CDC Environmental Health Nexus

Climate Change and Human Health Webinar will begin at 1 p.m. ET
Climate Change and Human Health

Dr. Patrick Breysse, Ph.D., CIH
Director
National Center for Environmental Health (NCEH)/
Agency for Toxic Substances and Disease Registry (ATSDR)
Centers for Disease Control and Prevention
Video: How Climate Affects Community Health

https://www.youtube.com/watch?v=JywsWktvODc
What is Climate Change?

Solar radiation enters Earth's atmosphere

Greenhouse gases act like a blanket

Some solar radiation is reflected back into space

Solar radiation is trapped in Earth's atmosphere
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
- Forced migration, civil conflict, mental health impacts
- Respiratory allergies, asthma
- Extreme Heat
- Air Pollution
- Changes in Vector Ecology
- More Extreme Weather
- Increasing Allergens
- Rising Sea Levels
- Rising Temperatures
- Malnutrition, diarrheal disease
- Water and Food Supply Impacts
- Water Quality Impacts
- Cholera, cryptosporidiosis, campylobacter, leptospirosis, harmful algal blooms
- Environmental Degradation

*Animated*
CDC’s Climate and Health Program

- **Serve as a resource** for federal, state, local, and tribal health agencies
- **Prepare public health practitioners** to address the health effects of climate change
- **Provide tools, guides, and processes** to help assess vulnerability to possible health effects
- **Serve as a leader** in planning for public health effects of climate change
Climate Ready Tribes and Territories Initiative

- Partnership with the National Indian Health Board and the Association of State and Territorial Health Officials
- Since the first-year of funding in 2016, nine tribes and three territories have been funded
- Individual awards range from $5,000 to $80,000
- Three tribes currently funded
  - Lummi Nation
  - Pala Band of Mission Indians
  - Sitka Tribe of Alaska
Recent Executive Orders on Climate Change, Environmental Justice, and Health Equity

- **EO 14008** Tackling the Climate Crisis at Home and Abroad
- **EO 13990** Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis
- **EO 14013** Rebuilding and Enhancing Programs To Resettle Refugees and Planning for the Impact of Climate Change on Migration
- **EO 13985** Advancing Racial Equity and Support for Underserved Communities Through the Federal Government
Overview

- What determines climate vulnerability?
- How do specific climate threats vary by race and space?
- What is climate justice?
- How is CDC responding?
Climate change does not affect everyone equally.

Climate Vulnerability

Level of exposure to climate threats

Sensitivity

Capacity to adapt
Unequal Climate Vulnerability

Root Causes

- Racism, historical and current disenfranchisement, unequal distribution of power and resources rooted in institutions and processes

Environmental justice factors that may increase climate vulnerability

- Proximity and exposure to environmental stressors
- Unique exposure pathways
- Physical infrastructure, such as poor housing
- Multiple stressors, cumulative, and compounding impacts
- Capacity to participate in decision making

Unequal climate vulnerability

1) Adapted from Climate Change, Health and Equity: A Guide for Health Departments, Public Health Institute and American Public Health Association, 2018
2) Adapted from Guidance on Considering Environmental Justice During Development of Regulatory Actions, EPA, 2015
Snapshot of Today’s Climate Inequities

Urban Flooding

- Impacts low-lying areas with poor infrastructure
- Disproportionately affects low-income residents and people of color
- Further reduces capacity to adapt
Agriculture, Food Security, and Food Safety

- Native American and Alaskan Native communities are disproportionately affected
- High exposure to climate impacts but limited capacity to adapt
- Ability to fish, farm, and hunt
  - Diminishing crop yields and nutrition
  - Dangerous thawing permafrost
  - Increase of water toxins leading to contamination

A boy and his grandfather fish in Selawik, Alaska
Heat

- ~12,000 U.S. premature deaths annually\(^1\)
- Greater vulnerability for extreme heat risk among elderly, people of color
- Energy insecurity is common in U.S., but unequally distributed

1) Shindell et al, GeoHealth, 2020
History of Redlining: People of Color More Likely to Live in the Hottest Neighborhoods

Paved surfaces  Tree cover  Summer temperature

Environmental & Climate Justice

Fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policy (EPA)

Those who are least responsible for global warming bear the brunt of climate impacts
Three Key Strategies for the National Center for Environmental Health

01 Build expertise
Enhance the skills and expertise of our workforce

02 Shine a light on environmental injustice
Amplify community voices by sharing data that tell the story of environmental injustice

03 Partner to empower
Conduct strategic stakeholder engagement and develop pathways to involve communities and partners
Summary

- Climate vulnerability is a function of exposure, sensitivity, and capacity to adapt.
- Climate threats vary by race and space.
- Environmental and climate justice drive action.
HEALTH CO-BENEFITS OF CLIMATE MITIGATION

LCDR Heather Joseph, M.P.H.
Health Scientist, Climate and Health Program
Asthma and Community Health Branch
Division of Environmental Health Science and Practice
National Center for Environmental Health
Centers for Disease Control and Prevention
Overview

▪ Mitigation is the process by which a condition is made less severe
▪ Climate change mitigation: slow warming by reducing the accumulation of heat-trapping gases
▪ Can lead to near-term health opportunities: reduced air pollution, increased physical activity, and healthier diets
▪ Huge potential for achieving health equity, today and tomorrow
Where Do We Stand With Warming Projections Based on Global Emissions?

Source: Climate Action Tracker
https://climateactiontracker.org/global/
## What is the Difference Between 1.5 and 2.0°C Warming?

The difference will have big impacts on where we can safely live, farm, and fish.

<table>
<thead>
<tr>
<th>Category</th>
<th>1.5°C</th>
<th>2°C</th>
<th>2°C Impacts</th>
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</thead>
<tbody>
<tr>
<td><strong>Extreme Heat</strong></td>
<td></td>
<td></td>
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<tr>
<td>Global population exposed to severe heat at least once every five years</td>
<td>14%</td>
<td>37%</td>
<td>2.6x WORSE</td>
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<tr>
<td><strong>Ecosystems</strong></td>
<td></td>
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<tr>
<td>Amount of Earth's land area where ecosystems will shift to a new biome</td>
<td>7%</td>
<td>13%</td>
<td>1.86x WORSE</td>
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<tr>
<td><strong>Sea Level Rise</strong></td>
<td></td>
<td></td>
<td>.06m MORE</td>
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<tr>
<td>Amount of sea level rise by 2100</td>
<td>0.40 Meters</td>
<td>0.46 Meters</td>
<td></td>
</tr>
<tr>
<td><strong>Crop Yields</strong></td>
<td></td>
<td></td>
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<tr>
<td>Reduction in maize harvests in tropics</td>
<td>3%</td>
<td>7%</td>
<td>2.3x WORSE</td>
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<tr>
<td><strong>Fisheries</strong></td>
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<tr>
<td>Decline in marine fisheries</td>
<td>1.5 MILLION TONNES</td>
<td>3 MILLION TONNES</td>
<td>2x WORSE</td>
</tr>
</tbody>
</table>

Source: World Resources Institute, 2018
Global Green House Gasses: Current Emissions Sources and Natural Sinks

CURRENT SOURCES

-25% Electricity Production
-24% Food, Agriculture & Land Use
-21% Industry Transportation
-14% Buildings
-6% Other Energy-Related Emissions

CURRENT SINKS

-24% Land Sinks
-17% Coastal & Ocean Sinks

THE ATMOSPHERE

~59% Remains in the Atmosphere

Mitigation: Reduce Sources and Support Sinks

Reduce Sources

Support Sinks
Mitigation Leads to Multiple Health Co-Benefits

Benefits
- Mental health and social equity
- Clean air
- Physical activity
- Healthy diets

Actions
- Access to clean household energy
- Low carbon electricity
- Healthy transport
- Sustainable healthcare
- Reduced red and processed meat

Sectors
- Urban planning
- Power generation
- Transport
- Industry
- Healthcare
- Agriculture and forestry

Source: The Lancet Countdown
Burning and extracting fossil fuels harms people

8.7 million deaths worldwide annually due to fossil fuel air pollution¹

355k deaths in US annually¹

Black and Latinx people are exposed to 56% and 63% more pollution than they cause by their consumption²

¹) Vorha et al, Environmental Research, 2021, 2) Tessum et al, Proceedings of the National Academy of Sciences, 2019
Transitioning Away From Fossil Fuel Use for Energy Production Leads to U.S. Air Pollution Health Co-benefits

- Green house gas reductions would prevent 24,000 air pollution related deaths by 2050\(^1\)
- Air quality benefits offset costs of U.S. carbon policies\(^2\)
- Shutdown of 334 coal-fired electricity plants saved 22,563 lives\(^3\)
- Health equity impacts

Conclusion

- Urgent transformative changes are needed to slow warming
- Climate mitigation brings health co-benefits to local areas in short term, offsets transition costs, and helps achieve health equity
CLIMATE AND HEALTH ADAPTATION
PREPARING FOR AND RESPONDING TO THE HEALTH IMPACTS OF CLIMATE CHANGE

Claudia Brown, M.D.P.
Health Scientist, Climate and Health Program
Asthma and Community Health Branch
Division of Environmental Health Science and Practice
National Center for Environmental Health
Centers for Disease Control and Prevention
Focus on Health Equity and Vulnerability Assessment

Assessing Health Vulnerability to Climate Change: A Guide for Health Departments

Climate and Health Technical Report Series

Guidance for health departments to identify communities that will be disproportionately affected by climate change
Two Complementary Paths to Resilience

**Adaptation**
Manage the risks of climate change impacts

- Flood protection
- Managed retreat
- Upgrade infrastructure
- Disaster preparedness

**Mitigation**
Reduce emissions causing climate change

- Education
- Green urban
- Active transport
- Public health
- Sustainable agriculture
- Afforestation and reforestation
- Clean energy sources
- Carbon capture (CCS)
- Energy efficiency
- Sustainable agriculture
- Afforestation and reforestation
- Clean energy sources
- Carbon capture (CCS)
- Energy efficiency
Adaptation Plans Come in All Shapes and Sizes
Resources for Communities

Coastal Flooding, Climate Change, and Your Health
What You Can Do to Prepare

CLIMATE CHANGE and EXTREME HEAT
What You Can Do to Prepare

www.cdc.gov/climateandhealth/guidance.htm
ADAPTATION IN ACTION

Successes from the Climate-Ready States and Cities Initiative
How New York City is Addressing Extreme Heat

THE PROBLEM
Disadvantaged communities face increased risk of climate-related illness and death.

OUR SOLUTION
Be A Buddy was implemented to prepare residents and local organizations to check in on vulnerable residents.

LASTING IMPACT
Strengthened relationships between residents and local organizations to reduce vulnerabilities to extreme heat and other weather emergencies in four low-income communities

How Minnesota is Protecting Drinking Water

**THE PROBLEM**

Extreme rainfall can wash contaminants into drinking water resources. One in five Minnesotans use private wells and must maintain water quality themselves.

**OUR SOLUTION**

Assessed and found 22,000 private wells were in floodplains. Led to collaboration that improved and enhanced private well water testing.

**LASTING IMPACT**

This was the first time deliberate actions were taken to institutionalize climate knowledge into drinking water programs in the state and have established new and continuing collaborations.

https://www.health.state.mn.us/communities/environment/climate/index.html
How the Tribal Village of Wainwright is Preparing for Thinning Ice

**THE PROBLEM**
Recent warming as caused a thinning of ice that was previously stable for much of the spring and used for transportation by snow machines, creating hazardous travel conditions.

**OUR SOLUTION**
“InReach” devices implemented for emergency communication. Allows for emergency communication when snow mobiles get stuck in unseasonably thin ice.

**LASTING IMPACT**
Money saved due to reduction in helicopter rescues for ice emergencies and improved community awareness of hazards of unseasonably thin ice on travel.

Source: CDC

How Florida is Protecting Residents During Hurricane Season

**THE PROBLEM**

With increasing sea level rise and more intense hurricanes, Florida is more prone to flooding and will need to set up emergency shelters more readily and make them more accessible.

**OUR SOLUTION**

The Florida Department of Health conducted assessments of emergency shelters and made recommendations to clarify shelter roles and the resilience of communication systems.

**LASTING IMPACT**

Emergency shelters are better prepared to serve the most in need residents, particularly those with disabilities, and the partnership with FEMA and Red Cross is an established and ongoing collaboration.

Source: NASA

https://flbrace.org/
Four Strategies for Continued Success

- Educate public about the public health harms of climate change and what they can do
- Create early warning systems that help people prepare for climate-influenced events
- Contribute to public dialogue
- Enhance monitoring
- Research
- Inform stakeholders about climate-related health harms and how those harms will be experienced locally
- Use research to better understand health harms and effective responses
CLIMATE AND HEALTH COMMUNICATION

Eric Lahr, M.Sc.
Health Communication Specialist, Climate and Health Program
Asthma and Community Health Branch
Division of Environmental Health Science and Practice
National Center for Environmental Health
Centers for Disease Control and Prevention
Why is Climate and Health Communication Important?

- 72% of U.S. adults believe global warming is happening, but only 43% believe it will harm them personally.¹
- Effectively communicating climate and health impacts can increase this number by showing tangible and relatable ways people are vulnerable.
- Because climate communication needs vary by location, we must support local health officials in communicating with their communities about adaptation and mitigation.

¹ Marlon et al, 2020, Yale Climate Opinion Maps 2020 – Yale Program on Climate Change Communication
CLIMATE AND HEALTH COMMUNICATION RESOURCES
A six-webinar series designed to help state and local health departments effectively communicate about the health impacts of climate change in their communities.

Climate and Health Webinars | CDC
Social Media Toolkit

How Climate Affects Community Health

- Includes suggested post copy, shareable graphics, videos, and best practices
- Includes tips on using this content to engage audiences and boost the reach of messages

How Climate Affects Community Health: A Social Media Toolkit for Engaging Local Communities in Climate and Health Adaptation (cdc.gov)
Health Harm Cards

These eight health harm cards

- Provide simple information about health harms and the vulnerable populations associated with each
- Feature a case/success story from another community
- Useful for both stakeholders and the general public

CDC Health Harms Postcards
Climate and Community Health Infographic

Identifies community partners and the role each of them can play in addressing the public health impacts of a changing climate

Climate and Community Health (cdc.gov)
Communication Opportunities Going Forward

- New focus on mitigation and co-benefits.
- Opportunities to increase community involvement
  - As more people understand the health impacts of climate change and are empowered to take action individually and as a community.