



April 26, 2018

Scott Pruitt, Administrator
U.S. Environmental Protection Agency
Comments submitted via Regulations.gov

Re: Proposed Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units. Docket ID EPA-HQ-OAR-2017-0355-0002.

Dear Administrator Pruitt:

As representatives of the medical and public health community, our organizations wish to share our joint comments on the U.S. Environmental Protection Agency's proposal to repeal the Carbon Pollution Emission Guidelines for Existing Stationary Sources, commonly referred to as the Clean Power Plan (the Plan).

Climate change poses grave threats to public health. To protect our communities and the public, the United States must significantly reduce carbon pollution from the largest stationary source, which is existing power plants. Our organizations oppose the proposed repeal of the Clean Power Plan and urge EPA to implement the Plan to protect public health as required under the Clean Air Act.

[Climate change poses serious threats to human health](#)

The changing climate threatens the health of Americans alive now and in future generations. Carbon dioxide lasts in the atmosphere for hundreds of years, altering climate in damaging ways. Time is of the essence in curbing releases of this pollution if we are to avoid catastrophic damage. Consequently, the nation has a short window to act to reduce those threats.

Growing evidence over the past few years has demonstrated the multiple, profound risks that imperil the lives and health of millions.

Since the Clean Power Plan was finalized in 2015, hundreds of additional studies and major reports have made even clearer the essential need to adopt and maintain the strongest possible measures to reduce carbon and other greenhouse gases that endanger the long-term health of all people.¹

The fourth and most recent report of the U.S. Global Change Research Program issued in 2017 confirmed and updated estimates of the impact of the changing climate in the United States. The report again concludes that climate change is demonstrably real and caused by human activities.

“The global, long-term, and unambiguous warming trend has continued during recent years. Since the last National Climate Assessment was published, 2014 became the warmest year on record globally; 2015 surpassed 2014 by a wide margin; and 2016 surpassed 2015. Sixteen of the warmest years on record for the globe occurred in the last 17 years (1998 was the exception).”

“[I]t is extremely likely that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century. For the warming over the last century, there is no convincing alternative explanation supported by the extent of the observational evidence.”²

In 2014, the Intergovernmental Panel on Climate Change issued its fifth policy assessment of observations and analyses about the changing climate. The IPCC found:

“Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks.”³

EPA’s own findings in the Clean Power Plan identified similar threats from climate change on public health:

“GHG pollution threatens the American public by leading to damaging and long-lasting changes in our climate that can have a range of severe negative effects on human health and the environment. . . .

“New scientific assessments since 2009, when the EPA determined that GHGs pose a threat to human health and the environment (the “Endangerment Finding”), highlight the urgency of addressing the rising concentration of CO₂ in the atmosphere. Certain groups, including children, the elderly, and the poor, are most vulnerable to climate-related effects. Recent studies also find that certain communities, including low-income communities and some communities of color (more specifically, populations defined jointly by ethnic/racial characteristics and geographic location), are disproportionately affected by certain climate change related impacts— including heat waves, degraded air quality, and extreme weather events— which are associated with increased deaths, illnesses, and economic challenges. Studies also find that climate change poses particular threats to the health, well-being, and ways of life of indigenous peoples in the U.S.”⁴

These reviews echoed reports previously produced by several of our organizations: the American Academy of Pediatrics’ technical report in 2007 (updated in 2015) on “Global Climate Change and Children’s Health”⁵; the American College of Physicians’ position paper on Climate Change and Health”⁶;

the Asthma and Allergy Foundation of America's *Extreme Allergies and Global Warming*, issued with the National Wildlife Foundation in 2010⁷; the American Public Health Association's *Climate Change: Mastering the Public Health Role*, in April 2011⁸; and the American Thoracic Society's workshop on Climate Change and Human Health published in 2012⁹ and report on the global health threat from 2014.¹⁰ All these reviews arrived at similar conclusions, summarized below.

Ground-level ozone is likely to be worse as the climate warms further and will be harder to clean up in some locations. Higher temperatures increase the likelihood that the precursor gases will react to form ground-level ozone, making it harder to protect people from this most widespread air pollutant. Researchers repeatedly found that the risk of premature death increased with higher levels of ozone.¹¹ Ozone causes asthma attacks and respiratory distress, and may increase cardiovascular harm, risk of harm to the central nervous system and the risk of low birth weight in newborns.¹²

Wildfires and drought conditions, worsened by the warmer climate, give rise to smoke and dust storms spreading miles from their source. The year 2017 showcased the risks from wildfire smoke from blazes in the West. Fires raged in Washington, Oregon, Montana, and especially California, creating severe dangers to health. The fires destroyed homes, forcing relocation. The most extensive threats came from the serious air pollution produced by the smoke. For example, Ojai, California had multiple days in December 2017 when the air quality reached "Very Unhealthy" and "Hazardous" levels.¹³ In addition to the lower 48 states, Alaska has seen a decade of increased severe wildfires, a trend expected to continue.¹⁴

Climate-exacerbated drought-driven dust storms also produce elevated levels of particulate matter. The impact of dust storms in recent years, such as one in Oklahoma in 2012 that shut down Interstate 35, demonstrate their power to threaten health in multiple ways, when near-blackout conditions created traffic accidents injuring nine people.¹⁵ Researchers concluded that climate change further worsened the dry soil in California with the increased risk of higher temperatures in the winters of 2013-2014 and 2014-2015.¹⁶

Even short-term increases in particle pollution have been linked to premature death from respiratory and cardiovascular causes, including strokes;^{17, 18, 19, 20} increased mortality in infants and young children;²¹ increased numbers of heart attacks, especially among the elderly and in people with heart conditions;²² increased hospitalization for cardiovascular disease, including strokes and congestive heart failure;^{23, 24, 25} increased risk of low birthweight and preterm births;²⁶ increased hospitalization for asthma among children;^{27, 28, 29} and increased severity of asthma attacks in children.³⁰

Wildfire smoke contains more toxic pollutants than just particulate matter; the smoke mixture includes carbon monoxide, nitrogen oxides, volatile organic compounds and carcinogens as well.³¹

These examples show that climate change erects new hurdles to our ability to protect health from air pollution. As EPA acknowledged in its 2009 report on the impacts of global climate change on ground-level ozone, modeling for future pollution levels shows the complexity of the problem, with one compelling outcome: climate change had "the potential to make U.S. air quality management more difficult."³²

Extreme weather threatens health. Many cities across the U.S., such as Chicago and Milwaukee, have experienced increased death rates from episodic heat waves in recent years.³³ Hotter temperatures can

increase the risk of heat stroke and heat exhaustion and the risk of hospitalization for cardiovascular and respiratory diseases.³⁴

Increased risk of dangerous hurricanes threatens not only damage and death from the wind, but disruption in communities that suffer the hurricanes. In 2017, Hurricane Maria destroyed Puerto Rico's infrastructure, resulting in a lack of electricity and damaged roads. As a result, more than 135,000 Puerto Ricans have reportedly moved to the mainland, and many thousands are left without electricity even as these comments are filed.³⁵ As Hurricanes Katrina and Sandy showed, the disruption can last for years. Hospitals, clinics, medical care and public health services may be blocked from serving their patients and communities if they are too damaged to provide those services or as resources are diverted to emergency response. Patients find themselves in emergency shelters or relocated to new homes far away from their previous medical caregivers.

The aftermath of Hurricane Harvey left the greater Houston area with more than 50 inches of floodwater, a record rainfall that two studies concluded resulted from the impacts of climate change.³⁶ Flooding causes premature deaths, often through drowning, but the aftermath of flooding expands the burden. Water damage leaves behind lingering health risks including dampness and mold, chemicals and sewage spread through flood waters, and contaminated debris in flooded homes, schools, hospitals and other community facilities.³⁷

Allergens and risks of vector-borne diseases are already increasing. Warmer weather leads to shifting growing seasons that change flowering time and pollen development and can expand the habitat for allergen-rich plant species. Higher concentrations and longer growing seasons increase the exposure to allergens that trigger asthma and other respiratory and allergic responses.³⁸ In the U.S., spread of diseases such as Lyme, West Nile Virus, and Rocky Mountain spotted fever is linked to complex differences in weather, hosts and human behavior that can be profoundly affected by changes in climate.³⁹

Food and water supplies face uncertain challenges. The ongoing drought in California and more recent droughts in the Southeast, including Florida, exemplify the risks associated with a warming climate to the ability to supply adequate water and food supplies to the nation.⁴⁰ As the water levels continue to drop, farmers confront more challenges growing food to supply the rest of the nation and the world. Certain communities, such as Alaska Natives, may suffer shortages of fresh water and food they have historically hunted or fished.⁴¹

Psychological stress will complicate response and increase the incidence of mental health issues. Mental health problems increase after disasters, such as seen after Hurricane Katrina. Moreover, even people with no history of mental health problems, including children, will risk increased stress from responding to and accommodating these severe changes. Among the expected impacts from these stresses are post-traumatic stress disorder; depression and anxiety; increases in violence; and strains due to relocation.⁴²

Millions of Americans already suffer greater vulnerability to these threats. Many people will face greater exposure to dangerous air pollution, and associated health risks due to climate change-related high heat events, as documented in the large air pollution science assessments EPA has repeatedly completed. Children face special risks because their bodies are growing and because they are so active.⁴³ Older adults are more likely to die during high heat events.⁴⁴ People with chronic respiratory

diseases like asthma and chronic obstructive pulmonary disease, people with cardiovascular diseases and people with diabetes also risk greater harm from increased pollution.⁴⁵ Even healthy adults can be affected by increased air pollution, especially if their work requires them to be outdoors, as the study of lifeguards in Galveston, Texas demonstrated.⁴⁶

Poorer people and some racial and ethnic groups are among those who often confront higher exposure to air pollutants and who may experience greater responses to such pollution. Many studies have explored the differences in harm from air pollution to racial or ethnic groups and people who are in a low socioeconomic position, have less education, or live nearer to major sources.⁴⁷

Poorer people, people of color, older people and disabled people will have a harder time responding to the threats, especially if electricity is lost or relocation or evacuation is required due to ever-more frequent and severe storms related climate change.⁴⁸ Hurricane Katrina demonstrated that many people in these groups had difficulty evacuating and relocating after a major weather event.⁴⁹ Native American tribal communities may face threats to food supplies and difficulty relocating due to tribal land locations.⁵⁰

To protect health, the United States needs to reduce carbon pollution from existing power plants. The Clean Power Plan provides an excellent approach.

Given the overwhelming evidence of harm from climate change, the nation must reduce emissions from greenhouse gases from all sources, but particularly from electric utilities. Fossil fuel electricity generation is the largest stationary source of carbon dioxide and greenhouse gas emissions in the U.S.; as of 2016, power plants emitted 35 percent of the total U.S. carbon dioxide emissions.⁵¹

The Clean Power Plan's core flexibility encourages innovation and tailoring to reduce those emissions, including many tools that go beyond the property boundaries of a power plant. States need flexibility to use multiple tools and to innovate in their approaches to cut carbon. The Plan encourages innovation and the use of cleaner energy sources for electricity generation. The Plan encourages strategies to improve energy efficiency, which could decrease the need to burn fossil fuels. Many of our organizations, particularly those with state chapters, have worked to support the states' adopting plans and systems that would provide the greatest reduction in carbon emissions to protect public health.

Repealing the Clean Power Plan would force Americans to suffer unnecessary risks to their health and lives that would be avoided under the Clean Power Plan.

Reducing carbon pollution is essential to reduce the burden of climate change, but the benefits go far beyond the impact on the climate. The Clean Power Plan is an essential first step, as it locks in emissions reductions that have already occurred, and will yield additional reductions. In addition to reducing carbon pollution, the Clean Power Plan will reduce other air pollution emissions that directly form particulate matter and ozone, which cause widespread harm and premature death as described earlier. The Clean Power Plan had appropriately and accurately recognized these benefits.

Unfortunately, the current Administration completely mischaracterizes that decision in a recent press statement as "essentially hiding the true net cost of the CPP by claiming benefits from reducing pollutants that had nothing to do with the rule's stated purpose."⁵² In fact, the EPA is bound by several

Executive Orders and the procedures directed by the Office of Management and Budget to assess *all* benefits, direct and indirect, to be achieved by a major regulation.⁵³

As public health and medical groups, we have long seen added benefits that accrue from actions aimed at other targets, resulting in substantial avoidance of premature death and illness. For that reason, our organizations actively urge EPA to continue to recognize and include these co-benefits in the analysis of the benefits from the Clean Power Plan. They are indivisible from the Plan. The technology needed to reduce emissions at each plant, as well as the energy efficiency and added use of cleaner energy sources, will directly and immediately reduce these dangerous emissions.

In addition to reducing the risks due to pollution causing climate change, the Clean Power Plan's steps to cut carbon pollution would cut other recognized harmful air emissions as well, with significant local and immediate human health benefits from cleaner air. EPA's new estimates of the tons of these pollutants left in the air under a Clean Power Plan repeal are staggering: 423,000 tons of sulfur dioxide and 255,000 tons of nitrogen dioxide. For sulfur dioxide alone, that means 45 percent more emissions than under the Clean Power Plan.⁵⁴

Based on those reductions, EPA provided three different estimates of the "foregone benefits" from repealing the Plan. One of these estimates is valid, but the other two estimates are fallacious because they are derived using invalid assumptions, as described below.

In the first model, using the only valid methodology for calculating these added benefits, EPA estimated that implementing the Clean Power Plan could avoid 1,900 to 4,500 premature deaths in 2030. In 2030, children would suffer 74,000 to 90,000 fewer asthma attacks. People with cardiovascular disease would have 150 to 1,700 fewer heart attacks. Days missed at work and school would drop, with 260,000 to 3000,000 fewer days missed in 2030.⁵⁵ Other benefits that cannot be as precisely quantified would also be achieved⁵⁶

It is important to remember that the modeling *minimizes* the real-world benefits of these reductions. EPA's use of established BenMAP modeling is appropriate to make these estimates, but the predictions are limited to estimation of benefits from only certain studies looking at specific outcomes. The BenMAP model does not estimate the impact on other, also demonstrated, benefits. For example, although the World Health Organization has determined that particulate matter causes lung cancer, the model currently lacks appropriate capacity to estimate how many fewer cases of lung cancer would occur in 2030 with the reductions in particulate matter.⁵⁷

A major, separate study confirmed that the human health co-benefits of clean air from reducing carbon pollution are real, and warned that doing too little could prove harmful. Strong limits on carbon pollution from existing power plants could improve air quality and prevent an estimated 3,500 (780 to 6,100, 95% CI) premature deaths in 2020 along with other significant benefits to human health, according to an analysis released in 2014 by researchers from Harvard University, Syracuse University, and Boston University. That report, *Health Co-Benefits of Carbon Standards for Existing Power Plants*, evaluated alternative approaches for reducing carbon pollution from power plants, and showed that limits must be strong, flexible and enforceable to achieve the greatest health benefits for the American people.⁵⁸

The study compared “business as usual” conditions with three alternatives for limiting carbon from power plants. Results showed that a strong, enforceable and flexible approach to reducing carbon pollution would reduce emissions of other harmful pollutants of sulfur dioxide and nitrogen oxides by about 775,000 tons each year, reductions that would also reduce particulate matter and ozone. In addition to reducing premature deaths, the strongest options avoided 530 to 1500 hospital admissions for cardiovascular and respiratory diseases in 2020. As a result of lower emissions, all of the lower 48 U.S. states would experience cleaner air.⁵⁹

In another critical finding, this modeling showed that an approach targeting only actions that can be achieved on-site at a power plant had significant limitations and, in fact, would likely increase harmful emissions. By limiting actions to improving the efficiency of existing plants, a so-called “inside the fence-line” approach did decrease the annual reductions in CO₂ emissions slightly (by 2.2 percent) from the 2020 reference case. However, the likelihood that these more efficient plants would be dispatched more often resulted in an estimated annual 3 percent *increase* in sulfur dioxide emissions. This estimated increase in sulfur dioxide emissions is projected to result in an increase in annual premature deaths and heart attacks.⁶⁰ Indications that EPA is exploring ways to weaken the New Source Review program portend even greater emissions increases, with corresponding greater public health harms than these earlier analyses project.⁶¹

EPA’s present proposal includes calculations that undercount the health risks of inaction, using long-disproved “thresholds.”

In an apparent effort to devalue the benefits from reducing carbon pollution (not to mention the benefits of associated reduced levels of other types of air pollution), EPA has requested comment on two alternative ways to calculate the premature deaths avoided from reductions in particulate matter that accompany Plan implementation. These two approaches amount to cherry-picking data to include or exclude in its assessment of the “foregone benefits” of repealing the Clean Power Plan. Both are seriously flawed, and should be discarded in EPA’s final assessment.

As mentioned above, EPA provided three estimates of “Estimated Forgone PM_{2.5} and Ozone-Related Avoided Premature Mortality Estimates Incorporating Concentration Cutpoints” in its Regulatory Impact Analysis (RIA) of the repeal of the Clean Power Plan. The first followed the usual approach for calculating the premature deaths avoided under the Plan, with estimates based on the “risk from the full range of PM_{2.5} exposures,” merely updating the forecasts based on the 2017 Annual Energy Outlook (AEO 2017). EPA noted that this approach to quantify risk was consistent with its approach in eight RIAs published since 2009.⁶² That approach calculated that the premature deaths avoided in 2030 would range from 1,900 to 4,500 under the fully implemented Clean Power Plan. Using the updated AEO 2017, the high end of that estimate at 4,500 is higher than the estimate EPA originally predicted in the 2015 final Plan: 3,600.⁶³

However, the second and third models drew thresholds that incorrectly and inappropriately limited the estimated benefits from reducing emissions, and would change past EPA practice. Using these models, EPA would ignore any health benefits that would accrue at places where prevailing levels now meet the annual national ambient air quality standard for PM_{2.5} or, alternatively, at locations below PM_{2.5} levels considered in older studies.⁶⁴ Adopting either of these erroneous approaches would require EPA to disregard more recent scientific evidence showing effects at exposures below those benchmarks.^{65, 66, 67}

These studies cited above indicate a benefit to health from reductions in PM_{2.5} down to very low air pollution levels. EPA also ignores its own scientific assessments, which have demonstrated that significant health benefits can be gained by achieving ambient levels below the NAAQS.⁶⁸

The World Health Organization has stated that “[s]mall particulate pollution have [sic] health impacts even at very low concentrations – indeed no threshold has been identified below which no damage to health is observed.”⁶⁹

Other independent reviews have also found that no threshold exists. In 2010, the American Heart Association updated its Scientific Statement on Particulate Matter Air Pollution and Cardiovascular Disease to state that the evidence supported measures to reduce PM because of the presence of no threshold of harm:

“[W]e agree with the concept and continue to support measures based on scientific evidence, such as the US EPA NAAQS, that seek to control PM levels to protect the public health. Because the evidence reviewed supports that there is no safe threshold, it appears that public health benefits would accrue from lowering PM_{2.5} concentrations even below present day annual (15 µg/m³) and 24-hour (35 µg/m³) NAAQS, if feasible, to optimally protect the most susceptible populations.”⁷⁰

The Health Effects Subcommittee (HES) of the EPA’s independent Scientific Advisory Board reviewed this issue in 2010 when EPA was assessing the benefits and costs of the Clean Air Act as required under Section 182. This panel also concluded that the evidence supported modeling that included no threshold:

“The HES fully supports EPA’s decision to use a no-threshold model to estimate mortality reductions. This decision is supported by the data, which are quite consistent in showing effects down to the lowest measured levels. Analyses of cohorts using data from more recent years, during which time PM concentrations have fallen, continue to report strong associations with mortality. Therefore, there is no evidence to support a truncation of the CRF [Concentration Response Function].”⁷¹

EPA has no scientific justification now to include a threshold that would underestimate the benefits from the implementation of the Clean Air Act. As noted before, available models can only show a limited picture of the total benefits expected from reductions in carbon pollution. EPA should not further limit their assessment of the benefits of the cleaner air that will be engendered by the Plan by inserting invalid thresholds in the modeling of benefits.

[EPA dismisses the case for the increased use of cleaner energy sources as the basis for the standards.](#)

In the proposed repeal, EPA makes the faulty argument that the core reasons for repealing the Clean Power Plan stem from legal flaws the Agency made in relying on two of the three “building blocks” forming the basis for the “best system of emissions reduction” (BSER) used to calculate the target emissions rate. EPA now argues that Building Block 1, including carbon emission reductions at existing coal-fired power plants, is legally authorized, but that Building Blocks 2 (increased use of plants powered by lower emitting natural gas) and 3 (increased use of cleaner alternative energy sources like wind and solar) are not legally valid because they would constitute “regulation of the nation’s generation mix” and “[impose] greater emission reductions.”⁷² EPA claims that under their revised interpretation of the

Clean Air Act, EPA cannot have a plan that incorporates the “types of measures that constitute the second and third ‘building block’ of the CPP.”⁷³ EPA also argues that, absent the other two components, “the first ‘building block’ cannot stand on its own in the form in which it was issued.”⁷⁴

This argument dismisses inappropriately the idea that the BSER could extend beyond “measures that can only be applied to or at the source.”⁷⁵ In fact, no limitation in the statute supports EPA’s current proposed view. EPA does have authority to set standards for existing plants based on the idea of substituting generation from cleaner options for generation from the dirtiest plants, to be implemented through a system of tradeable credits. That is because the electrical grid is a complex “system” that includes a network of sources and demand for electricity with varying costs; the costs drive the decision to use any electricity source. Contrary to the EPA’s new view, the Clean Air Act affords the opportunity and flexibility to each state to use all these tools to establish a plan for reducing carbon emissions from existing power plants in that state, either independently or in partnerships with other states—extending the system even to a broader, regional network that reflects the integrated electrical grid in most of the nation.

Of particular concern to our organizations is EPA’s dismissal of the opportunity this broader system approach provides to protect public health. Yes, “generational shifting”—that is, the use of different, cleaner sources of electricity—does form “a significant percentage of the emissions reductions” in the Clean Power Plan. In the original Plan, that shifting of electricity generation would go to cleaner sources of power, reducing emissions not just of carbon, but of other air pollutants as well. Allowing plant owners to obtain allowances or credits from cleaner sources as an implementation strategy would not only reduce those emissions from dirtier, coal-fired sources, but would encourage the expanded use of cleaner sources like solar and wind going forward.

According to the U.S. Energy Information Administration, wind and solar provided more than 60 percent of all new utility-scale electricity generation capacity in 2016, setting new records for levels of wind- and solar-generated electricity.⁷⁶ These sources add capacity within the complex networks that allow power plants to shift more and more electricity generation to sources that do not spew carbon and other harmful emissions into the air that our patients and the public breathe. Relying more on cleaner energy sources—while reducing the use of other more polluting sources—provides essential benefits to those most vulnerable to these emissions, especially those who live immediately downwind.

The electricity grid is a system that goes far beyond the property boundaries of any individual facility. This system operates as an integrated network now, with power generation dependent on the decisions of the utilities and end-users. EPA’s complete reversal of its reliance in standard setting on the reductions available from that system not only flies in the face of reality, it threatens the health of Americans across the nation.

[EPA should implement the Clean Power Plan—not repeal it.](#)

The United States emits more carbon pollution than any other single nation except China⁷⁷, and our electricity generating system is the highest emitting industrial source of such pollution. The U.S. needs to show greater leadership to fight climate change, as the threats to the lives and health of our citizens will not end with the current generation or even in the current century without profound action. The Clean Power Plan contains excellent tools to tackle those challenges.

On behalf of our patients and the public, we urge the EPA to reject the proposal to repeal the Clean Power Plan and, instead, work to implement it.

Sincerely,

Alliance of Nurses for Healthy Environments

American Academy of Pediatrics

American College of Physicians

American Lung Association

American Public Health Association

American Thoracic Society

Asthma and Allergy Network

Children's Environmental Health Network

Healthcare without Harm

Physicians for Social Responsibility

¹ Hundreds of studies on the health effects of climate change have been published since EPA adopted the Clean Power Plan. This list includes just a sample: Watts N, Amann M, Ayeb-Karlsson S, Belesova K et al. 2018 The *Lancet* Countdown on health and climate change: from 25 years of inaction to a global transformation for public health. *Lancet* 391: 581-630; Ahdoot S, Pacjeco SE, and The Council on Environmental Health. 2015. Global Climate Change and Children's Health. *Pediatrics* 138: e1-e17; Petlova EP, Vink JK, Horton RM, Gasparini A, et al. 2017. Towards more comprehensive projections of urban heat-related mortality: estimates for New York City under multiple population, adaptation, and climate scenarios. *Environ Health Perspect.* 125: 47-55; National Research Council. 2015. *Modeling the Health Risks of Climate Change: Workshop Summary*. Washington, DC: The National Academies Press.; Short EE, Caminade C, and Thomas BN. Climate Change Contribution to the Emergence or Re-Emergence of Parasitic Diseases. 2017. *Infectious Diseases: Research and Treatment*. 10:1-7.

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³ Intergovernmental Panel on Climate Change. *Climate Change 2014 Synthesis Report*. November 1, 2014. Accessed at http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_SPM.pdf.

⁴ U.S. Environmental Protection Agency. Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units; Final Rule. 40 CFR Part 60. 80 FR 64677. October 23, 2015.

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⁸ American Public Health Association. *Climate Change: Mastering the Public Health Role. A Practical Guidebook*. April 2011. Accessed at <http://www.apha-environment.org/ClimateandHealth.aspx>.

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