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Short communication

Integrating climate change education into board certification for pediatricians: A model for other specialties

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The 6th Intergovernmental Panel on Climate Change Report [1] released this year states that human influence has unequivocally warmed our planet. Rapid warming drives weather extremes around the planet, such as heatwaves, flooding events, droughts, and wildfires with increasingly disastrous effects on human health. The IPCC report acknowledges that, while certain harms are “locked in”, there is still a window for governments and societies to transition quickly to clean energy economies to protect human health. The American Medical Association also recognizes the impact climate change has on human health, recommending both the integration of climate change into medical education and encouraging physician advocacy to address climate change in a 2019 policy statement [2]. While there has been progress toward integration of climate change into medical curriculum and residency education [3–5], incorporating this information into the board certification process has not yet occurred.

Fortunately, the tide is turning. In June of 2021, the American Board of Pediatrics (ABP) published a board maintenance of certification (MOC) module that we created, titled “The Impact of Climate Change on Pediatric Health Care.” By launching this groundbreaking module, the ABP is the first U.S. board certifying body, to our knowledge, officially recognizing climate change as a foundational health issue affecting the clinical care of patients in ways that require dedicated education. We hope this prompts other major medical boards to follow suit. Here we provide an outline of our process and the themes of our module to assist other physicians seeking to advocate to their medical boards.

The effort to integrate climate change into pediatric board certification materials grew out of a Climate Advocates Program within the American Academy of Pediatrics. Climate-passionate pediatricians from across the U.S. began meeting regularly to share lessons learned and organize for action. A subset of advocates interested in medical

education convened to discuss strategies to improve physician education on climate change. With efforts underway for integrating climate change into medical school curriculum by groups like the Medical Students for a Sustainable Future [6], our group recognized the need to create additional touchpoints in a physician’s training, including content on board maintenance of certification examinations. Outreach was undertaken to the American Board of Pediatrics to discuss integrating content on climate change. The American Board of Pediatrics, in articulating their motivations for including this curriculum, stated: “We recognize the importance of educating pediatricians on how children are vulnerable to the impact of climate change. . .the effects of climate change on temperature, air quality, food insecurity, and extreme weather events impact the physical and mental health of our children” [7].

Seizing this opportunity, a working group of ten pediatricians from across the U.S., both academic and community based, with expertise in climate change, structural racism, and their impacts on health, was identified through the AAP’s Chapter Climate Advocates group. After several meetings over two months, themes were agreed upon that elucidate the causes of climate change, the exposures it lays bare, and the most important pediatric health impacts that result. These foundational themes include the health effects of heat waves, health and developmental effects of air pollution, how historical policies such as redlining drive higher exposure to environmental pollution creating health disparities [8], allergic and atopic disease from warming and shifting seasons, rising food insecurity and threats to children’s nutritional status, and the spread of vector-borne disease [9]. The main learning objective was to appreciate how the themes may be applied to pediatric patient care across different ages, geographical areas, socioeconomic statuses, and racial identities [10]. Further, a goal of the pediatricians involved with this activity is to foster improved patient care and climate advocacy by being cognizant of social inequities that affect health. Communities vulnerable to climate change are often burdened by multiple systemic stressors, including poverty, housing insecurity, inadequate access to healthcare, and racism [8,10].

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The American Board of Pediatrics requested 20 questions be written and connected with a corresponding paper that pediatricians would be expected to read in order to answer them. The ABP suggested most questions be created as clinical scenarios that a pediatrician may encounter in the office or hospital setting, while having some be non-clinical to give the module complexity and build foundational knowledge. Using our themes and learning objectives as a guide, papers were chosen that would serve as a foundation for a pediatrician's understanding of the health effects of climate change. The selected papers include the AAP's Global Climate Change and Children's Health Policy Statement and Technical Report [11,12], an article summarizing the scientific evidence [13], and several research articles and systematic reviews to emphasize key findings [8,14–17]. All articles chosen were peer reviewed and open access. Clinical scenarios were grounded in many of the authors' experiences with patient care and climate change. Data and policy guidance were integrated into the answer choices and rationale for the best answer choice.

Two pediatricians from the working group produced the 20-question draft module in one month's time. Five other pediatricians from the working group acted as pilot test takers and took the module without knowing the answers beforehand and gave feedback. The module underwent editing to incorporate the comments and was then submitted to the ABP Quality and Education Department for Continuing Certification about five months after the very first working group meeting took place. It came back from the ABP two months later with editing suggestions, mostly for style and some for content, these were integrated, the module was resubmitted and then accepted! However, we had not yet crossed the finish line. The next step was for a group of ABP pilot test takers to complete the module and send feedback. Their suggestions were considered, the module was edited further, and then resubmitted to the ABP. Finally, one year after the first AAP Climate Change Advocate working group meeting took place, the ABP launched the MOC Part 2 "The Impact of Climate Change on Pediatric Health Care" module on their website ready to be taken as part of the board recertification process!

Building from the success of this module, a second subset of pediatrician climate advocates is in the process of creating an MOC Part 4 practice and quality improvement module. This module will assess and augment a pediatrician's understanding of how best to prevent and treat the health effects of climate change experienced by patients. The MOC Part 4 module will start with an initial data collection period to assess whether pediatricians currently incorporate the health impacts of climate change into patient counseling, what modes of counseling they use, and how comfortable they are doing it. This will be followed by an education intervention to provide information about climate change, health, and equity. After this, another data collection period with the same questions, a communication intervention on how to incorporate climate change and its health effects into the well child visit, and a final data collection survey will complete the MOC Part 4 module.

Once both the MOC Part 2 and Part 4 modules are integrated into the American Board of Pediatrics' recertification materials, the next step will be continued advocacy to integrate this information into Bright Futures [18], a national health promotion and prevention initiative by the AAP that provides theory-based and evidence-driven guidance for well-child visits, as well as into the pediatric board certification examinations. Standardizing this information through the major touchpoints in a pediatrician's practice can best prepare pediatricians and families for the health stressors we can expect from climate change.

The motivations and willingness to change within each board specialty will be unique and require continued advocacy to integrate this information for clinicians. As clinicians advocate to their boards, we hope the American Board of Pediatrics taking the first step will encourage others to follow suit. Our patients deserve physicians who

understand what this rapidly changing and unpredictable world will mean for their health. Physicians need touch-points throughout their medical education to build their understanding and practice of how climate change affects health in order to be effective advocates in protecting their patients from this grave public health emergency.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- [1] Allen R, Arias P, Berger S, Belgium F. Climate change 2021 the physical science basis 134 working group I contribution to the sixth assessment report of the intergovernmental panel on 135 climate change summary for policymakers.; 2021. Accessed October 7, 2021. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf
- [2] American Medical Association. Policy finder | AMA. <https://policysearch.ama-assn.org/policy-finder/detail/climate%20change?uri=%2FAMADoc%2FHOD.xml-0-309.xml>
- [3] 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 J Assoc Am Med Coll* 2021;96(3):355–67. doi: [10.1097/ACM.0000000000003719](https://doi.org/10.1097/ACM.0000000000003719).
- [4] Rabin BM, Laney EB, Philipsborn RP. The unique role of medical students in catalyzing climate change education. *J Med Educ Curric Dev* 2020;7:2382120520957653. doi: [10.1177/2382120520957653](https://doi.org/10.1177/2382120520957653).
- [5] Wellbery C, Sheffield P, Timmireddy K, Sarfaty M, Teherani A, Fallar R. It's time for medical schools to introduce climate change into their curricula. *Acad Med J Assoc Am Med Coll* 2018;93(12):1774–7. doi: [10.1097/ACM.0000000000002368](https://doi.org/10.1097/ACM.0000000000002368).
- [6] Cohen Marill M. Pressured by students, medical schools grapple with climate change. *Health Aff (Millwood)* 2020;39(12):2050–5. doi: [10.1377/hlthaff.2020.01948](https://doi.org/10.1377/hlthaff.2020.01948).
- [7] American Board of Pediatrics. Personal communication 8/4/20.
- [8] Nardone A, Casey JA, Morello-Frosch R, Mujahid M, Balmes JR, Thakur N. Associations between historical residential redlining and current age-adjusted rates of emergency department visits due to asthma across eight cities in California: an ecological study. *Lancet Planet Health* 2020;4(1):e24–31. doi: [10.1016/S2542-5196\(19\)30241-4](https://doi.org/10.1016/S2542-5196(19)30241-4).
- [9] USGCRP. Fourth national climate assessment. Washington, DC: U.S. Global Change Research Program; 2021. 2018:1–470. Accessed October 9 <https://nca2018.global-change.gov>.
- [10] National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Population Health and Public Health Practice; Committee on Community-Based Solutions to Promote Health Equity in the United States; Baciu A, Negussie Y, Geller A, et al., editors. *Communities in Action: Pathways to Health Equity*. Washington (DC): National Academies Press (US); 2017 Jan 11. 3, The Root Causes of Health Inequity. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK425845/>
- [11] Ahdoot S, Pacheco SE, The council on environmental health. Global climate change and children's health technical report. *Pediatrics* 2015 Published online October 1. doi: [10.1542/peds.2015-3233](https://doi.org/10.1542/peds.2015-3233).
- [12] Council on Environmental Health. Global climate change and children's health policy statement. *Pediatrics*; 2015 Published online October 1. doi: [10.1542/peds.2015-3232](https://doi.org/10.1542/peds.2015-3232).
- [13] Perera FP. Multiple threats to child health from fossil fuel combustion: impacts of air pollution and climate change. *Environ Health Perspect* 2017;125(2):141–8. doi: [10.1289/EHP299](https://doi.org/10.1289/EHP299).
- [14] Bekkar B, Pacheco S. Association of air pollution and heat exposure with preterm birth, low birth weight, and stillbirth in the US: a systematic review | *Neonatology | JAMA Network Open | JAMA Network*. *JAMA Netw Open* 2020;3(6):e208243 doi: [10.1001/jamanetworkopen.2020.8243](https://doi.org/10.1001/jamanetworkopen.2020.8243).
- [15] Bergeron MF, DiLaura Devore C, Rice SG, Council On Sports Medicine and Fitness and Council on School Health. Climatic heat stress and exercising children and adolescents. *Pediatrics* 2011;128(3):e741–7. doi: [10.1542/peds.2011-1664](https://doi.org/10.1542/peds.2011-1664).
- [16] Basagaña X, Sartini C, Barrera-Gómez J, et al. Heat waves and cause-specific mortality at all ages. *Epidemiology* 2011;22(6):765–72.
- [17] Schonfeld DJ, Demaria T, The disaster preparedness advisory council and committee on psychosocial aspects of child and family health. Providing psychosocial support to children and families in the aftermath of disasters and crises. *Pediatrics* 2015;136(4):e1120–30. doi: [10.1542/peds.2015-2861](https://doi.org/10.1542/peds.2015-2861).
- [18] American Academy of Pediatrics. Bright Futures: prevention and health promotion for infants, children, adolescents and their families. Accessed October 9, 2021. <https://brightfutures.aap.org/Pages/default.aspx>