



One Health Reporting of Cyanotoxin Illness: Current State, Future Directions, and the Complementary Roles of Human Health and Environmental Monitoring

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- The One Health Harmful Algal Bloom System (OHHABS) is a passive surveillance system launched in 2016 and maintained by CDC
- State, territorial, local, and tribal public health partners can report to OHHABS
- OHHABS takes a One Health approach to collecting data about harmful algal blooms and their impact on human and animal health
- OHHABS data help us better understand HABs and prevent associated illnesses

What's reported?



Environmental

The environmental HAB event reports detail:

- Location
- Waterbody characteristics
- Visual observation
- Lab confirmation testing

Human

Human illness reports are linked to the HAB event with details on:

- Case definition
- Reports for each individual
- Illness characteristics

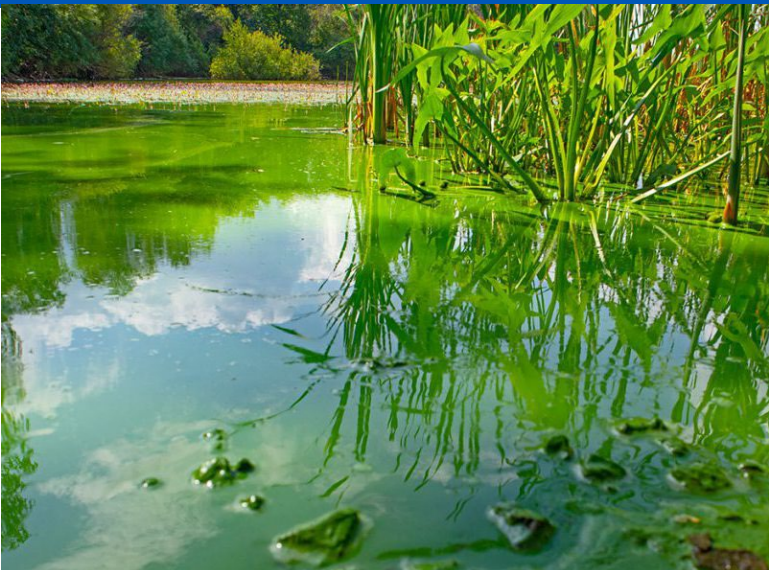
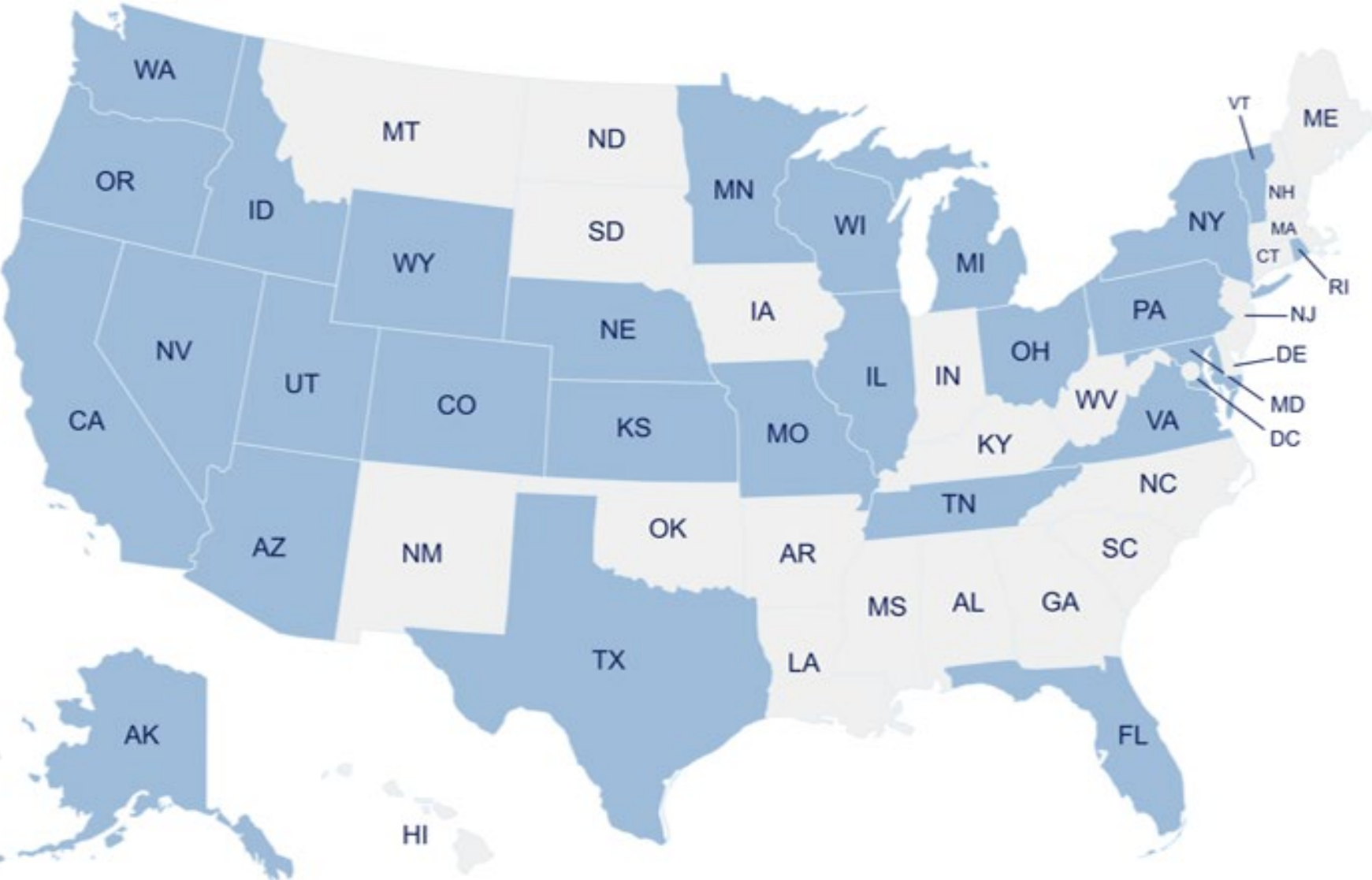
Animal

Animal illness reports are linked to HAB events with details on whether the ill animal:

- Was a single animal or part of a group
- Was a domestic pet, wildlife, or livestock

+ Illnesses linked to foodborne HAB toxin exposure can be reported

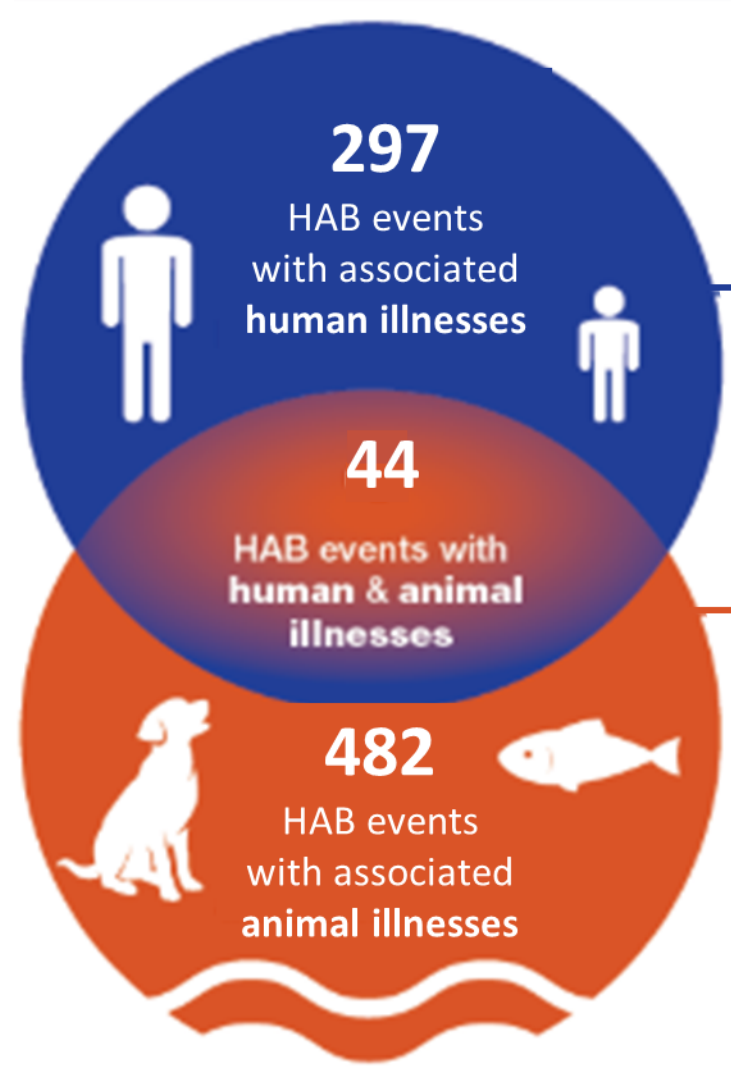
States reporting to OHHABS, 2016-2024



Total HAB events and associated human and animal illnesses, 2016-2024



Total HAB Events: 2,689



Number of Associated Illnesses

924
human illnesses

447,915
animal illnesses

646
single case forms → animal illnesses

164
group case forms → animal illnesses

Animal illnesses are reported on forms as single cases of illnesses or in groups, such as flocks of birds

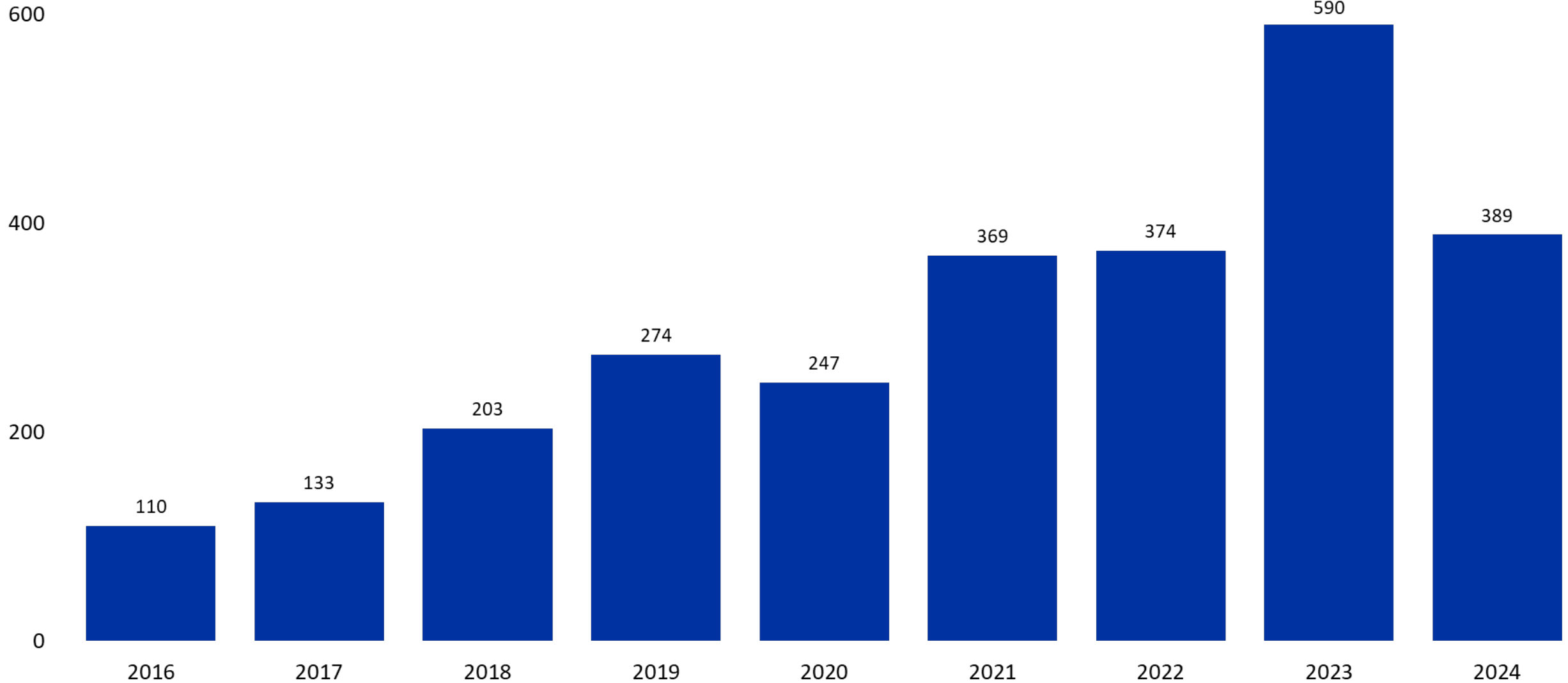
- Data is from the One Health Harmful Algal Bloom System
- HAB events and associated human and animal illnesses occurring between January 1, 2016 and December 31, 2024
- All records have been finalized and closed out
- Reports with any case classification



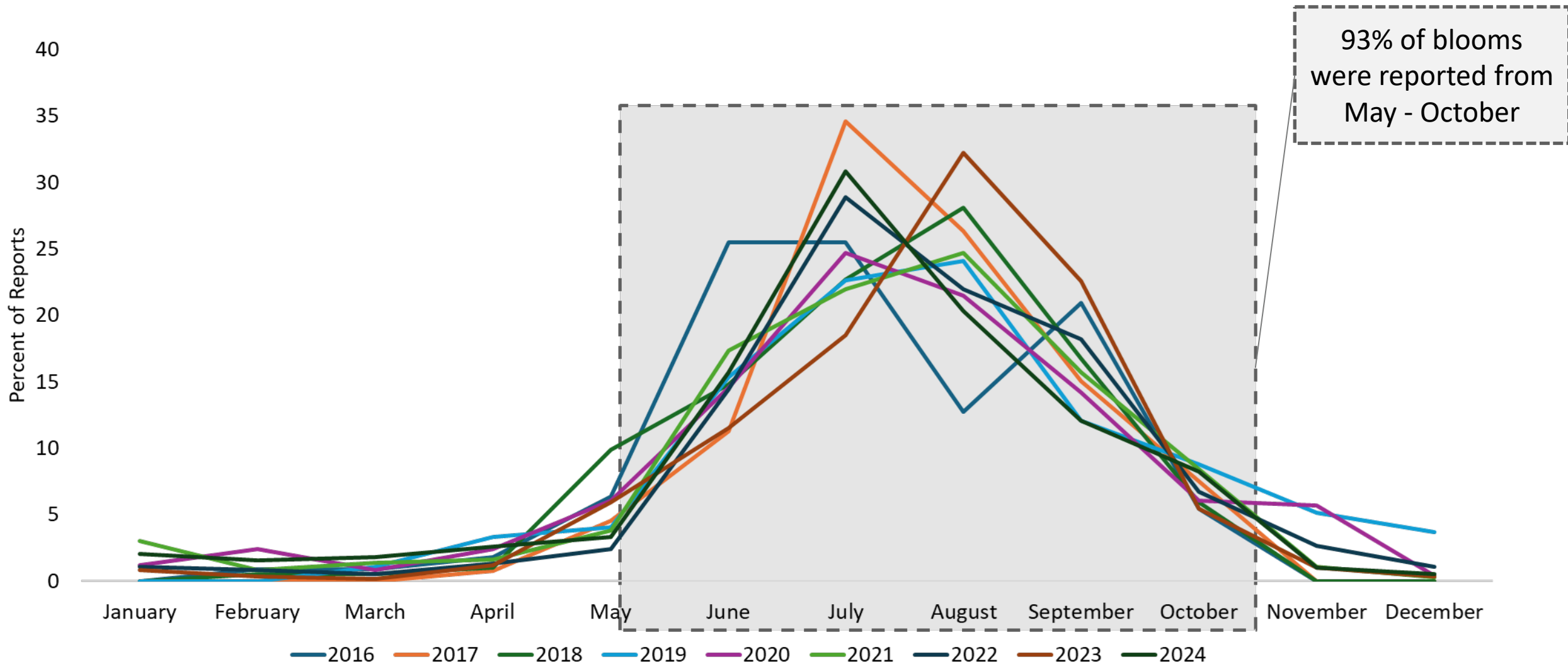
Bloom Events



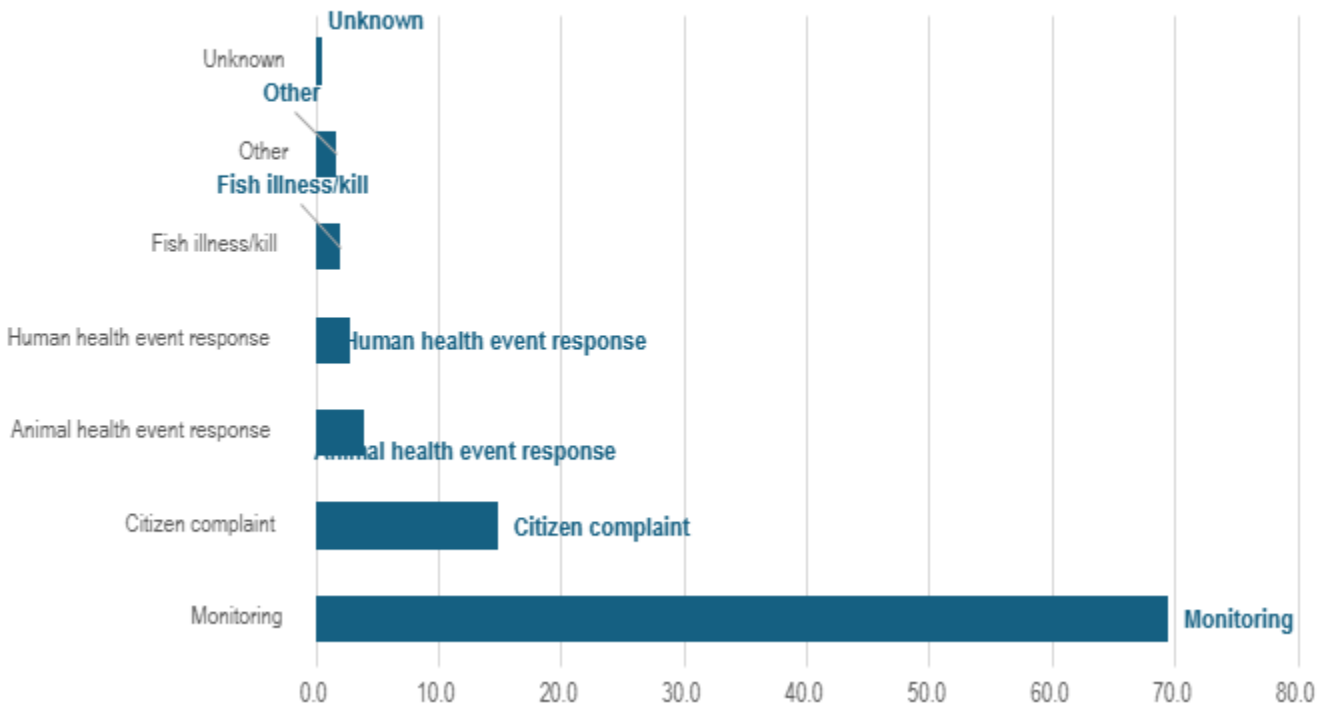
HAB Events Reports to OHHABS, 2016 – 2024



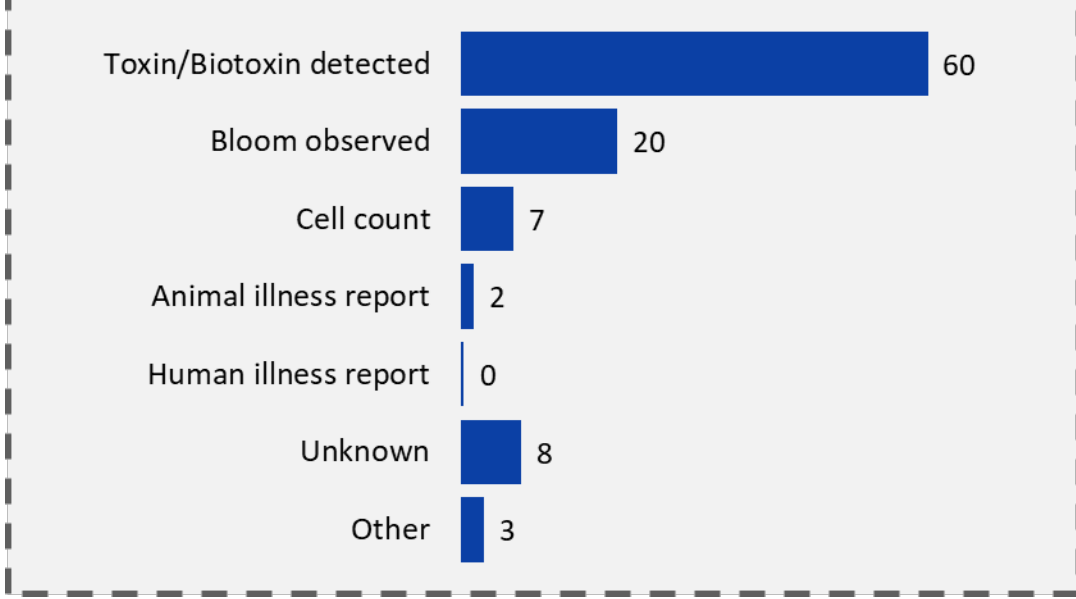
Reported Events by Bloom Months, 2016 – 2024



REASON ENVIRONMENTAL SAMPLES TESTED



Reasons Advisory or Warning Issued



Animal health event response



4

Citizen complaint



15

Monitoring



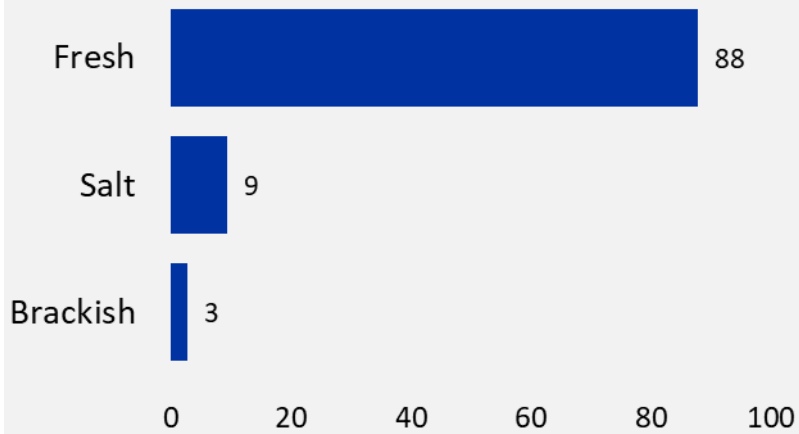
69

0 20 40 60 80

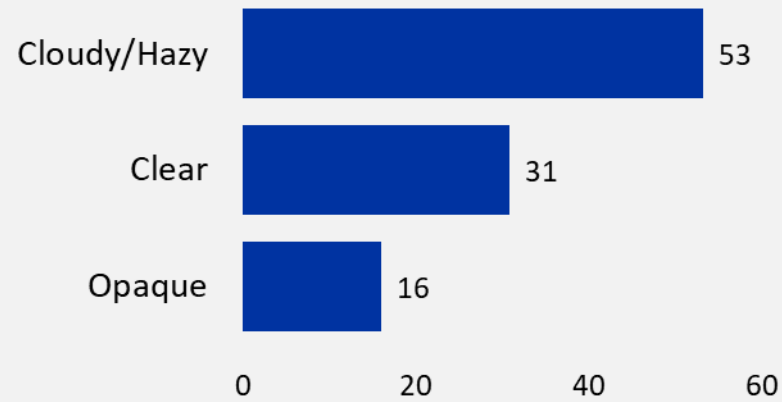
Characteristics of Bloom Observations, 2016-2024



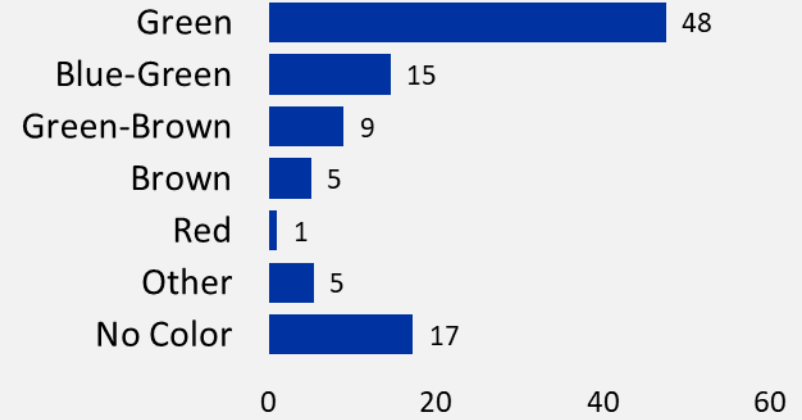
Water Salinity



Water Clarity



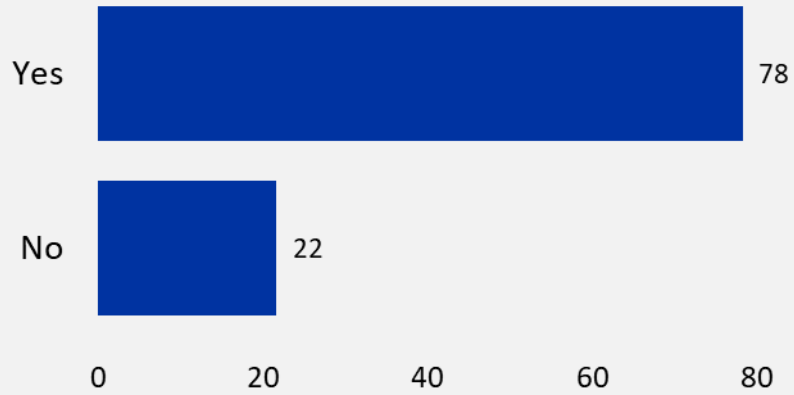
Water Color



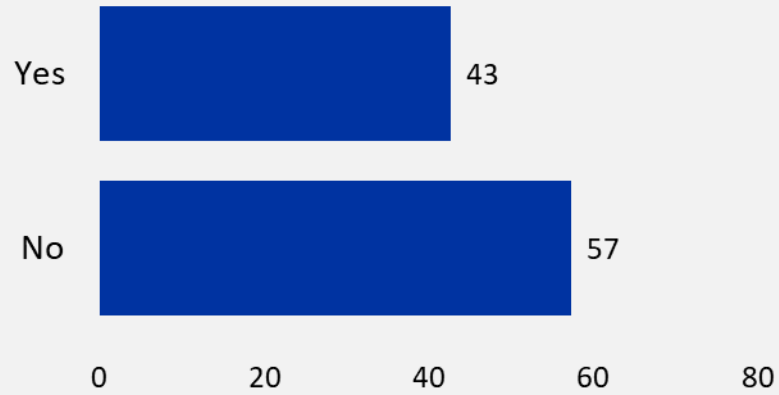
Characteristics of Bloom Observations, 2016-2024



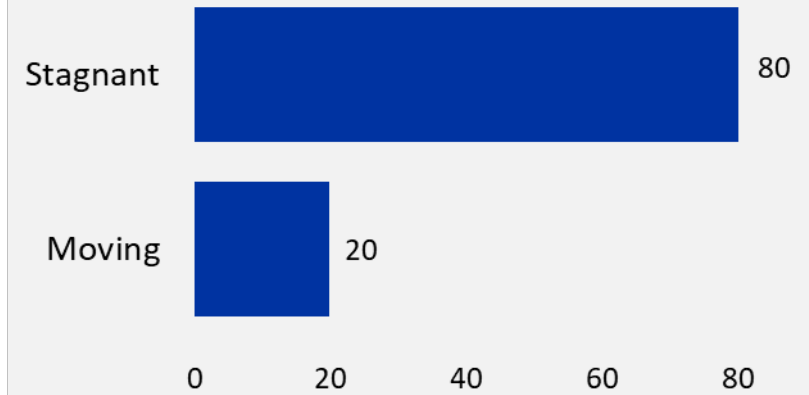
Water Scum



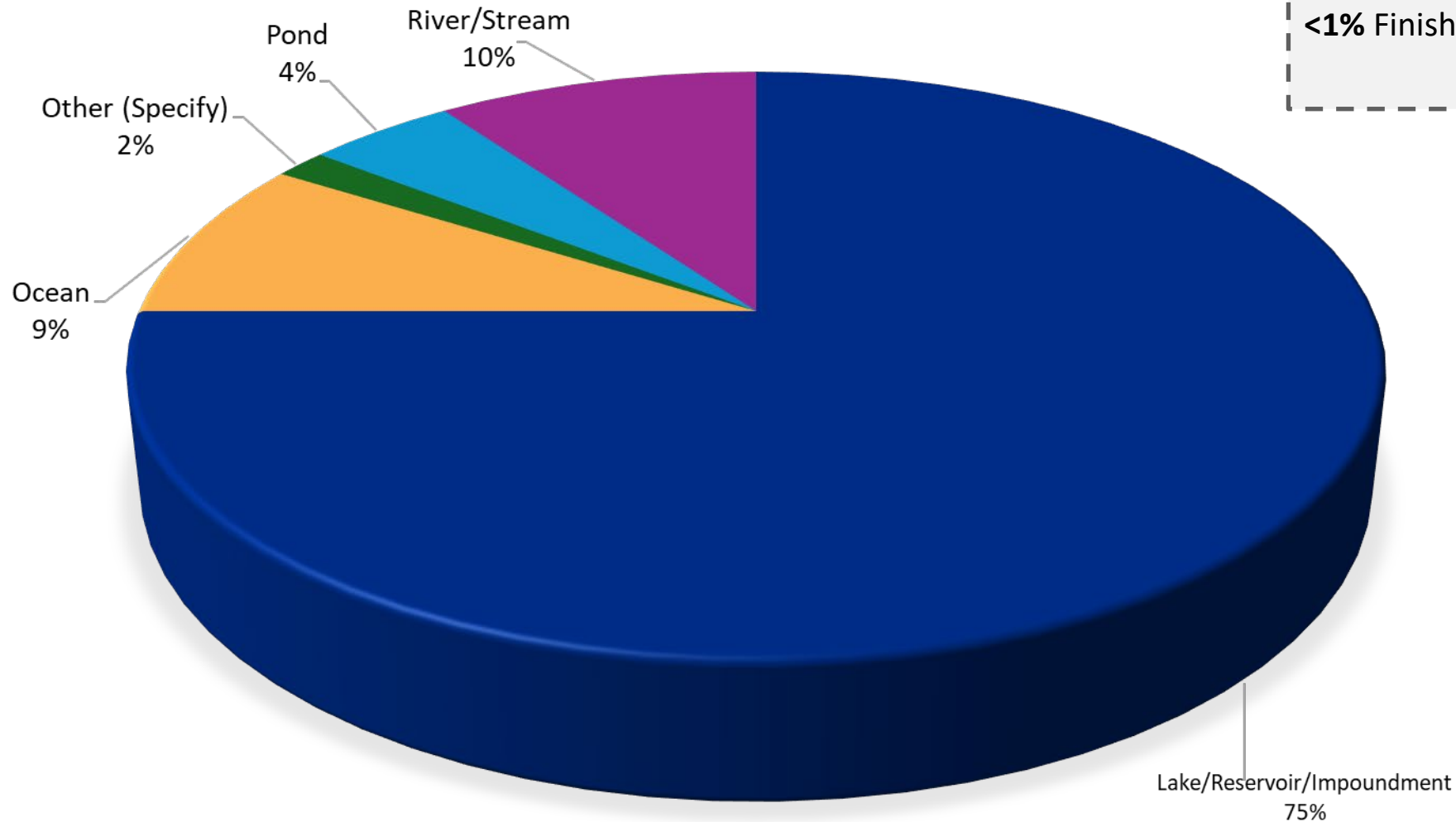
Water Odor



Water Flow



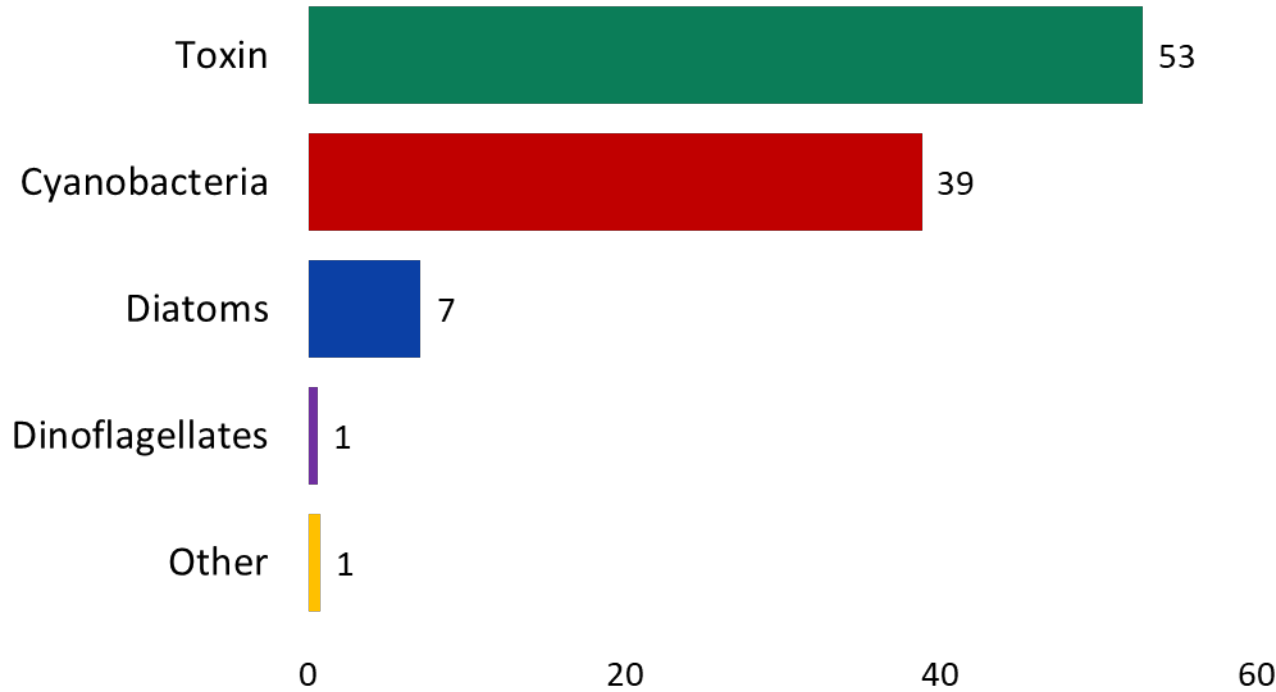
HAB Events by Water Type, 2016-2024



2,644
Samples Tested
79% Raw/Ambient water
20% Algae/Cyanobacteria/Phytoplankton
<1% Finished drinking water or food

Environmental Testing Results, 2016-2024

Etiology Type



Toxins Detected	Percent
Microcystin	84.4
Anatoxin-A	8.1
Saxitoxin	3.3
Cylindrospermopsin	2.4
Other (including <i>Nodularin</i> , <i>Domoic acid</i> , <i>Ciguatoxin</i> , <i>Haemolytic toxin</i> , <i>Lyngbyatoxin</i> , <i>Maitotoxin</i>)	1.2
Unknown	0.1

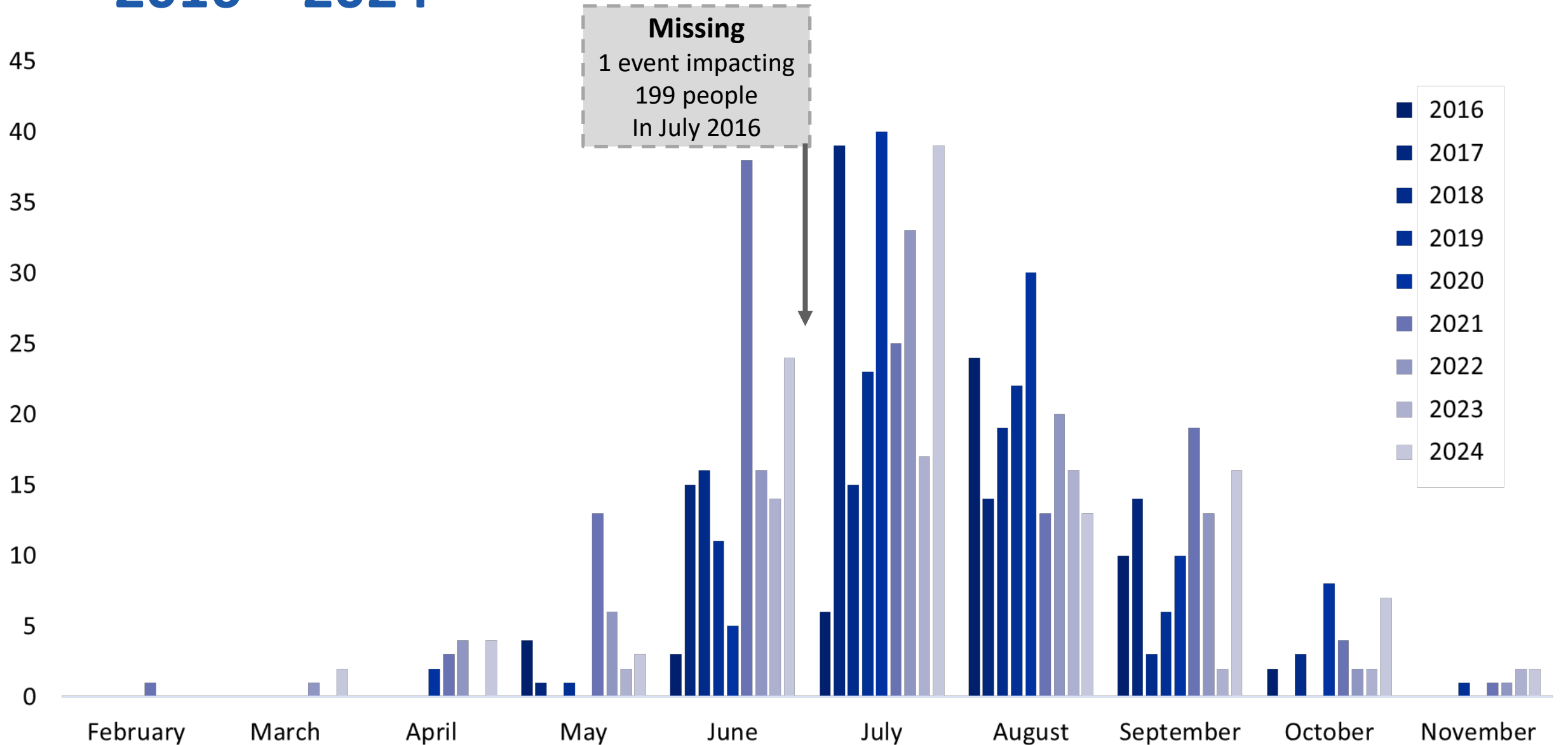
Cyanobacteria Detected	Percent
Aphanizomenon	27.1
Microcystis	16.9
Planktothrix	8.4
Anabaena	5.4
Oscillatoria	1.6
Cylindrospermopsis	1.6
Phormidium	1.4
Lyngbya	1.1
Other (includes <i>Anabaenopsis</i> , <i>Nostoc</i> , <i>Auerococcus</i> , <i>Nodularia</i>)	34.6
Unknown	1.9

Diatoms Detected	Percent
Pseudo-nitzschia	99.0
Other	1.0

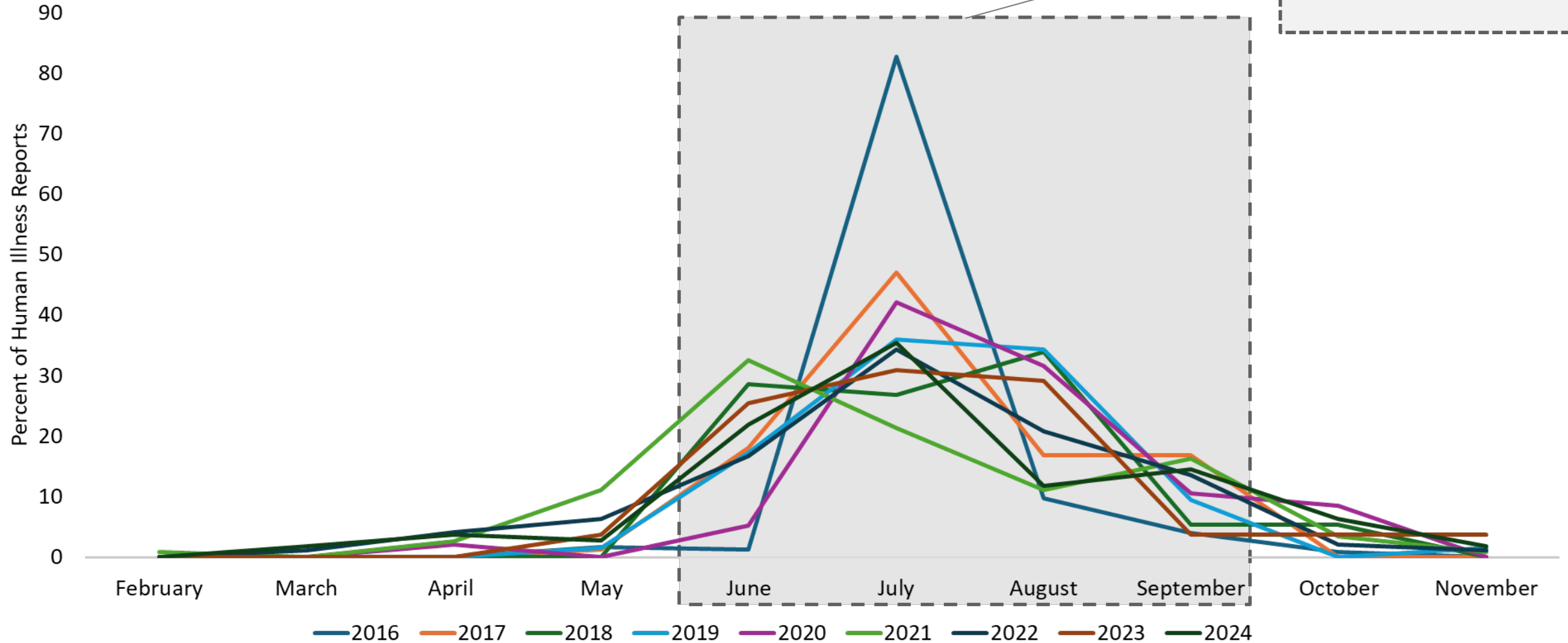
Human Illnesses



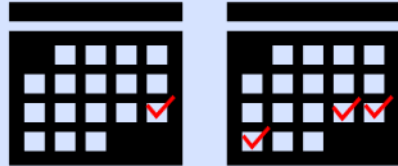
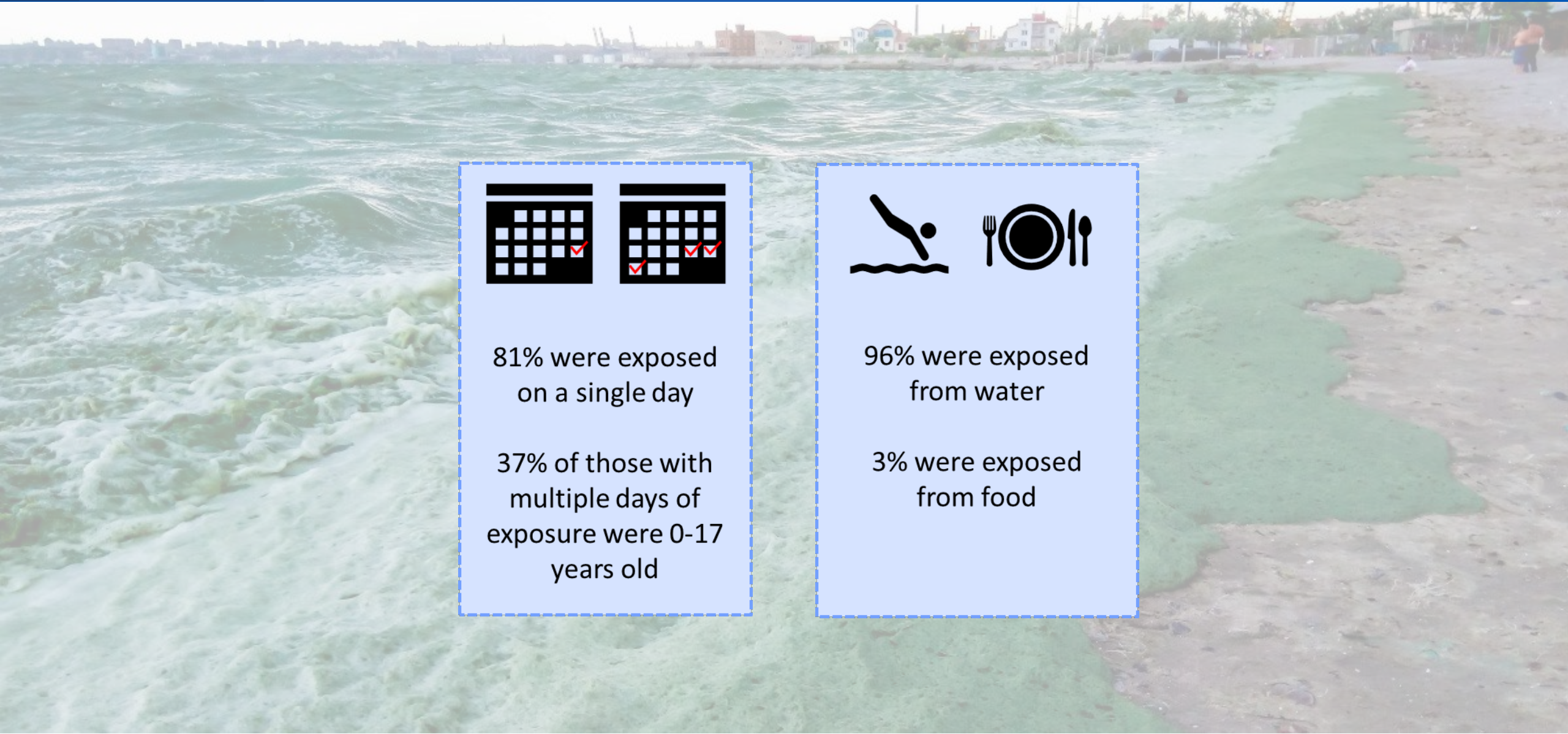
OHHABS Human Reports submitted, 2016 – 2024



OHHABS Human Reports submitted by Month, 2016 – 2024



Illness and Exposure Characteristics, 2016-2024



81% were exposed
on a single day

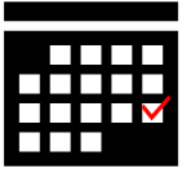
37% of those with
multiple days of
exposure were 0-17
years old



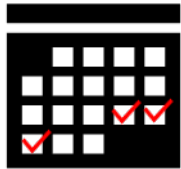
96% were exposed
from water

3% were exposed
from food

Illness Duration, 2016-2024



- 47% had symptoms begin the same day as the exposure
- 27% of symptoms presented the next day

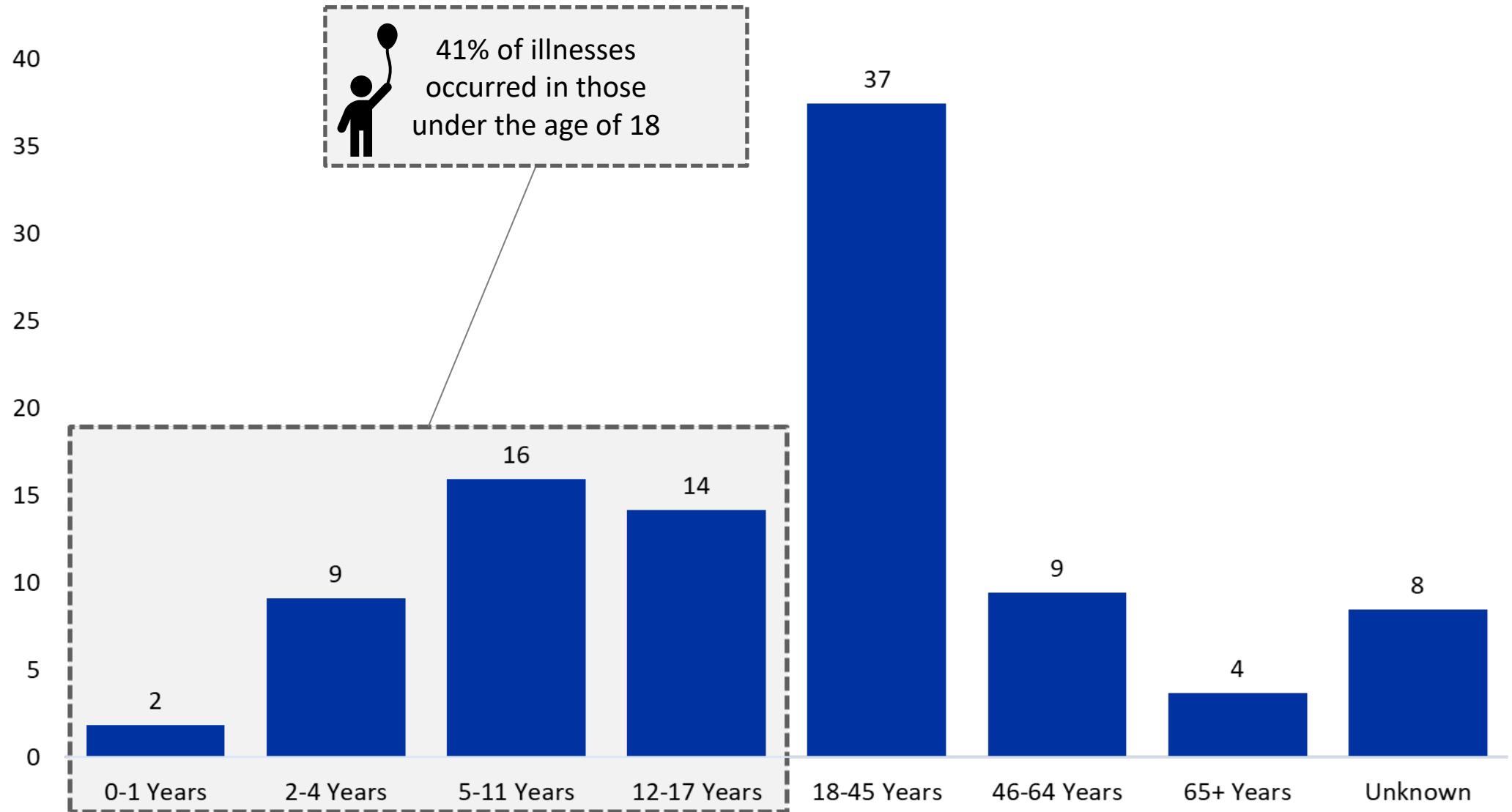


- 66% were interviewed within 4 days of illness onset
- 77% of interviews happening within a week



- 78% reported recovery within a week
- Most often illness recovery happened on day 2

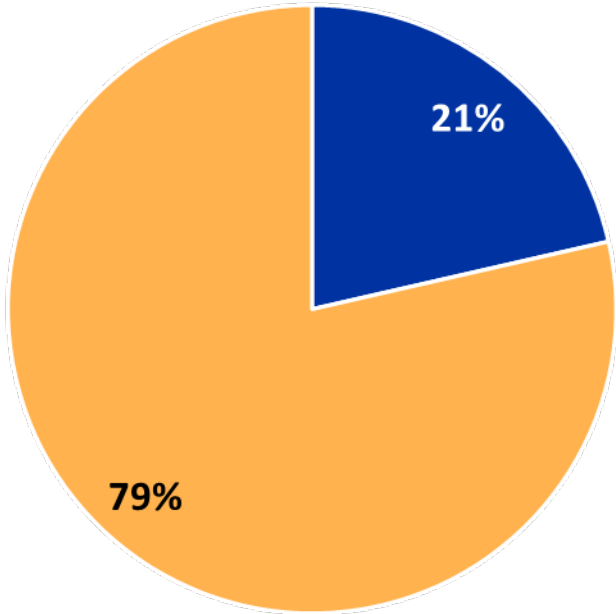
Reported Ages of Human Illness Cases, 2016-2024



Route of Exposure, 2016-2024



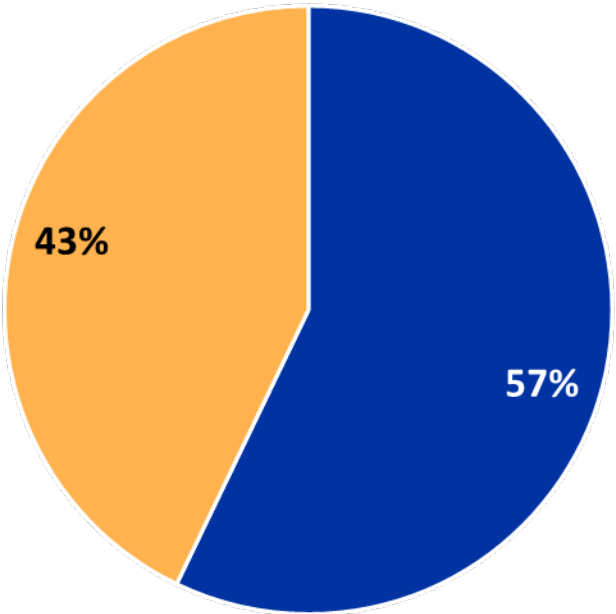
Inhalation



■ Yes ■ No



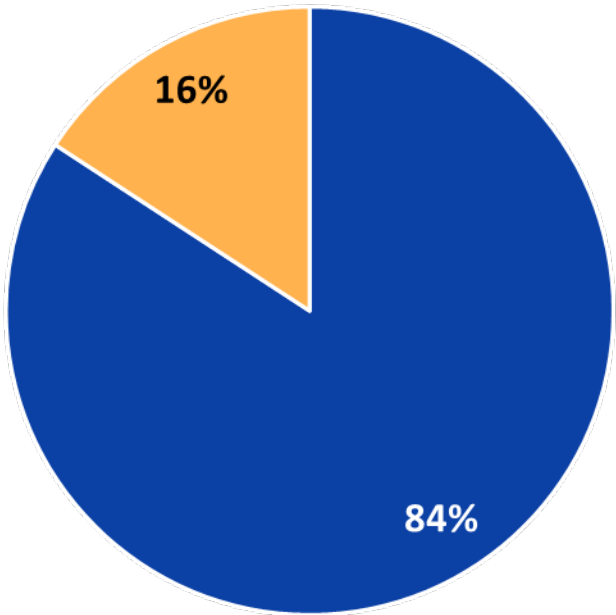
Ingestion



■ Yes ■ No

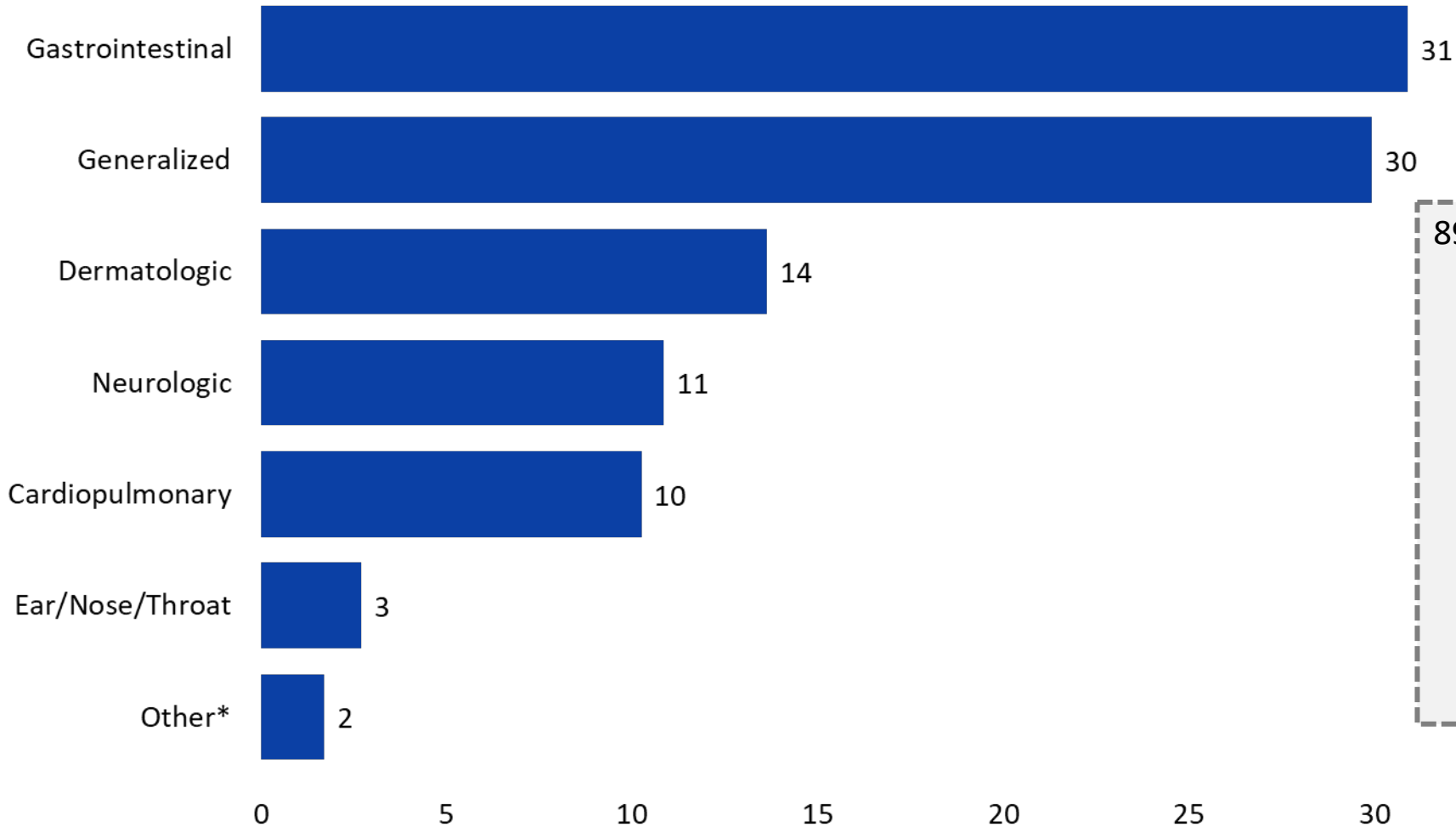


Direct Contact



■ Yes ■ No

Categories of Signs and Symptoms associated with human illnesses after HAB exposure, 2016-2024

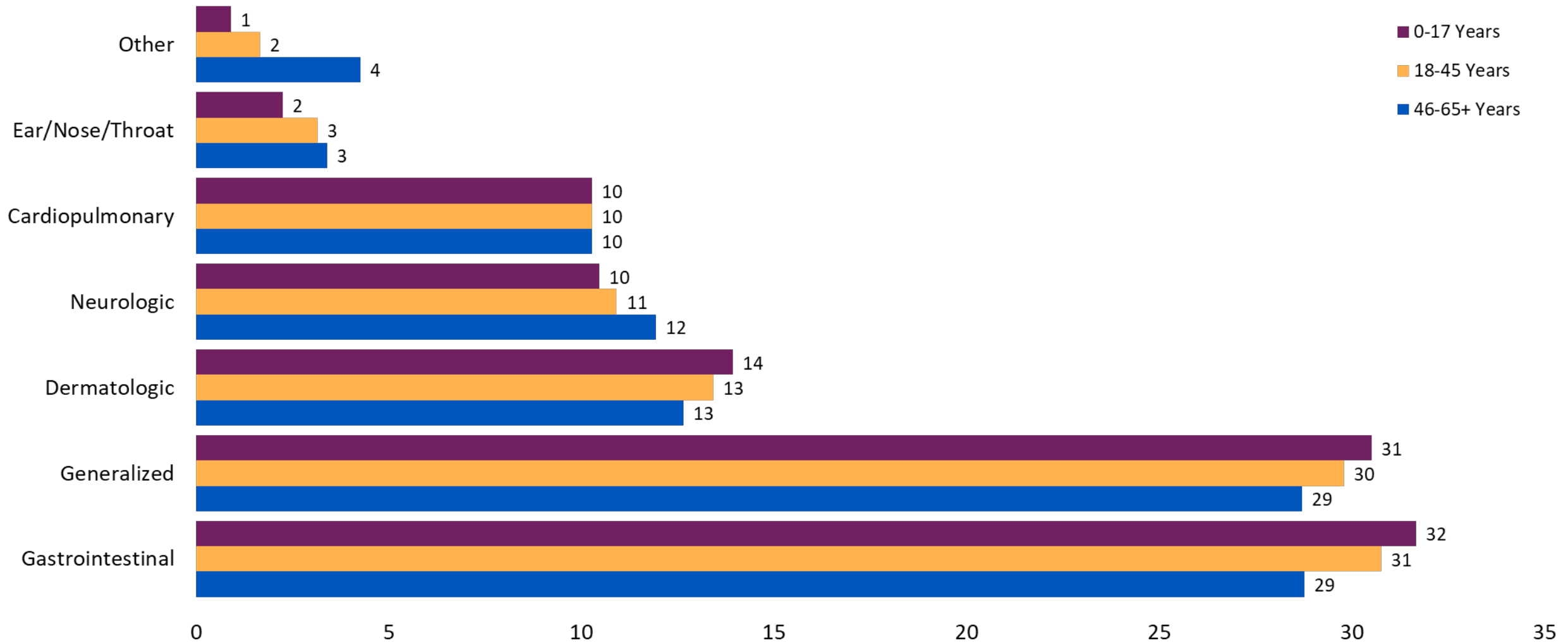


89.8% of symptoms were reported as:

- Cough
- Rash/itchy skin
- Abdominal cramps
- Diarrhea
- Vomiting
- Fever
- Headache
- Malaise (general discomfort)
- Tingling
- Nausea
- Rash
- Pruritus (itchy skin)

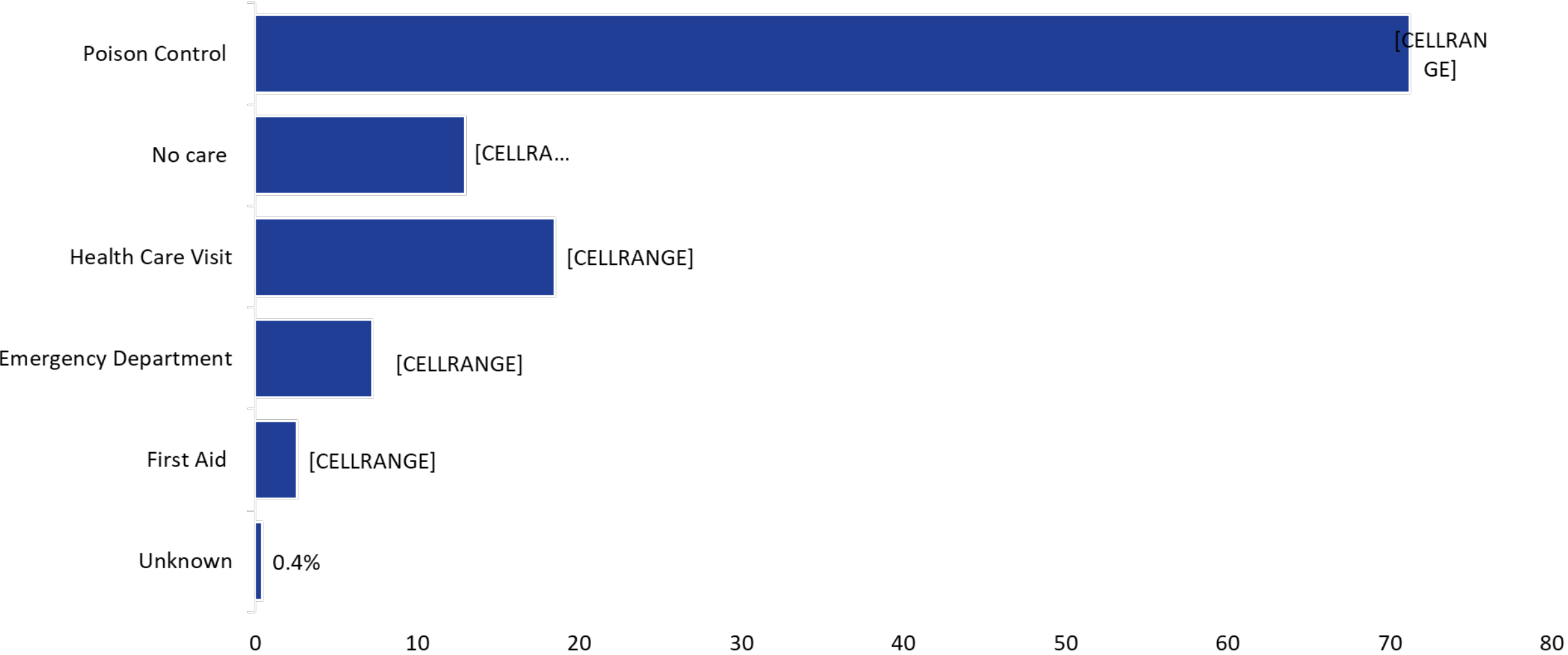
* Other includes ophthalmologic, musculoskeletal, and genitourinary

Signs and Symptoms of HAB-associated human illnesses by Age, 2016-2024



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Illness Care Seeking Behaviors, 2016-2024



Illness Care Seeking Behaviors by Exposure Route, 2016-2024



Inhalation

- 42.9% contacted poison control
- 35.7% went to the emergency department
- 1.2% went to their health care provider



Ingestion

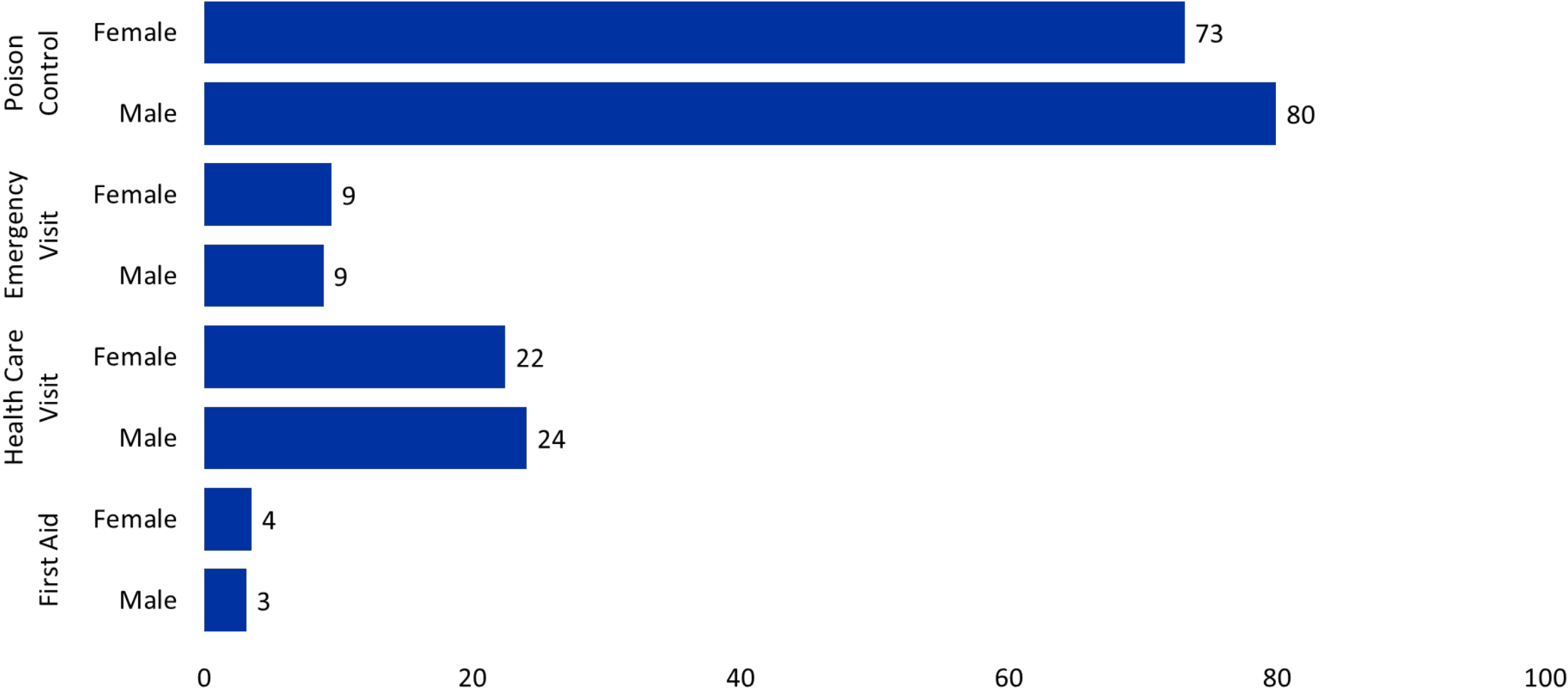
- 80.9% contacted poison control
- 22.7% went to the emergency department
- 2.4% went to their health care provider



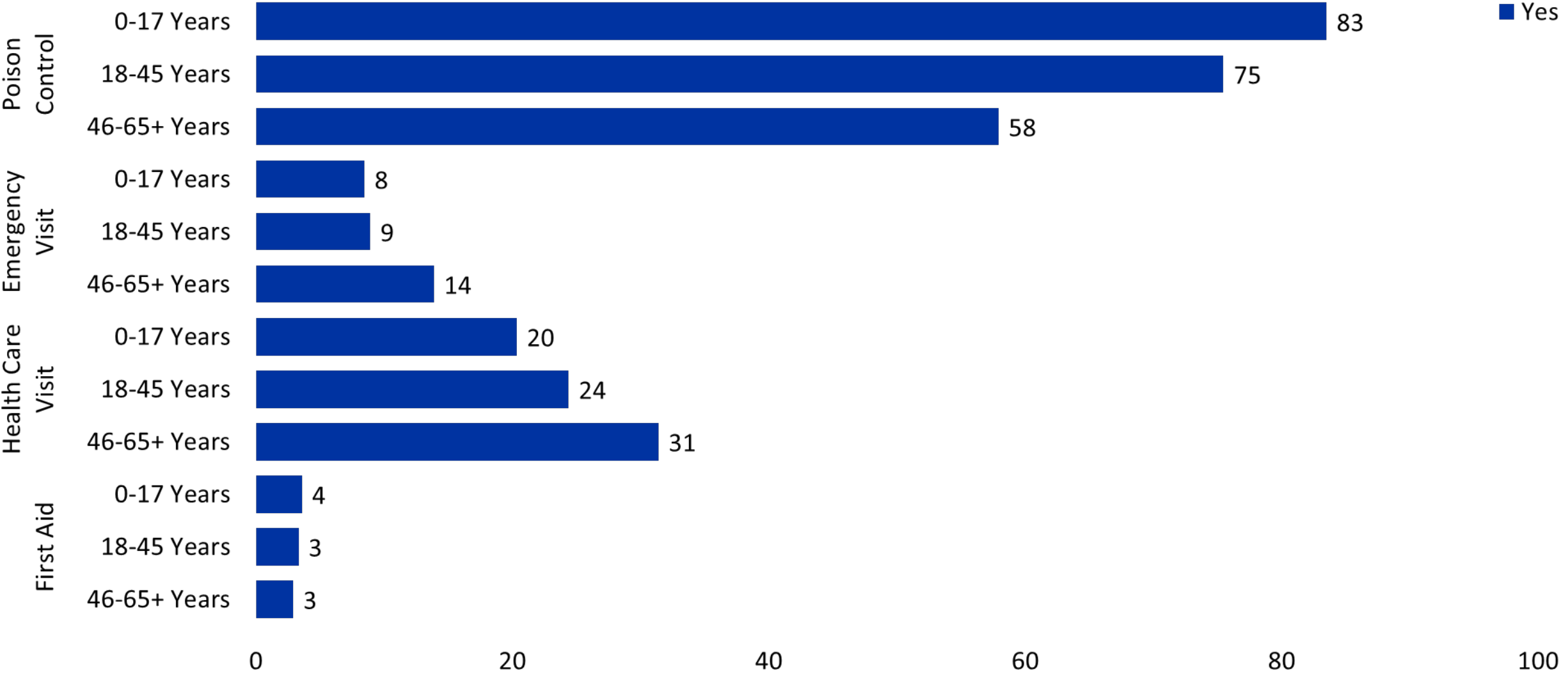
Direct Contact

- 78.8% contacted poison control
- 8% went to the emergency department
- 24.2% went to their health care provider

Illness Care Seeking Behaviors by Gender, 2016-2024



Illness Care Seeking Behaviors by Age, 2016-2024



Clinical Testing of Human Specimens



- Less than 2% had some clinical testing performed
- Tests were most often urinalysis

Toxin	Specimen Type
Microcystins	Urine (human)
Anatoxin-A	Urine (human, dog)
Dihydroanatoxin-A	Urine (human, dog)
Brevetoxins	Plasma (human)
Saxitoxin	Urine (human)

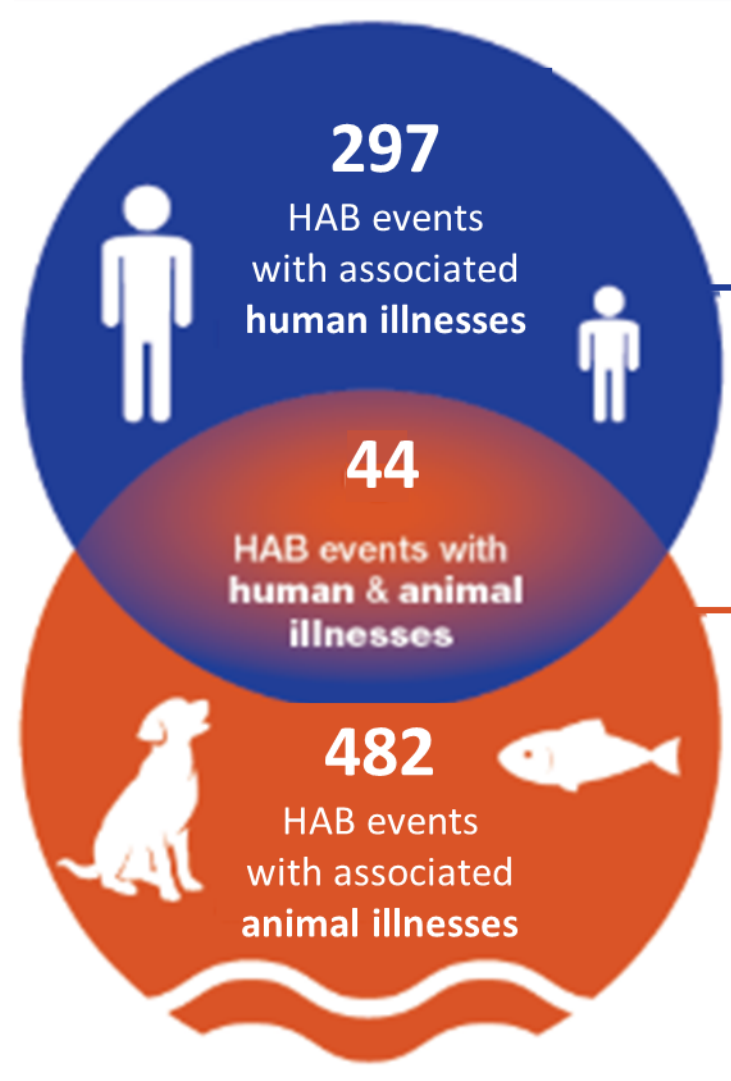
Animal Illnesses



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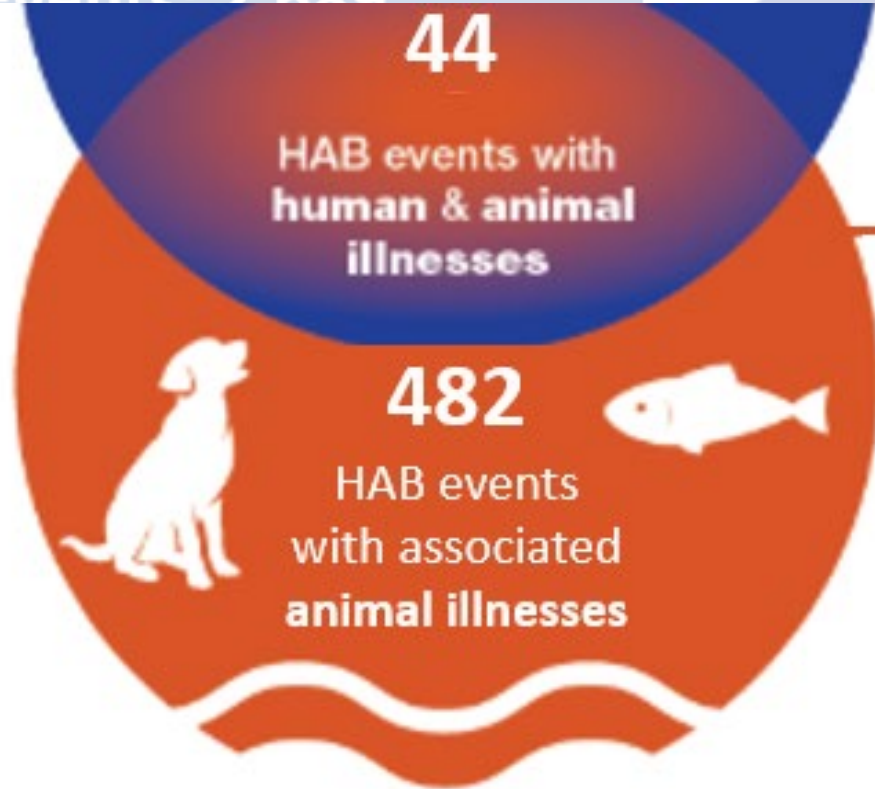
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Animal illnesses are reported on forms as single cases of illnesses or in groups, such as flocks of birds

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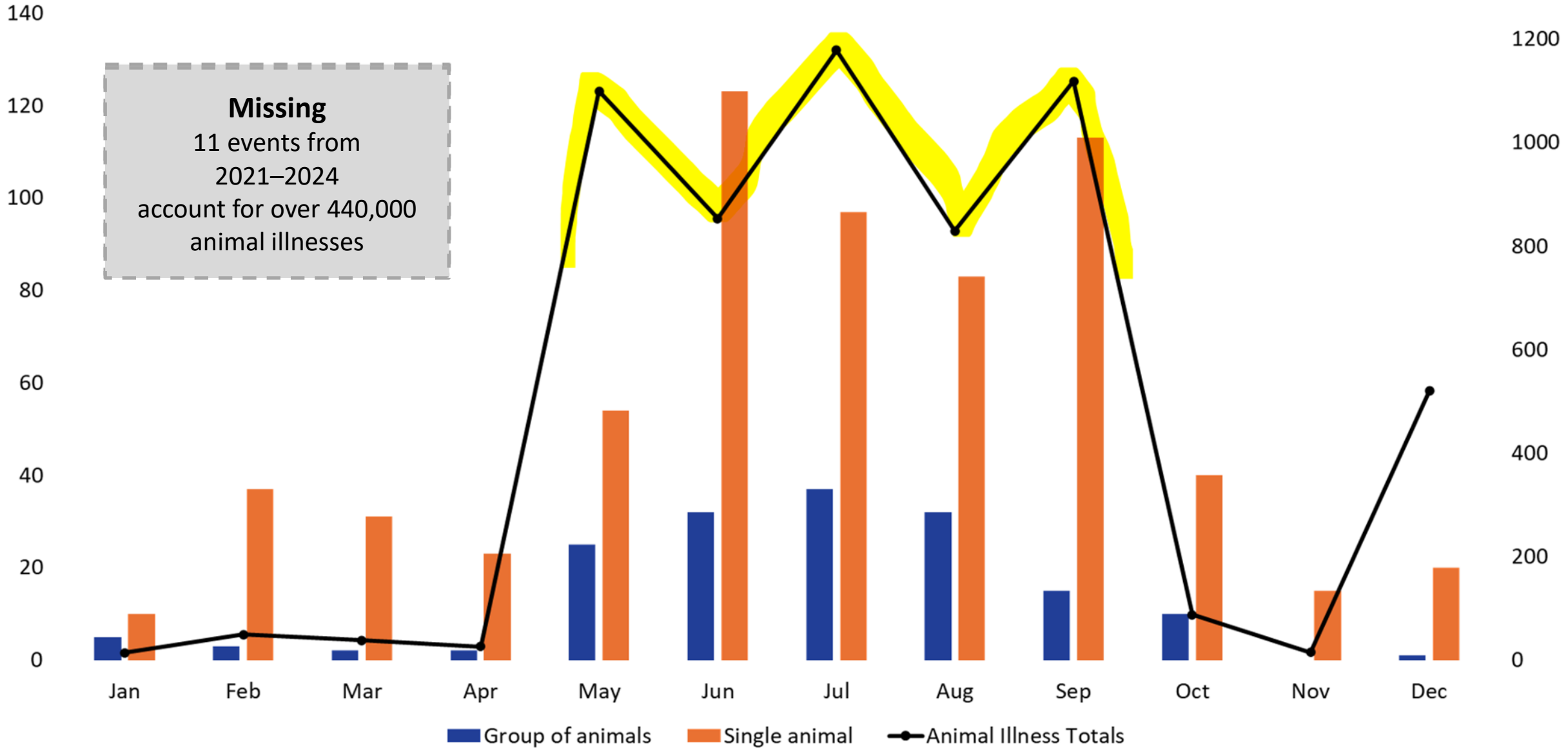
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Animals with reported illnesses, 2016 – 2024



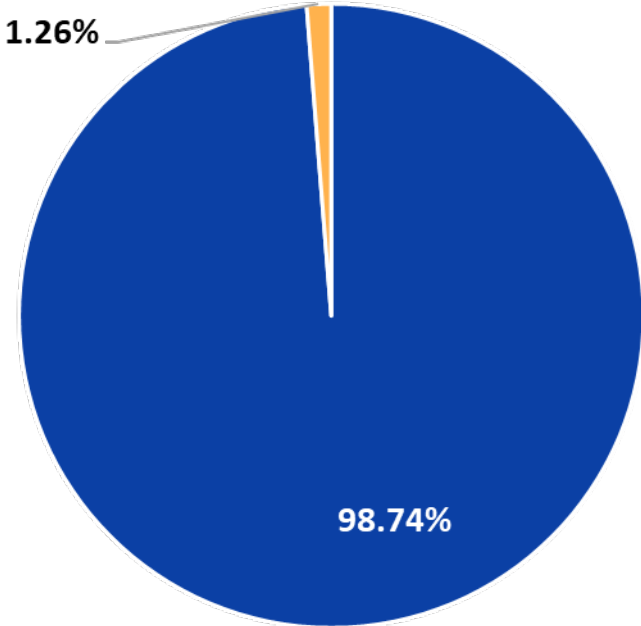
Animal Discovery, 2016 – 2024



Animal Route of Exposure, 2016-2024



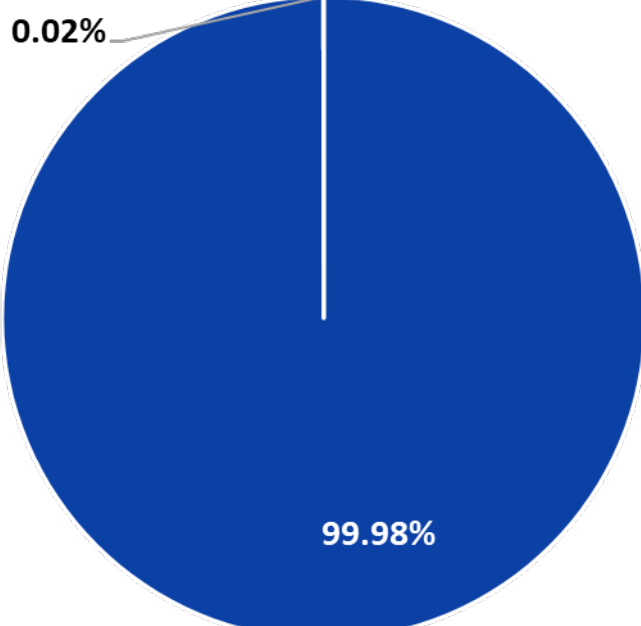
Inhalation



■ Yes ■ No



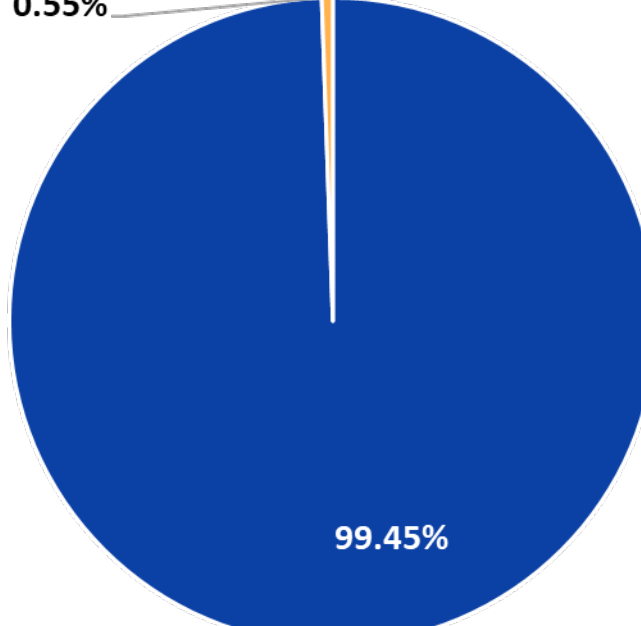
Ingestion



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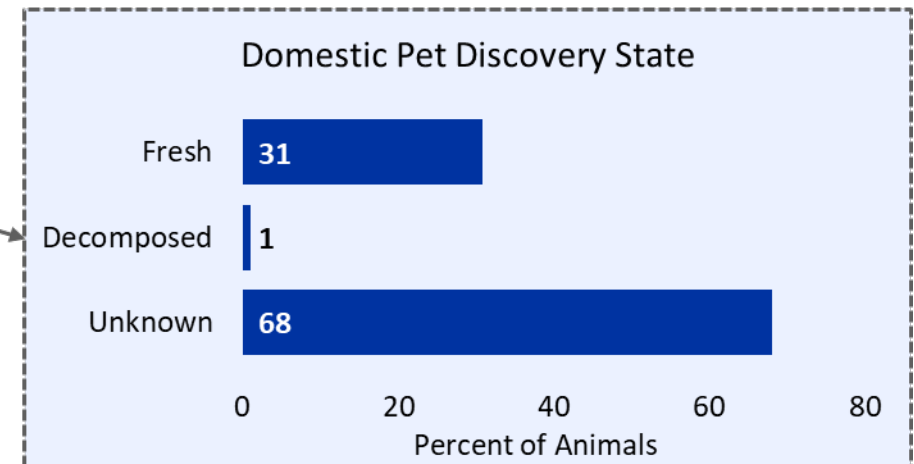
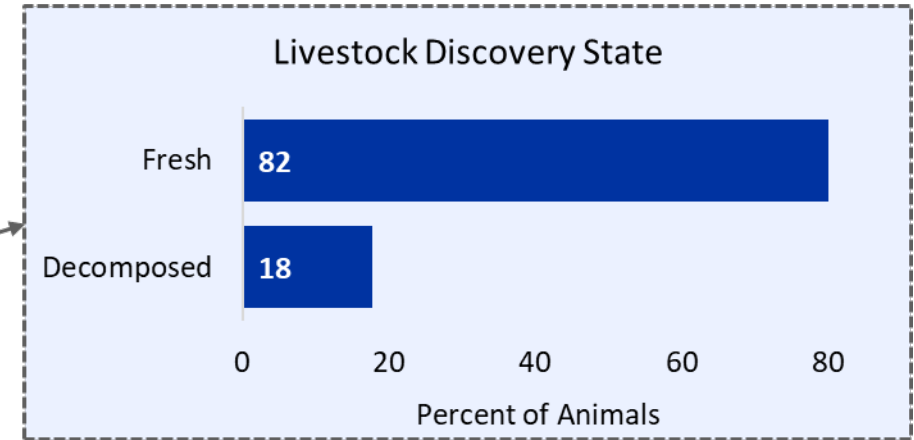
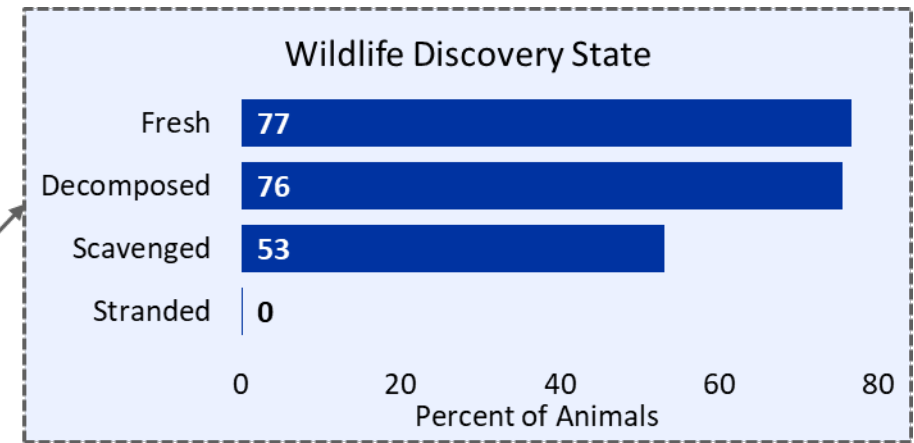
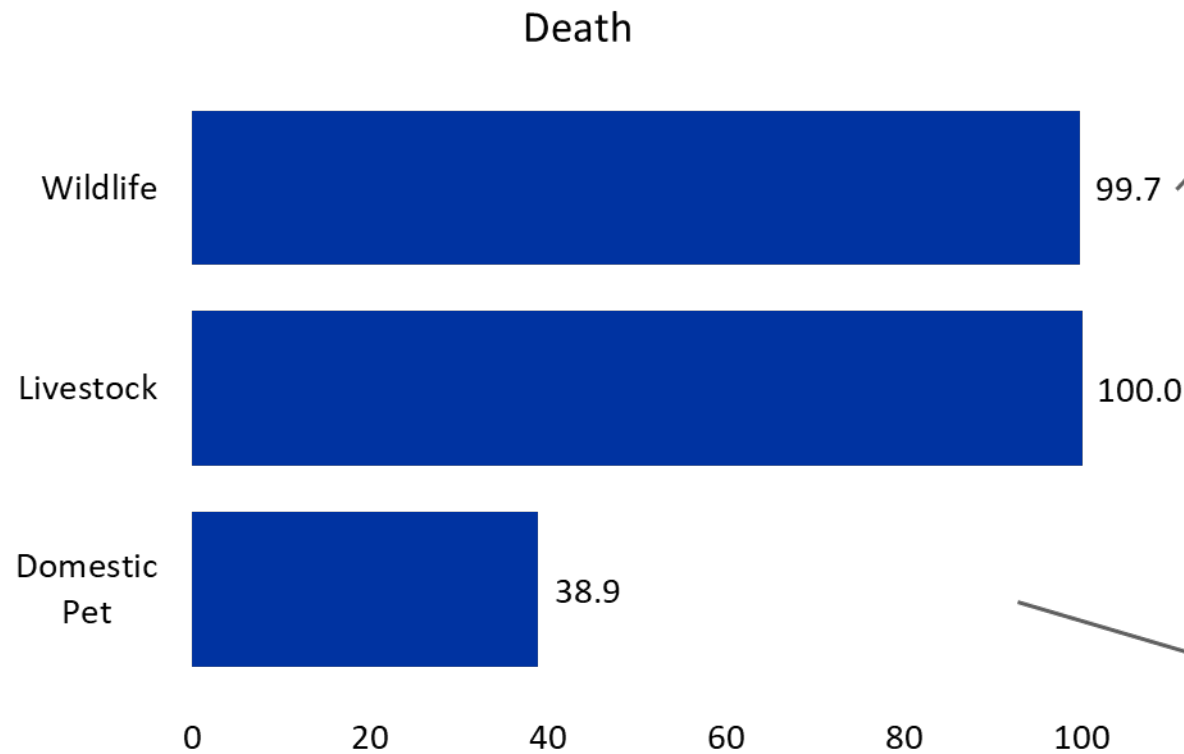


Direct Contact

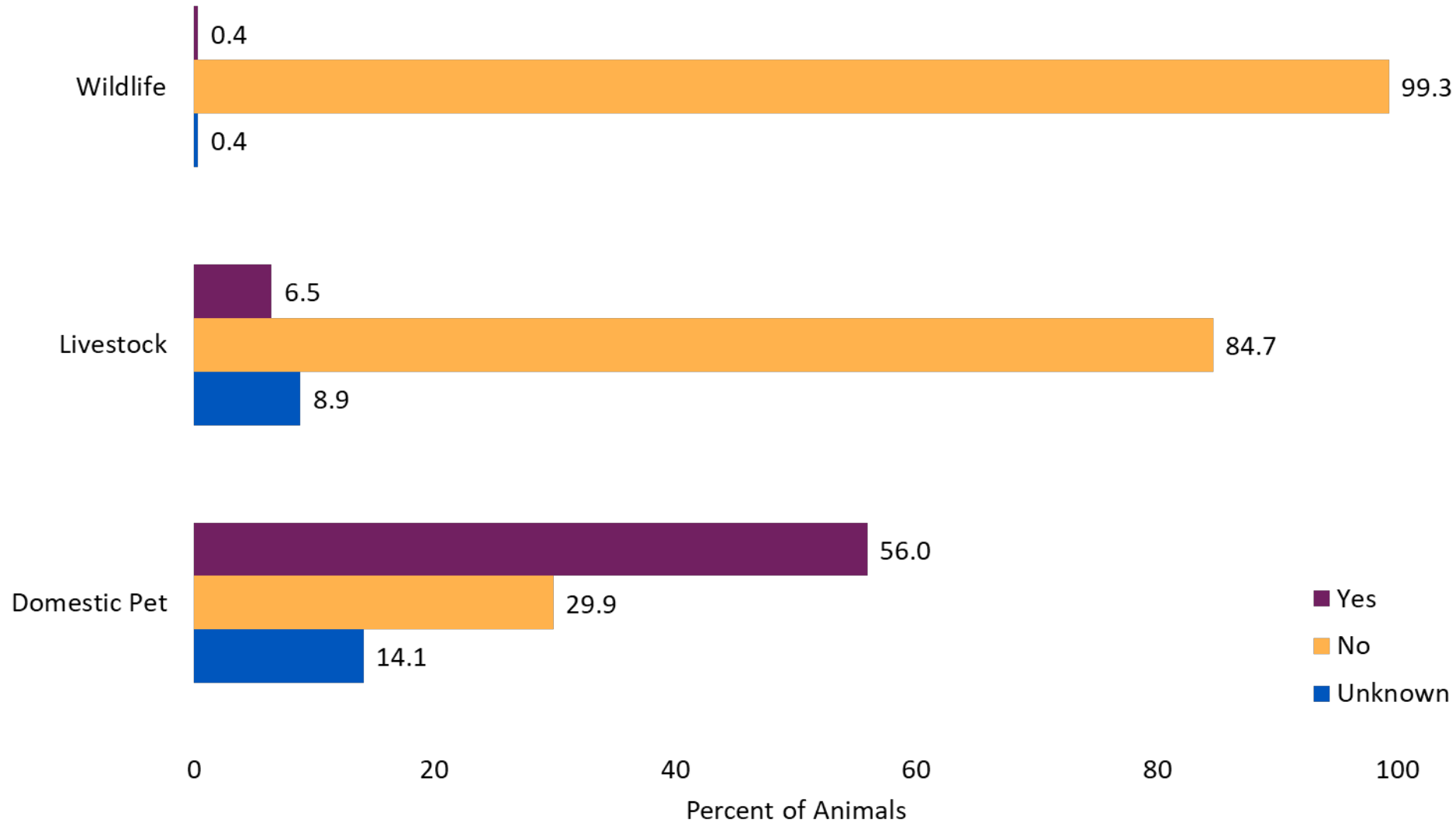


■ Yes ■ No

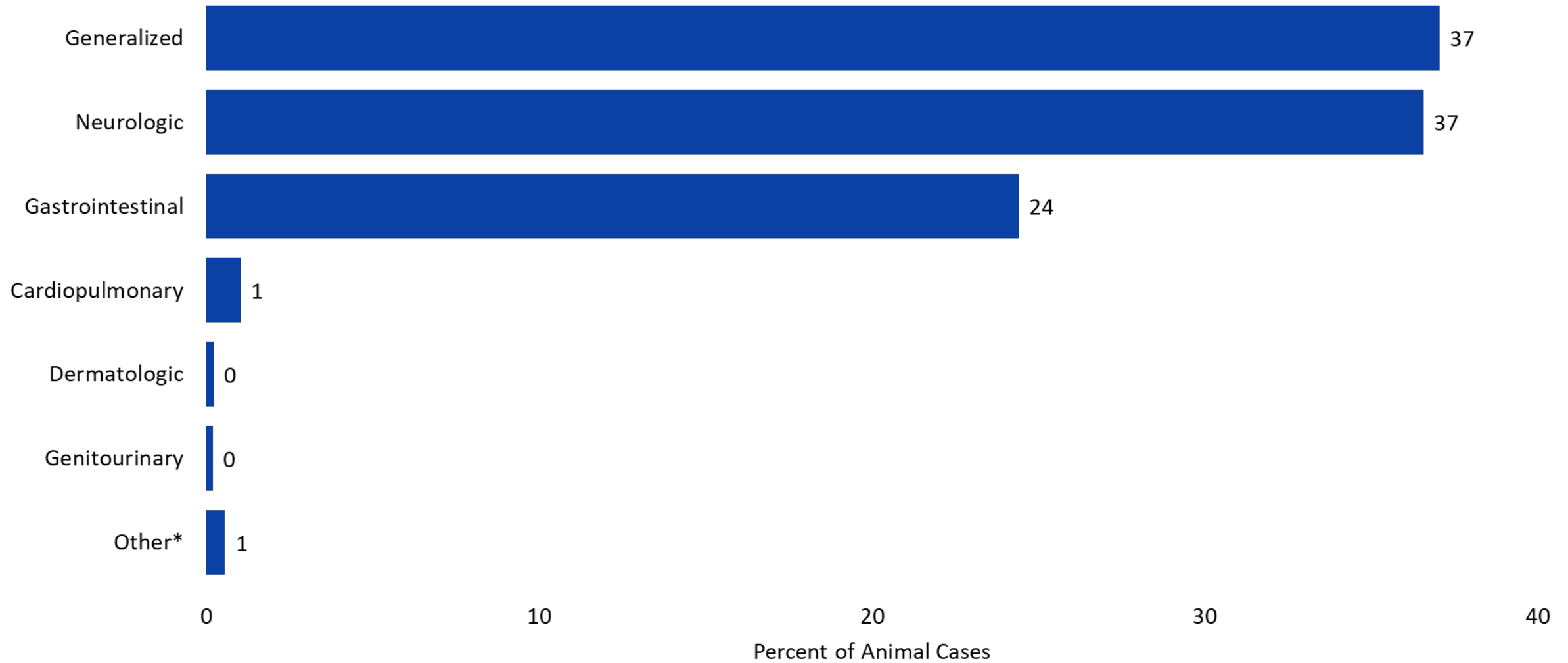
Animal Discovery State, 2016 – 2024



Animals provided veterinary care, 2016 – 2024



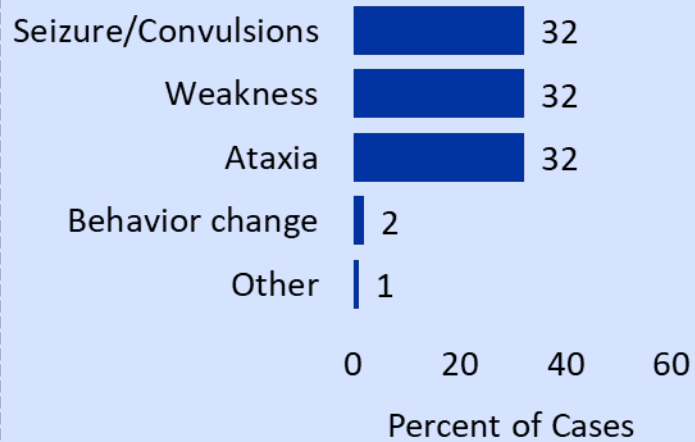
Categories of Reported Signs of Illness in Animals, 2016 – 2024



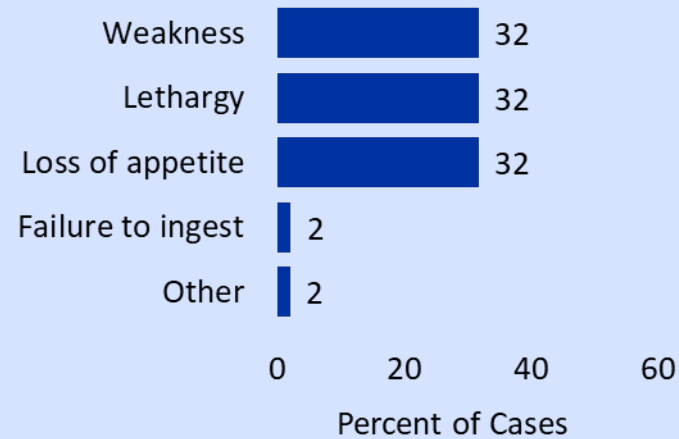
* Other includes Ear/Nose/Throat, unknown, ophthalmologic, hematologic, and musculoskeletal

Highly Reported Signs of Illness in Animals, 2016 – 2024

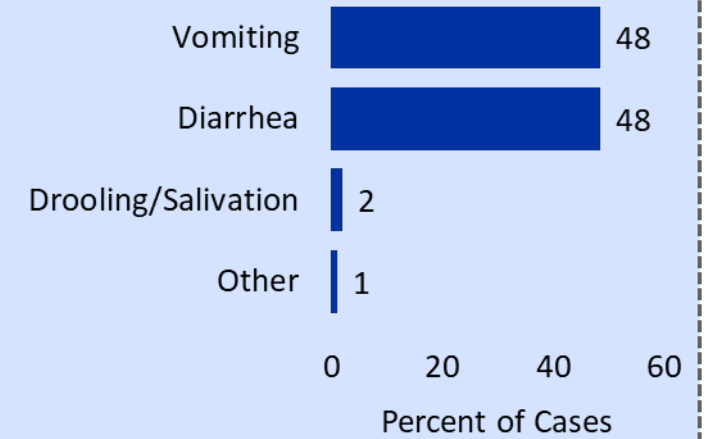
Neurological



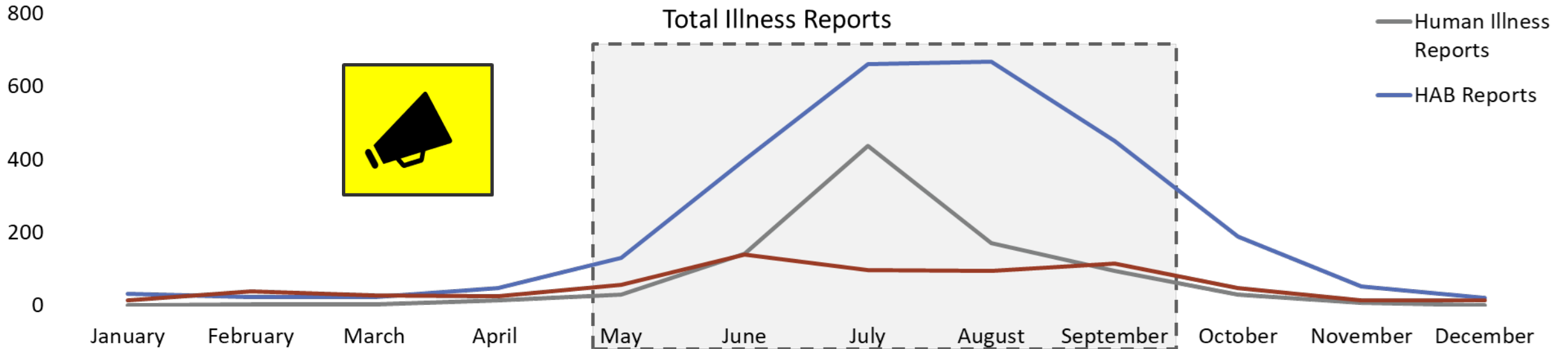
Generalized



Gastrointestinal



Main Take Aways



Environmental

- Most reported HABs occurred during the summer
- Majority of blooms occur in fresh water and had visible signs of a HAB like cloudy, green, scummy, and stagnant water

Human

- Very few specimens are tested
- Most symptoms are generalized or gastrointestinal
- Poison control is key stakeholder in surveillance

Animal

- Most wildlife and livestock die after exposure, but are found soon after death
- Domestic pets received veterinary care in more than half the cases

Thank you!



<https://www.cdc.gov/ohhabs/data/index.html>

Contact OHHABS at OHHABS@cdc.gov for any questions

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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.