

# A Single Institution Study: Integrating Evidence Based Climate Health Curricular Topics

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## Background and Introduction

- World Health Organization estimates that climate change will cause an additional 250,000 deaths annually.<sup>1</sup>
- US healthcare system is responsible for 25% of all global healthcare greenhouse gas emissions.<sup>2</sup>
- Educating medical students on the imminent health risks associated with a warming planet is essential to producing future physicians who will manage these patients' concerns.
  - Majority of medical students believe climate change should be a core topic in medical school curricula and current coverage is inadequate.<sup>3</sup>
  - Many U.S. medical schools have started to integrate climate health into their curricula.<sup>4</sup>

Our goal is to assess student awareness of climate health curriculum at Robert Wood Johnson Medical School (RWJMS) and to integrate evidence-based interventions across topics such as pathophysiology, social determinants of health, and health systems science.

## Methods and Materials

- We conducted a needs assessment prior to developing a climate health curriculum.
  - Two surveys were administered: one to first-year MS, and one to a small subset of fourth-year MS at RWJMS.
    - 30 first-years and 13 fourth-year students responded.
- To develop a climate health curriculum:
  - Resources from Columbia University's Global Consortium on Climate Health and Education (GCCHE), the University of New Mexico's Climate Health ECHO Project, and the U.S. Global Change Research Program's 2016 report titled "The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment".
  - Generated an inventory for where specific climate health interventions could be incorporated into the RWJMS preclinical curriculum (ie. required reading, dedicated lecture slides, or module-based learning).
  - Our team then began reaching out to course directors to methodically integrate climate health.

## References

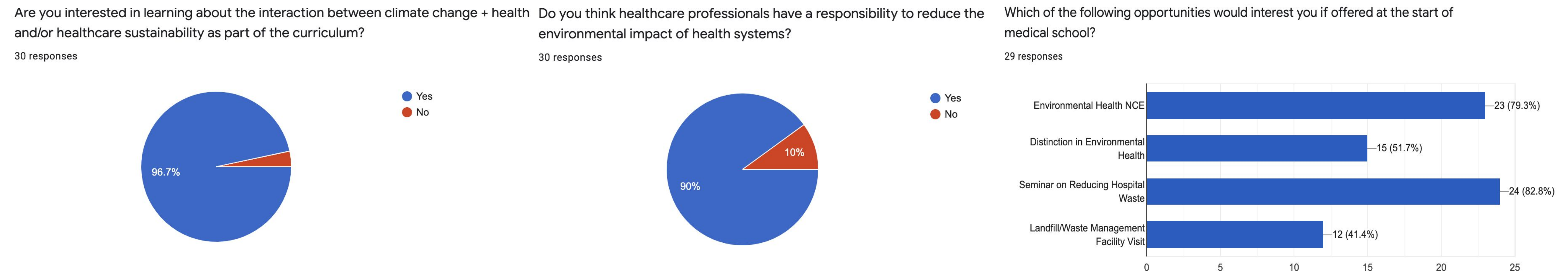
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## Acknowledgements

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## Results and Curriculum Schematic

**Figure 1:** Results from questions in the RWJMS first-year medical student survey



**Figure 2:** Results from questions in the RWJMS fourth-year medical student survey

Q#	Question	100% of sampled 4th year MS answered:
1.1	Does your medical school curriculum address the relationship between extreme temperature health risks and climate change	No, this topic was not covered
1.11	Does your medical school curriculum address the carbon footprint of healthcare	No, this topic was not covered
1.12	In training for patient encounters, does your medical schools' curriculum introduce strategies to have conversations with patients about the health effects of climate change?	No, this topic was not covered

Course	Curricular Topics	Evidence-Based Interventions
Physicianship	Population Health Health Equity & Disparities  Health Systems Science	<ul style="list-style-type: none"> <li>Introduction to Climate Health</li> <li>Climate change, urban heat environment disparities, tree equity, and disproportionate occupational exposure, how urban planning of built environment impacts health outcomes</li> <li>Environmental impact, waste production, and greenhouse gas emissions from healthcare systems and hospitals</li> </ul>
Foundations in Medical Sciences	Immunology  Microbiology	<ul style="list-style-type: none"> <li>Climate change and increased incidence of autoimmunity</li> <li>Increase in atopic conditions due to rising temperatures, air pollution, and the lengthening of pollen season</li> <li>Geographic changes in vector borne illness such as Lyme, Yellow Fever, West Nile, and Zika.</li> <li>Geographic changes in spore-borne diseases in dry arid climates</li> </ul>
Integrated Systems 1	Cardiology Pulmonology  Nephrology	<ul style="list-style-type: none"> <li>Heat stroke and heart strain/adverse cardiac events</li> <li>Wildfires and asthma</li> <li>Air pollution and pulmonary disease</li> <li>"Greening" Dialysis</li> <li>The Stone Belt: how high temperatures impact kidney stone incidence</li> </ul>
Integrated Systems 2	Metabolism and Gastroenterology  Endocrine and Reproductive Systems	<ul style="list-style-type: none"> <li>Heat waves and Inflammatory Bowel Disease flares</li> <li>Environmental changes linked to dysbiosis of the gut microbiome and environmental enteropathy</li> <li>Climate change, obesity, and malnutrition</li> <li>Adverse pregnancy outcomes related to pre-eclampsia and rising temperatures</li> </ul>
Movement, Brain, and Behavior	Neurology  Psychiatry  Dermatology	<ul style="list-style-type: none"> <li>Heat stress as a trigger for neuroinflammation in Multiple Sclerosis, Parkinson's, and Alzheimer's</li> <li>Environmental pollution as a risk factor for developmental disability such as Autism Spectrum Disorder</li> <li>Intersection of forced migration from environmental disaster and mental health disorders and mental health resilience</li> <li>Increased incidence of PTSD and eco-anxiety after extreme weather events</li> <li>Rising temperatures and skin cancer incidence</li> <li>Positive association between poor air quality from wildfires and atopic dermatitis</li> </ul>

## Discussion and Future Directions

Given the implications of climate change on human health, it is essential for current medical students to be educated on the interaction between climate and health. Future physicians must be taught about the impact that the healthcare system has on the environment, and how we can make sustainable choices on both a systems and individual level in order to decrease the burden of climate change on health. Future initiatives include:

- Introduction to Climate Health Inaugural Lecture** titled "What do physicians need to know about climate health?"
- Formal Establishment of an Environmental Health Curriculum** with oversight from a faculty director and using insights gained from our 2022-2023 Planetary Health Report Card
- Community Health Education Collaborations (CHEC)** to offer community level discussions about local impacts of climate change on health
- Non-Credit Elective** involving guest lecturers from other fields related to climate, sustainability, health equity, and environmental justice
- Distinction in Environmental Healthcare** for students who wish to complete a scholarly project and receive notation on their transcript
- Review Progress** with the continued use of the Planetary Health Report Card to determine the school's year to year development and areas for further improvement

