IMPACT

Human Health

"Climate change is expected to increase injury and death related to extreme events, to alter the distribution of infectious diseases, and to exacerbate current climate-related health issues."

Dust storm on Interstate 10 near Phoenix. Changes in extreme climatic events are expected to influence the growth and airborne release of valley fever. Photo courtesy of Los Cuatro Ojos blog, loscuatroojos.com.

Key Messages

1

Climate change will exacerbate heat-related illness and death, affect respiratory health through an increase in particulate matter from wildfires, and influence the prevalence of diseases carried by insects and rodents.

2

Elderly, infirm, and economically disadvantaged populations are expected to bear a greater burden from climate change, based on assessment of their current reduced access to medical care and limited resources for implementing adaptation strategies.

3

The impact of climate change on public health can be lessened through mitigation and adaptation plans tailored to specific vulnerabilities of cities and states.

The fifteenth chapter of the *Assessment of Climate Change in the Southwest United States* reviews the state of knowledge with regard to climate-related public health threats, including those related to extreme heat, air quality (including respiratory ailments, dust, and fire-related particulate matter), and changes to disease vectors (such as mosquito and rodent populations). "Human Health" examines factors that interact with and complicate disease transmission and risk. The chapter concludes by discussing public health and adaptation planning.

Peak temperatures and the frequency, duration, and intensity of extreme heat events in the Southwest are projected to be substantially higher than at present. Climate models also project changes in precipitation patterns, drought, flooding, and sea-level rise. While these climate changes will vary across the region, research shows that they are sufficient to threaten human health and well-being. If these issues are not addressed, it will increase the chances that climate change will negatively affect human health in the Southwest. To prepare for future changes, public health organizations, cities, and towns will need tools and techniques to predict both positive and negative effects of climate change.

For more information about *Assessment of Climate Change in the Southwest United States*, see: www.swcarr.arizona.edu, www.cakex.org, www.islandpress.org/NCAreports.
This fact sheet developed by Institute of the Environment, University of Arizona.

Increased warmth allows West Nile virus-carrying mosquitoes to persist through the winter.

Climate and Human Health

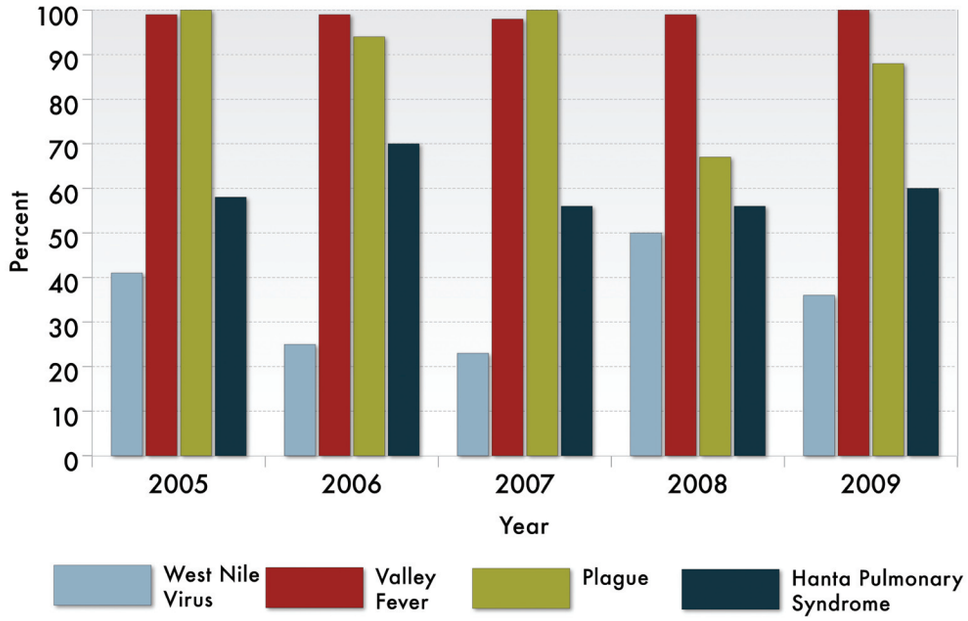
Changes in climate in the Southwest have varying effects depending on location, event, population susceptibility, and disease. Compared to other parts of the United States, the Southwest will be affected disproportionately by increases in the concentration of air pollutants, increases in heat-related illnesses and deaths, increases in air pollutants from wildfires, and potential increases in incidences of valley fever.

Increases in the length of the freeze-free season are also expected to change the ranges and intensity of mosquito-borne diseases and the plague, which is a flea-borne bacterial disease. Predicting precise changes to the geographic presence and intensity of mosquito-borne diseases is difficult because of the complexity with which climate influences interactions between insects, hosts, and pathogens.

Climate Change

Observed climate-related health effects in the Southwest demonstrate how climate change is already exacerbating health concerns and altering the distribution of vulnerabilities by age, geographical, and socioeconomic factors on a local level. Observed climate-change related health effects include:

- Increase in allergy and asthma cases due to earlier and longer spring bloom for many plant species
- Increase in heat-related illnesses and deaths observed in California's heat wave of July 2006
- Increase in West Nile virus transmissions during winter months



Incidence of selected diseases in the Southwest as a percent of total for the United States.

Prediction Challenges

Though observed climate-change-related health effects can aid in prediction of future health impacts, precise estimation of future impacts is not yet possible and a range of values is often used. Challenges to predictions include:

- Lack of adequate health data and downscaled climate data
- Incomplete understanding of how non-climate-related factors modify risk
- Incomplete understanding of the relationships between climate, health, and disease processes
- Uncertainty in estimating the influence on physiological, behavioral, and societal adaptations to reduce future impacts
- Difficulty in predicting shifts in the ranges of infectious diseases, which can result in the introduction of new diseases to the region

Adaptation

Key challenges for public health planning in response to climate change are to assess linkages between climate and human health at city, state, and regional levels, and to develop mitigation and adaptation plans for each spatial scale. Climate change adaptations in the Southwest health sector include:

- Disease surveillance coordinated with first-alert systems and emergency services, such as Los Angeles County's automated, near-real-time surveillance system to detect increases in illness and death related to environmental stresses
- Public education campaigns that emphasize protective behaviors to reduce risk
- Access to cooling centers, particularly for the elderly, infirm, and economically disadvantaged people
- Insect- and rodent-control programs and occupational safety standards for outdoor workers

Visible smog and poor air quality reduce cardiorespiratory health. Photo courtesy of David Iliff. License: CC_BY_SA 3.0.

Information from: Brown, H. E., A. C. Comrie, D. M. Drechsler, C. M. Barker, R. Basu, T. Brown, A. Gershunov, A. M. Kilpatrick, W. K. Reisen, and D. M. Ruddell. 2013. "Human Health." In *Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment*, edited by G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, 312–339. A report by the Southwest Climate Alliance. Washington, DC: Island Press.