Chapter 15: PUBLIC HEALTH

BACKGROUND

- In a 2004 report on Ecological Health and Climate Change, the Consultative Group on Biological Diversity (CGBD) concluded: "Climate change is increasingly understood as a major public health challenge for this generation. It will be an even greater one for future generations." Simply put, what is disruptive to the Earth's climatic systems is harmful to many of Earth's inhabitants as well. The forces *driving* climate change are already causing adverse health effects on humans, wildlife and ecosystems. The complex *system upheavals* caused by climate change represent even more profound threats to health."
- The U.S. Centers for Disease Control and Prevention (CDC) stated quite simply: "Changes in climate can affect human health." Climate change affects human health in a number of ways including:
  - **Heat waves**, classified by the CGBD as the "the largest natural-caused killer in the world," increased by 88 percent in the United States during the period 1949-1995. Some 52,000 deaths were linked to the 2003 European heat wave and more than 200 people died when three summer heat waves scorched much of the U.S. and Canada in the summer of 2006. A recent study by Environment Maryland predicts that heat-related deaths will more than double in the United States within 50 years.
  - Intense **pollution** events are particularly stressful on the elderly, young children and those with respiratory or heart disease. Ragweed **pollen** is boosted disproportionately to the growth of the plant when grown under elevated levels of CO_2[1]. Ozone also can aggravate **asthma** and has been shown to initiate new cases of asthma in children.[2] Asthma rates quadrupled in the U.S. between 1980 and 2000.
- Global warming creates conditions that make **weather related disasters** more likely and more damaging. Many communities still handle sewage and storm water together and following heavy rainfall, combined sewage overflow events already occur across much of the U.S. While chlorination and high quality filtration can prevent some health effects from contaminated water, many nations lack the water treatment infrastructure and resources of the United States. Even in the U.S., drinking water treatment systems do not offer 100 percent protection. Approximately two-thirds of reported waterborne disease outbreaks in the U.S. have been preceded by heavy rainfall in relevant watersheds. In general, extreme events can precipitate clusters of water-, mosquito- and rodent-borne diseases.
- Temperature, humidity, rainfall and rising sea levels can influence the **transmission of infectious diseases** — especially water-borne illnesses, viruses and other diseases carried by insects. Malaria kills 3,000 African children a day, and West Nile virus cost the U.S. $500 million in 1999 alone. Lyme disease, the most widespread vector-borne disease, is increasing in North America as winters warm and ticks proliferate. Outbreaks of vector-borne diseases in tropical nations can also affect tourism.
- With rising temperatures, warmer near-shore waters are becoming hosts for **concentrations of unwelcome organisms** that threaten human health, from the tropics to northern coasts and inland lakes. (See Fresh Water and Oceans chapters.)

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BACKGROUND *(continued)*

- **Food and Water Supplies:** In tropical regions, many staple food crops on which people depend already are near their thermal limits – they won't thrive and produce well as temperatures rise. **Drought** poses additional concerns. The 2007 IPCC report projects that yields from rain-fed agriculture in Africa, which accounts for over 99 percent of African cropland, may be reduced by up to 50 percent by 2020. In other areas, excessive rainfall from increased precipitation is likely to decrease crop productivity through flooding and saturated soils. Global warming also is increasing the range and distribution of insect pests and diseases that thrive in warm conditions, and undermining the complex predator-prey relationships that provide natural controls for many crop and forage pests.
- The **health impacts of climate change will fall unevenly** on different populations. For thermal stress, the elderly, children, the poor and urban residents may be most at risk.
- As early as 1993, a study for the United Nations Environment Programme noted that the **psychological stresses of climate change** may "lead to dysfunctional responses." Psychological stress may be especially difficult for children. In Arctic nations, the strain is already evident as outlined in part in the Arctic Climate Impact Assessment.

EXECUTIVE ACTIONS

1. Direct the Secretary of Health and Human Services (HSS) to assess the nation's capacity to monitor and treat diseases related to climate change, including infectious diseases, heat-related illness and respiratory illness. This could augment the Environmental Health Tracking Program.
2. Direct the administrator of the EPA to assess contamination risks to U.S. drinking water supplies from saltwater intrusion, storm water contamination, floodwater contamination and other climate and weather related events.
3. Direct the Centers for Disease Control and Prevention (CDC) and the Department of Homeland Security (DHS) to meet annually with representatives of local governments and professional organizations to assess their needs for assistance in adapting to health- and weather-related emergencies. Reflect local priorities and needs in budget requests and program plans.
4. Direct the National Institutes of Health, HSS, DHS and CDC to coordinate their programs and plans for mitigating and adapting to climate-related health problems.
5. Direct the CDC, HHS and DHS to provide communities with information on how to prepare for and address public health emergencies related to climate change, including preparation for heat waves, storms and winter weather anomalies; the use of air-conditioned facilities as emergency shelters during heat events; and the provision of back-up energy supplies for hospitals and other critical facilities. (See Adaptation and States and Localities chapters.)
6. Revive the federal government's Cool Communities program, providing grants to cities to reduce the urban heat island effect and resulting heat-related illness and deaths with the use of green roofs, urban forests, light-colored surfacing and other strategies.

7. Direct the CDC and the Building Codes and Standards Program at the U.S. Department of Energy to work with the Department of Housing and Urban Development (HUD), FEMA and other agencies to incorporate disaster resilience, cooling strategies and other critical design features into model national building codes. Pay particular attention to standards for schools and public buildings that affect large populations, factoring in energy efficiency and other green building advantages.

8. Direct the Secretaries of HHS and DHS to develop a national response plan for heat wave emergencies with the participation of local governments.

9. Direct EPA to review existing science on the impact of E85 fuels (85 percent alcohol) on the emission of volatile compounds that increase ground-level ozone – a respiratory irritant and a greenhouse gas.

10. Direct EPA, CDC and NIH to collaborate on incorporating public health impacts into life-cycle analyses of federal policies, including investments in energy technologies (See Economy chapter).

[1] Rogers et al. 2006; Ziska and Caulfield 2000

[2] McConnell et al. 2002