

Written Testimony for the United States Senate Committee on the Budget

Hearing: “Under the Weather: Diagnosing the Health Costs of Climate Change”

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Testimony of:

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Thank you, Chairman Whitehouse, Ranking Member Grassley and honorable members of the committee, for the invitation to speak with you today.

As an emergency physician, I see the impact of climate change on my patients every day. However, the health consequences are so vast and varied, that the role of climate change is often hidden.

Sometimes, the relationship to climate change is clear. For example, I treated a patient, a young man, who suffered severe heat stress while working in construction during the summer. With his body temperature elevated to a dangerous level, he required rapid cooling and fluids through the IV. He suffered muscle breakdown in the heat, poisoning his kidneys and requiring hospital admission.

However, the link between climate change and our health is not always so readily apparent. Consider my 85-year-old patient who presented with a heart attack. It was only because of astute EMS providers that we were able to connect her heart attack to an overheating apartment which lacked air conditioning, coupled with her inability to leave. Her body’s physiologic cooling center could not overcome the oppressive heat. The resulting strain was more than her heart could handle.

Climate change is a *threat multiplier* with health impacts happening through a variety of mechanisms including worsening temperature extremes, wildfires, coastal storms, spikes in air pollution, and vector borne diseases, as well as disruptions to supply chains, safe housing, safe working conditions, safe water, nutrition, and healthcare.¹ Climate change also acts as a *threat magnifier* worsening chronic diseases such as heart and lung disease, or mental illness. It leads to acute flares of other conditions such as asthma exacerbations, heat exhaustion, or kidney injury. Because the effects of man-made climate change are so widespread and varied, it makes recognizing and tallying the total magnitude of these worsening impacts difficult. We are often unable to see the forest through the trees. Thus, the economic impacts of poor health outcomes

are severely underestimated, as only easily quantifiable climate-linked disaster events and their infrastructure or crop damage consequences are typically considered.² Health-related costs are seldom if ever included in the math on climate change impacts.

These climate repercussions and costs to human lives are not felt equally. When I come to work during a heat wave, I worry about the elderly. I worry about the blue-collar workers outside on hot days. I worry about my pregnant patients who are less able to regulate their body temperatures and I worry about their unborn children as the worsening heat increases the risk of fetal death and premature labor.³

Similarly, when I consider the effects of a hurricane in my home state, I worry about my patients who lack the resources or social support to evacuate or find alternate housing.⁴ I worry about my patients with disabilities who rely on electricity for breathing machines or require refrigeration for medicines. Others need nebulizer treatments, or dialysis.

Notably, the patients who are most at risk from climate hazards, are also the same patients most likely to be on Medicaid or Medicare^{5,6} and least able to afford these costs. It is the socially and economically vulnerable, the disabled, children and the elderly who will bear the brunt of climate change impacts. While we may not know the exact total social and monetary costs of climate change on health, we know these costs—to Americans seeking care in emergency rooms, hospitals, and other healthcare settings-- are immense, and growing.

Vulnerable Patients: Medicaid and Medicare Recipients

Globally, nearly every child in the world is at risk from at least one climate threat.⁷ That includes children right here in the US. Medicaid covers almost 40% of children in the US.⁸ Children and infants are highly vulnerable to climate change through many different pathways. For example, their smaller airways are more sensitive to swelling from air pollution and toxins; children inhale more air relative to their body mass, resulting in increased pollution exposure. Their thermoregulation is immature and less able to manage environmental temperature extremes. They are at increased risk for mental and physical trauma from disasters and they bear the consequences of these impacts for many years to come.⁹

We also know negative climate impacts happen even before birth. Climate stress to mom translates to many medical problems for baby, such as neurodevelopment disorders, heart problems, diabetes and lung problems.¹⁰ All of these impacts are costly. As just one small example, researchers calculated the costs of childhood asthma to be \$4 billion nationally in 2008 alone. Of this, \$2.2 billion were made up of direct healthcare costs attributable to environmental factors such as air pollution.¹¹

This spring, I have seen the same teen on multiple occasions as her asthma has been increasingly difficult to control. She presents struggling to breathe, fear and fatigue written across her face. On one of her visits, we needed to put her on a BIPAP machine, pushing air into her lungs as she struggled. We were worried she would become too tired to breathe on her own. Climate change is worsening her asthma through an extended pollen season, and her home, close to the highway puts her in constant exposure to air pollution. With brush fires in Western Rhode Island last week, I expect to see her again.

Chronic conditions, most common in the Medicare population of older adults, increase one's vulnerability to climate change. Age, heart disease, and diabetes alone are risk factors for climate change health impacts. However, these risks are worsened through additional pathways. Medications such as diuretics, high blood pressure pills or antidepressants limit the body's ability to respond to heat stress.¹² Disruptions in supply chains or healthcare systems from natural disasters, wildfires or extreme weather can limit a patient's ability to access care needed to maintain their health. Mobility issues reduce one's ability to adapt in the face of extreme weather, such as accessing cooling centers or safely evacuating.

When we consider populations most likely to be covered by Medicaid such as those with disabilities or in lower socioeconomic standing, we find a vulnerable population with higher exposure to air pollution, which increases the risk of asthma or COPD (chronic obstructive pulmonary disease). They are more likely to live in an urban heat island, work in manual jobs outside and are less likely to have access to adaptive strategies such as air conditioning. We find patient populations that require more frequent access to healthcare facilities, dialysis, or rely on electricity for medical equipment at home.

Specific Climate Threats

Where I live and work in Rhode Island, we are experiencing increasing utilization of prehospital resources, emergency department visits and increased mortality as summer temperatures rise.^{13,14} However, we are not unique. Increasing temperatures and heatwaves are worsening nationwide.⁶

It is important to note that people across the country are already shouldering a significant economic burden to respond to the health costs of climate change. In July 2012, Wisconsin experienced a 1-week heat wave of record high temperatures. **From this 1 event**, there were over 1,620 emergency room visits and 27 deaths were recorded *when considering direct heat related illnesses only*. Total health-related costs, including indirect costs such as lost wages, were estimated to be over \$250,000,000. The direct costs to **Medicare** were estimated at \$900,000 and \$700,000 for Medicaid with an additional \$1,000,000 in costs to the uninsured.¹⁵ Given that this Wisconsin analysis did not consider the exacerbation of chronic diseases from extreme heat, such

as heart attacks or renal failure, I suspect that the true health costs of that heatwave were far greater.

When we consider climate-sensitive disasters such as hurricanes, droughts, floods or wildfires, health impacts also occur through many mechanisms. There are the direct impacts from the event such as drownings or traumas. However, there are also the cascading secondary effects leading to harm and death. Some examples include infrastructure damage resulting in lack of access to healthcare for baseline occurring health emergencies. People may be unable to find safe drinking water, which can result in water-borne diarrheal diseases. Unsafe and moist home environments can result in respiratory problems or physical injury. People with chronic illness may lose access to their home medications or electronic medical devices resulting in rising morbidity. These secondary effects lead to a subsequent rise in healthcare costs, but those costs are currently difficult to quantify because our nation is not carefully and comprehensively tracking the health harms and health-related financial costs of climate impacts.¹⁶ In addition, people may lose their jobs due to health consequences, social consequences, or direct infrastructure damage leading to indirect costs in the form of lost wages.

With climate change, access to healthcare is often disrupted.¹⁷ During COVID-19, I witnessed the effects of healthcare disruptions on my patients firsthand. Unable to access insulin, a young woman with COVID presented with decompensated diabetes, a situation I would see again and again. In the span of 4 hours, she went from speaking on her phone with family to dead despite our best efforts to stabilize her. I still think about her small children and how different their lives would have been had she just had insulin. Her inability to access healthcare contributed to her death. Similar lack of access to medications has been documented for both Hurricane Katrina in 2005 and Hurricane Harvey in 2017.¹⁸ The health complications that result are not only tragic, but also costly.

In 2003, Florida experienced 4 hurricanes. The cost of direct provider care was estimated at \$312 million. With the inclusion of all health-related costs, this increased to \$1.5 billion.¹⁹ In 2012, Hurricane Sandy, with sea level rise amplified by climate change²⁰, hit the Northeastern United States. In *New Jersey alone*, the **Medicare costs** were estimated over \$280 million and **Medicaid** over \$37 million with total healthcare costs above \$530 million.

Above are just some of the impacts of climate change on health and, subsequently, our healthcare costs. There are many others: the spreading transmission of vector borne diseases, dangerous wildfires and the toxic, far-reaching smoke plumes that they generate, reduced drinking water access and water quality because of intensifying droughts, reduced food security and risks of malnutrition. The impacts of climate change on our health are broad, substantial, and worsening. Consequently, the economic impacts—in the form of direct medical bills to patients,

cost burdens on public and private health insurers and employers, and long-term costs to society are immense and worsening.¹⁶

In 2008, the Congressional Budget Office presented this evaluation: “For the federal government, rising health care costs constitute the principal challenge of fiscal policy—no other single factor will exert more influence over the long-term balance of the federal budget.”²¹ A recent report estimated the annual health related costs of fossil fuel-generated air pollution alone as **\$820 billion**.²² While this estimate includes indirect costs to society, such as the economic toll of premature deaths, it gives a sense of the magnitude of the problem. We cannot fix the health of our nation or our healthcare system without also addressing climate change.

Similarly, we cannot adapt without also mitigating. I strongly support adaptive measures such as water conservation, cooling centers, or subsidized air conditioning for vulnerable populations. However, we must also mitigate climate change and curb our greenhouse gas emissions. Without a transition away from fossil fuels and carbon emissions, the health consequences and associated healthcare costs will exponentially worsen. We can only build the sea wall so high. The trees planted will not provide shade if they are dead from drought and heat stress.

As a physician, I see firsthand the devastating impact of climate change on my patients and their families. It has changed how I practice medicine. I now inquire about the safety of my patient’s environment. Frequently, I recommend walking outside to treat anxiety, depression, obesity, or low back pain. However, recognizing the negative impacts of fossil fuel combustion and resultant climate change, I ask about their home location first. Do they live by a highway? Are they in an urban heat island where temperature effects are magnified? Similarly, for my high-risk patients, such as the 90-year-old who is managing at home with only the support of her neighbors, are her medications increasing her risk of heat related illness? Can she seek out cooling centers, libraries, or grocery stores during a heat wave? And, without air conditioning, what will she do at night as temperatures no longer cool to safe levels?

Climate change harms are burdening the United States from coast to coast, and we are paying for this problem through lost lives, destroyed livelihoods, and expensive healthcare bills. These costs are already staggering, and they are poised to grow substantially in the years to come. We cannot afford to wait any longer to address this urgent threat. I urge you to make climate action a top priority. It is not only the moral decision, but also the fiscally responsible one. Our legacy and the health of our nation depends on it.

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