RED HILL IN FOCUS
WEBINAR SERIES

Public Health Activities related to Red Hill

January 12, 2023

Webinar Series

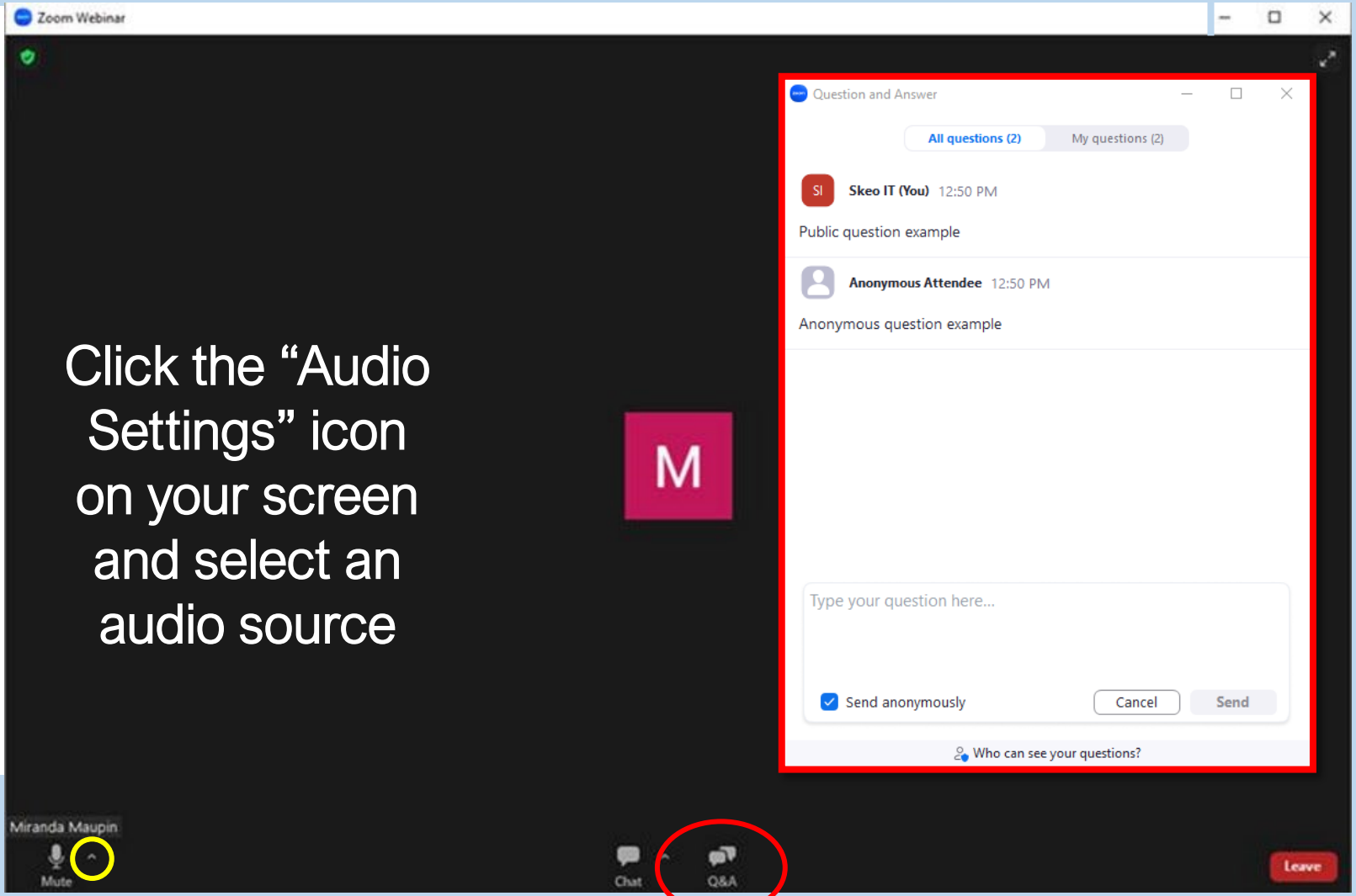
The U.S. Environmental Protection Agency and the Hawai'i Department of Health are hosting the Red Hill In Focus Webinar Series to present information to the public on what agencies are doing to address impacts to human health and the environment from Red Hill Bulk Fuel Storage Facility releases.

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.



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

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

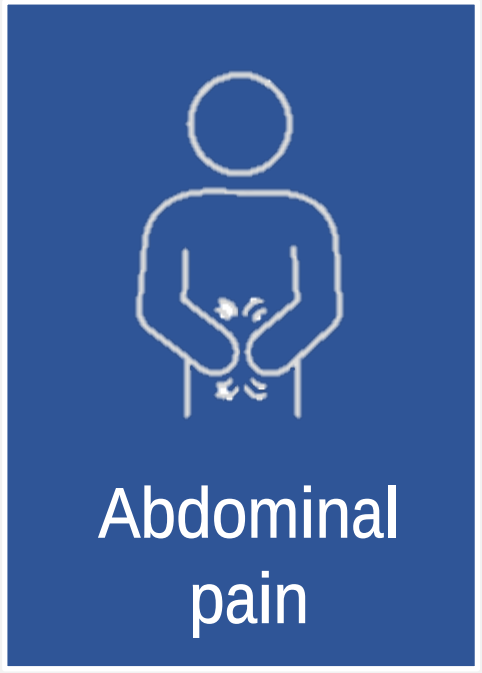
Stacey Konkle, PhD, MPH
Epidemiologist
ATSDR/CDC
Office of Innovation and Analytics
Registries and Surveillance Section
Assessment of Chemical Exposure (ACE) Lead

~9,700

households potentially exposed to jet fuel in their tap water

Data Source: 1
Image Source: Getty ImagesFrom the

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



Initial ACE investigation

January 2022

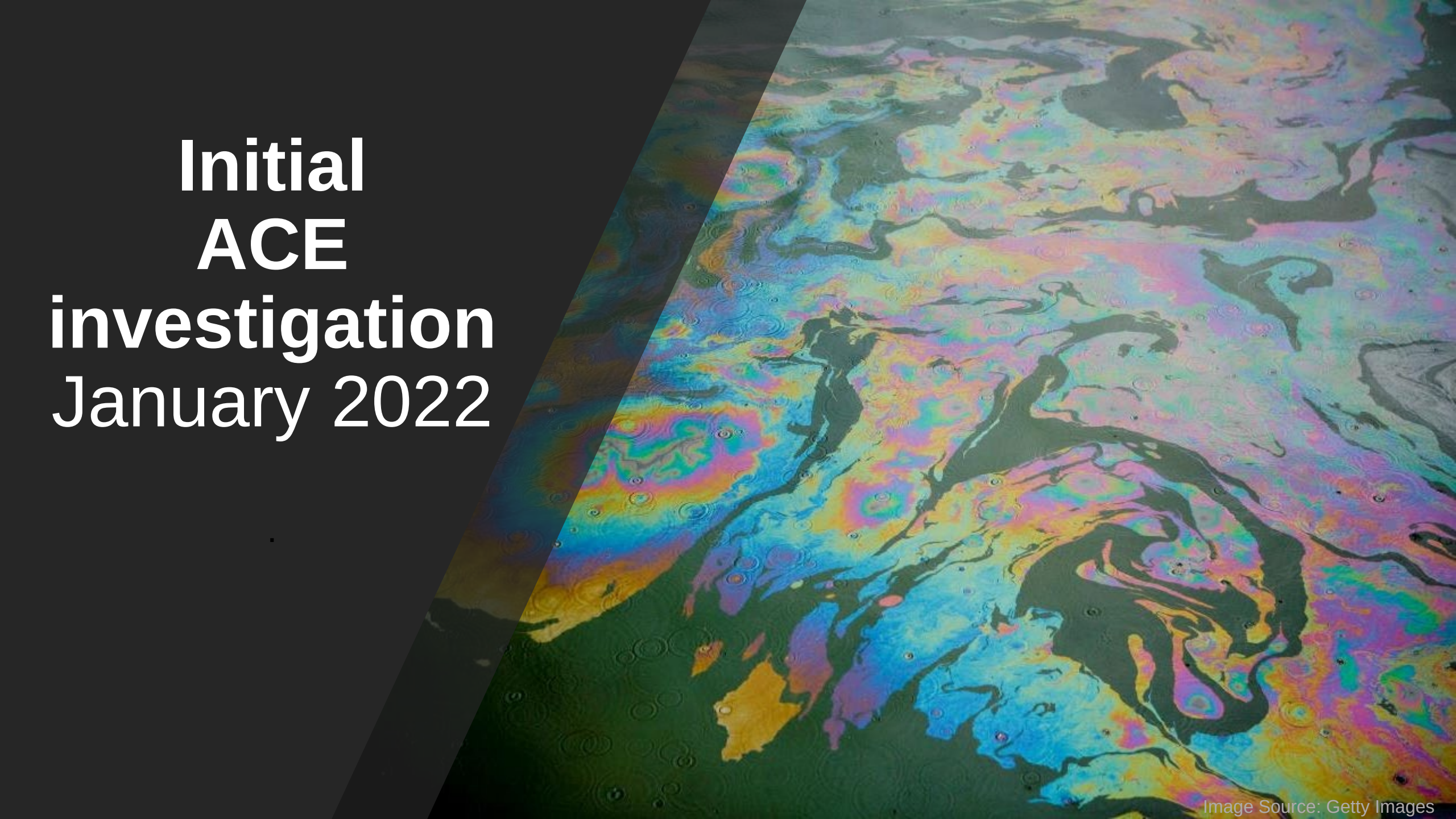
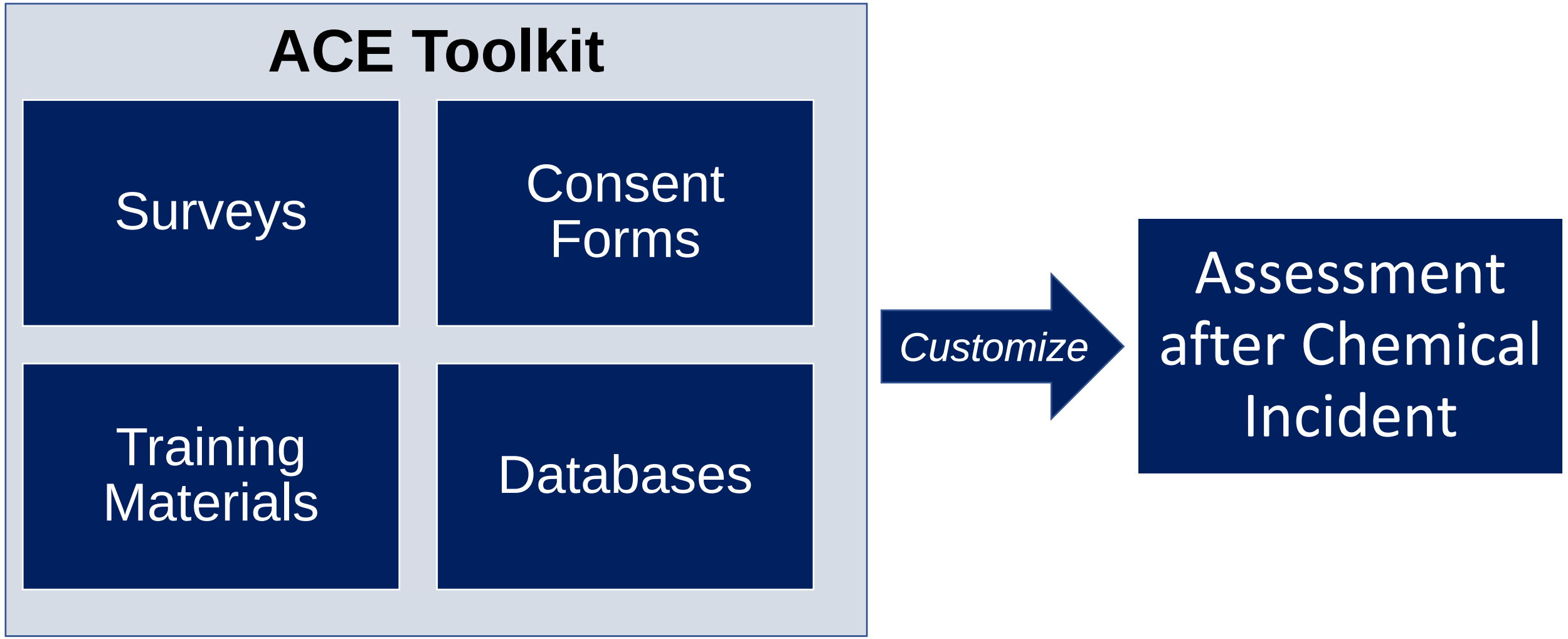


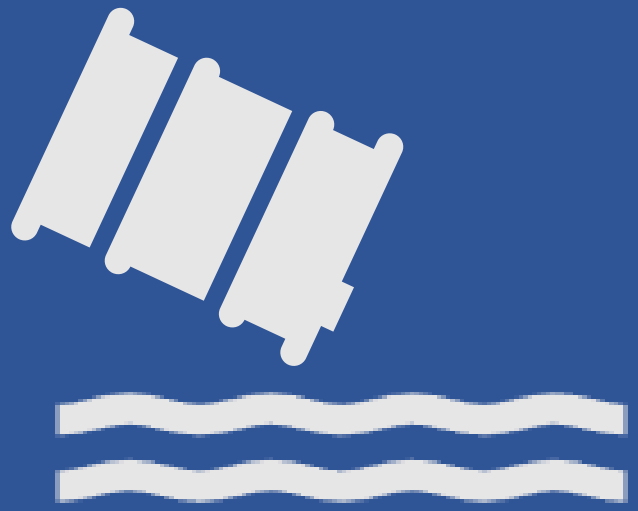
Image Source: Getty Images

ACE Investigation

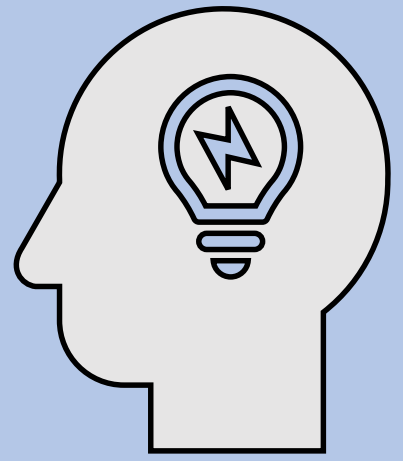


Data Source: 2

Purpose of Initial Assessment of Chemical Exposures (ACE) investigation



Assess the impact of the incident

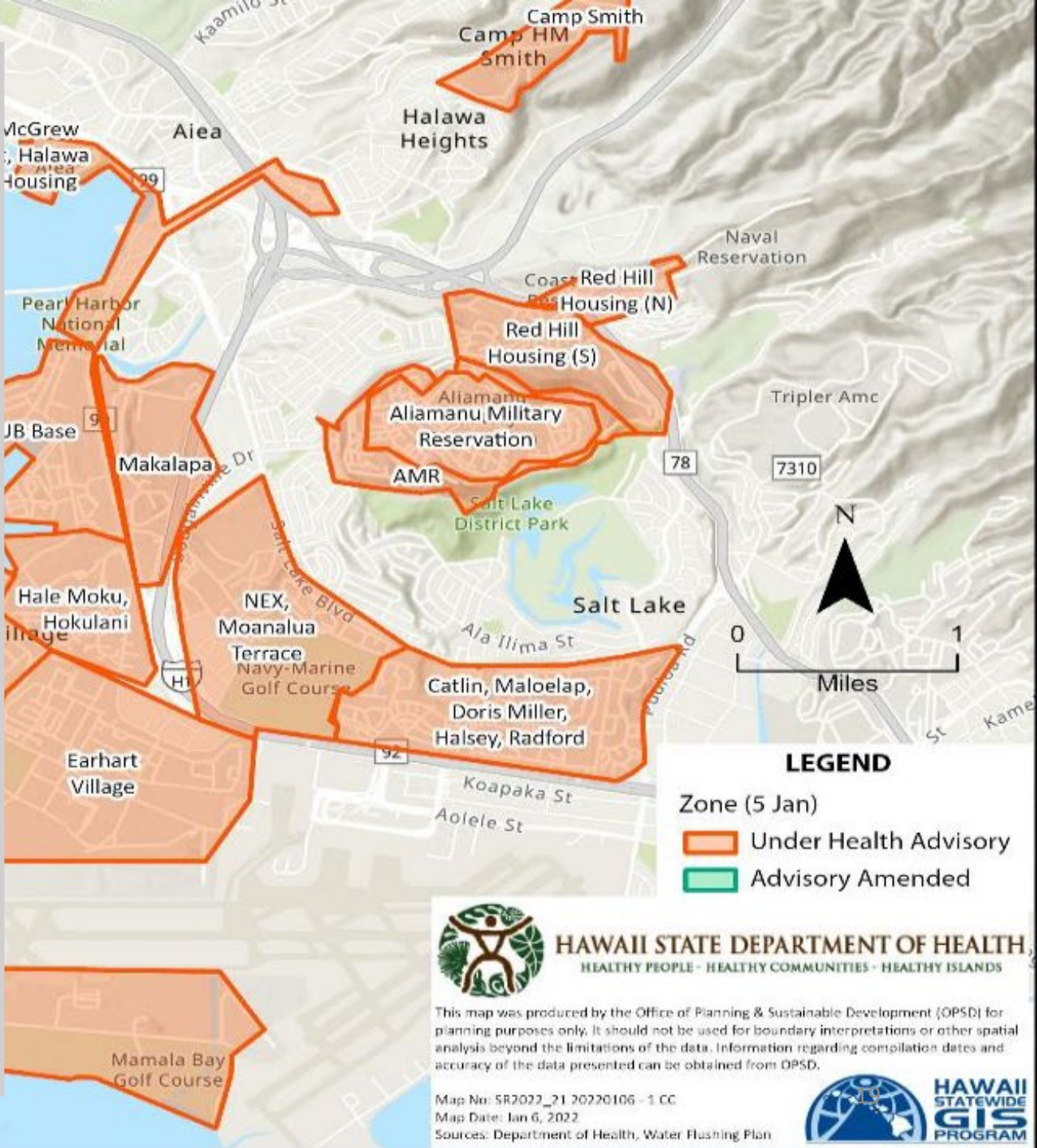


Provide recommendations

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



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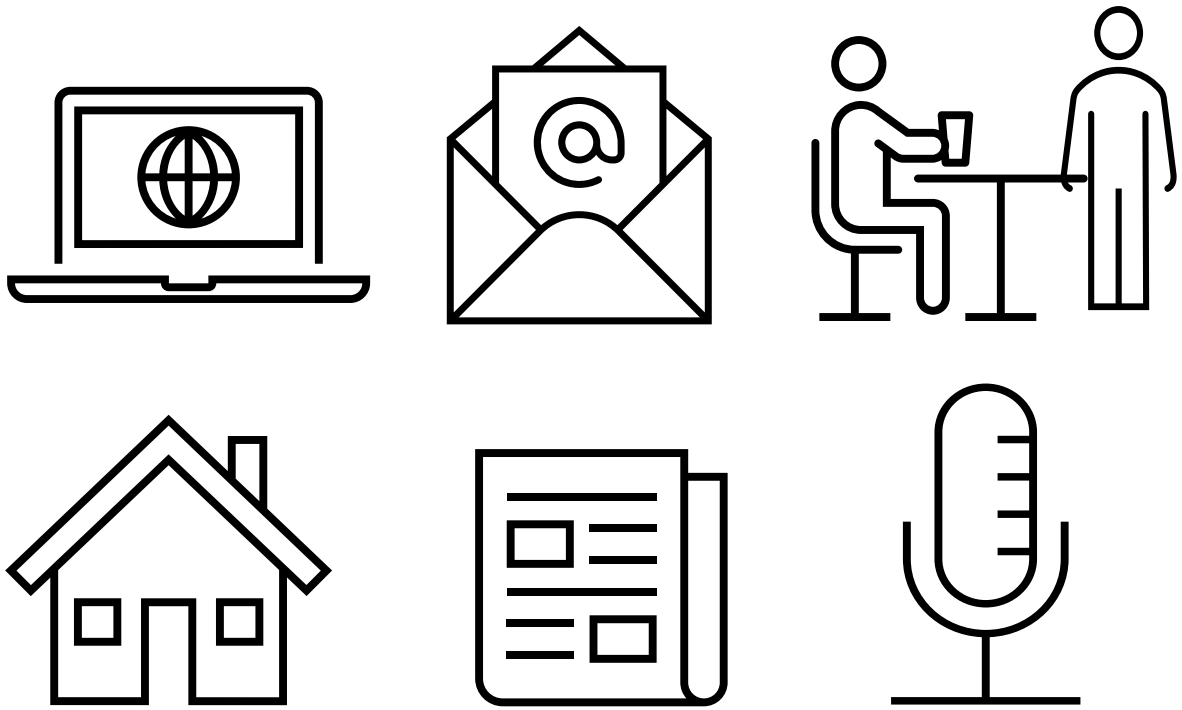
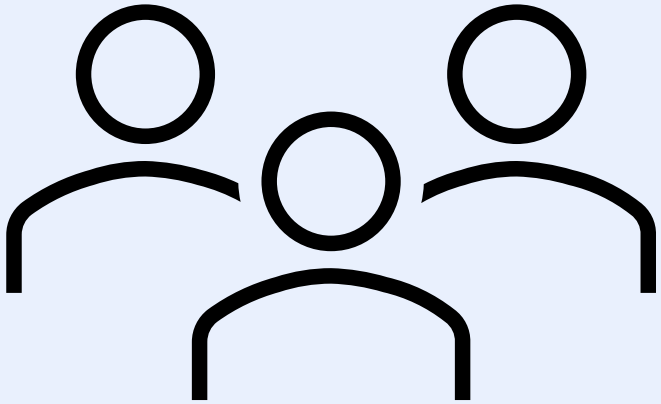
Survey recruitment



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

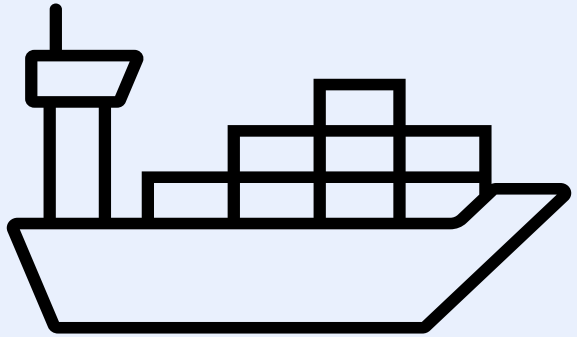


2,289

participants submitted surveys electronically

14%

of affected households were represented

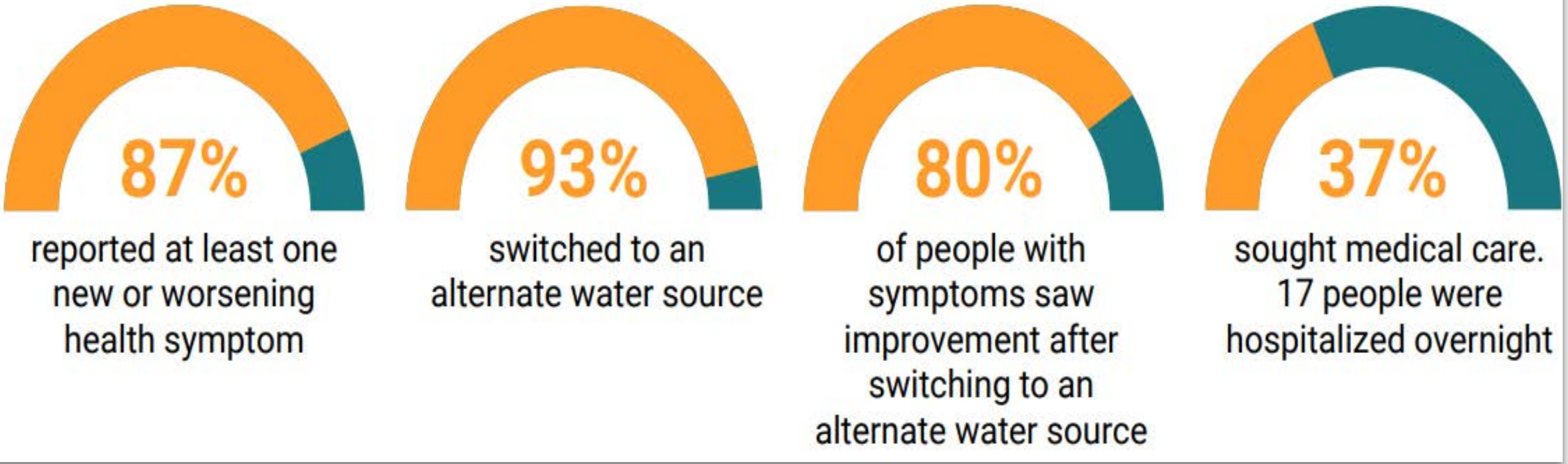


88%

were affiliated with the military

Data Source: 4

Initial ACE investigation key findings



Data Source: 5

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%

Data Source: 4

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

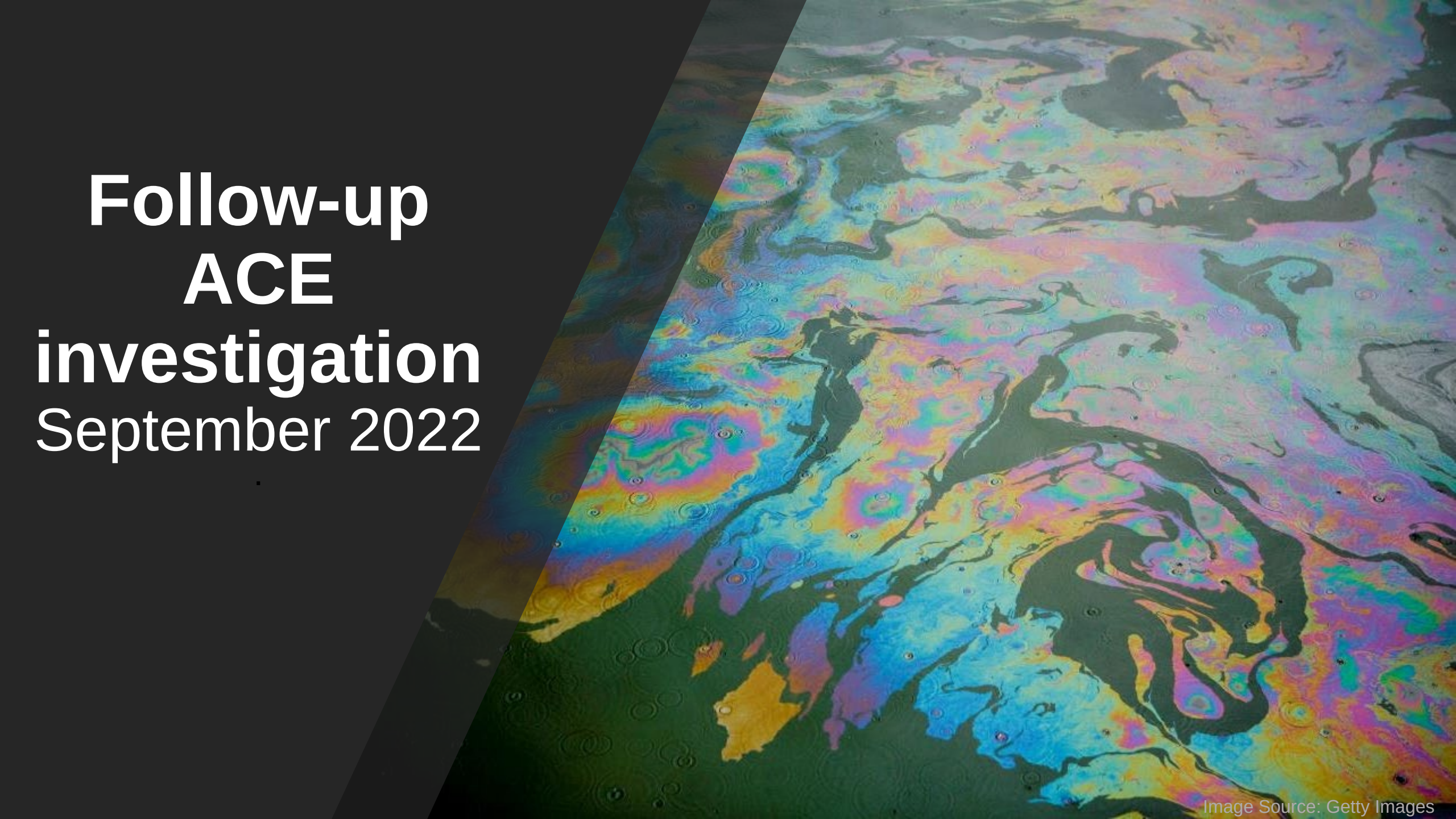
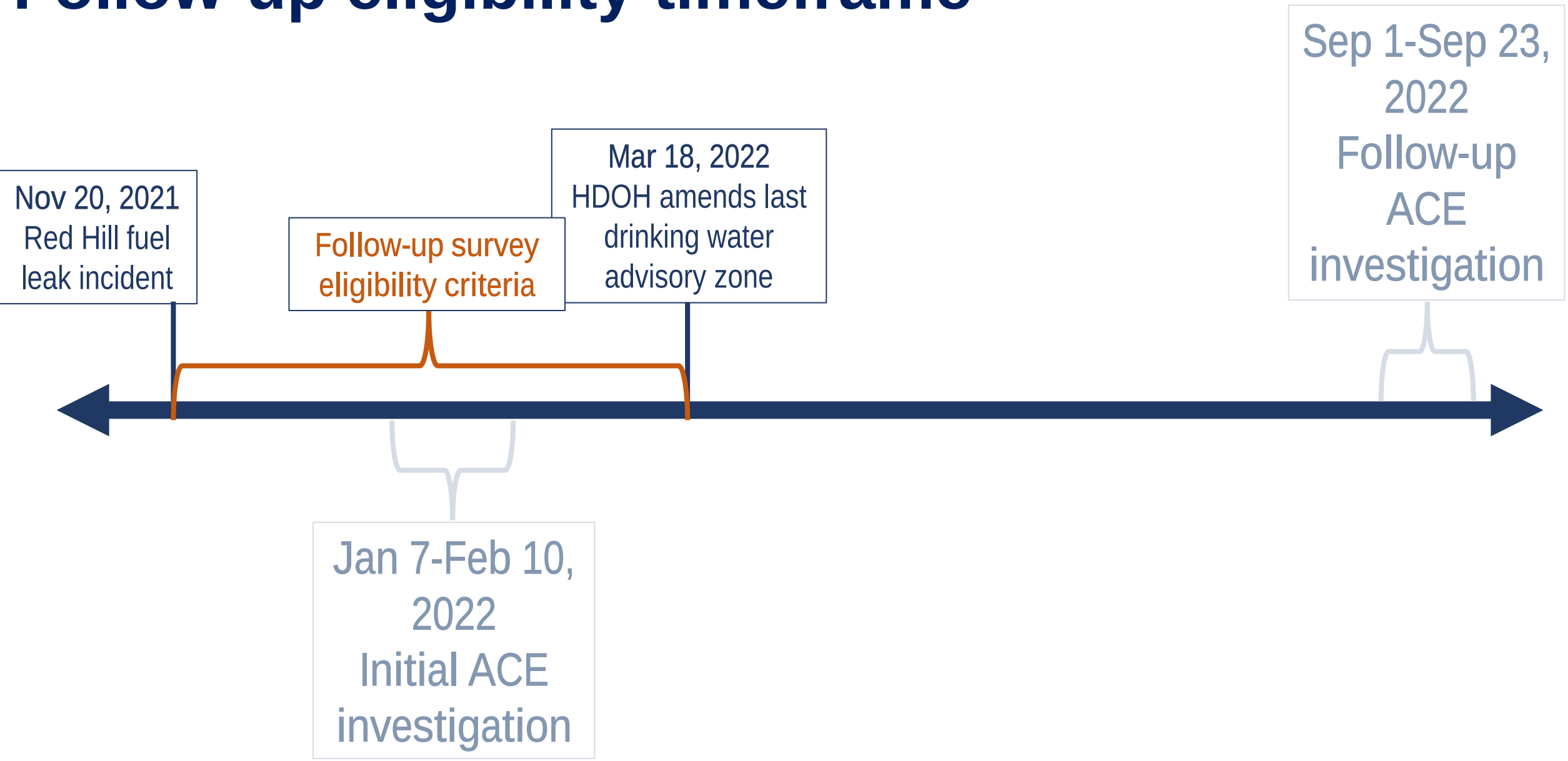
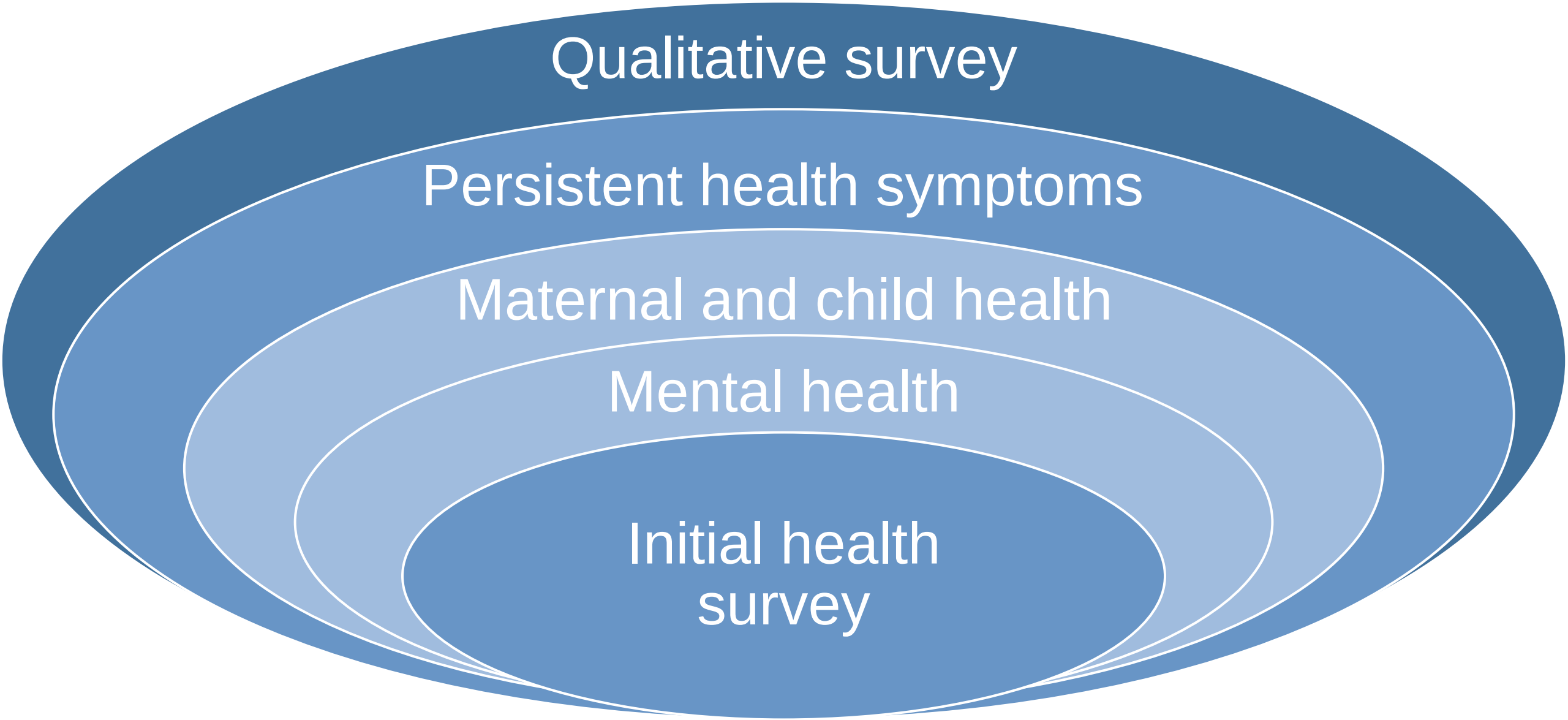


Image Source: Getty Images

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

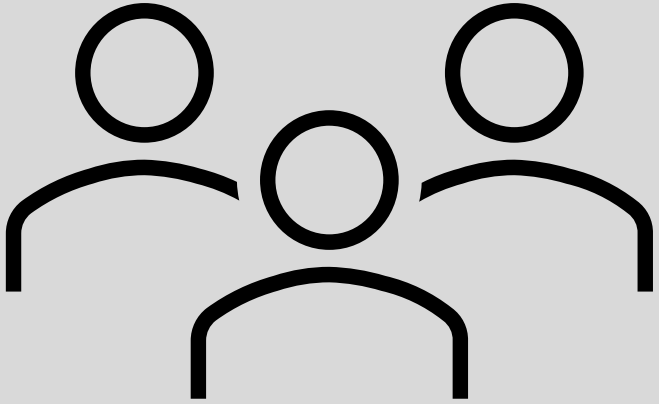
Phone: 404-567-3256

Email: ATSDRACE@cdc.gov

The survey will be available online until September 23, 2022

For more info, visit health.hawaii.go

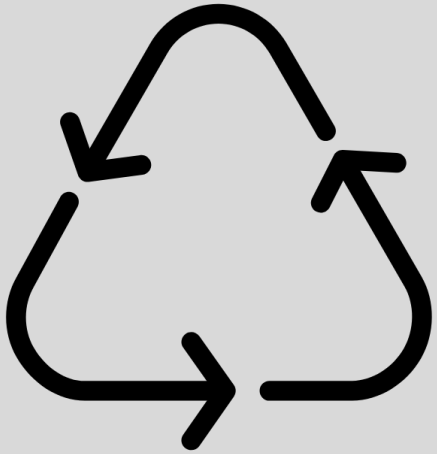
Survey Recruitment



986

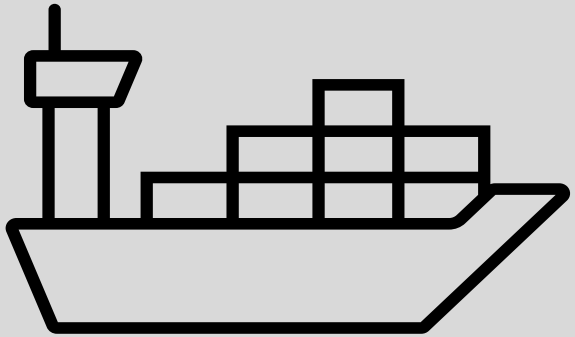
participants submitted surveys electronically

representing 8% of affected households



61%

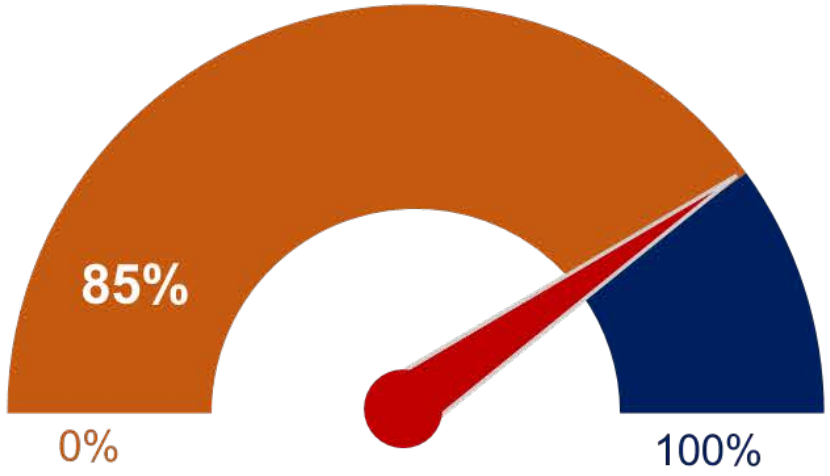
returning participants



90%

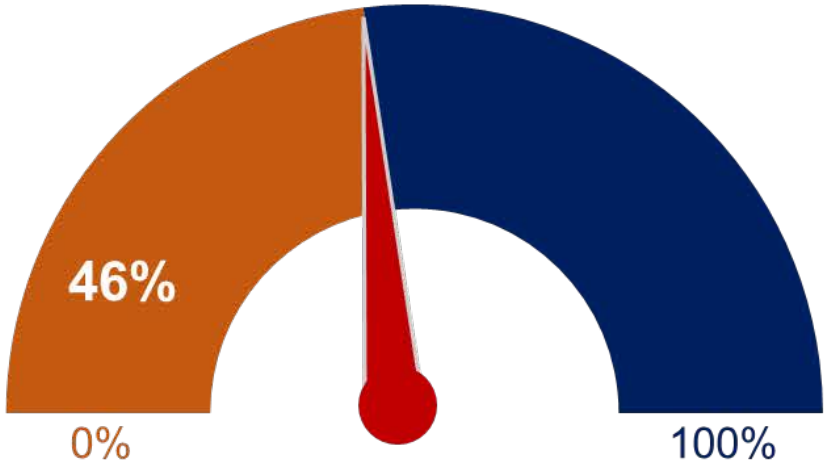
were affiliated with the military

Water quality and trust findings



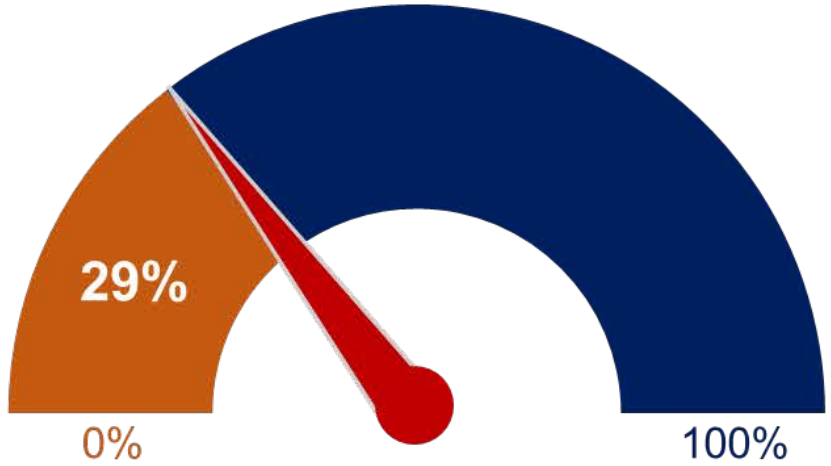
85%

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

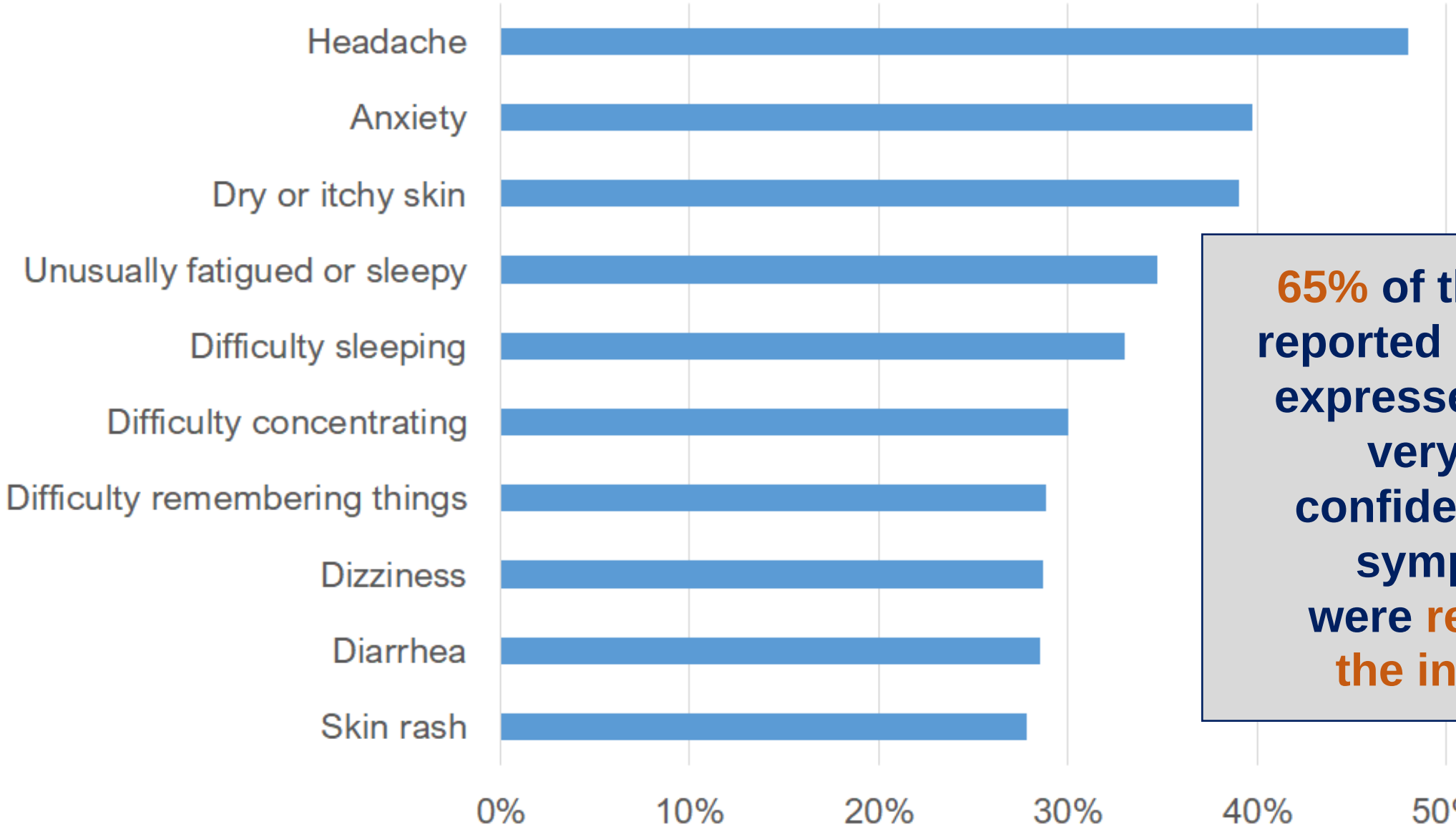
55%

reported worse physical health after the incident when compared to before

21%

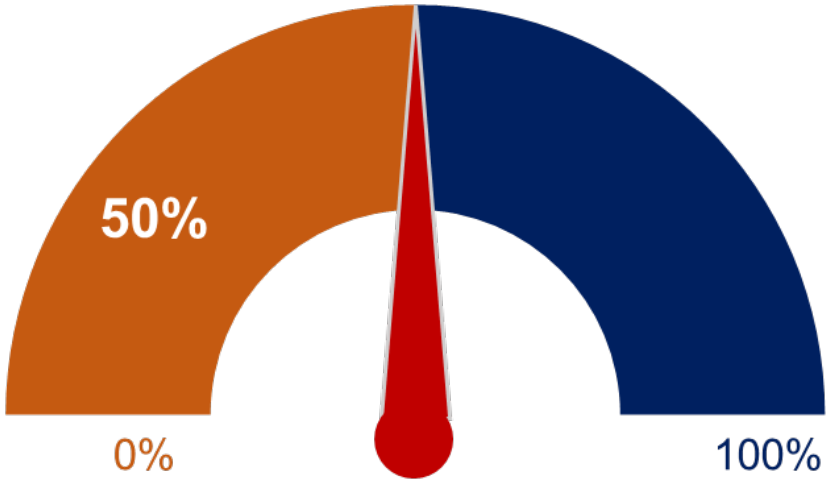
kept from usual activities for 14+ days of the past 30 days due to poor health

Top symptoms in the past 30 days



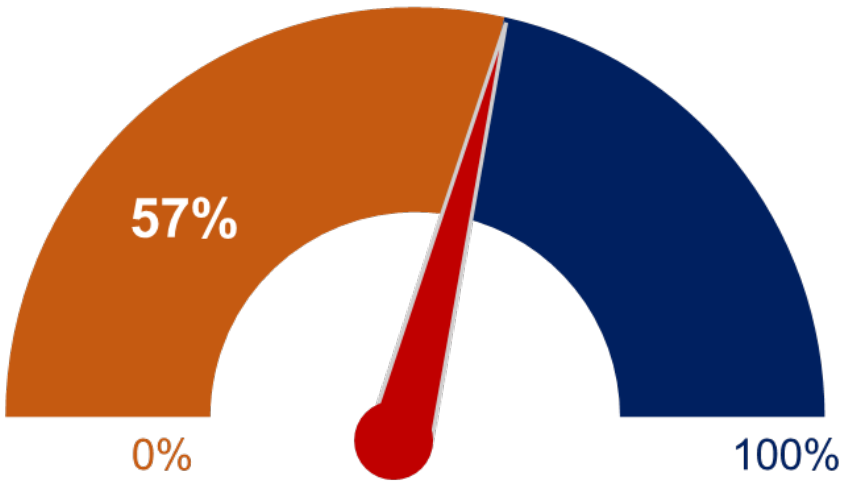
65% of those who reported symptoms expressed high to very-high confidence that symptoms were related to the incident

Follow-up ACE investigation mental health findings



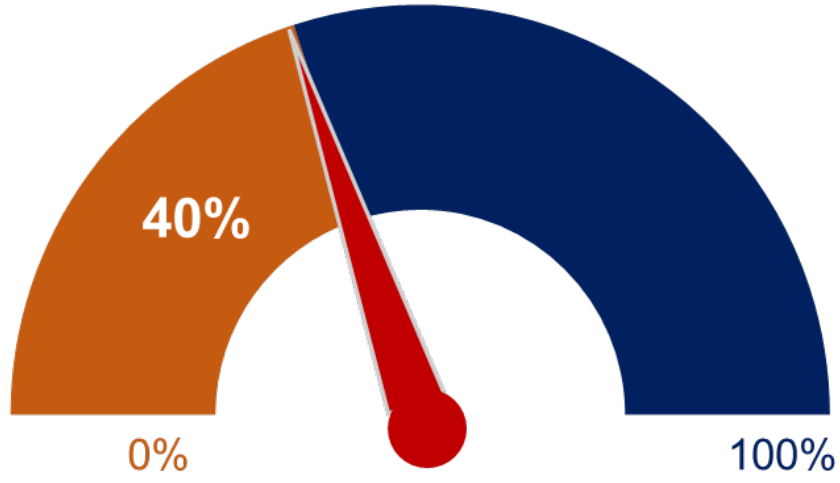
50%

worse mental health in the past 30 days



57%

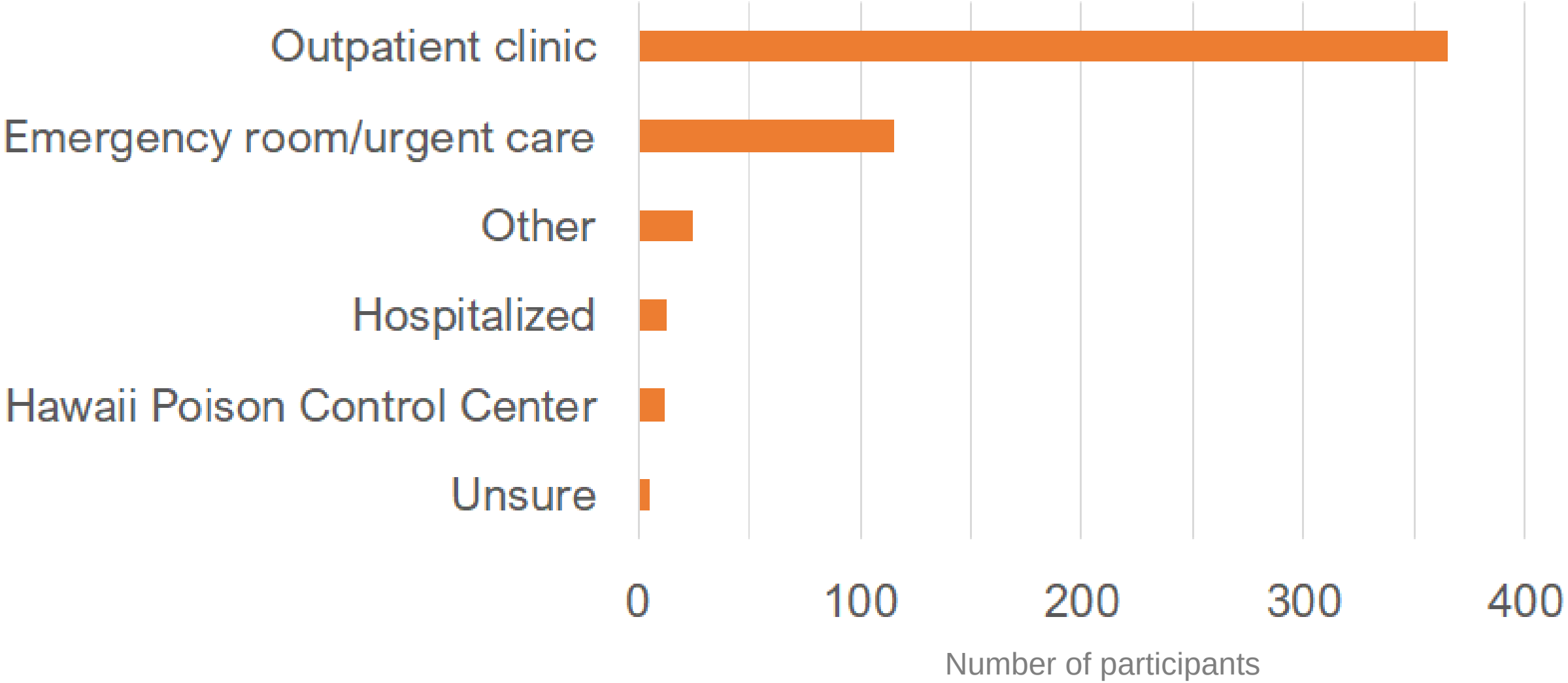
think about the incident **every day**



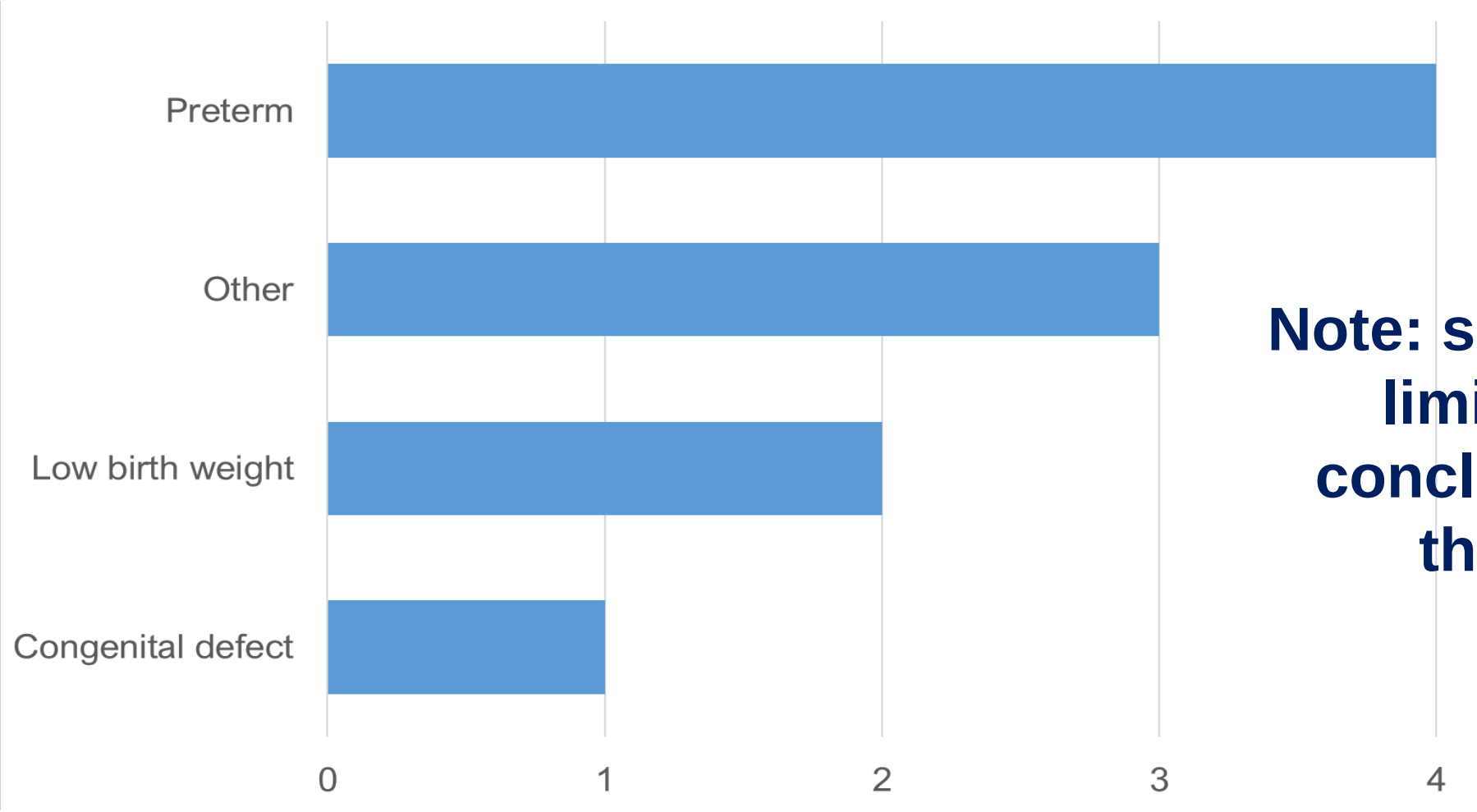
40%

anxiety in the past 30 days

55% sought medical care because of the incident



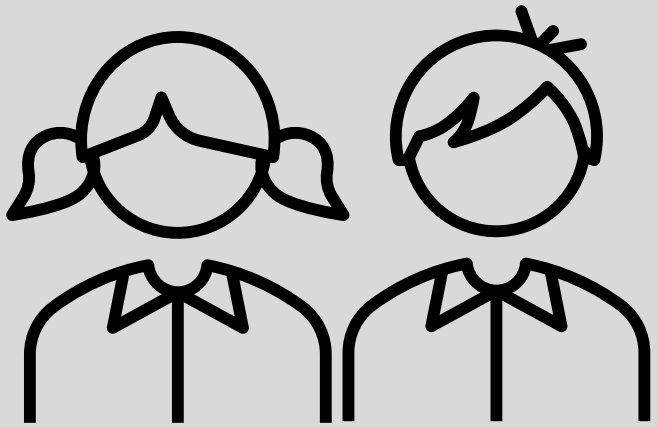
8 of 20 participants who gave birth since the incident reported an adverse outcome



*some participants reported multiple adverse outcomes

Note: small numbers limit drawing conclusions from these data

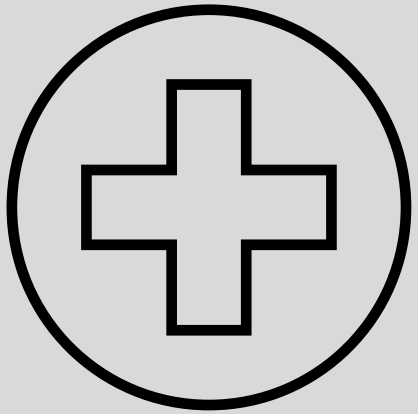
Follow-up pediatric responses



Pediatric responses

152

vs. 740 initial



Symptomatic

79%

vs. 83% initial

Sought medical care

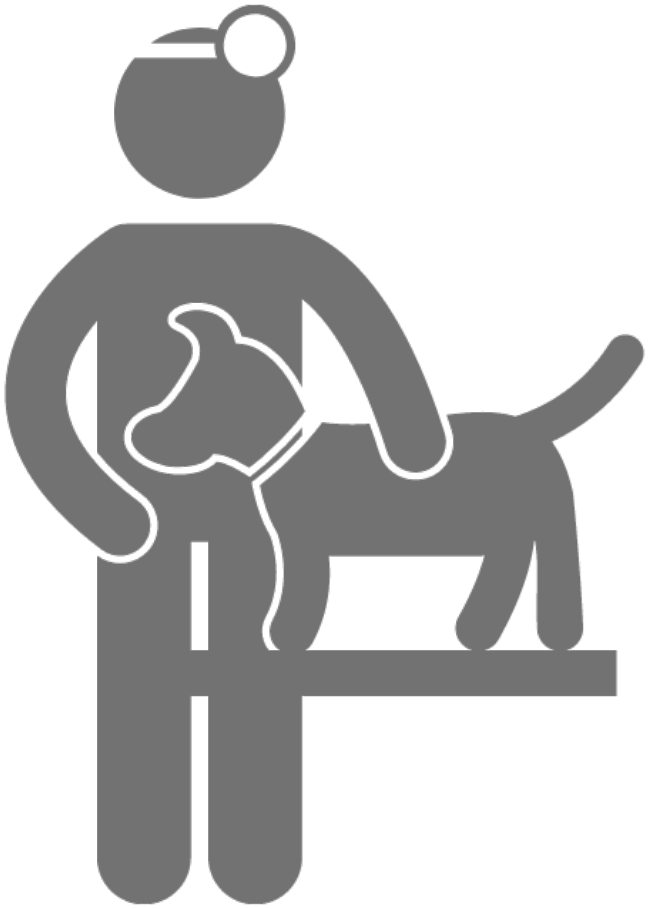
65%

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?

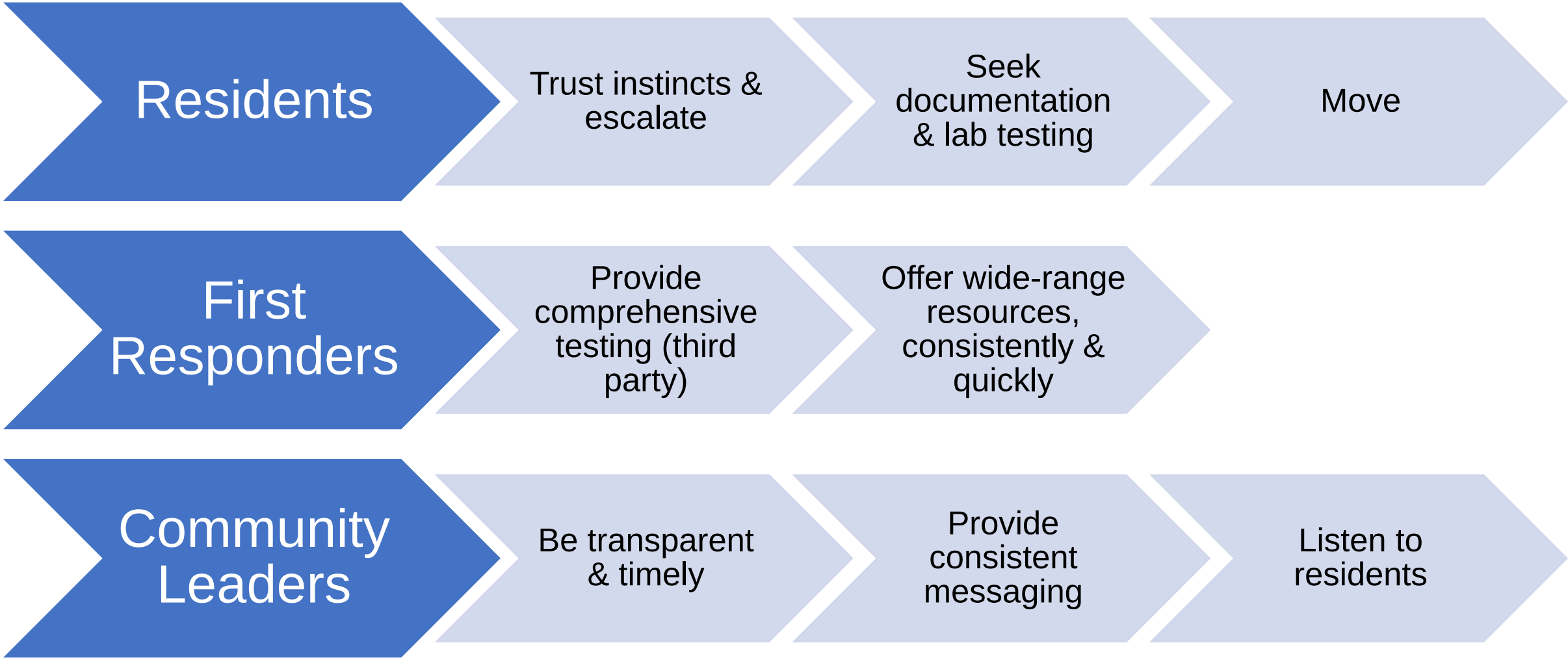


Photo provided by the ACE Epi-aid team

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

Photo provided by the ACE Epi-aid team

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

Study design

- Convenience sampling
- Self-reported symptoms
- Lack of exposure data
- Barriers in outreach

Survey design

- Data server/ management complexities
- Self-administration
- Only offered in English

Study population

- Transient population
- Mistrust of government agencies

Strengths

- Built off foundation of initial survey
- Widespread partner engagement
- Highly motivated community members

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
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- 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.

Photos provided by the ACE Epi-Aid team

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
Follow us on Twitter @CDCEnvironment

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/JBPHH-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/JBPHH-Water-Contamination-Survey-Results.pdf

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

PUBLIC HEALTH ASSESSMENT ACTIVITIES

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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

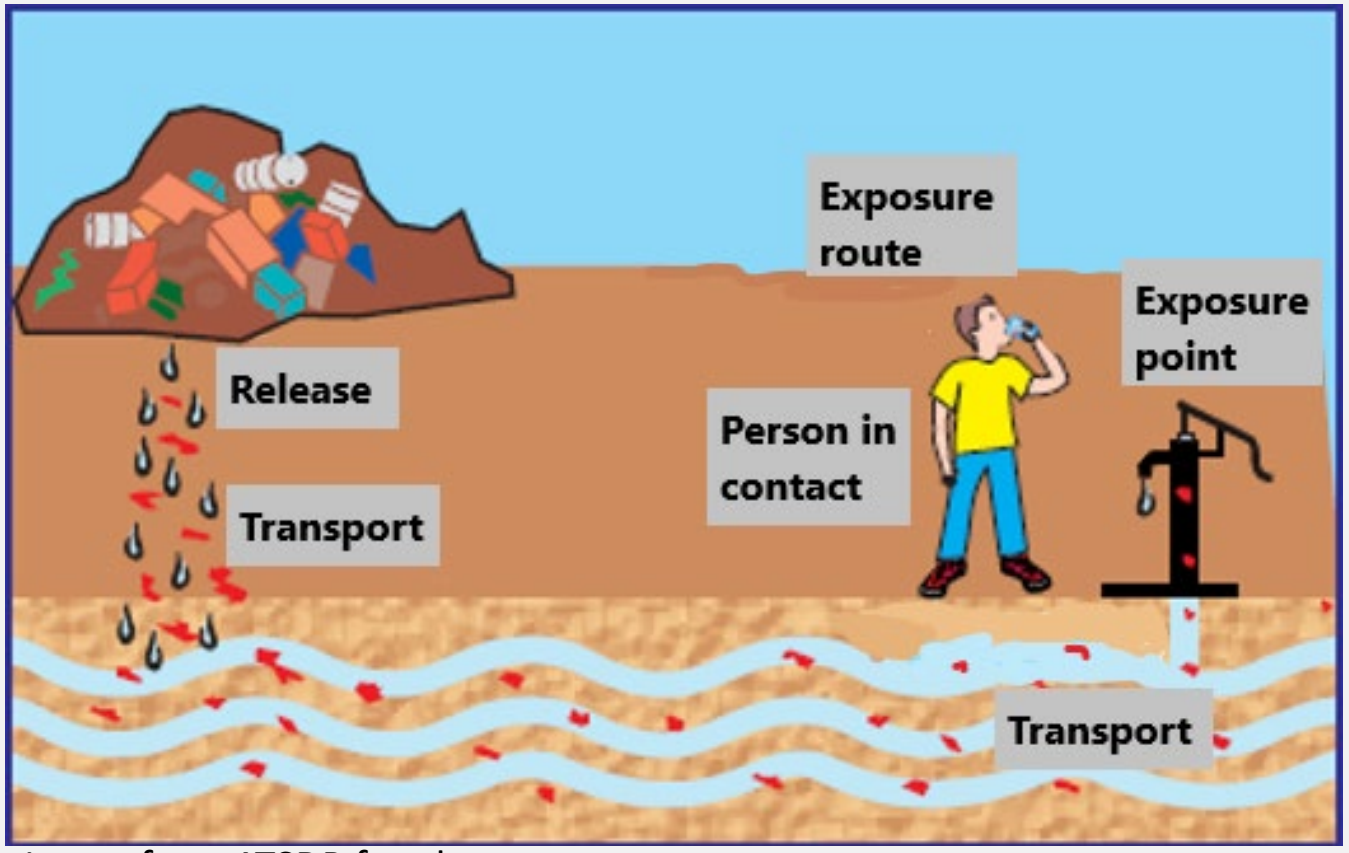
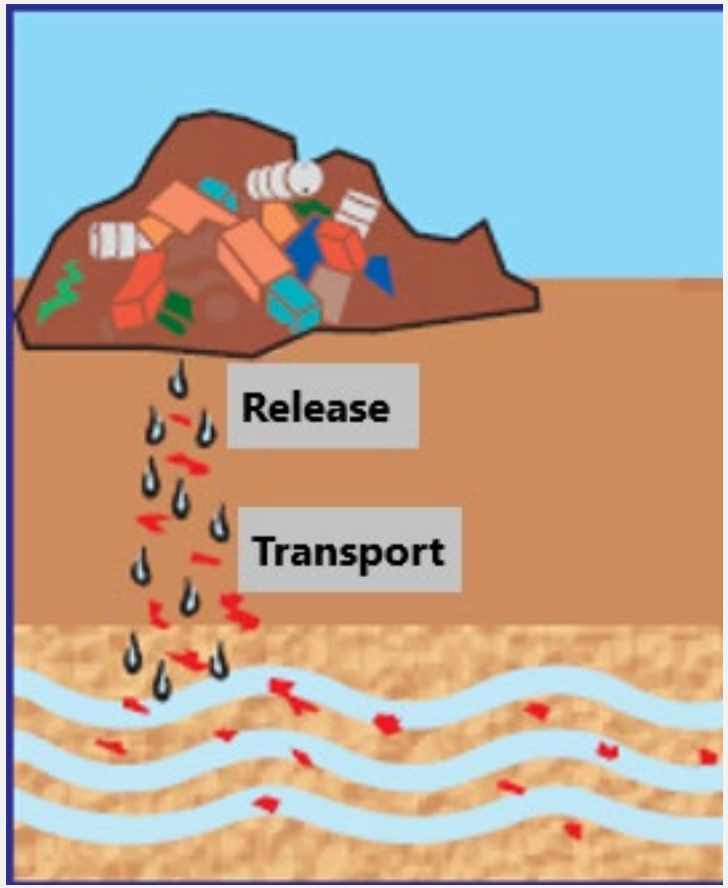


Image from ATSDR factsheet.

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?

- Which ones?
- Where?
- How much?
- When and how long?

Jet Fuels, other ?

Soil ?

Ground water ?

Drinking water

? gallons leaked

? Nov 2021 – Mar 2022 ?

Public Health Assessment

Collect and review environmental and health data and information

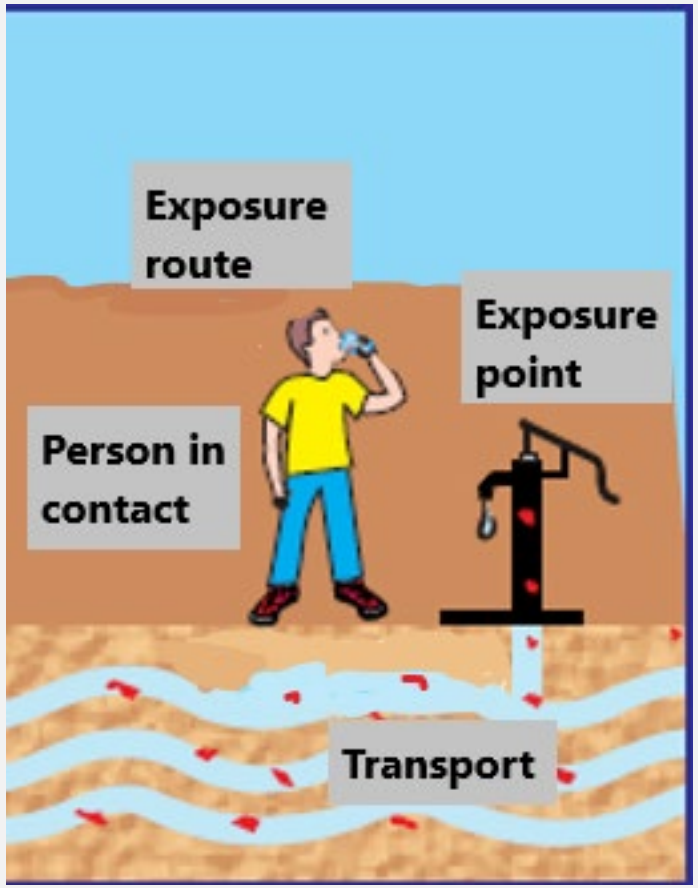
Seeking Data/Information from 2005 - 2022:
Navy water distribution system
Groundwater
Chemical gases in soil
Releases/leaks from the Red Hill Facility
Red Hill incident response
Health data and information

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

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?

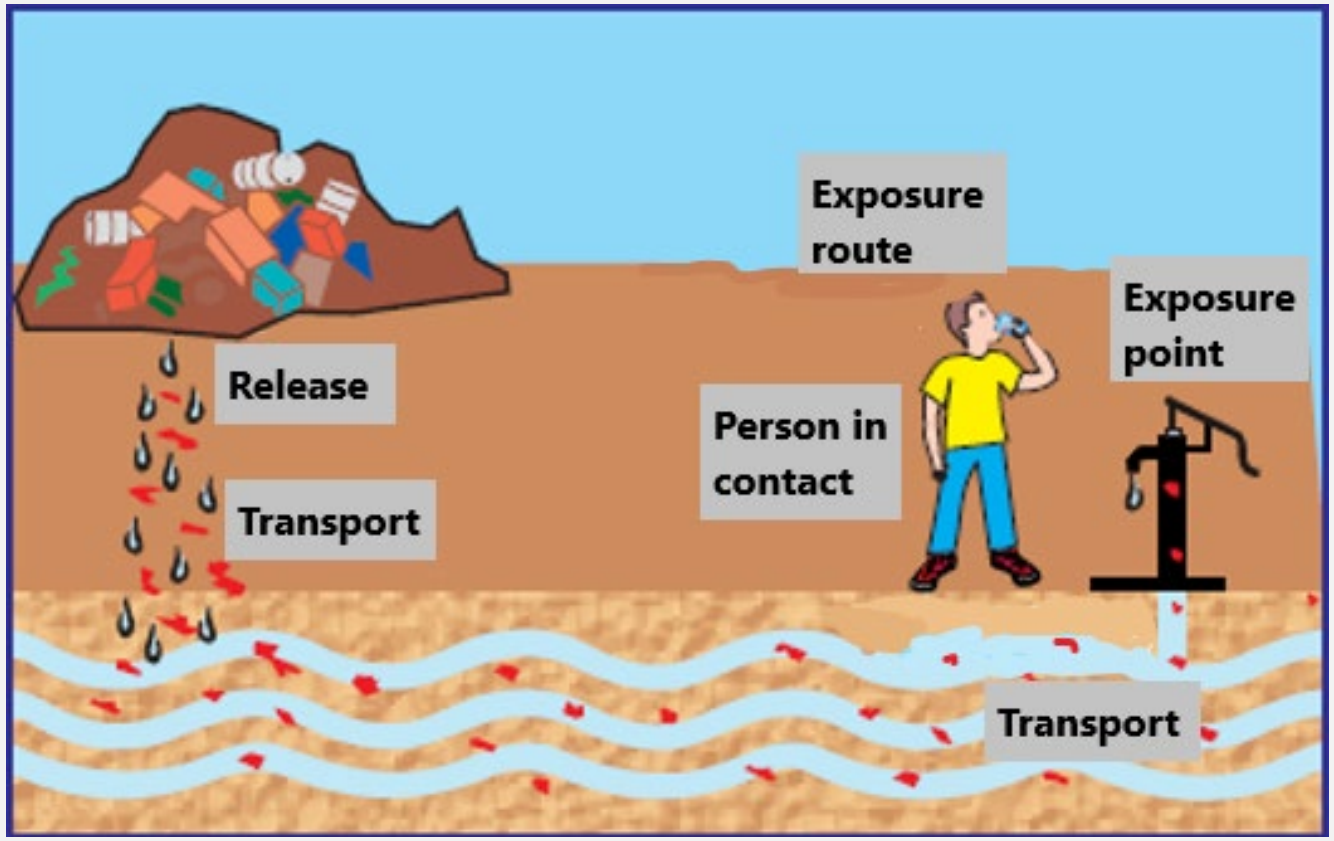
Public Health Assessment

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.

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

Public Health Assessment

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

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

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

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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.

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Thank you