



# Legionnaires' Disease: Overview of Clinical Features and Epidemiology

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Event  
Date

The Bellevue-Stratford Hotel,  
site of the first known outbreak  
of Legionnaires' Disease, in 1976 in  
Philadelphia PA.



# Legionellosis

- **Legionnaires' Disease:**  
Anorexia, malaise, muscle aches,  
headache, fever, pneumonia, cough
- **Pontiac Fever:**  
Similar, but no pneumonia  
(May be a reaction to inhaled antigen)

# *Legionella pneumophila* (*L. pneumophila*)

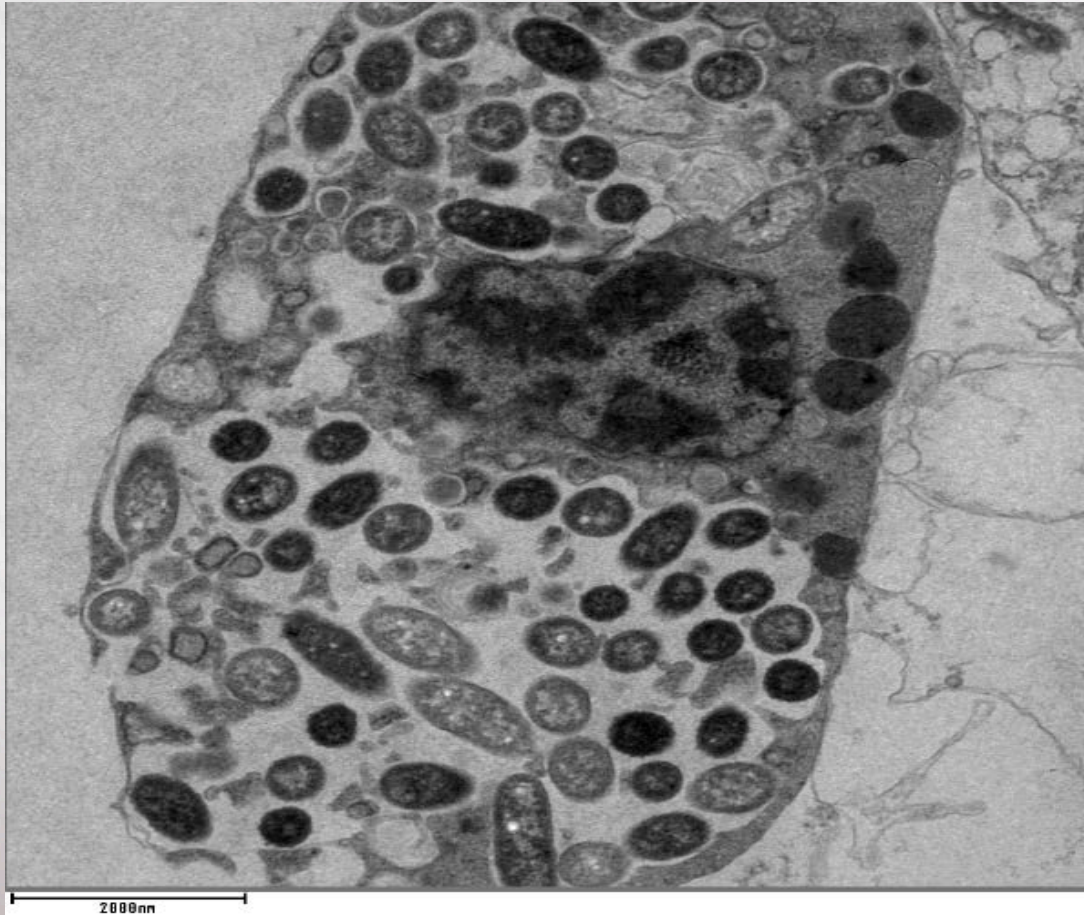
Gram-negative bacterium

- Aerobic
- Pleomorphic
- Flagellated
- Non-spore forming
- Facultative, intracellular parasite of macrophages and amoebae.





White blood cell infected with  
*L. pneumophila* bacteria



*L. pneumophila* (red chains) multiplying  
inside *Tetrahymena pyriformis*, a free-living  
ciliate.



***L. pneumophila* serogroup 1 is most commonly associated with disease.**

However, there are 18 other serogroups of *L. pneumophila*.

Also, other species of *Legionella* have been isolated from pneumonia patients, including:

- *L. micdadei*
- *L. bozemanii*
- *L. longbeachae*
- *L. dumoffii*



## How is *Legionella* Transmitted?

- Inhalation of aerosolized *Legionella*

AND

- Aspiration of water.
- Person-to-person transmission does not occur.



# Legionnaires' Disease

## Incubation Period

- From exposure to onset of illness: 2-10 days

## Diagnosis

- Urine antigen test (may stay positive up to a year)
- Culture of respiratory specimens
- Serology

## Treatment

- Levofloxacin (fluoroquinolone)
- Azithromycin (macrolide)



## Legionnaires' Disease

- The disease became reportable in Ohio in 1982.
- **Positive lab findings** are also reportable, and should be reported by the end of the **next business day**.
- Hospitals, labs, and physicians report to the local health department in the jurisdiction in which the patient resides.

Before it is diagnosed as Legionnaires' Disease, it may be referred to as community-acquired pneumonia or atypical pneumonia.

# Legionellosis

**Definition of a confirmed case: clinically compatible case that meets at least one of the confirmatory lab criteria.**

## **Clinical Case Definition**

Legionellosis is associated with two clinically and epidemiologically distinct illnesses:

- Legionnaires' disease, which is characterized by fever, myalgia, cough and clinical or radiographic pneumonia, and
- Pontiac fever, a milder illness without pneumonia

## **Laboratory Criteria for Diagnosis**

- Urine antigen positive, or
- Isolation of any *Legionella* from respiratory or other sterile site, or
- Four-fold change in antibody titer

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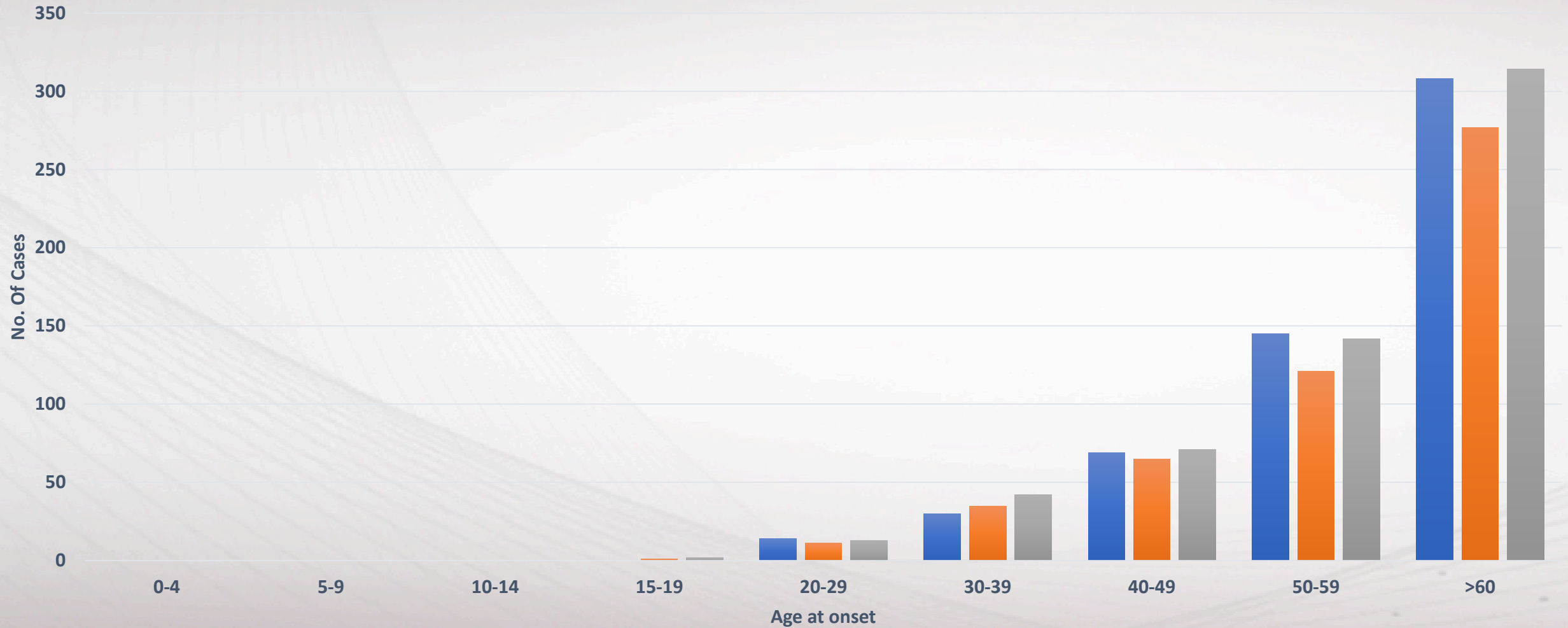
## Who is at Risk of Getting Legionnaires' Disease?

- Seniors
- Smokers
- People taking an immune-suppressive drug
- Transplant patients
- People with:
  - Cancer
  - Diabetes
  - Chronic lung disease
  - Renal disease
  - Compromised immune system

# Legionnaires' Disease

## Ohio: 1660 cases

### 2015-2017



Source: ODRS

■ 2015 ■ 2016 ■ 2017

## **Legionnaires' Disease Ohio 2017**

Hospitalization rate: 98% are hospitalized

Mortality rate: 11% of cases are fatal

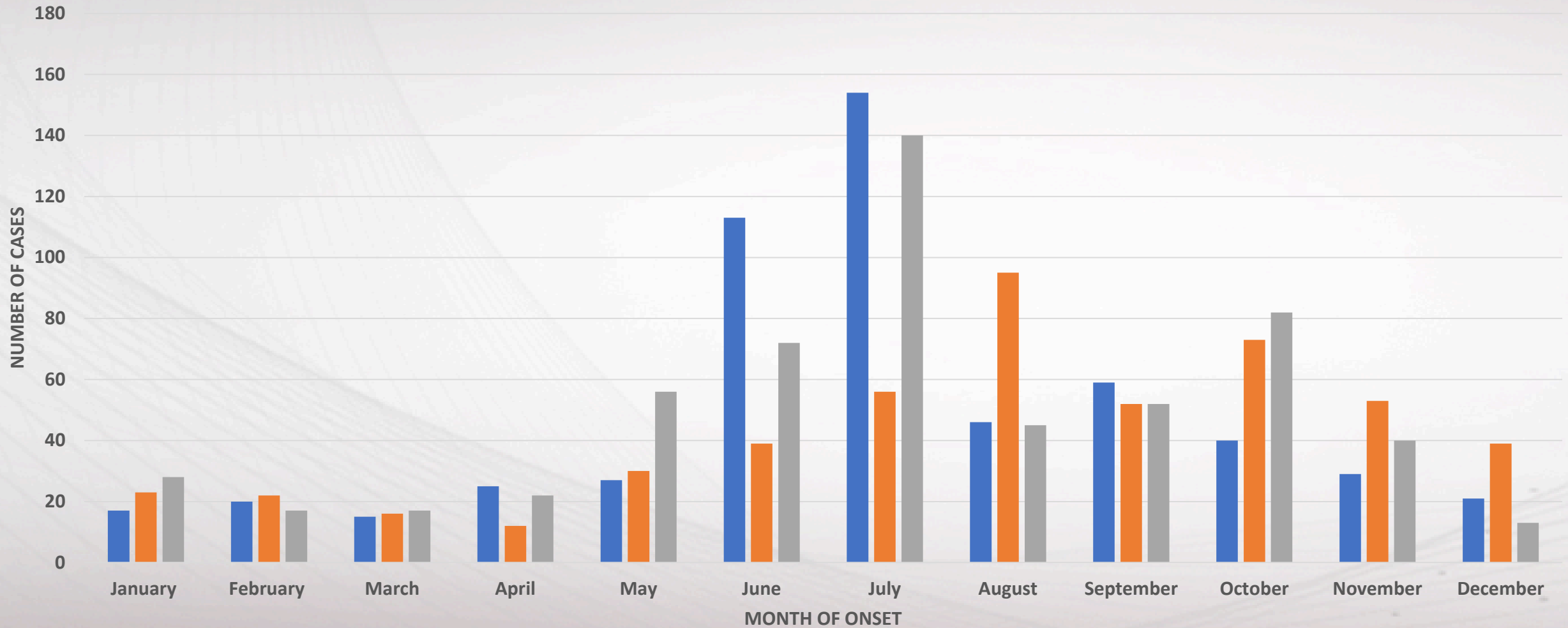
2017 data is preliminary



# Legionnaires' Disease

## Ohio: 1,660 CASES

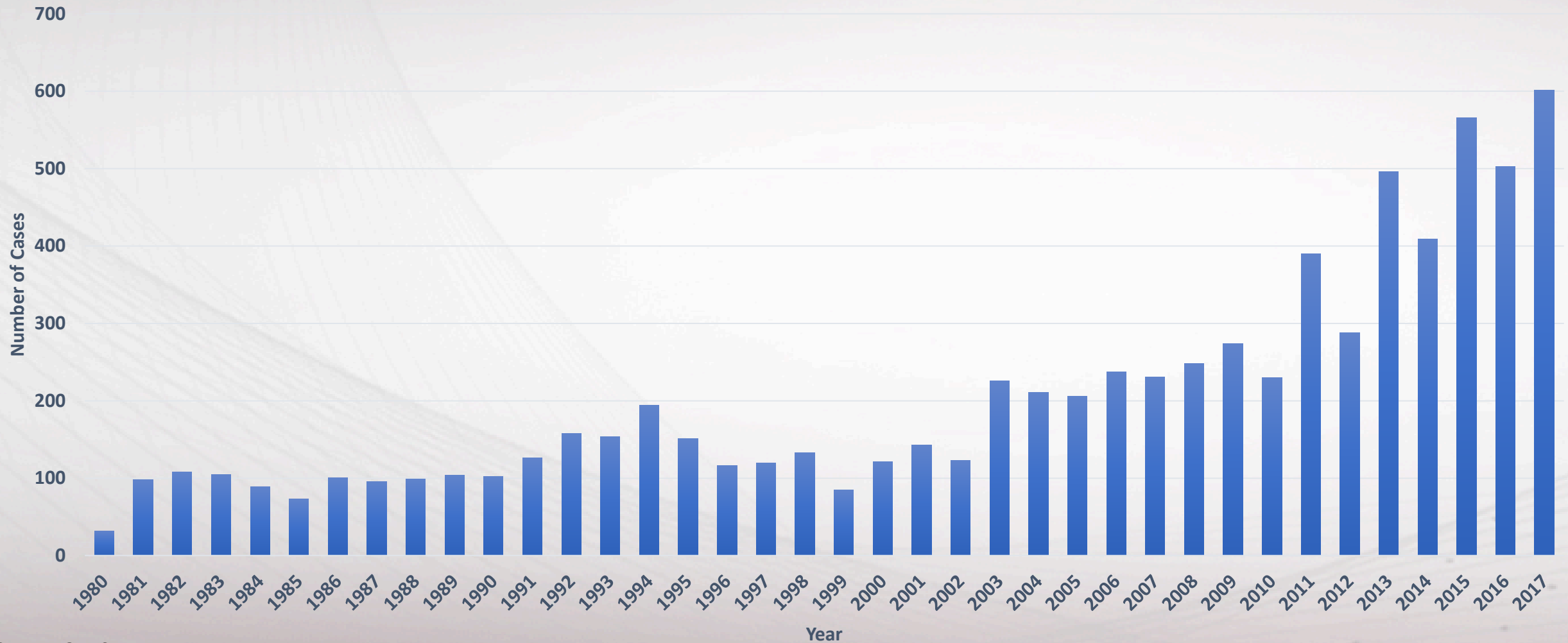
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Source: ODRS

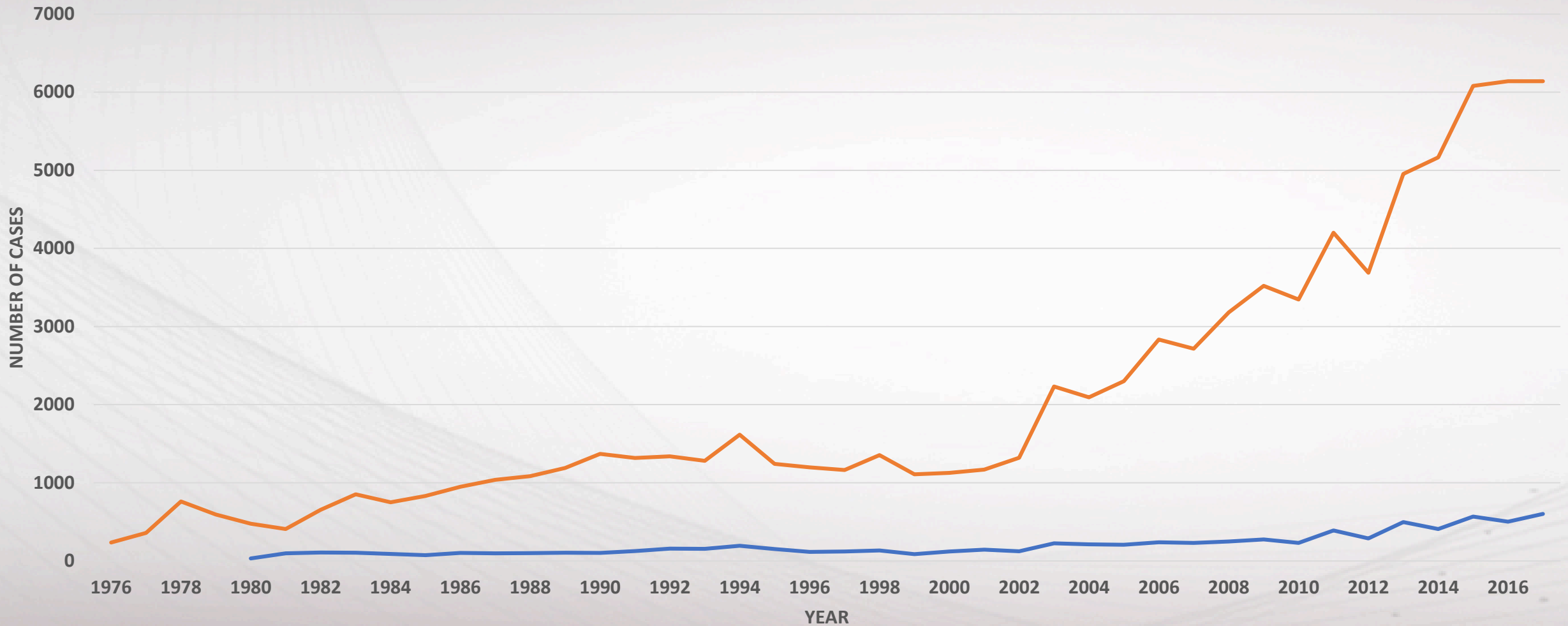
■ 2015 ■ 2016 ■ 2017

# Legionnaires' Disease Ohio 1980-2017



Source: ODRS

# Legionnaires' Disease United States and Ohio 1976-2017



SOURCE: MMWR, ODRS

— OH — US

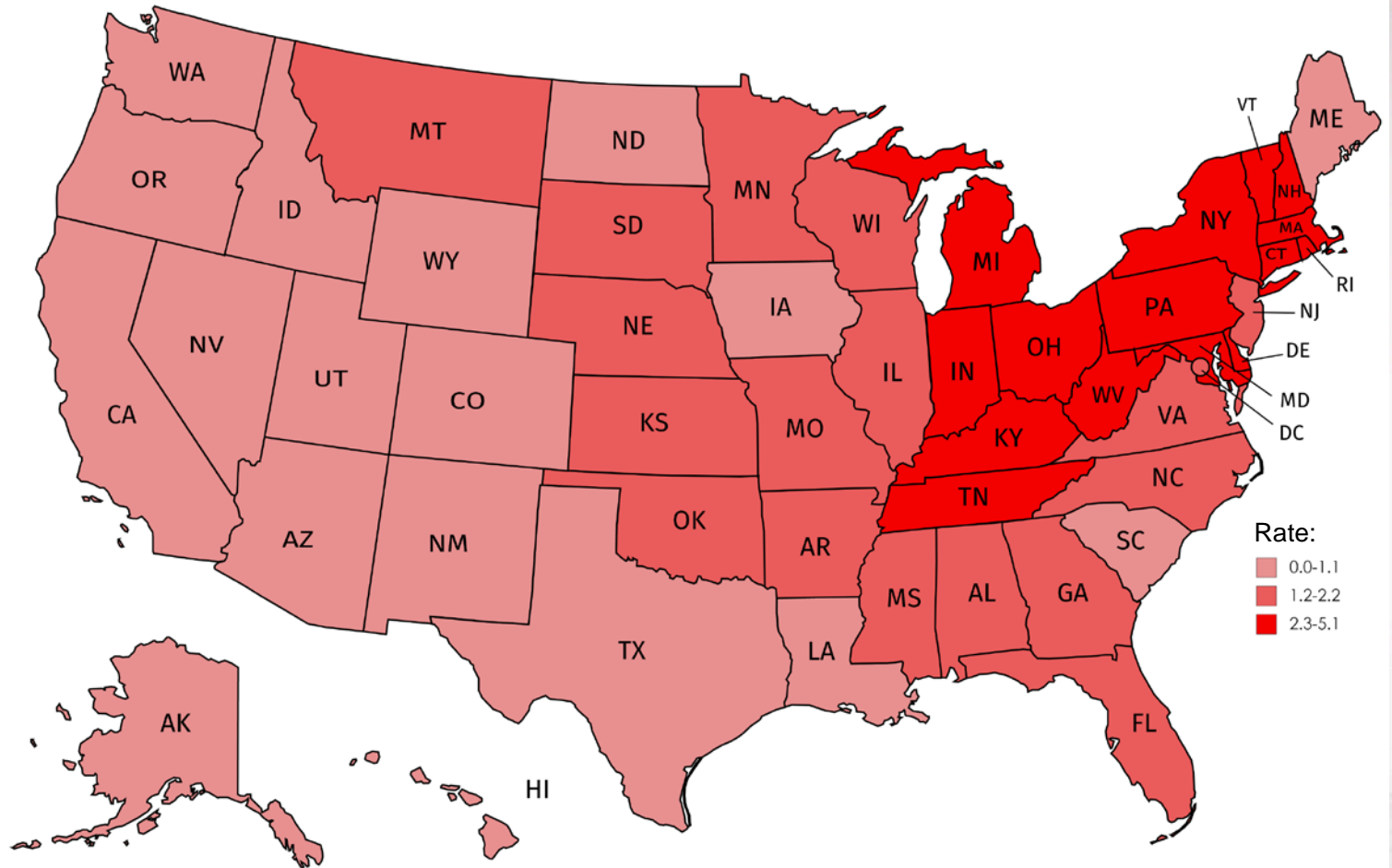
# Why is Legionnaires' Disease Increasing?

More people are at risk because:

- Population is aging
- More use of immune-suppressive drugs
- Higher prevalence of co-morbid conditions
- Growing dependence on heating/vent/cooling systems
- Increased complexity of indoor plumbing in large buildings
- Inadequate maintenance of public water supplies.



Legionnaires'  
Disease  
United States: 6,140  
cases, 2017  
Rate (cases/100,000  
population)



Source: MMWR

## Ohio Ranks

Second in the United States for number of cases

&

Second in the United States when calculated as a rate

(# of cases per 100,000 population).

New York (state and city) is first.

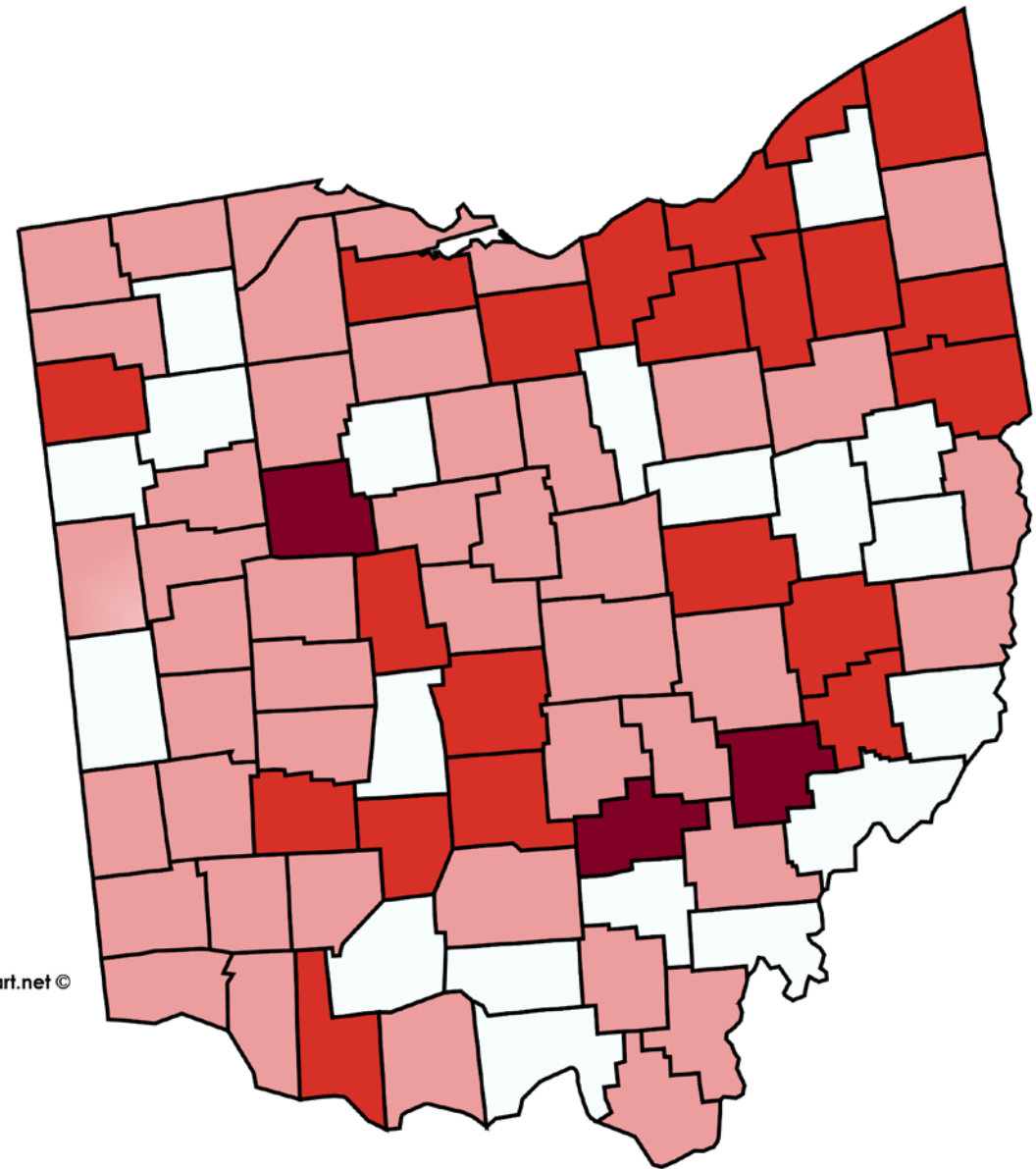
# Legionnaires' Disease

## Ohio: 601 cases in 2017

Rate (cases/100,000 population)

Rate:

- 0
- 1-4
- 5-9.9
- 10+

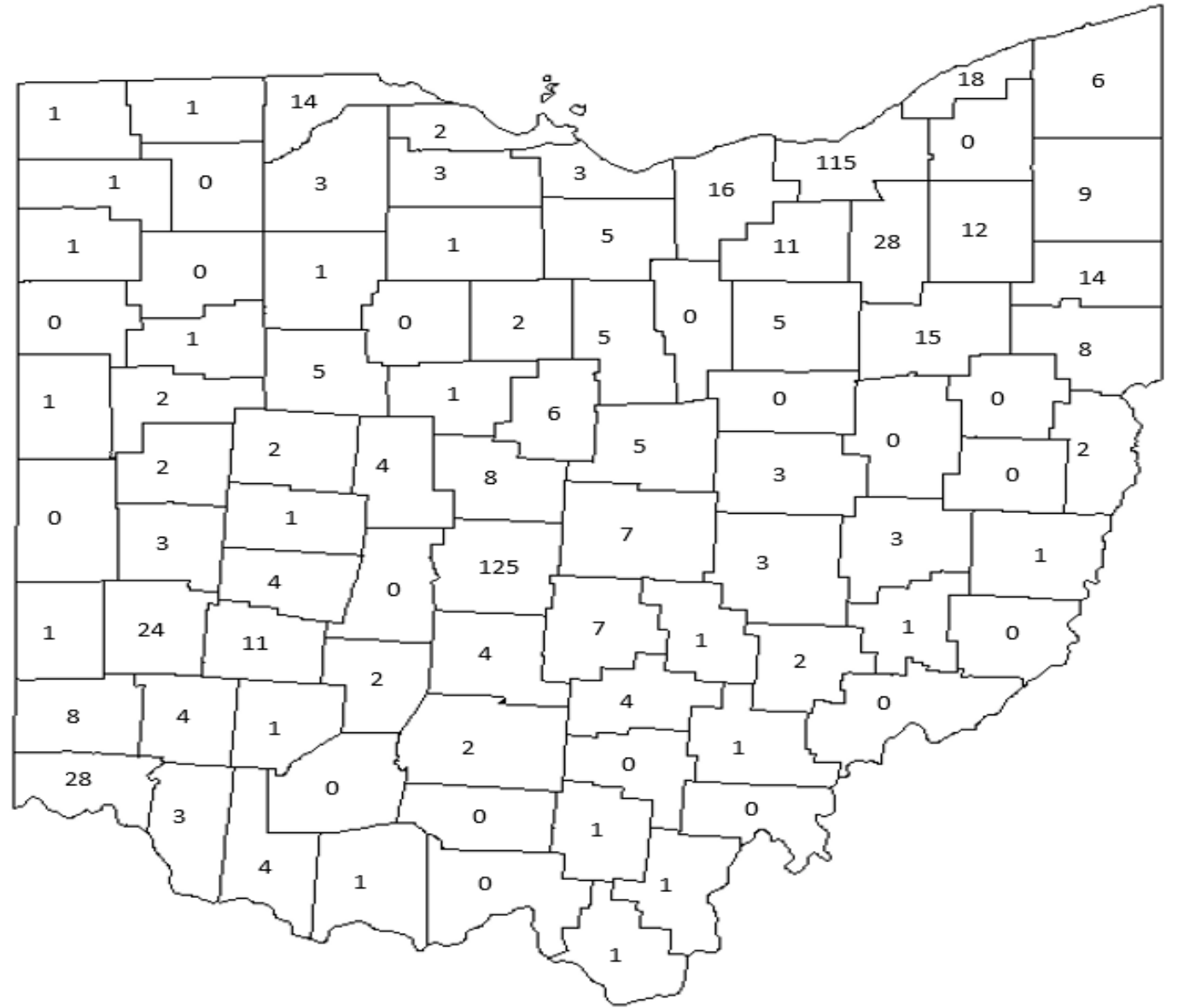


Created with mapchart.net ©

Source: ODRS

# Legionnaires' Disease

# Ohio: 601 cases, 2017



Source: ODRS



## **Why Investigate Cases?**

Your case investigation may uncover additional cases.

Further investigation may lead to control of the outbreak, preventing illnesses and saving lives.

# Legionnaires' Disease Case Investigation

- Does it meet the case definition? (urine antigen and pneumonia)
- Identify onset date
- Review travel and activities for the ten days prior to onset
- See ODRS for questions to ask:
  - Whirlpool?
  - Respiratory therapy equipment?
  - Visit or reside in long-term care, hospital, or assisted living?
  - Is the person working?
  - Overnight stay away from home?

## What are Some Sources of Aerosols?

- Cooling towers
- Hot tubs
- Showers and faucets
- Decorative fountains
- Manufacturing processes



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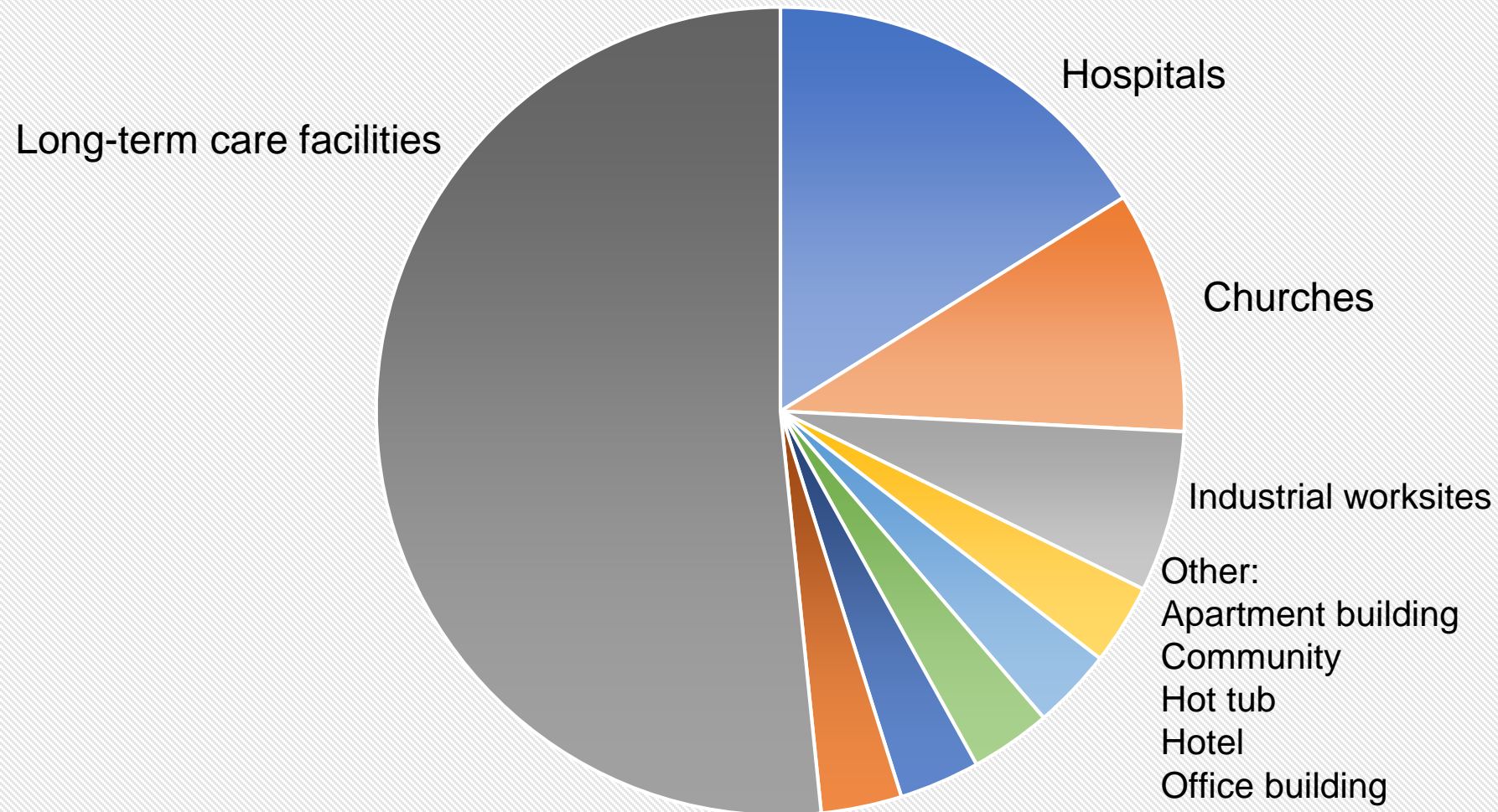
# Legionnaires' Disease

The case investigation may uncover:

- Two or more cases with a common exposure, such as:
  - Long-term care facility
  - Hospital
  - Manufacturing plant
  - Office building
  - Church
- A person who has been living in a long-term care facility for ten days before onset

# Legionnaires' Disease Outbreaks in Ohio: 2008-2017

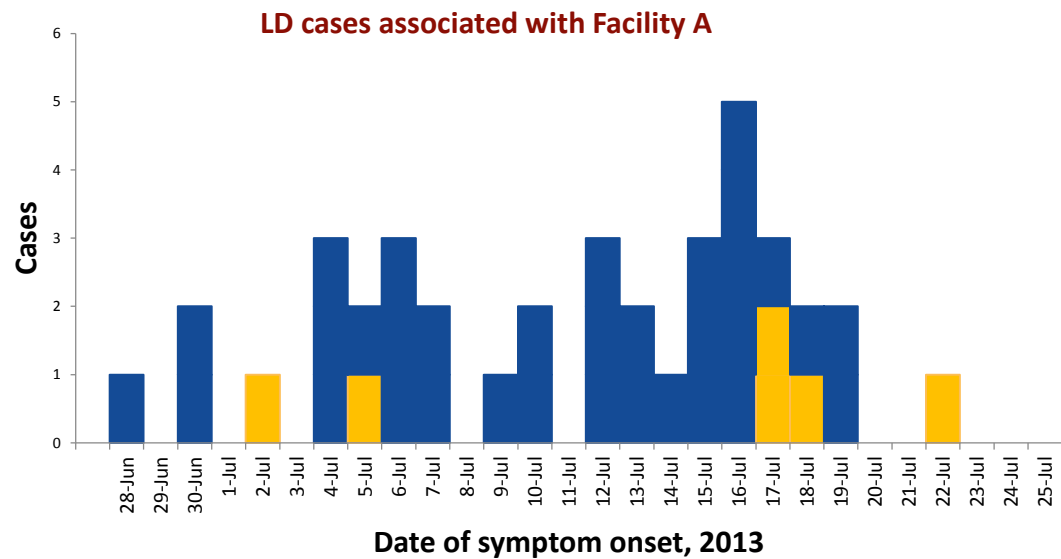
Total = 31





## Legionnaires' Disease Outbreak: Franklin County, 2013

- Onset dates: June 28 to July 22
- 39 cases, 6 fatal; median age = 87 years
- New cooling tower was the primary source
- Potable water could not be ruled out



Source: "LD outbreak at a long-term care facility...", J Env Health, Dec 2015; Vol 78 (5).

# Contact Information

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