



## GLOBAL CHANGE RESEARCH PROGRAM

### REPORT ASSESSES EFFECTS OF GLOBAL CHANGE ON HUMAN HEALTH, WELFARE, AND SETTLEMENTS

FINDINGS OF THE U.S. CLIMATE CHANGE SCIENCE PROGRAM SYNTHESIS AND ASSESSMENT PRODUCT 4.6

#### Overview

The U.S. EPA's Office of Research and Development (ORD) has completed a report that focuses on impacts of global climate change, especially impacts on three broad dimensions of the human condition: human health, human settlements, and human welfare. The report also assesses adaptive strategies that can be taken to respond to the challenges of a changing climate and identifies near- and long-term research goals for addressing data and knowledge gaps.

*Synthesis and Assessment Product 4.6: Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems* is one of 21 reports commissioned by the U.S. Climate Change Science Program (CCSP). The CCSP is responsible for coordinating federal research on climate and global change by 13 federal agencies.

A team of 28 experts from academia, government, and the private sector

analyzed and synthesized current research on the impacts of global change on human health, settlements and welfare. The assessment was coordinated by the Global Change Research Program in ORD which evaluates the potential consequences of global change (particularly climate variability and change) on air quality, water quality, ecosystems, and human health in the United States.

#### Conclusions

Impacts on Human Health: Climate change poses a risk for U.S. populations.

#### Highlights:

- It is very likely that heat-related illnesses and deaths will increase over coming decades.
- There is a growing body of evidence that ozone concentrations would be more likely to increase than decrease in the U.S. as a result of climate change, if one assumes that

precursor emissions are held constant. An increase in ozone could cause or exacerbate heart and lung diseases.

- Because we cannot project changes in future extreme climate change events, it is not yet possible to estimate changes in health impacts that may result from these events. However, we do know that when such events occur, there are potentially serious health consequences. Moreover, health risks associated with extreme events are likely to increase due to an increasing population and the degree to which people are physically or financially constrained in or uninformed about their ability to prepare for and respond to extreme weather events.
- Several food and water-borne diseases are likely to be transmitted among susceptible populations, although climate will seldom be the only factor.
- The very young and old, the poor, those with health problems and

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## GLOBAL CHANGE RESEARCH PROGRAM

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disabilities, and certain occupational groups are at greater risk.

- Health burdens related to climate change will vary by region.
- The U.S. is better prepared than most developing countries to respond to public health impacts from climate change.

**Impacts on Settlements:** The report explores the limited research on climate change impacts on communities in the United States.

### Highlights:

- The most vulnerable areas in the United States are likely to be in Alaska, coastal and river basins susceptible to flooding, and arid areas where water scarcity is a pressing issue, and areas where economic bases are climate-sensitive.
- Populations are moving toward those areas that are more likely to be vulnerable to the effects of climate change.
- Warming is virtually certain to increase overall energy demand in U.S. cities.
- Climate change can affect a settlement's economy, such as areas that are based on agriculture, forestry, water resources, or tourism.

### Impacts on Human Welfare:

Climate change is expected to have both positive and negative effects on the quality of life, or welfare, of people in America. The report concludes that additional research is needed to fully measure the impact on quality of life. One possible approach to improving our understanding of the relationship between climate change and human well-being is with economic assessments that place a dollar value on welfare effects.

### Opportunities to Adapt:

The report identifies opportunities for actions that could minimize the adverse impacts from a changing climate. It also emphasizes the challenges to adapting effectively while recognizing the inability to adapt in some cases.

The U.S. has a well-developed public health infrastructure and environmental regulatory program to protect our air and water. If these are maintained, the U.S. can respond to many of the effects of climate change, moderating their impact.

Many of the opportunities to deal with climate change are smart things to do anyway. For example, incorporating green building and sustainable design into current community planning can help

ameliorate future effects of climate change.

### Application and Impact

This report is the most current synthesis and assessment of scientific literature on the impact of global change on human health, welfare, and settlements in the United States.

It serves as an important resource for public health officials, resource managers, urban and transportation planners, and policy makers as they begin to plan and develop strategies to protect public health and address the consequences of a changing climate.

### REFERENCE

<http://www.climate-science.gov/Library/sap/sap4-6/>

CCSP, 2008: *Analysis of the Effects of Global Change on Human Health and Welfare and Human Systems*. A report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. Gamble, J.L., K.L. Ebi, A. E. Grambsch, F.G. Sussman and T.J. Wilbanks. U.S. Environmental Protection Agency, Washington, DC, USA.

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