



ANNUAL REPORT OF
LEGIONNAIRES'
DISEASE
2018

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Cleveland, Ohio

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Cover Image: This image is an illustration of *Legionella pneumophila*, the bacterium that causes the majority of Legionnaires' disease cases and outbreaks

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INTRODUCTION

Legionnaires' disease³ is a respiratory infection caused by multiple species of Legionella bacteria. Most commonly Legionella Pneumophila Serogroup 1 (Lp1). The route of transmission appears to be airborne, most commonly by inhalation of aerosolized contaminated water. A less common route of transmission is through aspiration.

According to Ohio Administrative Code 3701-3-02, cases of selected infectious diseases are required to be reported to state and local public health agencies. These "reportable diseases" include Legionnaires' disease.

The Office of Communicable Disease Surveillance and Epidemiology (OCDSE) at Cleveland Department of Public Health (CDPH) conduct communicable disease investigations, surveillance, data analysis and public health actions to control the spread of communicable disease and chronic disease in the City of Cleveland. An important component of meeting these goals is interviewing case-patients and/or taking direct public health action when needed. Data collected⁴ via the reports and interviews describe characteristics of cases and reviews trend over time.

The purpose of the 2018 Annual Legionnaires' Report is to provide an overview of Legionnaires' disease in the City of Cleveland, Ohio. These cases meet the public health surveillance definition of a confirmed, probable, or suspected case. Surveillance definitions are used to standardize data collection and reporting across public health jurisdictions and may differ slightly from clinical definitions used in patient management. Please note that reported annual data are preliminary and may change due to delayed submissions and additional laboratory results.

³ The Legionella bacterium is a gram negative bacilli known to cause human disease called Legionnaires' disease or Legionellosis.

⁴ Data used in Annual report are collected from Ohio Reportable Disease System (ODRS).

KEY FINDINGS

IN CITY OF CLEVELAND IN 2018:

- There were 61 cases of Legionnaires' in Cleveland, Ohio. This is an increase of 22% compared to 2017 (50 cases) and a 103% increase compared to 2013 (30 cases).
- Incidence rate of Legionnaires' in Cleveland, Ohio was 15.4 per 100,000⁵.
- The rate of Legionnaires' among Blacks was almost three times the Legionnaires' rate among Whites (11.1 vs 3.6 cases per 100,000).
- The rate of Legionnaires' among males was almost two times the Legionnaires' rate among females (10.3 vs 5.6 cases per 100,000).
- Most cases (92%) were sporadic⁶ community acquired. 3% were possibly travel-associated.
- Case counts were highest in the month of August and November.
- The majority of cases; 66% were seen among adults' ages between 40 and 64 (incidence rate 30.8 per 100,000).
- 93% of Legionnaires' patients reported at least one risk factor, with 68% who reported having a history of smoking.
- The case fatality rate among Legionnaires' cases in Cleveland, Ohio was 6.6%.

STATE OF OHIO IN 2018:

- There were 946 cases of Legionnaires' in the state of Ohio, which is almost a 50% increase compared to 2017.
- Incidence rate in Ohio was 8.2 per 100,000.
- Cuyahoga County had the second highest rate of Legionnaires' Incidences in the State of Ohio 1.28 per 100,000.
- Case counts were highest in the month of June, August, and September.

⁵ Includes confirmed cases excluding suspected and probable cases

⁶ A sporadic case of Legionellosis disease is a single confirmed in which an individual has identified a number of facilities in which they resided or other possible exposure (e.g., spa, fountain) during the incubation period of the disease.

DEMOGRAPHIC PROFILE OF CLEVELAND, OHIO

CITY OF CLEVELAND POPULATION, 2017⁷

- The total population estimate of Cleveland, Ohio was 388,812 in 2017.
- 52.1 percent of the City of Cleveland residents were female, and 47.9 percent were male.
- 50.4 percent of City of Cleveland residents were Black or African American, 39.8 percent were White, 2.1 percent were Asian, 0.5 percent was American Indian or Alaskan Native, and 4.0 percent identified as two or more races.
- 11.2 percent of City of Cleveland residents were Hispanic or Latino.

TABLE 1: CLEVELAND, OHIO POPULATION BY GENDER, 2017

Gender	2017	
	POPULATION	PERCENT
Female	202,385	52.1
Male	186,427	47.9
Total	388,812	100

TABLE 2: CLEVELAND, OHIO POPULATION BY ETHNICITY, 2017

Ethnicity	2017	
	POPULATION	PERCENT
Hispanic or Latino	43,466	11.2
Non-Hispanic or Non-Latino	345,346	88.8
Total	388,812	100

TABLE 3: CLEVELAND, OHIO POPULATION BY RACE, 2017

Race	2017	
	POPULATION	PERCENT
White	154,718	40
Black or African American	196,006	50
Asian	8,026	2
American Indian and Alaska Native	1,931	1
Native Hawaiian and Other Pacific Islander	60	0
Two or more races	15,592	4
Other race	12,479	3
Total	388,812	100

TABLE 4: CLEVELAND, OHIO POPULATION BY AGE GROUP, 2017

AGE(YEARS)	2017	
	POPULATION	PERCENT
0-4	25,902	7
5-14	48,048	12
15-24	58,599	15
25-39	80,187	21
40-64	124,251	32
65+	51,825	13
Total	388,812	100

⁷ The 2017 population estimates are the most recent estimates provided by the Census Bureau's Population Estimates Program, can be found on their [website](#)

LEGIONNAIRES' DISEASE EPIDEMIOLOGY

GENERAL INFO

Legionnaires'		2018
Number of Cases		61
Crude Rate‡		15.4
Age of Cases	Mean	56
	Median	56
	Range	25-96

‡Rate is calculated per 100,000

Disease Info

Infectious agent: Legionella bacteria, most commonly L.Pneumophila.

Case Definition: Please see the Ohio Infectious Disease Control Manual ([IDCM](#)).

Incubation: Usually 5 - 6 days, the average incubation period is around 2 – 10 days.

Mode of transmission: The airborne route appears to be the mode of transmission, most commonly by inhalation of aerosolized contaminated water. A less common route of transmission is through aspiration of drinking water.

Risk Factors: Certain populations are in increased risk of acquiring Legionnaires'. These populations include individuals with smoking history, chronic obstructive disease (COPD), immune disease disorders⁸, and age above 50 years old.

Symptoms: Legionnaires' disease presents with symptoms similar to pneumonia, including fever, chill, myalgia, cough, shortness of breath, headache, confusion, nausea, and diarrhea.

Treatment: Legionnaires' disease requires antibiotic treatment. Recommended treatment includes respiratory Fluoroquinolone (e.g. Levofloxacin), or Macrolides (e.g. Azithromycin). Penicillin, cephalosporin, and aminoglycosides are ineffective (ODH ICDM, 2018).

Prevention: Building owners can take steps to prevent the growth of Legionella in water distribution systems, heating- and cooling-ventilation systems and cooling towers through the development of water management plans, environmental controls and monitoring, remediation and treatment plans when Legionella is detected. High risk facilities include those with sensitive population⁹, buildings more than 10 stories high, and have cooling towers.

NOTES:

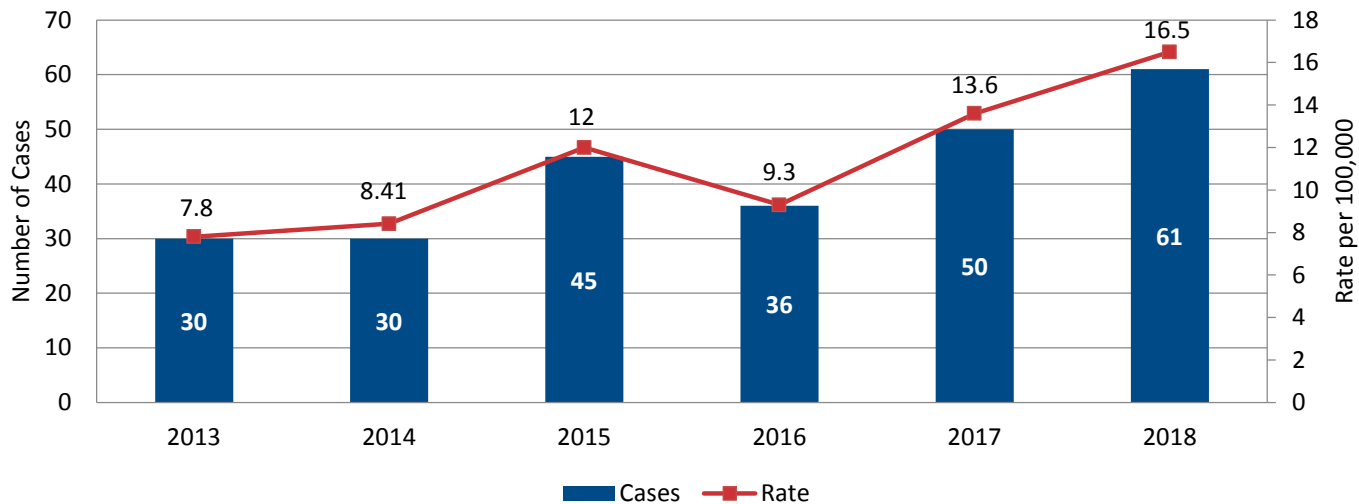
1. Counts include confirmed cases following the CDC/CSTE case criteria.
2. Legionellosis became nationally notifiable in 1976.
3. In 2005, the CDC/CSTE case criteria were revised to include classification criteria for travel-associated case of legionnaires' disease.
4. A case that has a history of spending at least one night away from home, either in the same country of residence or abroad, in the ten days before onset of illness is classified as "travel-associated".
5. Nosocomial transmission are defines as follows: A case is classified as "definitely nosocomial" if the patient spent the entire 10 days before symptoms onset in a healthcare facility. A case is classified as "possibly nosocomial" if the patient was hospitalized 2-9 days before the onset of Legionellosis infection. Cases with no inpatient or outpatient hospital visits in the 10 days prior to onset of symptoms are not nosocomial.

⁸ Immune system disorder can include patients with decreased immunity as a result to medication, or disease including acquired immunodeficiency disorder (AIDS), renal failure, and liver failure.

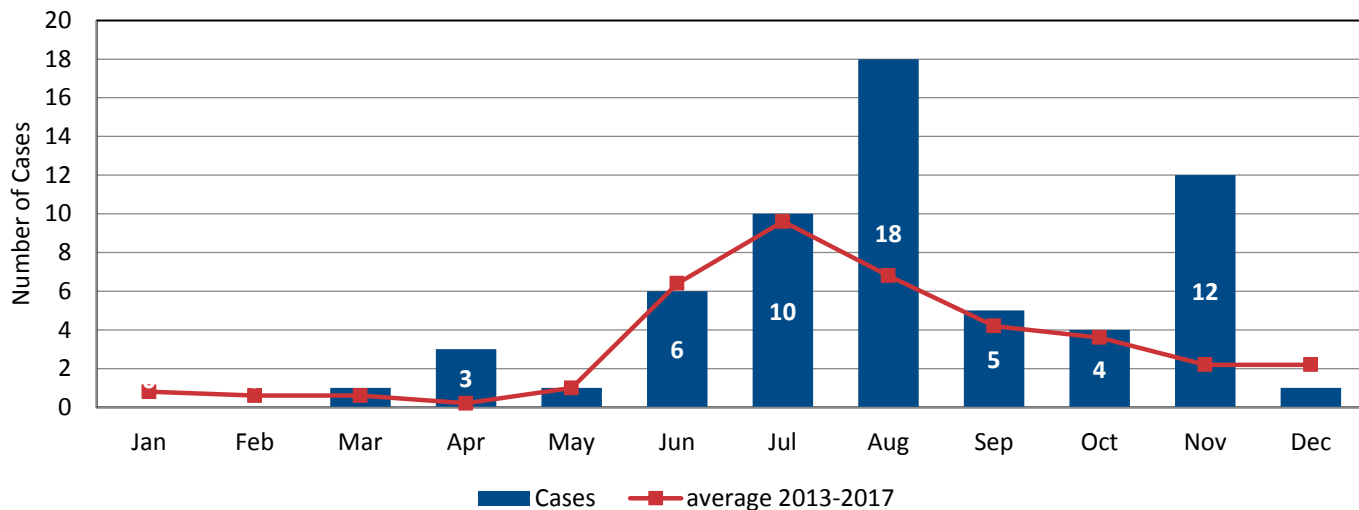
⁹ Facilities include hospitals, long-term facilities, or facilities for transplant or chemotherapy.

NUMBER OF CASES & RATES

**Figure 1: Legionnaires' Cases, Cleveland, Ohio
2013-2018**



**Figure 5: Legionnaires' Cases by Month of Onset,
Cleveland, Ohio, 2018**



NOTES:

- Legionellosis demonstrated seasonal pattern in previous years where nearly all regions in the US reported their highest percentage of cases during the summer and early fall.
- In 2018, City of Cleveland showed no distinct pattern (Cases mostly in August and November), unlike those found in previous years (2013 -2017).

CHARACTERISTICS

Figure 3: Legionnaires' Cases by Race, Cleveland, Ohio, 2018

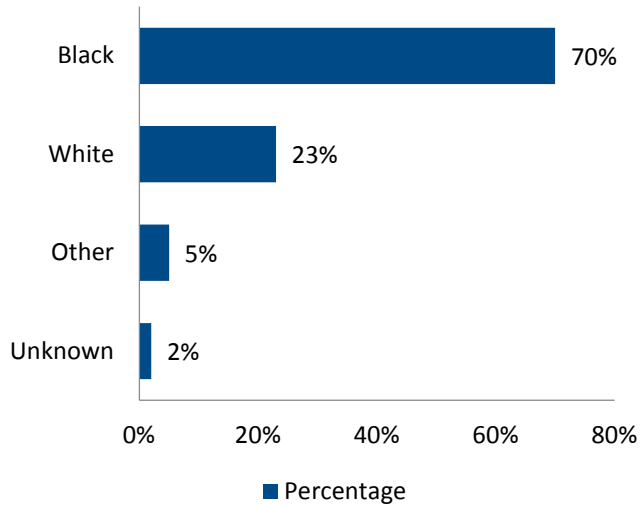


Figure 4: Legionnaires' Cases by Gender, Cleveland, Ohio, 2018

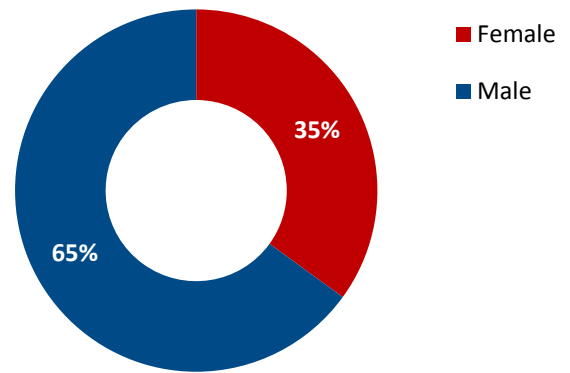
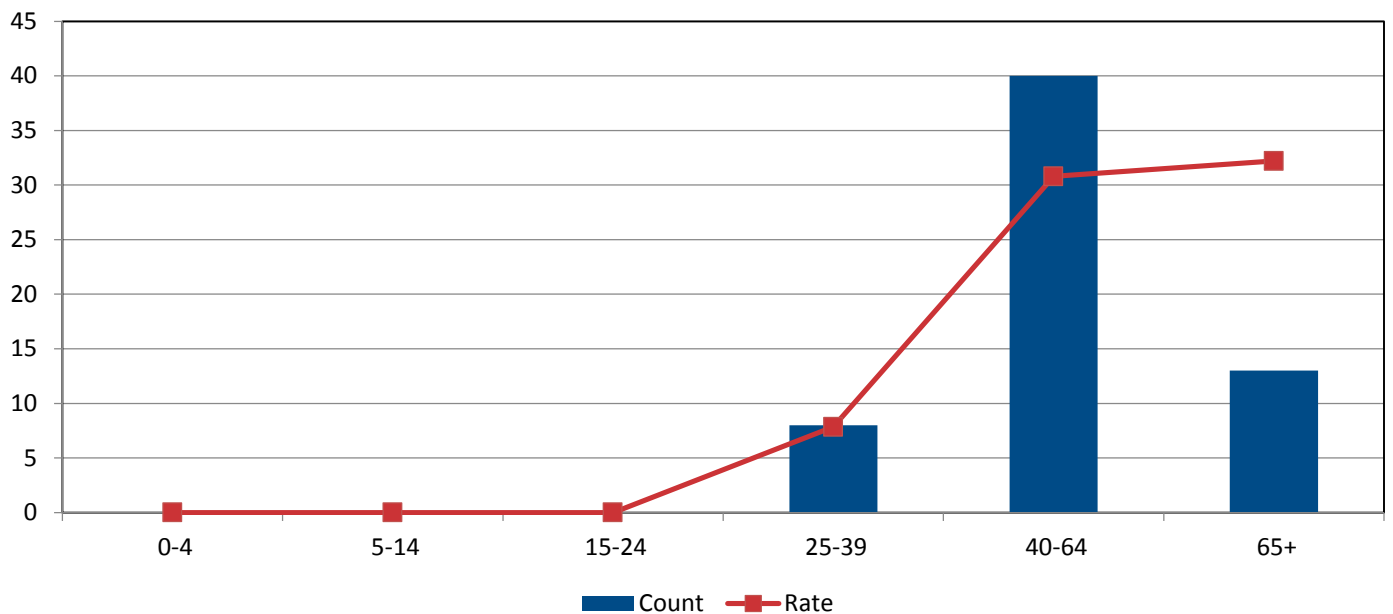
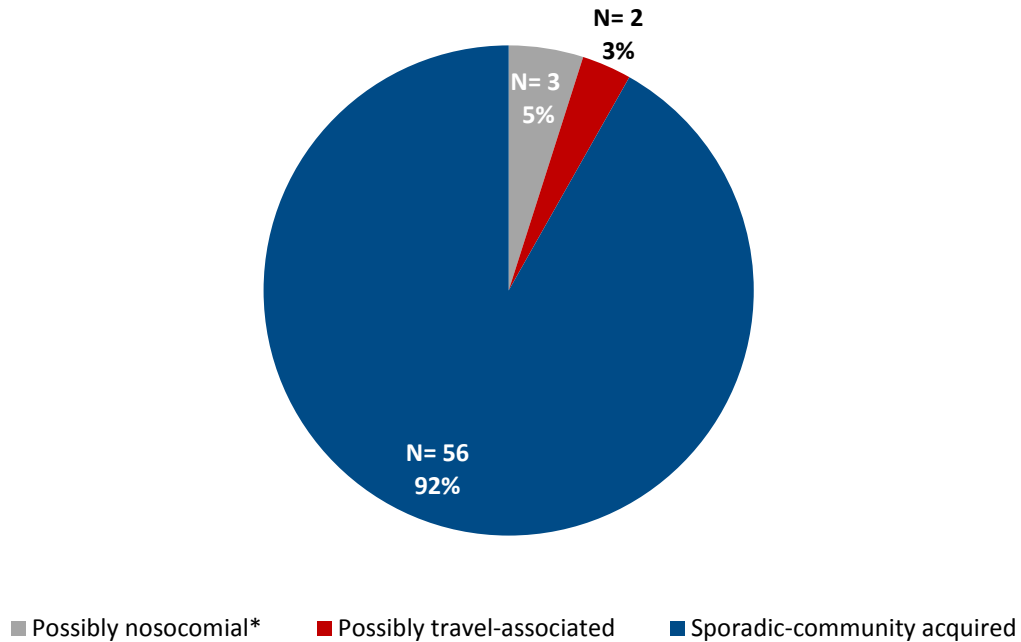


Figure 2. Legionnaires' Cases and Rates by Age, Cleveland City, 2018



TRANSMISSION AND RISK

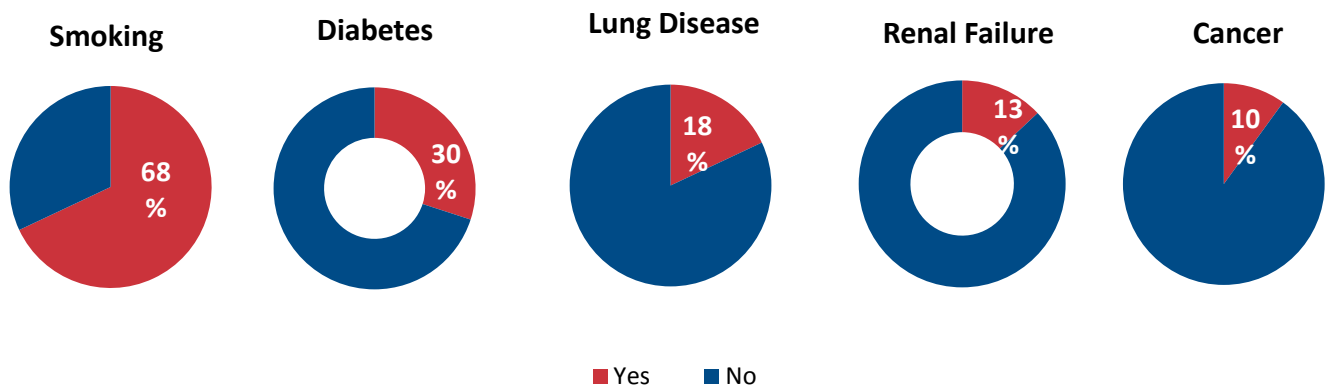
Figure 6: Legionnaires' Cases by Transmission Type in Cleveland, Ohio, 2018



*Defined as a patient who spent a portion of the 10 days before symptom onset in a healthcare facility

Risk Factors among Legionnaires' disease patients in Cleveland, Ohio, 2018

93% of Legionnaires' patients reported at least one risk factor such as:



CLINICAL CHARACTERISTICS, AND OUTCOMES

Figure 7: Clinical Characteristics Reported by Legionnaires' Cases, Cleveland, Ohio, 2018

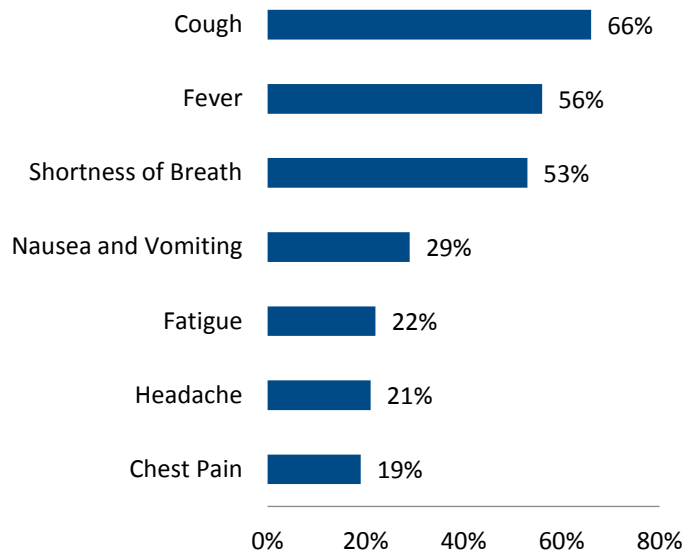


Figure 8: Other Clinical Characteristics Reported by Legionnaires' Cases, Cleveland, Ohio, 2018

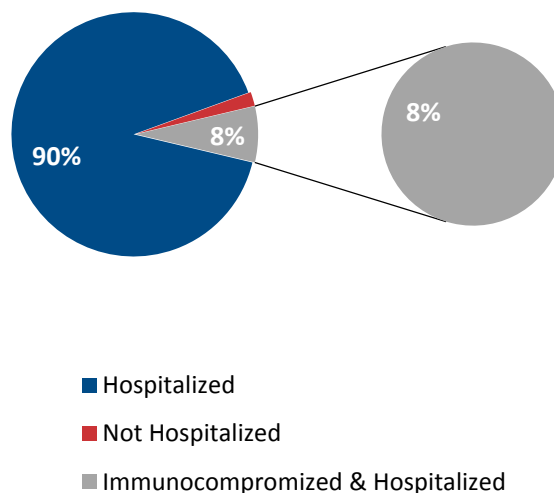


Figure 9: Legionnaires' Cases Outcome, Cleveland, Ohio, 2018

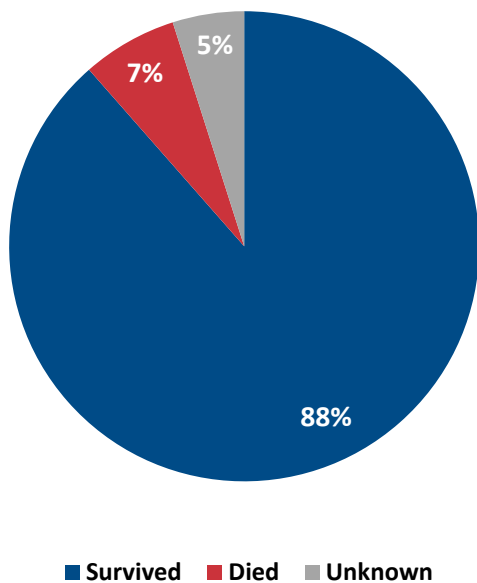
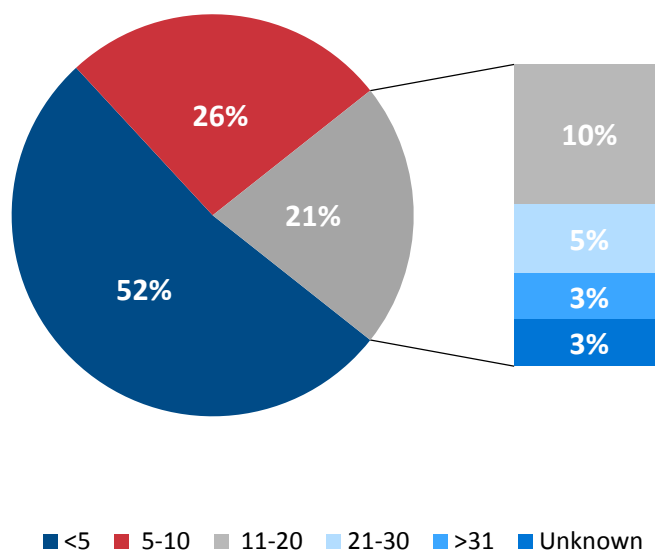
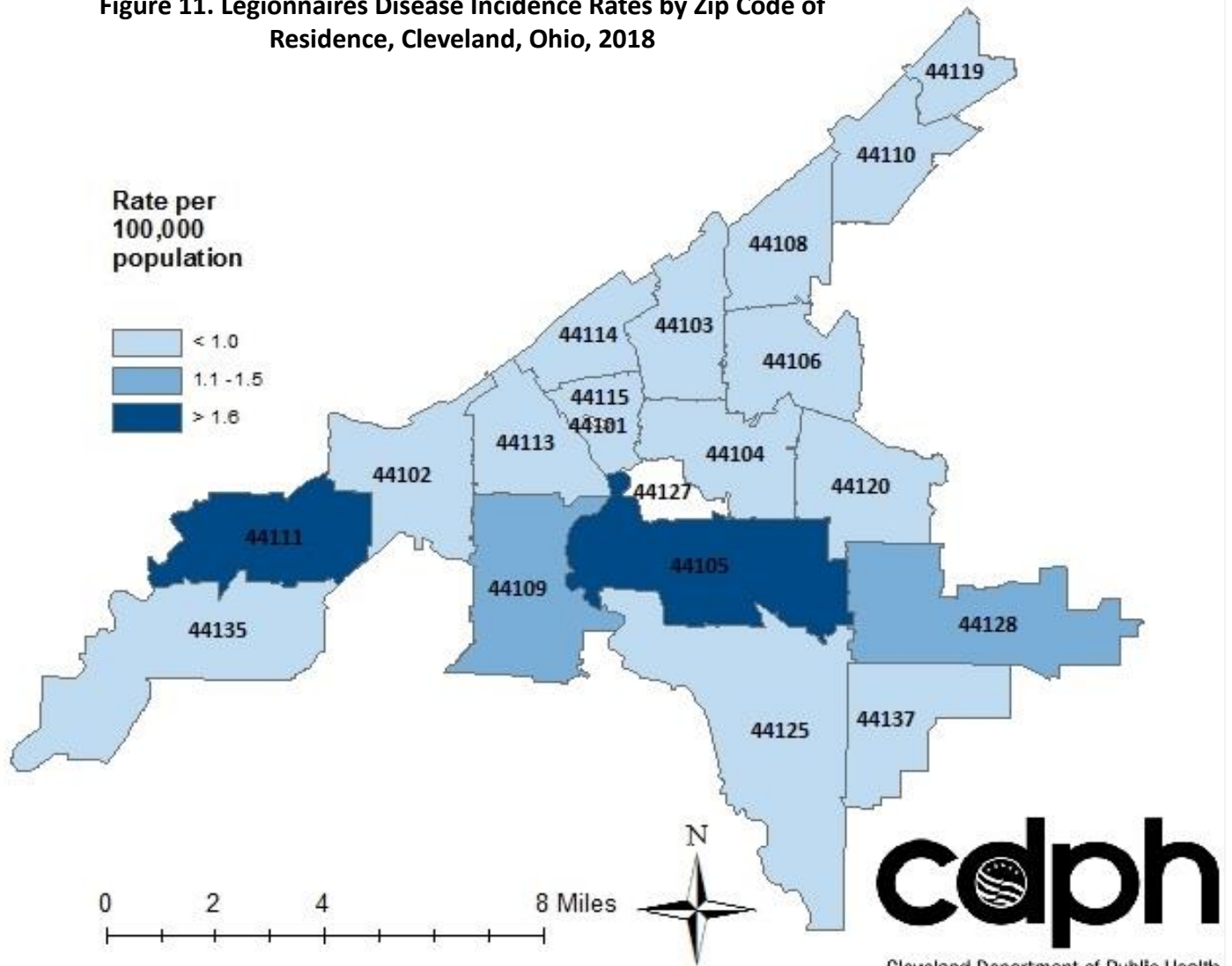


Figure 10. Number Of Days Hospitalized For Legionnaires', Cleveland, Ohio, 2018



MAP OF RATES BY ZIP CODE, CLEVELAND

Figure 11. Legionnaires Disease Incidence Rates by Zip Code of Residence, Cleveland, Ohio, 2018



Map created by Communicable Disease Surveillance & Epidemiology at the Cleveland Department of Public Health Feb 2019. D Mofleh. Data Source: Ohio Disease Reporting System, Legionellosis Cases, 2018

For more information:

- [Center for Disease Control and Prevention \(CDC\) Legionella website](#)
- [CDC/CSTE Legionellosis Case Definition](#)
- [Ohio Department of Public Health \(ODH\) Legionellosis website](#)

Note: ZIP Codes are often not aligned with municipal boundaries, the incident rates may be underestimates.

NUMBER OF CASES & RATES OF LEGIONNAIRES' DISEASE 2015-2018

TABLE 5. REPORTED LEGIONNAIRES' CASES AND RATES PER 100,000 BY AGE GROUP, RACE/ETHNICITY, AND GENDER, CLEVELAND, OHIO 2015 -2018

	2015			2016			2017			2018		
	No.	(%)	Rate‡	No.	(%)	Rate‡	No.	(%)	Rate‡	No.	(%)	Rate‡
Age group												
0-4	0	-	-	0	-	-	0	-	-	0	-	-
15-39	6	13	1.5	5	14	1.3	5	10	1.3	8	13	2.1
40-65	24	54	6.2	23	64	5.9	28	57	7.2	40	66	10.3
65+	15	33	3.9	8	22	2.1	16	33	4.1	13	21	3.3
Race/Ethnicity												
Asian	0	-	-	0	-	-	0	-	-	0	-	-
Black	34	76	8.7	23	64	5.9	33	67	8.5	43	71	11.1
Hispanic	0	-	-	0	-	-	0	-	-	0	-	-
White	10	22	2.6	11	30	2.8	11	22	2.8	14	23	3.6
Other	1	2	0.3	1	3	0.3	2	4	0.5	3	5	0.8
Unknown	0	-	-	1	3	0.3	2	4	0.5	1	1	0.3
Gender												
Female	16	36	4.1	13	36	3.3	15	30.6	3.9	21	34	5.4
Male	29	64	7.5	23	64	5.9	34	69	9.7	40	66	10.3
Total	45	100	11.6	36	100	9.3	49	100	12.6	61	100	15.7

Note: The percentage of cases for which a specific case was reported was calculated on the basis of the total numbers of cases for which are confirmed cases for that reported year.

‡ Rate per 100,000 population. Rates were calculated based on the 2017 population estimates are the most recent estimates provided by the Census Bureau's Population Estimates Program, can be found on their [website](#)

INCIDENCE, CITY OF CLEVELAND, AND OHIO

Figure 12: Age adjusted Legionnaires' Incidence Rates, Cleveland City, and Ohio, 2013-2018

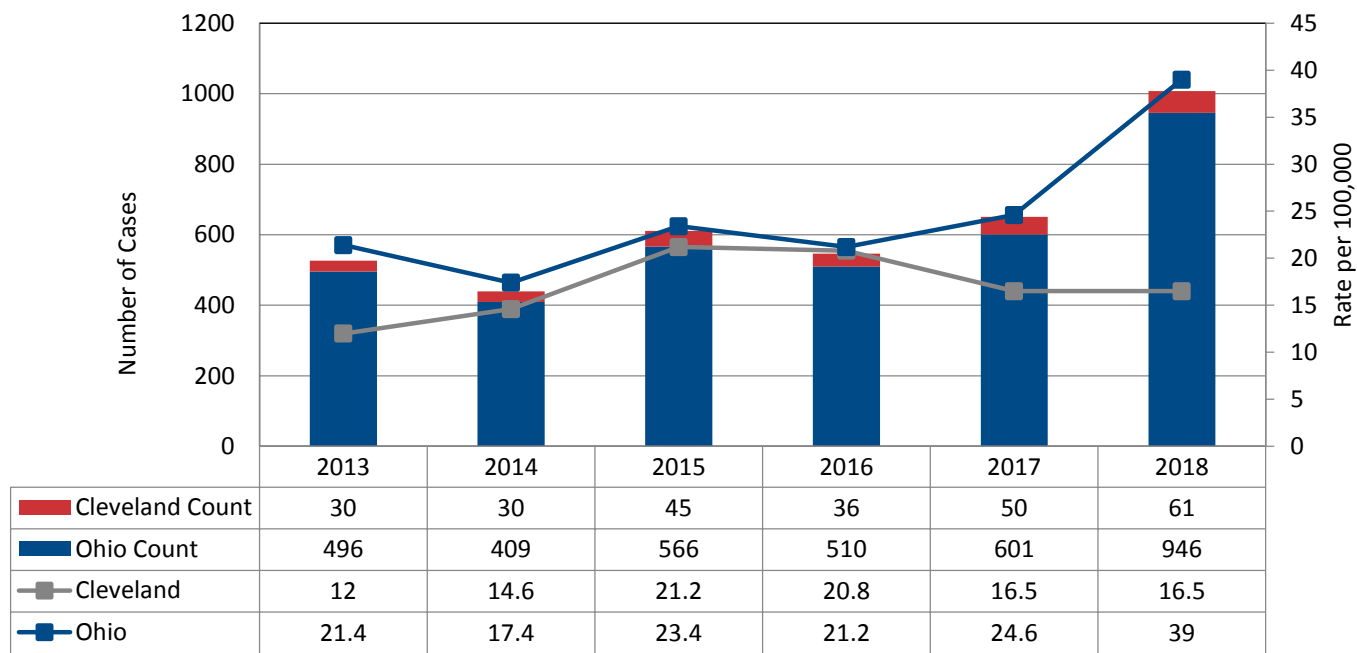
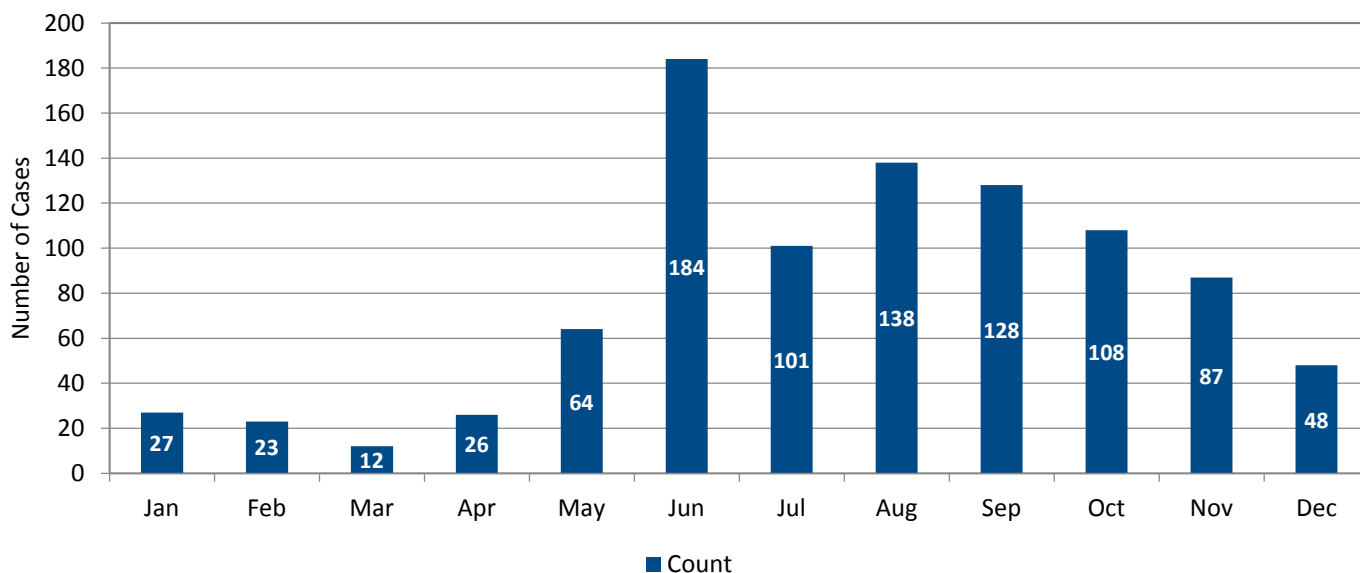


Figure 13: Legionnaires' Cases by Month of Onset, Ohio, 2018

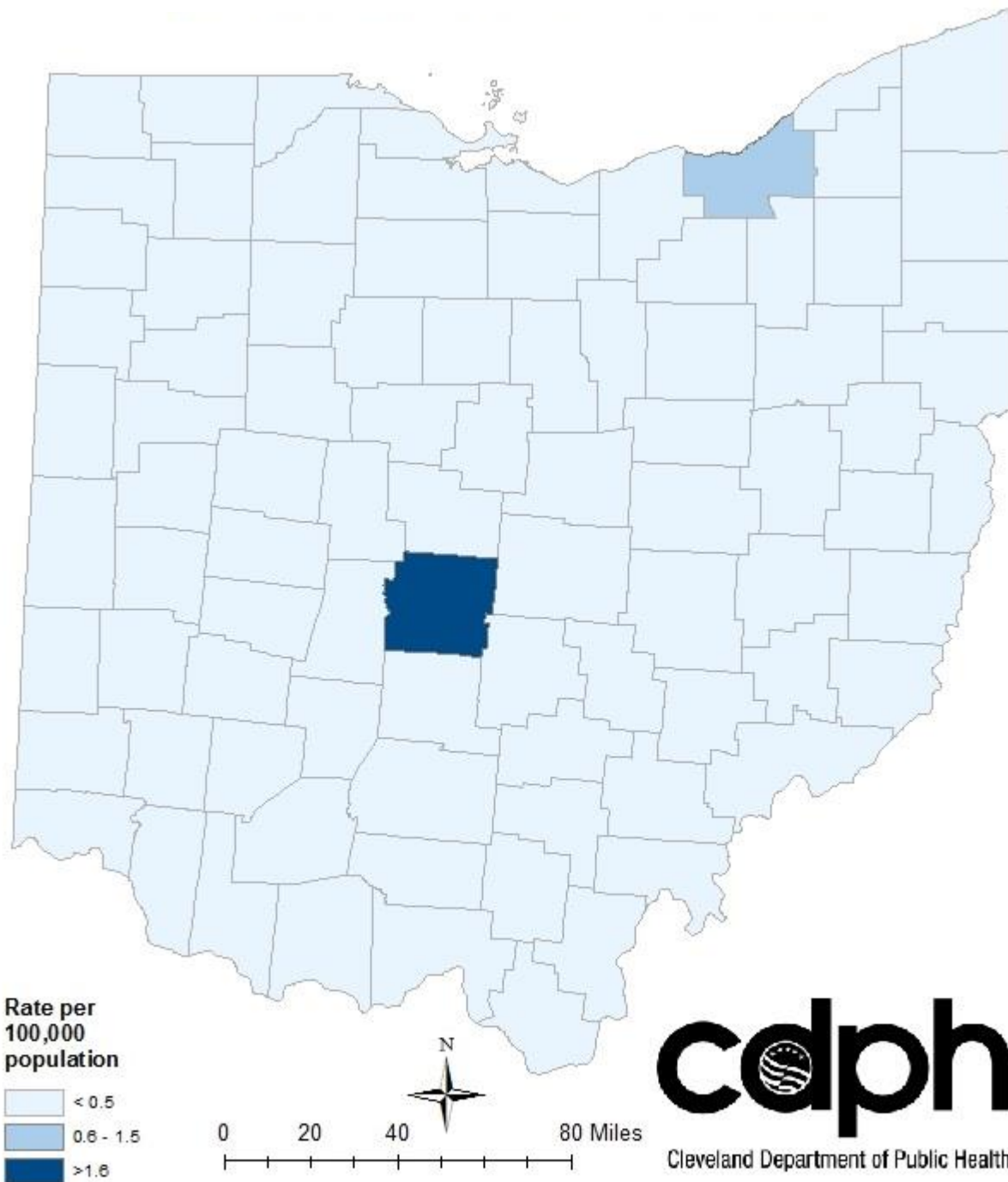


Note: Cases for the State of Ohio are calculated from the Center for Disease Control and Prevention Notifiable Infectious Disease and Conditions Annual Data Tables for years 2013 -2017 and the Ohio Disease Reportable System for the year 2018.

The rate for City of Cleveland and State of Ohio are calculated per 100,000 population based on the 2017 population estimate provided by the Census Bureau's Population Estimate Program, 2017. Seven age-group categories were used for calculating the rates.

MAP OF RATES BY COUNTY, OHIO

Figure 14: Legionnaires' disease Crude Rates by Counties, Ohio, 2018



Map created by Communicable Disease Surveillance & Epidemiology at the Cleveland Department of Public Health Feb 2019. D Mofleh. Data Source: Ohio Disease Reporting System, Legionellosis Cases, 2018

Legionnaires' Disease Reporting In the City Of Cleveland

Local providers are encouraged to report laboratory positive legionella detections to Katie Romig, Chief Epidemiologist by FAX 216-664-6159. Please fax a [Case Report Form](#) and/or a printed laboratory result, and indicate if the patient was admitted to the hospital. For questions regarding Legionnaires' disease please call Katie Romig at 216-420-7743 or email to: kromig@city.cleveland.oh.us

Resources:

Ohio Disease Reporting System (ODRS)

Center for Disease Control and Prevention Notifiable Infectious Disease and Conditions [Annual Data Tables](#)

Ohio Department of Health (ODH) Legionella [resource](#)

Ohio Infectious Disease Control Manual ([IDCM](#)).