



## IMPACTS OF EXTREME EVENTS ON HUMAN HEALTH

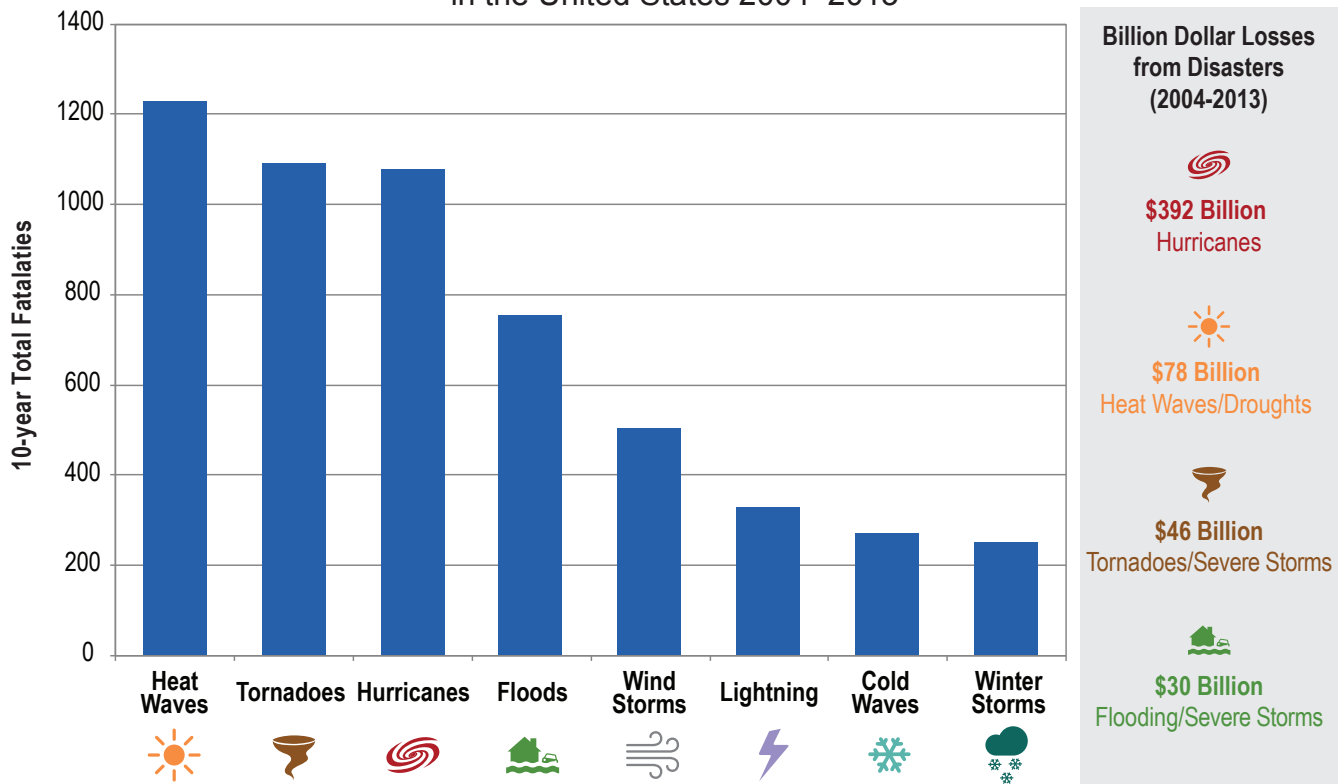
Climate change projections show that there will be continuing increases in the occurrence and severity of some extreme events by the end of the century, while for other extremes the links to climate change are more uncertain. Some regions of the United States have already experienced costly impacts—in terms of both lives lost and economic damages—from observed changes in the frequency, intensity, or duration of certain extreme events.

While it is intuitive that extremes can have health impacts such as death or injury during an event (for example, drowning during floods), health impacts can also occur before or after an extreme event, as individuals may be involved in activities that put their health at risk, such as disaster preparation

and post-event cleanup. Health risks may also arise long after the event, or in places outside the area where the event took place, as a result of damage to property, destruction of assets, loss of infrastructure and public services, social and economic impacts, environmental degradation, and other factors.

Extreme events also pose unique health risks if multiple events occur simultaneously or in succession in a given location. The severity and extent of health effects associated with extreme events depend on the physical impacts of the extreme events themselves as well as the unique human, societal, and environmental circumstances at the time and place where events occur.

Estimated Deaths and Billion Dollar Losses from Extreme Events in the United States 2004–2013



This figure provides 10-year estimates of fatalities related to extreme events from 2004 to 2013,<sup>4</sup> as well as estimated economic damages from 58 weather and climate disaster events with losses exceeding \$1 billion (see Smith and Katz 2013 to understand how total losses were calculated).<sup>5</sup> These statistics are indicative of the human and economic costs of extreme weather events over this time period. Climate change will alter the frequency, intensity, and geographic distribution of some of these extremes,<sup>1</sup> which has consequences for exposure to health risks from extreme events. Trends and future projections for some extremes, including tornadoes, lightning, and wind storms are still uncertain (see Ch. 4: Extreme Events).

## Increased Exposure to Extreme Events

**Key Finding 1:** Health impacts associated with climate-related changes in exposure to extreme events include death, injury, or illness; exacerbation of underlying medical conditions; and adverse effects on mental health [*High Confidence*]. Climate change will increase exposure risk in some regions of the United States due to projected increases in the frequency and/or intensity of drought, wildfires, and flooding related to extreme precipitation and hurricanes [*Medium Confidence*].



(Top) A truck gets stuck in the storm surge covering Highway 90 in Gulfport, Mississippi, during Hurricane Isaac. (Bottom) Power lines damaged in Plaquemines Parish, Louisiana, by Hurricane Isaac. September 3, 2012.



Family farmer in drought-stressed peanut field, Unadilla, Georgia. July 24, 2012.

## Disruption of Essential Infrastructure

**Key Finding 2:** Many types of extreme events related to climate change cause disruption of infrastructure, including power, water, transportation, and communication systems, that are essential to maintaining access to health care and emergency response services and safeguarding human health [*High Confidence*].

## Vulnerability to Coastal Flooding

**Key Finding 3:** Coastal populations with greater vulnerability to health impacts from coastal flooding include persons with disabilities or other access and functional needs, certain populations of color, older adults, pregnant women and children, low-income populations, and some occupational groups [*High Confidence*]. Climate change will increase exposure risk to coastal flooding due to increases in extreme precipitation and in hurricane intensity and rainfall rates, as well as sea level rise and the resulting increases in storm surge [*High Confidence*].

