

FACT SHEET

TRACKING “THE SILENT KILLER”: EXPERTS TRACK EFFECTS OF HEAT ON HUMAN HEALTH AS TEMPERATURES RISE

It’s not your imagination—it’s getting hotter. Over the past three decades, annual average temperatures have been on the rise around the globe, and 2015 was the hottest year worldwide since recordkeeping began.¹ Climate change is fueling more intense, frequent, and longer heat waves, posing a serious threat to public health in the United States.² This heat isn’t just uncomfortable; it can be deadly. During the Chicago heat wave of 1995, more than 700 people died;³ during the California heat wave of 2006, hundreds perished and emergency rooms saw 16,000 more patients than expected.⁴

According to the 2015 *Lancet* Commission on Health and Climate Change, climate change poses a “potentially catastrophic risk” to human health,⁵ and rising temperatures are a threat to countries across the globe.⁶ The European heat wave in the summer of 2003 saw 70,000 deaths.⁷ In the spring of 2015, more than 2,500 people died during a weeks-long heat wave in India.⁸ In June 2015 in Pakistan, more than 700 people perished during a three-day heat wave.⁹

Children, the elderly, low-income households and communities of color are especially at risk from extreme heat, as are people with respiratory, heart, or kidney illnesses.¹⁰ Extreme heat is responsible for more annual deaths on average than any other weather event in the United States.¹¹ More than 65,000 Americans visit emergency rooms each year for heat-related causes,¹² and from 2001 to 2010, there was a pattern of increasing heat-related hospitalizations in the United States.¹³ Between 1999 and 2010, more than 7,400 people in the United States died from heat-related causes.¹⁴

LACK OF NATIONWIDE HEAT-HEALTH EFFECTS SURVEILLANCE HAMPERS PUBLIC HEALTH EFFORTS

Although the dangerous links between extreme heat and health impacts are well known, there currently is no centralized system to track these impacts in the United States. A heat-health surveillance system would give public health experts early warning, allowing them to intervene in real time, and a means of knowing whether their interventions are working. The Centers for Disease Control and Prevention (CDC)’s National Environmental Public



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Health Tracking system compiles indicators on climate change and heat-health effects in 26 states,¹⁵ but lacks the resources to provide a nationwide picture of the current burden that heat places on the health of Americans.

There is typically a two- to three-year lag time before hospital data can be publicly released. Mortality data, as well, can have significant lags. More timely access to this information, as a standardized system for reporting heat-health data, could improve our response to heat waves and the resultant health crises.

Syndromic surveillance—which tracks the earliest signs and “syndromes” to detect public health threats—is another way to understand the toll of heat events on health in a more timely fashion. This system draws de-identified information from a variety of sources daily, including preliminary emergency room visit data, routinely collected clinical data from electronic medical records, pharmacy sales, emergency department calls, Internet search trends, and even social media. The data are then analyzed for indications of emerging public health threats. Researchers and health workers agree that syndromic surveillance networks could help improve responses to heat waves and enhance climate adaptation by providing both early warnings of heat-related illnesses or syndromes, and evaluating how response efforts can ameliorate those syndromes. Syndromic surveillance systems are already known to help detect local outbreaks of infectious illnesses like influenza,¹⁶ for example, and now they are being applied to promote situational awareness during heat waves.

Syndromic heat-health surveillance is relatively new, yet more than a dozen U.S. cities and states are piloting Heat-Health Syndromic Surveillance (HHSS) systems.^{17,18} These systems can help health departments quickly reach out to fellow practitioners to discuss effective ways to protect vulnerable populations during multi-day heat waves.

In March of 2015, the Natural Resources Defense Council (NRDC) through its Science Center organized the National Heat-Health Surveillance Expert Workshop, the first gathering of its kind in the United States. This one-and-a-half day workshop was held at the Mailman School of Public Health at Columbia University. The workshop convened approximately 50 participants from across the United States with expertise on heat-health tracking and surveillance. The discussions and sessions set out to:

- Examine current U.S. syndromic surveillance of heat-related health impacts:
 - What research methods and evaluation protocols are being used?
 - How are sites applying data to inform or modify heat-health interventions?
- Share best practices in collecting, interpreting, and using heat-health surveillance data to inform response.
- Identify opportunities for and challenges to conducting timely surveillance of heat-health impacts.



- Explore ways to use these data to improve climate change-preparedness policy.
- Recommend steps to bolster heat-health surveillance, including national and regional priorities for collaboration and funding.

Workshop discussion included the following recommendations:

- Develop a tool kit with guidance materials for local health departments to assist in the development of HHSS systems that includes:
 - “Best practices” and methods for establishing baseline heat-related illness and death rates;
 - Guidance on collecting, analyzing, interpreting, and using HHSS data to inform heat wave response;
 - Discussion of the routine use of HHSS (versus surveillance during specific heat events) and how to define temperature thresholds;
 - Computer code to analyze HHSS data; and
 - Strategies for involving key stakeholders, incorporating their feedback, and utilizing their support.
- Create systems to access, analyze, and improve data gathering, including:
 - Weather data linked to syndromic heat-health effects information;
 - Establish timely access to emergency medical service (EMS), emergency room, and hospital data; and
 - Develop a centralized, national repository for HHSS resources and data.
- Work with professional societies such as the Council of State and Territorial Epidemiologists (CSTE) or the International Society of Disease Surveillance (ISDS) to document and refine heat-related illness case definitions:
 - Establish case definitions specific to syndromic surveillance for heat-related illnesses and death;
 - Create a shared clearinghouse of standard heat illness case definitions, analysis tools for different types of data, and frameworks to evaluate heat response plans and interventions; and
 - Develop training programs that target medical examiners or coroners to discuss heat-related health conditions, and propose strategies to more consistently code death certificates and emergency room/hospital discharge codes from heat-related conditions.

- Continue discussions about making heat-related illness a “reportable condition.”
 - Develop ideas on how to require medical professionals to report heat-related illnesses to public health authorities or agencies, similar to the “reportable conditions” that now apply for many infectious diseases (e.g. influenza, West Nile virus, etc.).
- Foster collaboration and conversation between key stakeholders, such as:
 - Regional climate-health academic researchers and public health departments, to develop collaborative projects.
 - Local health departments and utility companies, to improve conditions for at-risk populations during heat waves (e.g., ensure that electricity and water continue to function, promote efficient use of air conditioning, subsidize cooling costs for the most vulnerable who cannot afford to run air conditioning during hot weather, and collect information regarding indoor versus outdoor temperatures).
- Increase funding to bolster heat-health surveillance.
- Establish and improve local and state heat-health surveillance and tracking programs.
- Develop funded programs to provide emerging researchers and students interested in HHSS systems and climate change-related health effects with hands-on training, for example, doing rotations in local public health departments.
- Develop proposals for panel discussions or “late breaker” sessions on HHSS at the annual meetings of national organizations like National Association of County and City Health Officials (NACCHO), Association of State and Territorial Health Officials (ASTHO), American Public Health Association (APHA), CSTE and other stakeholder groups, as a way to gauge progress with expanding, standardizing, and linking HHSS systems.

CONCLUSIONS

Co-sponsors of the workshop, participants, and key stakeholders involved with HHSS are continuing to advance several of these recommendations. These include CSTE, the CDC’s BRACE Framework (Building Resilience Against Climate Effects) and its grantees, the National Environmental Public Health Tracking Program, and the ISDS. Government, foundation, and private funding could help with this effort. Specifically, more support is needed to create research-practice partnerships that investigate

outstanding important topics, including:

- Applying HHSS morbidity and tracking data to develop a model that estimates the larger burden of excess heat-related illness and mortality.
- Developing a wider set of protective tips to distribute during heat waves. For example, guidance for the homebound elderly, or what to do in case of a widespread or smaller but prolonged power outage that occurs during hot weather
- Evaluating local cooling center usage.
- Exploring whether HHSS data can inform local development of heat alert thresholds.
- Examining existing data from past heat events to conduct economic valuations of their health effects.



While the roadmap for creating and maintaining a regional or national syndromic heat monitoring and tracking system is far from complete, workshop participants identified short-term and long-term actions to help advance U.S. HHSS networks. With more complete and current data and a clearer picture of the burden extreme heat places on public health, we can enhance preparedness for climate change-fueled heat waves.

To prevent the worst effects of climate change, heat-trapping carbon pollution must be limited at its source. Under the U.S. Environmental Protection Agency’s (EPA) 2015 Clean Power Plan, states will soon establish carbon pollution standards to limit heat-trapping pollution from power plants.

By combining heat-health surveillance and tracking with climate change-preparedness and prevention, we can help build healthier, more secure communities for today while helping to protect our future.

Along with NRDC, the Heat-Health Surveillance Expert Workshop was hosted and co-sponsored by the Climate & Health Program, Department of Environmental Health Sciences of the Mailman School of Public Health at Columbia University. The workshop was also co-sponsored by the American Public Health Association (APHA), Association of State and Territorial Health Officials (ASTHO), California Environmental Health Tracking Program, Council of State and Territorial Epidemiologists (CSTE), National Association of County and City Health Officials (NACCHO), and the Public Health Institute’s Center for Climate and Health.

ENDNOTES

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