



Cancer and Climate Change

January 14, 2025

A photograph of a tree where the left side is bare and the right side is lush green, symbolizing the impact of climate change. The ground in the foreground is cracked and dry, contrasting with the green grass on the right.

ACS Webinar for Cancer Coalitions

We acknowledge the Centers for Disease Control and Prevention, for its support of the American Cancer Society staff, and in the development and dissemination of this webinar, under cooperative agreement NU58DP007540 awarded to the American Cancer Society. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC.



January 14, 2025

Housekeeping

1

Today's webinar will be recorded. The link to view the recording will be shared with all who have registered.

2

If you have any issues during today's webinar or have any questions for our presenters, please use the chat.

3

To ensure that there are no disruptions during the presentation, all participants have been muted by the host.

4

We will have a Q&A portion at the end – so please put your questions in the chat.

Learning Objectives

1. **Describe** how climate change impacts cancer control efforts

2. **Learn** evidence-based Interventions which support climate and cancer control efforts



Help us understand our impact and improve future webinars and ACS CCC support by taking this quick poll.

Time for a quick poll!

Cancer and Climate Change



Leticia Nogueira, PhD, MPH

Scientific Director of Health Services Research
at the American Cancer Society



Gila Neta, PhD, MPP

Program Director with the Implementation
Science team in the Office of the Director in the
Division of Cancer Control and Population
Sciences (DCCPS) at the National Cancer
Institute (NCI)

Presenters

Climate Change and Comprehensive Cancer Control Plans

Leticia M. Nogueira, PhD MPH

Gila Neta, PhD MPP

Climate Change

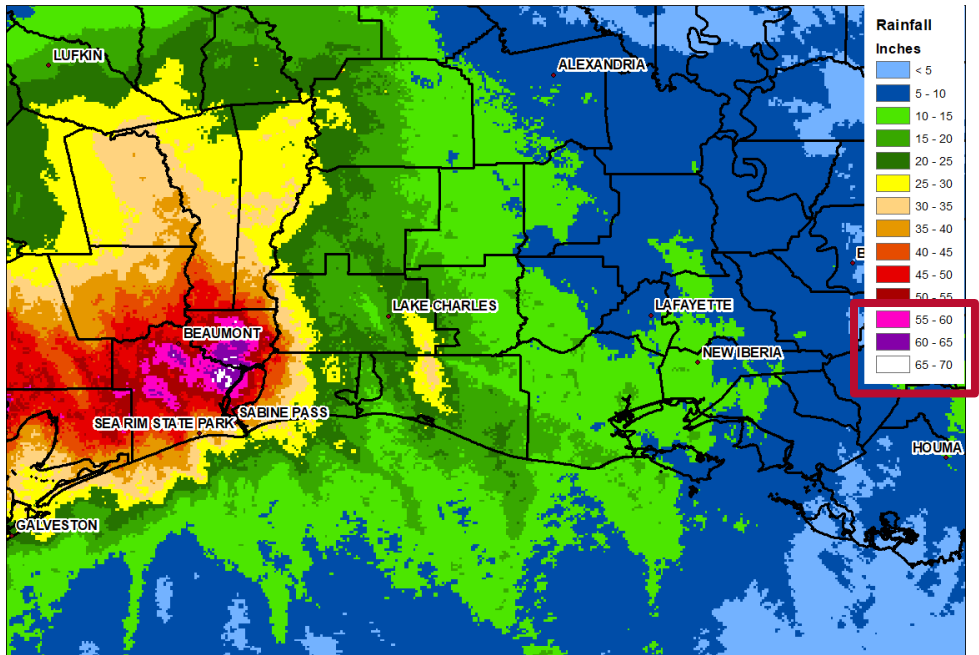
Alters the behavior of extreme weather events



Extreme Weather Events

Warmer air holds more water vapor, which increases the water capacity of hurricanes

Harvey Radar Derived Storm Total Rainfall



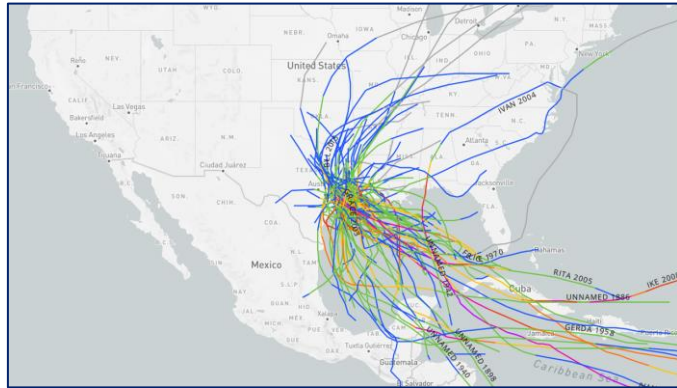
Rainfall over Houston during Hurricane Harvey
National Oceanic and Atmospheric Administration (NOAA)



Kossin JP. *A global slowdown of tropical-cyclone translation speed.* *Nature.* 2018;558:104-107
Emanuel K. *Assessing the present and future probability of Hurricane Harvey's rainfall.* *Proc Natl Acad Sci U S A.* 2017;114:12681-12684

Disruptions in Access to Care

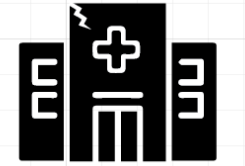
Climate-driven disasters



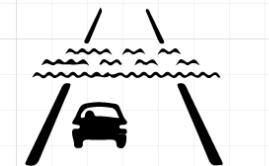
Historical Hurricane Paths, Houston TX
<https://coast.noaa.gov/hurricanes/#map=4/32/-80>



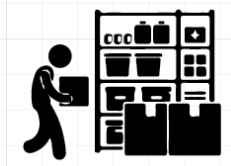
Extreme Weather Events



Medical Infrastructure



Transportation Links



Supply Chain



Hurricane Harvey

Changing frequency and behavior of extreme weather events makes it harder for communities to prepare and respond to increasingly unpredictable circumstances

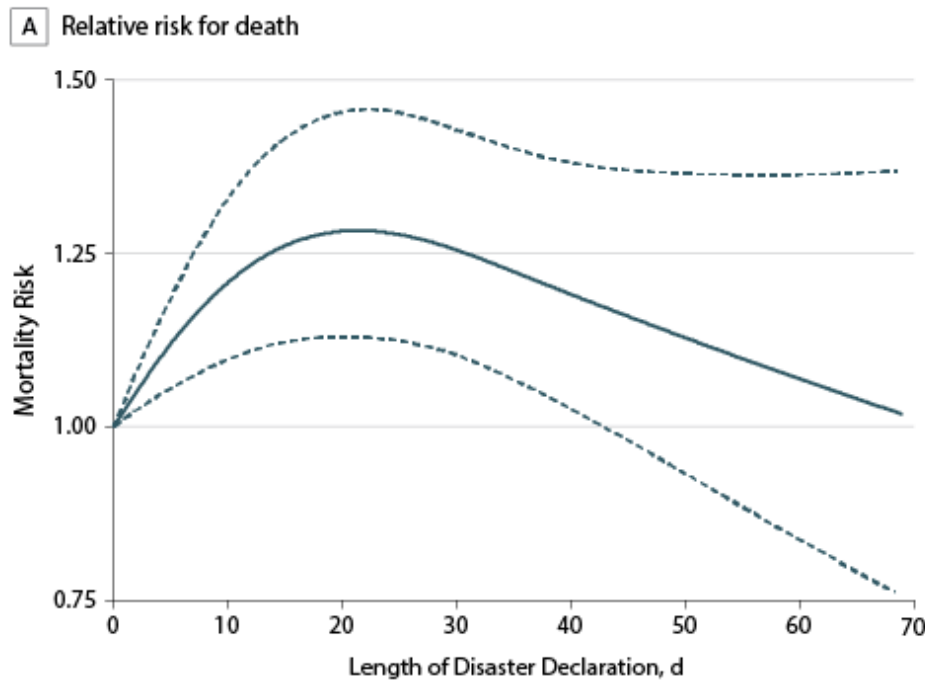


Especially concerning for medically vulnerable populations

Impact of Hurricanes on Cancer Patients

Disruptions in access to care and worse survival

Figure. Association Between Length of Hurricane Disaster Declaration and Risk of Death in Patients With Lung Cancer Undergoing Radiation



Climate-driven disasters disrupt access to potentially life-saving care



Impact of Hurricanes on Cancer Patients

Disruptions in access to cancer prevention and screening services

HUMAN VACCINES & IMMUNOTHERAPEUTICS
2021, VOL. 17, NO. 12, 5623–5627
<https://doi.org/10.1080/21645515.2021.2004809>



SHORT REPORT

OPEN ACCESS Check for updates

Effect of Hurricane Maria on HPV, Tdap, and meningococcal conjugate vaccination rates in Puerto Rico, 2015–2019

Vivian Colón-López ^{a,b}, Olga L. Díaz-Miranda^a, Diana T. Medina-Laabes^a, Roxana Soto-Abreu^a, Idamaris Vega-Jimenez^a, Ana P. Ortiz^{a,c}, and Erick L. Suárez^c

^aPuerto Rico Cancer Control and Population Sciences Division, University of Puerto Rico Comprehensive Cancer Center, San Juan, Puerto Rico;

^bDepartment of Health Services Administration, Graduate School of Public Health, University of Puerto Rico Medical Science Campus, San Juan, Puerto Rico; ^cDepartment of Biostatistics and Epidemiology, Graduate School of Public Health, University of Puerto Rico Medical Science Campus, San Juan, Puerto Rico

Disruption on HPV vaccination and cervical cancer screening

JAMA
Network | **Open**[™]



Research Letter | Public Health

Cervical Cancer Screening Among Medicaid Patients During Natural Disasters and the COVID-19 Pandemic in Puerto Rico, 2016 to 2020

Ana Patricia Ortiz, PhD, MPH; Axel Gierbolini-Bermúdez, MA; Jeslie M. Ramos-Cartagena, MS; Vivian Colón-López, PhD, MPH; Kalyani Sonawane, PhD; Ashish A. Deshmukh, PhD, MPH; Karen J. Ortiz-Ortiz, DrPH

Environmental Pollutants

Exposure to carcinogens



Houston Ship Channel



Arkema Chemical Plant



Houston, the self-declared oil capital of the world, has a high concentration of petrochemical infrastructure

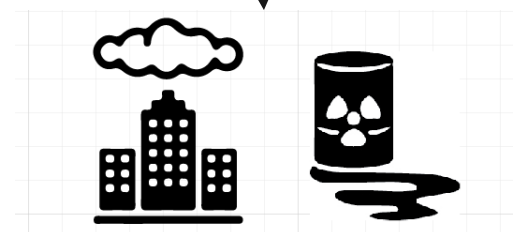


Climate Change



Extreme Weather Events

3.5 times more likely



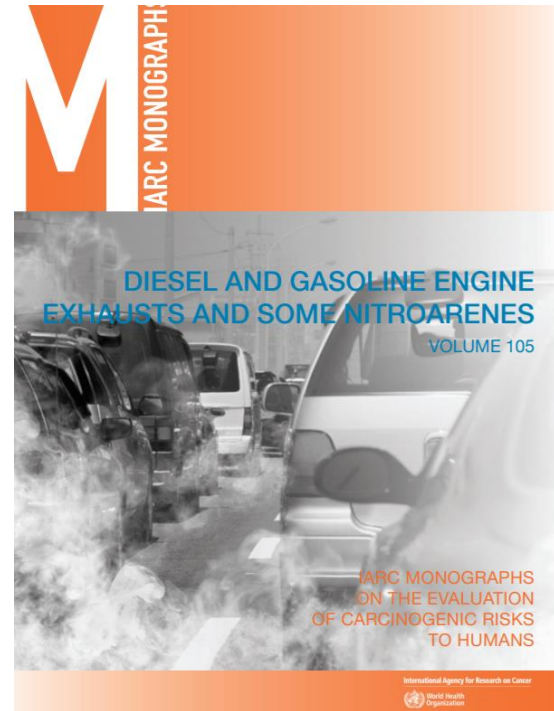
Hurricane Harvey flooded several chemical plants, oil refineries, and Superfund sites in Houston



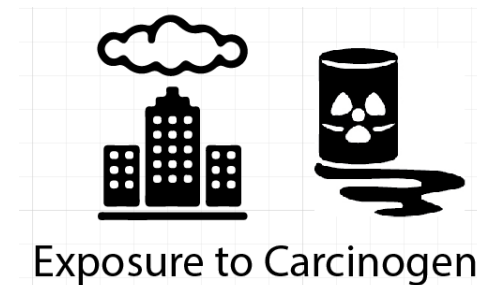
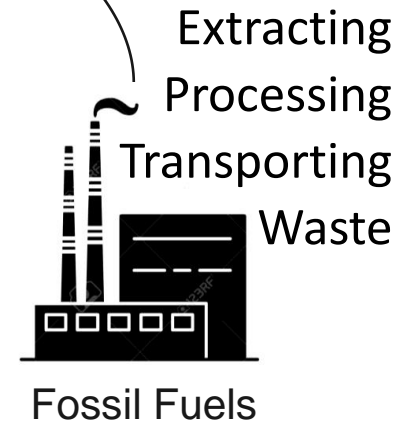
Risser MD, Wehner MF. *Attributable human-induced changes in the likelihood and magnitude of the observed extreme precipitation during hurricane Harvey.* Geophys Res Lett. 2017;44:12-457

Reliance on Fossil Fuels

Shared cause of climate change and rise in exposure to carcinogens



The same air pollution that is driving the greenhouse effect also increases lung cancer risk



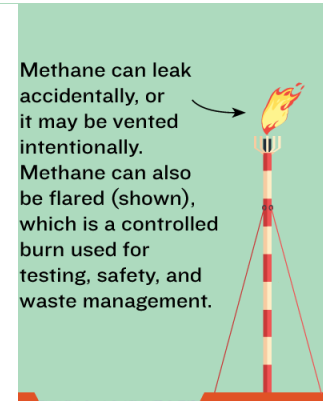
Natural Gas Extraction - Fracking

Carcinogens released during fossil fuel extraction

Formaldehyde

Benzene

Particulate matter

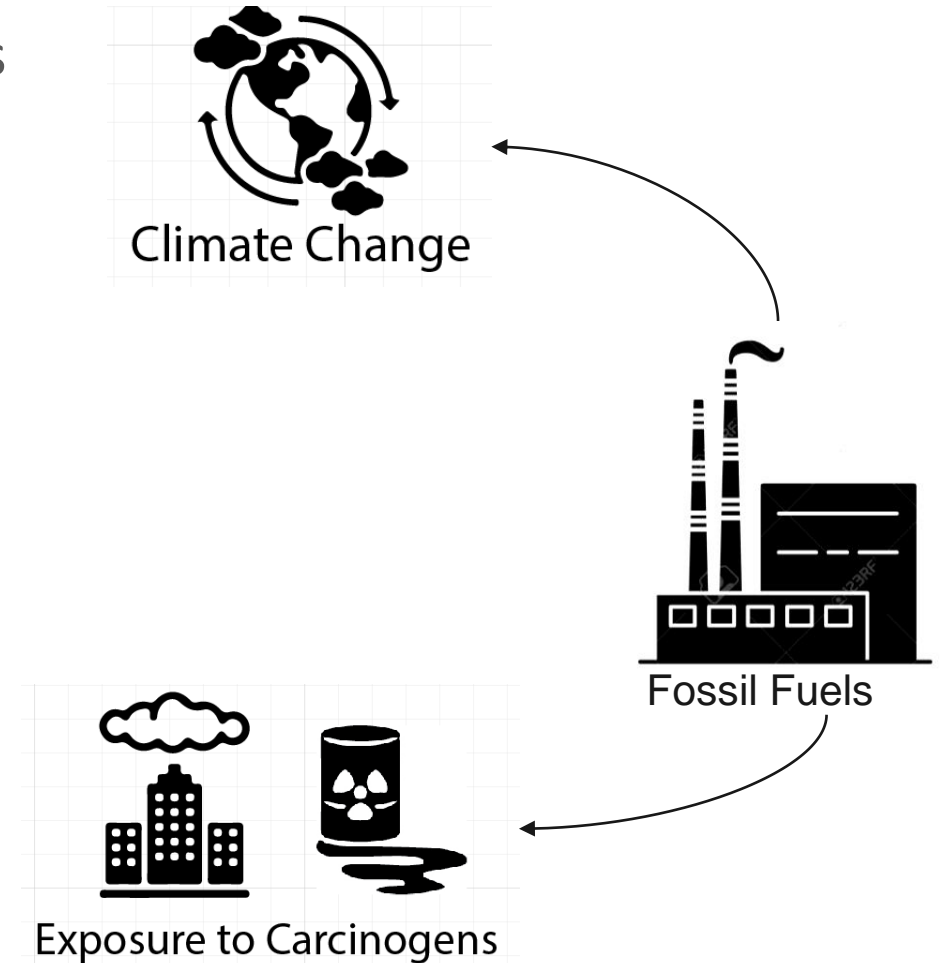


Reliance on Fossil Fuels

Shared cause of climate change and rise in carcinogens

1 | Extraction

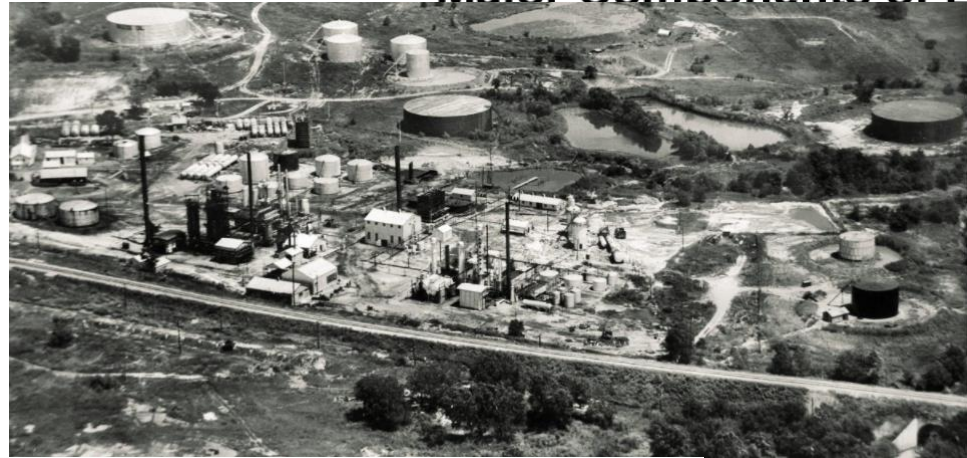
2 | Processing



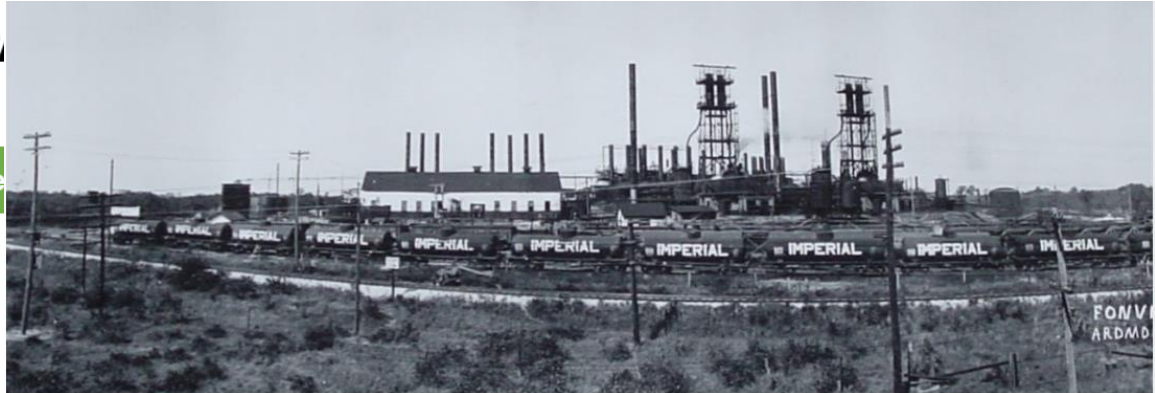
Superfund Sites

Fossil fuel processing contributes to increased exposure to carcinogens

Major Components of EPA



Wilcox Oil Company Superfund Site, OK



Imperial Refining Co. Superfund Site, OK (SI)

System Package (SPS)

(as necessary)

Priorities List (NPL)



Sinclair Refinery Superfund Site, NY



Texaco Refinery Superfund Site, IL

Fossil Fuel Processing

Oil refineries release carcinogens in communities

1 Extraction

2 Processing



Refineries in operation today release carcinogens in the air, water, and soil during processing of fossil fuels



Fossil Fuel Transportation

Carcinogens released during spills

- 1 Extraction
- 2 Processing
- 3 Transportation



East Palestine, Ohio train derailment



Climate Change

Vinyl chloride

Petrochemical used in plastic production

Group 1 carcinogen (IARC)



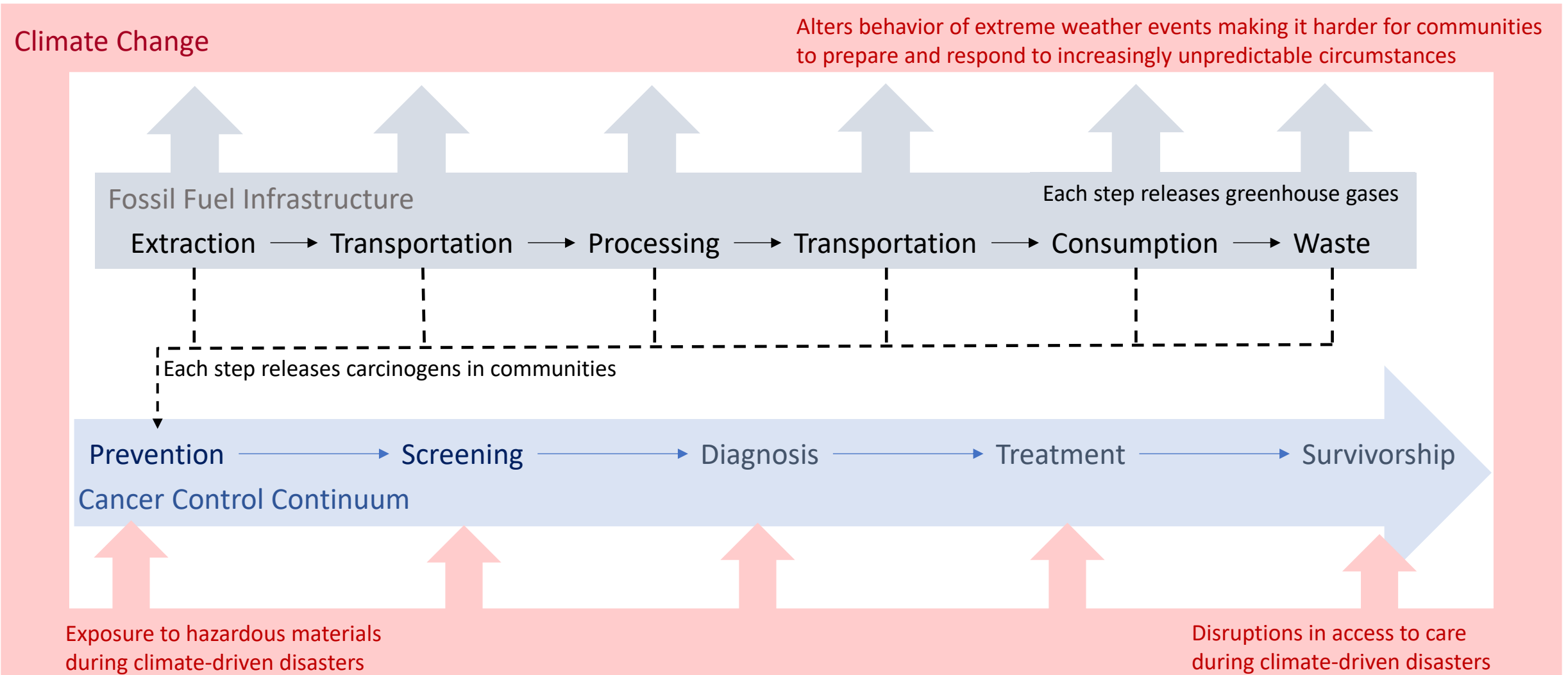
Fossil Fuels



Exposure to Carcinogens

Reliance on Fossil Fuel

Shared cause of climate change and rise in carcinogens



Health Hazards of Climate Change

Medically vulnerable populations

Consequences of cancer diagnosis and treatment

- Physical
- Psychological
- Socioeconomic

Individuals diagnosed with cancer are a vulnerable population to the health hazards of climate change

Individuals diagnosed with cancer

Vulnerable population to the health hazards of climate change

Physical consequences

- Organ Damage
- Weakened Immune System
- Anemia
- Fatigue
- Dehydration

Psychological consequences

- Depression
- Cognitive impairment



Increased sensitivity to climate change health hazards

- Some chemotherapy agents
 - Inhibit thermoregulation
 - Harder to regulate body temperature
 - Increase vulnerability to heat waves
 - Weaken immune system
 - Increase vulnerability to infections during floods
- Some cancers or cancer treatments
 - Cardiorespiratory issues
 - Increase vulnerability to wildfires

Wildfire Activity

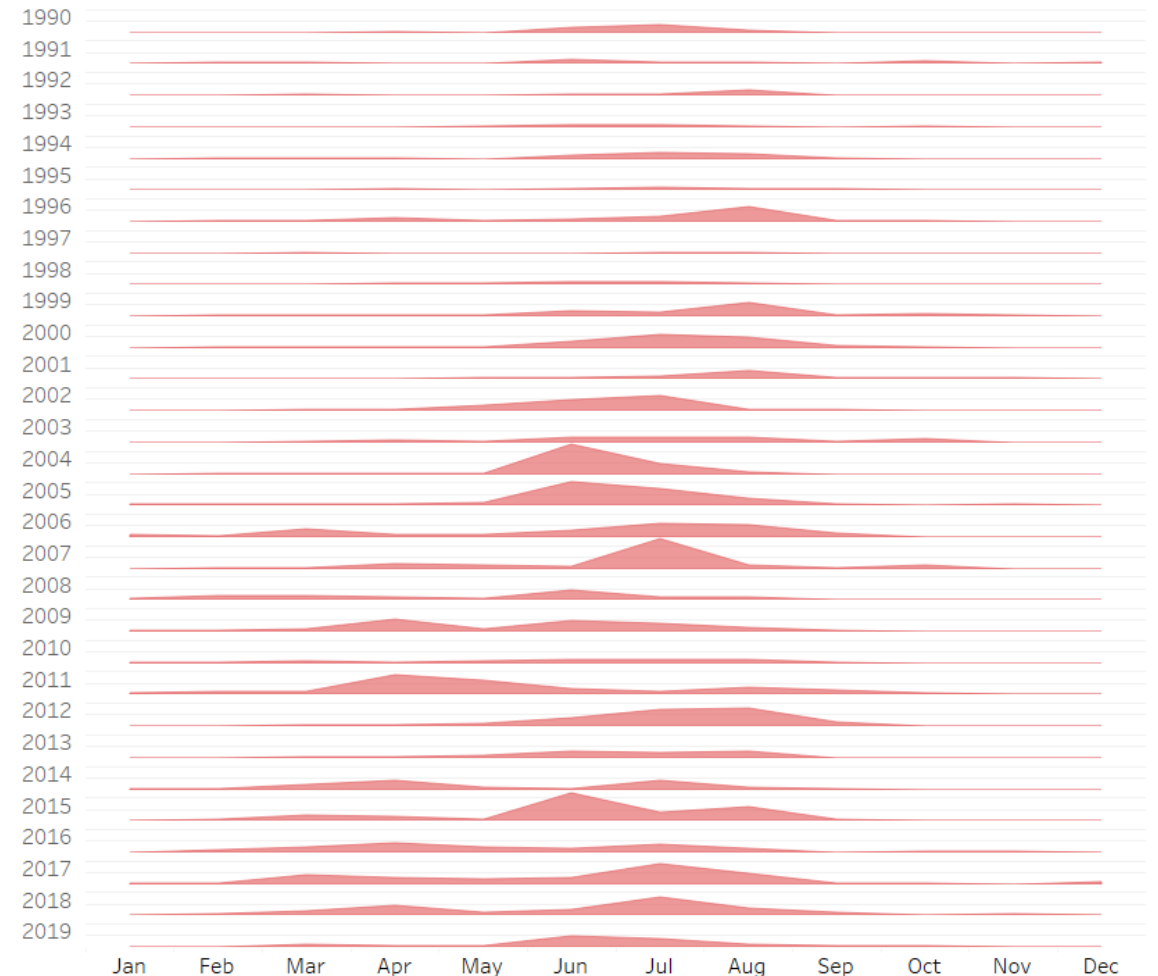
Closely tied to temperature and drought

Increase in wildfire activity in the US

- Area burned
- Number of large fires
- Fire season length

Schoennagel T, Balch JK, Brenkert-Smith H, et al. Adapt to more wildfire in western North American forests as climate changes. *Proceedings of the National Academy of Sciences of the United States of America*. 2017;114(18):4582-4590

Wildfires Since 1990



Wildfire Exposure and Lung Cancer Survival

Among individuals discharged from the hospital following lung cancer surgery



NASA HEALTH AND AIR QUALITY
APPLIED SCIENCES TEAM
Connecting NASA Data and Tools with Health and Air Quality Stakeholders



National Aeronautic and Space Agency (NASA)
<https://appliedsciences.nasa.gov/what-we-do/disasters/fires>

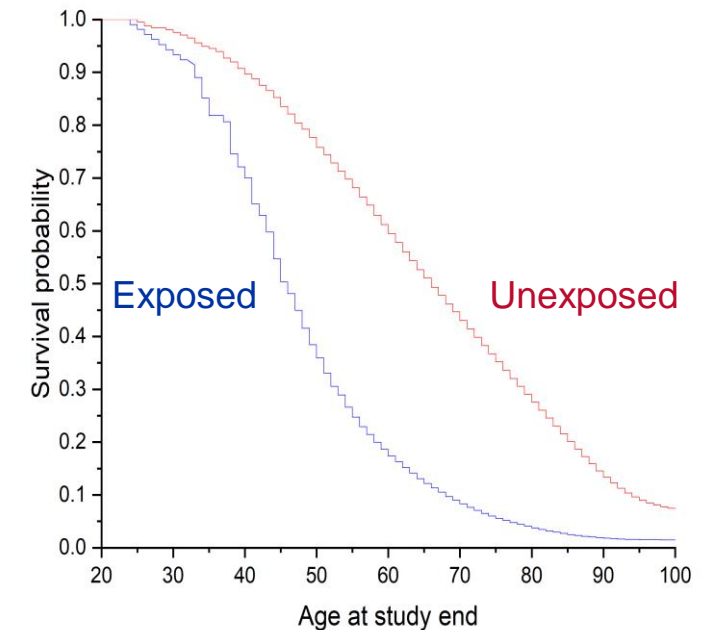
Exposure to wildfire goes beyond
inhaling wildfire smoke

Stress associated with potentially having to
evacuate, threat to property and life, water
and soil contamination



<https://pubmed.ncbi.nlm.nih.gov/33189165/>

Cancer patients are a vulnerable
population to climate hazards



Climate Change Impacts Across the Cancer Control Continuum

Climate change alters the frequency and behavior of extreme weather events



Climate Change

Wildfire smoke, chemical spills during floods

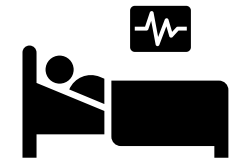


Extreme Weather Events



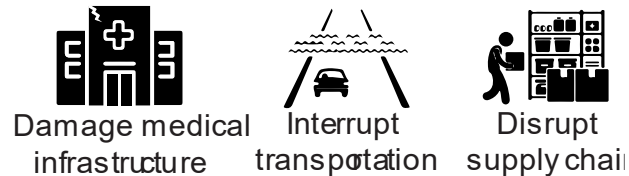
Exposure to toxic compounds

Cancer diagnosis and treatment can increase vulnerability to climate hazards



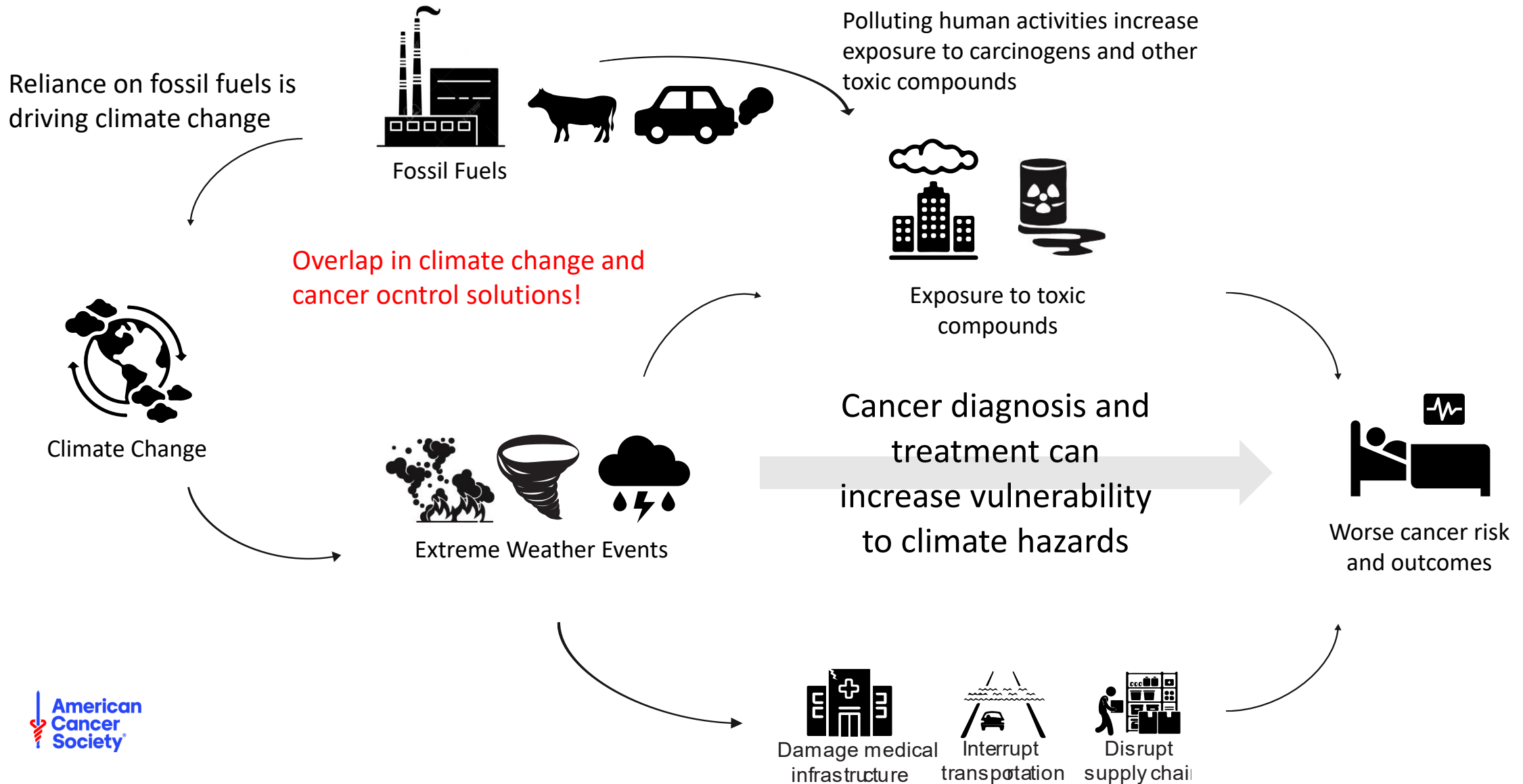
Worse cancer risk and outcomes

Harder for communities to prepare and respond to increasingly unpredictable circumstances



Disruptions in cancer care services

Climate Change Impacts Across the Cancer Control Continuum



Climate Change and Cancer Control

Overlap in solutions

ARTICLES

<https://doi.org/10.1038/s43016-021-00225-9>

nature
food

Check for updates

Food systems are responsible for a third of global anthropogenic GHG emissions

M. Crippa¹, E. Solazzo¹, D. Guizzardi¹, F. Monforti-Ferrario¹, F. N. Tubiello² and A. Leip¹

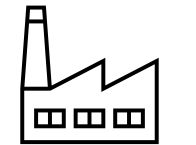
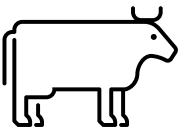
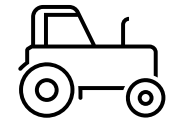
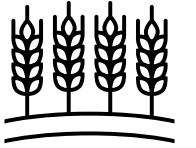
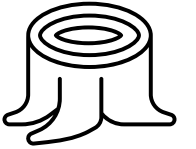
Environmentally Responsible Food

- Manufacture
- Shipment
- Waste

Meat from ruminants

High environmental impact

- Production of feed
- Processing
- Transport
- Methane emissions by ruminants
- Feedlot and slaughterhouse practices
- Antibiotic and Pesticide Use
- Waste



Climate Change and Cancer Control

Overlap in solutions

Environmentally Responsible Food

- Manufacture
- Shipment
- Waste

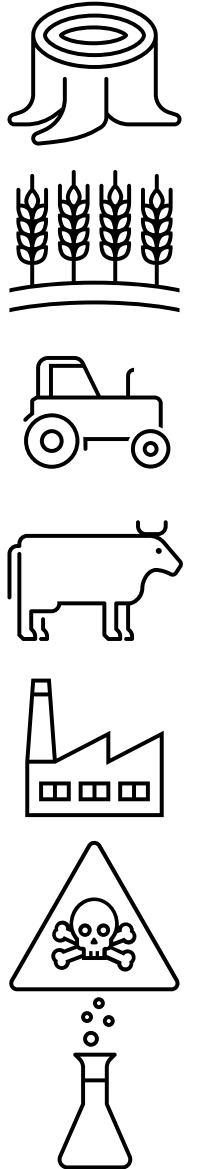
Strategies aimed at reducing reliance on the industrialized food system have climate and cancer control co-benefits



industrialization

High environmental impact

- Land clearing
- Monocultures
- Heavy machinery
- Processing
- Packaging
- Herbicides, pesticides, fertilizers
- Additives



Climate Change and Cancer

Overlap between solutions



National Comprehensive Cancer Control Program (NCCCP)

Research Letter

May 30, 2024

Climate Change in Comprehensive Cancer Control Plans in the US

Leticia M. Nogueira, PhD¹; A. Julia Ross²; Heather D'Angelo, PhD³; Gila Neta, PhD³

[» Author Affiliations](#) | [Article Information](#)

JAMA Oncol. 2024;10(7):977-979. doi:10.1001/jamaoncol.2024.1294

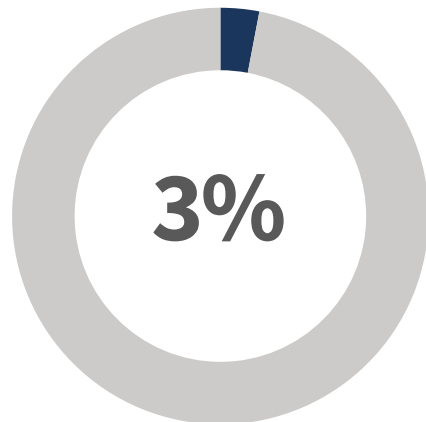
The Centers for Disease Control and Prevention (CDC) National Comprehensive Cancer Control Program (NCCCP) funds cancer coalitions in US states, territories, and tribal health organizations to design and implement comprehensive cancer control plans (henceforth, plans).¹ Several recommended cancer control strategies are also relevant to climate change mitigation and adaptation efforts.

Climate Change and Cancer

Overlap between solutions



National Comprehensive Cancer Control Program (NCCCP)



Alaska Tribal Health System



Illinois

“Today, due to **climate change**, the risk of exposure is increasing as glacier ice melts releasing pollutants that have accumulated for decades.”

“Advocate for enforcement of U.S. Environmental Protection Agency (EPA) rules to reduce air pollution and to address **climate change** to increase the use of renewable energy sources.”

Climate Change and Cancer

Overlap between solutions



National Comprehensive Cancer Control Program (NCCCP)

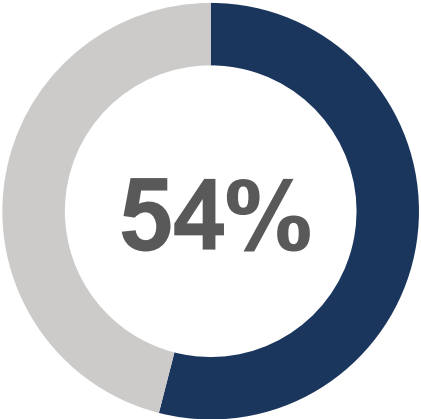
Climate-relevant Cancer Control Strategies:

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- Prepare for disasters to limit disruptions to cancer care
- Foster active transportation to increase physical activity and reduce emissions
- Support healthy eating and reduce reliance on industrialized food systems

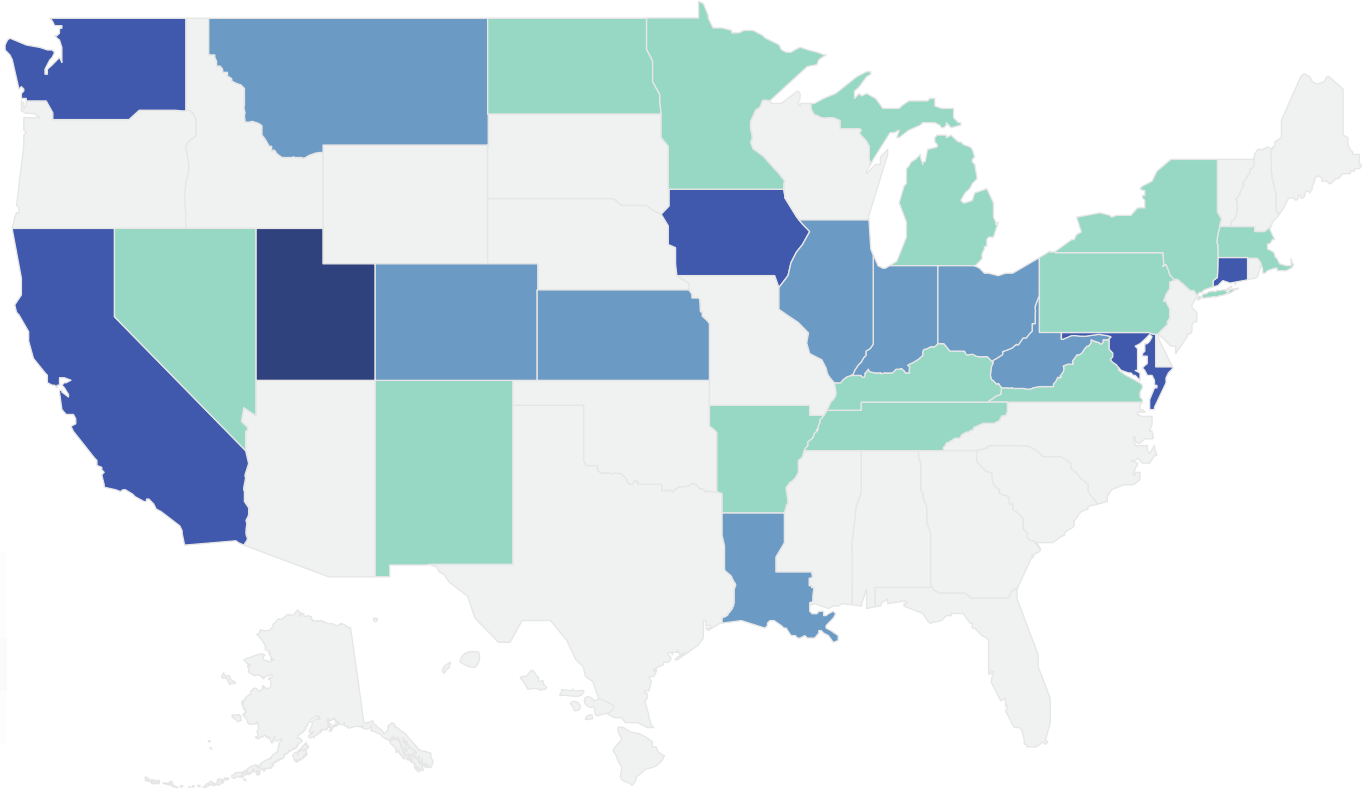
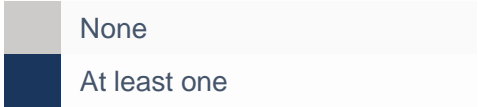
Climate Change and Cancer

Overlap between solutions

Number of climate-relevant strategies mentioned in each Comprehensive Cancer Control Plan



Percent of CCCPs with indirect mention of climate change



Number of climate-relevant strategies mentioned



American Indian Cancer Foundation

District of Columbia

Federated States of Micronesia

Northern Mariana Island

Northwest Portland Area Indian Health Board

Puerto Rico

Republic of the Marshall Islands

South Puget Intertribal Planning Agency

Alaska Tribal Health System

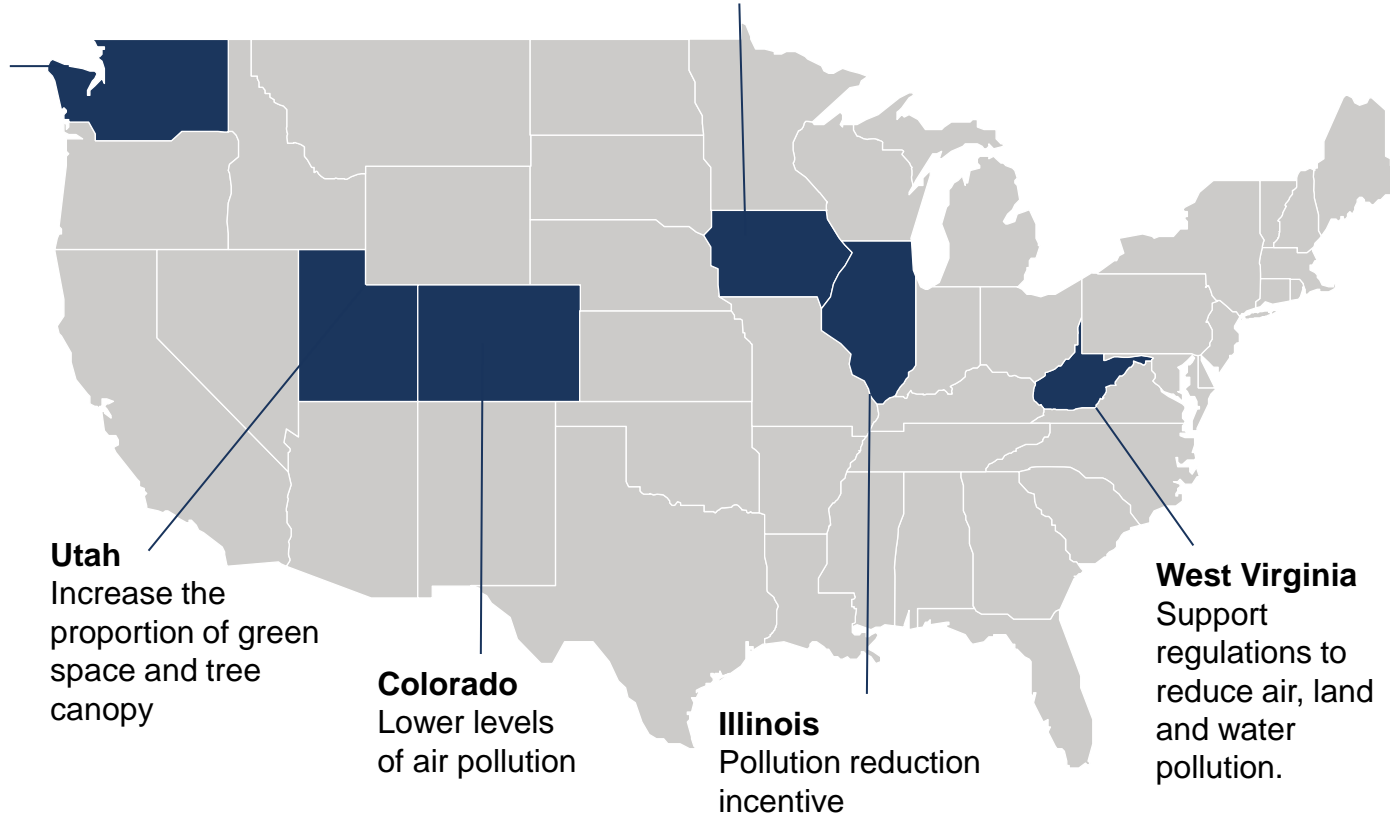


Climate Change and Cancer Solutions

Reduce exposure to pollution

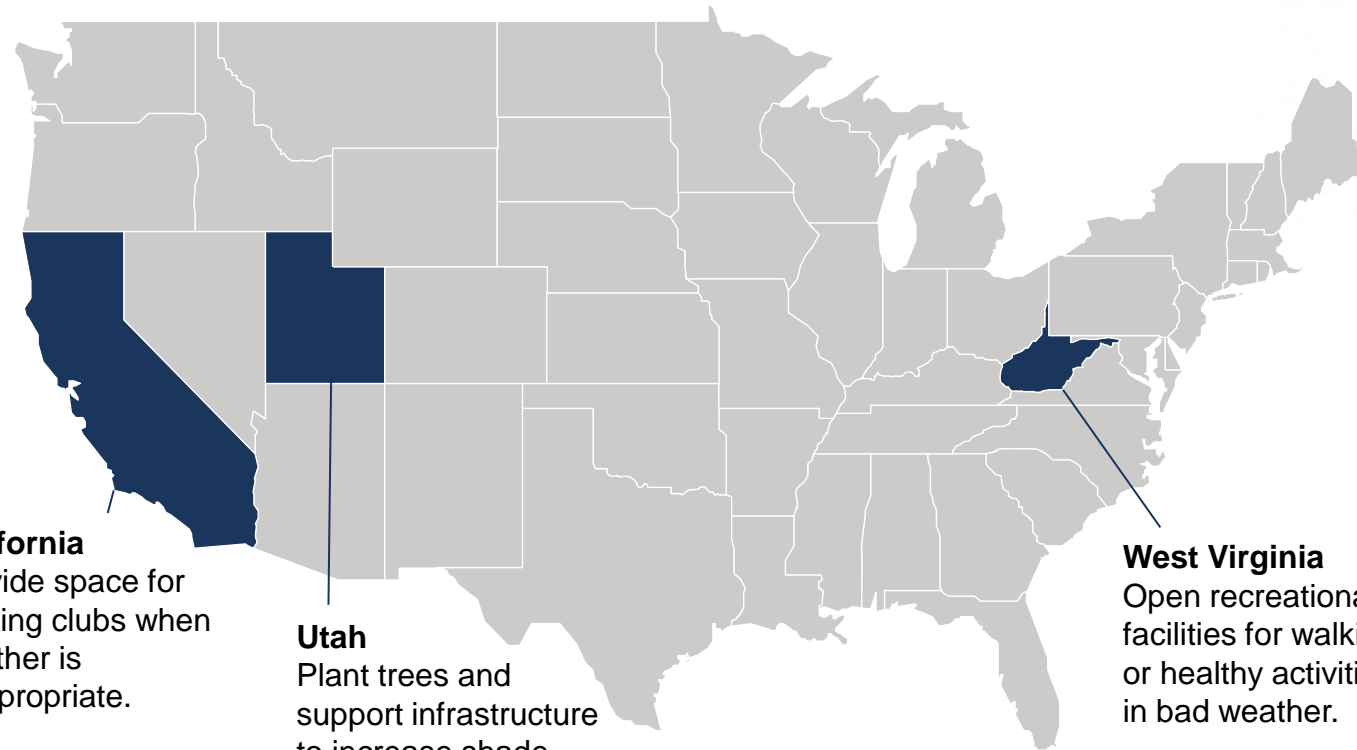
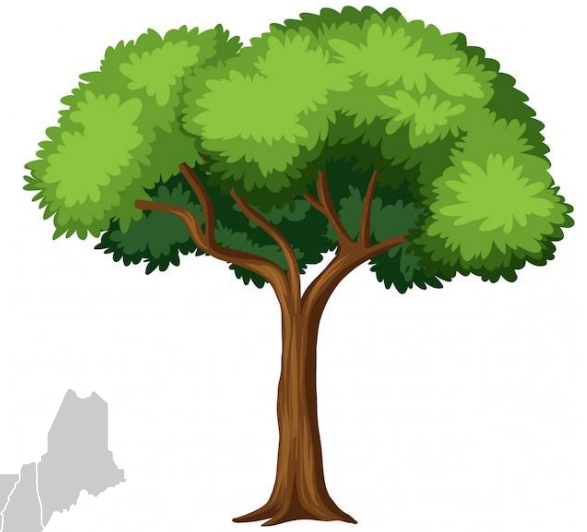
Washington
Reduce diesel emission

Iowa
Reduce hazardous air pollution



Climate Change and Cancer Solutions

Cancer preventive behaviors during extreme weather events



California
Provide space for walking clubs when weather is inappropriate.

Utah
Plant trees and support infrastructure to increase shade availability

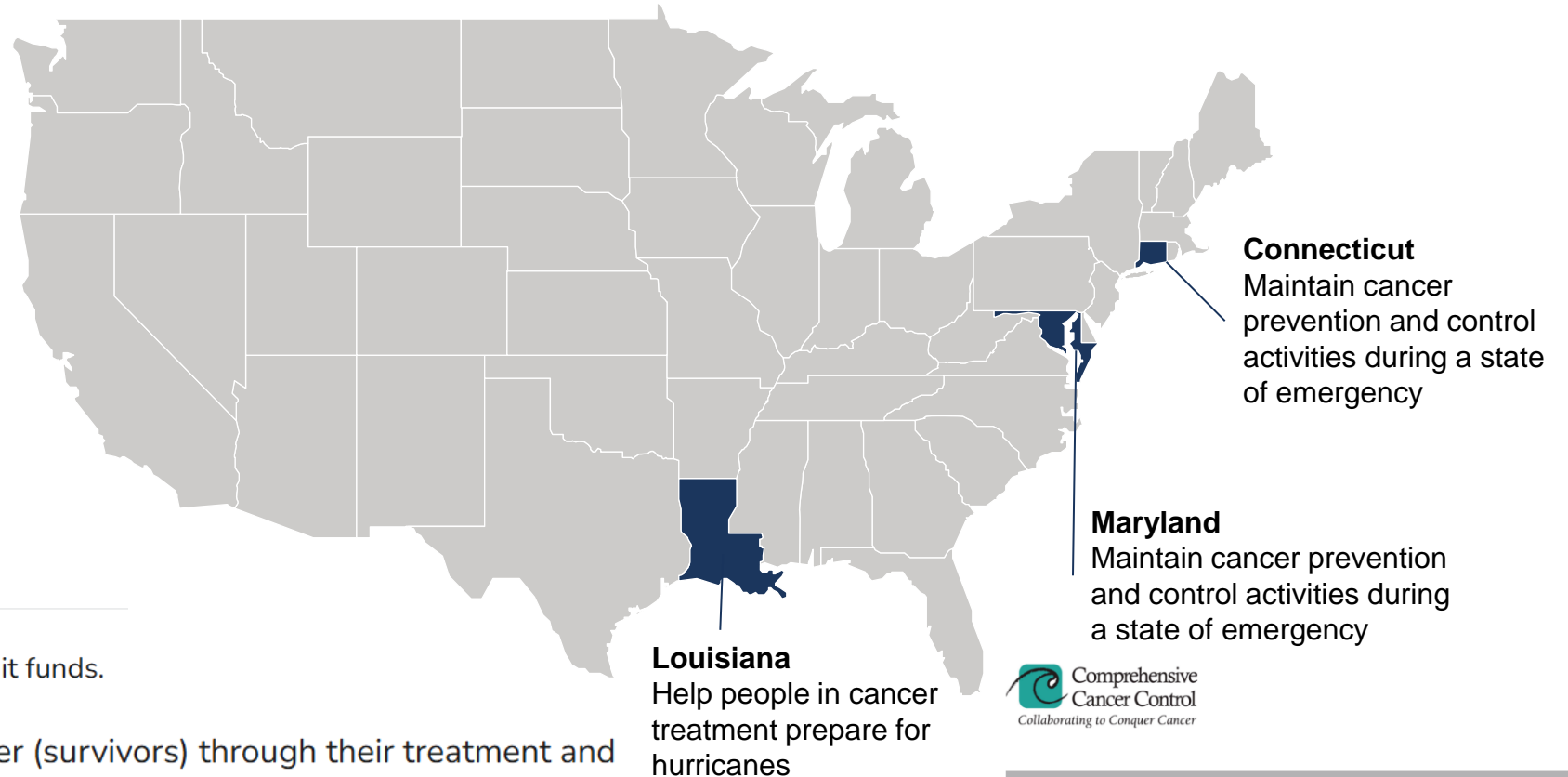
West Virginia
Open recreational facilities for walking or healthy activities in bad weather.

Putting priorities into action

- 84% of programs stress lowering cancer risk by eliminating tobacco use, encouraging people to be physically active and eat healthy, and protecting people from skin-damaging ultraviolet light from the sun or indoor tanning.

Climate Change and Cancer Solutions

Disaster Preparedness



Priorities

CDC has six priorities for the CCC programs it funds.

3. Support people diagnosed with cancer (survivors) through their treatment and beyond. Comprehensive cancer control programs assess survivors' needs, provide education programs and patient navigation systems, and improve access to cancer resources and services.

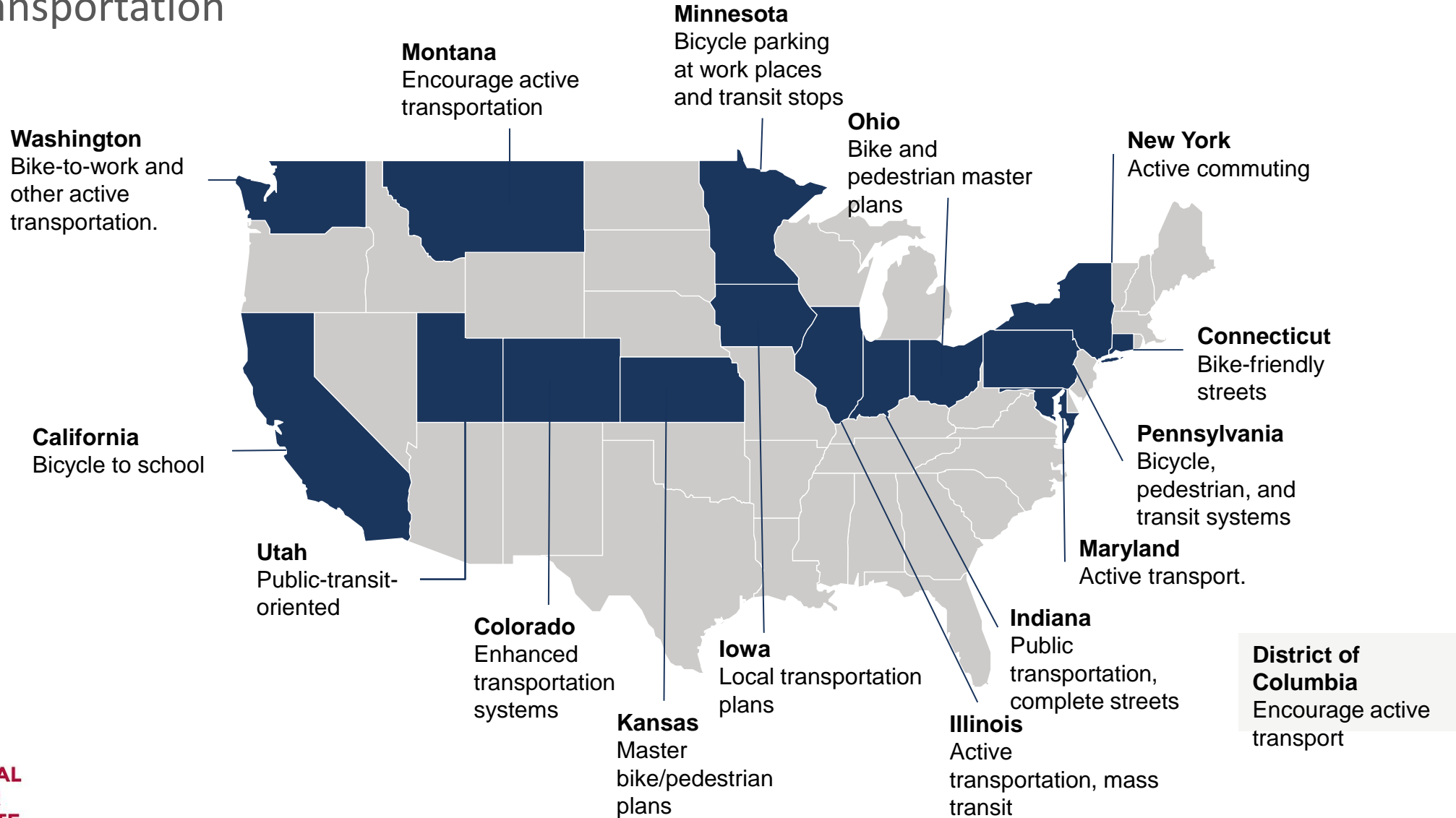
COMPREHENSIVE
CANCER CONTROL PLAN

EMERGENCY PREPAREDNESS

TIP SHEET

Climate Change and Cancer Solutions

Active transportation



E. Food System

Washington

Increase sustainable community gardens in underserved areas.

Northwest Portland Area Indian Health Board

Traditional and subsistence foods

Federated States of Micronesia

Let Local Food Be Your Medicine

California

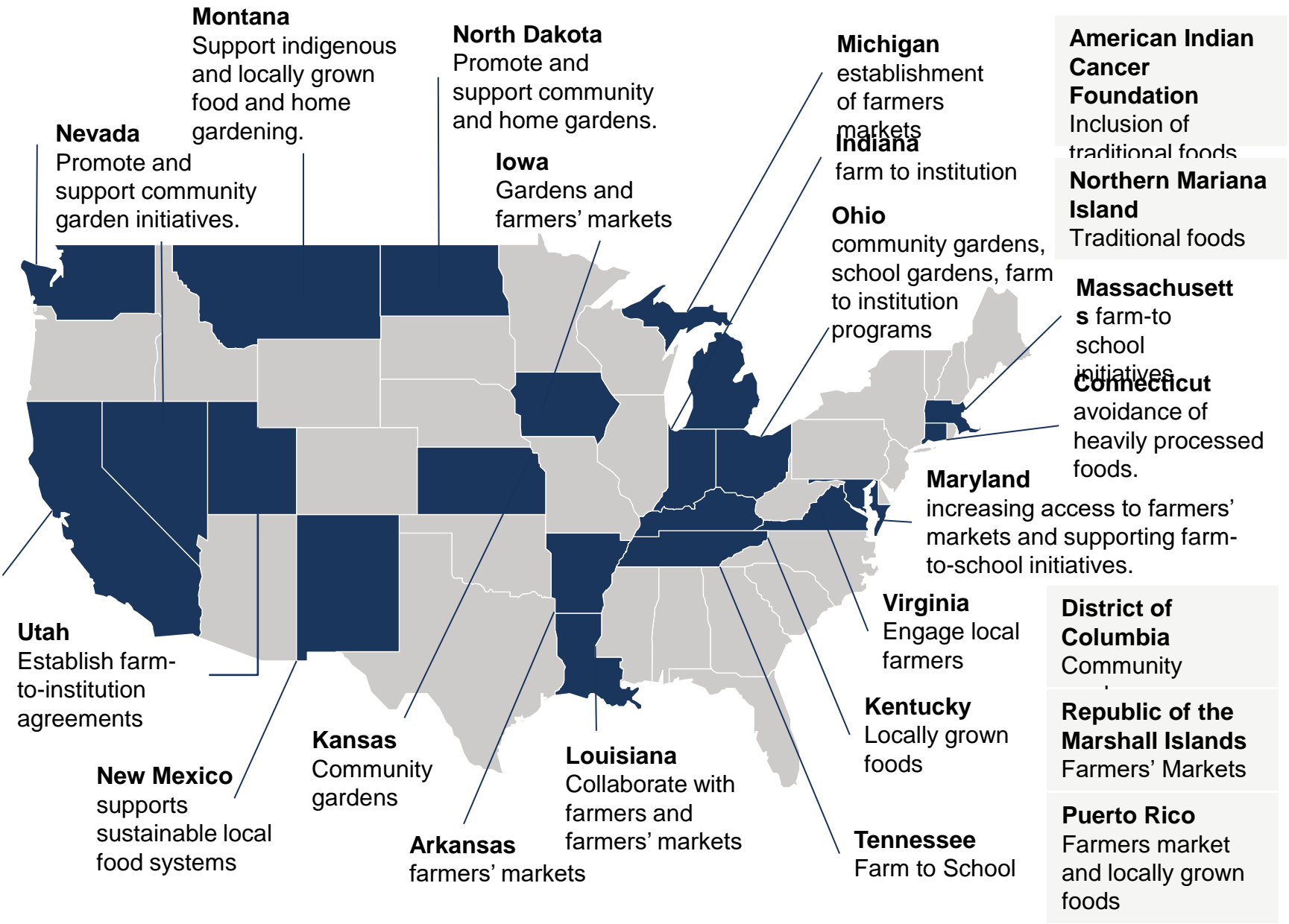
minimally processed foods

Alaska Tribal Health System

Inclusion of traditional foods

South Puget Intertribal Planning Agency

Traditional and tribal gardens



Thank You

Learning Objectives

- Recognize at least one way in which climate change impacts cancer control efforts

Pre and Post Questions

1. Does climate change impact cancer control efforts?
 - a. Just prevention
 - b. Just treatment
 - c. Just survival
 - d. All of the above
 - e. None of the above

Learning Objectives

- Learn evidence based interventions that support cancer and climate efforts

Pre and Post Questions

1. Which of the following evidence-based interventions support climate and cancer control efforts? Select all that apply:
 - a. Emergency preparedness plans
 - b. Lower levels of air pollution
 - c. Incentivize active transportation
 - d. Community gardens and farmers markets
 - e. None of the above

Climate Change and Comprehensive Cancer Control Plans

Leticia M. Nogueira, PhD MPH

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Climate Change and Cancer

Overlap between solutions



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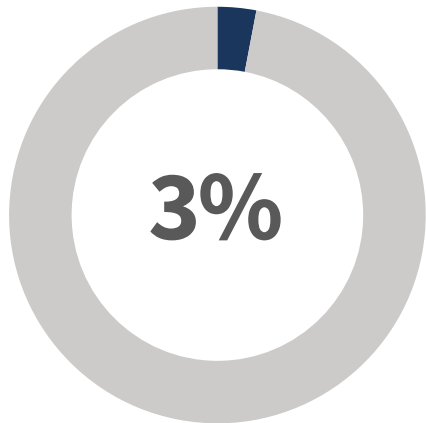
Climate Change and Cancer

Overlap between solutions



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

National Comprehensive Cancer Control Program (NCCCP)



Alaska Tribal Health System



Illinois



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Climate Change and Cancer

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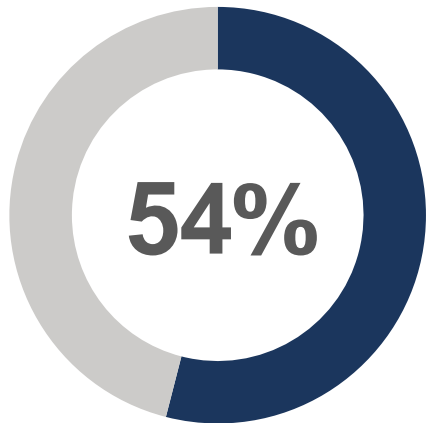
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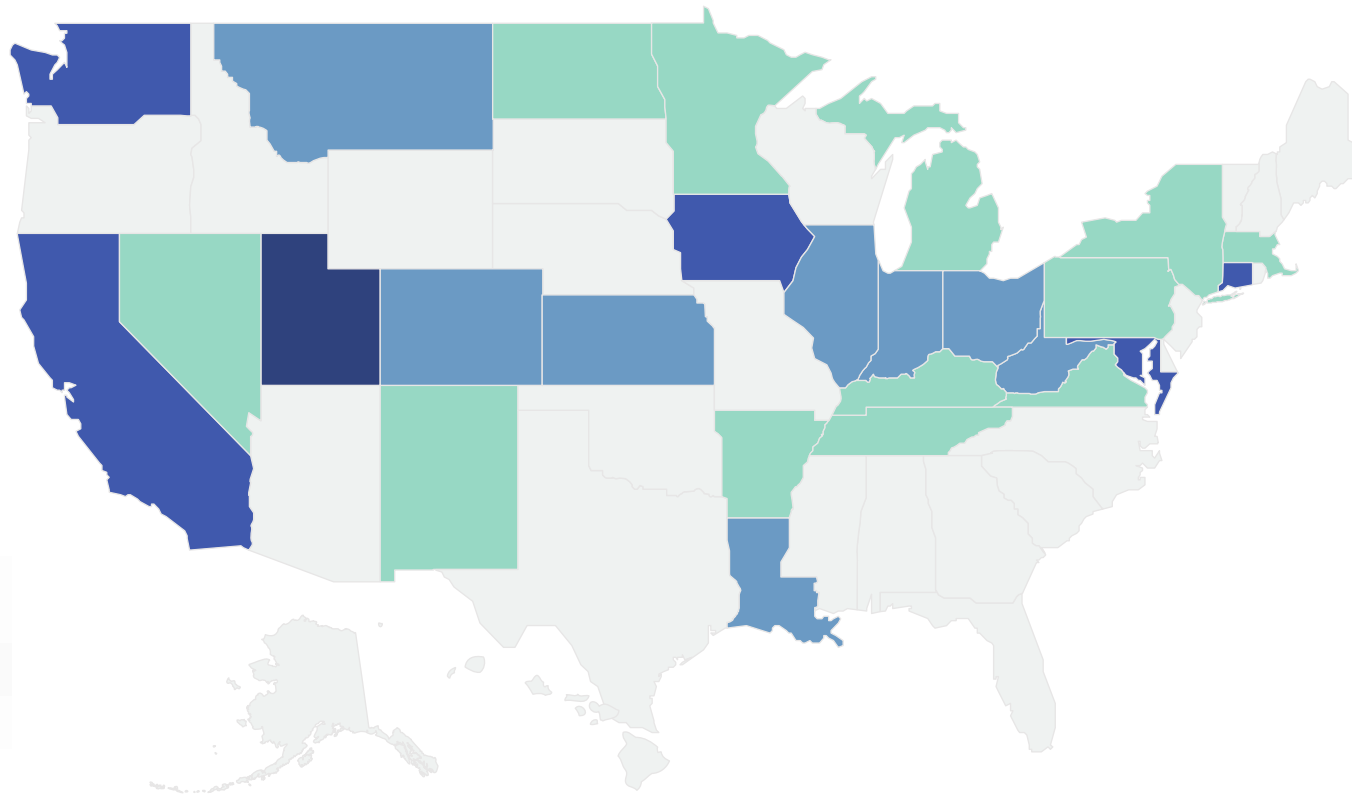
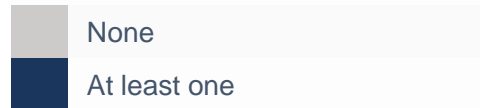
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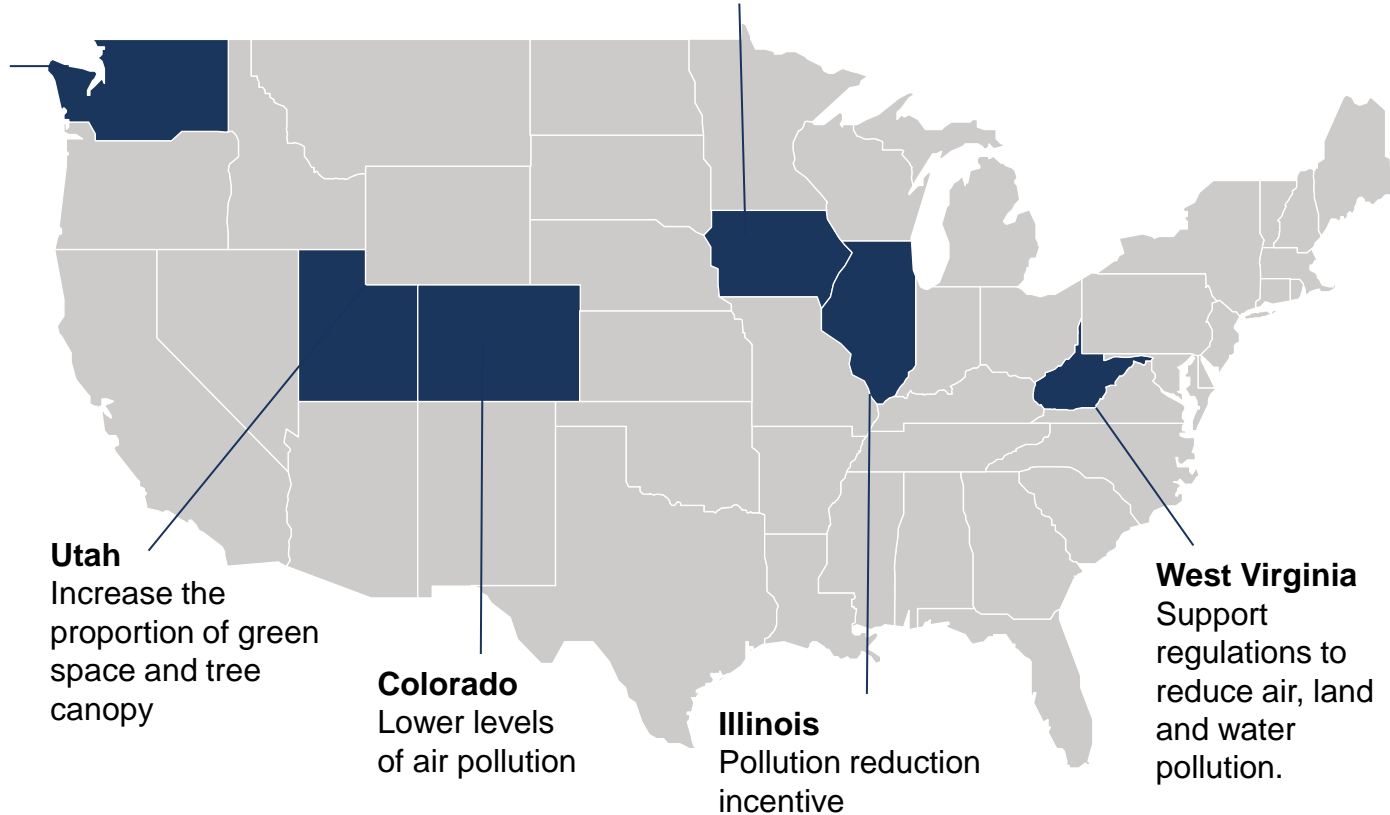
Alaska Tribal Health System

Climate Change and Cancer Solutions

Reduce exposure to pollution

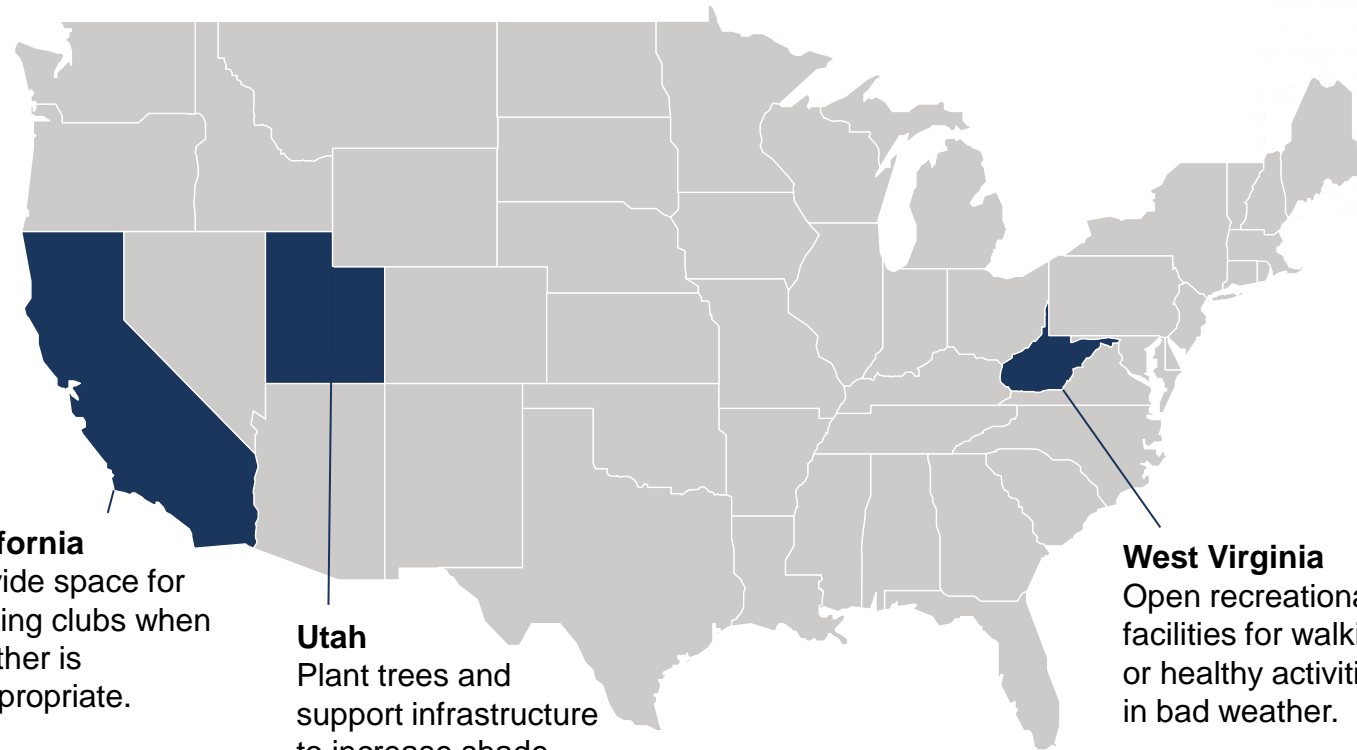
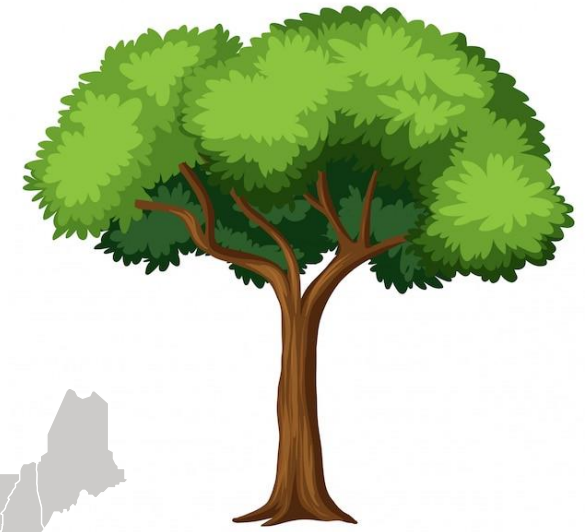
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Climate Change and Cancer Solutions

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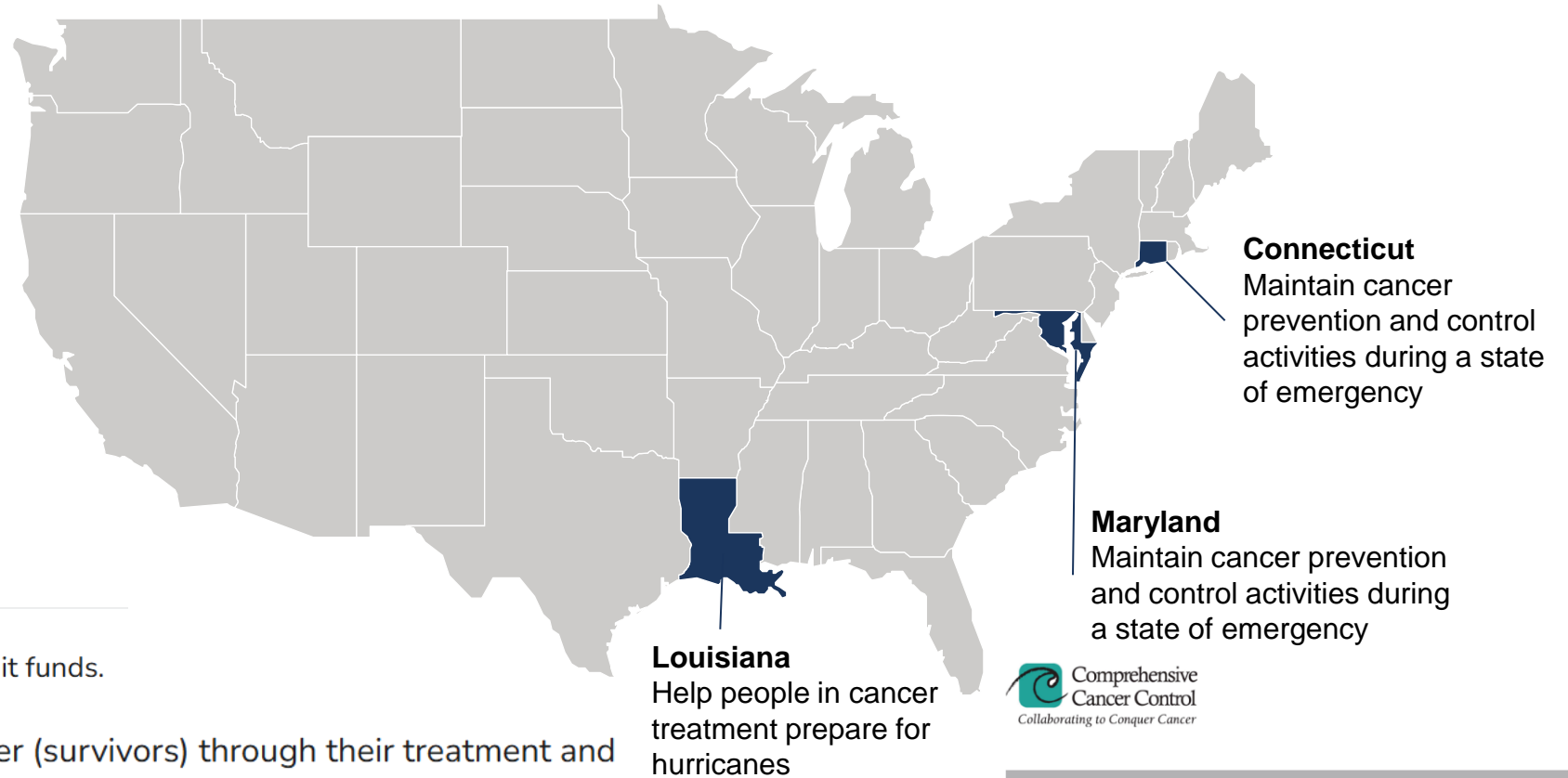
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Climate Change and Cancer Solutions

Disaster Preparedness



Priorities

CDC has six priorities for the CCC programs it funds.

3. Support people diagnosed with cancer (survivors) through their treatment and beyond. Comprehensive cancer control programs assess survivors' needs, provide education programs and patient navigation systems, and improve access to cancer resources and services.

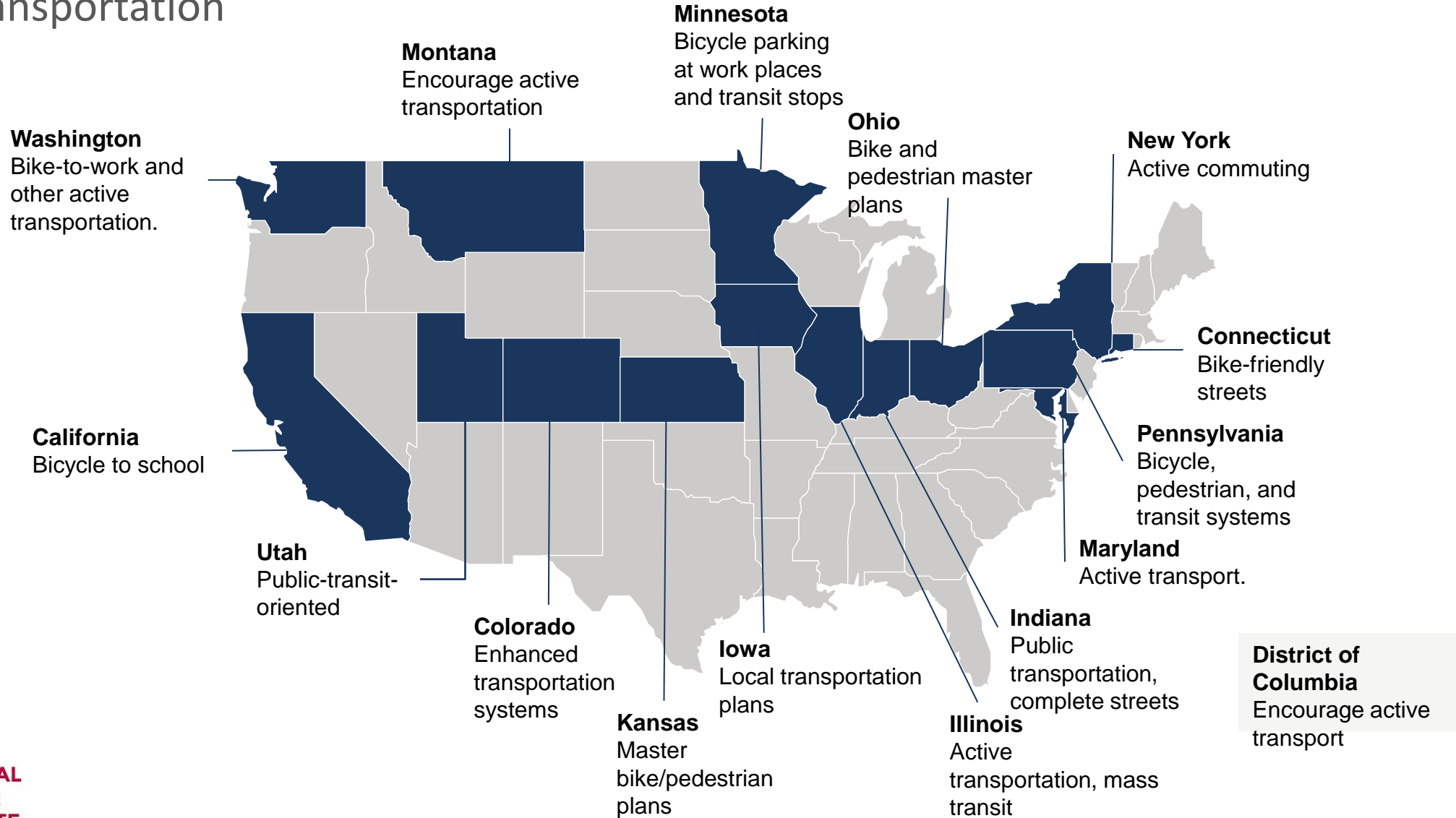
COMPREHENSIVE
CANCER CONTROL PLAN

EMERGENCY PREPAREDNESS

TIP SHEET

Climate Change and Cancer Solutions

Active transportation



E. Food System

Washington

Increase sustainable community gardens in underserved areas.

Northwest Portland Area Indian Health Board

Traditional and subsistence foods

Federated States of Micronesia

Let Local Food Be Your Medicine

California

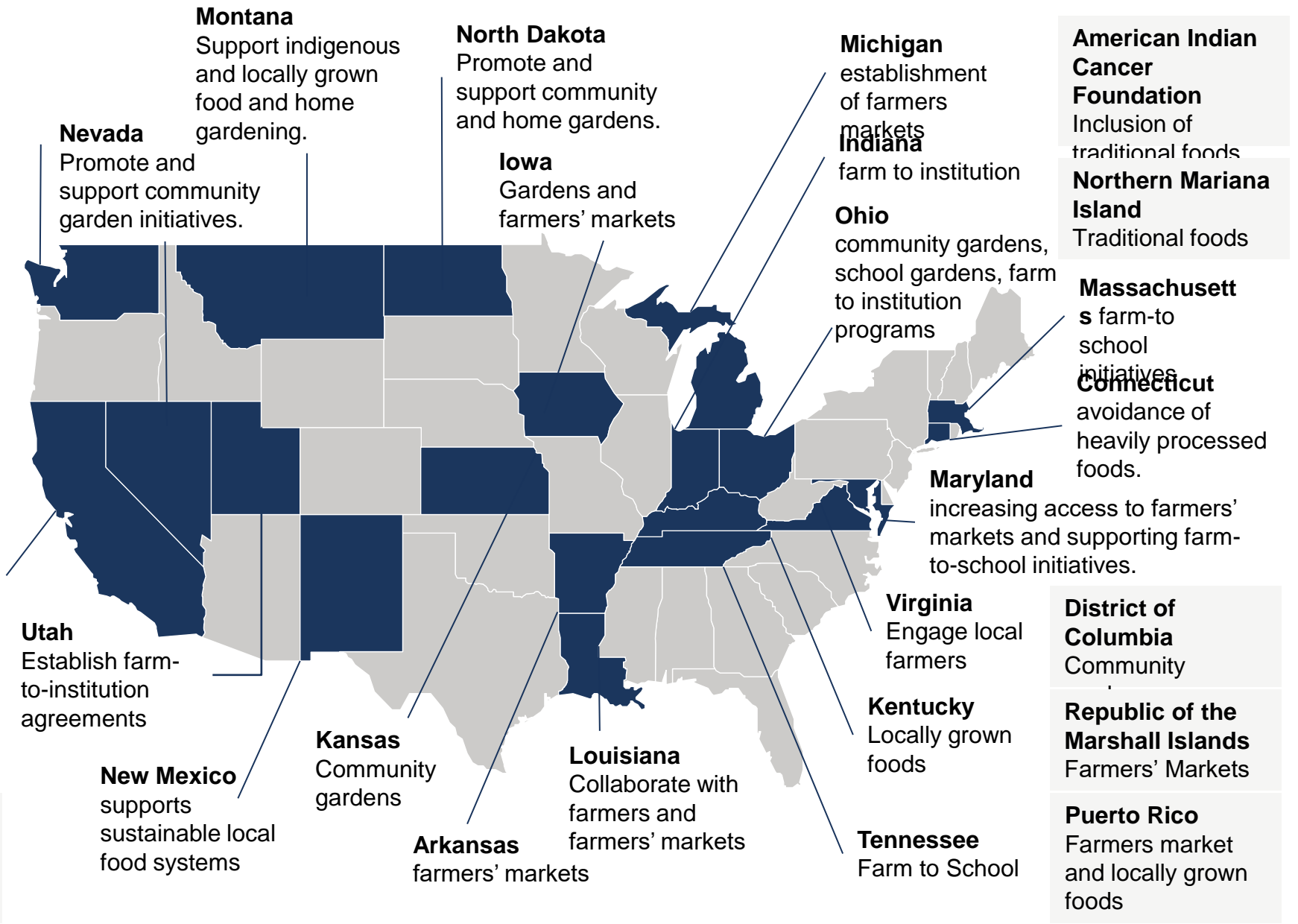
minimally processed foods

Alaska Tribal Health System

Inclusion of traditional foods

South Puget Intertribal Planning Agency

Traditional and tribal gardens



Thank You

Learning Objectives

- Recognize at least one way in which climate change impacts cancer control efforts

Pre and Post Questions

1. Does climate change impact cancer control efforts?
 - a. Just prevention
 - b. Just treatment
 - c. Just survival
 - d. All of the above
 - e. None of the above

Learning Objectives

- Learn evidence based interventions that support cancer and climate efforts

Pre and Post Questions

1. Which of the following evidence-based interventions support climate and cancer control efforts? Select all that apply:
 - a. Emergency preparedness plans
 - b. Lower levels of air pollution
 - c. Incentivize active transportation
 - d. Community gardens and farmers markets
 - e. None of the above

Cancer and Climate Change

Thank you



Leticia Nogueira, PhD, MPH
Gila Neta, PhD, MPP





Help us understand our impact and improve future webinars and ACS CCC support by taking this quick poll.

Time for a quick poll!



Thank You!

acs4ccc.org

ACS Webinar for Cancer Coalitions



ACS Cancer Planning Learning Community

Why? Through participation in this learning community, your confidence and capacity in leading the cancer planning process will increase.

How? The five learning community sessions will include panel discussions, brief presentations, small group breakouts and Q & A time with subject matter experts and peers.

Who should attend? Those who are new to cancer planning or would like a refresher and an opportunity to connect with CCC colleagues.

WHEN? All meetings will be 1-2 pm EST

- February 12, 2025
- March 12, 2025
- April 9, 2025
- May 14, 2025
- June 11, 2025

Register Today!

<https://zoom.us/meeting/register/tJUvd-mppzlvHtFj6CNEr37j4PUSRC0-R31j#/registration>



ACS Colorectal Cancer Mortality Learning Community

Why? to increase your capacity to integrate interventions mitigating colorectal cancer mortality disparities into the cancer planning process.

Who should attend? NCCCP grantee program & coalition staff members & their coalition partners. The CRC Mortality Learning Community would be ideal for coalitions prioritizing CRC initiatives.

When? All meetings will be 3-4 pm EST

- May 1, 2025
- June 5, 2025
- July 10, 2025
- August 7, 2025
- September 4, 2025

Register Today!

https://zoom.us/meeting/register/jVtSzV6HTtGjlp_9d3Grvg#/registration

Check out resources from ACS CCC!

acs4ccc.org

Your one-stop shop for coalition resources across ACS

Monthly Newsletter



Cancer Coalition Circular

Stay informed by joining our email list. Get the latest updates about upcoming forums, webinars, resources, and news delivered monthly in your inbox.

Sign up today >>
HERE

NEW ACS Coalition University

Brief, [on-demand trainings](#) for CCC coalition staff & leadership

The screenshot shows the website for 'Technical Assistance for CCC Programs and Coalitions'. The navigation menu includes 'Home', 'About', 'News', and 'Resources'. The 'Resources' dropdown menu is open, listing various topics such as 'ACS Coalition University', 'ACS Regional Partners', 'ACS Roundtable Resources', 'AME Church Project', 'Cancer Data Resources', 'Cancer Prevention', 'Cancer Screening', 'Cancer Survivorship', 'Cancer Treatment', and 'CCC Planning'. A red arrow points to the 'ACS Coalition University' link in the menu. The main content area features a blue box with the text 'ACS Coalition University' and a paragraph describing interactive micro-learning modules. Below this is a section titled 'Coalition Meeting Challenges' with an illustration of people in a meeting.

Thank you from your ACS CCC Team



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