

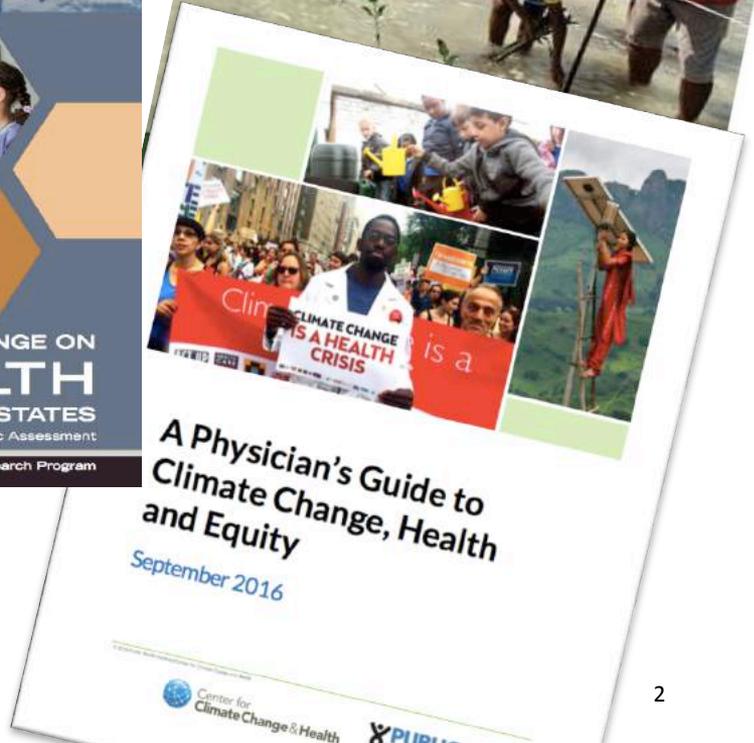
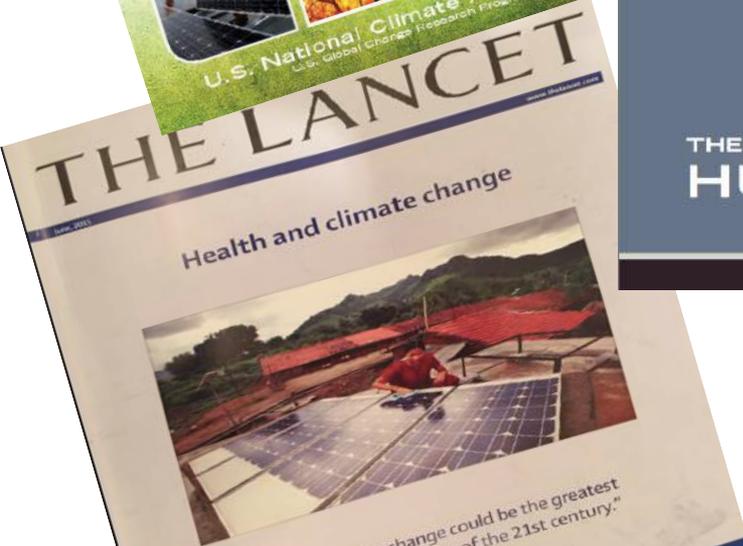
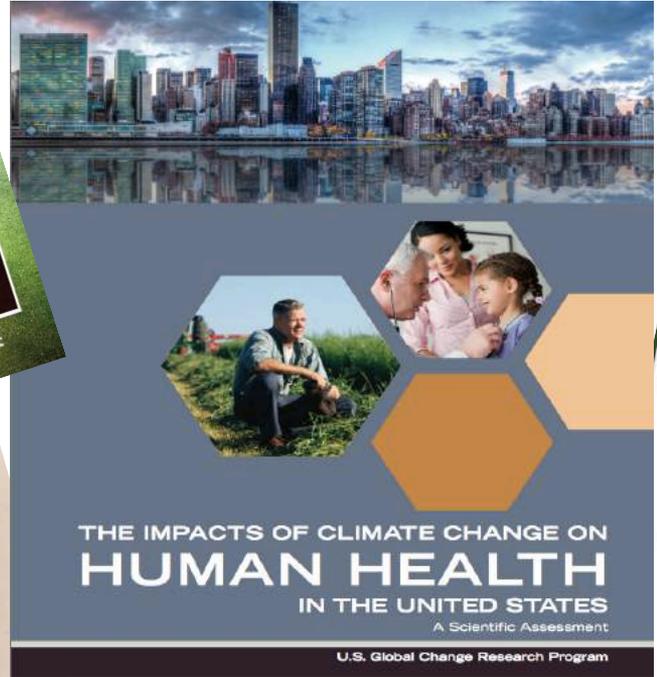
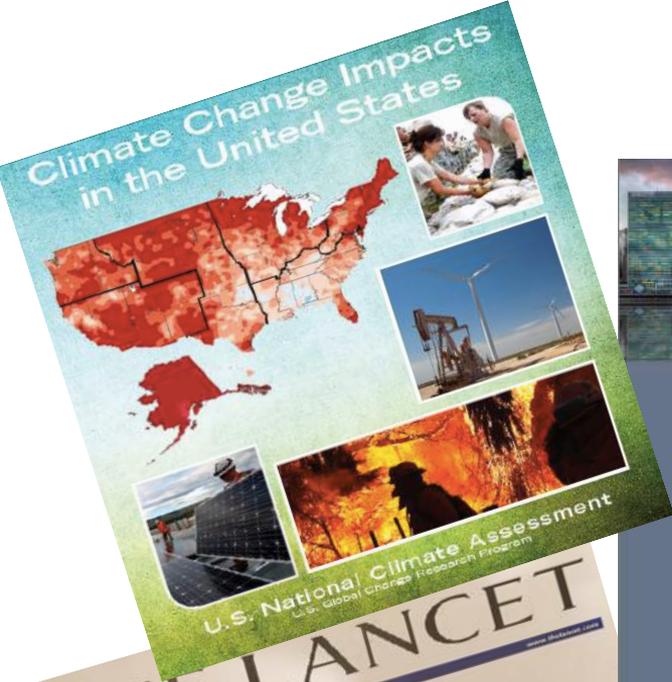


Climate Change and Public Health



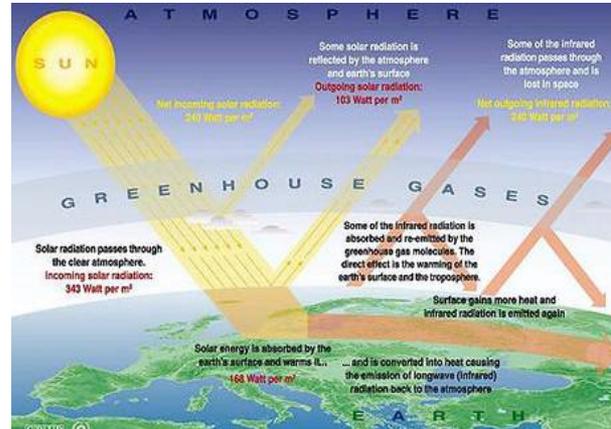
Center for
Climate Change & Health





Climate Change 101

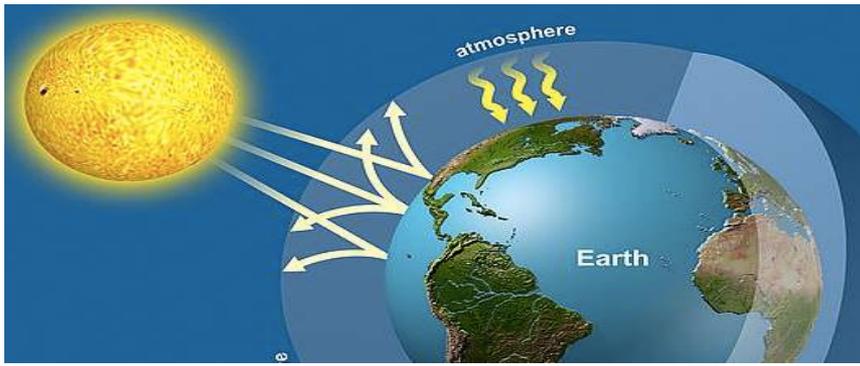
- Climate vs. weather
- Warming of earth's surface and oceans
- Emissions
 - Carbon dioxide
 - Methane
 - Nitrous oxide
 - Black carbon
 - Potent climate pollutants



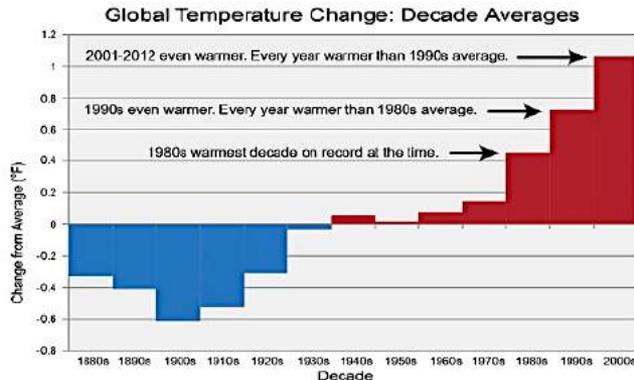
? DID YOU KNOW?

Why 1.5 °C?

To avoid catastrophic impacts of climate change, the earth's average global temperature cannot rise more than 1.5°C above pre-Industrial levels. Currently, the planet is on track for a 4°C rise, which would make the earth uninhabitable.



Global Climate Impacts



Warming



Sea Level Rise



Ocean Acidification



Glacier & Snowpack Loss



Hydrologic Variability

Climate Change 101

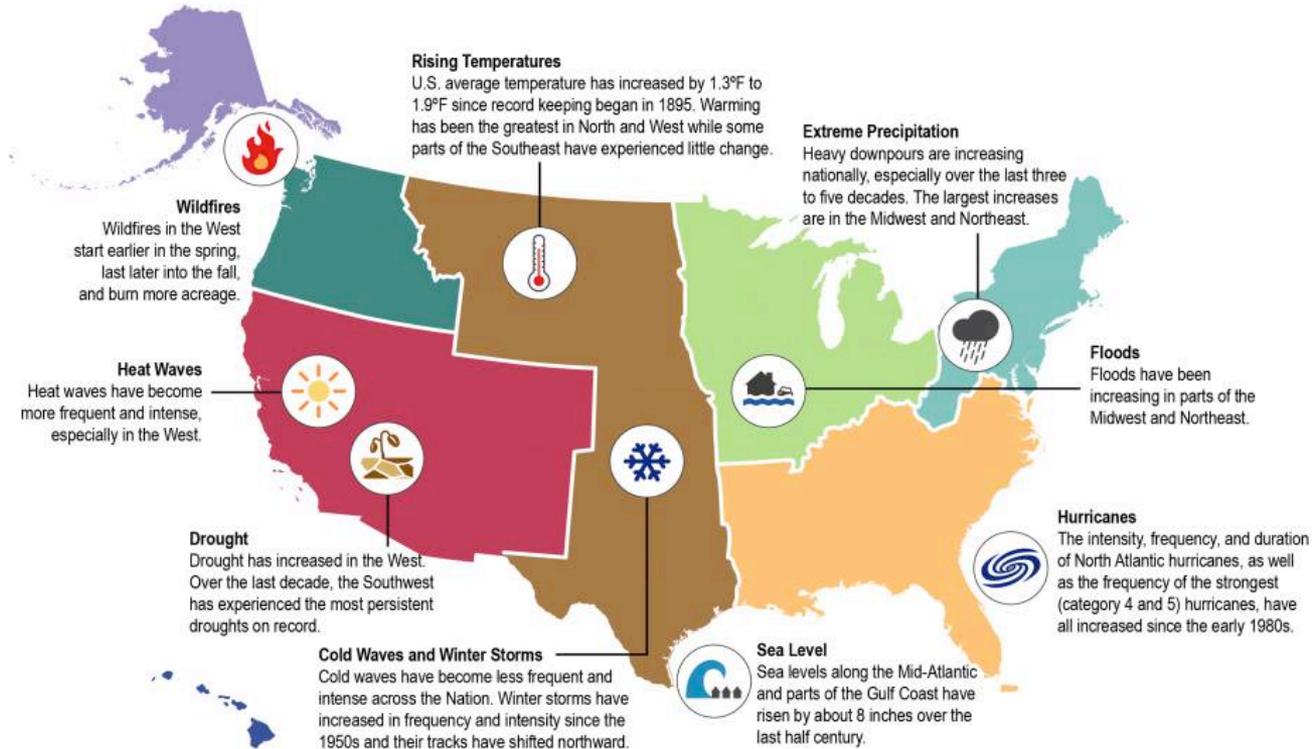


Photo credit: US Global Change Research Project *Climate and Health Assessment*

How are climate change and health equity linked?



Vulnerability & Resilience

Vulnerability

- Higher risk
- Lack of ability to cope
- Both environmental and individual factors

Resilience

- Capacity (individual, community, institutional) to effectively respond
- Ability to continue to function and prosper

- Characteristics of resilience or vulnerability co-exist simultaneously
- Resources, social connection, coping mechanisms, exposures, and susceptibility will determine how climate change impacts health and well-being

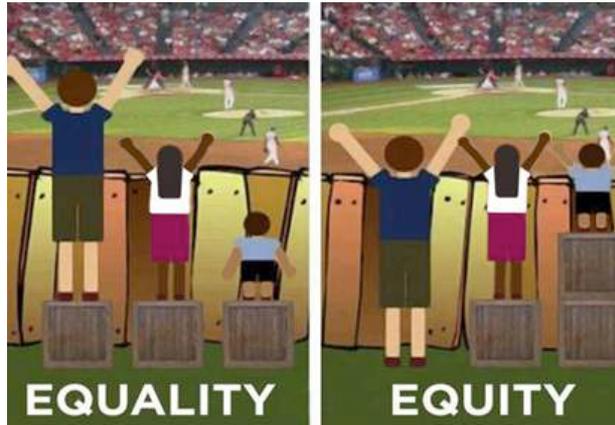
Climate Change and Health Equity: The Climate Gap

“...climate change is a ‘threat multiplier’... [that] will intensify the challenges of global instability, hunger, poverty and conflict.”

Chuck Hagel, 24th U.S. Secretary of Defense

“Social injustice is killing people on a grand scale.”

WHO Commission on the Social Determinants of Health, 2008





ZIP CODE 95219 **73** < **88** ZIP CODE 92657
 Life Expectancy

health happens here



Extreme Heat

- Leading cause of weather related deaths
- Exacerbates cardiovascular, respiratory, and renal disease
- Drug interactions and efficacy
- Crop and livestock loss
- Longer pollen seasons
- Urban heat islands
- Increased violence



Extreme Heat & Health Equity

- Urban heat islands
 - Map to areas of historical residential segregation, poverty, communities of color
 - People with pre-existing chronic disease at high risk
- Access to AC (fuel poverty & cost concerns)
- Outdoor work (e.g. farm labor)
- Upper-level apartments
- Social isolation



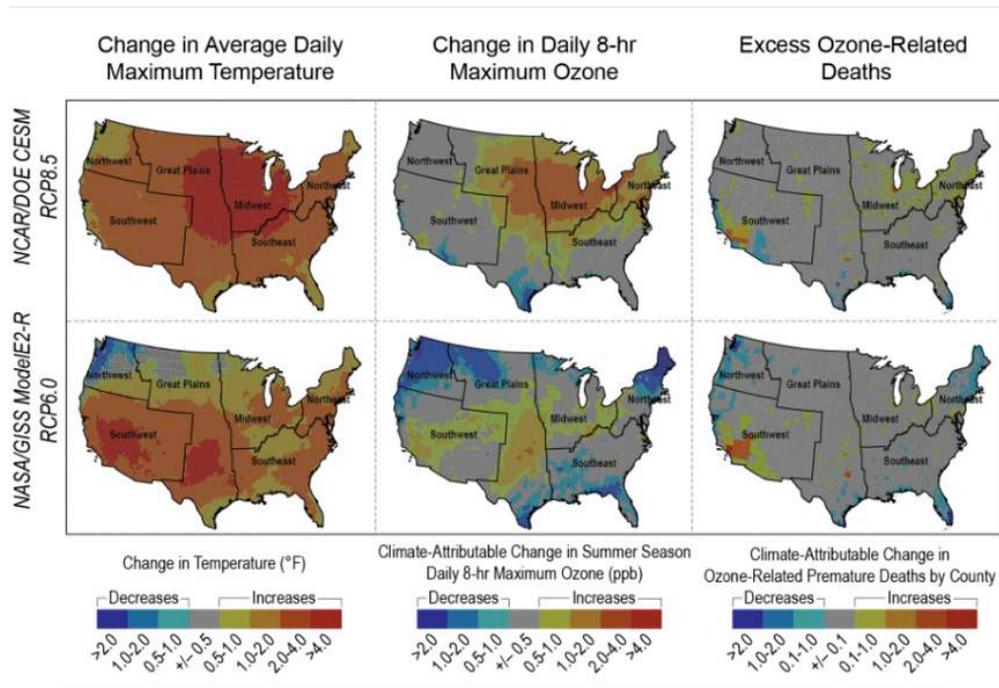
! FAST FACT:

African Americans in Los Angeles are more than twice as likely to die in a heat wave than other residents.

Ozone & Climate Change

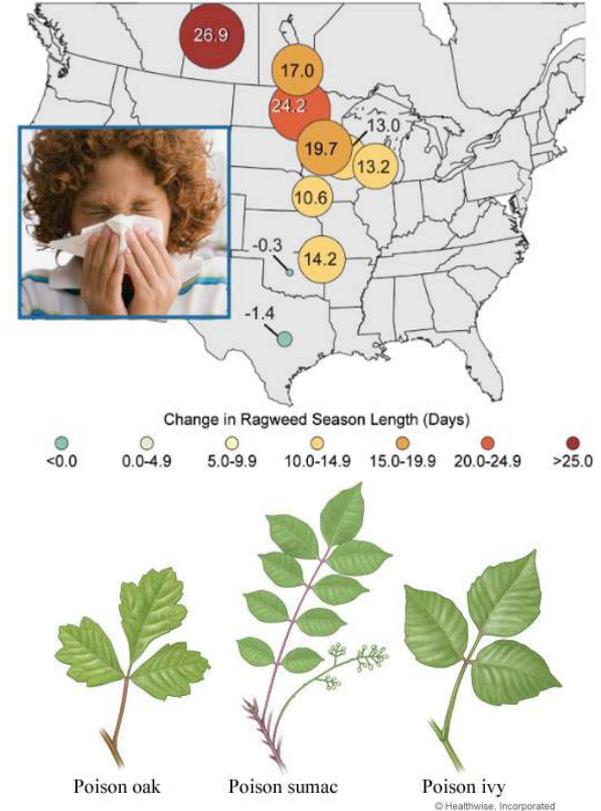
- Higher temperature → ground level ozone
- At risk: children, older adults, people with asthma, outdoor workers
- Air pollution adversely impacts lung development
- Reduced lung function may increase risk of e.g. wheezing during viral infection

Figure ES4: Projected Change in Temperature, Ozone, and Ozone-Related Premature Deaths in 2030



Allergens

- Longer, stronger pollen seasons
- Increased pollen production and potency
- More potent poison ivy and oak
- Higher temperatures → more ozone → increased sensitivity of the respiratory tract



Drought

- Water quality and quantity
- Crop loss and food insecurity
- Wildfire risk
- Migration and conflict
- Infectious disease risk
 - Valley Fever
 - Dengue and WNV

Community showers, East Porterville, CA



! FAST FACT:

The total economic impact of the 2015 drought to California's agriculture is estimated to be \$2.7 billion—including losses in crop revenue, livestock and jobs.

Wildfires

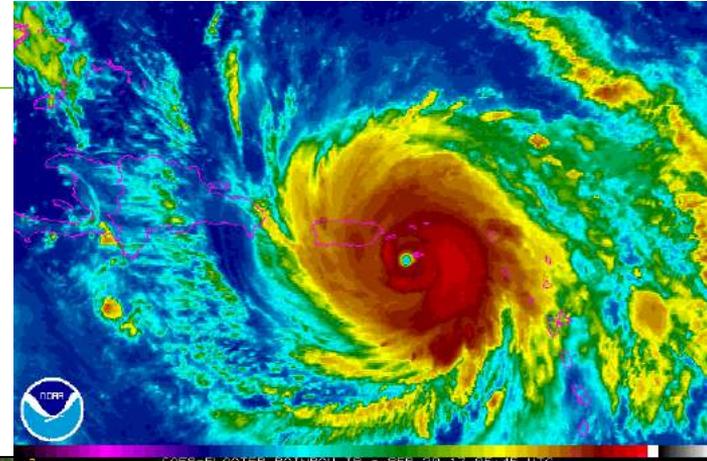
- Risk of injury, burns or death
- Homes and businesses destroyed
- At risk: emergency response and public safety occupations
- Trauma, stress, displacement
- Risks to water supply
- Air pollution: soot and fire fighting chemicals
 - Exacerbates asthma, COPD, and cardiovascular disease
 - Premature death and acute illness
- Greenhouse gas emissions

? DID YOU KNOW?

Smoke from wildfires in Quebec traveled more than 1,000 miles downwind, causing a 30-fold increase in Baltimore's air pollution in 2002.

Rainfall, Storms & Floods

- Risk of injury from floods and severe storms
- Worsening indoor air quality: mold
- Increased waterborne pathogen exposure from sewer runoff and overflow
- Increased winter precipitation → increased pollen production in spring
- Recreational water risks



Sea Level Rise

- Flooding and erosion: injury, death, property loss
- Freshwater contamination (salinization): threatens drinking water, irrigation stores, fish and wildlife
- Soil contamination (saltwater intrusion): threatens plants and wildlife



! FAST FACT:

The U.S. government has allocated \$48 million to relocate the entire Biloxi-Chitmacha-Choctaw tribe of Isle de Jean Charles, LA, which is being flooded by sea level rise. These are the first American climate refugees.

Extreme Weather, Drought, SLR, and Health Inequities

- Indigenous communities vulnerable to impacts on fisheries & farming
- Low-income households often lack disaster insurance, resources to recover from losses
- Low-income less capacity to respond (e.g. rising food prices)



FAST FACT:

One year after Katrina, only 44% blacks vs 67% non-blacks returned

By 2013 only 30% residents low-income, mainly black Lower 9th Ward returned

2014: 100,000 fewer African-Americans, 9,000 fewer whites live in New Orleans.



Infectious Disease

- Flooding and storm surge → waterborne and foodborne illness, diarrheal disease
- Drought → Valley Fever, West Nile Virus
- Expanded mosquito and tick habitats, impacting rates and spread of:
 - Dengue, West Nile Virus, Zika
 - Lyme Disease



“The Aedes mosquitoes, which now live throughout Southern California, didn't start spreading across the state until 2015, experts say. They prefer warmer climates. Last year was one of the hottest on record in the Southland, creating conditions "optimal for Aedes to expand”

Kenn Fujioka, Manager

San Gabriel Valley Mosquito and Vector Control District

<http://www.latimes.com/local/cityhall/la-me-climate-health-20160223-story.html>

Infectious Disease and Health Inequities

Flooding & Storm Surge

- Aging & inadequate storm water & sewage infrastructure



Vector-Borne Diseases

- Outdoor work
- Poor housing quality
- Blight & vacant properties



Food Security and Nutrition

- Declining crop yields, nutrient content
- Livestock death, decreased fish yields
- Algal blooms, increased shellfish toxins
- Rising food prices, water shortages
- Increased herbicide and pesticide use



? DID YOU KNOW?

The typical American meal includes ingredients from at least **five foreign countries**, contributing to global GHGE, especially if shipped by air.

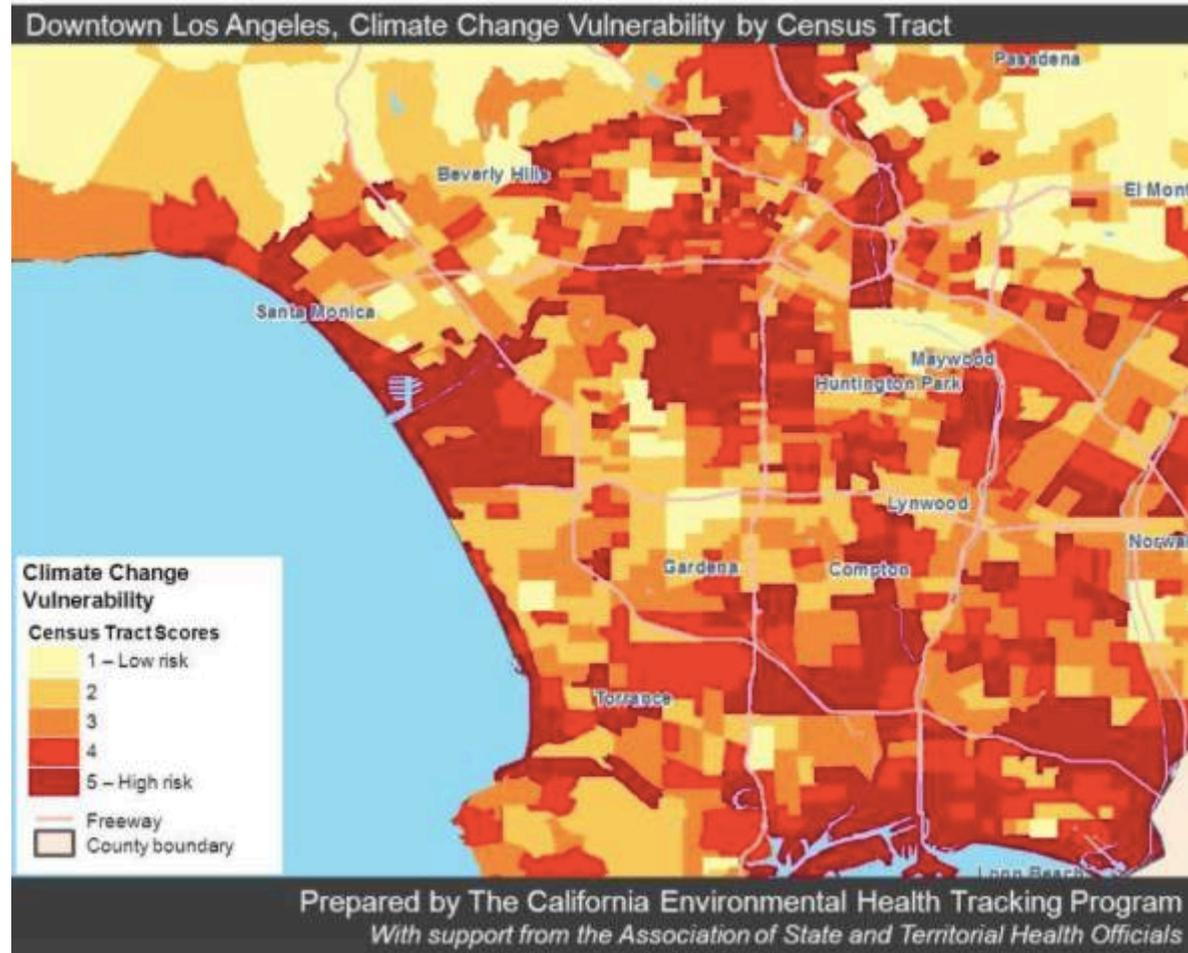
Climate Change and Mental Health

- Economic stress, anxiety
- Displacement, trauma and PTSD
- Chronic disease management and comorbid depression
- Nutrition and physical activity
- At risk groups
 - First responders
 - Pregnant women and children
 - Pre-existing mental illness

CDC

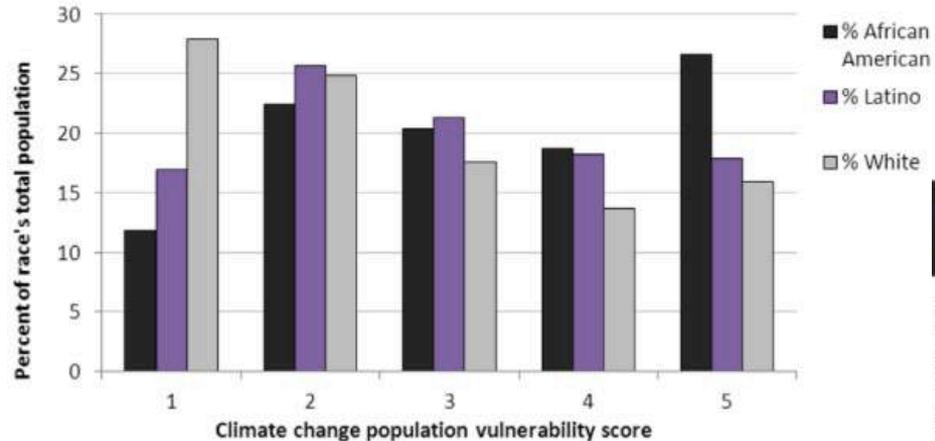


Place, Race, Health, & Climate Change



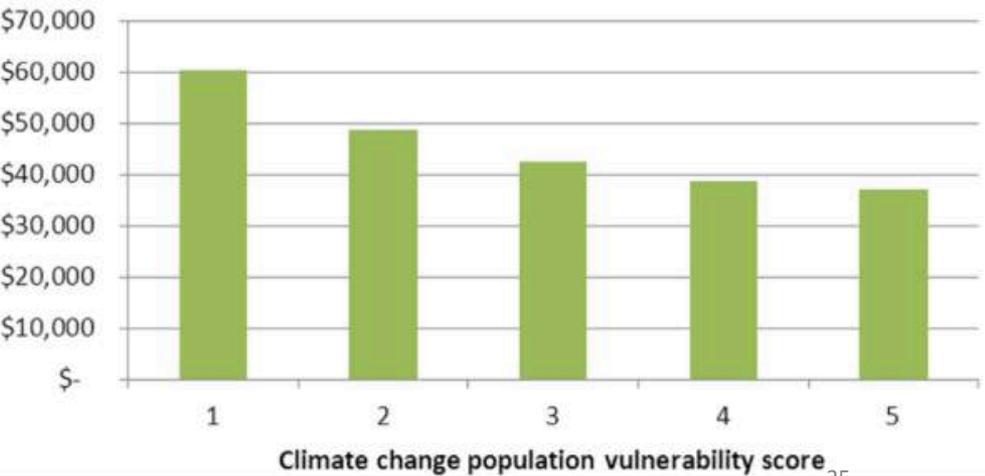
Place, Race, Health, & Climate Change

Los Angeles County: 46% of African Americans and 36% of Latinos reside in the two highest vulnerability categories compared to 30% of Whites



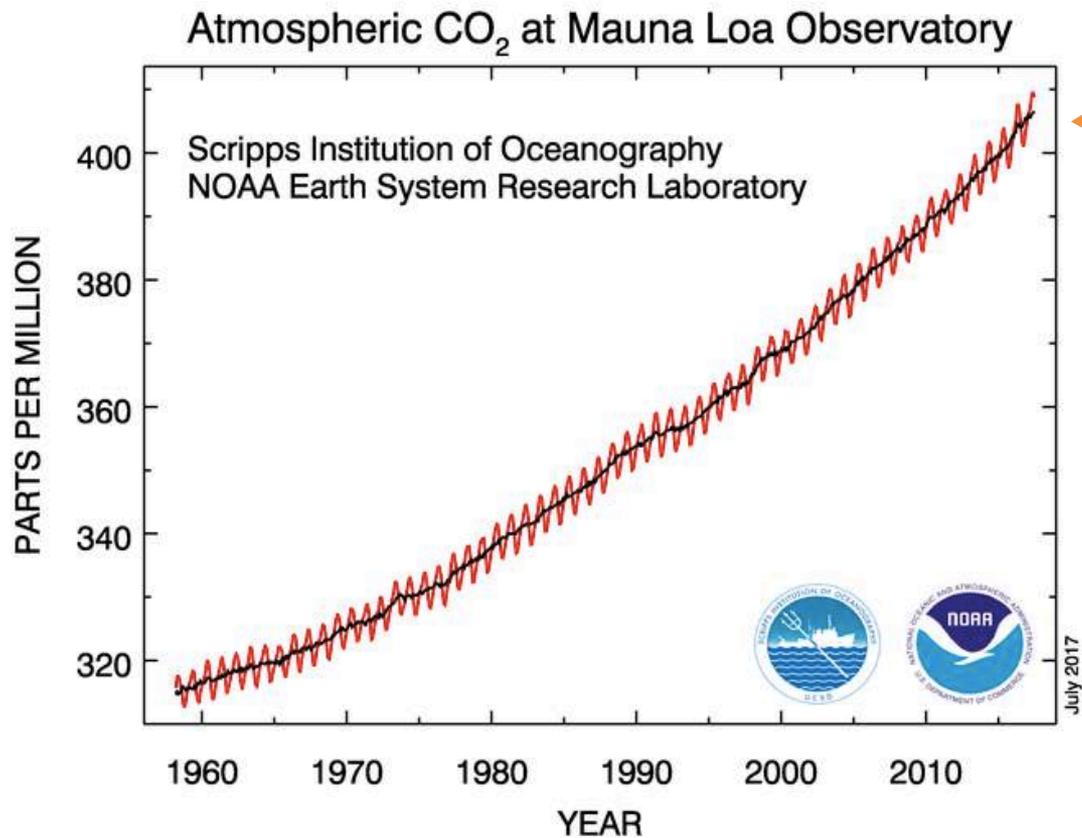
Prepared by The California Environmental Health Tracking Program

Los Angeles County: Median income in the most vulnerable areas is 40% lower than the least vulnerable areas



Prepared by The California Environmental Health Tracking Program

Highest levels CO₂ in at least 800,000 years

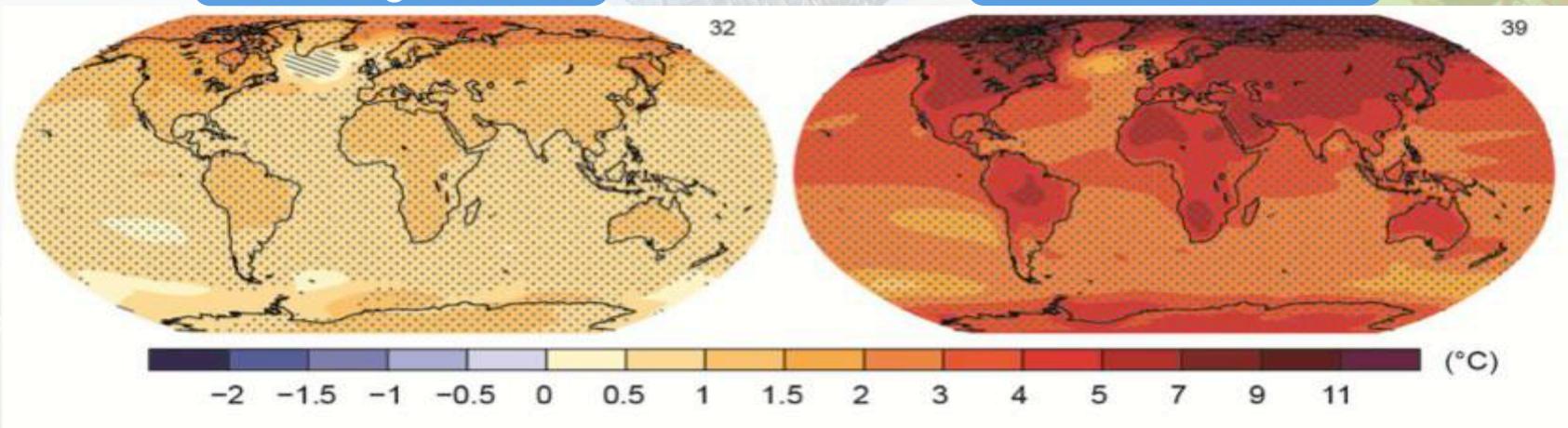


407.04 ppm
July 30, 2017

The Choices We Make Will Create Different Outcomes

With substantial mitigation

Without additional mitigation



Change in average surface temperature (1986–2005 to 2081–2100)

AR5 WGI SPM

The window for action is rapidly closing

65% of our carbon budget compatible with a 2°C goal already used



AR5 WGI SPM

POLICY RESPONSES FOR HEALTH

“Responding to climate change could be the **greatest global health opportunity** of the 21st century”

Nick Watts,
Lancet Commission



[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)60854-6/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60854-6/fulltext)



What are climate and health
co-benefits of mitigation?



Active Transportation and Transit

- ✓ Reductions in heart disease, stroke, diabetes, obesity, depression, osteoporosis, asthma, cancers, premature death
- ✓ Social cohesion
- ✓ Lower transportation costs
- ✓ Access to essential services



? DID YOU KNOW?

A Bay Area study showed that increasing average time using active transportation would reduce CVD and diabetes by 14%, along with reductions in dementia, colon and breast cancers and depression

Active Transportation Co-Benefits

ITHIM Preliminary Projections of Health Impacts of Increased Bicycling and Walking: 4 to 19 minutes of daily physical activity, SCAG Region

	Change in disease burden	Change in premature deaths/yr
Cardiovascular Dis.*	12% 	3,134
Diabetes	12% 	374
Depression	3% 	<2
Dementia	6% 	465
Breast cancer	3% 	60
Colon Cancer	3% 	75
Road traffic crashes	22% 	315

* Ischemic heart disease, stroke, hypertensive heart disease

Zero Emission Vehicles and Fuel Efficiency

- ✓ Reduces: asthma, CVD, premature death
- ✓ Lower transportation costs



? DID YOU KNOW?

In 2016, 30% of all US GHGE came from transport vehicles, mostly from passenger cars and light-duty trucks.

Clean Energy, Energy Efficiency

- ✓ Reduces: respiratory disease, cardiovascular disease, adverse birth outcomes
- ✓ Reduces fuel poverty
- ✓ Green Jobs



Photo: Michael Macor

? DID YOU KNOW?

The World Bank has stopped funding construction for new coal-fired power plans, rejecting the notion that coal energy is the answer to fuel poverty.

Sustainable Agriculture

- ✓ Reduces: heart disease, diabetes, obesity, cancers
- ✓ Reduces antibiotic resistance
- ✓ Increases food security
- ✓ Reduces pesticide illness



? DID YOU KNOW?

A massive 40% of food goes to waste each year in the U.S., accounting for 23% of methane emissions due to food waste decay in landfills.

Urban Greening and Green Infrastructure

Decreases:

- ✓ Heat illness
- ✓ Flood risk
- ✓ Air pollution

Increases:

- ✓ Physical activity
- ✓ Social cohesion
- ✓ Carbon capture
- ✓ Healthy foods
- ✓ Water capture/filtration



? DID YOU KNOW?

Surfaces shaded by trees and other plants can be 20-45° F cooler than unshaded surfaces!

Co-benefit solutions:

Healthy People, Healthy Places, Healthy Planet

- **Active Transportation and Public Transit**
 - Reduces heart disease diabetes, obesity and cancers
- **Clean Energy**
 - Reduces Respiratory disease, cardiovascular disease, adverse birth outcomes
- **Sustainable Agriculture**
 - Reduces food insecurity, heart disease, antibiotic resistance, pesticide exposure
- **Urban Greening**
 - Reduces heat illness, flood risk, air pollution,
 - Increases physical activity, carbon capture

What Can We Do Here?



Health professional voice is critical

- Health frame elicits support for climate action
- Health co-benefits and community empowerment
- Health workers are trusted, credible messengers in communities
- Health works in and with vulnerable communities
- Health voice has been critical – **in partnership with community advocates**

What Can Local Health Departments Do?

- Understand social and environmental vulnerability to climate change within your county, by neighborhood
- Communicate about climate vulnerability and the co-benefits of climate action – with your colleagues, community and policy-makers
- Use your health voice to support strong, healthy and equitable climate action (mitigation, adaptation, resilience)
- Climate, health and equity in all policies and programs

Climate Change and Health Learning Collaborative

12 urban Local Health Departments	\$30,000 over 18 months funded by the Kresge Foundation
Diverse project type and area of focus	<ul style="list-style-type: none">• Bimonthly consultation and webinars• Peer-to-peer training and resource sharing• Two in-person 2-day meetings

State, County, and City Health Department Climate and Health Learning Collaboratives and Capacity Building Grants, 2010-2016



N Maizlish - DRAFT 9/26/2016

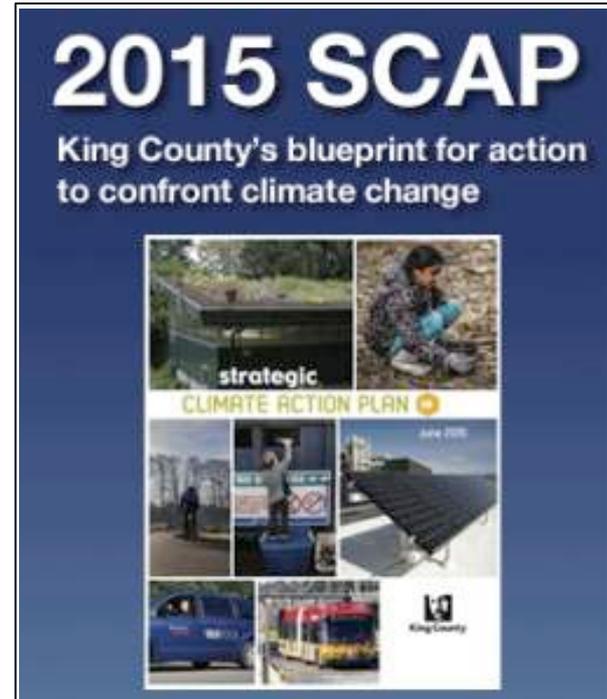


Broad Goals of the Learning Collaborative

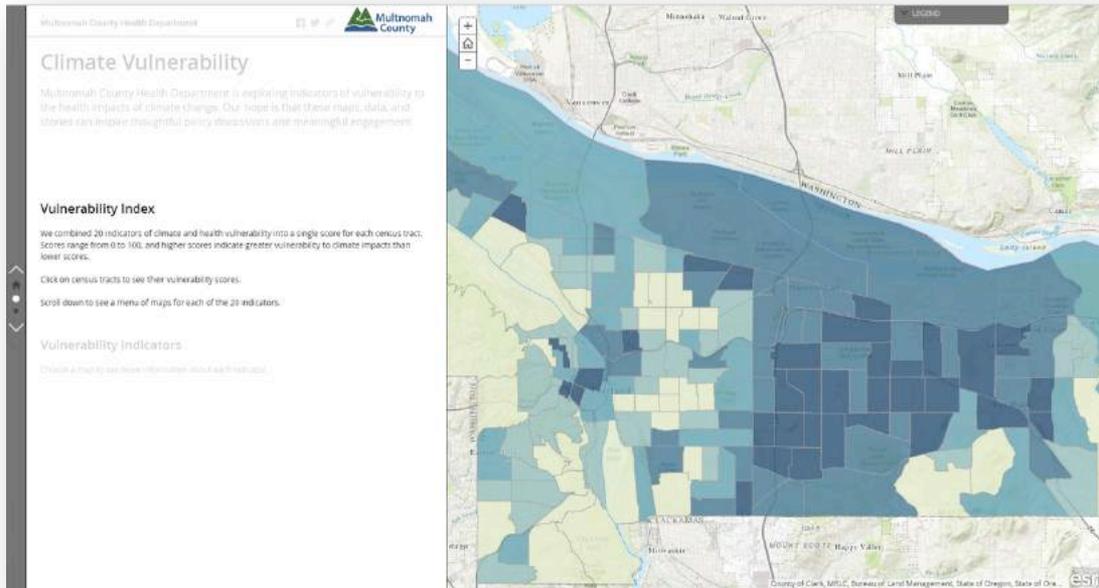
- Simultaneously address climate change, community health and vulnerable populations, and health equity
- Incorporate climate change into LHD program practice and/or enhance LHD participation in on-going local/regional climate change mitigation, adaptation and resilience work
- Support inter- and intra- departmental communication and collaboration around climate change and health
- Support community engagement

Seattle- King County Department of Public Health

- Climate Change, Health and Equity: A Blueprint for Public Health
- Development of a strategic plan- articulate role of PH in climate change and health
 - Leadership & employee interviews and surveys
 - Partner interviews & surveys
- Key Partners- County Administrator's Office of Sustainability, Public Health Department Executive Team



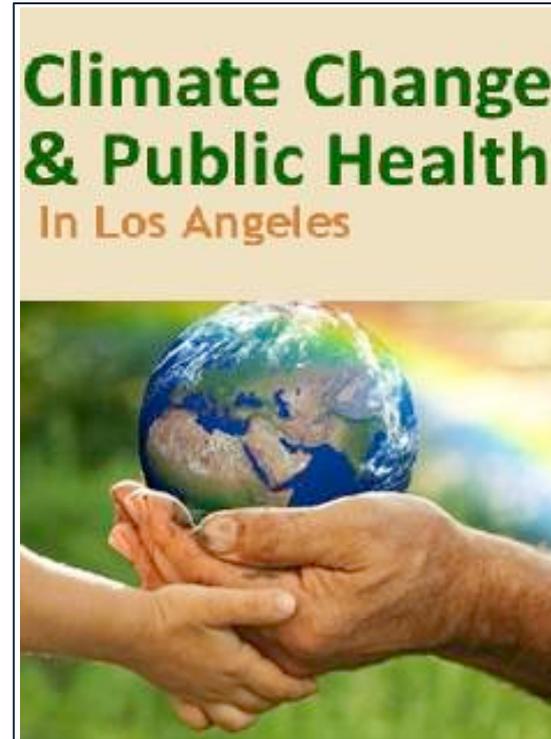
Multnomah Department of Public Health



- Community climate resilience: indicators for policy change
- Community engagement in developing resilience and equity indicators
 - Interactive vulnerability maps
- Key Partners- Coalition of Communities of Color

Los Angeles Department of Public Health

- Climate Change Strategic Planning Initiative
- Development of strategic plan that creates a self-sustaining work culture with the Department that will encourage, recognize, and organize climate change work
- Key Partners- Internal department divisions and program managers

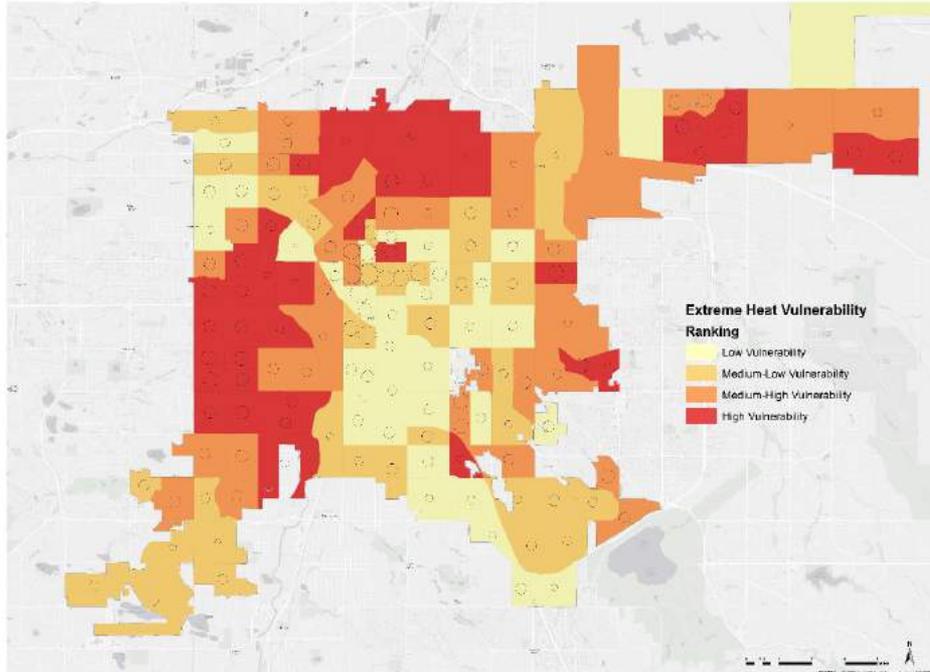


Maricopa Department of Public Health



- Assessing Heat Knowledge, Awareness and Services for Homebound Individuals
 - Survey of homebound individuals during heat season
- Bridging Climate Change & Public Health Initiative
 - Cross-sector effort to mitigate climate change
- Key partners- Area Agency on Aging and Arizona State University, National Weather Service, and others

Denver Department of Environmental Health



- Denver Neighborhood Climate and Health Vulnerability Project
- Conduct climate and health vulnerability assessment rooted in health equity in all policies framework
- Key Partners- city and county agencies

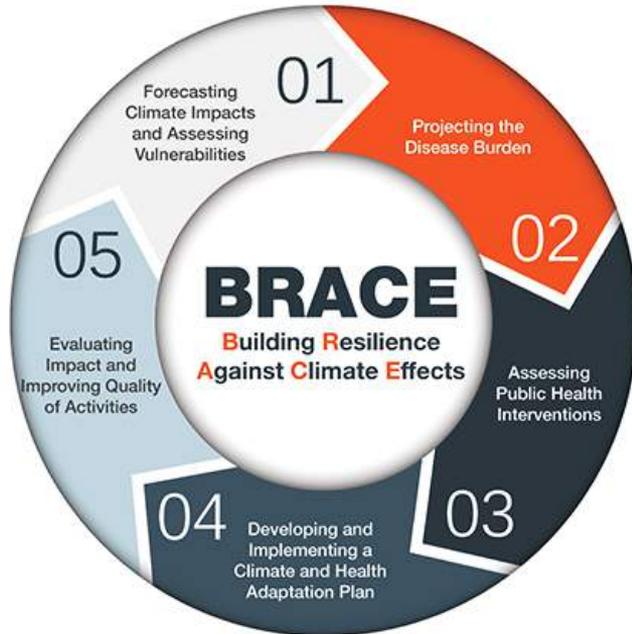
Tulsa Department of Health

- Vector Control- Building Climate Resilience
- Preparing for new climate challenges in vector control- vector-borne diseases, species distribution, range
- Key partners- State of Oklahoma Department of Health and Oklahoma City-County Health Department



New Orleans Department of Public Health

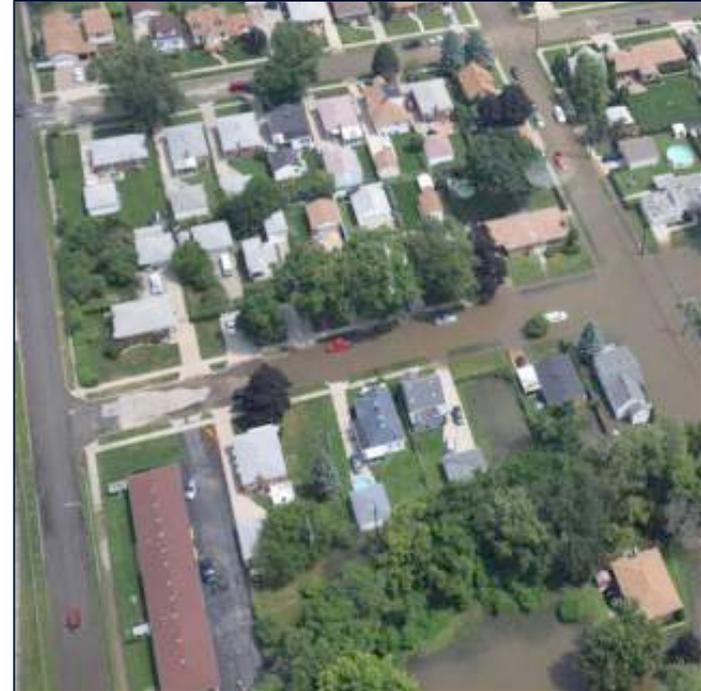
Building Resilience Against Climate Effects



- Climate Change and Health: A Rapid BRACE Assessment
- Conduct a community-wide climate vulnerability assessment, engage in community conversations, and develop informational materials
- Key partners- City Resilience Office, PH programs, Gulf Coast Center for Law & Policy, Louisiana Public Health Institute, among others

Macomb County Department of Public Health

- Building Climate Preparedness and Resilience
- Flood prevention and resilience in vulnerable communities
- Key partners- City of Warren, University of Michigan, Community Coalition, Green Macomb



Columbus Department of Public Health

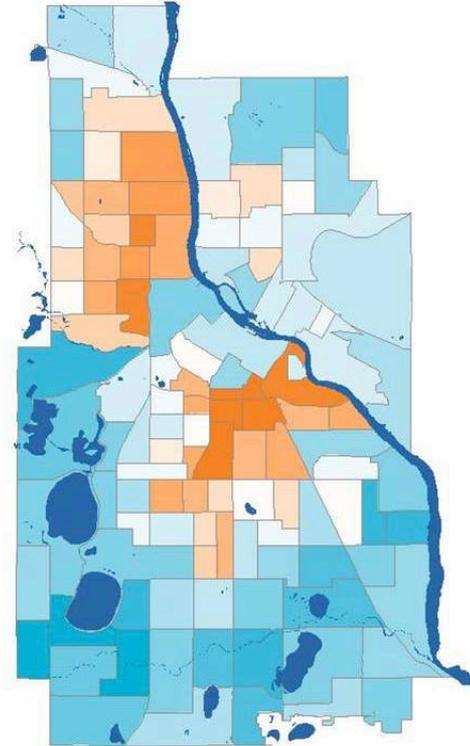


- Climate Change and Faith Communities
- Community education for climate action
- GreenSpot Schools
- Key partners- Columbus Office of Sustainability, Ohio Interfaith Power and Light

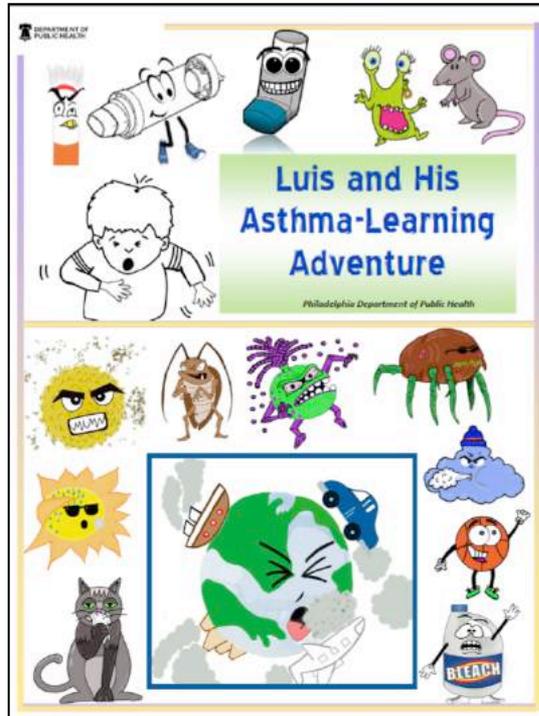
Minneapolis Department of Public Health

Overall social vulnerability scores

- Climate & health vulnerability assessment – heat, flooding, social vulnerability
- Community resilience workshops: Near-North, Phillips, Longfellow, Northeast
- Workshops to inform department planning and decision-making



Philadelphia Department of Public Health



- PDPH is using CDC's BRACE framework and Sustainability's climate projections to develop Climate Change and Health Adaptation Plan
- Extreme Heat Plan- enhancing existing resources, identifying other opportunities
- Public materials- climate change, asthma, and allergens calendar

Key Takeaways

- Local data
- Climate & health vulnerability assessments
- Strong community partners
- Community-driven solutions
- Inter- and intra- department engagement & collaboration



Additional Resources





A Physician's Guide to Climate Change, Health and Equity

September 2016

CLIMATE CHANGE & HEART HEALTH

What does climate change have to do with heart disease?

Climate pollution changes our climate and makes the world warmer.

Warmer temperatures lead to more air pollution, and more extreme heat.

Air pollution increases the risk of heart attacks.

Cars & trucks, industry and power plants all create climate and air pollution.

Extreme heat can lead to irregular heartbeat and stroke.

Who is most at risk? Older adults and those living alone • People with existing high blood pressure, diabetes, or obesity • People who smoke and people who drink too much • People who don't get enough exercise

You can take action today to make sure we have a healthy planet with healthy places for healthy people!

Take a walk 10-15 minutes walk, 3 times a day. If it's too hot or polluted outside.

If you're stuck, quit or see us as possible. Visit www.mindconnect.org

Talk to your doctor about staying safe and healthy on extreme heat days

Replace car trips with biking, walking, and public transit

Find food from your community energy efficient or buy clean energy, bio-based or solar

Eat more locally grown fruits and vegetables, eat less red meat and processed foods

Ask your state and local officials for:

- Farmer's markets and community gardens in your neighborhood
- Safe places to walk and bike
- More trees, parks and green spaces
- Clean energy, like wind and solar, in your community

Vote for elected leaders that will act on climate pollution

Join local efforts to fight climate pollution

To learn more and take action, visit: www.climatehealthconnect.org/takeaction

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CLIMATE CHANGE & YOUR FOOD

Making and delivering processed and non-local foods creates more climate pollution.

Climate pollution makes the world warmer and changes our climate.

Climate change makes food more expensive by hurting crops, animals and fish.

Cows raised for beef and dairy make methane gas—a climate pollutant—when they burp and fart.

When food prices rise, it's more tempting to buy cheep, processed, unhealthy foods.

Processed food high in sugars, salts and bad fats can increase obesity, diabetes and heart disease.

Red meat is high in bad fats and can increase the risk of heart disease.

Local fruits & vegetables are healthy food choices with important nutrients.

You can take action today to make sure we have a healthy planet with healthy places for healthy people!

Healthy YOU

- Eat more fruits and vegetables
- Eat less red meat and fewer processed foods

Healthy PLACES

- Find out how you can be energy efficient or buy clean energy, like wind or solar
- Shop local. Ask your local officials to bring farmer's markets and community gardens to your neighborhood
- Ask for farmer's markets to accept nutrition assistance, like WIC and SNAP/food stamps

Healthy PLANET

- Ask your local officials to move your community to clean energy now
- Vote for elected leaders that will act on climate pollution
- Join local efforts to fight climate pollution

To learn more and take action, visit: www.climatehealthconnect.org/takeaction

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Policy Resources

State Transportation Policy for Climate, Health, and Equity: A FACT SHEET FOR HEALTH PROFESSIONALS

Transportation offers access to important goods, services, and opportunities, but our current transportation system, which relies heavily on motor vehicles powered by petroleum-based fuels, comes with substantial costs to our health and to the environment. Some of these impacts include increased greenhouse gas emissions and air pollution, as well as injury and illness from motor vehicle collisions and more sedentary lifestyles. Significant reductions in illness and deaths can be achieved if we improve our transportation system. As a result, health professionals should have a prominent voice in transportation policy conversations.

Given ongoing policy gridlock at the federal level and the administration's rollback of federal efforts to address climate change, more attention is shifting to state legislatures as venues for healthy transportation policy. States can lead the way on transportation, but can also be venues for detrimental legislation.

To assist you in making your voice heard in transportation policy conversations at the state level, this fact sheet summarizes some of the more significant state transportation policies, offers key messages to use in advocating for state transportation policy, and points to additional resources and information for state transportation policy advocacy.

State Transportation Policy

State policies aimed at a healthier transportation system typically include efforts to reduce emissions from motor vehicles and reduce the number of vehicle miles traveled. Key strategies states use to achieve these goals generally center around advancing **public transit and other active transportation options** such as bicycling and walking, and promoting **cleaner vehicles**. While both strategies provide important health benefits, active transportation offers significant additional health benefits by increasing physical activity. These policy areas are discussed in more detail below, but first it is important to understand some of the basics of state transportation policy.

State Transportation Policy/Funding Basics

State transportation policy includes a web of funding, policy, and planning strategies involving all levels of government. Funding is particularly important because transportation infrastructure (roads, bridges, rail, etc.) requires large capital investment and ongoing maintenance.

States receive significant federal funding for transportation – in some cases accounting for a third or more of the state's transportation spending. In exchange, states must comply with many requirements. Some of the more significant requirements include developing a State Long-Range Transportation Plan (SLRP) identifying how the transportation system will meet the state's goals for a 20+ year planning horizon and developing a Statewide Transportation Improvement Program (STIP)

HEALTH PROFESSIONALS: YOUR VOICE MATTERS ON TRANSPORTATION POLICY

YOUR STORIES AND EXPERTISE ARE POWERFUL ADVOCACY TOOLS



YOUR VOICE IS
DEEPLY RESPECTED



YOU ARE A FRONTLINE
WITNESS OF THE IMPACTS
OF ENERGY POLICY



POLICYMAKERS VALUE
YOUR EXPERIENCE

WHY TRANSPORTATION?

Transportation offers access to important goods, services, and opportunities, but our current transportation system, powered by petroleum-based fuels, comes with substantial costs to our health and to the environment.

Healthy transportation policy can reduce greenhouse gas emissions and air pollution, as well as injury and illness. It can also address equitable access issues, in addition to providing numerous health co-benefits, such as those gained from increased physical activity through active public transportation.



Photo: AP

STATE POLICIES NEED YOUR VOICE

In today's ongoing policy gridlock at the federal level and the Administration's rollback of efforts to address climate change, state legislatures have the potential to lead the way—or halt progress—when it comes to transportation and climate change.

Health professionals' influential voices can SUPPORT policies that will improve our health and our climate and OPPOSE policies that will be detrimental to our health and our planet.





The US Climate and Health Alliance is a national network of health and public health practitioners dedicated to addressing the threats of climate change to health.

<http://usclimateandhealthalliance.org/>

Questions



Contact:

Savannah North

savannah.north@phi.org

<http://climatehealthconnect.org>



Center for
Climate Change & Health

