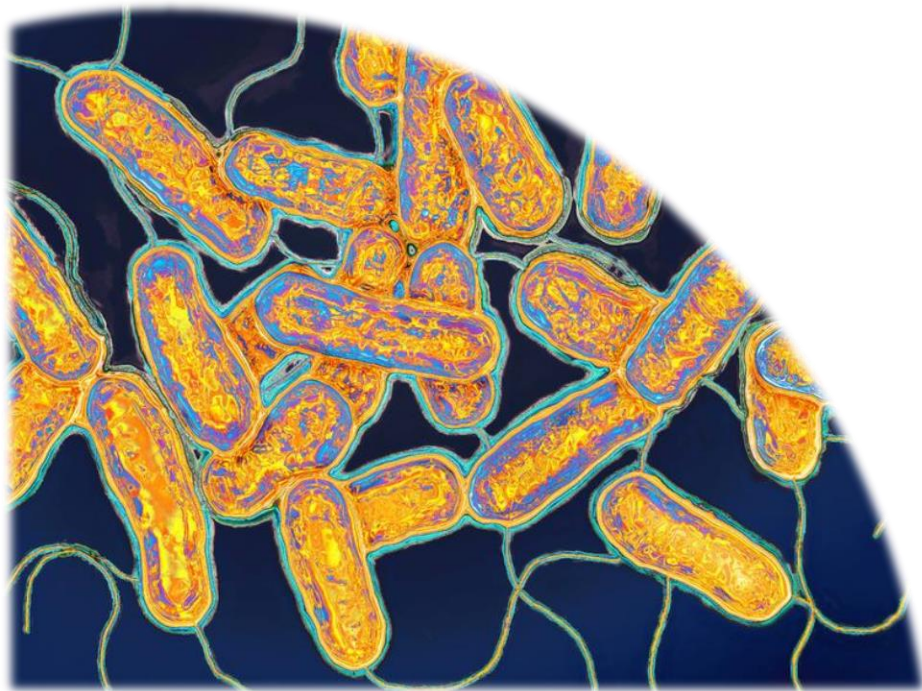# Legionnaires' Disease in New York City: 2019-2022 Surveillance Report

Summary and Frequently Asked Questions

What is Legionnaires' disease?

- Legionnaires' disease is a form of pneumonia caused by *Legionella* bacteria, with symptoms that typically include cough, shortness of breath, fever, muscle aches and headaches.
- People can contract Legionnaires' disease by inhaling droplets of water (mist) contaminated with *Legionella* bacteria into their lungs.
- People cannot contract Legionnaires' disease by drinking water contaminated with *Legionella* bacteria.
- People generally develop symptoms of Legionnaires' disease between 2 and 14 days after they inhale *Legionella* bacteria.
- *Legionella* bacteria are very common in the natural environment. Most people who are exposed to the bacteria do not develop Legionnaires' disease.

How does Legionnaires' disease spread and infect people?

- *Legionella* bacteria can grow in building water systems, including in health care facilities, hotels and residential buildings, and can spread in showerheads, sink faucets, cooling towers, hot water tanks and heaters, and large complex plumbing systems.
- Legionnaires' disease is not typically spread from person to person, but people who live or work together may have similar exposures to *Legionella* bacteria.

Who gets Legionnaires' disease?

- Most healthy people do not develop Legionnaires' disease even if they are exposed to *Legionella* bacteria. People at higher risk for Legionnaires' disease include those who are age 50 or older, people with chronic lung disease or other chronic conditions, and people taking immunosuppressive medications.
- Over half of people diagnosed with Legionnaires' disease in 2019-2022 reported a history of smoking.
- Men were nearly twice as likely as women to be diagnosed with Legionnaires' disease.
- Among all racial and ethnic groups, non-Latino Black New Yorkers had the highest rate of disease.
- In 2019-2022, most people diagnosed with Legionnaires' disease resided in the Bronx.

How common is Legionnaires' disease in NYC?

- Legionnaires' disease is not a common disease. Among the 8.5 million people living in NYC, between 200 and 700 people are diagnosed with Legionnaires' disease each year. In 2019, there were 438 people diagnosed with Legionnaires' disease.

Is the rate of Legionnaires' disease increasing in NYC and across the United States?
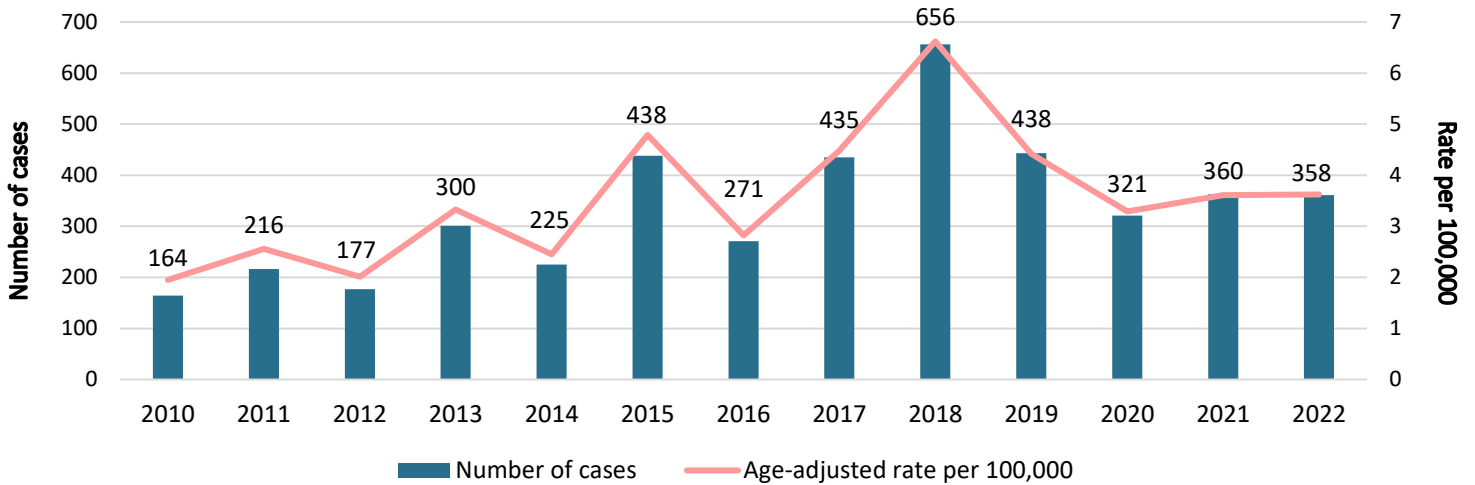
- The rate of Legionnaires' disease has stabilized in recent years. The reasons for this plateau are unknown but might include:
    1. Fewer people with *Legionella* pneumonia getting diagnosed and reported to the NYC Health Department due to health care system capacity issues caused by COVID-19
    2. More people staying indoors and wearing masks
    3. A combination of these factors

Contents

1. Legionnaires' Disease Rates in NYC Over Time

Figure 1.1 Number and Age-Adjusted Rate of Reported Legionnaires' Disease Cases, NYC, 2010-2022[1]

- The rate of Legionnaires' disease in NYC increased from 2010 to 2018, with a peak in 2018. Since 2018, rates have decreased and stabilized.

- In 2020, the COVID-19 pandemic caused many New Yorkers to stay indoors, wear masks and limit their access to health care services, which likely contributed to the reduction in people diagnosed with Legionnaires' disease in 2020.

Table 1.1 Trends in Legionnaires' Disease Age-Adjusted Rates by Demographic Groups, NYC, 2019-2022[2]

Group	2019	2020	2021	2022	Average annual rate per 100,000 people
Total	**3.9**	**3.0**	**3.2**	**3.3**	3.3
Sex					
Male	6.1	4.9	4.6	5.4	5.3
Female	3.0	1.8	2.7	2.2	2.4
Race and ethnicity					
Black (non-Latino)	7.5	5.7	7.2	6.6	6.7
Latino	4.5	3.2	3.0	3.7	3.6
White (non-Latino)	2.5	2.3	2.1	2.0	2.2
Asian (non-Latino)	1.4	0.8	1.2	1.0	1.1
Age group (crude rate)					
< 35 years	0.5	0.4	0.3	0.5	0.4
35-49 years	3.2	2.9	1.9	2.6	2.6
50-64 years	10.6	6.5	8.2	8.0	8.3
65-74 years	13.4	9.4	11.3	10.9	11.2
75-84 years	12.6	12.3	14.3	13.8	13.3
≥ 85 years	19.5	16.0	21.0	15.9	18.1

Table 1.1 Trends in Legionnaires' Disease Age-Adjusted Rates by Demographic Groups, NYC, 2019-2022[2] (Continued)

Group	2019	2020	2021	2022	Average annual rate per 100,000 people
Borough of residence					
Bronx	9.7	8.3	7.2	8.1	8.3
Brooklyn	2.3	1.9	2.2	2.2	2.2
Manhattan	4.5	2.7	4.0	4.3	3.9
Queens	3.7	2.7	2.6	2.1	2.8
Staten Island	3.0	1.6	3.5	1.8	2.5
Neighborhood federal poverty level (FPL)					
Low (< 10% below FPL)	3.5	2.6	2.7	3.0	3.0
Medium (10% to < 20% below FPL)	3.6	2.7	2.7	2.4	2.9
High (20% to < 30% below FPL)	5.7	3.5	5.2	3.8	4.5
Very high (≥ 30% below FPL)	6.8	6.6	6.2	9.9	7.4

- Neighborhoods with the highest rates of disease have older populations and higher rates of poverty.

- Neighborhoods with primarily Black and Latino residents are disproportionately affected, likely due to the impacts of long-term structural racism.

- Potential sources of *Legionella* bacteria in the built environment may vary widely by neighborhood and affect exposure risk for Legionnaires' disease. Contributing factors may include density and elevation of buildings, distance of source from public areas, infrastructure design and age, and quality of building maintenance.

- Rate of testing may not be uniform across the city due to variation in testing protocols across different health care systems.

Figure 1.2 Average Legionnaires' Disease Rate by Neighborhood Tabulation Area, 2019-2022[3]

Average annual rate per 100,000 people
- 0.0-1.4
- 1.5-3.0
- 3.1-5.3
- 5.4-9.3
- 9.4-21.5
- Nonresidential zones
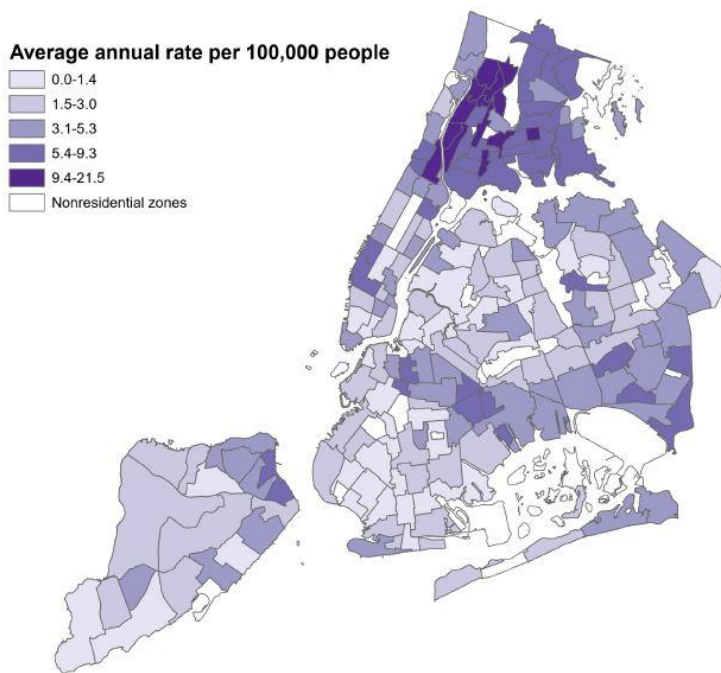
Figure 1.3 Neighborhood Poverty by Neighborhood Tabulation Area, 2019-2022[4]

- Low (< 10% below FPL)
- Medium (10% to < 20% below FPL)
- High (20% to < 30% below FPL)
- Very High (≥ 30% below FPL)
- No Data Available
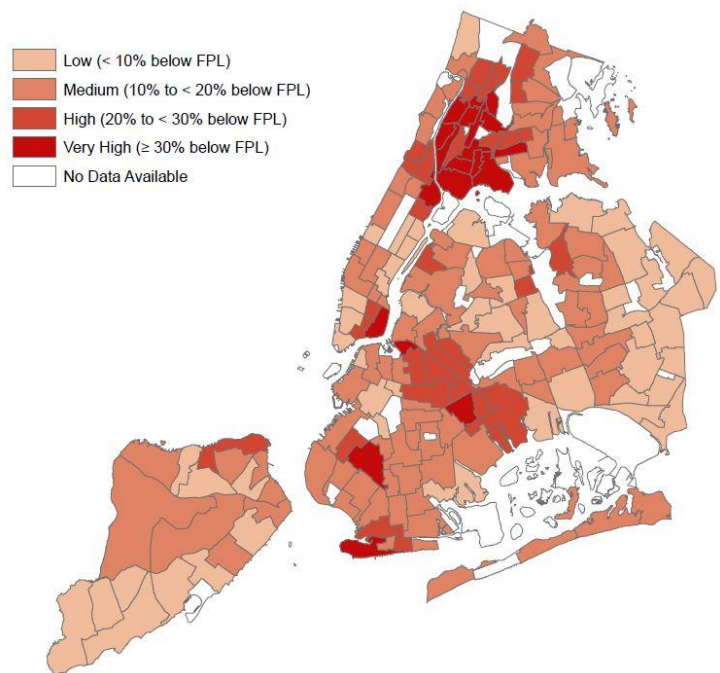
2. Sources of Exposure and Clinical Outcomes in People Diagnosed With Legionnaires' Disease

Table 2.1 Sources of Exposure in People Diagnosed With Legionnaires' Disease, NYC, 2019-2022

Year	2019	2020	2021	2022
Confirmed cases	**438**	**321**	**360**	**358**
	n (%)	n (%)	n (%)	n (%)
Source of exposure[5]				
Neither health care nor travel exposure	214 (48.8)	176 (54.8)	200 (55.6)	204 (57.0)
Presumptive health care-associated	27 (6.2)	32 (10.0)	25 (6.9)	22 (6.1)
Possible health care-associated	89 (20.3)	75 (23.4)	96 (26.7)	68 (19.0)
Travel exposure	31 (7.1)	9 (2.8)	19 (5.3)	24 (6.7)
Unknown	77 (17.6)	29 (9.0)	20 (5.5)	40 (11.2)

Table 2.2 Diagnostic Methods and Clinical Outcomes in People With Legionnaires' Disease, NYC, 2019-2022

Year	2019	2020	2021	2022
Confirmed cases	**438**	**321**	**360**	**358**
	n (%)	n (%)	n (%)	n (%)
Method of diagnosis (not mutually exclusive)				
Urine antigen test	434 (99.1)	315 (98.1)	353 (98.1)	337 (94.1)
Bacterial culture	25 (5.7)	25 (7.8)	22 (6.1)	32 (8.9)
Polymerase chain reaction (PCR) or nucleic acid amplification test (NAAT)	11 (2.5)	7 (2.2)	8 (2.2)	34 (9.5)
Hospitalized due to Legionnaires' disease				
Yes	422 (96.4)	311 (96.9)	352 (97.8)	344 (96.1)
No	16 (3.6)	10 (3.1)	8 (2.2)	14 (3.9)
Death caused by Legionnaires' disease[6]				
Yes	14 (3.2)	14 (4.4)	12 (3.3)	15 (4.2)
No	424 (96.8)	307 (95.6)	348 (96.7)	343 (95.8)

- Most people diagnosed with Legionnaires' disease did not have health care-associated or travel exposure and likely acquired it in their community from sources such as cooling towers, grocery store misters, decorative fountains or other sources of aerosolized water.

- There was an increase in positive PCR and NAAT tests in 2022. This is likely due to the use of a PCR panel that tests for multiple causes of pneumonia that started being used more frequently in 2022.
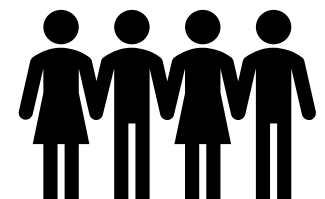
3. Risk Factors and Health Conditions of People Diagnosed With Legionnaires' Disease

Table 3.1 Risk Factors and Health Conditions of People Diagnosed With Legionnaires' Disease, NYC, 2019-2022

Year	2019	2020	2021	2022
Confirmed cases	**443**	**321**	**363**	**361**
	n (%)	n (%)	n (%)	n (%)
Underlying medical conditions				
Yes	402 (90.8)	297 (92.5)	328 (90.3)	342 (94.7)
No	24 (5.4)	23 (7.2)	34 (9.4)	19 (5.3)
Unknown or missing	17 (3.8)	1 (0.3)	1 (0.3)	0 (0)
Common conditions (not mutually exclusive)				
Diabetes	149 (33.6)	101 (31.5)	121 (33.3)	118 (32.7)
Lung disease	106 (23.9)	98 (30.5)	83 (22.9)	95 (26.3)
Cancer	69 (15.6)	64 (20.0)	71 (19.6)	71 (19.7)
HIV/AIDS	32 (7.3)	28 (8.8)	46 (12.7)	30 (8.3)
Kidney failure	19 (4.3)	13 (4.1)	11 (3.0)	22 (6.1)
Other chronic condition	344 (77.7)	235 (73.2)	251 (69.2)	286 (79.2)
Smoking status				
Any history of smoking	248 (56.0)	184 (56.7)	215 (59.2)	214 (59.3)
Current smoker	124 (28.0)	109 (34.0)	125 (34.4)	99 (27.4)
No history of smoking	133 (30.0)	113 (35.2)	127 (35.0)	127 (35.2)
Unknown or missing	62 (14.0)	24 (7.5)	21 (5.8)	20 (5.5)

- Among people with Legionnaires' disease in 2019-2022, more than 90% had at least one chronic medical condition and more than 50% were previous or current smokers.

- The single most commonly reported underlying medical condition was diabetes (31%), followed by lung disease (28.5%).

- People who were under 50 at the time they were diagnosed with Legionnaires' disease were more likely to report being current smokers or to have been diagnosed with HIV.

Figure 3.1 Health Conditions of People Diagnosed With Legionnaires' Disease, NYC, 2019-2022
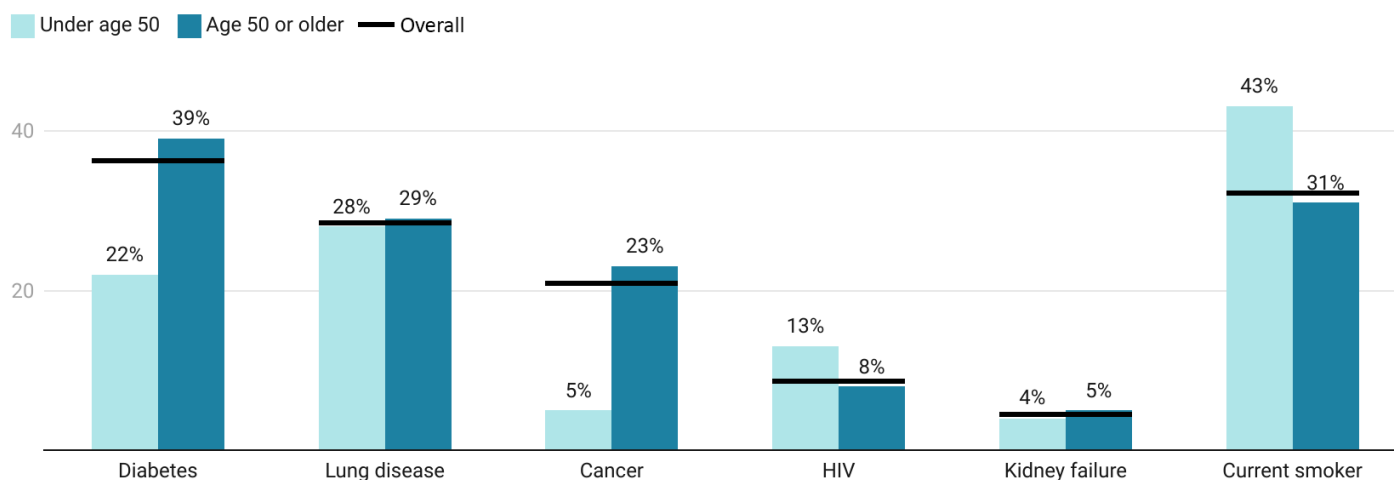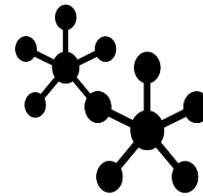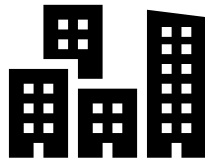
Building water system evaluation:
The NYC Health Department initiates a building evaluation when (1) two or more people in a building are diagnosed with Legionnaires' disease within 12 months of each other or (2) a single person diagnosed with Legionnaires' disease spends the entirety of their disease incubation period in a higher-risk setting, such as a shelter or assisted living facility. A building evaluation requires the owner to hire a water management team to perform a site-specific analysis of the building's water system. This includes reviewing the building's plumbing and mechanical systems and testing the water for the presence of *Legionella*.

Community cluster investigation:
The NYC Health Department investigates community sources of exposure, such as cooling towers, when several people who live near one another but in different buildings are diagnosed with Legionnaires' disease within a short period of time.

Table 4.1 NYC Health Department Response Summary, 2019-2022[7]

		Building water system evaluation		Community cluster investigation
2019	13	Thirteen building water system evaluations were initiated. Each evaluation had a range of one to four people diagnosed with Legionnaires' disease. Ten out of 14 buildings required remediation.	0	There were no community clusters identified in 2019.
2020	7	Seven building water system evaluations were initiated. Each evaluation had a range of two to four people diagnosed with Legionnaires' disease. Two out of six buildings required remediation.	0	There were no community clusters identified in 2020.
2021	3	Three building water system evaluations were initiated. Each evaluation had a range of two to five people diagnosed with Legionnaires' disease. Three out of three buildings required remediation.	1	One community cluster was identified in the Central Harlem neighborhood in Manhattan. Eighteen people were diagnosed with Legionnaires' disease. Nineteen environmental samples were collected from 24 cooling tower systems. One clinical isolate from one patient was highly related to two environmental isolates from a single cooling tower system, as identified by whole genome sequencing.
2022	8	Eight building water system evaluations were initiated. Each evaluation had a range of two to four people diagnosed with Legionnaires' disease. Seven out of eight buildings required remediation.	1	One community cluster was identified in the Highbridge neighborhood in the Bronx. Thirty people were diagnosed with Legionnaires' disease. Nine environmental samples were collected from 11 cooling tower systems. Two clinical isolates were indistinguishable from two environmental isolates from the same cooling tower system.

Figure 4.1 Building Water System Evaluations and Community Cluster Investigations by United Hospital Fund, 2019-2022

Legend

- 1 building evaluation
- 2 building evaluations
- 3 building evaluations
- 6 building evaluations

Community clusters

Average age-adjusted annual rate of Legionnaires' disease per 100,000 people

- 0.9-2.4
- 2.5-4.5
- 4.6-7.0
- 7.1-12.2
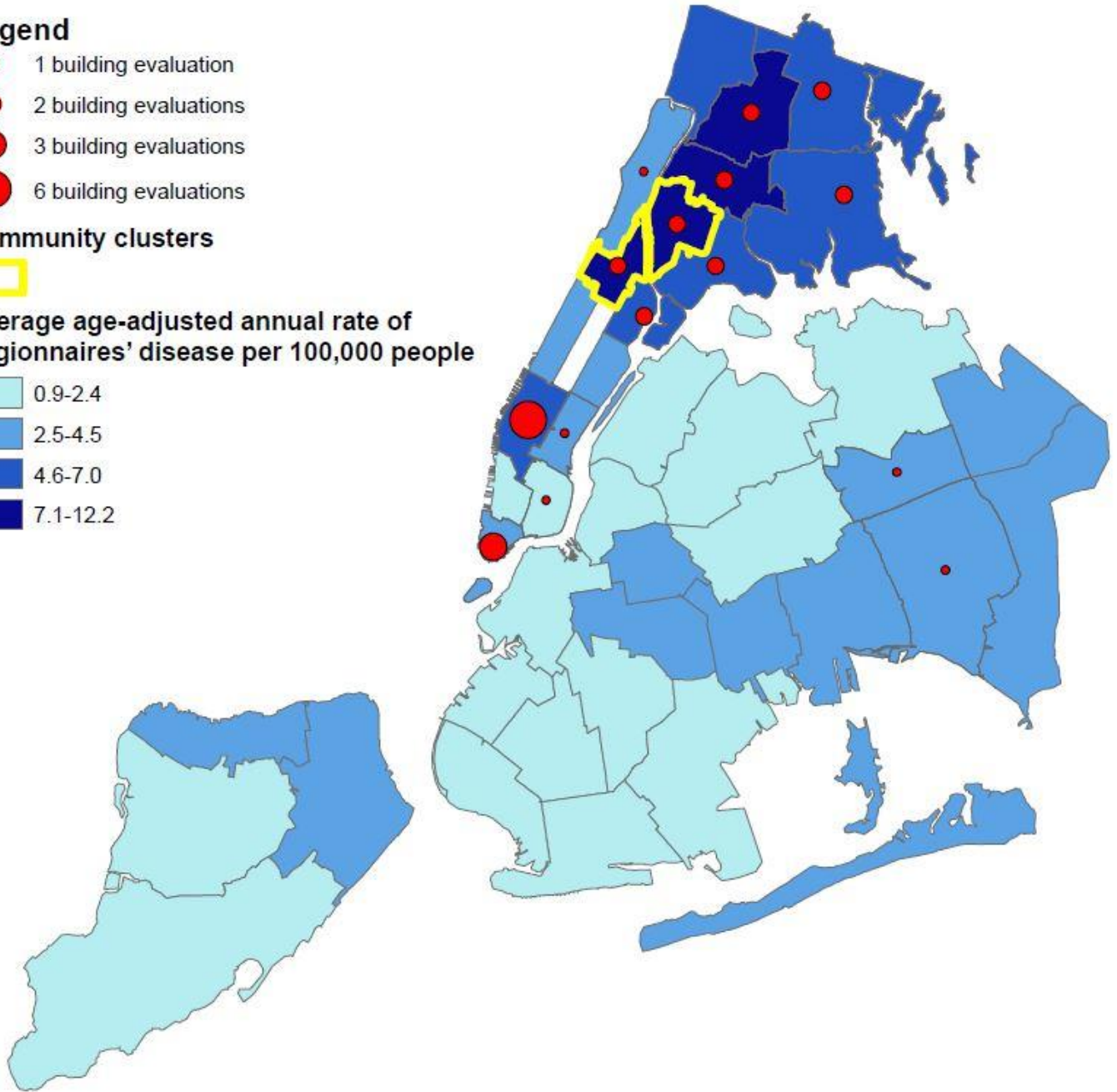
- Community clusters were identified in Upper Manhattan and the Bronx in 2021 and 2022, respectively.
- Most building evaluations occurred in Manhattan and the Bronx.
- There were no building evaluations in Brooklyn or Staten Island.

5. Endnotes

1. Numbers represent all confirmed cases of legionellosis, which includes Legionnaires' disease and a flu-like illness called Pontiac fever. Pontiac fever makes up less than 2% of reported legionellosis cases each year. Case counts are subject to change.

2. Race and ethnicity rate calculations do not include the following categories: Non-Latino Other; Non-Latino Multiracial; Non-Latino Does not identify; Decline; Missing or unknown. Neighborhood poverty rates (based on ZIP code) are defined as a percent of residents with incomes below 100% of the federal poverty level, per the American Community Survey 2017-2021. Cases involving an incomplete address were not included in the neighborhood poverty analysis (n = 6).

3. Population data are from NYC Health Department population estimates, modified from U.S. Census Bureau interpolated intercensal population estimates, 2000-2021. Updated September 2022. See Appendix A (on Page 11) for rate values by neighborhood tabulation area.

4. Neighborhood poverty rates (based on ZIP code) are defined as a percent of residents with incomes below 100% of the federal poverty level, per the American Community Survey (ACS) 2017-2021. No ACS poverty data were available for BX-13: Co-op City; BX98: Rikers Island; or QN98: Airport. Park-cemetery neighborhood tabulation areas were excluded (MN99, BK99, BX99, QN99, SI99).

5. **Possible health care-associated:** A person spent a portion of the 14 days before onset of symptoms in one or more health care facilities but does not meet criteria for presumptive health care-associated.

   Presumptive health care-associated: A person had ≥ 10 days of continuous stay at a health care facility during the 14 days before onset of symptoms.

   The definition for health care-associated cases changed in 2019. For more information on case definitions and classifications see: Council of State and Territorial Epidemiologists (CSTE). Revision to the case definition for national *Legionellosis* surveillance. CSTE position statement 19-ID-04. 2019. https://www.cste.org/resource/resmgr/2019ps/final/19-ID-04_Legionellosis_final.pdf

6. Mortality data was provided by the NYC Health Department's Office of Vital Statistics, where *Legionella* or Legionnaires' disease is reported as a cause of death on patient death certificates.

7. Remediation is defined as methods and practices that aim to eradicate and control *Legionella* in a building's water system. Remediation may include strategies such as chemical disinfection (for example, chlorination or copper-silver ionization), flushing regimens or thermal disinfection.

6. Appendix: Average Age-Adjusted Legionnaires' Disease Rates by Neighborhood Tabulation Area (NTA), 2019-2022

NTA code	NTA name	Average annual rate of Legionnaires' disease per 100,000 people
	Brooklyn	
BK25	Homecrest	0.00
BK46	Ocean Parkway South	0.00
BK29	Bensonhurst East	0.27
BK44	Madison	0.36
BK19	Brighton Beach	0.50
BK73	North Side-South Side	0.51
BK91	East Flatbush-Farragut	0.64
BK72	Williamsburg	0.66
BK41	Kensington-Ocean Parkway	0.67
BK37	Park Slope-Gowanus	0.70
BK90	East Williamsburg	0.78
BK27	Bath Beach	0.80
BK40	Windsor Terrace	0.83
BK09	Brooklyn Heights-Cobble Hill	0.97
BK30	Dyker Heights	0.98
BK88	Borough Park	1.04
BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	1.07
BK60	Prospect Lefferts Gardens-Wingate	1.11
BK28	Bensonhurst West	1.17
BK43	Midwood	1.39
BK50	Canarsie	1.43
BK42	Flatbush	1.44
BK34	Sunset Park East	1.63
BK33	Carroll Gardens-Columbia Street-Red Hook	1.78
BK32	Sunset Park West	1.82
BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	1.88
BK83	Cypress Hills-City Line	1.96
BK76	Greenpoint	2.21
BK23	West Brighton	2.22
BK77	Bushwick North	2.27
BK31	Bay Ridge	2.32
BK58	Flatlands	2.40
BK78	Bushwick South	2.65
BK26	Gravesend	2.99
BK75	Bedford	2.99
BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	3.02
BK63	Crown Heights South	3.16
BK96	Rugby-Remsen Village	3.57

BK61	Crown Heights North	3.64
BK82	East New York	3.70
BK68	Fort Greene	4.11
BK35	Stuyvesant Heights	4.43
BK95	Erasmus	4.77
BK21	Seagate-Coney Island	5.46
BK79	Ocean Hill	6.19
BK69	Clinton Hill	6.53
BK85	East New York (Pennsylvania Ave)	6.58
BK93	Starrett City	6.68
BK64	Prospect Heights	6.71
BK81	Brownsville	6.91

Bronx

BX98	Rikers Island	0.00
BX17	East Tremont	3.56
BX10	Pelham Bay-Country Club-City Island	4.27
BX31	Allerton-Pelham Gardens	4.57
BX22	North Riverdale-FIeldston-Riverdale	5.11
BX29	Spuyten Duyvil-Kingsbridge	5.22
BX13	Co-op City	5.36
BX52	Schuylerville-Throgs Neck-Edgewater Park	5.55
BX44	Williamsbridge-Olinville	6.14
BX49	Pelham Parkway	6.25
BX03	Eastchester-Edenwald-Baychester	6.45
BX37	Van Nest-Morris Park-Westchester Square	6.50
BX09	Soundview-Castle Hill-Clason Point-Harding Park	6.55
BX39	Mott Haven-Port Morris	6.70
BX62	Woodlawn-Wakefield	6.79
BX59	Westchester-Unionport	6.82
BX35	Morrisania-Melrose	7.29
BX41	Mount Hope	7.58
BX34	Melrose South-Mott Haven North	7.74
BX55	Soundview-Bruckner	7.75
BX07	Bronxdale	8.31
BX14	East Concourse-Concourse Village	8.57
BX27	Hunts Point	8.77
BX08	West Farms-Bronx River	9.10
BX36	University Heights-Morris Heights	9.76
BX06	Belmont	10.49
BX33	Longwood	10.56
BX75	Crotona Park East	10.72
BX30	Kingsbridge Heights	10.81
BX46	Parkchester	10.84
BX01	Claremont-Bathgate	10.85
BX43	Norwood	10.97

BX05	Bedford Park-Fordham North	11.00
BX63	West Concourse	13.06
BX40	Fordham South	13.60
BX28	Van Cortlandt Village	13.84
BX26	Highbridge	20.50

Manhattan

MN24	SoHo-TriBeCa-Civic Center-Little Italy	0.48
MN27	Chinatown	0.78
MN17	Midtown-Midtown South	0.84
MN12	Upper West Side	1.39
MN21	Gramercy	1.72
MN19	Turtle Bay-East Midtown	1.73
MN23	West Village	1.77
MN35	Washington Heights North	2.03
MN40	Upper East Side-Carnegie Hill	2.12
MN32	Yorkville	2.57
MN50	Stuyvesant Town-Cooper Village	2.57
MN28	Lower East Side	2.88
MN31	Lenox Hill-Roosevelt Island	3.41
MN14	Lincoln Square	3.42
MN36	Washington Heights South	3.48
MN22	East Village	3.76
MN25	Battery Park City-Lower Manhattan	4.27
MN01	Marble Hill-Inwood	4.27
MN11	Central Harlem South	4.36
MN20	Murray Hill-Kips Bay	4.79
MN09	Morningside Heights	4.87
MN34	East Harlem North	5.24
MN33	East Harlem South	6.11
MN15	Clinton	6.78
MN06	Manhattanville	7.11
MN04	Hamilton Heights	7.22
MN13	Hudson Yards-Chelsea-Flatiron-Union Square	7.53
MN03	Central Harlem North-Polo Grounds	12.21

Queens

QN44	Glen Oaks-Floral Park-New Hyde Park	0.00
QN30	Maspeth	0.58
QN70	Astoria	0.99
QN29	Elmhurst	1.03
QN18	Rego Park	1.09
QN22	Flushing	1.17
QN52	East Flushing	1.19
QN42	Oakland Gardens	1.22
QN19	Glendale	1.26

QN31	Hunters Point-Sunnyside-West Maspeth	1.42
QN54	Richmond Hill	1.46
QN48	Auburndale	1.50
QN61	Jamaica	1.50
QN41	Fresh Meadows-Utopia	1.70
QN50	Elmhurst-Maspeth	1.71
QN06	Jamaica Estates-Holliswood	1.78
QN20	Ridgewood	1.91
QN63	Woodside	1.92
QN53	Woodhaven	1.96
QN28	Jackson Heights	1.99
QN72	Steinway	2.08
QN60	Kew Gardens	2.15
QN51	Murray Hill	2.28
QN26	North Corona	2.33
QN25	Corona	2.48
QN38	Pomonok-Flushing Heights-Hillcrest	2.51
QN17	Forest Hills	2.57
QN10	Breezy Point-Belle Harbor-Rockaway Park-Broad Channel	2.71
QN08	St. Albans	3.01
QN35	Briarwood-Jamaica Hills	3.08
QN37	Kew Gardens Hills	3.14
QN45	Douglas Manor-Douglaston-Little Neck	3.21
QN23	College Point	3.33
QN56	Ozone Park	3.42
QN43	Bellerose	3.42
QN34	Queens Village	3.42
QN68	Queensbridge-Ravenswood-Long Island City	3.42
QN66	Laurelton	3.57
QN21	Middle Village	3.69
QN27	East Elmhurst	3.74
QN49	Whitestone	3.87
QN71	Old Astoria	3.90
QN07	Hollis	3.91
QN57	Lindenwood-Howard Beach	3.96
QN46	Bayside-Bayside Hills	3.98
QN76	Baisley Park	4.11
QN55	South Ozone Park	4.15
QN47	Ft. Totten-Bay Terrace-Clearview	4.27
QN12	Hammels-Arverne-Edgemere	4.34
QN15	Far Rockaway-Bayswater	5.05
QN01	South Jamaica	5.24
QN03	Springfield Gardens South-Brookville	5.36
QN33	Cambria Heights	5.47
QN62	Queensboro Hill	5.81
QN05	Rosedale	5.94

QN02	Springfield Gardens North	9.53

Staten Island

SI07	Westerleigh	0.70
SI45	New Dorp-Midland Beach	0.74
SI01	Annadale-Huguenot-Prince's Bay-Eltingville	0.77
SI11	Charleston-Richmond Valley-Tottenville	0.84
SI24	Todt Hill-Emerson Hill-Heartland Village-Lighthouse Hill	1.63
SI14	Grasmere-Arrochar-Ft. Wadsworth	1.84
SI12	Mariner's Harbor-Arlington-Port Ivory-Graniteville	2.01
SI05	New Springville-Bloomfield-Travis	2.22
SI54	Great Kills	2.28
SI08	Grymes Hill-Clifton-Fox Hills	2.61
SI28	Port Richmond	2.86
SI32	Rossville-Woodrow	2.90
SI22	West New Brighton-New Brighton-St. George	3.63
SI35	New Brighton-Silver Lake	3.71
SI36	Old Town-Dongan Hills-South Beach	3.81
SI48	Arden Heights	4.35
SI25	Oakwood-Oakwood Beach	4.36
SI37	Stapleton-Rosebank	5.30

7.   References

Bailey ZD, Kriege N, Agénor M, Graves J, Linos N, Bassett MT. Structural racism and health inequities in the USA: evidence and interventions. *Lancet*. 2017;389(10077):1453-1463. doi:10.1016/s0140-6736(17)30569-x

Centers for Disease Control and Prevention. How *Legionella* spreads. Updated January 29, 2024. Accessed July 16, 2024. https://www.cdc.gov/legionella/causes/index.html

Farnham A, Alleyne L, Cimini D, Balter S. Legionnaires' disease incidence and risk factors, New York, New York, USA, 2002-2011. *Emerg Infect Dis*. 2014;20(11):1795-1802. doi:10.3201/eid2011.131872

New York City Department of Health and Mental Hygiene. EpiQuery — Communicable Disease Surveillance Data, 2019-2020. Accessed June 14, 2023. https://a816-health.nyc.gov/hdi/epiquery

Council of State and Territorial Epidemiologists (CSTE). Revision to the case definition for national *Legionellosis* surveillance. CSTE position statement 19-ID-04. 2019. https://www.cste.org/resource/resmgr/2019ps/final/19-ID-04_Legionellosis_final.pdf

Simmering JE, Polgreen LA, Hornick DB, Sewell DK, Polgreen PM. Weather-dependent risk for Legionnaires' disease, United States. Emerg Infec Dis. 2017;23(11):1843-1851. doi:10.3201/eid2311.170137