

Environmental *Legionella* Investigations in Ohio

3/28/2024

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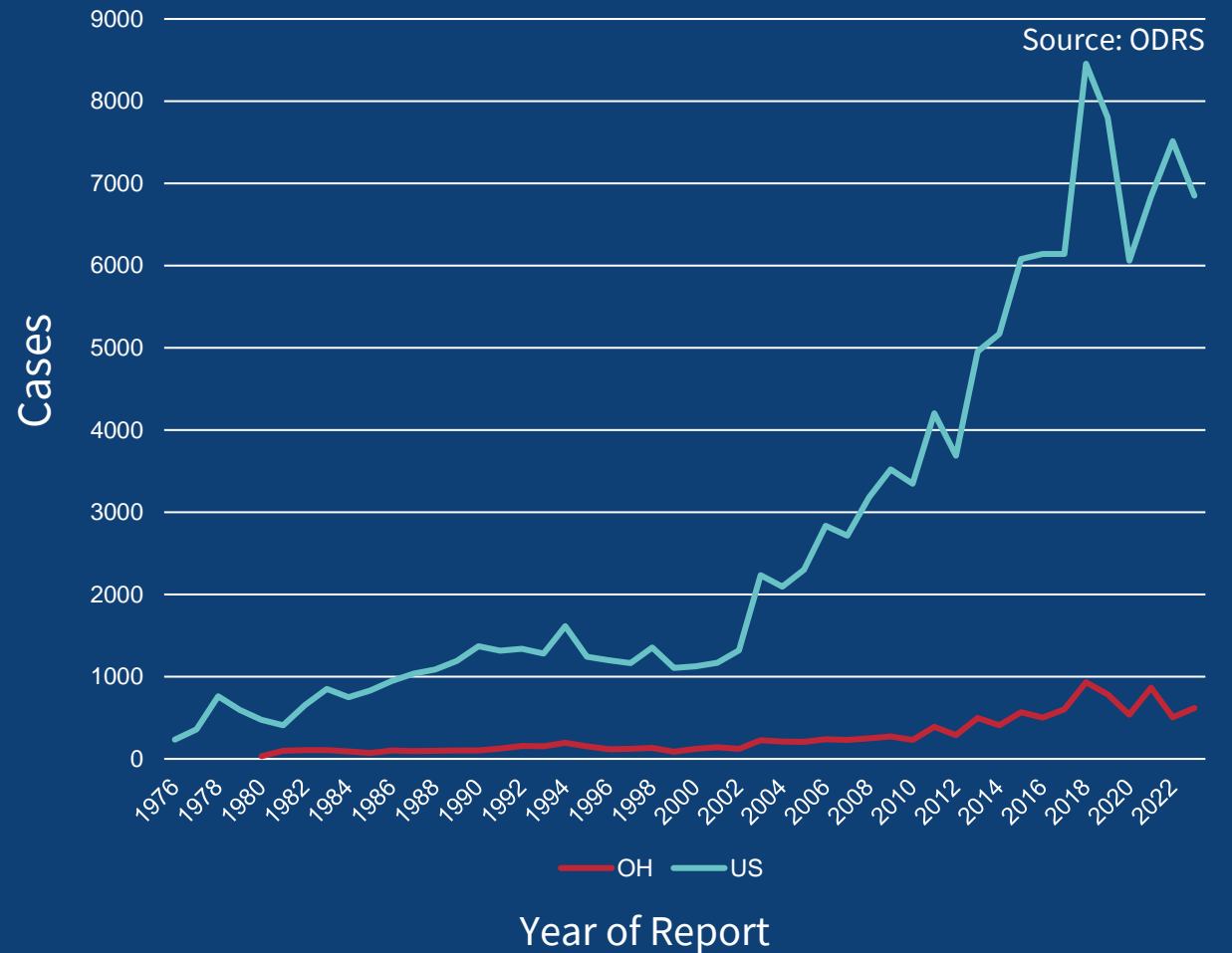
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Legionnaires' Disease in Ohio

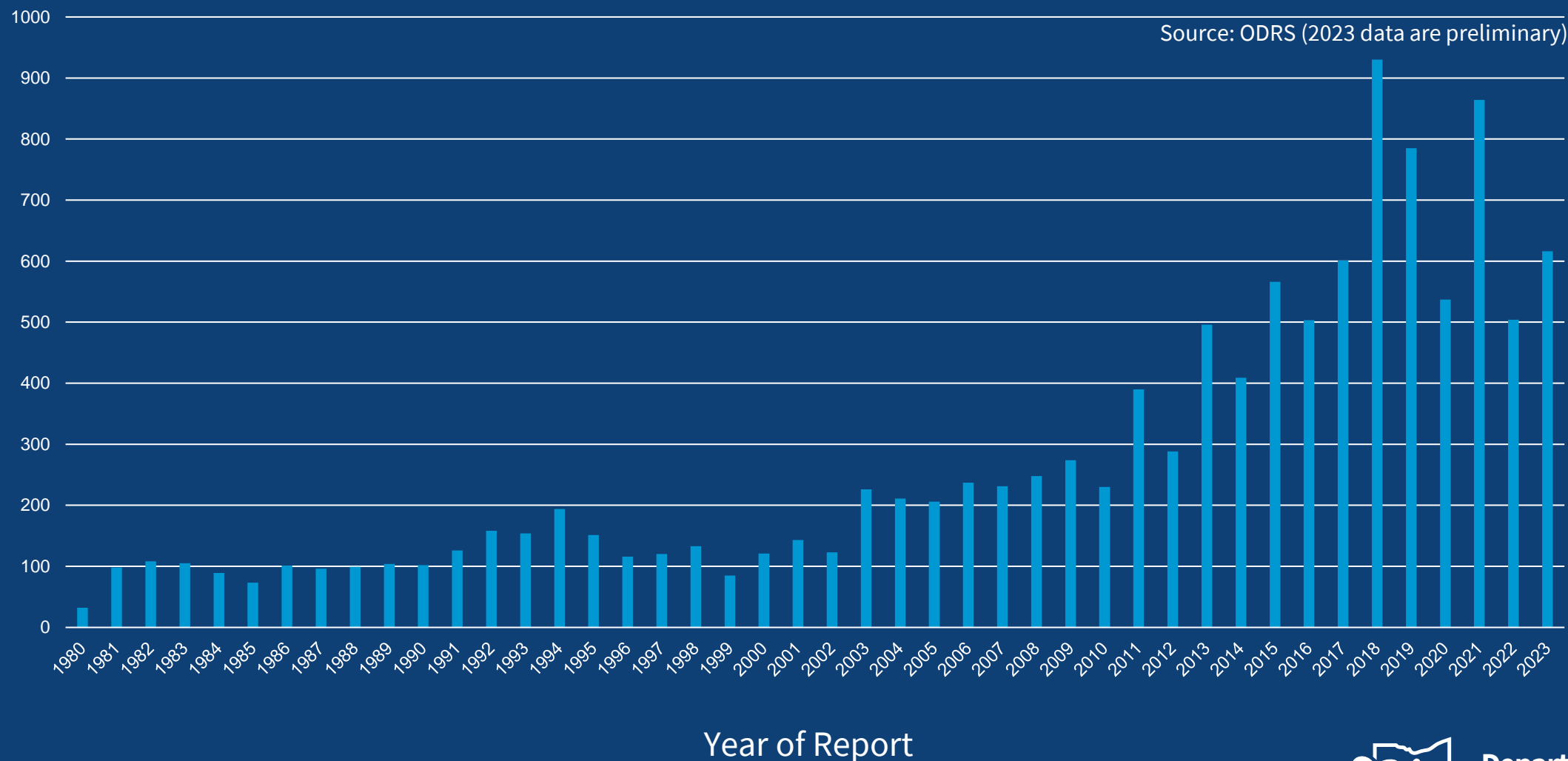
Legionnaires' Disease

Legionnaires' disease (LD) was discovered after an outbreak at a Philadelphia hotel in 1976.

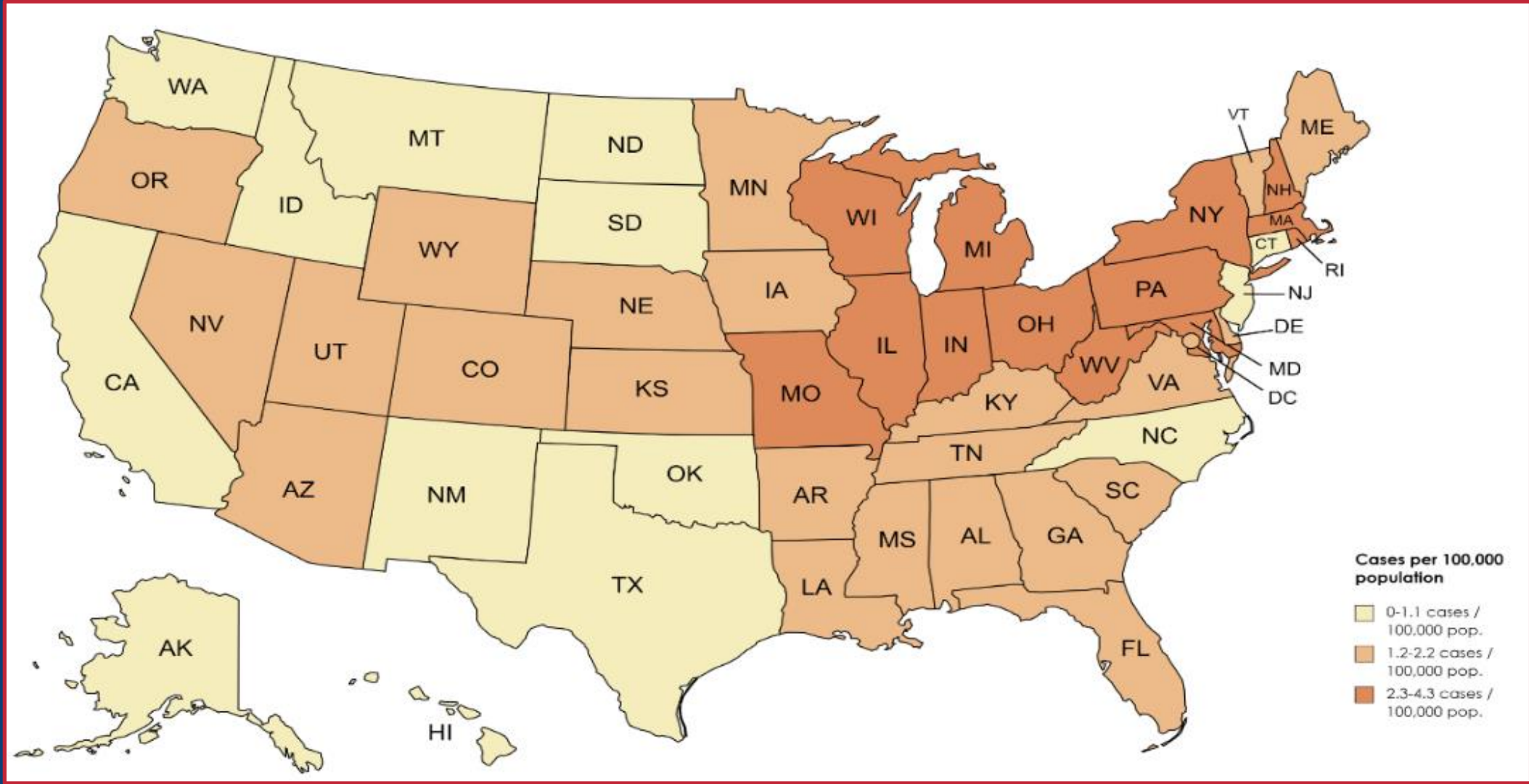
- LD was made nationally reportable in 1976.
- LD was reportable in Ohio by 1980.
- Number of cases reported increased drastically since 2000.
- True number of cases are likely higher.



Legionnaires' Disease in Ohio, 1980 – 2023

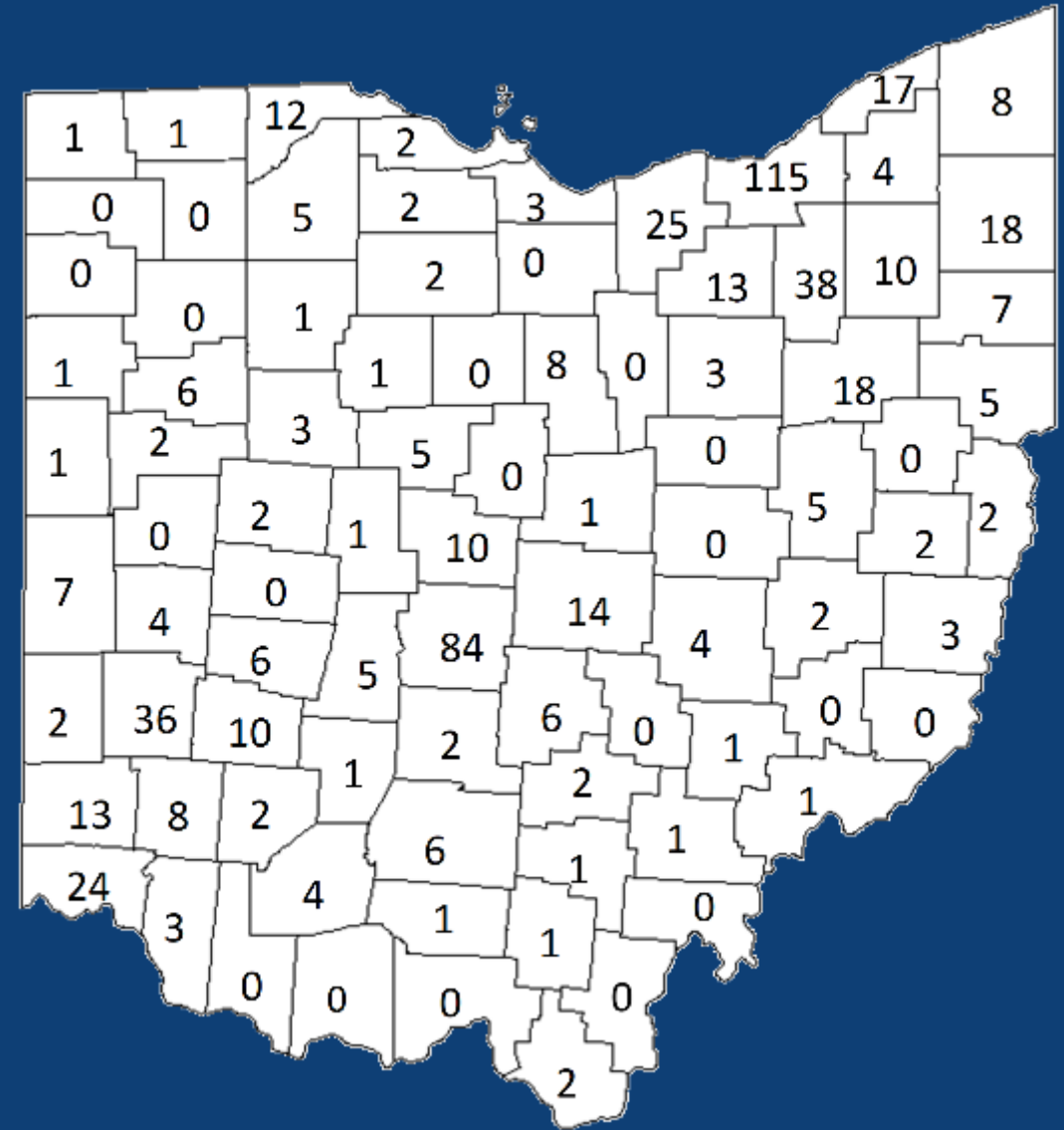


Legionnaires' Disease Cases per 100,000 Population, 2022



In 2023, Ohio reported 616 confirmed cases

- There were approximately 100 more cases than in 2022.
- Ohio's highest number of reported cases was 930 in 2018.
- Other states with high total cases in 2023 include:
 - **New York.**
 - **California.**
 - **Florida.**



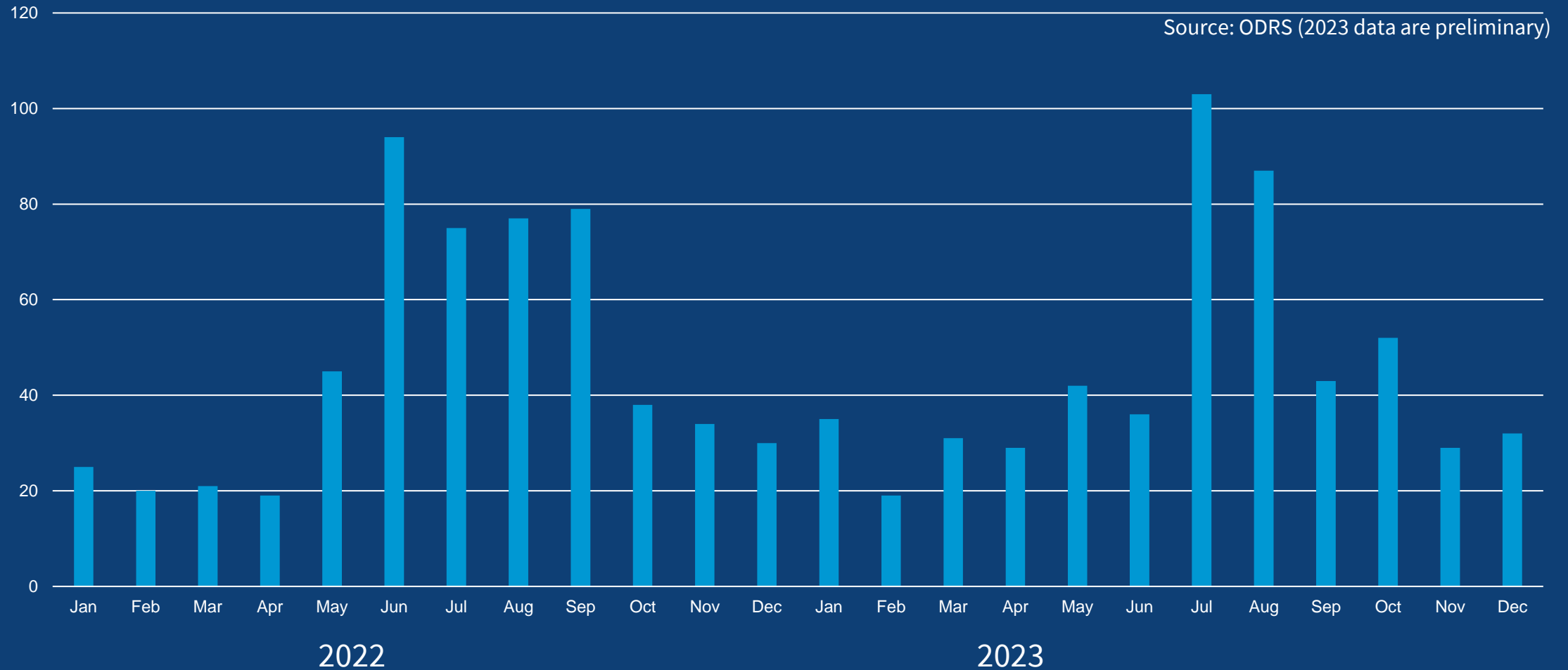
Cases per 100,000 population, 2023



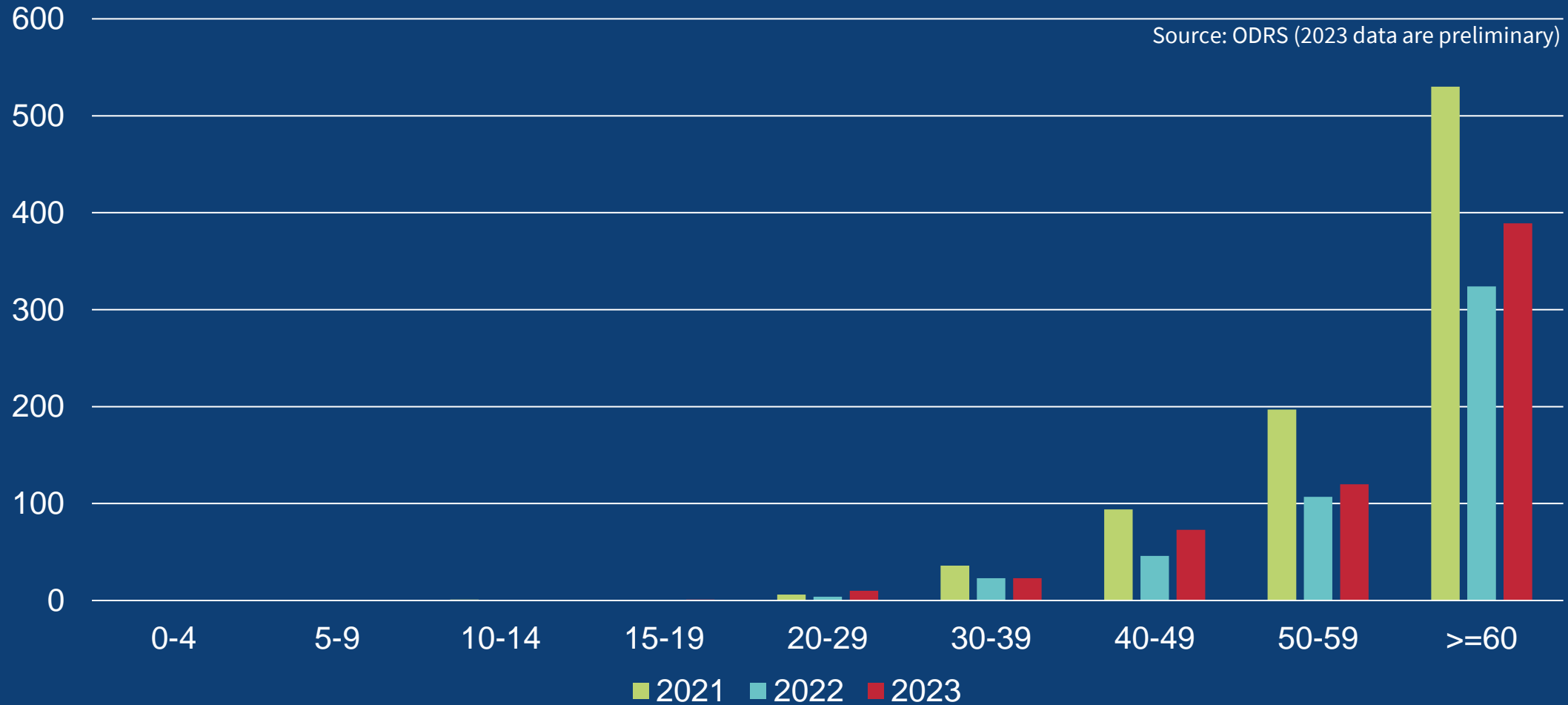
Cases per 100,000 Population

- No cases
- 0.1 – 3.5 cases per 100,00 population
- 3.6 – 5.0 cases per 100,000 population
- 5.1 – 12.9 cases per 100,000 population

Legionnaires' Disease in Ohio by Onset Date, 2022-2023



Legionnaires' Disease in Ohio, Cases by Age at Onset, 2021-2023



Median Age for Legionnaires' Disease in Ohio

Year	Median	Range
2023	64	19-101
2022	64	23-94
2021	63	13-97
2020	61	20-99
2019	62	6-100

Source: ODRS (2023 data are preliminary)

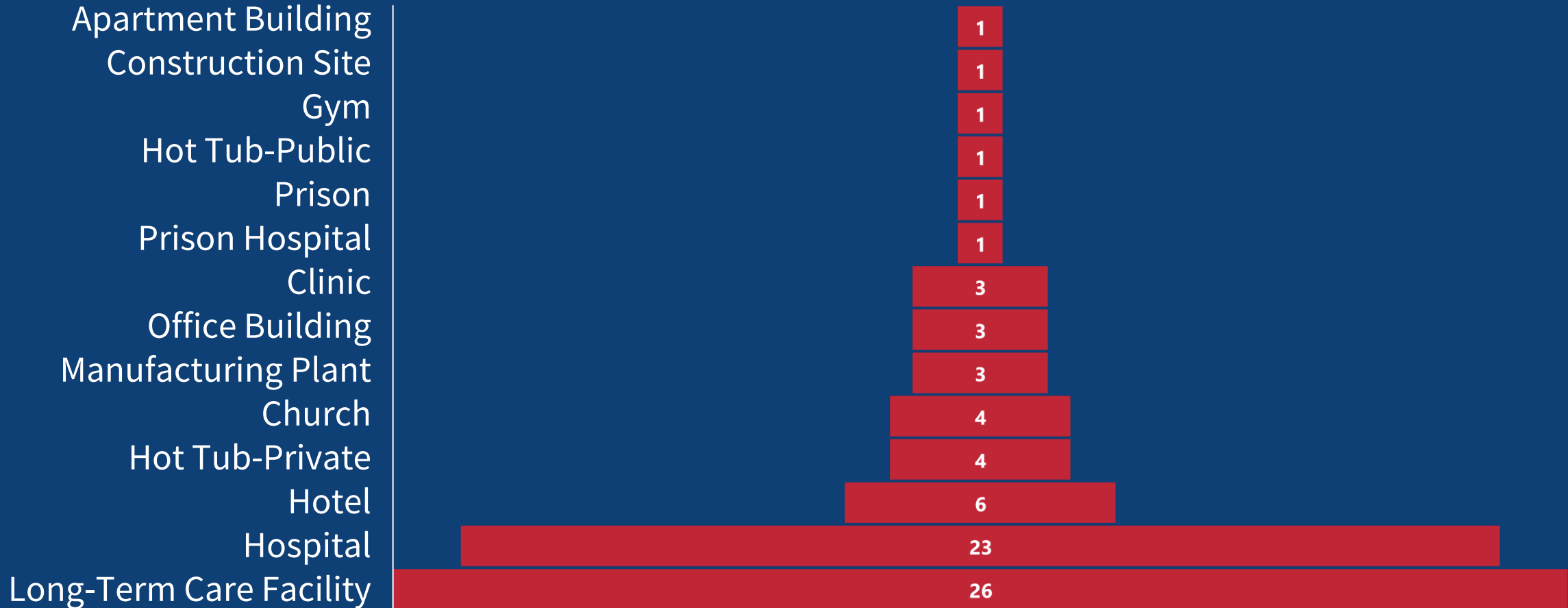
Legionnaires' Disease Outbreaks

Two or more confirmed cases with exposure to the same possible source within a 12-month period.

Outbreaks can be associated with many different settings:

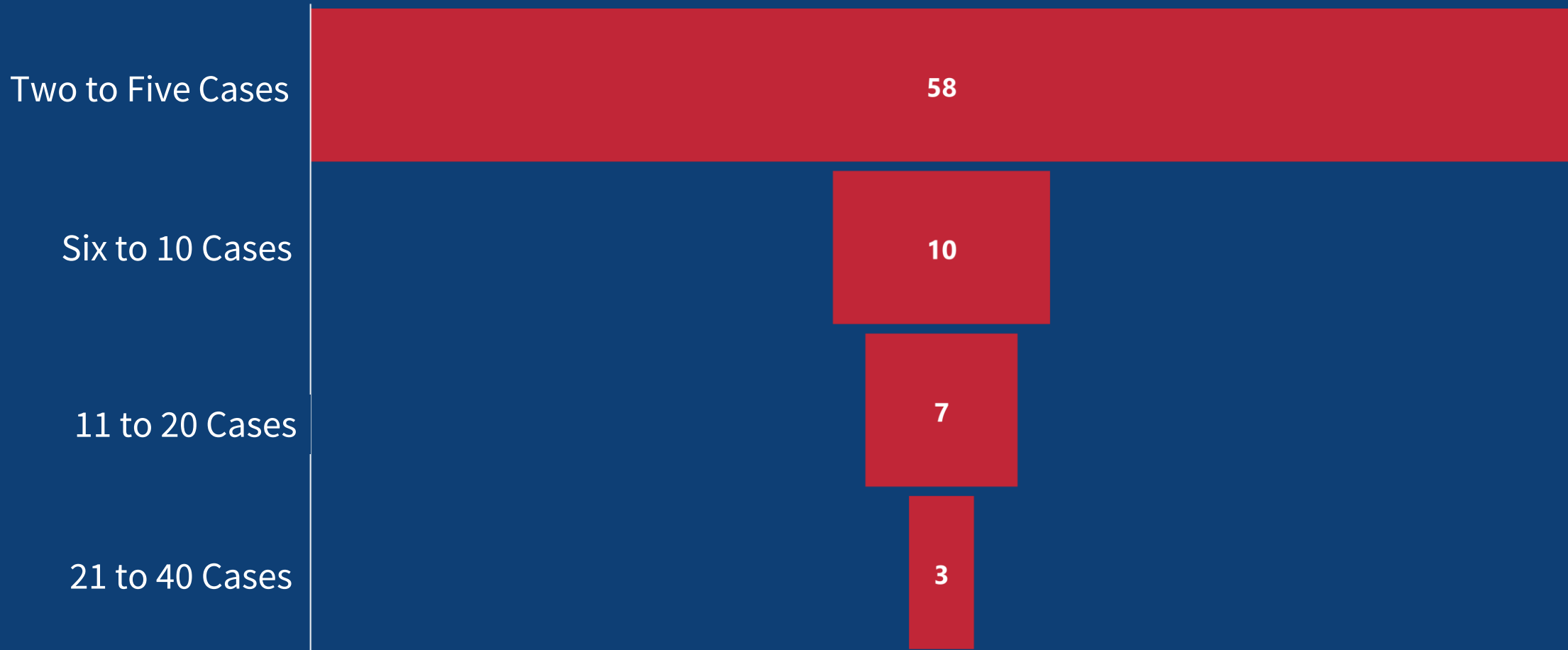
- Healthcare.
- Hotels.
- Apartments.
- Manufacturing plants.
- Gyms.
- Fairs.
- Places of worship.

Legionnaires' Disease Outbreaks in Ohio, 2007-2023



Source: ODRS (2023 data are preliminary) N = 78 outbreaks

Legionnaires' Disease Outbreaks in Ohio, 2007-2023



Source: ODRS (2023 data are preliminary) N = 78 outbreaks

Case Definition

A **confirmed case** of **Legionnaires' disease** needs to be **clinically compatible** with confirmatory laboratory evidence for *Legionella*.

Confirmatory methods include:

- Urine antigen (*Lp1*).
- PCR.
- Culture.



Healthcare Facilities



Hospitals

- Acute care hospitals.
- Critical access hospitals.
- Children's hospitals.
- Psychiatric hospitals.



Long-Term Care

- Skilled nursing facilities.
- Nursing homes.
- Inpatient hospice.
- Rehabilitation.
- Residential treatment facilities.



Clinics

- Outpatient clinics.
- Ambulatory surgery centers.
- Outpatient rehab.
- Dialysis centers.
- Dental clinics.



Non-Healthcare

The following are not considered healthcare facilities for LD surveillance:

- Assisted living.
- Senior living.
- Prisons.

Healthcare-Associated Cases

Further case classification is provided for confirmed cases of Legionnaires' disease with healthcare exposures.

Presumptive healthcare-associated Legionnaires' disease:

- Spent ≥ 10 days of continuous stay at a healthcare facility during the 14 days prior to symptom onset.
- CDC recommends a full environmental investigation.

Possible healthcare-associated Legionnaires' disease:

- Spent a portion of the 14 days prior to symptom onset at one or more healthcare facilities.
- Does not meet the criteria for a presumptive healthcare-associated case.

Environmental LD Investigations in Ohio



Legionella Investigations

The Bureau of Environmental Health and Radiation Protection (BEHRP) may contact the Local Health District (LHD) to provide educational outreach or initiate an environmental investigation.

Response varies depending on exposure and number of cases.

- Educational outreach.
- Limited response.
- Full Investigation.

Cooperation and Coordination Are Key

A successful investigation requires the collaboration of several different groups.

- Ohio Department of Health.
- The LHD.
- The facility.
- Consultants and contractors.
- State and federal partners.



Source: Microsoft Stock Images

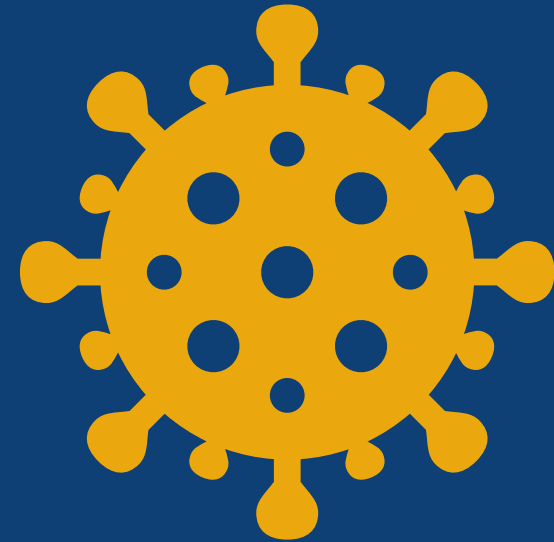
Role of ODH - Bureau of Infectious Diseases (BID)

Provides epidemiological support.

- Responsible for case surveillance and disease monitoring.
- Supports epi investigations.
- Contacts BEHRP if there is a potential environmental source.

Works with CDC partners.

- Can request assistance as needed.
- National reporting of disease occurrence.



Role of ODH - BEHRP

Provides environmental investigation support.

- Contacts LHD environmental staff when an investigation is needed.
- Provides environmental guidance and technical assistance during investigations.
- Coordinates calls and discussion as needed.
- Reviews documentation including water management programs (WMP).



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Role of the LHD

Conducts epidemiological evaluation.

- Determines case/outbreak category.
- Supports epi investigations.
- Investigates potential sources.

Coordinate investigations with ODH and the facility.

- Reaches out to facility to gather information.
- Communicate investigation procedure to facility.
- Provide support to the facility as needed.
- Forward information to ODH.



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Role of Facilities

Collaborate with ODH and the LHD.

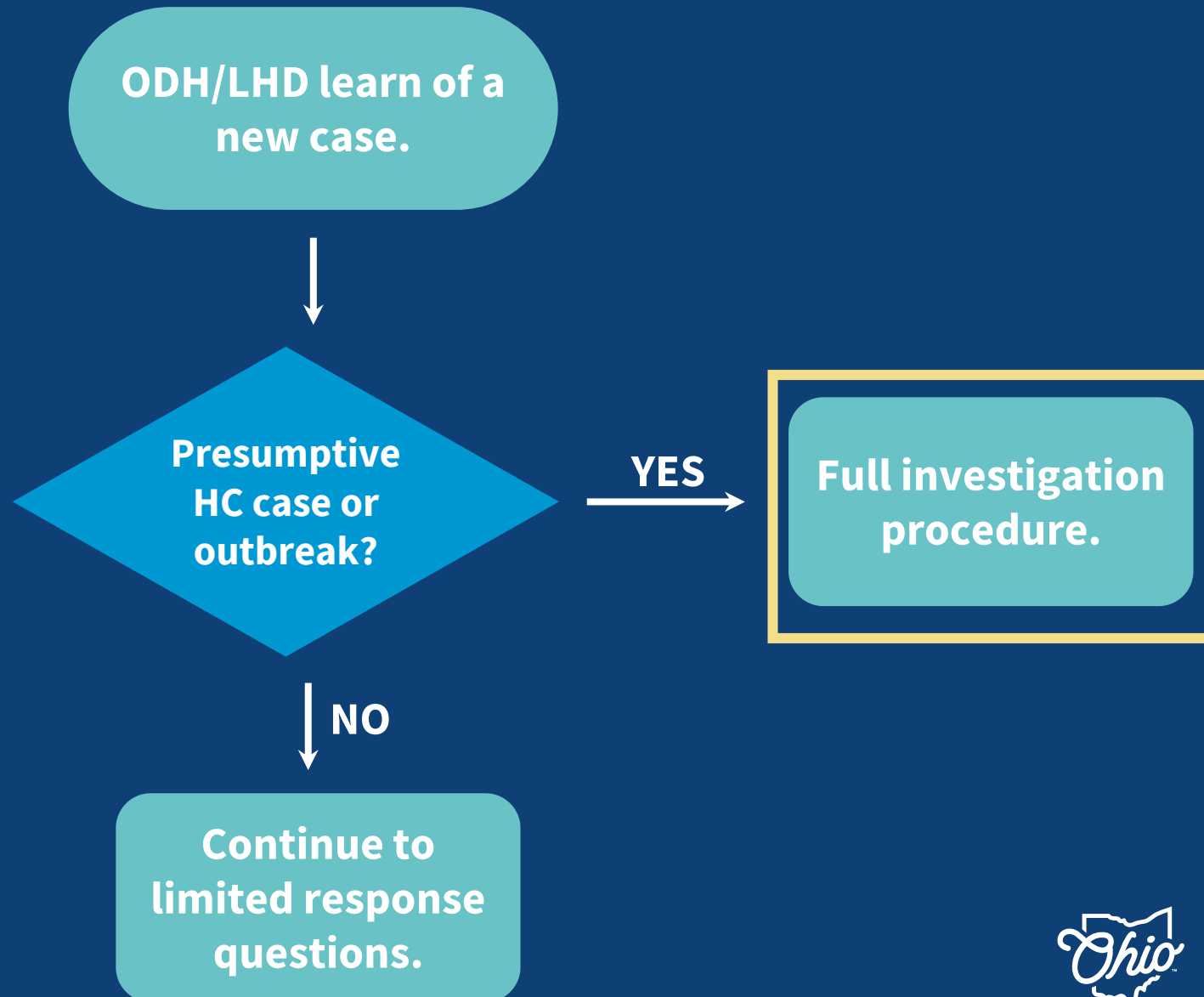
- Provides information to local health upon request.
- Complete investigation activities.
- Updates local health on investigation status.

Work with consultants and other contractors as needed.

- Can assist with activities such as WMP development and remediation.
- ODH can provide a contact list upon request.



ODH Environmental Response



Full Environmental Investigations

CDC recommends performing a full investigation in a facility upon the identification of:

- **≥ 1 presumptive healthcare-associated case of Legionnaires' disease.**
 - CDC also recommends this for correctional facilities where the case did not leave the premises during their incubation period.
- **≥ 2 or more cases within 12 months of each other.**
 - Considerations can be made based if cases were exposed to different water distribution loops in a facility.
 - Applies to all facility types.



Source: Microsoft Stock Images

1

Implement water-use restrictions and install filters.

- Point-of-use filters should have an effective pore size of 0.2 microns or less and comply with ASTM F838.
- Install filters throughout water distribution loops where case(s) had potential exposure.
- Alternatively restrict water on loop of exposure or use a combination of filters and restrictions.

2

Communication and notification.

- Distribute notification letters to appropriate audiences.
- Post signage on reporting removed or damaged filters.

3

Complete an environmental assessment.

- The CDC's *Legionella* Environmental Assessment Form is acceptable.
- More comprehensive assessment is preferred.

4

Create a sampling plan and collect pre-remediation samples.

- Select sampling locations according to CDC and ODH guidance.
- Submit sampling plan to ODH and the LHD for approval prior to collection.

5

Make water system corrections.

- Make any corrections or changes identified by the assessment prior to remediation.



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Source: Microsoft Stock Images



6

Remediate water systems as identified by assessment and sample results.

- Use sampling results to inform remediation method.
- ASHRAE Guideline 12-2020 advises against thermal shock.

7

Collect an additional sample set at least 72-hours after remediation.

- Include same locations as the pre-remediation set.
- Continue collecting samples until there are two consecutive negative post-remediation sets.

8

Revise water management program.

- Update WMP following the recommendations provided by ODH and the LHD.
- Investigation will close once all steps are completed.

Challenges with Full Investigations

Full investigations can be demanding to both facility owners and residents. There are many situations where a different approach may be warranted but a **full environmental investigation** is **not** needed:

- A single outpatient visit to a clinic.
- A three-day hotel stay.
- A nurse at a hospital that worked 10 days during their incubation period.
- A resident at a long-term care facility who had several appointments at a hospital during their incubation period.



Source: Microsoft Stock Images



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Limited Response Activities

A more flexible approach is needed to address cases that do not require full investigation. Some considerations include:

- Facility type.
- Length of exposure.
- Water management practices.
- Facility history with LD.



A scanning electron micrograph (SEM) showing numerous rod-shaped bacteria, likely E. coli, on a textured surface. The bacteria are in various orientations, some appearing in clusters and others individually. The image is in grayscale with a blue tint.

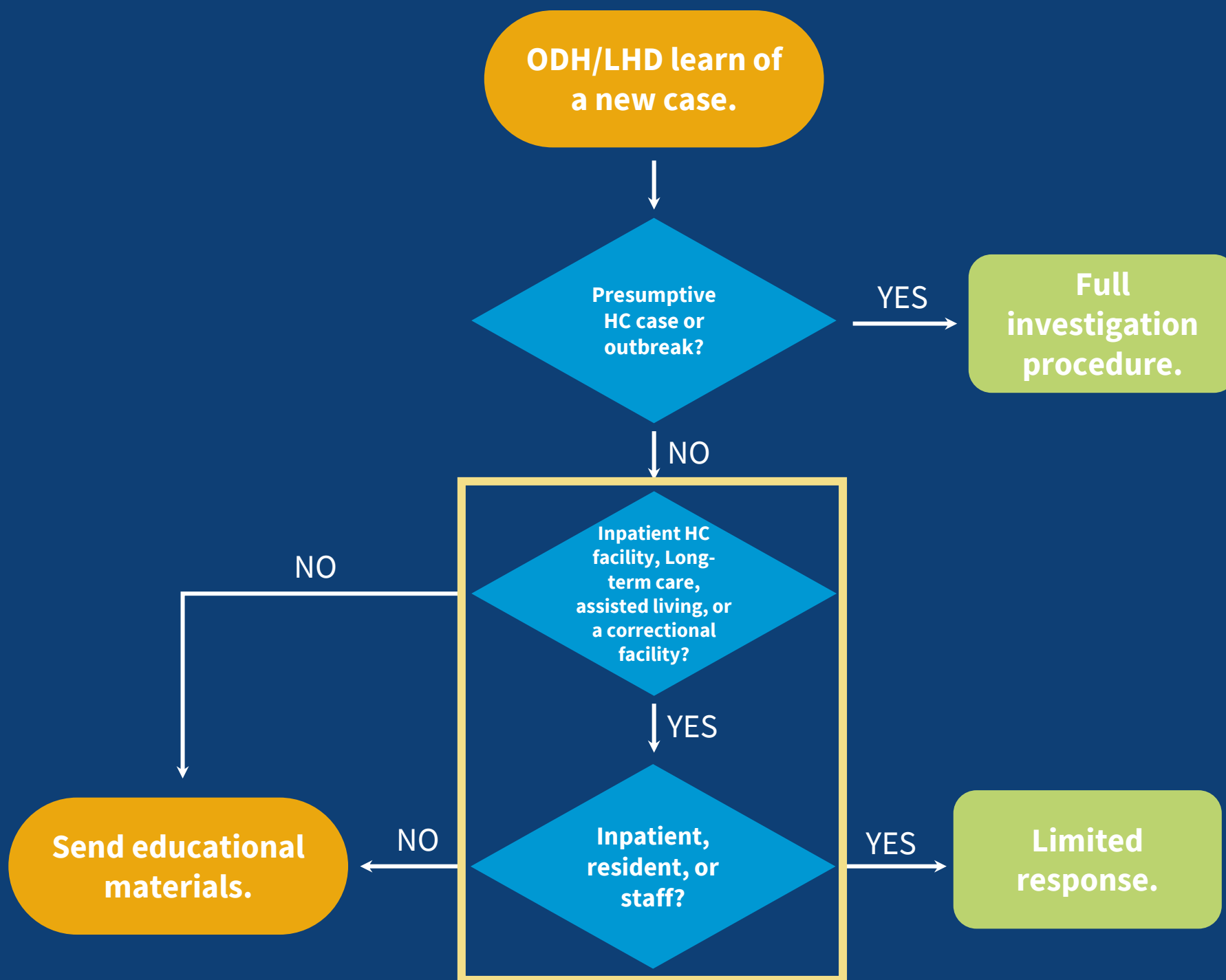
Outside of full investigations, response activities have several goals:

Clear and consistent response for cases that do not qualify for a full investigation.

- Improves response speed.
- Reduces any confusion between state and local health.

Response is divided into categories based on exposure and facility type.

- More intensive response actions such as sampling and remediation are no longer requested for outpatient visits.
- Specific guidance on when WMP reviews are required.



Determining Response Type

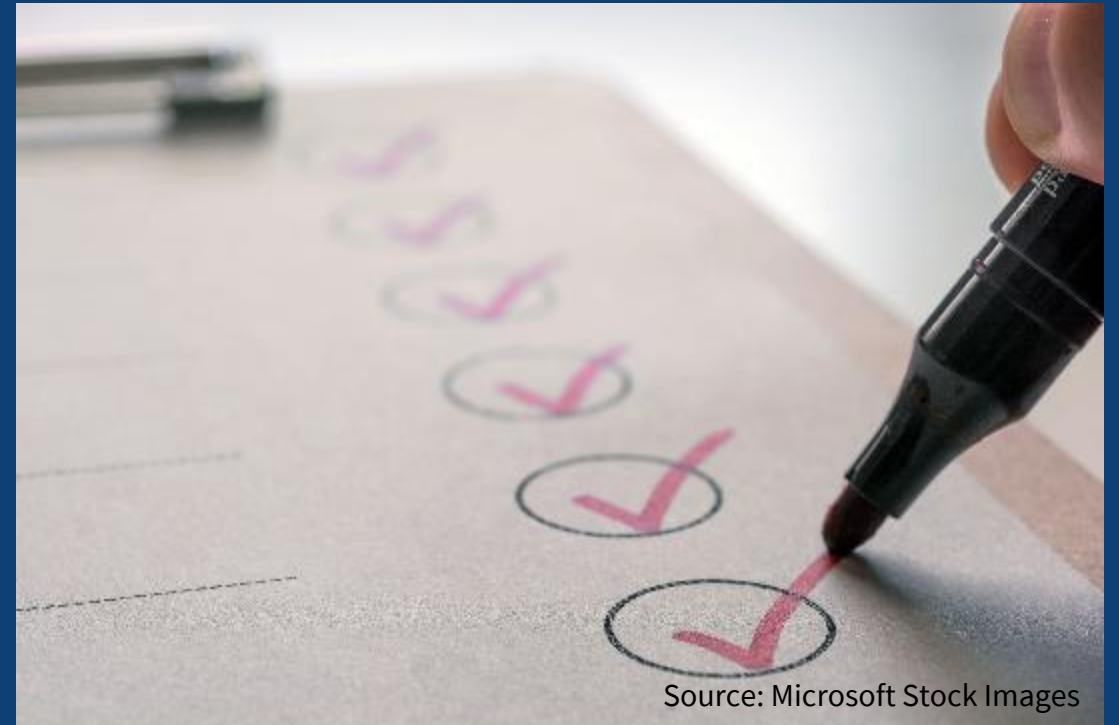
Depending on two factors, ODH may either ask for response activities or an educational email.

Factor 1: Facility type.

- Is the case associated with an inpatient facility, long-term care, assisted living, or correctional facility?

Factor 2: Case status at facility.

- Is the case an inpatient, resident, or staff at this facility?



Source: Microsoft Stock Images

How should we respond?

Hospital
outpatient visit



Education

Educational materials are provided for all single outpatient visit cases. This includes facilities such as hospitals that also treat inpatients.

Resident of an
assisted living facility



Limited Response

ODH asks for facility response if the case **resides** at an assisted living facility.

Guest at hotel for
six days



Education

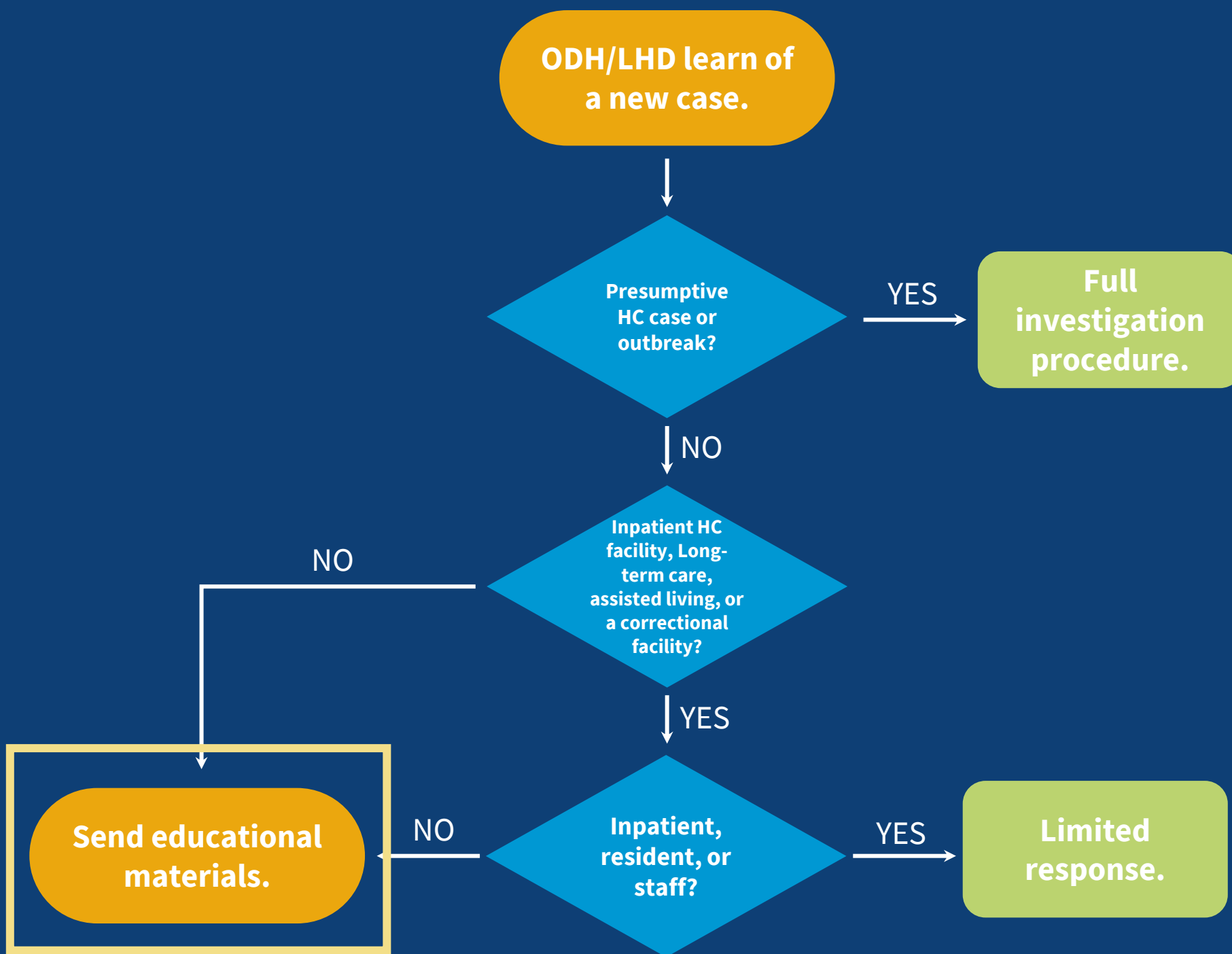
Hotels are not a facility type that ODH requires a response for a single case.

Hospital staff



Limited Response

Staff of inpatient facilities who worked during their incubation period qualify for response activities.





Environmental Education

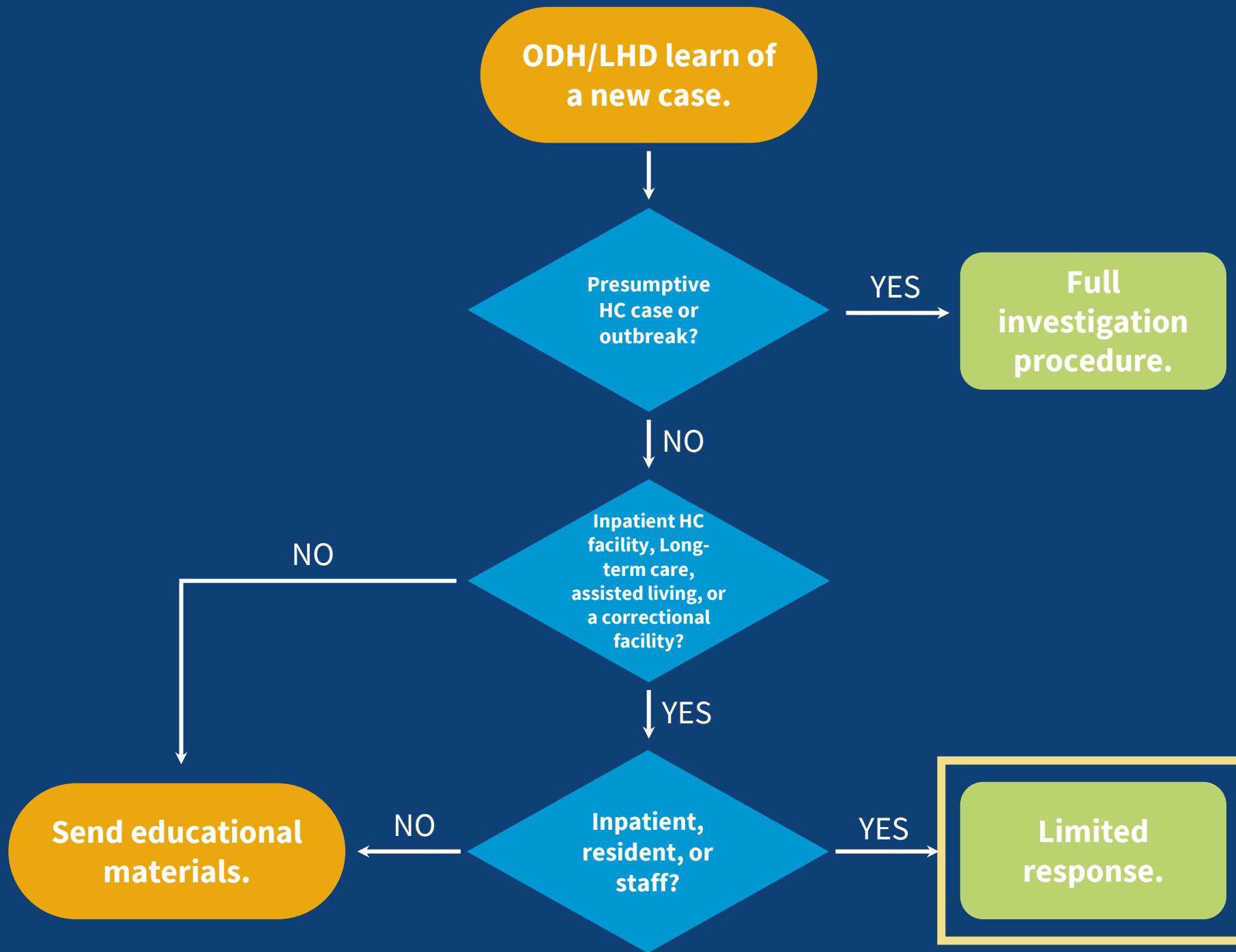
For many instances, ODH will provide a list of information and resources for the LHD to forward to the facility.

General *Legionella* information.

- ODH provides background information on the bacteria and how it spreads.
- The CDC Control Toolkit is linked to the facility as a reference for system conditions they should look for.

Water management program resources.

- The CDC has several resources such as their WMP Toolkit and the PreventLD training.
- Non-CDC materials such as the Council of State and Territorial Epidemiologists WMP template are also helpful in WMP development.



What will ODH ask for in limited responses?

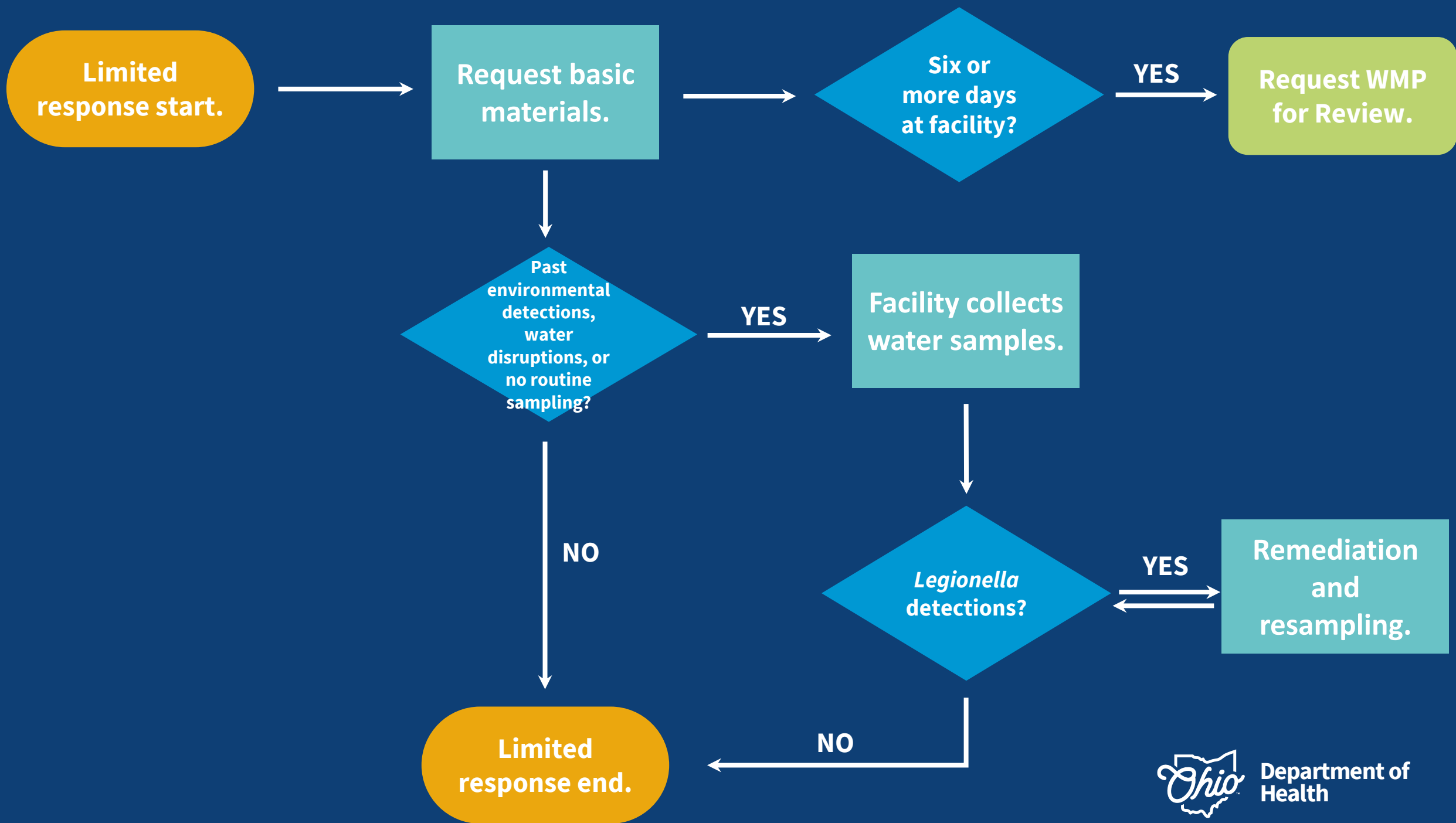
ODH and the LHD may ask for the facility to provide documentation, update their WMP, sample, and remediate.

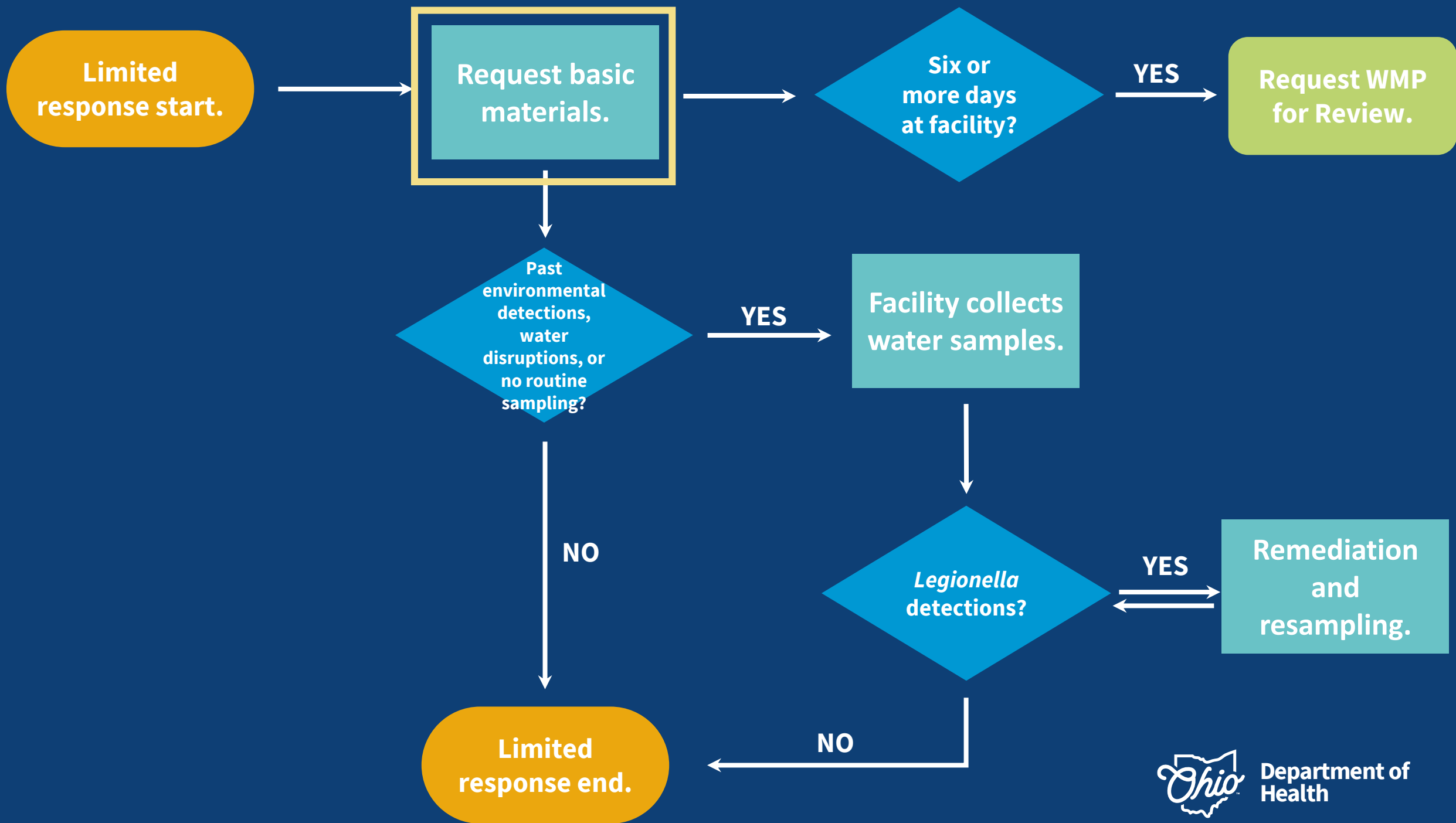
Specifics are dependent on:

- Time at facility.
- Facility sampling history.
- Water system detections.



Source: Microsoft Stock Images





Requested Documentation

When contacting the facility, the LHD should request the following materials.

- Water management program.
- An environmental assessment completed in the past year.
- *Legionella* water sampling results from the past year.
- Monitoring records for water temperature, disinfectant residual, and other water parameters from the past year.
- Additional documentation upon request.

**Limited
response start.**



**Request basic
materials.**



**Six or
more days
at facility?**

YES



**Request WMP
Review.**



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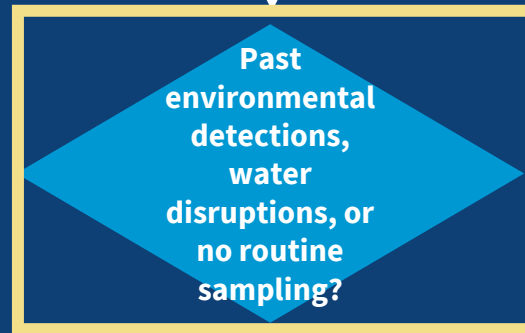
Water Management Program Review

Separate from the rest of the response actions, ODH may review and provide comments on the facility's WMP. WMP reviews are dependent on duration of exposure.

- **≥ 6 days of their incubation period at the facility.**
 - ODH will provide detailed comments and recommendations on the facility's WMP while response activities are completed.
 - The facility does not need to resubmit the WMP outside of a full investigation.
- **≤ 5 days of their incubation period at the facility.**
 - The facility can optionally request ODH to review their WMP.

Limited
response start.

Request basic
materials.



YES

Facility collects
water samples.

NO

Limited
response end.

Legionella
detections?

YES

Remediation
and
resampling.

NO



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Sampling History

ODH and the LHD will review the requested sampling and monitoring documentation.

The facility will develop a sampling plan if at least one of the following are true:

- The facility has no records of water sampling for *Legionella* from the past year.
- There have been positive *Legionella* detections from the past year.
- There was a disruption to the building water system, or the parameter monitoring logs indicated a concern.

No further response is required if ALL of the following are true:

- The facility provided adequate routine sampling results from the past year.
- The provided results were negative.
- No further concerns with the water system were indicated in the provided documentation.

Limited
response start.

Request basic
materials.

Past
environmental
detections,
water
disruptions, or
no routine
sampling?

YES

Facility collects
water samples.

Legionella
detections?

YES

Remediation
and
resampling.

NO

Limited
response end.



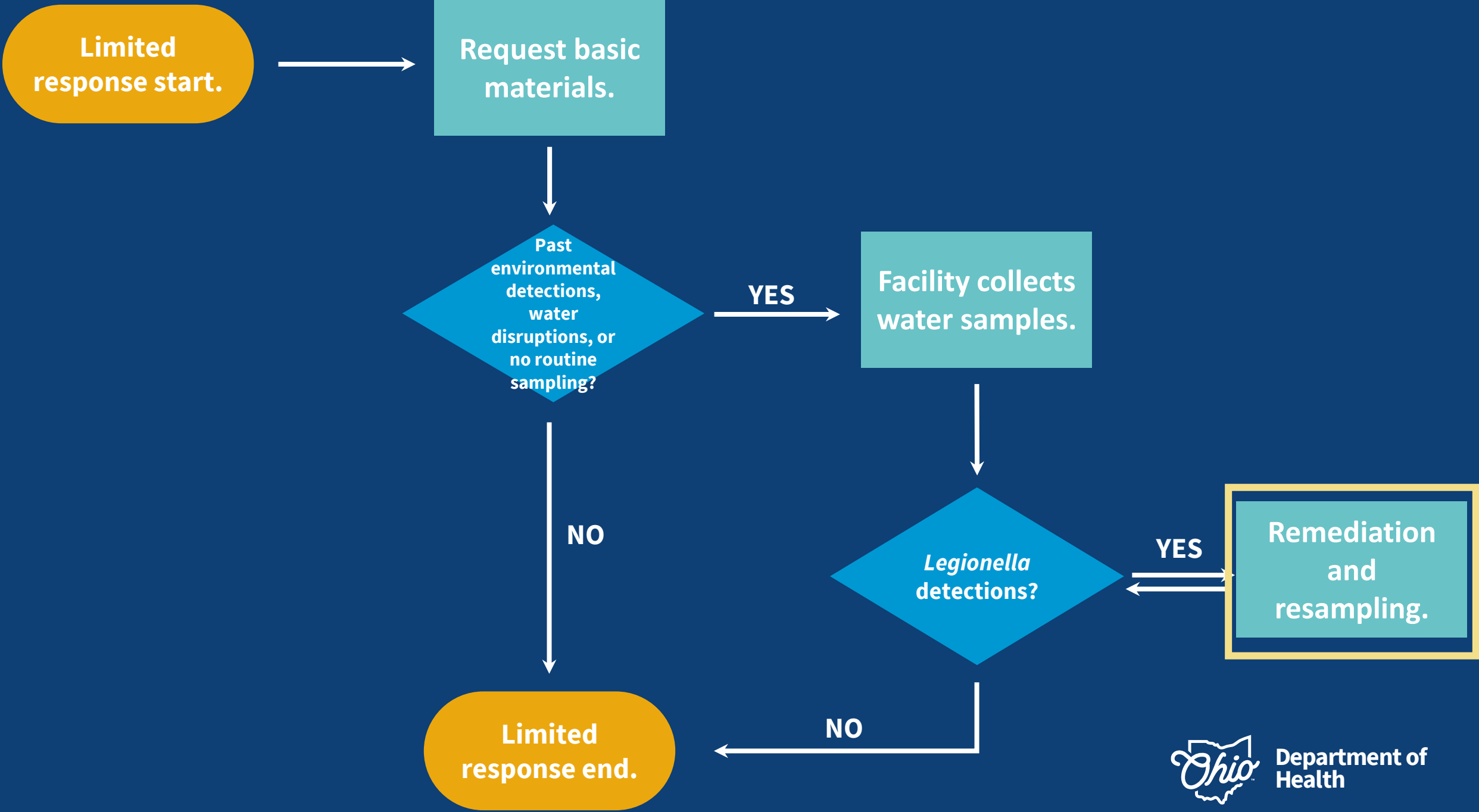
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Investigation Sampling



Source: The Centers for Disease Control and Prevention

- If sampling is required, the facility should send their proposed sampling plan to ODH and the LHD **PRIOR** to collection.
- Sampling should follow CDC guidance.
- Combination of sample types.
- Samples should include all case room fixtures if applicable.
- If the facility has records of past sampling and multiple water distribution loops, only the case loop needs to be resampled.



System Remediation

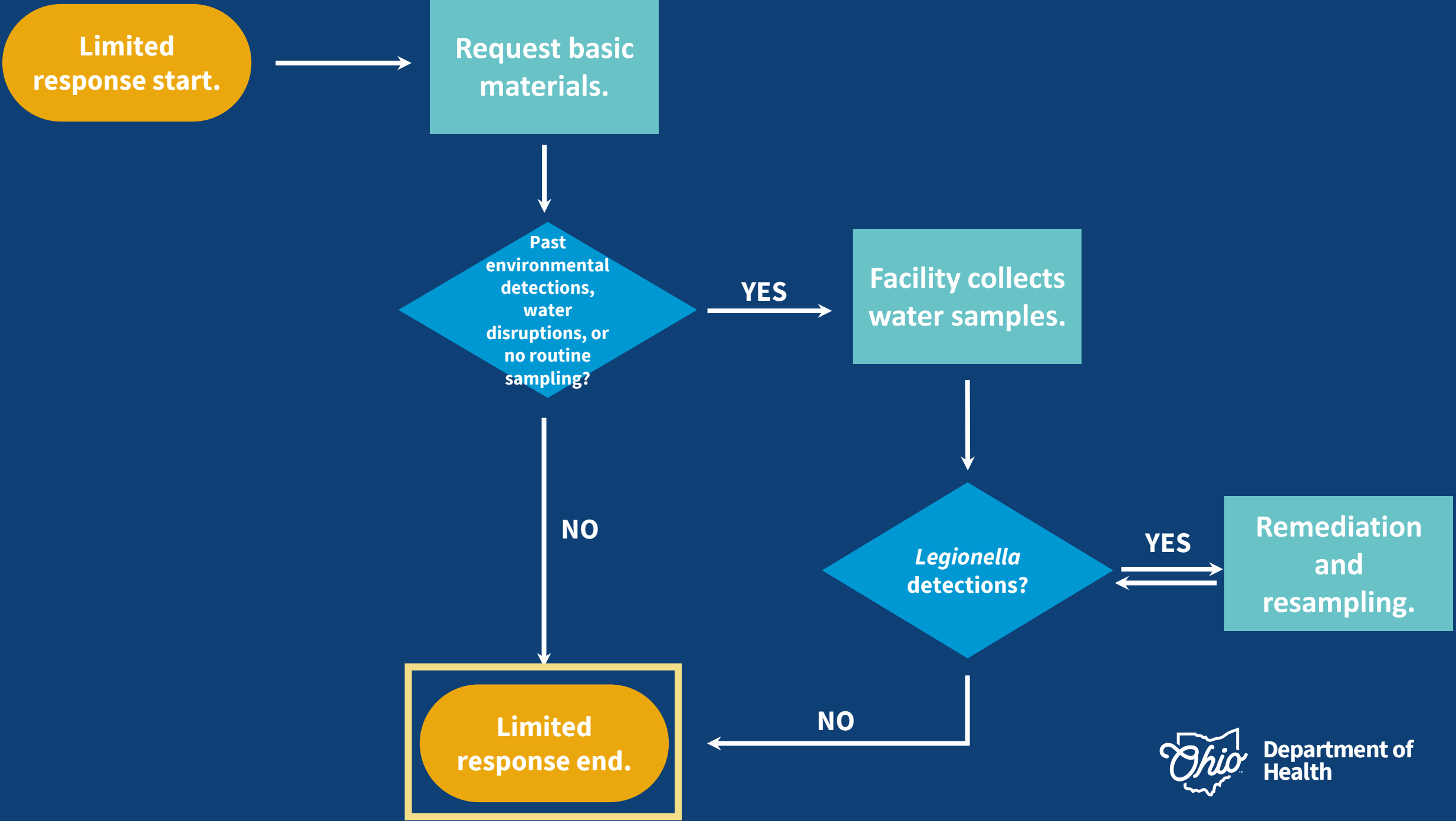
The facility should use their sampling results to determine their next steps.

If the facility had positive detections (>1 CFU/mL) of any *Legionella* species:

- The facility will work with their consultant or water management program team to develop a remediation plan.
- A new sample set will be collected at the **SAME** locations 72 hours after remediation is complete.
- Process continues until a single set of negatives.

If the facility did not have any positive sample results:

- No further response required.



Concluding Response Activities

Once sampling is negative, ODH will confer with the LHD to determine if all response activities are complete.

The LHD will notify the facility that no further actions are needed.

- The facility can resume activities according to their WMP.
- If another case occurs within 12 months, the facility will initiate the full investigation procedure.



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Next Steps

- ODH is still working to finalize this procedure in writing.
- ODH is working with local partners to improve the procedure.
- Already requesting this process for new cases that qualify.

QUESTIONS?

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