



RED HILL IN FOCUS

WEBINAR SERIES



Public Health Activities related to
Red Hill

January 12, 2023

Webinar Series

The U.S. Environmental Protection Agency and the Hawai'i Department of Health are hosting the Red Hill In Focus Webinar Series to present information to the public on what agencies are doing to address impacts to human health and the environment from Red Hill Bulk Fuel Storage Facility releases.

For webinar series information, visit
www.epa.gov/red-hill/red-hill-webinar-series

Zoom Webinar Functions

Please use the Q&A window to ask questions

If you have audio issues, try clicking the Audio Settings icon to choose a different audio source.

Click the “Audio Settings” icon on your screen and select an audio source

The screenshot displays a Zoom Webinar interface. At the top, the title bar reads "Zoom Webinar". The main content area is dark with a pink square containing the letter "M". In the bottom left corner, the name "Miranda Maupin" is visible above a microphone icon, which is circled in yellow. In the bottom center, there are icons for "Mute", "Chat", and "Q&A", with the "Q&A" icon circled in red. In the bottom right corner, there is a "Leave" button. A "Question and Answer" window is open on the right side, outlined in red. It features a header with "All questions (2)" and "My questions (2)". Below this, there are two question entries: one from "Skeo IT (You)" at 12:50 PM with the text "Public question example", and another from "Anonymous Attendee" at 12:50 PM with the text "Anonymous question example". At the bottom of the window, there is a text input field labeled "Type your question here...", a checked checkbox for "Send anonymously", and "Cancel" and "Send" buttons. A link at the bottom right of the window asks "Who can see your questions?".

Webinar Agenda

1. Introduction (Gabriela Carvalho, EPA)
2. Public Health Response to Red Hill (Diana Felton, DOH)
3. Overview of Assessment of Chemical Exposures (ACE) 1 & ACE 2 (Stacey Konkle, ATSDR)
4. Public Health Assessment Activities (Ben Gerhardstein, ATSDR)
5. Questions and Answers



Registration Questions

Public Health Response to Red Hill

Diana Felton, MD, Medical Toxicologist
Hawai'i Department of Health

Technical Assistance ATSDR/NCEH

- Review of environmental sampling data in the setting of health recommendations
- Literature review of available science related to short- and long-term health effects of petroleum in drinking water
- Water system expertise including water treatment options, flushing risks, and other water system issues
- Evaluation of the feasibility of biomonitoring related to the event
- Disease surveillance and health surveys

Public Health Activities at Red Hill, Oahu, HI

*Findings from the 2022 ACE Health Surveys and
Upcoming Public Health Assessment Activities*

Red Hill In Focus – Webinar Series Sponsored by EPA R9
January 12, 2023

Ben Gerhardstein, MPH
Environmental Health Scientist
Region 9

Stacey Konkle, PhD, MPH
Epidemiologist
Assessment of Chemical Exposures (ACE) Team

Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

- **20 tanks built into the earth**
- **Total storage capacity 250 million gallons**
- **3 pipelines run 2.5 miles through a tunnel**
- **Fuel releases in 2014 and 2021**
- **Secretary of Defense decided in March 2022 to close facility**



Image from EPA, <https://www.epa.gov/red-hill/what-red-hill-bulk-fuel-storage-facility>.

<https://www.epa.gov/red-hill/what-red-hill-bulk-fuel-storage-facility>

Agency for Toxic Substances and Disease Registry (ATSDR)

- **Federal public health agency**
- **Congressionally mandated to**
 - Perform public health assessments at contaminated sites
 - Develop toxicological profiles on harmful substances
 - Conduct epidemiological studies
 - Maintain health registries and conduct medical surveillance
- **Regional offices provide national presence**

ATSDR's work at Red Hill

- **Assessment of Chemical Exposures (ACE) health surveys**
 - Better understand health symptoms people have experienced after the November 2021 Red Hill fuel release
- **Public health assessment activities**
 - Evaluate data and information on chemical releases from Red Hill since 2005 that may have resulted in human exposures

Impacts Associated with the Joint Base Pearl Harbor-Hickam Water System Contamination: Assessment of Chemical Exposures (ACE) Investigations

Oahu, Hawai'i

Stacey Konkle, PhD, MPH

ATSDR/CDC

Office of Innovation and Analytics

Registries and Surveillance Section

Environmental Protection Agency (EPA)

Red Hill in Focus Webinar Series

January 12, 2023

National Center for Environmental Health
Agency for Toxic Substances and Disease Registry
Agency for Toxic Substances and Disease Registry



ATSDR Assessment of Chemical Exposures (ACE) team



Maureen Orr, MS
Epidemiologist
ATSDR/CDC
Office of Innovation and Analytics
Registries and Surveillance Section
Surveillance Team Lead

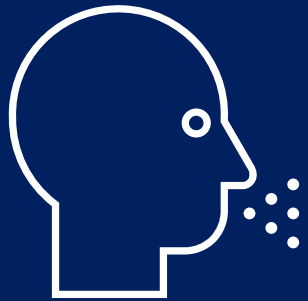


Stacey Konkle, PhD, MPH
Epidemiologist
ATSDR/CDC
Office of Innovation and Analytics
Registries and Surveillance Section
Assessment of Chemical Exposure (ACE) Lead

~9,700
households
potentially
exposed to jet
fuel in their tap
water



Previous studies suggest exposure to jet fuel may impact the *respiratory system*, *gastrointestinal tract*, and *nervous system*



Coughing



Difficulty
breathing



Abdominal
pain

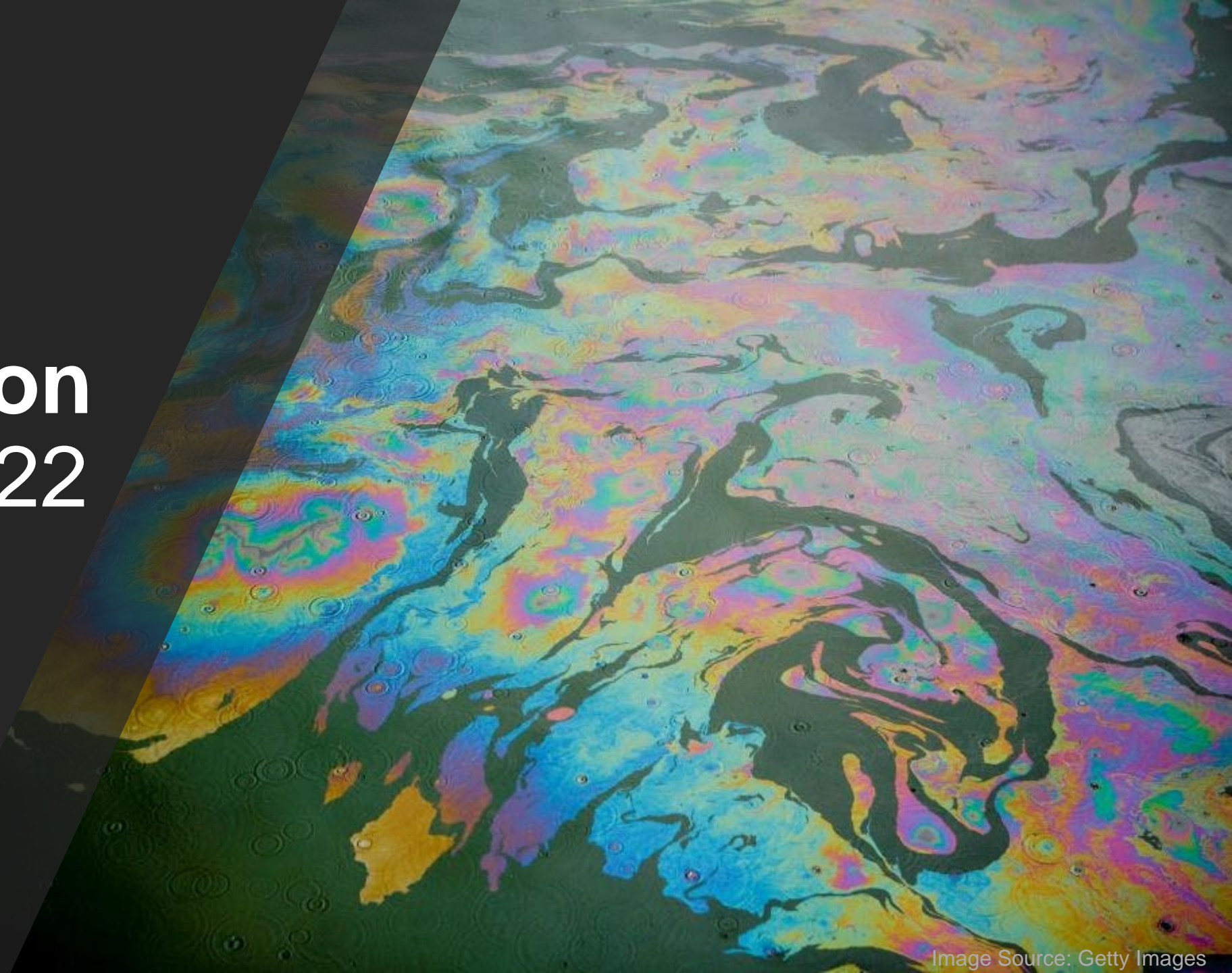


Fatigue



Convulsions

**Initial
ACE
investigation
January 2022**



ACE Investigation

ACE Toolkit

Surveys

Consent
Forms

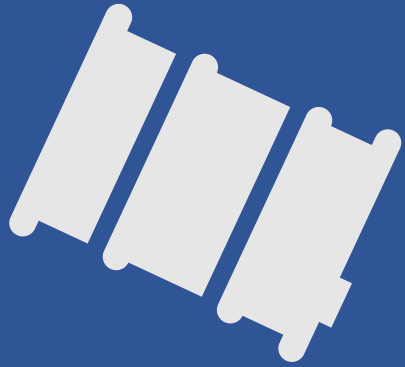
Training
Materials

Databases

Customize

Assessment
after Chemical
Incident

Purpose of Initial Assessment of Chemical Exposures (ACE) investigation



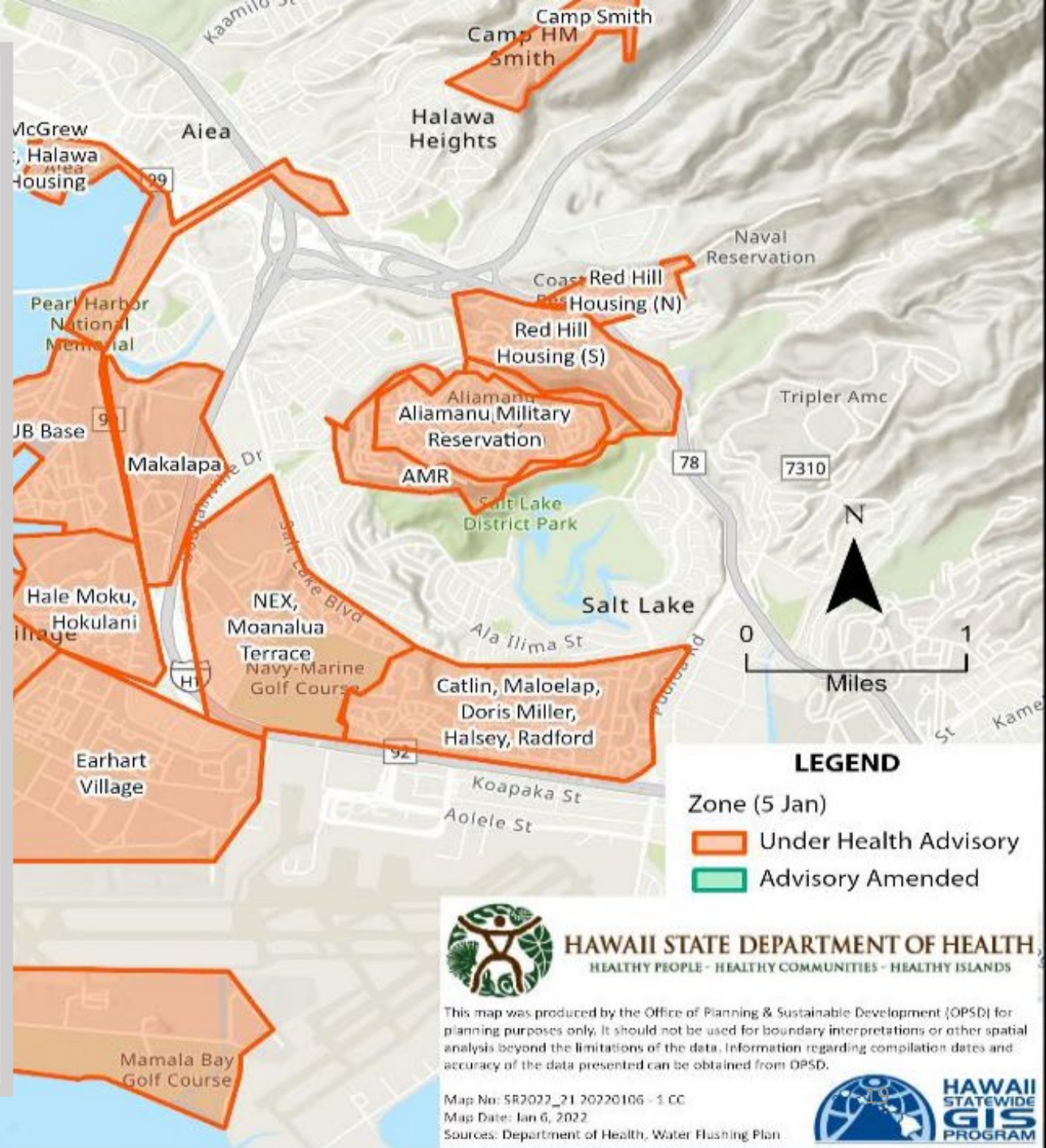
Assess the impact
of the incident



Provide
recommendations

Eligibility

1. At least 18 years or older (or parent/guardian of child <18 years)
2. Present in an affected area after November 20, 2021
 - Work
 - Residence
 - School



Survey recruitment

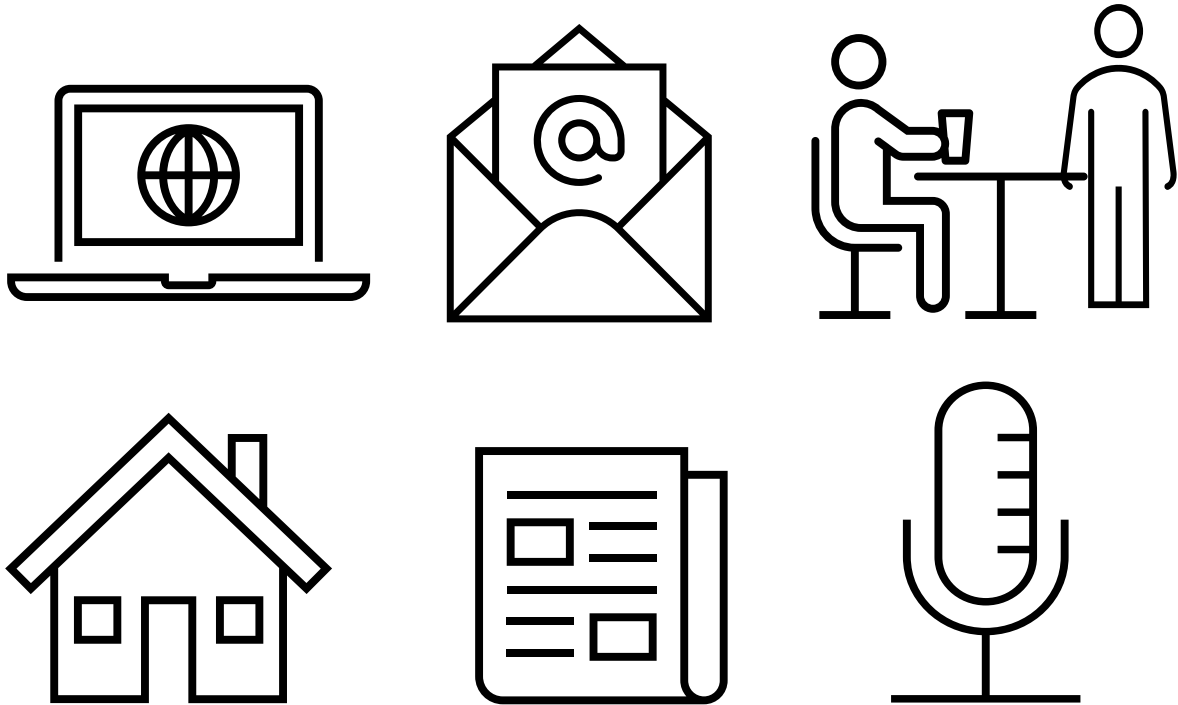
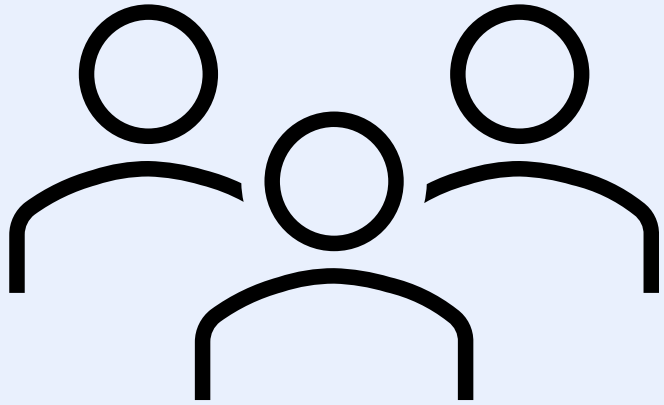


Photo used with permission from Epi-Aid study team

CDC team member conducting in-person interview at Kapilina's Beach Park



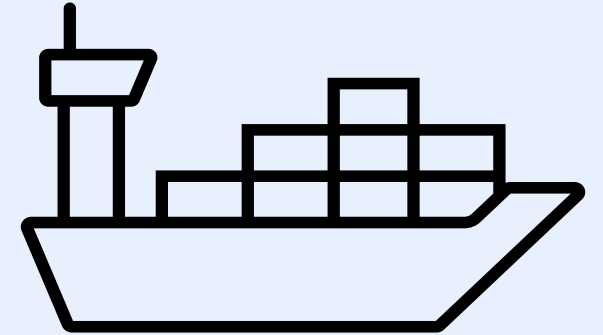
2,289

**participants
submitted
surveys
electronically**



14%

**of affected
households
were
represented**



88%

**were affiliated
with the military**

Initial ACE investigation key findings



reported at least one new or worsening health symptom



switched to an alternate water source



of people with symptoms saw improvement after switching to an alternate water source



sought medical care.
17 people were hospitalized overnight

Top reported symptoms and those lasting 30 days or more

Symptom	Symptoms Present	Percent Present
Headache	1330	57%
Skin_Dry_Itchy	1152	50%
Diarrhea	1128	49%
Fatigue	1026	44%
Nausea	936	40%
Skin_Rash	932	40%
Eye_Irritation_Burning	885	38%
Dizziness	885	38%
Skin_Irritation_Burning	862	37%
Anxiety	847	37%

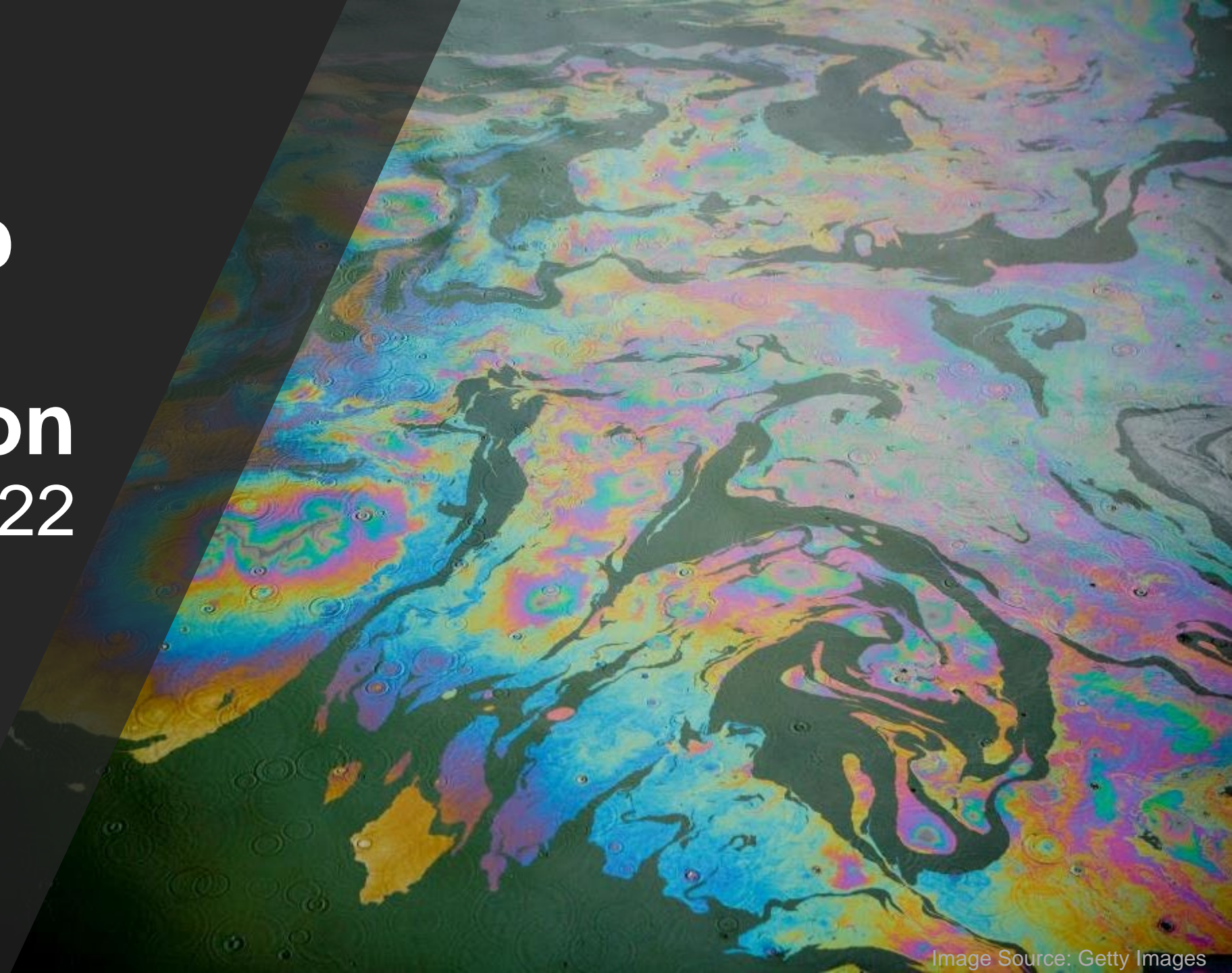
Initial ACE investigation recommendations

- Ensure the safety of the water system & build trust in it
- Conduct multi-agency hotwash
- Coordinate communication and actions across agencies
- Educate healthcare providers
- Use ATSDR's Community Stress Resource Center
- **Consider additional health investigations- 6-month follow-up ACE investigation**

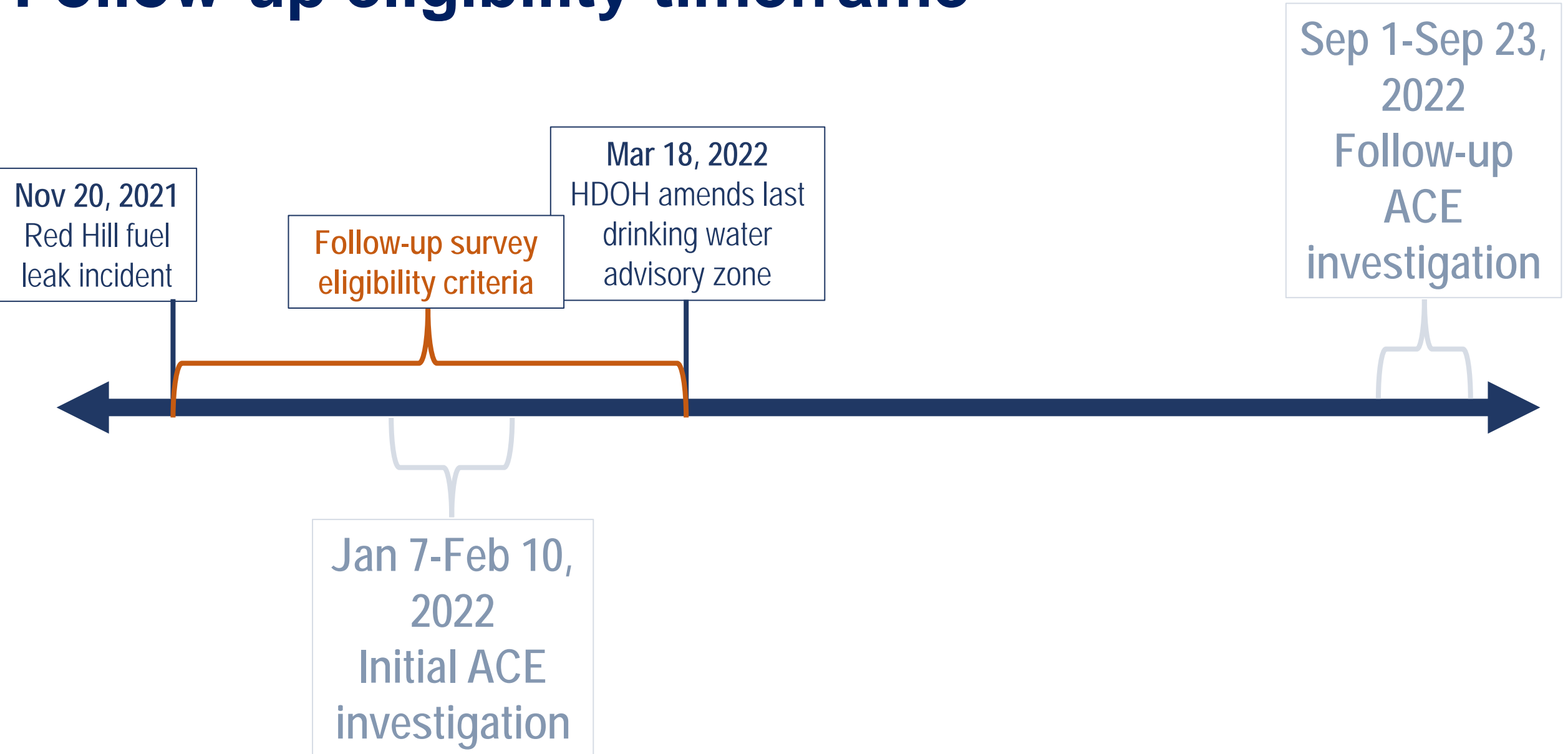


Photo provided by the ACE Epi-aid team

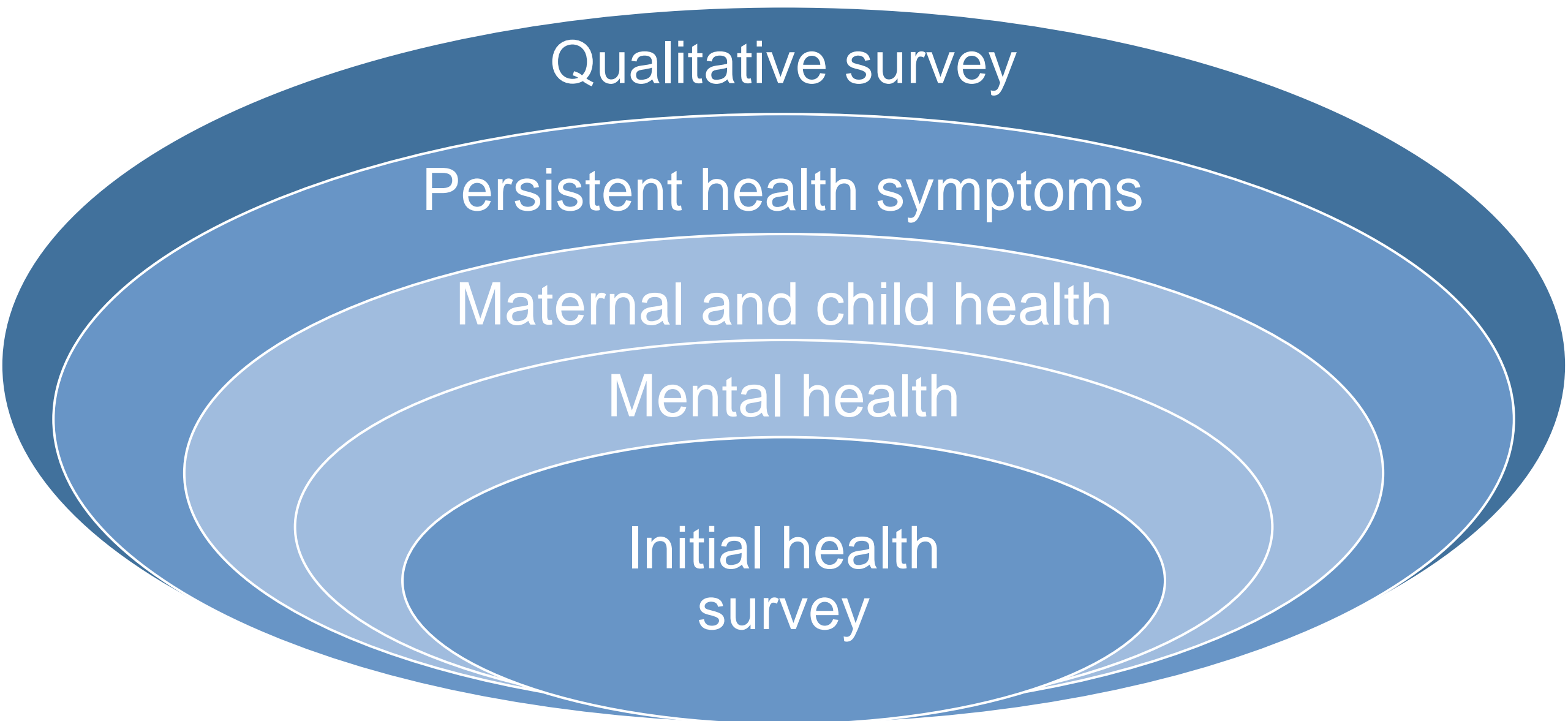
**Follow-up
ACE
investigation
September 2022**



Follow-up eligibility timeframe



Follow-up investigation design





Navy Water System Contamination Follow-Up Health Survey



How to Participate

Scan the QR code

Online: tinyurl.com/RedHillWater

Phone: 404-567-3256

Email: ATSDRACE@cdc.gov

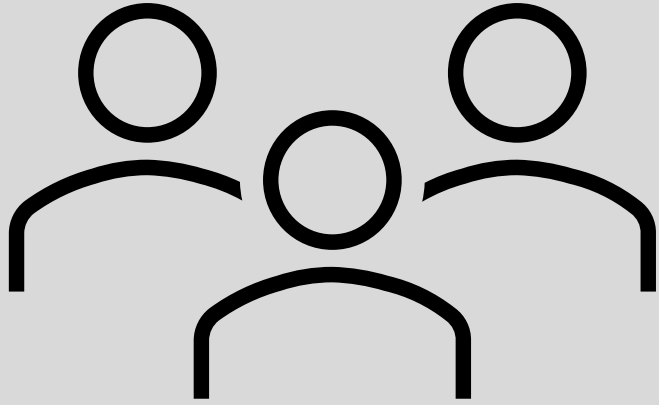
The survey will be available online until September 23, 2022



For more info, visit health.hawaii.gov

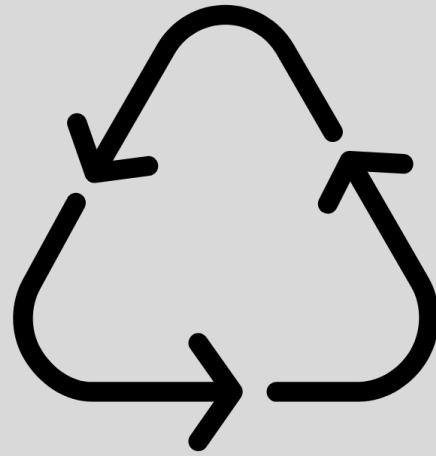
Survey Recruitment





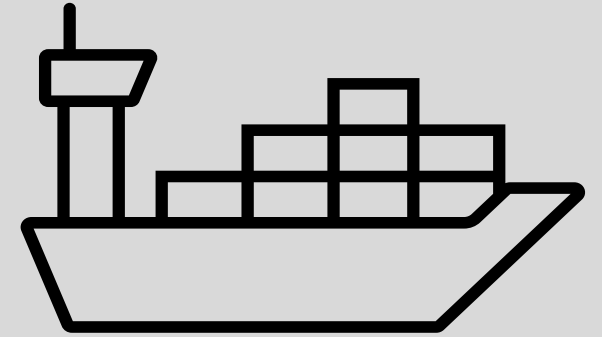
986

**participants
submitted
surveys
electronically**
representing 8% of
affected households



61%

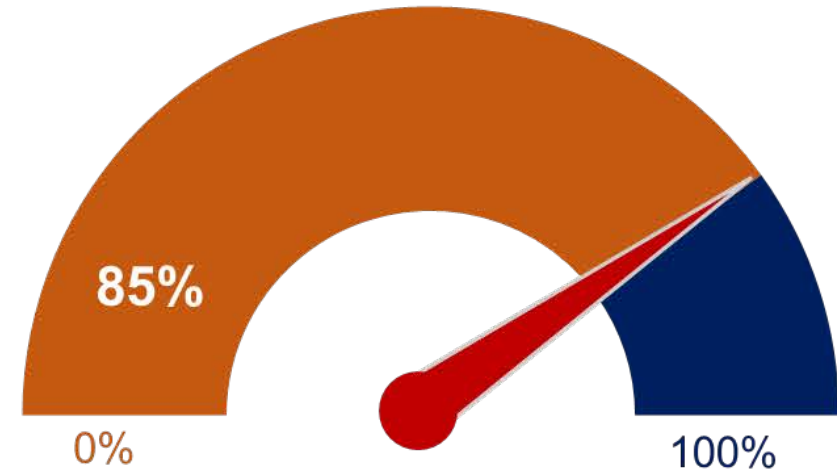
**returning
participants**



90%

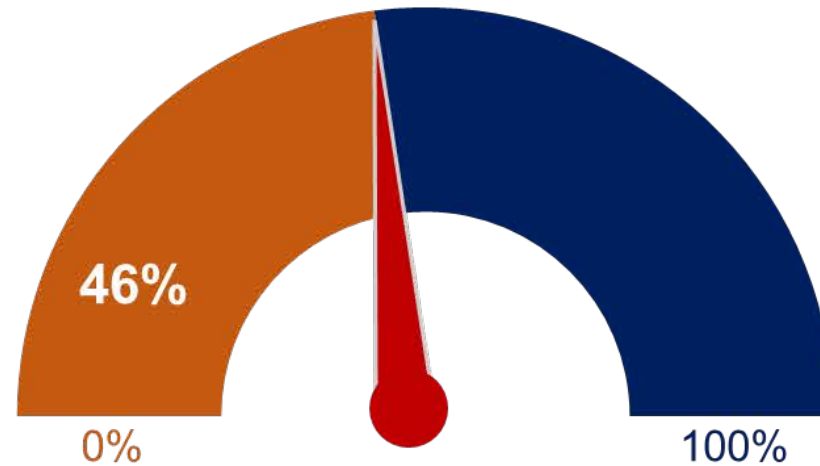
**were affiliated
with the military**

Water quality and trust findings



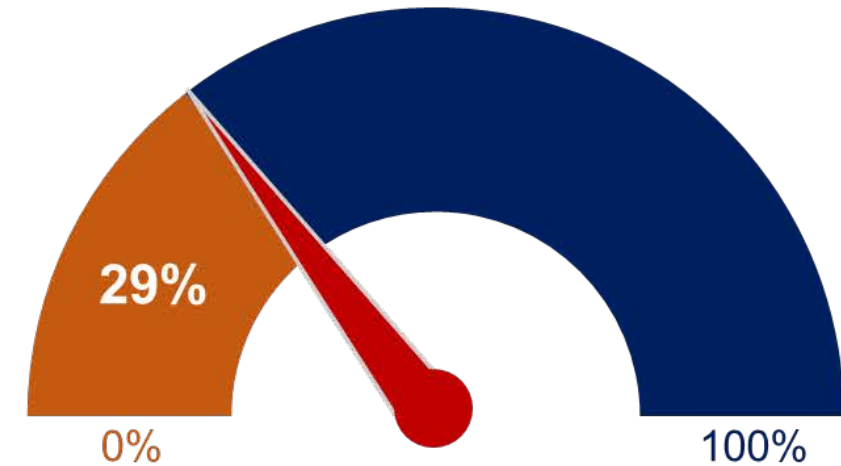
85%

still using
**alternate water
sources**



46%

**very concerned
about tap water**



29%

**smelled or tasted
petroleum or saw a
sheen in tap water**

Participants are **very concerned** about tap water safety

Do you think the water is safe now?

- "Absolutely not. Please bring back water distribution."
- "Not particularly for consumption, *pets included.*"
- "No, I truly believe there are still issues with the water."

Many participants report **worse health** after the incident

41%

of all participants reported worsening of an existing condition

31%

reported a **new diagnosis** from a healthcare provider since the incident

25%

of those with new diagnoses had no pre-existing conditions prior to the incident

Many participants report **worse health** after the incident

80%

Reported mental or physical health symptoms in the past 30 days

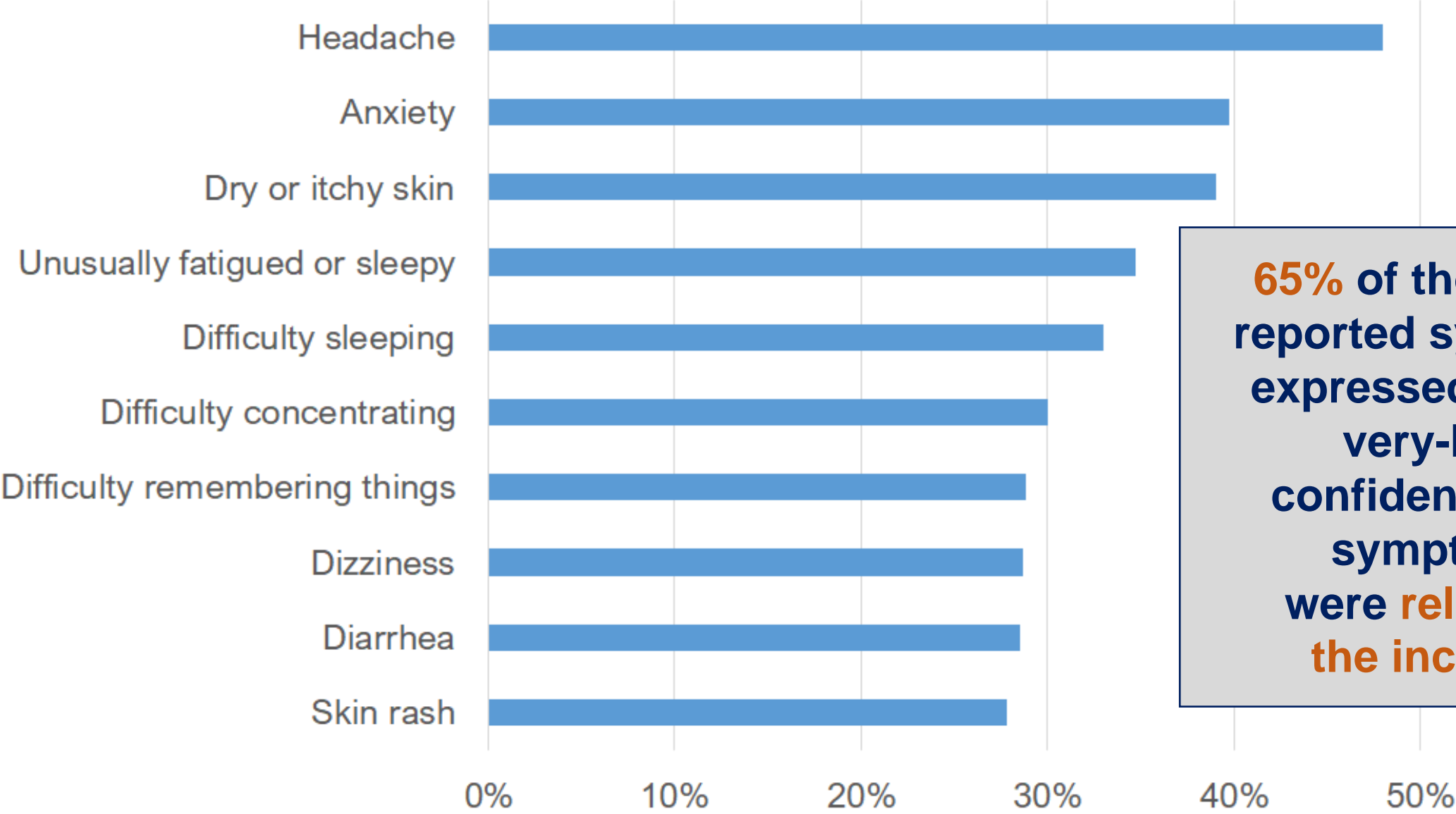
55%

reported worse physical health after the incident when compared to before

21%

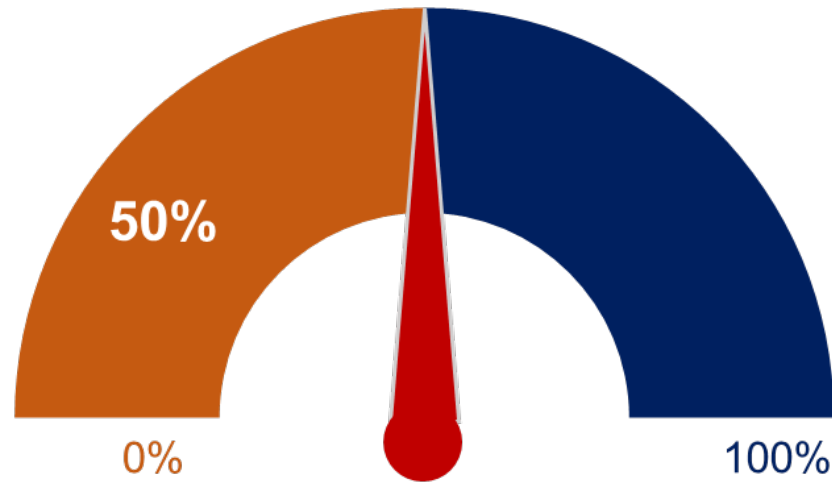
kept from usual activities for 14+ days of the past 30 days due to poor health

Top symptoms in the past 30 days



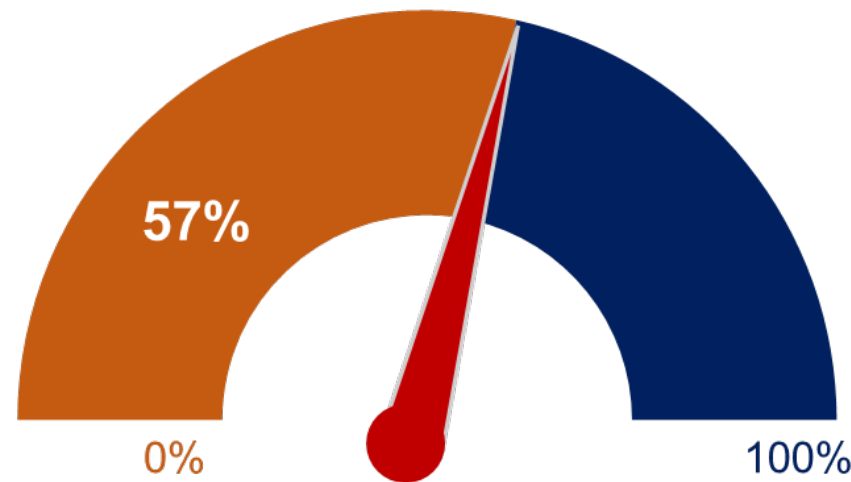
65% of those who reported symptoms expressed high to very-high confidence that symptoms were **related to the incident**

Follow-up ACE investigation mental health findings



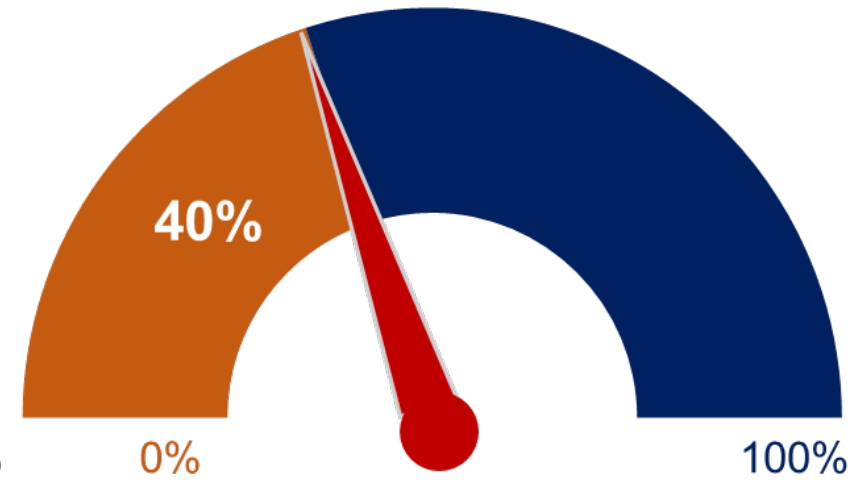
50%

worse mental health in the past 30 days



57%

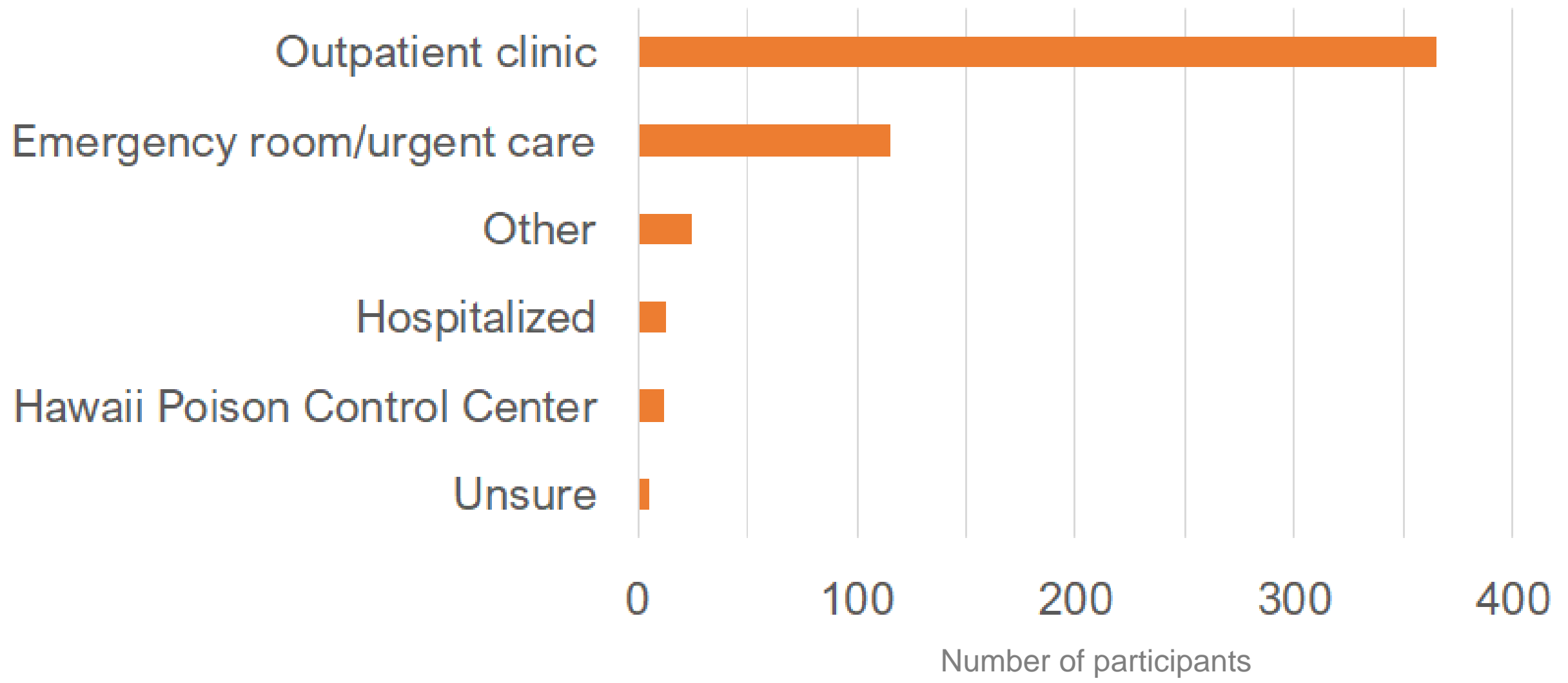
think about the incident every day



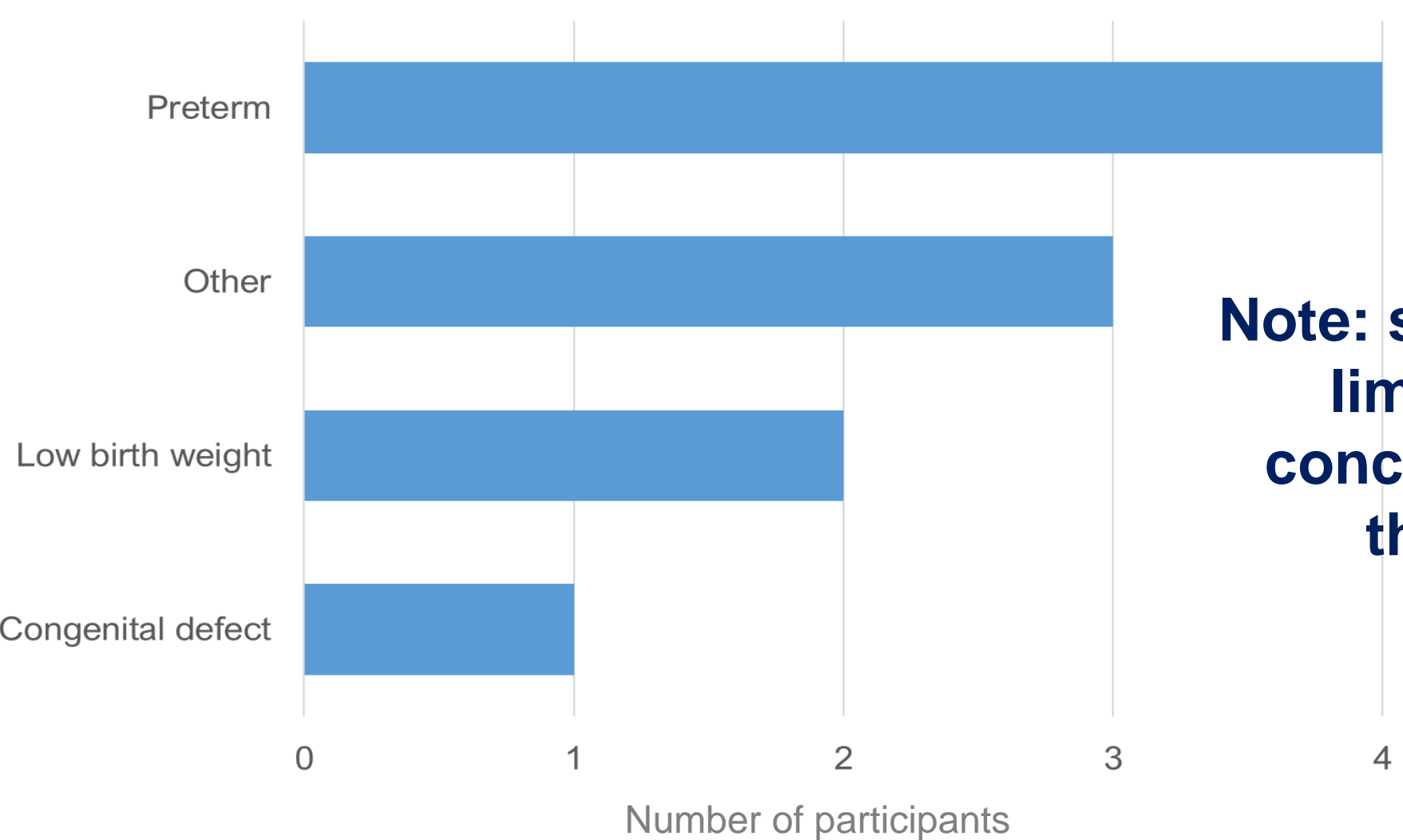
40%

anxiety in the past 30 days

55% sought medical care because of the incident



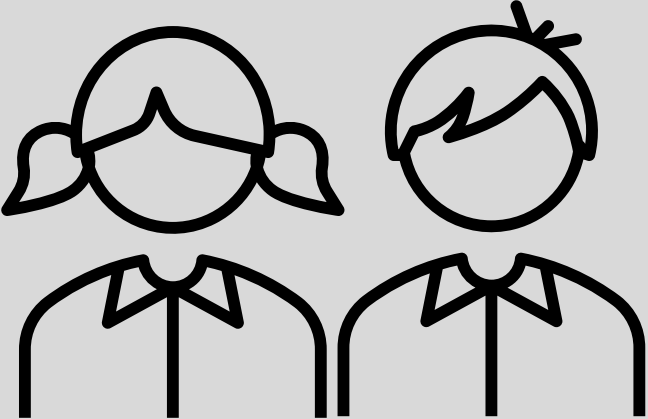
8 of 20 participants who gave birth since the incident reported an adverse outcome



Note: small numbers limit drawing conclusions from these data

*some participants reported multiple adverse outcomes

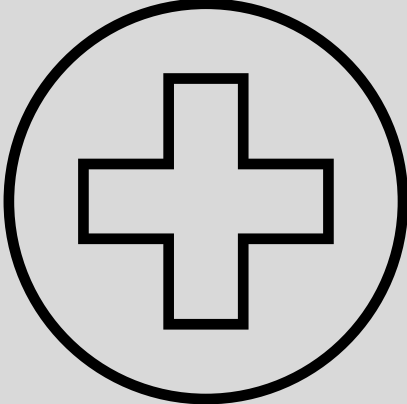
Follow-up pediatric responses



Pediatric responses

152

vs. 740 initial



Symptomatic

79%

vs. 83% initial



Sought medical care

65%

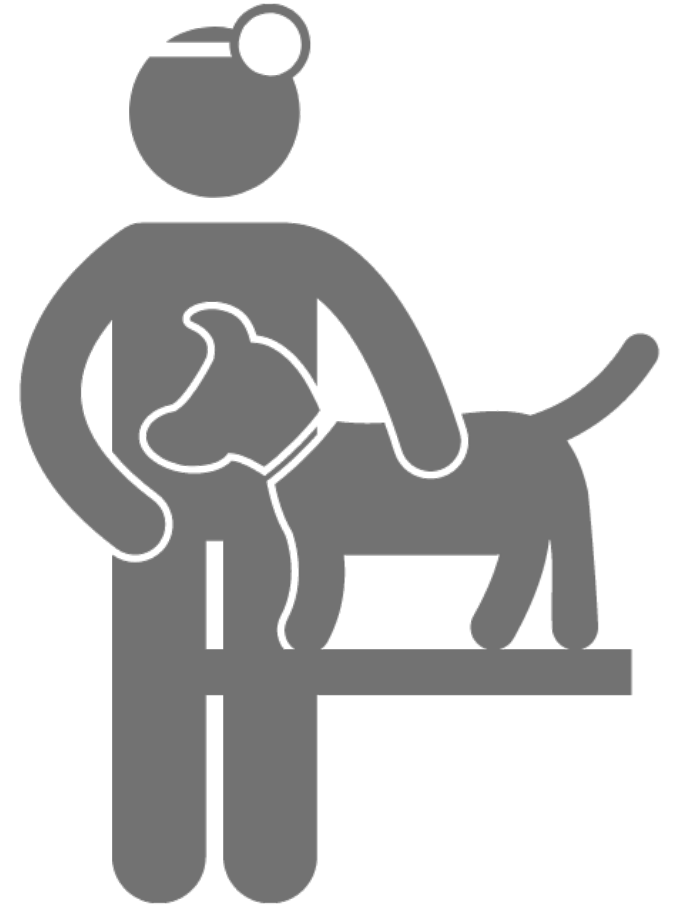
vs. 37% initial

Pets

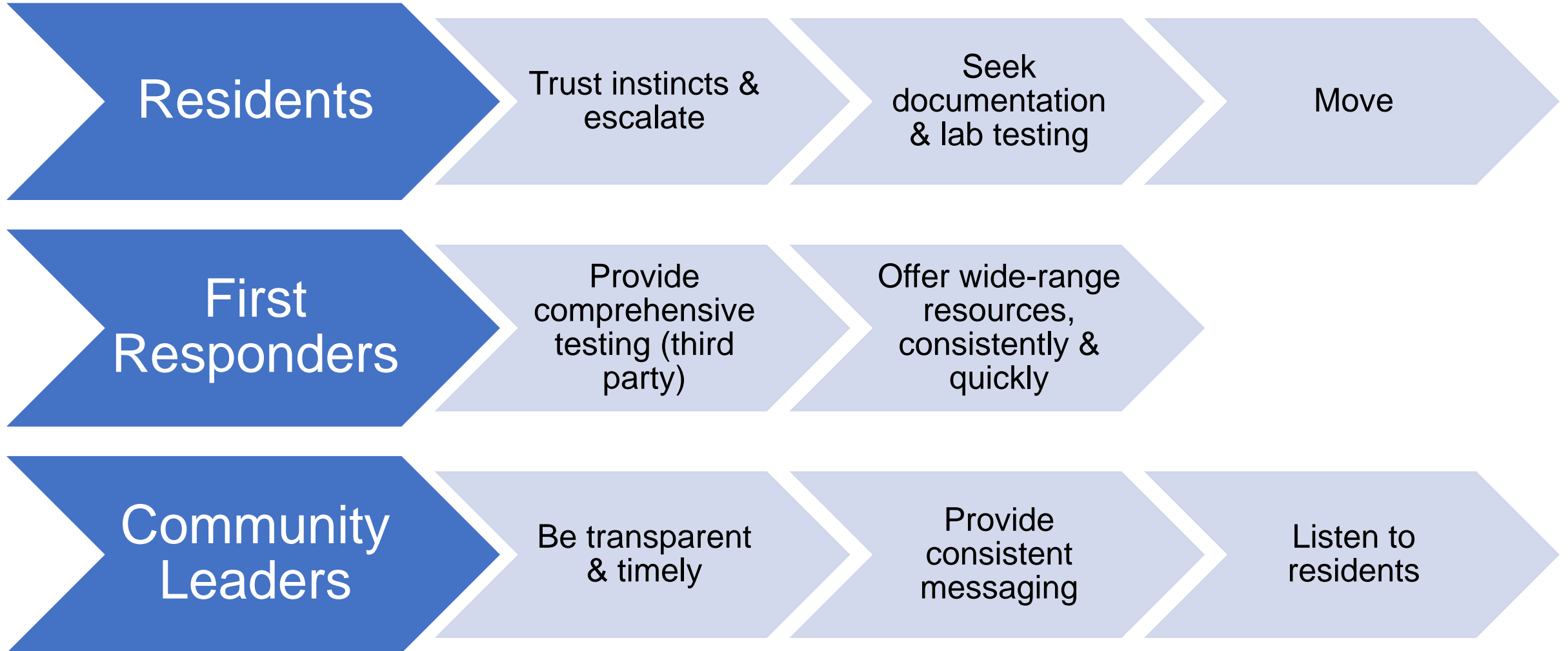
Proportion of ill pets

- Initial survey- **50%**
- Follow-up survey- **59%**

Of these, **55%** took an ill pet to a **veterinarian**



If an event like this occurred in a different community, what would you recommend to residents, first responders, and **community leaders** there?





Follow-up ACE Summary of results

Water usage

- **85%** of survey participants reported still using **alternate** water sources

Water quality

- **29%** report smelling or tasting petroleum or seeing a sheen in tap water in the past 30 days

Symptoms

- **80%** reported symptoms in the past 30 days
- **65%** expressed **high to very-high confidence** that symptoms were related to the incident

Follow-up ACE Summary of results

Mental health burden

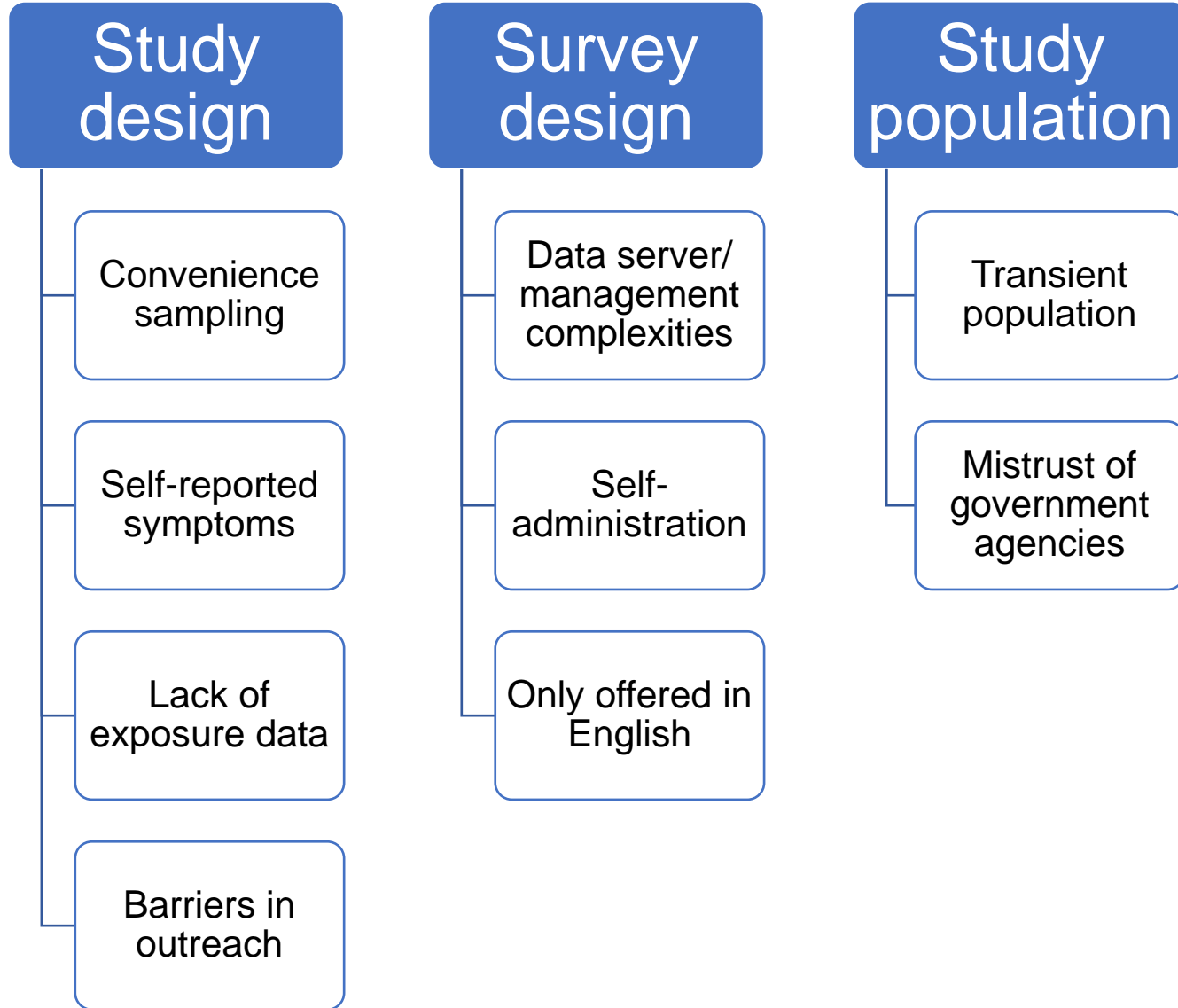
- **57%** of participants think about the incident every day
- **40%** of participants reported anxiety

Pediatrics

- **79%** of pediatric participants reported being **symptomatic** in the past 30 days



Limitations



Strengths



Follow-up ACE investigation recommendations

Develop multipronged strategy to rebuild confidence in the drinking water system.

- Continue regular drinking water monitoring at residences and businesses on the water system.
- Consider third-party split sampling to build trust as well as on-demand testing for people with concerns, even if it is above the quota.
- Ensure transparency with testing/monitoring plans and drinking water quality results that are easily accessible and understandable for the public.

Follow-up ACE investigation recommendations

To rebuild trust, multi-agency workgroups are key.

- Establish joint emergency preparedness plans and exercises among partners responsible for addressing potential future drinking water contamination.
- Ensure consistency of communication from leadership and parity of resources and support given to affected communities, including civilians.
- Develop emergency response protocol for rapid environmental and biological sampling.

Follow-up ACE investigation recommendations

Assist clinical providers in registering and supporting affected communities.

- Provide guidance on signs and symptoms of petroleum exposure and the effects that acute and chronic stress can have on health.
- Develop referral systems for mental health and trauma support.

Follow-up ACE investigation recommendations

Support affected communities.

- Acknowledge the disruption the incident caused to daily life.
- Facilitate access to mental/physical health care and support systems, locally and for those who moved away.

Follow-up ACE investigation recommendations

Further investigate health and environmental impacts.

- Consider conducting a review of Department of Defense (DOD) and other medical records for exposed individuals.
 - Include syndromic surveillance and birth records data
 - Link to Defense Occupational and Environmental Health Readiness System (DOEHRS)
- Identify and characterize ongoing and long-term health effects in affected individuals.
 - Consider developing a third-party registry (ex. Flint Registry)
- Provide environmental sampling data for CDC/ATSDR public health assessment activities.

Conclusion

ATSDR saw a significant number of people reporting symptoms in the 6-month follow-up survey that we did not expect to see.

ATSDR is committed to supporting those affected in the community and is working on several fronts to assist.

Next Steps

ATSDR is
working to

analyze data and make results available publicly

assist DHA in military medical records review

develop resources for medical providers

assist a third-party registry model

CDC/ATSDR

- Asha Choudhury
- Nakia Clemmons
- Charles Edge
- Ben Gerhardstein
- Kevin Horton
- Mohammed Khan
- Maureen Orr
- Stacey Konkle
- Michele Bolduc
- Alyson Cavanaugh
- Vidisha Parasram
- Renee Funk
- Alex Poniatowski
- Jamie Rayman
- Gregory Zarus
- Abigail Gates
- Susan McBreairty
- Amanda Smith
- Krishna Surasi
- Alyssa Troeschel
- Shanna Miko
- Daniel Nguyen



Hawaii Department of Health

- Kaitlin Arita-Chang
- Diana Felton
- Maddy Jarvis
- Dave Johnston
- Grayson Kallas
- Sarah Kemble
- Nicole Mintz

Additional Thanks

A special thanks to Jose Aponte, Jennifer Espiritu, Joanna Gaines, Jill Shugart, Suzanne Todd, the Epi-Aid program, and survey participants.

Thank you

For more information, contact NCEH/ATSDR
1-800-CDC-INFO (232-4636)

TTY: 1-888-232-6348 www.atsdr.cdc.gov www.cdc.gov

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention and the Agency for Toxic Substances and Disease Registry.



Sources

1. Joint Base Pearl Harbor-Hickam Interagency Drinking Water System Team. Water system flushing zone map. Oahu, HI; Accessed March 14, 2022. 2022. https://www.cpf.navy.mil/Portals/52/Downloads/JPBHH-Water-Updates/20220130_Flushing_Map_Status.pdf?ver=z8TDJP-ippC8g5Qg9j3RKg%3d%3dpdf icon
2. Agency for Toxic Substances and Disease Registry. Assessment of Chemical Exposures (ACE) Program. Accessed December 20, 2022. <https://www.atsdr.cdc.gov/ace/index.html#:~:text=When%20toxic%20substance%20spills%20or,perform%20a%20rapid%20epidemiologic%20assessment.>
3. Hawaii Department of Health. DOH Declares Drinking Water Distribution System Recovery Plan Zone I1 Safe; February 14, 2022. <https://health.hawaii.gov/news/newsroom/doh-declares-navy-drinking-water-distribution-system-zone-i1-safe/>
4. Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report (MMWR). Notes from the Field: Self-Reported Health Symptoms Following Petroleum Contamination of a Drinking Water System — Oahu, Hawaii, November 2021–February 2022; May 27, 2022 <https://www.cdc.gov/mmwr/volumes/71/wr/mm7121a4.htm>
5. Hawaii Department of Health. Navy Water Contamination Survey Results; Updated 5/26/22. <https://health.hawaii.gov/about/files/2022/05/JPBHH-Water-Contamination-Survey-Results.pdf>

For more information, contact NCEH/ATSDR
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PUBLIC HEALTH ASSESSMENT ACTIVITIES

Ben Gerhardstein

ATSDR Red Hill public health assessment team

San Francisco, CA



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Involvement Specialist
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Ben Gerhardstein
Regional Representative
bgerherdstein@cdc.gov

Atlanta, GA



Carole Hossom
Health Assessor



John Marr
Health Assessor

Public health assessment activities at Red Hill

- Evaluate existing environmental and health data on chemical releases from the Red Hill facility since 2005
- Determine whether and how exposures could harm people's health
- Identify data gaps
- Make recommendations to protect health

3 Big Questions about Community Exposure and Health

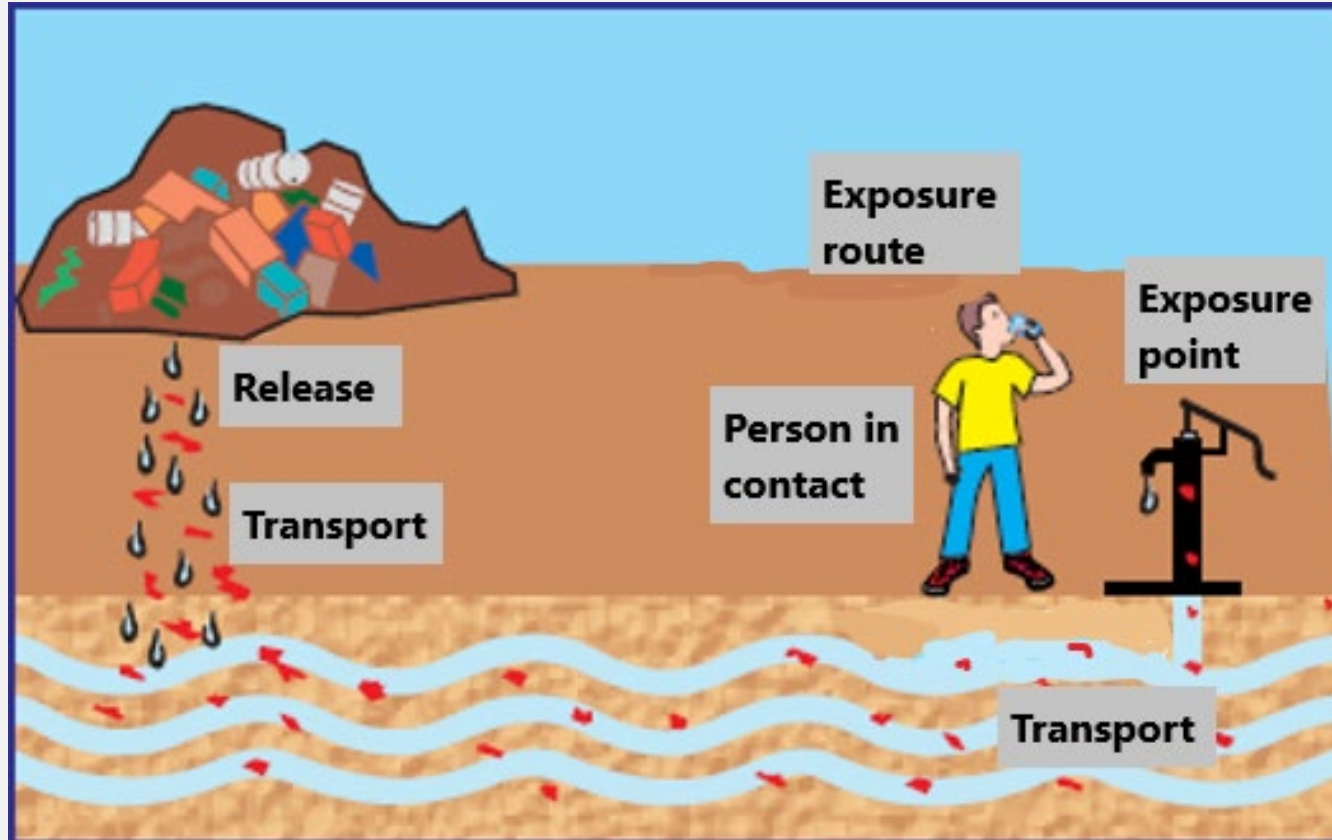
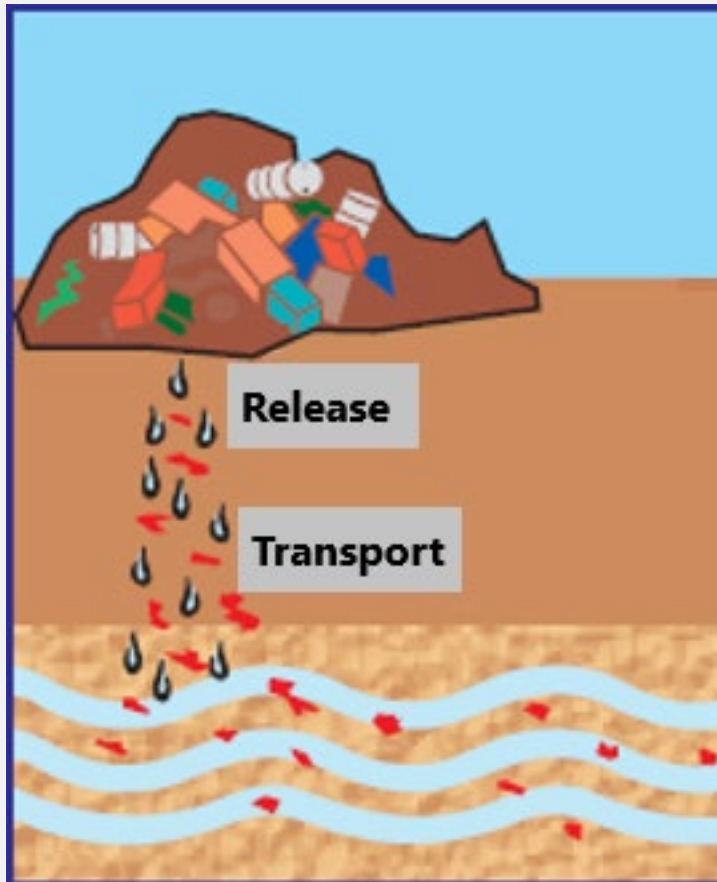


Image from ATSDR factsheet.

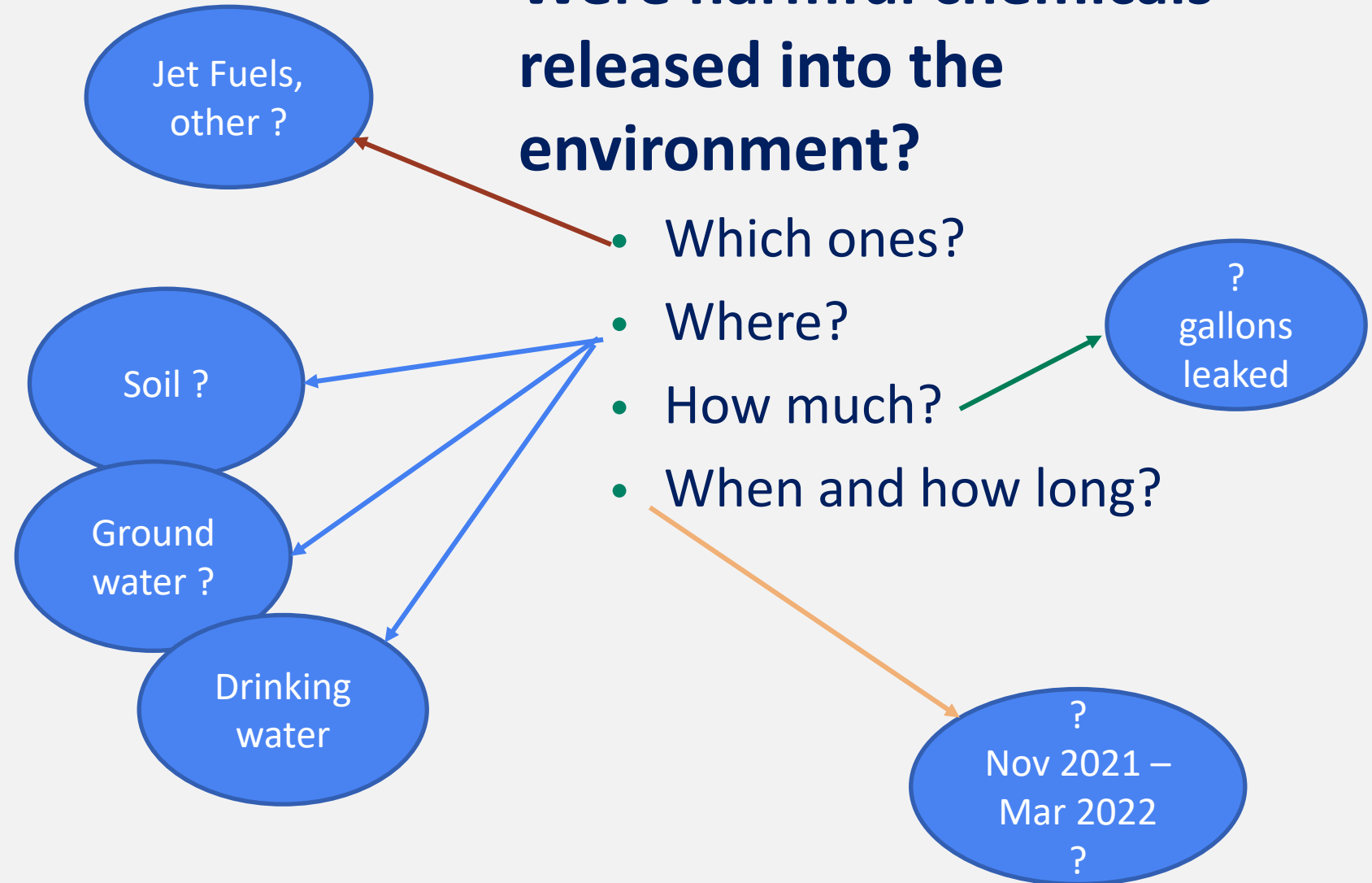
1. Were harmful chemicals released into the environment?
2. Could those chemicals get into people's bodies?
3. Could the amount of chemicals in people's bodies harm their health?

An **exposure pathway** is the path a contaminant takes from its source to the point where people are exposed to it.

Big Question



Were harmful chemicals released into the environment?



Public Health Assessment

Collect and review environmental and health data and information

Seeking Data/Information from 2005 - 2022:

Navy water distribution system

Groundwater

Chemical gases in soil

Releases/leaks from the Red Hill Facility

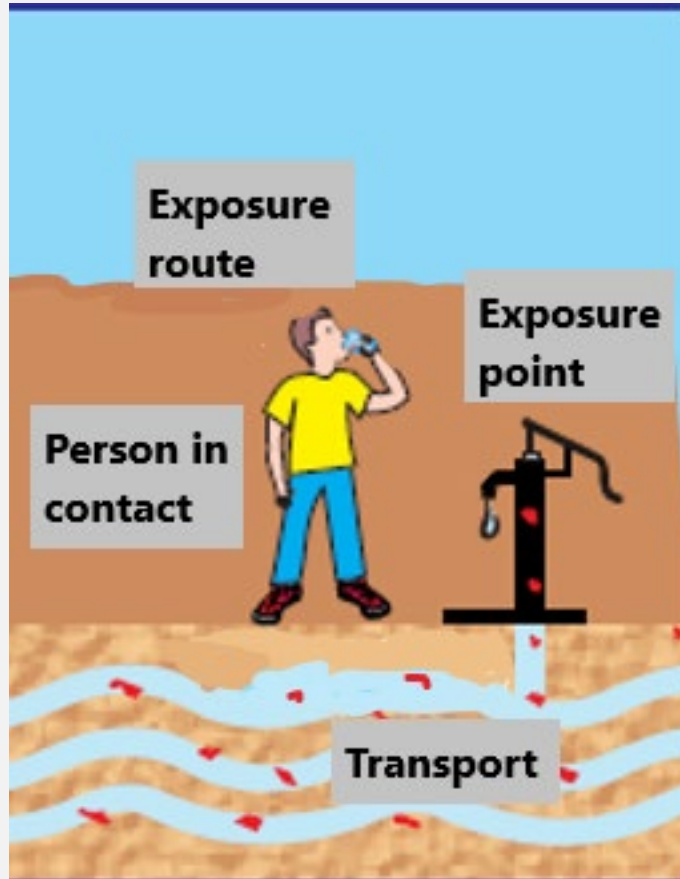
Red Hill incident response

Health data and information

Big Question

Navy drinking
water system

Other
exposure
pathways?



Could those chemicals get into people's bodies?

- Who might have been exposed?
- How were they exposed?
- How much of the chemical were people exposed to?
- How long did exposures last?
- How often did exposures occur?

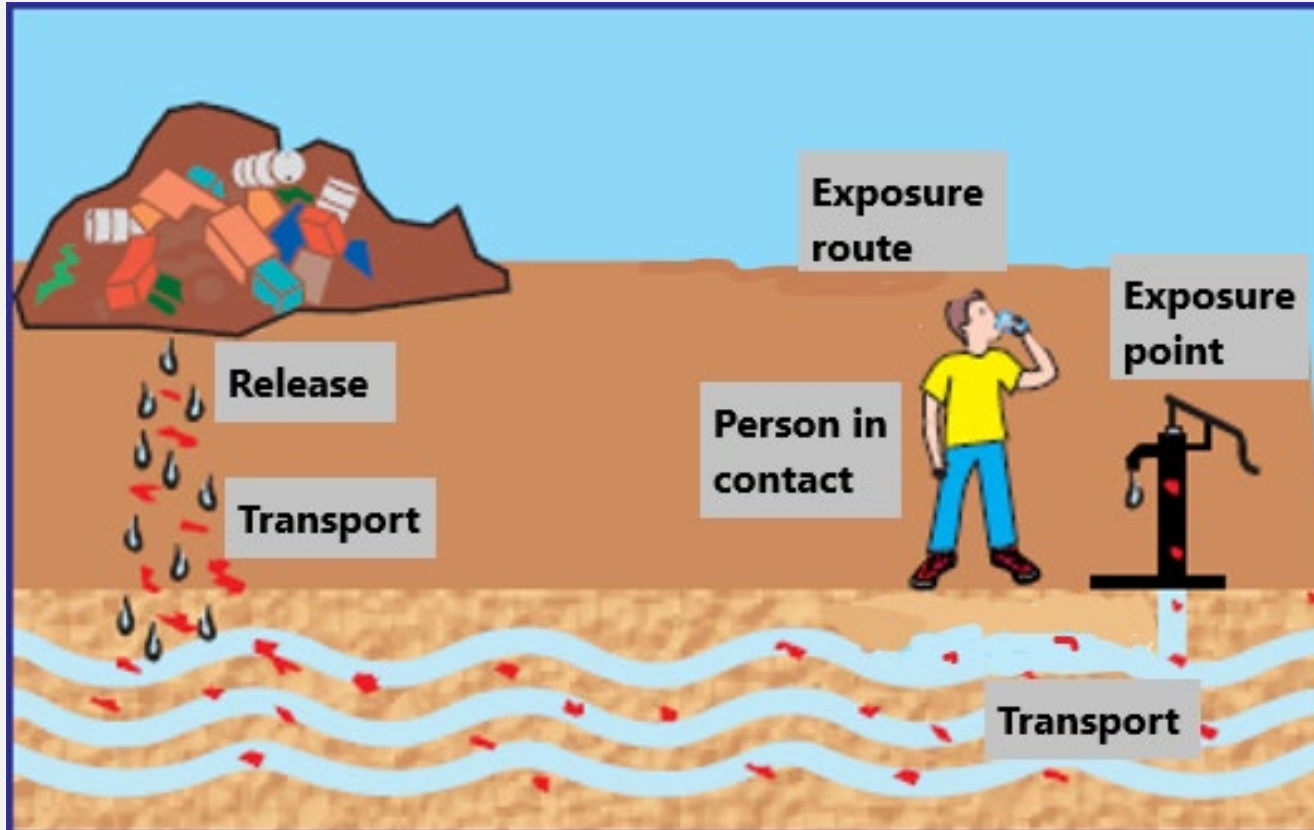
Public Health Assessment

Identify ways people might come in contact with chemicals

Chemical	Exposure Pathway	Completed ?
Jet fuels	Navy drinking water system	Yes
Firefighting foam	?	?
Other?	?	?

<https://www.atsdr.cdc.gov/pha-guidance/index.html>

Big Question



Could the amount of chemicals in people's bodies harm their health?

- Dose?
- Ages / Stages?
- Existing health conditions?
- What is known about health effects of a specific chemical exposure?

Public Health Assessment

Determine how exposure might affect public health.

Identify data gaps that prevent us from answering questions about health risks.

Public Health Assessment

Communicate findings and make recommendations to community members, health and environmental agencies, and other stakeholders to protect public health.

Commitment to community engagement

- **Will involve current and former residents in the process to better understand experiences and concerns**
 - Meetings, webinars, and other opportunities to dialogue
- **Will keep community members up to date on our progress**
 - Contact Jamie Rayman (JRayman@cdc.gov) to receive email updates

Status of Red Hill public health assessment activities

- **Received Hawaii Department of Health request in summer 2022**
- **Assembled an ATSDR team**
- **Scoped the assessment**
- **Asked for and started receiving data from the Navy and Hawaii Department of Health**
- **Communicating with the public and other organizations about progress of ATSDR's work streams**

Questions?

Public health assessment: Ben Gerhardstein: bgerhardstein@cdc.gov

Health survey: ATSDRACE@cdc.gov

For more information, contact ATSDR

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Questions and Answers

- Questions today will focus on presentation content
- If you have issues with your water:
 - Contact DOH's Safe Water Drinking Branch at (808) 586-4258 or SDWB@doh.hawaii.gov.
- If you need medical services:
 - DEERS enrolled patients can make an appointment at the Defense Health Agency Red Hill Clinic by calling 1-800-874-2273, press Option 1
 - Civilians can make an appointment with their primary care doctor or other medical providers

*DEERS is the Defense Enrollment Eligibility Reporting System, a military database for US military members, family members, veterans, retirees, DoD contractors and others who are eligible to receive military benefits.



Questions?

Agency Contacts

- For information about EPA and DOH work on Red Hill:
 - Sign up for EPA's Red Hill email list:
www.epa.gov/red-hill/forms/red-hill-email-distribution-list
 - Sign up for DOH's Red Hill email list:
health.hawaii.gov/ust/ust-home-test/ust-red-hill-project-main/
 - Send messages to RedHill@epa.gov and/or Thu.Perry@doh.hawaii.gov
- ATSDR contacts:
 - ACE health surveys: ATSDRACE@cdc.gov
 - ATSDR public health assessment activities: bgerherdstein@cdc.gov or jrayman@cdc.gov

Upcoming Webinars

Next webinar event will be announced shortly.

If there is a specific topic you would like covered in an upcoming webinar, please email RedHill@epa.gov with your suggestion.

For webinar series information, visit
www.epa.gov/red-hill/red-hill-webinar-series



Thank you