Climate Change and Health: A Special Edition of the *Rhode Island Medical Journal*

Examining the impacts of climate change on health, health care institutions, and mitigation strategies

WILLIAM BINDER, MD
THEME EDITOR

The impact of humans on climate has been recognized for centuries. Eighteenth-century Scottish Enlightenment philosopher David Hume postulated that the moderation of Europe's climate, in comparison to Roman times, was due to the gradual advance of cultivation in Europe. He further remarked, "Our northern colonies in America become more temperate, in proportion as the woods are felled…"[1]

While Hume could not cite rigorous data as a source for his opinion, scientists and philosophers continued to ponder the impact of humans on their environment. A century after Hume, Irish physicist John Tyndall ushered in the modern era of climate science in 1859 when he discovered the connection between atmospheric CO_2 and the greenhouse effect. By mid-20th century, 200 years after Hume, one scientist remarked, "Human beings are now carrying out a large-scale geophysical experiment of a kind which could not have happened in the past, nor be reproduced in the future. Within a few hundred years we are returning to the air and oceans the concentrated organic carbon stored over hundreds of millions of years."[2]

Data supporting the impact of humans on atmospheric warming continues to accumulate and this year's Nobel Prize in physics acknowledges the complex interaction between humans, climate, and weather. Rising seas, extreme weather events, and species extinction are no longer versions of apocalyptic science fiction but instead a harsh, modern reality with existential ramifications requiring mitigation and adaptation.

While some skeptics continue to doubt the incontrovertible data, the scientific, medical, and business communities, as well as the US military, have moved past reactionary arguments. In this special issue of the *Rhode Island Medical Journal* (RIMJ), we present an array of articles devoted to the impact of climate change on health in southern New England. Authors from throughout New England and representing multiple health systems, medical schools, universities, primary care practices, the United States Geological Survey, and the Rhode Island Department of Health have all contributed to this important edition of RIMJ.

NITIN S. DAMLE frames the issue by noting that extreme weather events and air pollution have precipitated increasing morbidity and mortality through heat waves, and increases in infectious and respiratory diseases. His commentary also alludes to the societal impact of climate change, as it can lead to food insecurity, mental health crises, and mass migration. The **RHODE ISLAND MEDICAL SOCIETY'S** consensus statement, signed in March 2020, endorses the perspective of multiple medical societies, and recognizes the impact of climate change on the health of every American.

EMMA WEBB et al., **NICHOLAS J. NASSIKAS** et al., and **KATELYN MORETTI** et al. offer supporting data on the impact of climate change on health in New England. **Webb** details the impact of extreme weather events such as hurricanes and floods – think Hurricanes Sandy, Katrina, and Ida – on electricity-dependent asthmatic patients in Massachusetts. Without electricity, asthmatic patients, as well as others requiring electrically dependent durable medical equipment, are at grave risk. **Nassikas** examines the consequences of pollution on asthma and reports on thousands of excess Emergency Department (ED) visits for summertime ozone-attributable asthma exacerbations across New England. **Moretti** reports on the straightforward association between higher temperatures and increasing Emergency Medical Services' (EMS), and de facto ED, utilization, suggesting that further research may help with planning and resource allocation during summer months. We are also fortunate to feature an article by **HOWARD S. GINSBERG** et al. from the US Geological Survey and the University of Rhode Island (URI) on the effects of climate change on tick-borne disease in Rhode Island and southern New England. The authors document the increasing incidence of Lyme, babesiosis and anaplasmosis in Rhode Island, and note that Lone star ticks, the Gulf Coast tick, and the introduced Asian longhorned tick have been spreading northward into our state. The **USGS/URI group** presents a balanced view, noting that climate change, as well as numerous other environmental and socioeconomic factors, may also contribute to the expanding range of ticks and tick-borne diseases.

The current issue of RIMJ also presents data on mitigation strategies designed to decrease hospital-based waste and reduce emissions. Previous reports suggest that the healthcare industry is responsible for 10% of greenhouse gases and two million tons of waste in the US annually.[3] **KATELYN MORETTI** et al. describe a waste mitigation project at Rhode Island Hospital that led to a 23% reduction in solid waste and significant reductions in greenhouse gas emissions. **KYLE DENISON MARTIN** et al. similarly performed a waste audit at Kent Hospital, noting the impact

of the Covid-19 pandemic on waste and energy use in the ED. **Martin** et al. also provide an accompanying commentary regarding important takeaways of waste audits, offering ideas for an environmentally responsible pathway for large health systems.

Paraphrasing the axiom that all politics is local, it can be said that climate change education begins at a local and regional level. **RACHEL CALABRO** and **CAROLINE HOFFMAN** offer an introduction to the Rhode Island Department of Health's Climate Change and Health Program. As part of a US Centers for Disease Control and Prevention initiative, the program has partnered with community groups and state and local agencies to provide educational resources, fund projects fostering community resilience, and offer technical assistance. **CALEB DRESSER** et al. assess the extent of educational activity on a regional basis. In a first-of-its-kind study, they report on the scale of climate and health activities within educational institutions and professional societies in the New England region.

Rounding out this issue is a report by **JOSHUA BAUGH** et al. examining a large health system's sophisticated approach toward a vulnerability analysis, recognizing that previous analyses using historical data is inadequate in an era of rapid climate change and extreme weather events. This Harvard-wide review is a broadly applicable approach for other health systems and should be a model for other institutions moving forward. Recognizing the importance of Baugh's discussion, **ANDREW E. BINDER** et al. provide data and commentary on creating an accurate hazard analysis in order to mitigate the impact of future flooding on Providence's critical health care facilities.

We hope readers appreciate this edition of the RIMJ and that it piques an interest in what is arguably the most salient and pressing issue of our time.

References

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3. Hsu S, Thiel CL, Mello MJ, Slutzman JE. Dumpster Diving in the Emergency Department: Quantity and Characteristics of Waste at a Level 1 Trauma Center. West J Emerg Med. 2020;21: 1211-1217.

Theme editor

William Binder, MD, Associate Professor of Emergency Medicine, Warren Alpert Medical School of Brown University; Attending Physician: Rhode Island and Miriam Hospitals, Providence, RI; Editor-in-Chief, *Rhode Island Medical Journal.*

Correspondence

william_binder@brown.edu