

## Chapter 2

# Impacts on Public Health

### ABSTRACT

*Many serious adverse public health impacts of climate change are already being felt around the globe, including record-breaking heat waves, severe air pollution, widespread water contamination that has brought a resurgence of cholera and has compromised clean drinking water and sanitation for more than one billion people worldwide, food scarcity and undernutrition from droughts and desertification, pandemics of vector-borne diseases, and increasingly frequent and severe natural hazards such as flooding, hurricanes, and earthquakes. Centralized, well-organized emergency preparedness planning is needed at the national, regional, and municipal levels to enable safe and efficient evacuations, and to minimize injuries and fatalities. In addition, effective planning to address the public health impacts of climate change is contingent on poverty reduction, and adequate access to education and healthcare for all. This chapter addresses the major public health impacts of global warming and the use of technologies in adapting to them.*

### INTRODUCTION

This chapter focuses on the public health impacts of global warming. Recommendations are made for adaptation strategies that use innovative technologies to prevent illness, injury, and loss of life and property from climate-change related events.

The public health impacts are discussed in order of the following seven categories (USGCRP, 2016):

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- Temperature-related illness and death;
- Air pollution—indoor and outdoor;
- Food safety, nutrition, and availability;
- Water-borne diseases and sanitation;
- Vector-borne diseases;
- Natural hazards, and
- Mental health and well-being.

The public health impacts of climate change disproportionately affect vulnerable populations--lower-income individuals, communities of color, individuals with asthma and other respiratory diseases, pregnant women, young children, the elderly, and people with disabilities--who are most at risk of serious health consequences from the hazards posed by climate change (see Chapter 3).

## **TEMPERATURE-RELATED ILLNESS AND DEATH**

One potentially life-threatening impact is an increase in the frequency and severity of heat waves. The elderly are particularly vulnerable to heat-related illness and fatalities during heat waves (Astrom et al., 2011). Young children also are at increased risk of heat-related morbidity (Xu et al., 2014). In 2003, a severe heat wave in Europe resulted in 15,000 deaths in France alone (CRED, 2015). Following this disastrous heat wave, several European countries developed heat wave early warning systems or national heat plans aimed at mitigating human health consequences of heat waves (Hagens & van Bruggen, 2015; Lowe et al., 2011).

In July, 1995, Chicago experienced an extreme heat wave that took the lives of about 739 people (Klinenberg, 2002). It was the deadliest weather event in Chicago history. The heat peaked on July 13, when O'Hare Airport showed a temperature of 104 degrees Fahrenheit, but the extreme humidity resulted in a heat index of 119 degrees Fahrenheit; at Midway Airport, on the south side of Chicago, the temperature was 103 degrees Fahrenheit but the heat index was a life-threatening 125 degrees Fahrenheit. The deadly effects of the heat wave were exacerbated by intense sunshine and trapped pollutants, taking the highest toll on poor city residents who did not have air conditioners or could not afford to turn on the air conditioners (National Centers for Environmental Information, 2016b). In addition, heat in inner city neighborhoods is intensified by the "heat island effect," whereby heat

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