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Climate Change and the Emergency Department

Hospitals Shrink Their Carbon Footprint, Prepare for Climate Refugees

by ALAN HUFFMAN

Special Contributor to Annals News & Perspective

As Renee Salas, MD, MS, was treating an elderly woman in the emergency department (ED) at Massachusetts General Hospital in the fall of 2017, the patient revealed that she had been displaced by the recent devastation wrought by Hurricane Maria in Puerto Rico.

The woman had come to the ED straight from the airport, with a single piece of luggage and a worn plastic bag full of empty medication bottles—medicine that she hadn't taken for days. Most hospitals in Puerto Rico were out of commission, largely because of power outages, or inundated with injured and sick people. Similar scenarios would later play out in California during an unprecedented outbreak in wildfires.

It occurred to Dr. Salas that this was the shape of things to come. "It's not going to be just climate refugees in far-off countries," she said. "Already, climate change is displacing Americans."

An emergency physician at Massachusetts General Hospital and Harvard Medical School, and a physician-investigator of climate change and

health at the Harvard Global Health Institute, Dr. Salas is well aware of the health care ramifications of climate change. She was lead author of a November 2018 *Lancet* Countdown US policy brief that described climate change as "the biggest global health threat of the 21st century" and warned that if it is not addressed, disease, poor air quality, and food insecurity will threaten millions of people.

Written by a team of international researchers, the report focused on specific climate-related influences, including extreme heat and its effect on labor productivity and the spread of disease. It also highlighted predicted dramatic upticks in the numbers of weather disaster victims and global refugees. The fact that the health care system is itself a major contributor to climate change means preparing for its effects is only a part of the equation, Dr. Salas said.

Dr. Salas referenced an analogy she attributed to a Canadian emergency physician, Courtney Howard, MD: "We, as emergency physicians, sometimes have a narrow therapeutic window for treatment, and with climate change, we're currently within that narrow, critical window. This is a crisis. As emergency medicine physicians, our clinical practice is built around responding to emergencies, and this is a medical emergency. We need to acknowledge the unique power we carry for communicating this message."

In addition to treating more people who are injured or sickened as a result of climate change in coming years, hospitals are both vulnerable to extreme weather events and part of their root cause. The Commonwealth Fund, a nonpartisan organization devoted to independent research of health care issues, lists the health care system as the seventh-largest producer of carbon dioxide in the world and a major contributor to global waste. In the United States, health care is estimated to account for nearly a tenth of greenhouse gas emissions, largely the result of the consumption of electricity. In addition to massive power demands for large medical facilities operating around the clock, equipment such as scanners and dialysis machines drains enormous amounts of energy, most of which is derived from fossil fuels that emit greenhouse gases and contribute to atmospheric upheaval.

Dr. Salas noted that the Hippocratic oath requires physicians to protect patients from harm, yet through its own contributions to climate change, "The health care industry is actually harming patients' health."

The good news is that the health care system is beginning to adapt to reduce its effect on climate change. But health care professionals are also beginning to face the consequences of changes that are under way, observed Cara Cook, MS, RN, with the Alliance of Nurses for a Healthy Environment, which is working to educate health care professions and the public about the effects of climate change.

"We're taking care of the people on the front lines of climate change, now," Cook said. Among them are victims and first responders who arrive in EDs as a result of more frequent and intense wildfires, increasingly potent storms, and heat-related illnesses, she said.

The Alliance of Nurses for a Healthy Environment is pushing for both reducing health care's contributions to climate change and preparing for the related growth in medical emergencies. "You have to have the infrastructure to treat extreme weather events, which can also affect hospital operations, like causing shutdowns," Cook said. In addition to injuries caused by high heat, floods, hurricanes, and wildfires, climate change will likely result in more vector-borne diseases as tropical conditions expand, she said.

Dr. Salas noted that health care professionals and scientific researchers have already begun to see a spread in vector-borne diseases. "Lyme disease is increasing. We could end up seeing malaria and dengue fever become more prevalent. We could even see dengue fever in the [United States]," she said. "We have to develop adaptation conventions. The association between increasing temperatures and antibiotic resistance is already a big concern, but climate change is a threat multiplier. People with asthma will encounter greater pollen loads. We'll also see more trauma cases from extreme weather." Ozone imbalances and air pollution are already leading to early mortality, heart attacks, and lung problems, she said.

Dr. Salas has 3 recommendations for hospital administrators and ED staff: set deadlines for conversion of medical facilities to full reliance on renewable energy sources, reduce waste, and urge medical personnel to take steps in their own lives to reduce greenhouse gas emissions and to use their position as trusted experts to spread the word to patients. In her experience, hospital administrators are generally open to making such changes, although she acknowledged there is a "knowledge gap" and that making systemic changes is complicated by the fact that health care has so many moving parts.

"The key is education," she said. "Our departments have to be prepared for more extreme weather events—dealing with power outages and supply chains. We've got to put money up front for that. Then we have to identify vulnerable patients and work to protect them from those harms. The American public hasn't thought about climate change as a health care issue, but people are receptive."

Acknowledging the need to reduce their carbon footprint, some hospitals have begun to augment or move toward

replacing conventional electrical power sources with energy from alternative sources such as windmills and solar devices, and meanwhile to reduce their waste streams. "Nurses are the largest part of the health care workforce, so we go to hospital administrators and put out needs for changes, along with the economic benefits," Cook said.

In June 2018, the American College of Emergency Physicians (ACEP) acknowledged these challenges and adopted a policy supporting collaboration with public health agencies and other stakeholders to address the effects of climate change. The policy noted that those effects include "the introduction of unprecedented pathology and worsening of existing chronic disease." ACEP also supports raising public awareness of the short- and long-term implications of climate change for public health and for the practice of emergency medicine; engaging in climate change research, including the surveillance of emerging diseases; advocating for policies and practices to mitigate or otherwise address the effects and to reduce the carbon footprint of EDs and affiliated treatment facilities; and educating patients about necessary precautions during extreme weather events.

Among the hospitals that have taken steps to reduce their carbon footprint is the Cleveland Clinic, a group of nonprofit academic and regional hospitals and health centers based in Cleveland, OH, with facilities in Ohio, Florida, Nevada, Ontario, and the United Arab Emirates. In response to concerns by staff physicians and scientists, the Cleveland Clinic began reevaluating its operations to reduce their environmental impact and found that the resulting measures also led to considerable cost savings, said Jon Utech, MBA, MSOD, senior director of its office for a healthy environment. The process began with a systemwide program called Green the OR.

"The operating room [OR] is the most energy- and material-intense part of our enterprise," Utech said. The Cleveland Clinic has more than 200 ORs in its system and approximately 3,000 physicians and scientists. In addition to Green the OR, "Other programs cover every aspect of our operations," he said.

Since 2007, when the Cleveland Clinic began making changes, its hospital and health care system has saved an estimated $50 million in energy costs and has realized $30 million in savings because of the reduction of waste, the use of recycling programs, and more sustainable equipment purchases, Utech said. In regard to the latter, he said that when large equipment such as a computed tomographic scanner is replaced at one campus, the old machine may be reused at another campus as part of a centralized supply chain. In some cases, the equipment may be sold to another health care provider or donated to a facility in an underserved country, such as Latin America or Africa. The final option is recycling. New purchases involve more energy-efficient equipment and low-flow water fixtures.

Cleveland Clinic employees now recycle everything possible, pay attention to seemingly minor details such as turning off lights and computers when not in use, and participate in community tree-planting programs. One small systemwide change—printing documents in black-and-white and on 2 sides—resulted in an estimated savings of $1.5 million. "Simple things can add up," Utech said. Those include revisiting wasteful established procedures such as the disposal of single-use surgical implements, which can be collected, reprocessed, and reused, saving millions of dollars per year.

The Cleveland Clinic is also reducing the frequency of energy-intensive air exchange systems that remove potentially harmful air in its ORs. "Most ORs exchange air 35 times an hour, and there's no clinical reason," Utech said. The Cleveland Clinic has begun reducing that to 20 times per hour and as infrequently as 6 times per hour when the OR is not in use, which alone has resulted in $2 million in energy savings, he said. The organization is also replacing fluorescent lighting with LED tubes and giving preference to Leadership in Energy and Environmental Design–certified building designs and equipment with high US Department of Energy ratings, with plans to be carbon neutral within the coming decade by increasing use of renewable energy sources such as solar and wind power and expanding existing efficiency and emission-reducing programs.

In addition to implementing such measures in EDs "in multiple stages," the Cleveland Clinic began evaluating the preparedness of its EDs in Ohio and Florida for increasingly intense weather events and changes in patient needs that will result, Utech said. Those evaluations cover the increasing chances of a health care campus's being hit by a tornado, flood, or hurricane. "How would we continue to provide care?" he said. To help plan their response to more frequent weather episodes in which its EDs are "inundated with patients," hospital administrators have begun coordinating with city and county emergency response services and meanwhile looking into "the mix of cases [they will] see increase," such as those involving infectious diseases.

Among US hospitals that have taken similar measures to reduce their own climate change influences are New York's Rochester Regional Health, which has plans to use all-renewable power sources by 2025 and has begun installing on-site solar panel generators at one of its campuses; George Washington University Hospital in Washington, DC, which now derives half of its power from

solar energy; and Seattle Children's Hospital, which has reduced its natural gas consumption and put in place employee commuting programs such as subsidized transit passes, carpooling, and vanpooling options, as well as loaning commuter bikes and offering daily commuting bonuses for staff who leave their cars at home or telecommute.

To assist hospitals in making such changes, the US Department of Energy publishes the *Advanced Energy Retrofit Guide for Healthcare Facilities,* which includes electrical retrofits and energy-saving measures that the agency says can reduce costs by more than 30%, extend the life of equipment, and even decrease patient recovery times. The guide notes that individual hospitals often spend hundreds of thousands of dollars annually on energy use, which is far higher than is spent for most other building types—nearly 3 times that of a typical office building. Potential energy cost savings for health care facilities is estimated at between 10% and 32%.

Cook said another tool for reducing contributions to climate change is patient education. In addition to enlisting other nursing organizations in the effort to prepare for climate change, Cook's job encompasses educating individual nurses on what they can do to advise the public about the need to address its causes. Although the general public may not grasp the urgency of the matter, or may feel there is little they can do personally, nurses can advise them on both, Cook said. "As nurses, we have a unique perspective," she said. "Nurses are trusted. They have credibility."

Dr. Salas has a similar view. "Patient education is a key aspect," she said. "The diagnosis is clear. As we work to protect patients, we have to frame things, explain the causes. Like with any disease, if the pollen counts are high, maybe postpone your run. Then explain why things are the way they are. It's not about getting political. Educating our patients is part of our duty, our mandate. Especially in the emergency medicine community, you have that critical intervention time to save lives."

The same is true for reducing and addressing the effects of climate change, Dr. Salas said. "I view our understanding like an iceberg, ironically; we only see the surface," she said. Although the knowledge of what lies ahead "can instill hopelessness," she said emergency medicine personnel rarely consider an individual case hopeless. "You walk into a trauma bay [and] you see the whole team focused on treating a patient. That's what we need to respond to climate change."

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