Nebraska Environmental Public Health Tracking Program

Derry Stover, MPH, CPH
Epidemiologist

Kristina W. Kintziger, PhD, MPH
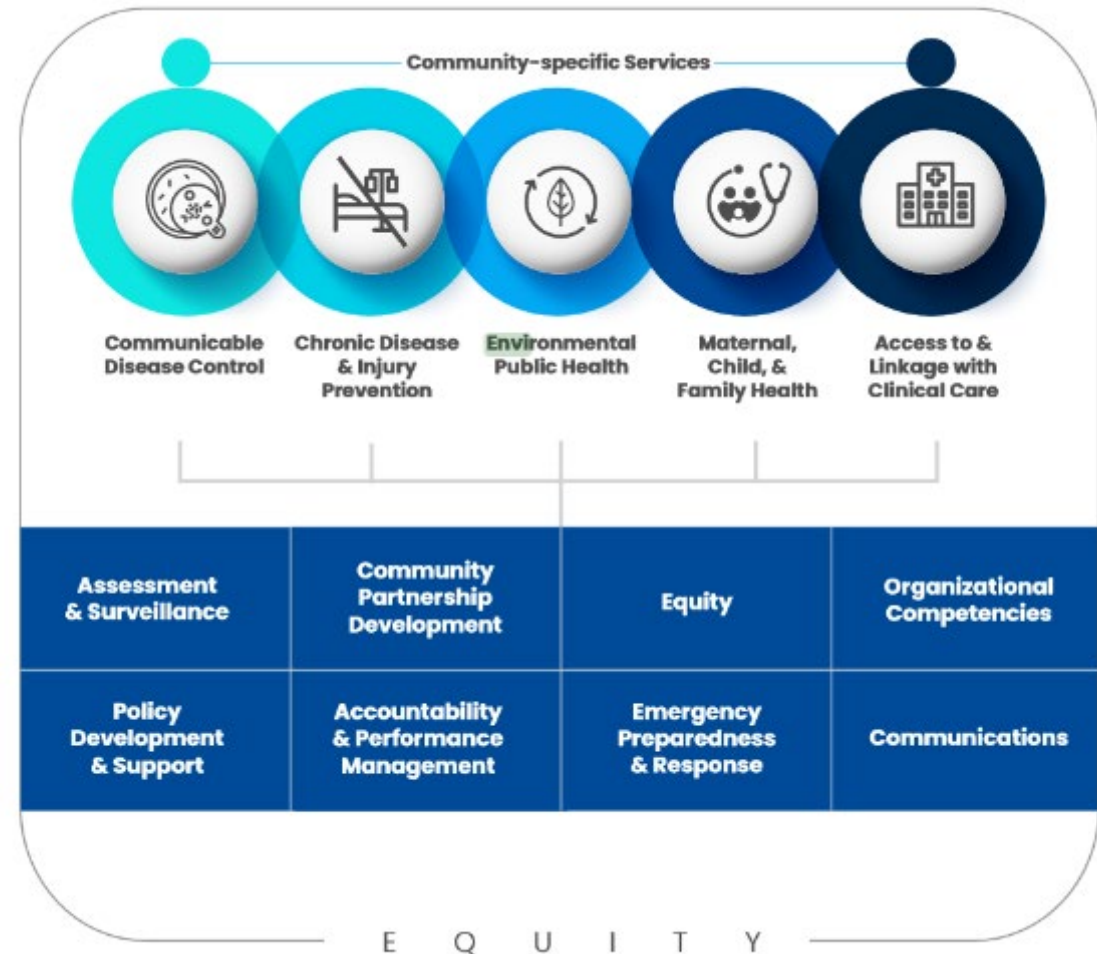Claire M. Hubbard Professor of Health and Environment

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Claire M. Hubbard Professor of Health and Environment

Environmental Public Health is a Foundational Public Health Service

https://phaboard.org/

Public Health Accreditation Standards

DOMAIN 2 INCLUDES **TWO** STANDARDS		
Standard 2.1:	Anticipate, prevent, and mitigate health threats through surveillance and investigation of health problems and environmental hazards.	
Standard 2.2:	Prepare for and respond to emergencies.	
FOUNDATIONAL CAPABILITY MEASURES:		
Assessment & Surveillance	**2.1.1 A:**	Maintain and improve surveillance systems.
	2.1.2 A:	Ensure 24/7 access to resources for rapid detection, investigation, containment, and mitigation of health problems and environmental hazards.
Communications	**2.2.5 A:**	Maintain a risk communication plan and a process for urgent 24/7 communications with response partners.
Emergency Preparedness & Response	**2.2.1 A:**	Maintain a public health emergency operations plan (EOP).
	2.2.2 A:	Ensure continuity of operations during response.
	2.2.7 A:	Conduct exercises and use After Action Reports (AARs) to improve preparedness and response.

Public Health Accreditation Board

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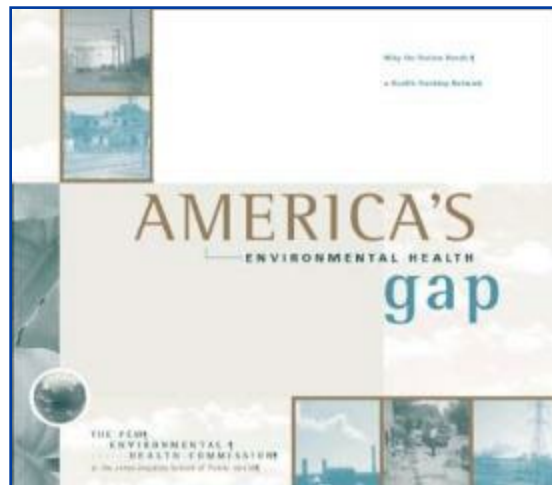
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America's Environmental Health Gap

- Pew Environmental Health Commission (2000)

- Little information was routinely collected on non-infectious disease and human exposures

- Environmental hazard data and monitoring conducted for regulatory purposes, not public health

Pew EH Commission Report: https://www.jhsph.edu/research/centers-and-institutes/center-for-excellence-in-environmental-health-tracking/pewcompanionreport.pdf

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Recommended a "Nationwide Health Tracking Network for diseases and exposures"

Pew EH Commission Report: https://www.jhsph.edu/research/centers-and-institutes/center-for-excellence-in-environmental-health-tracking/pewcompanionreport.pdf

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CDC Environmental Public Health Tracking

ENVIRONMENTAL PUBLIC HEALTH
TRACKING

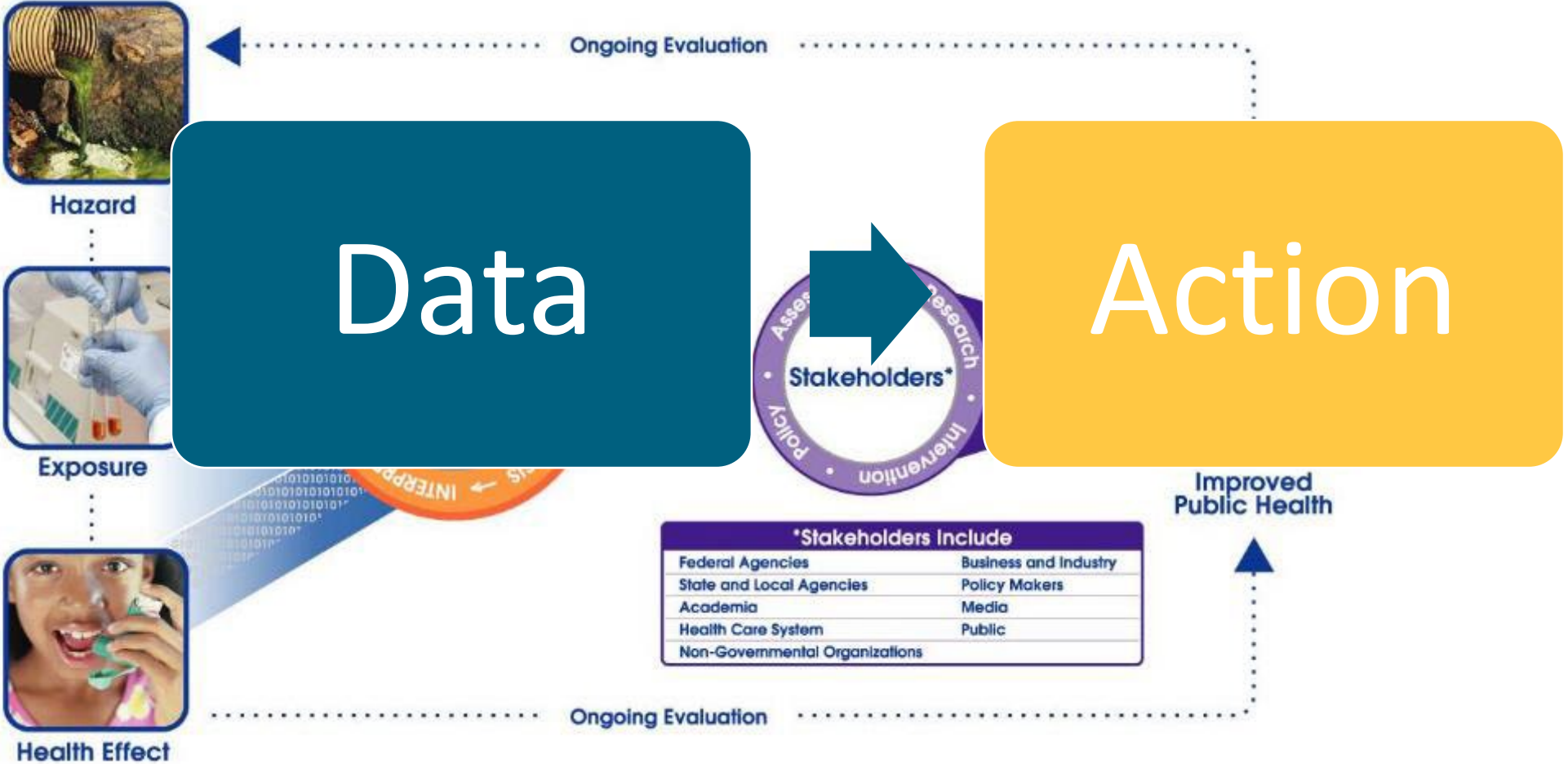**Created in 2002 in response to Pew Commission report**

Vision

- Healthy informed communities

Mission

- To provide information from a nationwide network of integrated health and environmental data that drives actions to improve the health of communities

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CDC Tracking Model

Data → **Action**

Hazard

Exposure

Health Effect

Ongoing Evaluation

Stakeholders*

Improved Public Health

Ongoing Evaluation

*Stakeholders Include

Federal Agencies	Business and Industry
State and Local Agencies	Policy Makers
Academia	Media
Health Care System	Public
Non-Governmental Organizations	

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ENVIRONMENTAL PUBLIC HEALTH
TRACKING
CONNECTS ENVIRONMENT & HEALTH INFORMATION

Check out CDC's data explorer and state and local tracking programs for more information.

Environmental

Radon
Drought
Sunlight & UV
Wildfire Smoke

- Air Quality
- Extreme Heat
- Drinking Water
- Flood Vulnerability
- Community Design

Pesticide Exposures ·
Toxic Substance Releases ·
Other Environmental Chemicals ·

Exposures

Health Effects

- Asthma
- Cancer
- Heart Disease
- Heat Stress Illness
- Childhood Lead Poisoning
- Developmental Disabilities
- Carbon Monoxide Poisoning
- Reproductive and Birth Outcomes

Population Characteristics

Lifestyle Risk Factors ·
Socioeconomics ·
Demographics ·
Vulnerabilities ·

CDC

Tracking Public Health Actions

Target prevention activities

Educate residents

Monitor community health

Inform city or state planning

Identify communities at risk

Inform health policies
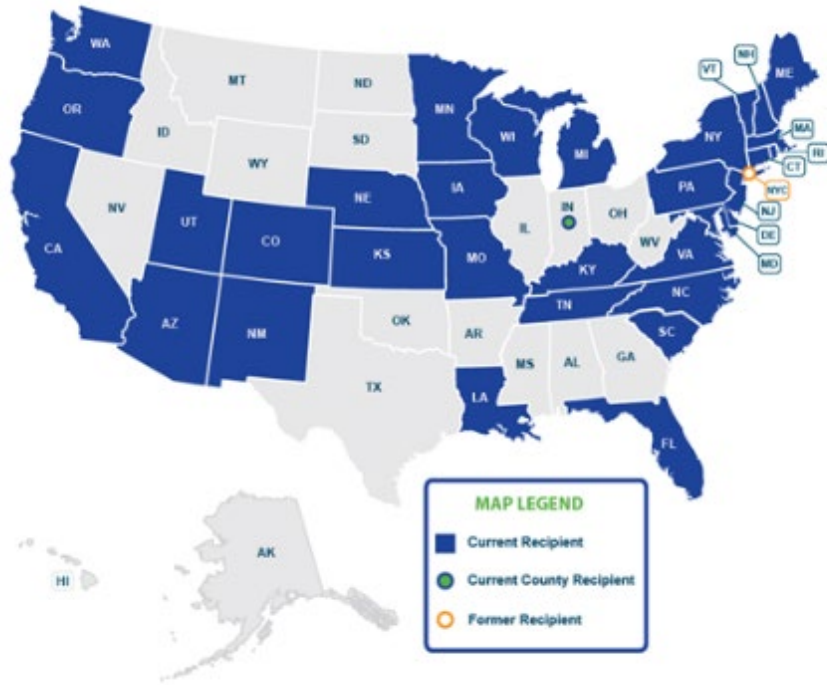
Support epidemiologic studies

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Nebraska Tracking Program

Nebraska Tracking

- Nebraska Environmental Public Health Tracking (EPHT)

- 5-year grant (2022-2027)

- Partners and Stakeholders

    - Water, Climate and Health Program at UNMC College of Public Health

    - Data Stewards (i.e. NDEE)

    - LHDs

    - Community Organizations

    - Public

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TRACKING

MAP LEGEND

■ Current Recipient
● Current County Recipient
○ Former Recipient

August 2022

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UNIVERSITY OF NEBRASKA MEDICAL CENTER™
COLLEGE OF PUBLIC HEALTH

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Tracking Strategies and Outcomes

Surveillance
- Increased monitoring of environmental health topics
- Increased EH data quality
- Increased surveillance EH disparities

Information Technology
- Improved IT, tools, and systems

Partnerships
- Increase stakeholders data sharing, communication, and response
- Collaboration with stakeholders to reduce disparities

Outreach/ Communication
- Dissemination of EH information

Program Capacity
- Increased knowledge and ability among EH workforce
- Increased capacity to provide Technical Assistance for PH interventions

Evaluation
- Increased completeness, timeliness and quality of evaluation data

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Tracking Data Measures

Air Quality
• Ozone, PM 2.5

Asthma
• ED and Hospitalizations

Birth Defects
• Prevalence

Cancer
• Incidence (Registry)
• Mesothelioma, melanoma, breast cancer, bladder cancer, leukemia, others

CO Poisoning
• Mortality
• ED Visits & Hospital visits

Childhood Lead Poisoning
• BLL data

COPD
• ED and Hospitalizations

Drinking Water Quality
• Nitrates, DBPs, arsenic, others

Heat Illness
• ED and Hospitalizations

Heart Attacks
• Hospitalizations (HDD)

Radon
• Testing data

Reproductive & Birth Outcomes
• Mortality (birth registry)

NCDMs: https://www.cdc.gov/nceh/tracking/pdfs/ncdm_requirements_april2017.pdf

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Nebraska Tracking Data Portal
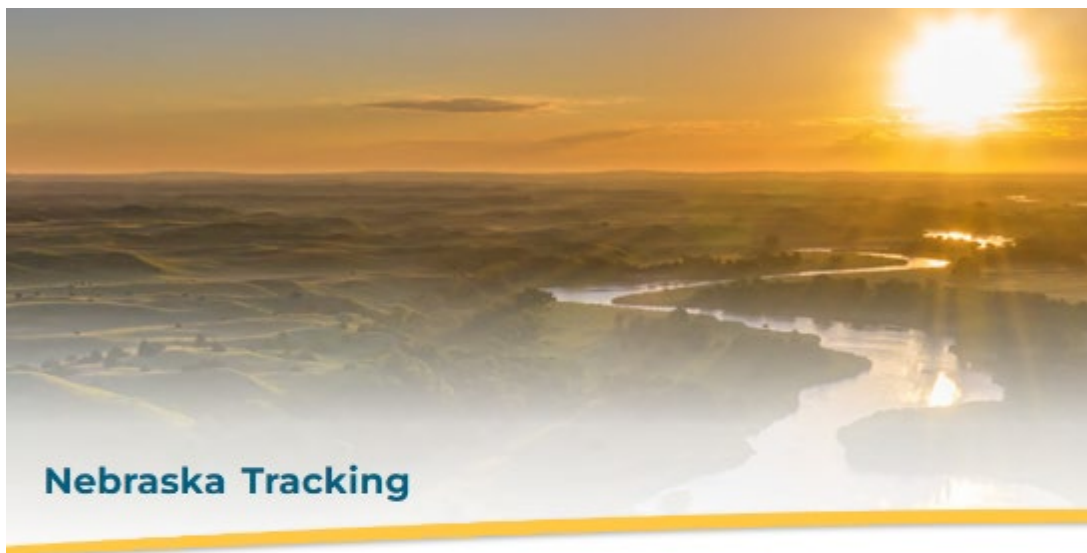
- Portal: Web-based data dashboards and query systems for communicating EH data to stakeholders

- GIS and Mapping

- Nebraska Portal Currently Under Development

- Nebraska Tracking Home Page:
  - https://dhhs.ne.gov/tracking

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State Portals

Iowa Public Health Tracking Portal

DEPARTMENT OF HEALTH — Minnesota Public Health Data Access

COLORADO Environmental Public Health Tracking

Environmental Public Health Tracking Program EPHT

The Missouri Environment Public Health Tracking (EPHT) program was developed to assist the

Explore our data — KANSAS ENVIRONMENTAL PUBLIC HEALTH TRACKING

Environmental Public Health Tracking — New York State

- Iowa: https://tracking.idph.iowa.gov/
  - Nitrate, Lyme disease

- Kansas: https://keap.kdhe.ks.gov/Ephtm/
  - Prescribed Burning, Rabies

- Colorado: https://coepht.colorado.gov/
  - Injuries

- Minnesota: https://data.web.health.state.mn.us/web/mndata
  - Cold-related illness

- Arizona: https://www.azdhs.gov/preparedness/epidemiology-disease-control/environmental-health/environmental-public-health-tracking/index.php
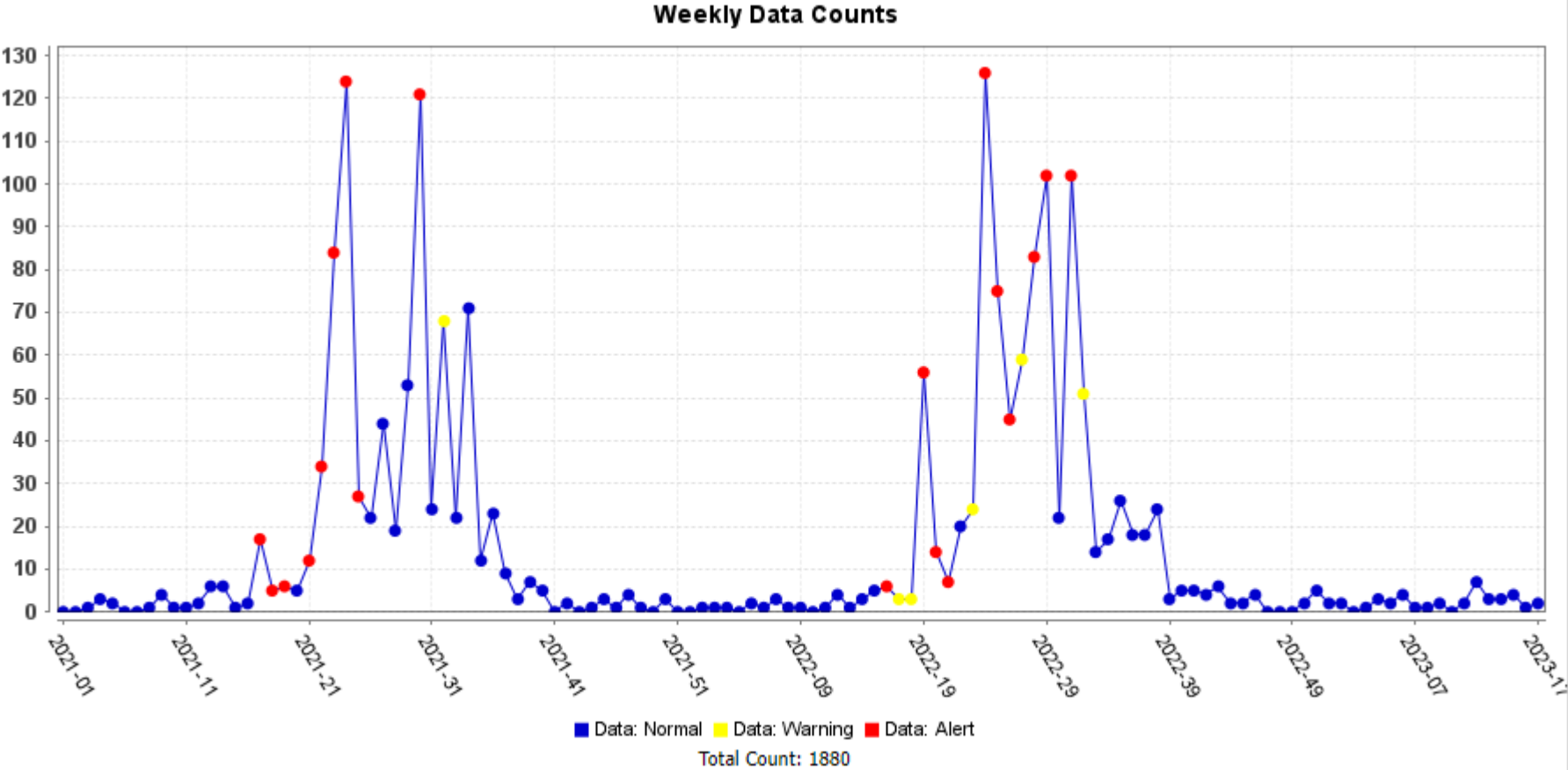 - Cancer

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Environmental Health Data and Tools

Nebraska Syndromic Surveillance:
Heat Illness ED Visits

Weekly Data Counts

■ Data: Normal ■ Data: Warning ■ Data: Alert
Total Count: 1880

Nebraska DHHS Syndromic Surveillance, ESSENCE data

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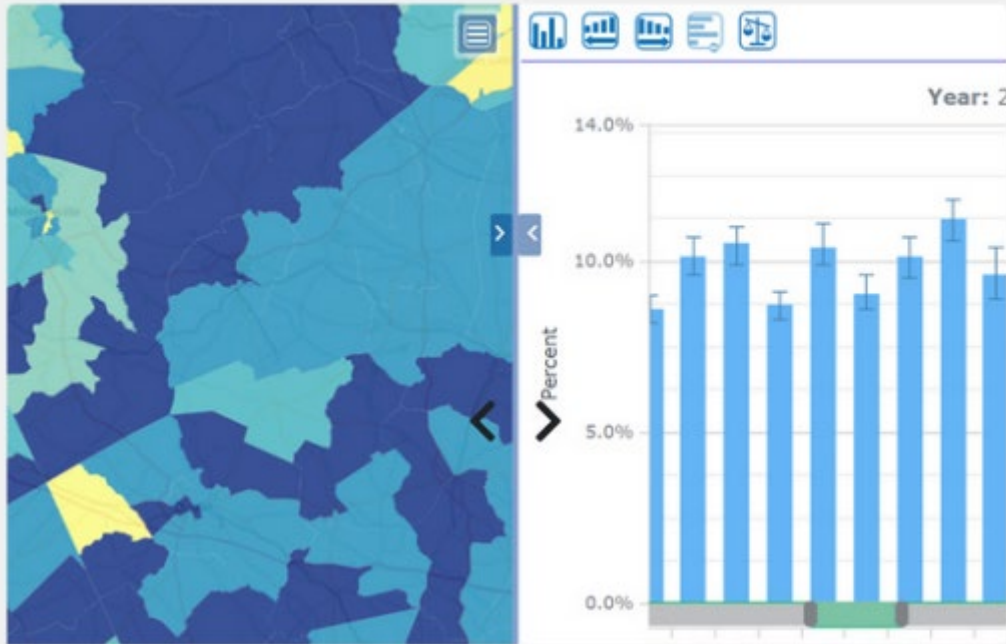Good Life. Great Mission.

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Nebraska Lead Poisoning

Children with Elevated Blood Lead Levels, 2021
by Local Health Department
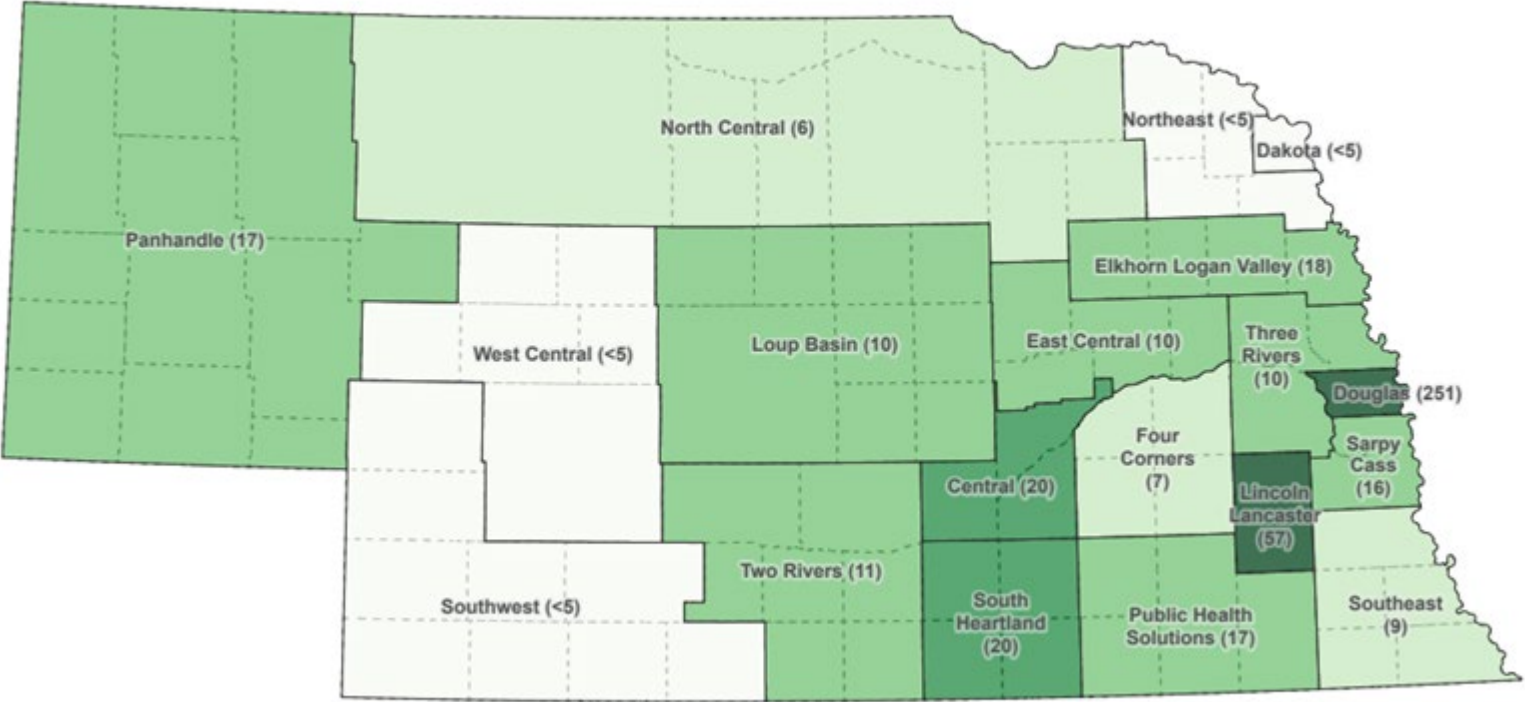
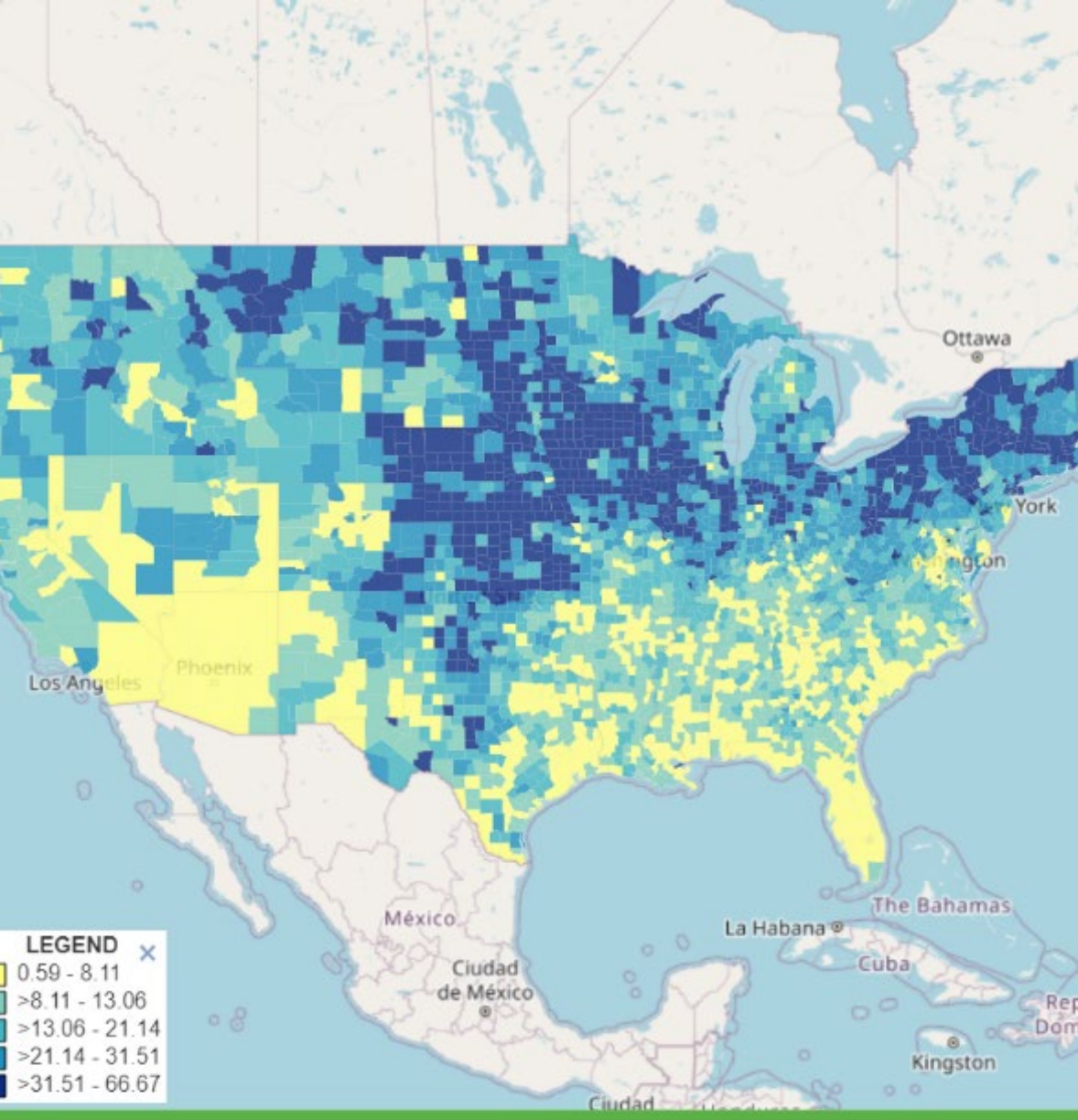# National Tracking Data Portal

CDC Tracking Data Explorer

- https://ephtracking.cdc.gov/

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Example 1: Age of Housing

LEGEND
0.59 - 8.11
>8.11 - 13.06
>13.06 - 21.14
>21.14 - 31.51
>31.51 - 66.67

CHILDHOOD LEAD POISONING | AGE OF HOUSING | PERCENT OF HOUSING UNITS BY YEAR STRUCTURE BUILT | ALL COUNTIES | Before 1950 | 2020

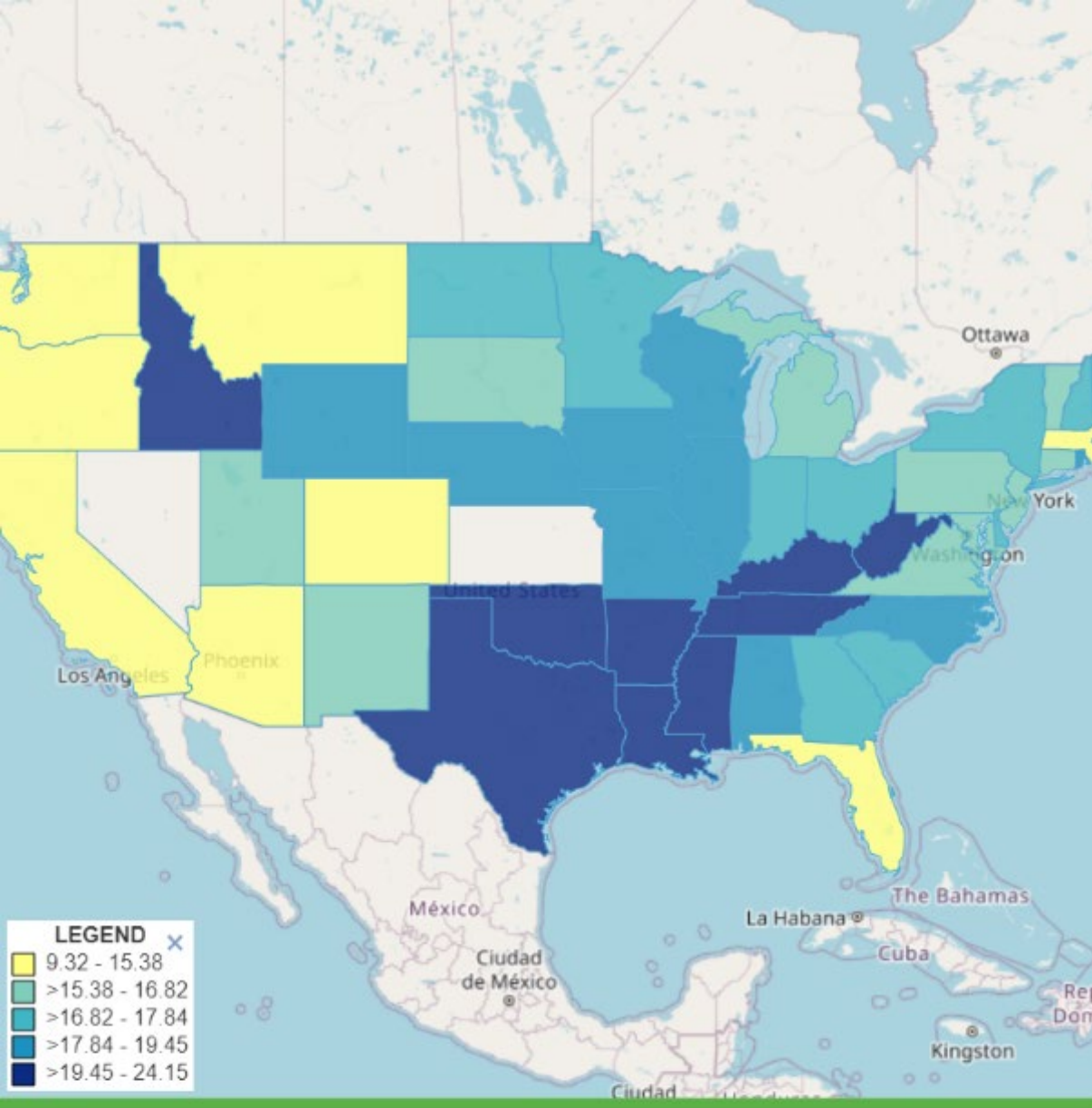Explore more data at ephtracking.cdc.gov/DataExplorer

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Example 2: Kidney Cancer

LEGEND
- 9.32 - 15.38
- >15.38 - 16.82
- >16.82 - 17.84
- >17.84 - 19.45
- >19.45 - 24.15

CANCER | INCIDENCE OF KIDNEY CANCER | AGE-ADJUSTED INCIDENCE RATE OF KIDNEY AND RENAL PELVIS CANCER PER 100,000 POPULATION | ALL STATES | 2019 **2019**
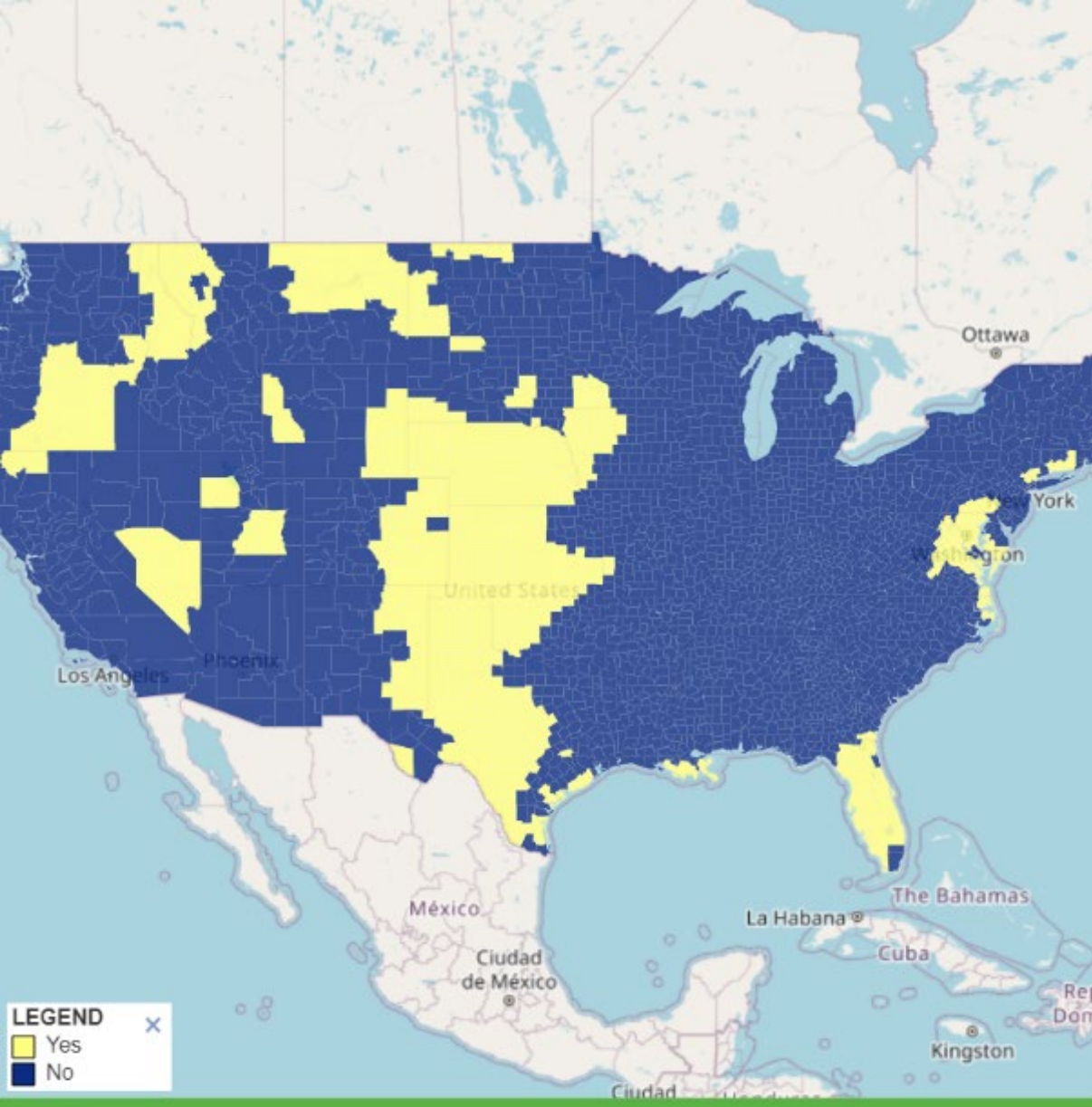
Explore more data at ephtracking.cdc.gov/DataExplorer

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Example 3: Counties Currently Experiencing Drought

LEGEND ×
- ☐ Yes
- ■ No

DROUGHT | HISTORICAL DROUGHT | COUNTIES CURRENTLY EXPERIENCING
DROUGHT (USDM) | ALL COUNTIES | 04/16/2023 - **04/22/2023**

Explore more data at ephtracking.cdc.gov/DataExplorer

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EH Data Tools for Public Health

❑ CDC Tracking Data Explorer
     ❑ https://ephtracking.cdc.gov/

❑ CDC Environmental Justice Dashboard
     ❑ https://ephtracking.cdc.gov/Applications/ejdashboard/

❑ Heat and Health Trackers
     ❑ https://ephtracking.cdc.gov/Applications/heatTracker/
     ❑ https://www.heat.gov/

❑ Drinking Water Watch
     ❑ https://drinkingwater.ne.gov/

❑ Air Quality
     ❑ https://www.airnow.gov/

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Other Data Tools for Public Health

❑ CDC Social Vulnerability Index (SVI)
- ❑ https://www.atsdr.cdc.gov/placeandhealth/svi/interactive_map.html

❑ DHHS Public Health Atlas BRFSS Data
- ❑ https://atlas-dhhs.ne.gov/Atlas/BRFSS

❑ CDC Wonder
- ❑ https://wonder.cdc.gov/

❑ CDC NIOSH Worker Health Charts
- ❑ https://wwwn.cdc.gov/NIOSH-WHC/

Advisory Panels (CAP)

❑ Community Advisory Panel (CAP)

 ❑ Aid in the selection of environmental public health priorities

 ❑ Foster the development of community partnerships

 ❑ Identify differences in community or regional needs and gaps in resources

 ❑ Ascertain potential actions to reduce environmentally-related health disparities

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March 27th CAP Meeting Summary

❑ **Lack of resources and local volunteers for emergency response to floods, fire, droughts.**

❑ **Lack of awareness regarding hazardous materials transported across the State (rail, road, etc.).**

❑ **Older housing stock hazards, greater impacts following emergencies, solutions for mitigation & remediation, lack of codes and codes enforcement.**

❑ **Air and water quality.**

❑ **Lack of (air monitors) or poor infrastructure (water systems) and resources to remedy these issues.**

❑ **Lack of transportation for healthcare, mental health services, and food access; especially for elderly populations.**

❑ **Several Others**

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THANK YOU

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DEPT. OF HEALTH AND HUMAN SERVICES

Derry Stover

Derry.Stover@nebraska.gov

Florida Tracking

- Funded since 2003
- Non-standard activities
  - GIS support for outbreak investigations (Zika, Dengue, etc.)
  - NASA-funded research project related to extreme heat
  - Emergency response activities (post-hurricane, flood)
- Unique data
  - Built environment
  - Dog bites
  - Occupational health and safety
  - Life expectancy

https://www.floridatracking.com/
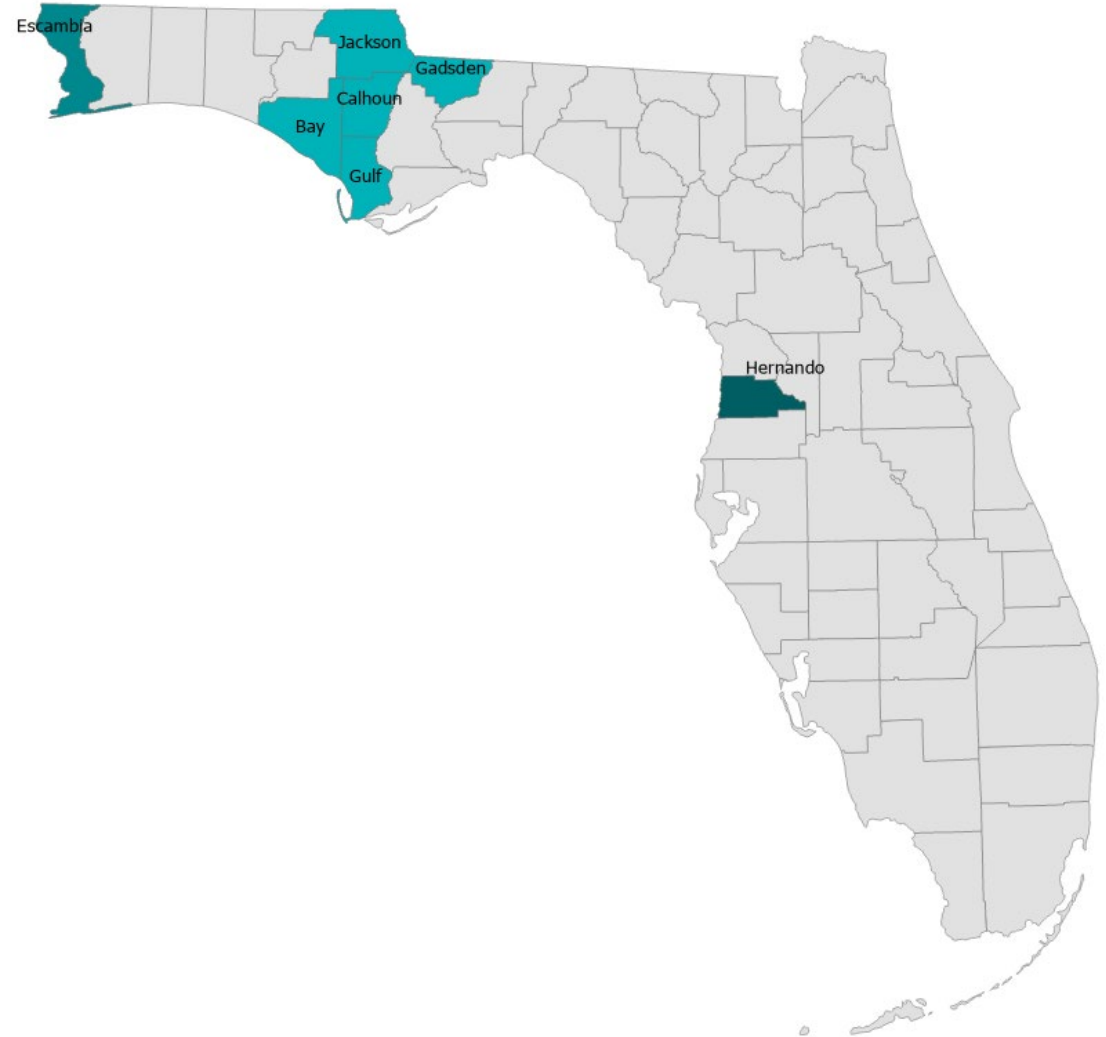
Public Health Actions

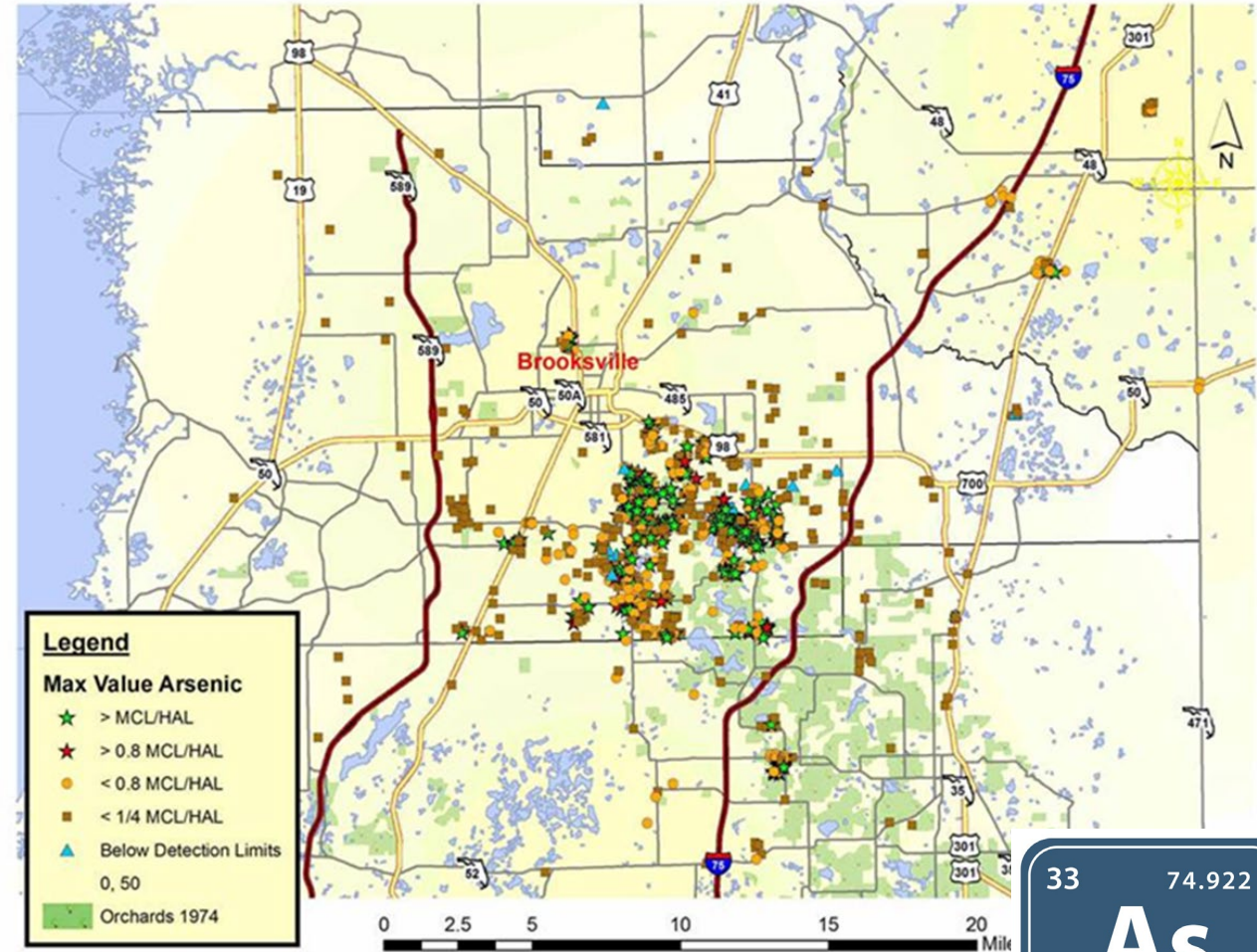Arsenic Biomonitoring Project

Flooding Health Impact Assessment

Post-Hurricane CASPER

Arsenic Biomonitoring Project

- Types of arsenic: organic and inorganic

- EPA Maximum Contaminant Limit (MCL) is 10μg/L

- Elevated arsenic found in 32% of private wells sampled in Hernando County, FL

- Supported the Safe Water Restoration Program

Legend

Max Value Arsenic

- ★ > MCL/HAL
- ★ > 0.8 MCL/HAL
- ● < 0.8 MCL/HAL
- ■ < 1/4 MCL/HAL
- ▲ Below Detection Limits 0, 50
- Orchards 1974

Objectives and Methods

Objectives

- Measure the amount of arsenic in tap water
- Measure individual short-term arsenic exposure
- Determine the relative importance of dietary and water sources of arsenic in study population
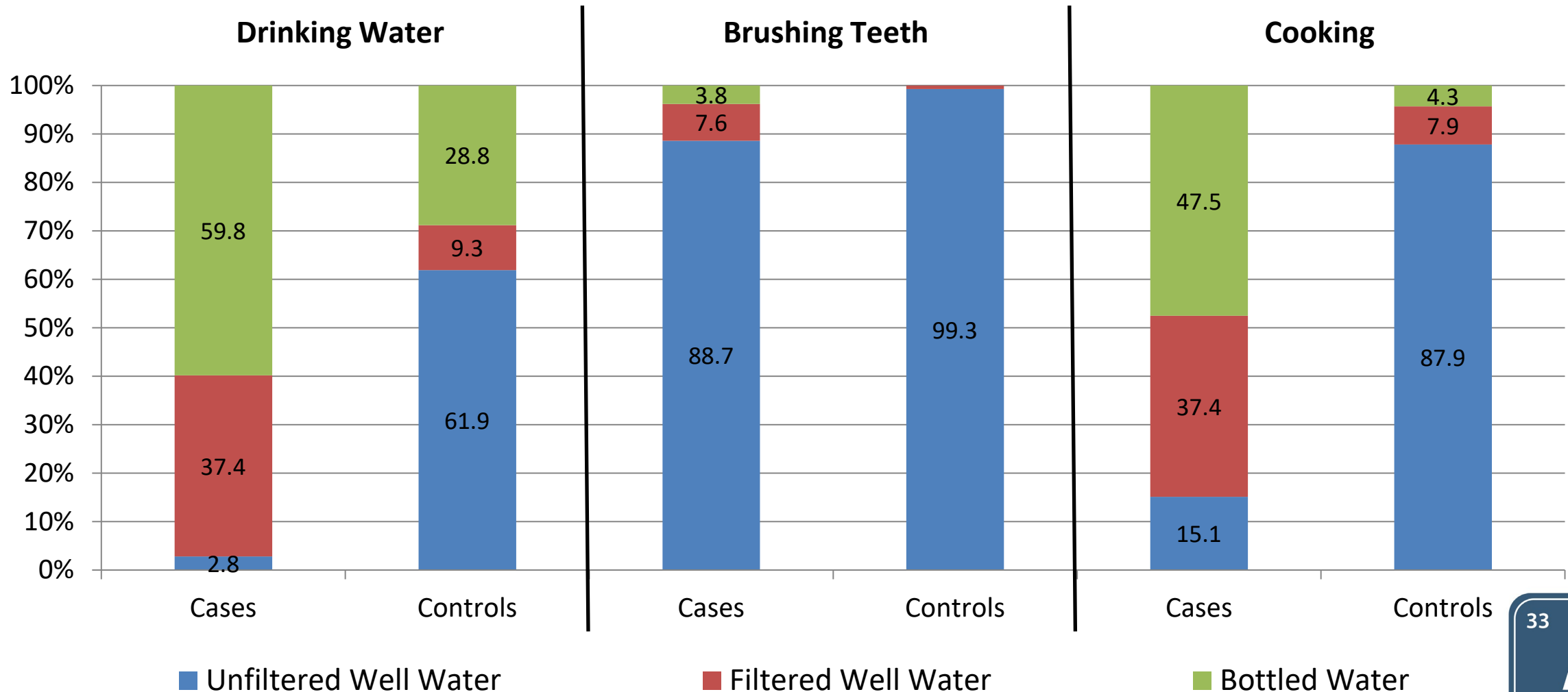
Methods

- Water and urine sampling
- Questionnaire on home water use, dietary exposures, pesticide and herbicide use, tobacco and alcohol use, occupational risk
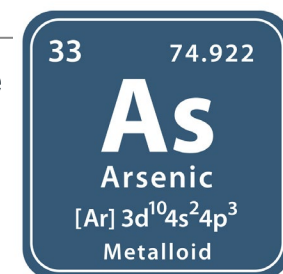- "Case" households (>10µg/L) compared to "control" households (<8µg/L)

33 74.922
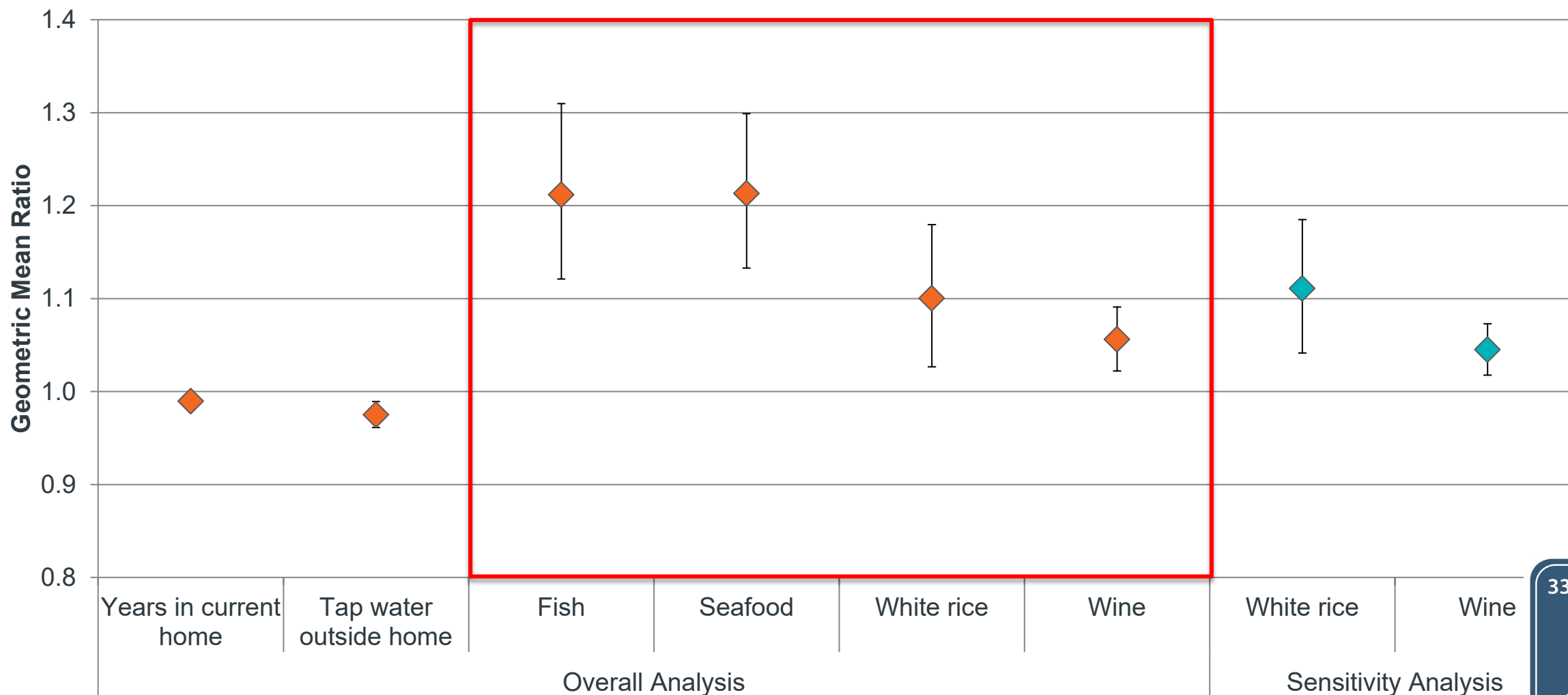
As

Arsenic

[Ar] $3d^{10}4s^24p^3$

Metalloid

Results: Risk Factors Other than Water

Public Health Actions

- Confirmed the effectiveness of FL Safe Water Restoration efforts

- Two "control" households identified as high-risk and qualified for mitigation

- Increased awareness of arsenic exposure and need to test private wells
  - Media coverage
  - Fact sheets and communication tools

33   74.922
As
Arsenic
[Ar] $3d^{10}4s^24p^3$
Metalloid

Flooding Health Impact Assessment (HIA)

- CDC: "process that helps evaluate the potential effects of a plan, project, or policy before it is built or implemented"

- Non-tropical extreme flooding event in Pensacola, FL
  - April 29-May 3, 2014
  - Peak rainfall of 15.5" in < 24 hours

- Significant road and bridge damage, multiple sanitary sewage lift station failures, power outages, raw sewage overflows, and multiple fatalities

Questions and Methods

Questions

- What types of injuries, deaths, other health effects associated with flood event?
- Are there policy changes that could have resulted in fewer health effects during a similar future flood event?

Methods

- Multiple Tracking health datasets used
  - Examined all-cause injury and mortality, asthma/respiratory effects, enteric diseases, mental health referrals
  - Exposure window varied by health condition of interest
- Compared event period to a baseline period

Exposure Windows by Health Condition

Health Outcome	Data Source	Exposure Windows[a]	Dates
All-cause injury	AHCA	Event + 14 d	April 29 to May 17
All-cause mortality	Vital statistics	Event + 30 d	April 29 to June 2
Asthma and other respiratory effects	AHCA	Event + 60 d	April 29 to July 2
Enteric diseases	Merlin	Event + 30 d	April 29 to June 2
Mental health conditions	AHCA (ED only)	Event + 30 d	April 29 to June 2

Abbreviations: AHCA, Agency for Health Care Administration; ED, emergency department; Merlin, State of Florida notifiable disease reporting system, FDOH Bureau of Epidemiology.

[a] Period of interest includes the 5-day event period (4/29-5/3) plus the additional days in the exposure window. The control period used the same calendar dates for the year 2008. Note—vector-borne diseases are not included in final analysis because of very low numbers.
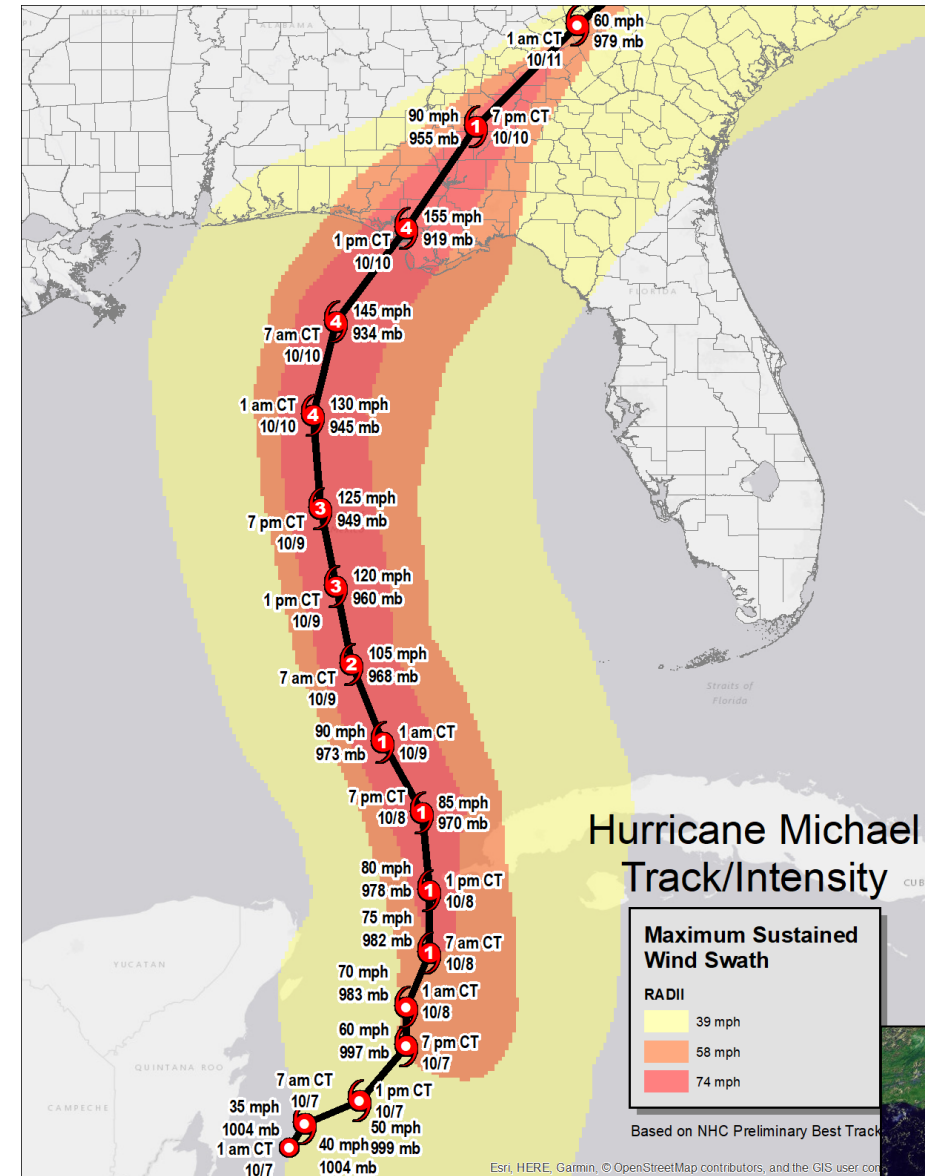
Results
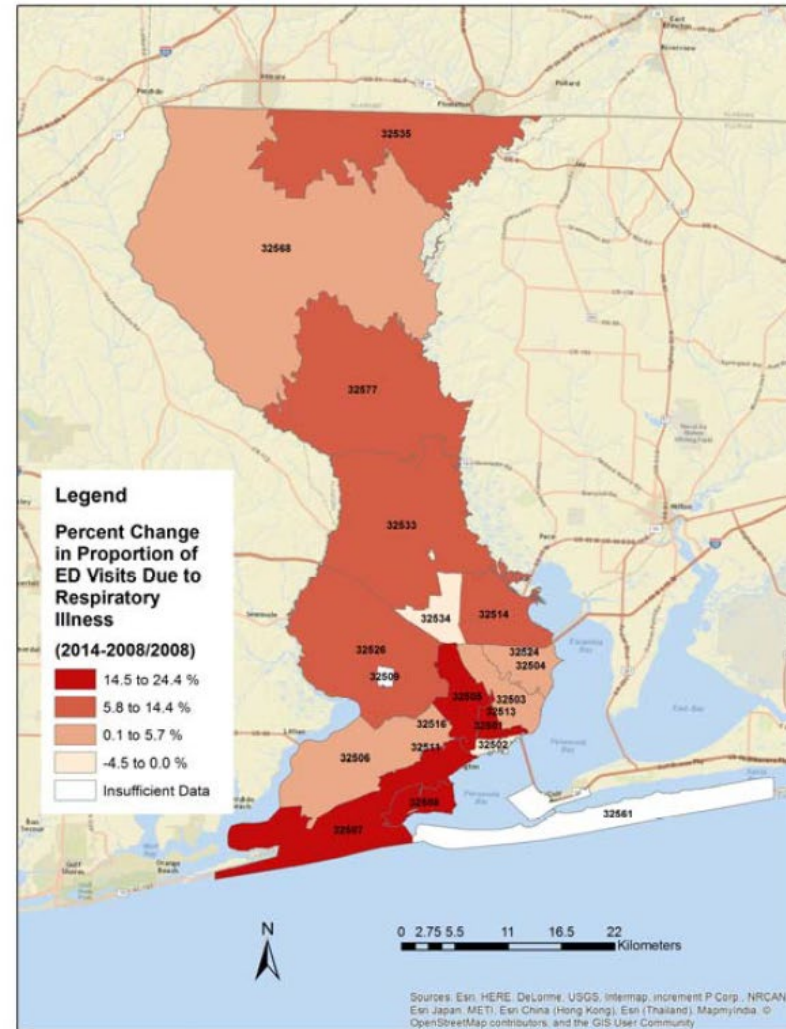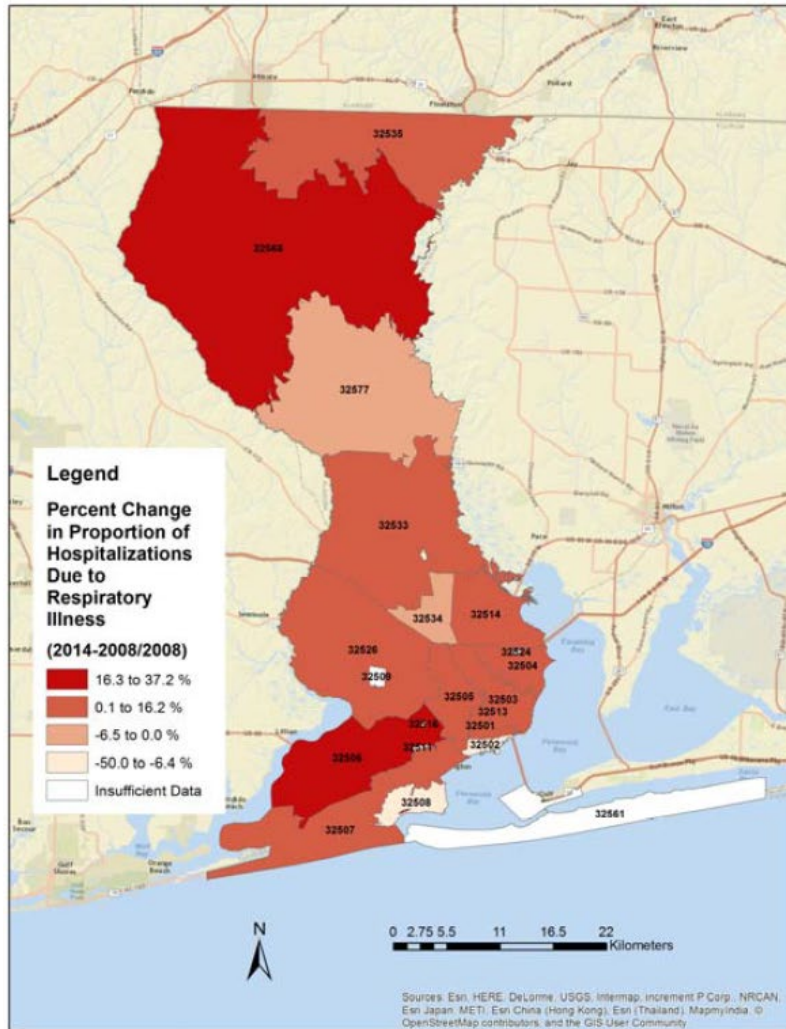
Public Health Actions

- Sewage lift stations
  - Raise electrical panels on lift station housing structures

- Environmental sampling
  - Better planning for personnel considerations, development of "strike teams"

- Waste disposal considerations
  - Air monitoring around demolition & construction disposal sites

Post-Hurricane CASPER

- ## Community Assessment for Public Health Emergency Response

  - A rapid needs assessment designed to provide public health leaders with information about a community to make informed decisions

- ## Hurricane Michael

  - Category 5, October 10, 2018
  - Winds > 160mph; storm surge 9-14'
  - 45,000+ structures damaged; 3,000 destroyed
  - 50 deaths
  - $18.4 billion in losses

Hurricane Michael Track/Intensity

Maximum Sustained Wind Swath

RADII
- 39 mph
- 58 mph
- 74 mph

Based on NHC Preliminary Best Track

Source: National Hurricane Center, https://www.weather.gov/tae/HurricaneMichael2018.

Objective and Methods

Objective

- Assess community preparedness and impacts experienced by Panhandle residents after Hurricane Michael

Methods

- Standard CASPER methodology
  - 30x7 two-stage cluster sampling design to select 210 households
- Questionnaire on demographics, housing, hurricane preparedness, and impacts, plus suicide behavior & ideation

CASPER Study Area

CASPER	County	Urban Status[1]	Population[2]	Poverty[2]	Contact Rate[3]	Cooperation Rate[4]	Completion Rate[5]
Coastal	Bay	Urban	175,216	12.4%	40.8%	69.8%	84.8%
(Oct/Nov 2019)	Gulf	Rural	14,192	15.1%			
Inland	Calhoun	Rural	13,648	20.3%	51.5%	70.6%	89.1%
(Jan 2020)	Gadsden	Rural	43,826	21.9%			
	Jackson	Rural	47,319	19.5%			

1. US Census Bureau, Census 2010. Rural: ≤ 100 persons per square mile.
2. US Census Bureau, Census 2020.
3. Completed interviews out of all households where contact was attempted.
4. Completed interviews out of all households where contact was made.
5. Completed interviews out of all interviews targeted.

Hurricane Readiness

Coastal Counties
- Evacuated before or after?   57.6%
- Emergency supply kit available?   74.4%

Inland Counties
- Evacuated before or after?   42.6%
- Emergency supply kit available?   66.3%

Damage & Economic Losses

Variable	Category	Coastal Counties	Inland Counties
Damage to Home	Destroyed	9.9%	5.8%
	Damaged but repairable	68.2%	57.4%
	Minimal to no damage	20.9%	36.3%
Damage Costs	Mean (median)	$79,653 ($50,000)	$32,289 ($15,000)
	Range	$240-565,000	$35-250,000
Home Repairs	Completely repaired	27.0%	30.2%
	Somewhat repaired	54.7%	39.2%
	Not repaired at all	1.9%	9.9%
	Home destroyed	10.1%	5.3%

Columns will not add to 100% as we have not included percentage with missing or unknown information.

General Health & Healthcare Access

Coastal Counties	%
Injured during storm or clean-up?	19.0
New/worsening conditions since landfall:	
Allergies	38.4
Asthma	27.5
Diabetes	4.7
Hypertension	17.0
Access to care:	
Difficulty getting meds	23.1
Needed primary care	73.5
Needed primary care and received it	70.2

Inland Counties	%
Injured during storm or clean-up?	9.0
New/worsening conditions since landfall:	
Allergies	19.8
Asthma	10.2
Diabetes	6.4
Hypertension	12.7
Access to care:	
Difficulty getting meds	7.6
Needed primary care	38.0
Needed primary care and received it	38.0

Mental Health & Mental Healthcare

Variable	Category	Coastal Counties	Inland Counties
Access	Needed mental healthcare	20.9%	10.9%
	Unable to receive the services needed[1]	19.3%	26.3%
New or worsening conditions	Anxiety	43.2%	28.1%
	Depression	33.8%	22.1%
	Difficulty concentrating	25.5%	9.2%
	Trouble sleeping	34.7%	19.4%
	Agitated behaviors	29.7%	10.3%
	Increased alcohol consumption	4.6%	1.0%
Suicide ideation and risk	Low to no risk	94.3%	88.6%
	Moderate to high risk	5.7%	7.3%

1. Percentage of those unable to receive services out of all of those who needed services.

Public Health Actions

- Increased education and communication regarding preparedness and recovery was identified

- Tailored risk messaging for inland areas is warranted

- Include clear explanations of options for pet-friendly shelters and care for elderly or those needing special accommodations