged health workers and cost millions of lives (Hess et al., 2023). Meanwhile, the health workforce has a limited understanding of climate change and health(care) and is eager for more training on these intertwined subjects (Kalogirou, et al., 2020). Therefore, the World Health Organization (WHO, 2015) has recognized the need to build the capacity of health professionals to promote climate-resilient, sustainable, net-zero health systems to protect people from climate change.

Graduate healthcare administration programs (also known as health service administration) equip students with skills in leadership, health law and policy, healthcare financing, and organizational behavior (Khalil et al., 2023). Graduates of these programs are expected to drive change in healthcare and assume a key role in creating safer, more resilient, and more equitable healthcare services and systems. Furthermore, health administrators require systems thinking for better climate disaster preparedness and response (Hertelendy et al., 2021).

Unfortunately, there is limited training on climate change and planetary health for healthcare administrators. A global survey of 160 health professional schools found that the integration of climate change into health education curricula was hindered by limited institutional support (Létourneau et al.,

2023). Meanwhile, there is increasing student demand for more education on climate change and planetary health (Baena-Morales & Froberg, 2023).

Scoping reviews on interprofessional education in climate change and health found most studies were published in the disciplines of medicine and nursing, with few focused on healthcare management (Dalapati et al, 2023; McKinnon et al., 2022). While climate change and the associated effects are important social issues, many health system stakeholders consider quality medical care the priority, with efforts to address climate change potentially detracting from this focus (Quitmann et al., 2022).

Research on the place of climate change in healthcare administration education is limited. In reviewing the literature to prepare for this study, we found no studies that examined how climate change was taught in healthcare administration programs. Although we were examining climate change specifically, we acknowledge that *climate change* and *sustainability* are terms often used interchangeably. We found this usage to be consistent with the program directors we interviewed and have used climate change and sustainability interchangeably throughout the paper.

Accreditation requirements establish the knowledge, skills, and behaviors that students must have at graduation. Until now, those requirements have been silent on climate change and planetary health. The teaching, learning focus, and outcomes are not focused on planetary health, despite its importance (Global Consortium on Climate and Health Education, n.d.).

Given the importance of climate change, it is important to consider how future healthcare administrators can be prepared to manage the climate-health crisis. The Commission on Accreditation of Healthcare Management Education (CAHME), which accredits health administration programs, and the Joint Commission, which accredits hospitals, have prioritized climate change and sustainability by establishing a fellowship that advances sustainable healthcare (Joint Commission, 2023). While this fellowship is helpful, academic curriculum needs a definitive approach to climate and health.

The development of accreditation standards that address climate change is likely to be challenging. For instance, it might pressure university executives to better prepare healthcare administrators for practice and demonstrate how graduate healthcare administration education aligns with other health disciplines that integrate climate change into their curriculum (Goshua et al., 2021; Ryan et al., 2020). Addressing the climate crisis in healthcare will require systematic change to accreditation standards to drive comprehensive curriculum updates in the education sector.

The aim of this study was to establish the extent to which climate change and sustainability were taught in accredited healthcare administration master's

degree programs in the United States, Canada, and Australia. Specifically, the study asked, how do accreditation standards influence curriculum development regarding climate change and sustainability in graduate healthcare administration programs?

METHODS

This sequential mixed-methods study incorporated a website-based audit of accredited degrees, followed by qualitative interviews with key stakeholders from representative institutions in the three countries.

Audit of Accredited Degrees

In May 2022, we searched the websites of the CAHME and Australasian College of Health Service Management (ACHSM) to identify its accredited postgraduate degrees. CAHME (n.d.) advances “the quality of healthcare management education globally” by accrediting graduate healthcare management programs in the United States and Canada that comply with the regulations of the Council for Higher Education Accreditation. Similarly, as the “peak professional body for health managers in Australasia,” the ACHSM recognizes “excellence in the education of healthcare managers and leaders” through its accreditation process (ACHSM, n.d.). At the time of this study, the CAHME and ACHSM collectively listed 156 postgraduate degrees as accredited, representing 105 universities, with a cluster of 14 programs in Texas in the United States (9.0%) and five programs (3.2%) at Flinders University in South Australia.

Information about each degree was sourced from the webpage of the university that offered it. As such, the audit of the degrees relied on information in the public domain; no further information was sourced by contacting the university. In addition to gathering information about the features of each degree (e.g., mode of delivery), each webpage was searched for the following terms, given the focus of this study: de-carbon, decarbon, climate change, climatic change, global warming, and climate disaster. Information was collated in a spreadsheet for synthesis and interpretation.

Interviews

We also conducted semi-structured interviews with nine directors of CAHME and ACHSM programs who were purposefully selected to represent different geographical regions, with seven from the United States, one from Canada, and one from Australia. Interviewees were contacted via email, and interviews were conducted by pairs of PhD-educated researchers currently employed at universities. Each pair included one male and one female researcher, all

of whom have extensive interviewing experience. The interviewers had no prior relationship with the interviewees; however, the interviewees were informed about the study's focus and the interviewers' positions and roles. All interviews were conducted online using Zoom, with only the interviewers and interviewees present. The interviews were recorded using Zoom software and subsequently transcribed to de-identify the information. As this was an exploratory study, the questions were semi-structured, focusing on curriculum content related to climate change, factors influencing curriculum content, and accreditation competencies related to climate change.

Interviews were analyzed using an inductive approach (Boyatzis, 1998; Pratt, 2009) to understand how accreditation influences curriculum development in graduate healthcare administration programs and how to prepare future health leaders for climate change and sustainability. Following Braun and Clarke's (2006) six steps, the interview transcriptions were read for preliminary insights. Two researchers then individually coded two transcripts by question to construct semantic codes. These codes were then reviewed and discussed to consider latent themes. Finally, themes were constructed and refined in the context of the research question. These themes reflect what Boyatzis (1998, p.161) defined as "a pattern in the information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon." The themes included curriculum integration and accreditation influence; student-driven curriculum evolution; faculty interest and an interdisciplinary approach; competency knowledge and integration; as well as the influence of sociopolitical contexts.

FINDINGS

Audit of Accredited Degrees

The website audit examined 156 accredited degrees. Of the 144 degrees for which delivery information was available, most were delivered as a residential program ($n = 81$; 51.9%), as opposed to a hybrid program, comprised of online and residential components ($n = 40$; 25.6%), or an online-only program ($n = 23$; 14.7%). Information on the delivery mode was not readily available for 12 accredited degrees (7.7%).

Of the 156 accredited programs we audited, only three (.02%) programs mentioned climate change in their course descriptions. These three programs were housed at Boston University (United States), San Diego State University (United States), and Deakin University (Australia). Course content mentioning climate change included: "Climate Change and Public Health" and "Incorporating Health to Design Climate Solutions" (Boston University); "Global

Climate Change” (San Diego State University); and “Climate Change Adaptation and Mitigation” (Deakin University). Boston University and San Diego State University offered their courses in programs with residential delivery modes, while Deakin University offered its course in a hybrid program.

Interviews

Interviews clarified the factors that influenced curriculum content regarding climate change, with five themes constructed as preliminary observations, including:

- Curriculum integration and accreditation influence
- Student-driven curriculum evolution
- Faculty interest and interdisciplinary approach
- Competency knowledge and integration
- Influence of sociopolitical contexts

Highlighting the integration of climate change into the curriculum, the theme of curriculum integration and accreditation influence underscored the impact of accreditation standards and institutional policies.

Climate change topics were more likely to be featured across elective than core elements. Topics included climate disaster preparedness and responses, sustainable health facilities, health inequity, climate policy advocacy, and communicating climate and health risks. This finding suggests the cautious integration of climate-related content into graduate healthcare administration curriculum, and how accreditation requirements potentially constrain curriculum change. Accreditation standards often dictate program content, leaving limited flexibility to introduce different topics. While university bureaucracy can stymie program changes, so too can accreditation requirements: “I can’t just make changes to our program without entering into a multi-stage major modification, even if I change the learning outcomes in a course” (Interview ID6).

There was a call for more flexible and forward-looking accreditation standards that can accommodate emerging topics, such as climate change. Many interviewees wanted their programs to include more content on climate change and sustainability but were hindered by accreditation requirements related to core competencies. Despite CAHME requiring programs to “monitor changes in the health sector, the University environment, and management theory and practice and adjust its mission, goals, objectives and competency model as necessary” (CAHME, 2023), programs are not necessarily responding to broader industry or societal needs.

Focusing on adapting the curriculum in response to growing interest and market demand, the theme of student-driven curriculum evolution emphasized the interaction between student priorities and education. Interviewees identified a notable increase in student interest in climate change and sustainability: “also see a growing interest of students in this domain... I see environment sustainability being much more in the discourse of students today than I saw 10 years ago” (Interview ID8). Evolving societal awareness about climate issues and resulting increased student demand could catalyze increased focus and integration in the future.

The faculty member interest and interdisciplinary approach theme demonstrated how faculty members drove curriculum change, integrating climate change and sustainability within a broader context. Faculty member interests and initiatives often prompted the introduction of climate change topics, demonstrating a bottom-up approach to curriculum development in the absence of a required competency. For instance, given the opportunity to introduce content beyond the core competencies, faculty members could add content on climate change:

I taught a full module on climate, and how that climate policy affects health... because I was on a sabbatical this past year, and didn’t teach that... I’m assuming that... faculty who taught it, included that. But I actually don’t know that for a fact. (Interview ID4)

The option for faculty members to add content beyond the core curriculum requirements, combined with the interdisciplinary nature of climate change connected to broader public health and social impact issues, reflects how climate change content is often not included given that it is not a core competency.

Emphasizing competency knowledge and integration, this theme underscored the importance of faculty members having the skills to deliver a curriculum addressing the connection between climate change and healthcare administration. The theme also spoke to the need to integrate climate change content into graduate healthcare administration programs, and the potential value of demonstrating how theoretical knowledge can be practically applied. One interviewee explained: “We don’t necessarily have a competency that’s specifically related to climate change” (Interview ID1). The interviewees suggested that actionable skills in healthcare administration would serve to address growing awareness of climate change and its equally increasing significance.

Demonstrating the impact of social factors and political climates at local, regional, and national levels, the theme of sociopolitical contexts showed how these elements influenced the integration of climate change and sustainability into the graduate healthcare administration curriculum. In regions where cli-

mate change was a politically sensitive topic, faculty members were cautious in addressing it explicitly. As one put it: “[I] Really haven’t... taken the time to, number one, make the connection... where I live politically we don’t have climate change” (Interview ID3).

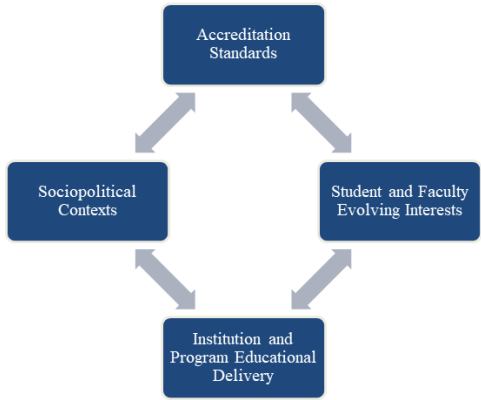
Faculty members were required to navigate complex sociopolitical landscapes, balancing the need to provide comprehensive education on climate change with the potential for political controversy. Some interviewees indicated that local or regional sociopolitical context can influence how climate change was incorporated into graduate healthcare administration programs. This balancing act could impact the depth and the manner to which climate change is integrated into the curriculum.

Collectively, these five themes suggest that there is only modest interest in integrating climate change and sustainability into graduate healthcare administration curricula. Their inclusion was often limited to elective courses and required the interest of faculty members. Growing student interest and demand appeared to drive change, with the potential to impel further curriculum adaptation. However, the relative absence of specific competencies as well as accreditation and institutional constraints point to improvement areas. Involving faculty members with an explicit interest in climate change and sustainability might drive curriculum innovation in response to market demands and societal shifts as well as equip administrators to address climate-related challenges in their professional roles. The global and local political contexts shape how climate change and sustainability are perceived and taught. Faculty member engagement with these contexts might help to incorporate climate change and sustainability into university curricula.

DISCUSSION

Through competency frameworks, accreditation and required competencies shape how graduate healthcare administration programs approach climate change and sustainability; however, findings from this study suggest that accreditation can also constrain curricula innovation. Our findings demonstrated how curricula innovation was often driven by students and faculty members who called for or introduced different curriculum topics. Sociopolitical considerations also impacted these programs, influencing the content and extent to which climate-related topics were integrated into the curriculum. These combined factors highlight the interplay among accreditation standards, the needs and interests of students and faculty members, sociopolitical contexts, and the delivery of postgraduate education (see Figure 1).

Figure 1: Factors Influencing Curriculum Innovation



Competency frameworks provide a structure to translate student education into job skills. The challenges of climate change require skills that enable prospective managers to address changing environmental conditions. Sorensen and colleagues’ (2023) core competencies for addressing climate change across the health professions align somewhat with the CAHME domains for graduate healthcare administration competencies, namely: knowledge of the environment and analytic skills; collaboration and communication; policy analysis and advocacy; public health practice; and clinical practice. These competencies require interprofessional collaboration. Global healthcare leadership competencies developed by the International Hospital Federation may be another model to review when considering integrating climate change and health into curricula (International Hospital Federation [IHF], 2023). Hence, health administration programs (at least in the United States of America and Canada) are poised to address issues that arise with climate change.

Simultaneously, the accreditation process provides programmatic scaffolding to ensure that programs meet the needs of industry and students by incorporating a systems approach (Richardson et al., 2023). That said, our interviewees suggested that accreditation constrained curriculum development for addressing climate change. Accreditation standards might be a hindrance partly because management programs have become crowded with job competencies, leaving little room for additions. Within this quarter century, we have faced the COVID-19 pandemic, which required managers to rethink their roles and the competencies they require (Hertelendy et al., 2022; Sriharan et al., 2022). Subsequently, a systems approach to contemporary problems might be

required as well as ongoing discussion of the competencies required to address changing environments, which might involve a problem-based approach to healthcare systems (Garman et al., 2023).

Student- and Faculty Member–Driven Curriculum Change

The study results presented in this article suggest that student and faculty member interest in climate change impelled curriculum development. They recognized the matter as relevant to graduate healthcare administration and related education, a response that reflects both growing public attention to climate change and increased climate change research (Dupraz & Burnand, 2021; Harper et al., 2021). Faculty members demonstrated bottom-up initiatives by adding climate change curriculum into existing courses or developing new courses. While gaining executive support for curricula on climate change might be more difficult (Barlett & Stewart, 2016), faculty members often drive curricula changes (e.g., via faculty governance), which speaks to the potential value of faculty as social intrapreneurs to lead such change (Brinkhurst et al., 2011). Social intrapreneurs are individuals who work within an organization, but outside of any formal hierarchy, to develop and promote solutions to social or environmental challenges—they are particularly beneficial when a topic is divisive (Brinkhurst et al., 2011). Social intrapreneurs can temper the risks of change through well-established knowledge of the topic and their organization's culture (Brinkhurst et al., 2011).

Therefore, we encourage university executives to advocate for social intrapreneurs within their institutions, offering them a platform to share their rationale with a wider audience and finding ways to support innovative curricula changes regarding climate change. As demonstrated in this study, some universities include climate change as a core pillar or strategic initiative within their healthcare curriculum. However, accrediting organizations do not currently require climate change content.

Sociopolitical Contexts

The integration of climate change into graduate healthcare administration programs can be significantly influenced by sociopolitical contexts. For instance, political will to address climate change and its effects on public health can encourage this integration. Conversely, when climate change is not a political priority, such integration might be limited or nonexistent (Naidu, 2024). Political decisions often lead to regulatory frameworks to govern healthcare systems. These frameworks might also mandate the integration of climate change and health education (Zigmund, 2024). For instance, governments might require healthcare managers to address climate-related health chal-

lenges as part of accreditation requirements, such as the Joint Commission's, or the insurance industry might impose monetary penalties if health systems are not disaster-ready (Joint Commission, 2024).

Social contexts, including public awareness and advocacy movements, can also influence curriculum. Increased public awareness about the health risks associated with climate change might impel policymakers and educators to prioritize this issue in graduate healthcare administration education. Additionally, social networks and collaboration among faculty members can drive the integration of climate change and health in curricula. Professional organizations, advocacy groups, and interdisciplinary collaborations might advocate for the inclusion of climate-related topics in curricula and provide resources to support such efforts (Teherani et al., 2023).

Cultural attitudes and beliefs regarding climate change and health can shape the integration of these topics into graduate healthcare administration programs. When climate change skepticism prevails, educators might resist incorporating climate-related content into graduate healthcare administration education. Conversely, widespread recognition of the health implications of climate change might see such integration readily accepted (Lemery, 2020). Overall, the integration of climate and health into healthcare leadership programs is influenced by a complex interplay of political priorities, regulatory frameworks, resource allocation, public awareness, professional networks, and cultural attitudes. Overall integration requires a multifaceted approach that considers and addresses these various factors.

LIMITATIONS AND FUTURE RESEARCH

This study has several methodological limitations that might have biased the results. Although a comprehensive search of graduate healthcare administration program webpages was conducted, the accuracy of the information might have been limited because it was outdated, or specific course information was not available. Additionally, the data were extracted by searching CAHME and ACHSM schools' webpages. Some of these webpages did not provide information on course offerings, so a course that included content on climate change might in fact have been offered. Finally, when auditing the webpages, only core and elective courses were examined to determine whether these covered the searched topics. Some universities offered "special topics in healthcare administration" as need and opportunity arose. These courses did not provide a full description of the courses as they were mainly based on the topics most relevant to the current healthcare environment. These courses might have covered climate-related topics, yet this information was not available on the searched webpages. It was not possible to interview representatives

of all CAHME- and ACHSM-accredited programs, so we selected a sample. Also, our search terms did not specifically include a focus on sustainability, which might have yielded additional results. Further research must make the distinction between the role of climate change and health and sustainability and how it would apply to healthcare administration curriculum. Our study scope did not focus on how climate change topics may naturally fit within competency development domains of prominent healthcare management and leadership models.

Future studies should consider the development of a competency framework specific to graduate healthcare administration that can be readily integrated into existing curricula, with careful consideration of the full spectrum—from prevention to advanced emergency response for health administration practice. Other health disciplines have moved in this direction; although clinically focused, these can provide the basis from which to develop holistic and cross-cutting leadership- and managerial-specific competencies (Brouillette, 2024; Jowell et al., 2023; Sorensen et al., 2023).

CONCLUSION

This exploratory study established the extent to which climate change and sustainability were taught in accredited healthcare administration master's degree programs in the United States, Canada, and Australia. Despite ample evidence of climate change (Bhola et al., 2023; Brown et al., 2023; Salas et al., 2024) and the associated effects on health and healthcare (Salas et al., 2024), there is a dearth of curricula to help healthcare administrators manage and address these issues. Climate change should be a part of the curriculum of every accredited graduate healthcare administration program. There is an urgent need for accreditation bodies to advocate for climate and health competencies for Master of Healthcare Administration graduates. Now is an opportune time to consider curricula changes and to adopt an approach that involves students, faculty members, program directors, university executives, and accreditation agencies to align their approach to meet one of society's greatest challenges: the climate crisis.

REFERENCES

- ACHSM (Australasian College of Health Service Management). (n.d.). About us. <https://www.achsm.org.au/about-us>
- ACHSM (Australasian College of Health Service Management). (2017). *ACHSM accreditation program: ACHSM accreditation guidelines for universities*. <https://www.achsm.org.au/education/university-programs/accreditation-process>
- Baena-Morales, S., & Fröberg, A. (2023). Towards a more sustainable future: Simple recommendations to integrate planetary health into education. *The Lancet Planetary Health*, 7(10), e868–e873.
- Barlett, P. F., & Stewart, B. (2016). Shifting the university: Faculty engagement and curriculum change. In *Anthropology and Climate Change* (pp. 356–369). Routledge.
- Bhola, V., Hertelendy, A., Hart, A., Adnan, S. B., & Ciottone, G. (2023). Escalating costs of billion-dollar disasters in the US: Climate change necessitates disaster risk reduction. *The Journal of Climate Change and Health*, 10(10020). <https://doi.org/10.1016/j.joclim.2022.100201>
- Boyatzis, R. (1998). *Transforming qualitative information: Thematic analysis and code development*. Sage.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101 <https://doi.org/10.1016/j.joclim.2022.100201>
- Brinkhurst, M., Rose, P., Maurice, G., & Ackerman, J. D. (2011). Achieving campus sustainability: Top-down, bottom-up, or neither? *International Journal of Sustainability in Higher Education*, 12(4), 338–354.
- Brouillette, M. (2024). Medical schools are updating their curricula as climate change becomes impossible to ignore. *JAMA*, 32(10), 775–776.
- Brown, P. T., Hanley, H., Mahesh, A., Reed, C., Strenfel, S. J., Davis, S. J., Kochanski, A. K., & Clements, C. B. (2023). Climate warming increases extreme daily wildfire growth risk in California. *Nature*, 621(7980), 760–766. <https://doi.org/10.1038/s41586-023-06444-3>

- CAHME (Commission on the Accreditation of Healthcare Management Education). (n.d.). *About CAHME*. <https://cahme.org/healthcare-management-education-accreditation/about-cahme/>
- CAHME. (2023). *CAHME accreditation standards and self-study handbook 2021: Standards for graduate programs in healthcare management education*. https://cahme.org/wp-content/uploads/2023/10/CAHME-HMA-Self-Study-Handbook-2021-Standards-2023_10_11.pdf
- Dalapati, T., Nick, S. E., Chari, T. A., George, I. A., Hunter Aitchison, A., MacEachern, M. P., O'Sullivan, A. N., Taber, K. A., & Muzyk, A. (2023). Interprofessional climate change curriculum in health professional programs: A scoping review. *Education Sciences*, 13(9), 945. <https://doi.org/10.3390/educsci13090945>
- Dupraz, J., & Burnand, B. (2021). Role of health professionals regarding the impact of climate change on health -- An exploratory review. *International Journal of Environmental Research and Public Health*, 18(6), 3222. <https://www.mdpi.com/1660-4601/18/6/3222>
- Garman, A. N., Basapur, S., Hughes, I., Chen, R., Beijster, M., Gomez-Perez, S. L., & Cygan, H. (2023). Planetary health education for future healthcare leaders: A practice-based approach. *Journal of Health Administration Education*. 39(3), 519–528. <https://www.mdpi.com/1660-4601/19/18/11786>
- Global Consortium on Climate and Health Education. (n.d.). <https://www.publichealth.columbia.edu/research/programs/global-consortium-climate-health-education>
- Goshua, A., Gomez, J., Erny, B., Burke, M., Luby, S., Sokolow, S., LaBeaud, A. D., Auerback, P., Gisondi, M. A., & Nadeau, K. (2021). Addressing climate change and its effects on human health: A call to action for medical schools. *Academic Medicine*, 96(3), 324–328.
- Harper, S. L., Cunsolo, A., Babujee, A., Coggins, S., Aguilar, M. D., & Wright, C. J. (2021). Climate change and health in North America: Literature review protocol. *Systematic Reviews*, 10(3). <https://doi.org/10.1186/s13643-020-01543-y>

- Hertelendy, A. J., Burkle, F., Greenia, E., Goniewicz, K., Donahue, D. A., & Ciottone, G. (2021). A new core competency for healthcare administrators: Discussing the need for emergency and disaster management education in the graduate healthcare administration curriculum. *Journal of Health Administration Education*, 38(3), 709–726.
- Hertelendy, A. J., Chekijian, S., McNulty, E., Mitchell, C. L., Grimes, J. O., Durneva, P., Ranse, J., Voskanyan, A., Nazarian, V., Rawaf, S., Tabche, C., & Ciottone, G. R. (2022). Crisis leadership: A case for inclusion in accredited Master of Public Health program curricula. *Public Health*, 209, 14–18. <https://doi.org/10.1016/j.puhe.2022.05.012>
- Hertelendy, A. J., & Ciottone, G. (2024). Strengthening hurricane preparedness in hospital systems. *JAMA*, 333(11), 459–460. doi: 10.1001/jama.2024.23936
- Hertelendy, A. J., Howard, C., Sorensen, C., Ranse, J., Eboreime, E., Henderson, S., Tochkin, J., & Ciottone, G. (2024). Seasons of smoke and fire: preparing health systems for improved performance before, during, and after wildfires. *The Lancet Planetary Health*, 8(8), e588–e602.
- Hess, J. J., Errett, N. A., McGregor, G., Busch Isaksen, T., Wettstein, Z. S., Wheat, S. K., & Ebi, K. L. (2023). Public health preparedness for extreme heat events. *Annual Review of Public Health*, 44, 301–321. <https://doi.org/10.1146/annurev-publhealth-071421-0255080>
- International Hospital Federation (IHF). (2023). *Global Healthcare Leadership Competency Model 2023. Competencies for future-focused leadership*. <https://ihf-fih.org/wp-content/uploads/2023/06/IHF-Global-Healthcare-Leadership-Competency-Model-2023.pdf>
- IPCC. (2023). <https://www.ipcc.ch/>
- The Joint Commission. (2023, November 8). *The Joint Commission & CAHME establish fellowship advancing sustainable health care*. <https://www.jointcommission.org/resources/news-and-multimedia/newsletters/newsletters/joint-commission-online/nov-8-2023/the-joint-commission-cahme-establish-fellowship-advancing-sustainable-health-care/>

- The Joint Commission. (2024, March 6). *New and revised emergency management standards*. <https://www.jointcommission.org/standards/prepublication-standards/new-and-revised-emergency-management-standards/>
- Jowell, A., Lachenauer, A., Lu, J., Maines, B., Patel, L., Nadeau, K., & Erny, B. C. (2023). A model for comprehensive climate and medical education. *The Lancet Planetary Health*, 7(1), e2–e3. [https://doi.org/10.1016/S2542-5196\(22\)00215-7](https://doi.org/10.1016/S2542-5196(22)00215-7)
- Kalogirou, M. R., Dahlke, S., Davidson, S., & Yamamoto, S. (2020). Nurses' perspectives on climate change, health and nursing practice. *Journal of Clinical Nursing*, 29(23–24), 4759–4768.
- Khalil, H., Liang, Z., Karimi, L., Ferrier, J. A., & Liu, C. (2023). Evaluation of a health administration program and future considerations. *Journal of Health Administration Education*, 39(3), 409–428.
- Lee, H., Calvin, K., Dasgupta, D., Krinner, G., Mukherji, A., Thorne, P., Trisos, C., Romero, J., Aldunce, P., & Ruane, A. (2023). IPCC, 2023: Climate change 2023: Synthesis report, summary for policymakers. *Contribution of Working Groups I, II, and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC. <https://doi.org/10.59327/IPCC/AR6-9789291691647>
- Lemery, J., Balbus, J., Sorensen, C., Rublee, C., Dresser, C., Balsari, S., & Hynes, E. C. (2020). Training clinical and public health leaders in climate and health. *Health Affairs*, 39(12), 2189–2196. <https://doi.org/10.1377/hlthaff.2020.01186>
- Lenzen, M., Malik, A., Li, M., Fry, J., Weisz, H., Pichler, P. P., Suveges Moreira Chaves, L., Capon, A., & Pencheon, D. (2020). The environmental footprint of health care: A global assessment. *The Lancet Planetary Health*, 4(7), e271–e279. [https://doi.org/10.1016/S2542-5196\(20\)30121-2](https://doi.org/10.1016/S2542-5196(20)30121-2)
- Létourneau, S., Roshan, A., Kitching, G. T., Robson, J., Walker, C., Xu, C., Jubas-Malz, D., & Xie, E. (2023). Climate change and health in medical school curricula: A national survey of medical students' experiences, attitudes and interests. *The Journal of Climate Change and Health*, 11, 100226.

- McKinnon, S., Breakey, S., Fanuele, J. R., Kelly, D. E., Eddy, E. Z., Tarbet, A., Nicholas, P. K., & Ros, A. M. V. (2022). Roles of health professionals in addressing health consequences of climate change in interprofessional education: A scoping review. *The Journal of Climate Change and Health*, 5. <https://doi.org/10.1016/j.joclim.2021.100086>
- Naidu, T., & Ramani, S. (2024). Transforming global health professions education for sustainability. *Medical Education*, 58(1), 129–135. <https://doi.org/10.1111/medu.15149>
- Pratt, M. G. (2009). For the lack of a boilerplate: Tips on writing up (and reviewing) qualitative research. *Academy of Management Journal*, 52(5), 858–862. <https://psycnet.apa.org/doi/10.5465/AMJ.2009.44632557>
- Quitmann, C., Sauerborn, R., Danquah, I., & Herrmann, A. (2023). “Climate change mitigation is a hot topic, but not when it comes to hospitals”: A qualitative study on hospital stakeholders’ perception and sense of responsibility for greenhouse gas emissions. *Journal of Medical Ethics*, 49(3), 204–210. doi:10.1136/medethics-2021-107971
- Richardson, E. L., Mast, L., Fisher, D., Schroeder, L., Conklin, S., & Gordon, J. (2023). A systems approach to scaffolding learning in healthcare administration education. [*Journal of Health Administration Education*. 39\(3\), 489–502.](#)
- Romanello, M., di Napoli, C., Green, C., Kennard, H., Lampard, P., Scamman, D., Walawender, M., Ali, Z., Ameli, N., Ayeb-Karlsson, A., Beggs, P. J., Belesova, K., Ford, L.B., Bowen, K., Cai, W., Callaghan, M., Campbell-Lendrum, D., Chambers, J., Cross, T.J.,... Costello, A. (2023). The 2023 report of the Lancet Countdown on health and climate change: The imperative for a health-centred response in a world facing irreversible harms. *The Lancet*, 402(10419), 2346–2394.
- Ryan, E. C., Dubrow, R., & Sherman, J. D. (2020). Medical, nursing, and physician assistant student knowledge and attitudes toward climate change, pollution, and resource conservation in health care. *BMC Medical Education*, 20, 1–14.
- Salas, R. N., Burke, L. G., Phelan, J., Wellenius, G. A., Orav, E. J., & Jha, A. K. (2024). Impact of extreme weather events on healthcare utilization and mortality in the United States. *Nature Medicine*, 30(4), 1118–1126.

[doi: 10.1038/s41591-024-02833-x](https://doi.org/10.1038/s41591-024-02833-x)

Sorensen, C., Campbell, H., Depoux, A., Finkel, M., Gilden, R., Hadley, K., Haine, D., Mantilla, G., McDermott-Levy, R., Potter, T. M., Sack, T. L., Tun, S., & Wellbury, C. (2023). Core competencies to prepare health professionals to respond to the climate crisis. *PLOS Climate*, 2(6), e0000230 <https://doi.org/10.1371/journal.pclm.0000230>

Sriharan, A., Hertelendy, A. J., Banaszak-Holl, J., Fleig-Palmer, M. M., Mitchell, C., Nigam, A., Gutberg, J., Rapp, D. J., & Singer, S. J. (2022). Public health and health sector crisis leadership during pandemics: A review of the medical and business literature. *Medical Care Research and Review*, 79(4), 475–486. <https://doi.org/10.1177/10775587211103>

Teherani, A., Nicastro, T., Clair, M. S., Nordby, J. C., Nikjoo, A., Collins, S., Irani, A., Zakaras, J., & Weiser, S. D. (2023). Faculty development for education for sustainable health care: A university system-wide initiative to transform health professional education. *Academic Medicine*, 98(6), 680–687. <https://doi.org/10.1097/acm.0000000000005137>

United Nations Framework Convention on Climate Change (UNFCCC). (2015). *The Paris Agreement*. https://unfccc.int/sites/default/files/english_paris_agreement.pdf

van Daalen, K. R., Tonne, C., Semenza, J. C., Rocklöv, J., Markandya, A., Dasandi, N., Jankin, S., Achebak, H., Ballester, J., Bechara, H., Becks, T., Callaghan, M. C., Carvalho, B., Chambers, J., Prada, M. C., Courtenay, O., Dasgupta, S., Eckelman, M. J., Farooq, Z., Fransson, P.,... & Lowe, R. (2024). The 2024 Europe report of the Lancet Countdown on health and climate change: Unprecedented warming demands unprecedented action. *The Lancet Public Health*, 9(7), e495-e522. [doi: 10.1016/S2468-2667\(24\)00055-0](https://doi.org/10.1016/S2468-2667(24)00055-0).

World Health Organization (WHO). (2015). *Climate resilient health systems*. WHO. <https://www.who.int/teams/environment-climate-change-and-health/climate-change-and-health/country-support/building-climate-resilient-health-systems>

Zigmond, B. (2024). Health care feels the heat: A primer for radiologists on climate change–related regulatory and policy trends. *Journal of the American College of Radiology*, 21(2), 257–264.