Coupling Public Health with Climate Resilience

Office of Policy & Planning
San Francisco Department of Public Health
City and County of San Francisco

Climate and Health Program
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Presentation Objectives

• Provide information about of the San Francisco Department of Public Health Climate and Health Program and City-Wide Initiatives

• Explain why it is important for Public Health professionals to know about climate change and the projected impacts of climate change on health.

• Learn about some of the past initiatives and highlights of the Climate and Health Program

• Learn about upcoming strategic activities
Climate Change is Happening Now

Northwestern Glacier melt, Alaska from 1940 (left) to 2005 (right)
# Climate Projections

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<tr>
<th>HAZARD</th>
<th>CLIMATE IMPACT</th>
<th>HEALTH IMPACT</th>
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| Temperature     | Average yearly temperature to increase between 4.1 and 6.2 degrees Fahrenheit by 2100 | • Heat-Related Illness  
  - Dehydration  
  - Heat Stroke  
  • Heat-Related Mortality  
  - Heart Disease  
  • Air Quality Effects  
  - Respiratory Illness  
  - Asthma  
  - Allergies  
  • Mental and Behavioral Health |
|                 | Extreme Heat Days (over 85°F) to increase by 15-40 by 2050, potentially 90 by 2100 |                                                                           |
|                 | Increase in heat wave length and frequency.                                   |                                                                           |
| Sea level Rise  | Projections indicate that in the most likely scenario, sea levels will rise between 7-15 inches by 2050 and 26-46 inches by 2100 | • Fatal and Nonfatal Injury  
  • Water-borne disease  
  • Mental and Behavioral Stressors  
  • Income Loss |
| Extreme Storms  | Bay Area precipitation levels are projected to fluctuate between wet and dry extremes. Currently California receives 35% - 45% of its annual precipitation from 'Pineapple Express' extreme storm events. This number could increase by up to 11% by 2100. | • Fatal and Nonfatal Injury  
  • Water-borne disease  
  • Mental and Behavioral Stressors  
  • Strain on public health infrastructure  
  • Income Loss |
| Drought         | Bay Area precipitation levels are projected to fluctuate between wet and dry extremes. In dry years where the high-pressure system off the coast does not dissipate, the frequency and severity of droughts will increase. | • Income Loss  
  • Food Insecurity  
  - Malnutrition  
  • Air Quality / Allergens  
  - Respiratory Illness  
  - Asthma  
  - Allergies  
  • Mental and Behavioral Health |
Impact of Climate Change on Human Health

- Injuries, fatalities, mental health impacts
- Asthma, cardiovascular disease
- Heat-related illness and death, cardiovascular failure
- Malaria, dengue, encephalitis, hantavirus, Rift Valley fever, Lyme disease, chikungunya, West Nile virus

RISING TEMPERATURES
- Severe Weather
- Extreme Heat
- Enviromental Degradation
- Malnutrition, diarrheal disease
- Cholera, cryptosporidiosis, campylobacter, leptospirosis, harmful algal blooms

MORE EXTREME WEATHER
- Air Pollution
- Changes in Vector Ecology
- Water and Food Supply Impacts
- Water Quality Impacts
- Increasing Allergens
- Respiratory allergies, asthma

RISING CO2 LEVELS
- Increasing Allergens
- Malnutrition, diarrheal disease

RISING SEA LEVELS
- Forced migration, civil conflict, mental health impacts
Climate Change Already Impacts Health

Deaths from climate change

≥ 150,000 deaths due to climate change occur each year

250,000 additional deaths per year between 2030 and 2050
Climate Change Impacts are Complex

Mitigation

Greenhouse gas emissions

Climate change

Ocean acidification
Reduced fishery and aquaculture productivity
Reduced agricultural productivity
Bacterial diarrhoea

Raiined average, and extreme temperatures
Altered rainfall patterns
Sea level rise
Extreme weather

Flood
Heatwaves
Drought
Fire

Biodiversity loss, ecosystem collapse, pests
Ozone increase
Particulate pollution
Pollen allergenicity burden

Social mediating factors
Loss of habituation
Poverty
Mass migration
Violent conflict
Other social determinants of health

Undernutrition
Impact on mental health
Cardiovascular disease
Respiratory disease
Harmful algal blooms
Vector-borne disease

Adaptation
Health Disparities Contribute Climate Vulnerability

- Rates of diseases are associated with race and poverty
  - Stroke and cardiovascular mortality
  - Diabetes
  - Asthma
  - “Mentally unhealthy days”

- Deaths and hospitalizations increase with heat in people with:
  - Cardiovascular diseases
  - Diabetes
  - Respiratory Diseases
  - Psychiatric

Reducing health disparities: part of the climate justice agenda
The Climate Gap

There is a climate gap. The health consequences of climate change will harm all Americans—but the poor and people of color will be hit the worst.

Figure 2. Percent change in mortality associated with 1°F increase in mean daily temperature by race/ethnicity in nine California counties. May through September, 1999–2003 (Source: Basu and Ostro 2008).
Climate change threatens public health.

San Francisco Climate and Health Profile

The San Francisco Climate and Health Profile is a report that links climate change projections with their associated health outcomes, and identifies populations and locations most vulnerable to these health outcomes. The goal of the Climate and Health Profile is to support local public health climate adaptation efforts, and advance urban health and environmental justice in the climate and health field.

View the Highlights

- San Francisco Climate Projections
- Health Impacts
- Neighborhood Summary
- Community Resiliency Indicator Maps

www.sfclimatehealth.org
Extreme Heat Risk

Climate and Health
Understanding the Risk:
An Assessment of San Francisco’s Vulnerability to Extreme Heat Events

Heat Vulnerability Index by Census Block Group
San Francisco, CA

Sum of factor scores, varimax rotated
-1.2355853 - 0.339524
-0.329623 - 5.067317
1.56716 - 1.423058
1.230175 - 5.778266
5.778266 - 0.778266

City and County of San Francisco
Department of Public Health
Environmental Health Division

Program on Health, Equity and Sustainability
Flooding and Extreme Storms

Climate and Health
Understanding the Risk:
An Assessment of San Francisco’s Vulnerability to Flooding & Extreme Storms

Interactive Story Map

Live Stories
Strategies/Activities - Emergency Planning

San Francisco Department of Public Health
Extreme Heat Response Plan
An Annex to the SFDPH Emergency Operations Plan

San Francisco Department of Public Health
Response to a Flood Tabletop Exercise
After-Action Report/Improvement Plan
Exercise Date: September 29, 2015
The most likely health outcomes of extreme storms and flooding include:

- **Physical injuries** may increase due to slips and falls, automobile or bicycle collisions, or downed trees or power lines. These injuries are directly caused by flood inundation and extreme storms.

- **Waterborne illnesses** are caused by proximity to contaminated water. San Francisco has little risk of contaminated drinking water, but stormwater overflows may result in raw sewage seepage onto streets or into the Bay.

- **Respiratory illnesses** that impact the lungs, throat, and airways can be spread through airborne particles. Mold growth from water intuition or flooding in buildings, as well as water damage which may cause exposure to toxic building materials, can trigger asthma, allergies, and other respiratory illnesses.

- **Vector-borne disease** can be exacerbated by flood events since rainy seasons, particularly after dry seasons, have been proven to be correlated with rodent vectors such as hantavirus. Standing water may additionally attract mosquito vectors.

- **Foodborne illnesses** may increase if a significant power outage impacts refrigeration in residents and food establishments, as well as if a combined sewer overflow impacts shellfish and other coastal seafood.

- **Any disruption to the city medical services**, either by power outage or transportation network disruption, may cause additional health impacts. Residents dependent on methadone clinics or dialysis may need to find alternative treatments during service disruption.

- **Carbon monoxide poisoning** is a potential health impact of power outages after hazard events. The poisoning is typically caused by improper usage of generators which that emit a harmful, odorless gas.

- We are all at risk of increased sensitivity to **mental health impacts** before, during, and after hazard events. These impacts can be caused, triggered, or exacerbated by stress, isolation, or anxiety associated with events.

- Any major flood inundation or extreme storm event may lead to **income loss**. Income loss has been correlated with many public health impacts.
Next Steps

- **Climate and Health Adaptation Plan**
  - Climate Health Risks
  - Baseline Conditions
  - Potential Interventions
  - Indictors of Success
  - Opportunities within the Health Department
  - Stakeholder Engagement
- **Goals**
  - Emphasize the wider scope of vulnerable populations
  - Bring together Public Health and Health Care Delivery Systems
  - Interagency and Cross Sector Collaborations
  - Reduce health burden from climate change