Understanding the Basics of Climate Change and Public Health: A Local Official's Guide

Introduction

Most discussions about climate change focus on how local agencies can reduce their greenhouse gas emissions and how they can adapt to or limit the impacts of climate change on their communities.[1] These are key issues that deserve thoughtful and serious attention.

However, the relationship between climate change and public health also deserves careful consideration. Increased awareness of the public health consequences of climate change can help local officials better anticipate and respond to the impacts that climate change may have on their communities. In addition, implementing strategies that enable a community to adapt to climate change can have additional benefits, such as improving air quality, decreasing chronic disease rates, and providing opportunities for physical activity.

This paper provides an overview of three issues:

- The relationship between climate change and public health;
- The public health effects that local officials can anticipate; and
- Potential response strategies.

Resources are offered at the conclusion for those interested in a more in-depth discussion of the topic.

The Public Health Impacts of Climate Change

The scientific consensus is that the consequences of climate change are likely to include higher temperatures, more extreme weather events, such as heavy rain and storms, and extreme heat events, flooding, and reduced snow pack and resulting water shortages. Because of the diversity of California's topography and varying local climates, the localized affects of climate change in California are complex and will differ from community to community.

[1] Climate change, according to the scientific consensus, is caused by greenhouse gases emitted into the atmosphere. Transportation is the largest source of greenhouse gas; electricity generation and natural gas use in buildings are the second largest source. Climate change is addressed both by reducing greenhouse gas emissions and by adapting to the impacts of climate change. AB 32, the Global Warming Solutions Act of 2006, establishes a process for California to reduce its statewide greenhouse gas emissions to 1990 levels by 2020.

Scientists also have concluded that the public health consequences of climate change will be significant and far reaching – and, that they are occurring sooner than expected. According to numerous experts, the main public health effects from climate change in California are as follows.

Extreme Heat Events

Higher temperatures in California are projected to increase the number, intensity, and length of extreme heat events and associated heat-related illnesses and deaths.[2] There is some evidence that nighttime temperatures also may be higher than during past heat waves. Populations vulnerable to extreme heat events include the elderly, children, and those already experiencing chronic health conditions. In addition, poorer populations and those without access to air conditioning may be disproportionately and seriously impacted.

Wildfires

Drought and other dry conditions resulting from changes in rain and snowfall patterns are expected to increase as a result of climate change. When coupled with higher temperatures, the result is an increased frequency and severity of wildfires. Not only do wildfires have devastating health and safety impacts on affected communities, the smoke from wildfires has respiratory health implications for vulnerable and other populations. Risk from flooding, erosion, and land slippage after wildfires is also a concern.

Flooding

Coastal and inland flooding is projected to increase as ocean, river, and lake levels rise. Areas previously considered outside of hazardous flood zones may no longer be considered safe. Water and wastewater systems (including septic systems) may be damaged from flooding, resulting in related water quality health impacts. Floodwaters reaching waste water treatment systems could result in untreated sewage water entering waterways, spreading contamination and water-borne diseases. Levees may fail, causing flooding, as well as impacting irrigation, drinking water and waste water systems, and agriculture. Finally, rising sea levels increases the potential for saltwater intrusion into freshwater drinking supplies.

[2] Daily maximum summertime temperatures in California are predicted to increase between 2.2 degrees F. and 7.6 degrees F. by midcentury (2035-2065) and 3.2 degrees F. and 12.8 degrees F by the end of the century. Depending upon future emissions and the sensitivity of the climate system, the length of the heat wave season statewide could increase between 15 and 23 percent by the middle of the century and 30 to 77 percent by the end of the century, compared to the period 1961-1990. "Climate Change and California's Local Public Health Agencies," Public Policy Institute of California, February 2008.

Insect-Caused Disease

The number of insects carrying disease, such as mosquitoes, ticks, fleas and black flies, may increase due to changes in temperature and rainfall patterns. This in turn could increase the potential for insect-caused (also known as "vector-borne") diseases such as West Nile disease, Lyme disease, and malaria. Changes in temperature and rainfall patterns could also increase disease spread by rodents, such as Human Hantavirus Syndrome.

Other Public Health Impacts

Other direct and indirect public health consequences of climate change are projected to include:

- Increased rates of asthma and other respiratory diseases due to poorer air quality.
- Variation in crop yields and increased food borne illness due to higher temperatures and larger pest populations.
- Reductions in the quality and quantity of drinking water, as well as water used for recreation, such as lakes and rivers.
- Potential disproportional impacts on low-income and other vulnerable communities due to limited access to air conditioning, lack of alternatives to contaminated drinking water, or already compromised health status.
- Increased rates of infectious disease and emergency room utilization and costs.

Populations at Risk

The effects of climate change will not be felt uniformly among all communities or populations. For example, extreme heat events will be felt more severely in areas already subject to high temperatures. But, communities not accustomed to high temperatures may be surprised as they experience summer heat waves.

It is also important to recognize that within individual cities or counties, different groups may be more vulnerable than others and thus experience the consequences of climate change differently. Understanding which groups are potentially vulnerable to localized effects can help ensure that local response strategies address the needs of these groups.

For example, the elderly, low income residents and those with existing health conditions may be disproportionately affected by heat events or increased air pollution levels. Residents without resources to purchase bottled water or without air conditioning may be hit harder if water supplies are compromised by flooding or during extreme heat events.

How Local Officials Can Respond

Public health experts use the concept of *resiliency* to describe how communities can anticipate risk, limit impact, and bounce back rapidly after being affected. Communities skilled in survival response and experienced in overcoming challenges through adaptability, evolution, and growth, will be the most resilient during difficult change. Another goal of resiliency is to avoid or minimize subsequent effects.

Communities that are resilient will be less affected by climate change.

To ensure their communities are resilient, local officials can anticipate and plan for the consequences of climate change so that residents and infrastructure bounce back quickly and adapt as needed.

Local officials can make sure their communities are resilient in the face of climate change by taking a number of key short and long term actions. Many of the actions that reduce greenhouse gas emissions also have other benefits, including public health and resiliency benefits. Conversely, many strategies to improve public health also reduce greenhouse gas emissions.

Understand the Public Health Impacts on the Community

The first step is to learn how the community may be affected by climate change. Is it likely to experience more and longer extreme heat events? Is there an increased risk for wildfires or flooding? Are there sensitive or potentially vulnerable populations in the community and where do they live?

Work with the Local Public Health Department

County and city public health officials are valuable resources to assist other local officials in understanding the localized public health implications of climate change. Health departments house valuable health data that can illustrate where and among what populations the potential health implications of climate change might occur within the community.

Local health departments also have the experience and expertise to assist in preparing response plans and procedures, such as those for extreme heat events. Additionally, health professionals can provide leadership regarding the health protection benefits of future sustainability activities, such as community design strategies that also reduce greenhouse gas emissions.

Near Term Actions

Scientists now believe that the effects of climate change appear to be impacting communities sooner than anticipated. This is especially true for extreme heat events, water shortages, and wildfires. Thus, there are many activities that local officials can take now that will achieve more immediate benefits.

√ Be Prepared for Heat Events

- Make sure the community has sufficient cooling centers for vulnerable populations that may be affected by severe and lengthy heat events. Be sure there is an adequate transportation system to help residents reach the centers. Consider keeping community centers and public buildings with air conditioning open longer during extreme heat events. (This system can be used for extreme cold periods as well.)

- Establish reverse 911 and other early warning systems to alert residents of extreme heat (or cold) events. This includes elderly and other vulnerable populations, hospitals, and nursing facilities. Similar systems can be used to warn residents about potential wildfires and flooding.

- Adopt an emergency response plan for extreme heat events.

√ Plan for Water Shortages

- Adopt policies and procedures to provide bottled water (or clean water from alternative sources) if traditional water supplies are compromised.

- Establish procedures to reach elderly and underserved populations that may not be able to get bottled water or water from alternative supplies themselves.

√ Plan for Wildfires

- Work with local and regional fire and police agencies to coordinate responses to wildfires.

- Work with public health and medical officials to assist populations vulnerable to respiratory complications from wildfires.

- Be prepared for flooding, erosion, and runoff in areas hit by wildfires, including potential water contamination.

Longer-Term Actions

Local officials have an opportunity to address more than one issue when considering longer term actions to respond to the public health consequences of climate change. This is because many of the longer-term actions have multiple benefits – or co-benefits. The term "co-benefit" is often used in the public health community to describe multiple, ancillary health benefits of a program, policy, or intervention.[3]

For example, how communities are designed – land use and transportation patterns, accessibility to parks, open space and transit, pedestrian and bicycle friendly features – have positive direct and indirect impacts on residents' health and health conditions. Conversely, many of the strategies that reduce vehicle miles traveled and greenhouse gas emissions also have positive public health benefits.

√ Healthy Neighborhood and Community Design

- Include pedestrian and bicycle friendly design features in new and revitalized developments to make it easier for residents to choose alternatives to the automobile for their daily travel needs. This not only reduces automobile-produced greenhouse gas emissions, it increases residents' physical activity and reduces their risk of contracting various chronic diseases.

- Make parks and open space more accessible to residents, thus promoting active lifestyles. This also reduces automobile trips needed to reach parks and increases open spaces and trees that store carbon dioxide and reduce the amount of heat stored in streets and buildings.

√ Increase Access to Transit and Non-Automobile Travel

- Link homes, shops, businesses, and institutions with a convenient and accessible transit system. This can reduce both greenhouse gas emissions and air pollution from motor vehicles.

- Design and retrofit street and road systems to promote safe walking and bicycling, thereby reducing greenhouse gas emissions and increasing physical activity.

[3] For a longer discussion of co-benefits of sustainability, including public health issues, see the California Climate Action Network's Whitepaper, "The Co-Benefits of Sustainability Strategies" at www.ca-ilg.org/ClimateWhitepapers.

√ Support Local and Regional Agriculture

- Adopt policies to enhance the resilience of the local food system by increasing access to locally and regionally grown food. This (a) supports local and regional agriculture and economies; (b) reduces emissions from transporting food grown outside the region; and (c) helps make fresh foods and produce more available locally, thus promoting healthy eating.

- Use locally and regionally grown produce and products in agency facilities, including hospitals, community centers, senior centers, public safety facilities, and at local agency sponsored events.

Resources to Learn More

This Whitepaper provides a broad overview of key public health and climate change issues. More detailed discussions about the relationship between climate change and public health, best practices to reduce greenhouse gas emissions and increase sustainability, and a deeper examination of the issues covered here are available from a wide variety of resources. These include the following.

Institute for Local Government. California Climate Action Network. www.ca-ilg.org/climatechange

Institute for Local Government. Healthy Neighborhoods Program. www.ca-ilg.org/healthyneighborhoods

California Air Resources Board. Public Health Work Group. www.arb.ca.gov/cc/ab32publichealth/ab32publichealth.htm

California Department of Public Health. Public Health and Climate Change Mitigation. www.cdph.ca.gov/programs/cclho/Documents/RUDOLPHspring2008.pdf

California Natural Resources Agency. California Climate Adaptation Strategy (includes discussion of public health issues). http://climatechange.ca.gov/adaptation/index.html

Centers for Disease Control and Prevention. Climate Change and Public Health. www.cdc.gov/ClimateChange/default.htm

Healthy Eating Active Living Cities Campaign. www.healcitiescampaign.org/

National Association of County and City Health Officials. www.naccho.org/topics/environmental/climatechange/

Public Health Institute Climate Change Initiative.
www.phi.org/people_programs/climate_change.html

Public Health Law and Policy. An Action Plan for Public Health.
www.phlpnet.org/climate-change/products/climate-change-action-plan

Public Policy Institute of California (www.ppic.org)

- Climate Change and California's Local Public Health Agencies. July 2008.
- Preparing California for a Changing Climate. November 2008.
- Climate Change and California's Public Health Institutions. November 2008.

The Institute thanks the individuals who reviewed and commented on early drafts of the Whitepaper, including: Robin Salsburg, Public Health Law and Policy; Karen Shore and Justin Rancadore, Center for Health Improvement; and Joseph Iser, Yolo County Health Department.

ABOUT THE INSTITUTE FOR LOCAL GOVERNMENT

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