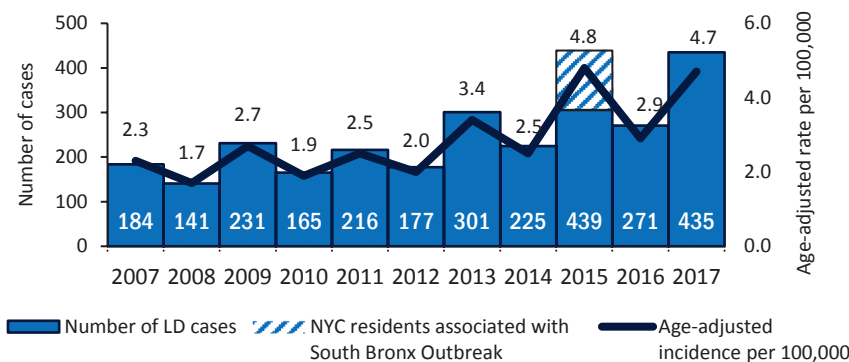# Legionnaires' Disease in New York City, 2007 to 2017

Legionnaires' disease (LD) is a pneumonia caused by *Legionella* bacteria. These bacteria are ubiquitous in the environment and can grow in human-made water systems in buildings, whirlpool spas, decorative fountains, and cooling towers.[1] People can get sick from inhaling water vapor (mist) or aspirating water that contains the bacteria.[1] This Epi Data Brief presents data on the trend in the rate of new LD cases (incidence) from 2007 to 2017, and includes an analysis by sociodemographic and neighborhood characteristics from 2015 to 2017.

Legionnaires' disease trends in New York City, 2007 to 2017

- From 2007 to 2017, LD incidence increased from 2.3 to 4.7 per 100,000, an average annual increase of 8%.
- LD incidence increased in all five boroughs, with an average annual increase of 15% in Staten Island, 9% in the Bronx, 9% in Queens, 8% in Manhattan, and 4% in Brooklyn.

Trends in Legionnaires' disease incidence, New York City, 2007–2017

Legend: Number of LD cases | NYC residents associated with South Bronx Outbreak | Age-adjusted incidence per 100,000

Source: NYC DOHMH Bureau of Communicable Disease, 2007–2017

2015 South Bronx Community Legionnaires' Disease Outbreak

A LD outbreak linked to a cooling tower in the South Bronx involved 133 NYC residents with illness onset July 2 to August 3, 2015.[2] In response, the Health Department established the NYC Cooling Tower Registration Portal. All building owners and property managers are mandated to register all cooling towers or evaporative condensers and abide by NYC cooling tower maintenance and testing regulations per Chapter 8 of Title 24 of the Rules of the City of New York.[3] The 133 cases associated with this outbreak were removed from analyses for 2015–2017, to avoid biasing comparisons.

Data Sources: NYC Legionnaires' disease data 2007–2017 are from surveillance data reported by laboratories and health care providers to the NYC DOHMH Bureau of Communicable Disease. All Legionnaires' disease patients had radiographic or clinical pneumonia and laboratory evidence of *Legionella* infection by urinary antigen test, culture, and/or paired serology with fourfold or greater rise in antibody titer.
NYC Department of Health and Mental Hygiene Population Estimates modified from the U.S. Census Bureau intercensal population estimates, 2000–2016, updated June 2017, were used for denominator data. Incidence rates were age-adjusted to the U.S. 2000 standard population.

Definitions:

Race/ethnicity data were collected by self-report, chart review, or lab report. For the purpose of this publication, Latino includes persons of Latino or Hispanic origin regardless of reported race. Black, White, Asian, and other race categories do not include persons of Latino origin. Other race includes those who self-reported American Indian/Pacific Islander, other, and two or more races.

Incidence by neighborhood poverty was defined according to the percentage of residents within each census tract living below the federal poverty level (FPL). Data were obtained from the American Community Survey, 2011–2015: low poverty (<10% of residents below FPL), medium poverty (10 to <20%), high poverty (20 to <30%), and very high poverty (≥30% of residents below FPL).

Neighborhood: Neighborhood Tabulation Areas (NTAs) are areas created by the NYC Department of City Planning using 2010 Census boundaries. NYC consists of 195 NTAs.

Risk factors are defined as medical conditions, high-risk behaviors, and/or immunosuppressive treatments, existing before Legionnaires' disease (LD) diagnosis, which might put one at greater risk for LD. Risk factors include **medical conditions**: diabetes mellitus, renal disease requiring dialysis, HIV/AIDS, lung disease (cystic fibrosis, asthma and chronic obstructive pulmonary disease including chronic bronchitis and emphysema), cancer, and organ transplant/splenectomy; **high-risk behaviors:** history of smoking (includes people with LD who reported smoking currently at LD diagnosis or in the past before LD diagnosis) and immunosuppressive **treatments**: steroid medications, radiation therapy, and chemotherapy. Risk factors were obtained by self-report or chart review.

Health care exposures: Health care-associated patients who stayed overnight in a hospital or nursing home in the 10 days before LD illness onset (10 nights: definite health care-associated; 2-9 nights: possible health care-associated).

Legionnaires' disease incidence in New York City, 2015–2017

- In 2015–2017, incidence of LD was higher among men compared with women (5.2 per 100,000 vs. 2.4 per 100,000).

- LD incidence increased with age; it was highest among residents 75 years and older.

- The Bronx was the borough with the most cases in 2015-2017. LD incidence was also highest in the Bronx, followed by Manhattan, Staten Island, Queens, and Brooklyn (6.5, 4.5, 3.2, 2.8, and 2.5 per 100,000 residents, respectively).

- LD incidence was highest among Black New Yorkers, followed by Latino, White, and Asian New Yorkers (6.0, 2.9, 2.7, and 1.8 per 100,000 residents respectively).

- LD incidence in the highest poverty neighborhoods was 5.7 per 100,000 residents compared with 3.0 per 100,000 residents in the lowest poverty neighborhoods.

o The highest LD incidence (21.1 per 100,000) was in East Tremont, a very high poverty neighborhood in the Bronx.

**Legionnaires' disease incidence among New York City residents by neighborhood,* 2015–2017**

**Legionnaires' disease incidence
(Average annual age-adjusted rate
per 100,000 residents)**

- 0.0 – 2.0
- 2.1 – 4.7
- 4.8 – 8.9
- 9.0 – 21.1
- Very high poverty areas[†]
- Non-residential areas[‡]
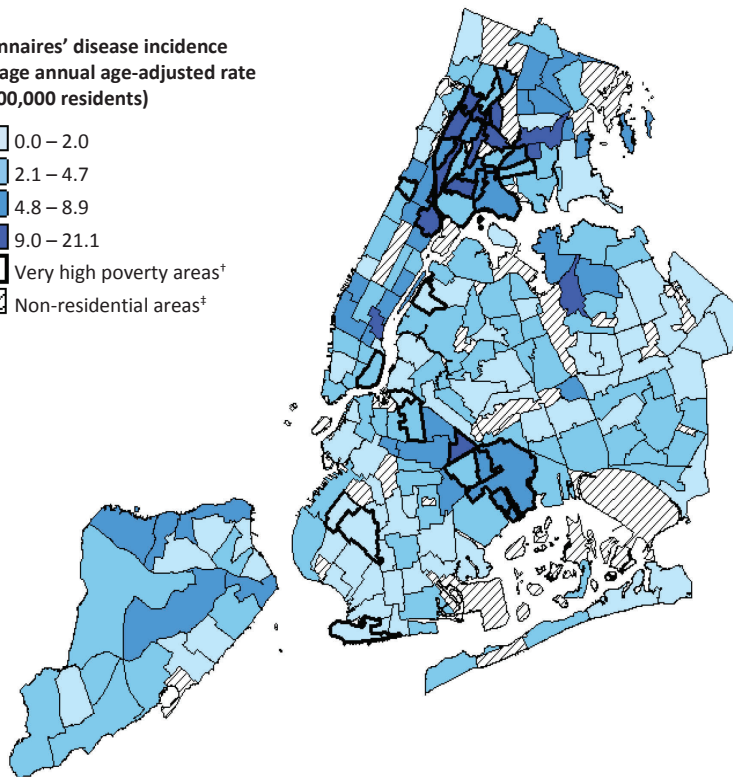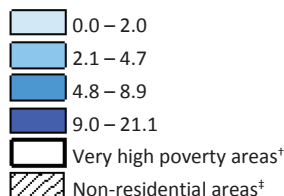
*Neighborhood Tabulation Areas (NTAs) classify NYC into 195 neighborhoods, using 2010 census tract boundaries. [†]Very high poverty areas are defined as NTAs where ≥30% of residents have incomes below 100% of the federal poverty level, per American Community Survey, 2011–2015. [‡]Non-residential areas include NTAs representing NYC airports, parks, cemeteries, and neighborhoods with a population less than the minimum NTA population size of 15,000.
Source: NYC DOHMH Bureau of Communicable Disease, 2015–2017

Legionnaires' disease by sociodemographic and neighborhood characteristics, New York City, 2015–2017
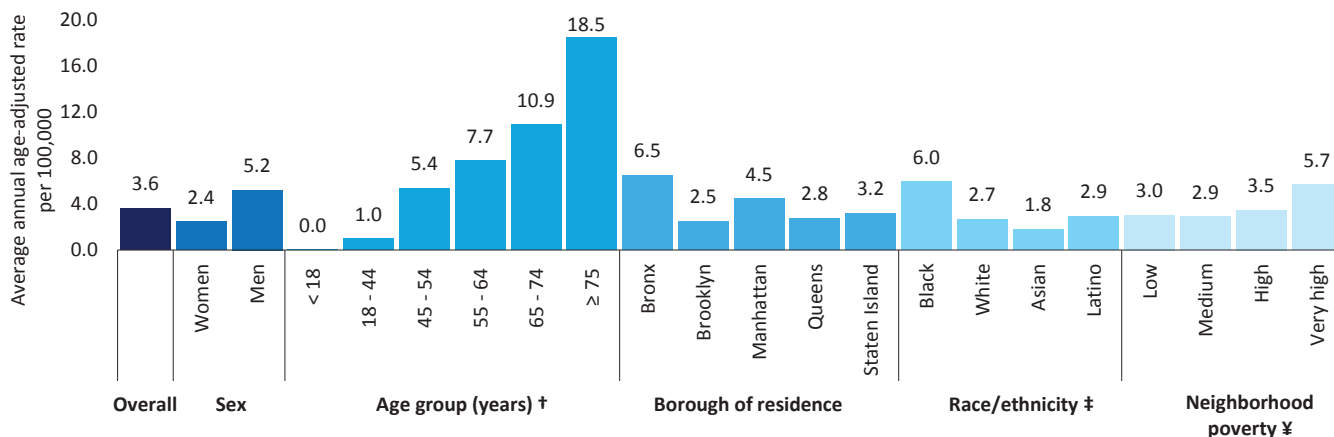
There were 1,011 LD cases diagnosed in 2015–2017, excluding 133 NYC residents associated with the South Bronx outbreak. [†]For rates by age group, incidence rates were not age-adjusted. [‡] Excludes 77 cases: unknown race and/or ethnicity was reported for 59 LD cases, race and ethnicity was missing for 1 LD case, and 17 LD cases with other race. White, Black, and Asian race categories exclude Latino ethnicity. Latino includes Hispanic or Latino of any race.
¥ Excludes six LD cases that occurred among people who were homeless and four cases with incomplete address information. Neighborhood poverty is based on census tract, defined as the percentage of residents with incomes below 100% of the federal poverty level (FPL), per American Community Survey, 2011–2015. Low poverty: <10% of residents below FPL; medium: 10 to <20%; high: 20 to <30%; very high poverty: ≥30% of residents below FPL.
Source: NYC DOHMH Bureau of Communicable Disease, 2015–2017

Most Legionnaires' disease patients reported having at least one risk factor

- In 2015–2017, 83% of LD patients reported having at least one risk factor that might put them at greater risk for LD.
  - More than half of patients (57%) reported a history of smoking.
    - Among those with a history of smoking, 28% reported being a current smoker.
  - Nearly a third of LD patients (31%) reported having diabetes.
  - Twenty-two percent of LD patients reported having a chronic lung disease.

Risk factors among Legionnaires' disease patients in New York City, 2015-2017

83% of LD patients reported at least one risk factor, such as:

57% History of smoking
31% Diabetes
22% Lung Disease
16% Cancer
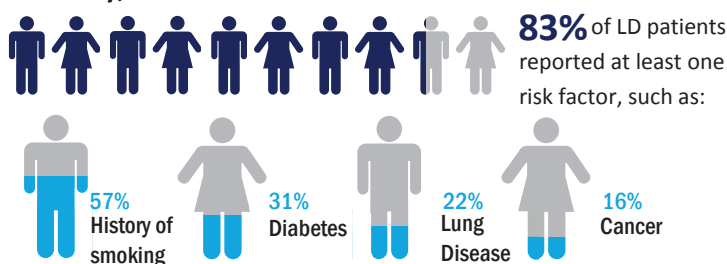
Risk factors include diabetes mellitus, renal disease requiring dialysis, HIV/AIDS, lung disease (cystic fibrosis, asthma, and chronic obstructive pulmonary disease including chronic bronchitis and emphysema), cancer, organ transplant/splenectomy, history of smoking (currently or in the past), steroid medications, radiation therapy, and chemotherapy.
Source: NYC DOHMH Bureau of Communicable Disease, 2015–2017

One in ten Legionnaires' disease patients reported a health care exposure

- In 2015–2017, 11% of LD patients reported a health care exposure in the 10 days before they developed symptoms (incubation period).
  - Fifty-six percent of LD patients with a health care exposure were men.
  - Among LD patients with a health care exposure, half were 75 years or older compared with a quarter among LD patients without health care exposures.
  - Thirty percent of LD patients with a health care exposure were White, 26% were Black, 19% were Latino, and 3% were Asian.

Legionnaires' disease among patients with and without health care exposures by demographic characteristics, New York City, 2015–2017

Legend: ■ Health Care Exposure   ■ Non-Health Care Exposure

Sex
	Health Care Exposure	Non-Health Care Exposure
Women	44%	37%
Men	56%	63%

Age group (years)
	Health Care Exposure	Non-Health Care Exposure
< 18	0%	0.1%
18 - 44	7%	12%
45 - 54	7%	19%
55 - 64	17%	24%
65 - 74	20%	21%
≥ 75	49%	24%

Race/ethnicity †
	Health Care Exposure	Non-Health Care Exposure
Black	26%	39%
White	30%	29%
Asian	3%	7%
Latino	19%	20%

Health care exposure is defined as hospital or nursing home stay within 10 days of LD illness onset (10 nights: definite health care-associated; 1-9 nights: possible health care-associated). † Excludes 77 patients: unknown race and/or ethnicity was reported for 59 LD patients, race and ethnicity was missing for 1 LD patient, and 17 LD patients with other race. White, Black, and Asian race categories exclude Latino ethnicity. Latino includes Hispanic or Latino of any race.
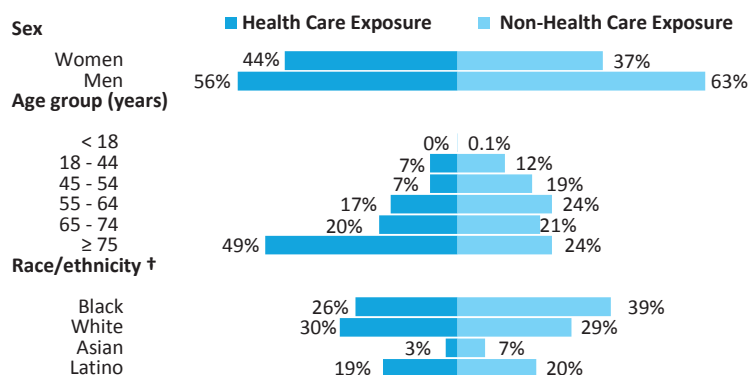*Source: NYC DOHMH Bureau of Communicable Disease, 2015–2017*

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New York City Department of Health and Mental Hygiene

Epi Data Tables

Legionnaires' Disease in New York City, 2007–2017

Data Tables

Data Sources

NYC Legionnaires' disease data, 2007–2017, are from legionellosis surveillance data reported by laboratories and health care providers to the NYC DOHMH Bureau of Communicable Disease. All patients had radiographic or clinical pneumonia and laboratory evidence of Legionella infection by urinary antigen test, culture, and/or paired serology with fourfold or greater rise in antibody titer. Five cases of Pontiac fever were also included in the analysis.

Table 1. Legionnaires' disease incidence among NYC residents, by borough, 2007–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2007–2017

Annual incidence rates were calculated using NYC DOHMH yearly intercensal population estimates, 2000-2016, updated June 2017 and age-adjusted to the US 2000 standard population

| | Age-adjusted Legionnaires' disease incidence per 100,000 residents | | | | | | | | | | | | | | | | | | | | | |
| | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | |
	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents	N	Age-adjusted LD incidence per 100,000 residents
Overall																						
Citywide	184	2.3	141	1.7	231	2.7	165	1.9	261	2.5	177	2.0	301	3.4	225	2.5	439	4.8	271	2.9	435	4.7
Borough of residence																						
Bronx	56	4.5	34	2.7	72	5.5	49	3.8	59	4.4	41	3.1	67	4.8	64	4.5	224	15.3	82	5.5	101	7.0
Brooklyn	45	1.8	44	1.8	56	2.2	44	1.7	58	2.3	44	1.7	71	2.7	64	2.4	59	2.2	55	2.1	88	3.3
Manhattan	43	2.6	38	2.2	45	2.6	38	2.2	40	2.3	44	2.5	91	5.0	38	2.1	86	4.7	65	3.5	106	5.6
Queens	33	1.4	22	0.9	49	2.0	29	1.2	52	2.1	37	1.5	58	2.3	57	1.9	57	2.1	52	2.0	113	4.2
Staten island	7	1.4	3	0.6	9	1.7	5	1.0	7	1.4	11	1.9	14	2.5	9	1.6	13	2.2	17	27.0	27	4.6

Table 2. Legionnaires' disease incidence average annual percent change in NYC, 2007–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2007 – 2017

	2007–2017		
LD Incidence Trend	**AAPC**	**Lower 95% Confidence Interval**	**Upper 95% Confidence Interval**
Overall			
Total	8.0	6.0	10.0
Borough by residence			
Bronx	8.8	2.6	15.5
Brooklyn	3.7	1.7	5.8
Manhattan	7.6	4.4	10.9
Queens	8.7	6.2	11.3
Staten Island	14.5	10.1	19.0

AAPC = Average Annual Percent Change

Table 3. Average annual Legionnaires' disease incidence among NYC residents, by sex, age, borough, race, and neighborhood poverty level, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 – 2017

Average annual incidence rates were calculated by summing case counts for 2015–2017 and dividing by the corresponding three years of NYC DOHMH yearly intercensal population estimates, 2000–2016, updated June 2017, and age-adjusting to the US 2000 standard population

	N	Percent	Age-adjusted average annual LD incidence per 100,000 residents
		2015-2017	
Overall			
Total cases *	1011	100%	3.6
Sex			
Women	382	38%	2.4
Men	629	62%	5.2
Age group (years)			
< 18	1	0.10%	0.0
18 - 44	114	11%	1.0
45 - 54	178	18%	5.4
55 - 64	230	23%	7.7
65 - 74	211	21%	10.9
≥ 75	276	27%	18.5
Borough of residence			
Bronx	283	28%	6.5
Brooklyn	202	20%	2.5
Manhattan	248	25%	4.5
Queens	221	22%	2.8
Staten Island	56	6%	3.2
Race/ethnicity ‡			
Black	379	37%	6.0
White	291	29%	2.7
Asian	67	7%	1.8
Latino	197	19%	2.9
Other	17	2%	N/A
Unknown/Missing	60	6%	N/A
Neighborhood poverty ¥			
Low	236	24%	3.0
Medium	255	26%	2.9
High	195	20%	3.5
Very high	315	32%	5.7

*Excludes 133 NYC resident cases associated with 2015 South Bronx community outbreak

† For specific age groups incidence rates are not age-adjusted.

‡ White, Black, Asian, and other race categories exclude Latino ethnicity. Latino includes Hispanic or Latino of any race. Other race includes those who self-reported American Indian/Pacific Islander, Other, and two or more races

¥ Excludes six LD cases that occurred among homeless people and four cases with incomplete address information.

Neighborhood poverty is based on census tract, defined as the percentage of residents with incomes below 100% of the federal poverty level (FPL), per American Community Survey 2011-2015. Low poverty: <10% of residents below FPL; 10 to <20%; high: 20 to <30%; very high poverty: ≥30% of residents below FPL.

Table 4. Legionnaires' disease incidence among NYC residents, by sex, borough, race, and neighborhood poverty level, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 − 2017

Annual incidence rates were calculated using NYC DOHMH yearly intercensal population estimates, 2000-2016, updated June 2017 and age-adjusted to the US 2000 standard population

	2015			2016			2017		
	N	Percent	Age-adjusted LD incidence per 100,000 residents	N	Percent	Age-adjusted LD incidence per 100,000 residents	N	Percent	Age-adjusted LD incidence per 100,000 residents
Overall									
Total Cases *	306	100%	3.4	271	100%	2.9	435	100%	4.7
Sex									
Women	99	32%	1.9	112	41%	2.1	171	39%	3.3
Men	207	68%	5.2	159	59%	3.9	264	61%	6.6
Age group (years) †									
< 18	1	0%	0.1	0	0%	0.0	0	0%	0.0
18 - 44	40	13%	1.1	24	9%	0.6	50	11%	1.3
45 - 54	66	22%	5.9	45	17%	4.1	67	15%	6.1
55 - 64	66	22%	6.7	71	26%	7.0	95	22%	9.4
65 - 74	51	17%	8.0	60	22%	9.2	100	23%	15.3
≥ 75	82	27%	16.6	71	26%	14.2	123	28%	24.6
Borough of residence									
Bronx	101	33%	7.0	82	30%	5.5	101	23%	7.0
Brooklyn	59	19%	2.2	55	20%	2.0	88	20%	3.3
Manhattan	78	25%	4.3	65	24%	3.4	106	24%	5.6
Queens	56	18%	2.1	52	19%	1.9	113	26%	4.2
Staten Island	12	4%	2.1	17	6%	2.8	27	6%	4.6
Race/ethnicity ‡									
Black	117	38%	5.6	119	44%	5.5	144	33%	6.7
White	80	26%	2.3	63	23%	1.7	148	34%	4.0
Asian	16	5%	1.2	21	8%	1.8	30	7%	2.3
Latino	63	21%	2.8	51	19%	2.8	83	19%	3.8
Other	9	3%	N/A	4	1%	N/A	4	1%	N/A
Unknown/Missing	21	7%	N/A	13	5%	N/A	26	6%	N/A
Neighborhood poverty ¥									
Low	74	24%	2.9	49	18%	1.8	111	26%	4.0
Medium	69	23%	2.4	80	30%	2.6	110	26%	3.8
High	64	21%	3.4	43	16%	2.6	87	20%	4.9
Very high	96	32%	4.9	99	37%	5.2	120	28%	6.5

*Excludes 133 NYC resident cases associated with 2015 South Bronx community outbreak.

† For rates by age group, incidence rates are not age-adjusted.

‡ White, Black, Asian, and other race categories exclude Latino ethnicity. Latino includes Hispanic or Latino of any race. Other race includes those who self-reported American Indian/Pacific Islander, Other, and two or more races.

¥ Excludes six LD cases that occurred among homeless people, and four cases with incomplete address information (2015= 3 cases, 2017= 7 cases) . Neighborhood poverty is based on census tract, defined as the percentage of residents with incomes below 100% of the federal poverty level (FPL), per American Community Survey 2011-2015. Low poverty: <10% of residents below FPL; 10 to <20%; high: 20 to <30%; very high poverty: ≥30% of residents below FPL.

Table 5. Risk factors among Legionnaires' disease patients in NYC, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 − 2017

	Risk Factors, 2015–2017	
	N	Percent
Overall		
Total cases *	1011	100%
Any risk factor		
None	168	17%
≥ 1 Comorbidities	842	83%
Number of risk factors		
1	268	32%
2	208	25%
3 or more	366	43%
Type of risk factors		
History of smoking †	579	57%
Current smoker	285	28%
Diabetes mellitus (type 1 and 2)	317	31%
Lung disease (asthma, COPD, cystic fibrosis)	226	22%
Asthma	146	14%
COPD (including chronic bronchitis and emphysema)	134	13%
Cystic fibrosis	2	0%
Other lung diseases	37	4%
Cancer ‡	157	16%
Chemotherapy	70	7%
Systemic steroid medication	120	12%
HIV/AIDS	127	13%
Immunosuppressive drugs	38	4%
Renal disease requiring dialysis	38	4%
AIDS	32	3%
Organ transplant	32	3%
Radiation therapy	12	1%
Splenectomy	1	0%

Risk factors are defined as medical conditions, high-risk behaviors, and/or immunosuppressive treatments, existing before Legionnaires' disease (LD) diagnosis, which might put one at greater risk for LD.

*Excludes 133 NYC resident cases associated with 2015 South Bronx community outbreak.

† Includes LD cases who reported smoking currently at LD diagnosis or in the past before LD diagnosis.

‡ Includes ever being diagnosed with cancer.

Abbreviations: COPD, chronic obstructive pulmonary disease

Table 6. Health care-associated exposure among Legionnaires' disease patients, New York City, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 – 2017

	Health care-associated exposure		Non-health care-associated exposure	
	N	Percent	N	Percent
Overall				
Total Cases *	116	100%	895	100%
Sex				
Women	51	44%	331	37%
Men	65	56%	564	63%
Age group (years)				
< 18	0	0%	1	0.1%
18 - 44	8	7%	106	12%
45 - 54	8	7%	170	19%
55 - 64	20	17%	211	24%
65 - 74	23	20%	188	21%
≥ 75	57	49%	219	24%
Race/ethnicity †				
Black	30	26%	349	39%
White	35	30%	256	29%
Asian	4	3%	63	7%
Latino	22	19%	175	20%
Other	1	1%	16	2%
Unknown/Missing	24	21%	36	4%

Other exposures include: residential or primary home address, community or exposures outside the residence, hospital, or nursing home, and unknown exposures.

* Other Exposure total cases excludes 133 NYC resident cases associated with 2015 South Bronx community outbreak

† White, Black, Asian, and other race categories exclude Latino ethnicity. Latino includes Hispanic or Latino of any race. Other race includes those who self-reported American Indian/Pacific Islander, Other, and two or more races.

Neighborhood Tabulation Area (NTA)* name	Code	Age-adjusted average annual LD incidence per 100,000 residents
Bronx		
Claremont Bathgate	BX01	15.1
Eastchester Edenwald Baychester	BX03	6.8
Bedford Park Fordham North	BX05	2.3
Belmont	BX06	12.9
Bronxdale	BX07	7.1
West Farms Bronx River	BX08	8.5
Soundview Castle Hill Clason Point Harding Park	BX09	4.2
Pelham Bay Country Club City Island	BX10	6.8
Co Op City	BX13	4.7
East Concourse Concourse Village	BX14	2.9
East Tremont	BX17	21.1
North Riverdale Fieldston Riverdale	BX22	0.8
Highbridge	BX26	4.9
Hunts Point	BX27	7.0
Van Cortlandt Village	BX28	4.3
Spuyten Duyvil Kingsbridge	BX29	2.5
Kingsbridge Heights	BX30	9.5
Allerton Pelham Gardens	BX31	6.5
Longwood	BX33	6.9
Melrose South Mott Haven North	BX34	10.0
Morrisania Melrose	BX35	6.6
University Heights Morris Heights	BX36	11.5
Van Nest Morris Park Westchester Square	BX37	9.8
Mott Haven Port Morris	BX39	3.2
Fordham South	BX40	9.9
Mount Hope	BX41	8.1
Norwood	BX43	8.9
Williamsbridge Olinville	BX44	5.6
Parkchester	BX46	9.7

Table 7. Average annual Legionnaires' disease incidence among NYC residents, by Neighborhood Tabulation Areas, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 – 2017

Average annual incidence rates were calculated by summing case counts for 2015–2017 and dividing by the corresponding three years of NYC DOHMH yearly intercensal population estimates, 2000–2016, updated June 2017, and age-adjusting to the US 2000 standard population

Neighborhood Tabulation Areas (NTAs) are areas created by the NYC Department of City Planning using 2010 Census boundaries. NYC consists of 195 NTAs.

*Non-residential areas include NYC parks, cemeteries, and neighborhoods with a population less than the minimum NTA population size of 15,000.

Table 7. Average annual Legionnaires' disease incidence among NYC residents, by Neighborhood Tabulation Areas, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 – 2017

Average annual incidence rates were calculated by summing case counts for 2015–2017 and dividing by the corresponding three years of NYC DOHMH yearly intercensal population estimates, 2000–2016, updated June 2017, and age-adjusting to the US 2000 standard population

Neighborhood Tabulation Area (NTA)* name	Code	Age-adjusted average annual LD incidence per 100,000 residents
Bronx		
Pelham Parkway	BX49	2.0
Schuylerville Throgs Neck Edgewater Park	BX52	1.1
Soundview Bruckner	BX55	4.3
Westchester Unionport	BX59	2.1
Woodlawn Wakefield	BX62	4.1
West Concourse	BX63	12.5
Crotona Park East	BX75	2.7
Rikers Island	BX98	0.0
Bronx Park Cemetery Etc	BX99	N/A
Brooklyn		
Brooklyn Heights Cobble Hill	BK09	0.0
Sheepshead Bay Gerritsen Beach Manhattn Beach	BK17	3.0
Brighton Beach	BK19	0.6
Seagate Coney Island	BK21	1.4
West Brighton	BK23	0.0
Homecrest	BK25	1.7
Gravesend	BK26	1.6
Bath Beach	BK27	0.8
Bensonhurst West	BK28	1.0
Bensonhurst East	BK29	1.4
Dyker Heights	BK30	1.1
Bay Ridge	BK31	2.5
Sunset Park West	BK32	2.1
Carroll Gardens Columbia Street Red Hook	BK33	0.0
Sunset Park East	BK34	0.7
Stuyvesant Heights	BK35	5.5
Park Slope Gowanus	BK37	1.9
DUMBO Vinegar Hill Downtown Brklyn Boerum Hill	BK38	2.6
Windsor Terrace	BK40	1.3
Kensington Ocean Parkway	BK41	0.0
Flatbush	BK42	1.5

Neighborhood Tabulation Areas (NTAs) are areas created by the NYC Department of City Planning using 2010 Census boundaries. NYC consists of 195 NTAs.

*Non-residential areas include NYC parks, cemeteries, and neighborhoods with a population less than the minimum NTA population size of 15,000.

Table 7. Average annual Legionnaires' disease incidence among NYC residents, by Neighborhood Tabulation Areas, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 – 2017

Average annual incidence rates were calculated by summing case counts for 2015–2017 and dividing by the corresponding three years of NYC DOHMH yearly intercensal population estimates, 2000–2016, updated June 2017, and age-adjusting to the US 2000 standard population

Neighborhood Tabulation Area (NTA)* name	Code	Age-adjusted average annual LD incidence per 100,000 residents
Brooklyn		
Midwood	BK43	3.9
Madison	BK44	1.6
Georgetown Marine Park Bergen Beach Mill Basin	BK45	0.7
Ocean Parkway South	BK46	0.0
Canarsie	BK50	2.2
Flatlands	BK58	1.2
Prospect Lefferts Gardens Wingate	BK60	2.5
Crown Heights North	BK61	5.5
Crown Heights South	BK63	2.9
Prospect Heights	BK64	5.3
Fort Greene	BK68	4.0
Clinton Hill	BK69	4.5
Williamsburg	BK72	0.0
North Side South Side	BK73	1.1
Bedford	BK75	3.1
Greenpoint	BK76	1.1
Bushwick North	BK77	2.5
Bushwick South	BK78	1.9
Ocean Hill	BK79	11.0
Brownsville	BK81	3.7
East New York	BK82	6.7
Cypress Hills City Line	BK83	4.1
East New York (Pennsylvania Ave)	BK85	5.3
Borough Park	BK88	1.2
East Williamsburg	BK90	4.0
East Flatbush Farragut	BK91	3.1
Starrett City	BK93	8.9
Erasmus	BK95	1.4
Rugby Remsen Village	BK96	5.2
Brooklyn Park Cemetery Etc	BK99	N/A

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*Non-residential areas include NYC parks, cemeteries, and neighborhoods with a population less than the minimum NTA population size of 15,000.

Table 7. Average annual Legionnaires' disease incidence among NYC residents, by Neighborhood Tabulation Areas, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 – 2017

Average annual incidence rates were calculated by summing case counts for 2015–2017 and dividing by the corresponding three years of NYC DOHMH yearly intercensal population estimates, 2000–2016, updated June 2017, and age-adjusting to the US 2000 standard population

Neighborhood Tabulation Area (NTA)* name	Code	Age-adjusted average annual LD incidence per 100,000 residents
Manhattan		
Marble Hill Inwood	MN01	2.3
Central Harlem North Polo Grounds	MN03	8.9
Hamilton Heights	MN04	5.7
Manhattanville	MN06	3.0
Morningside Heights	MN09	2.4
Central Harlem South	MN11	5.6
Upper West Side	MN12	3.4
Hudson Yards Chelsea Flat Iron Union Square	MN13	6.3
Lincoln Square	MN14	1.4
Clinton	MN15	6.7
Midtown Midtown South	MN17	3.3
Turtle Bay East Midtown	MN19	7.1
Murray Hill Kips Bay	MN20	11.0
Gramercy	MN21	5.3
East Village	MN22	2.9
West Village	MN23	3.4
SoHo TriBeCa Civic Center Little Italy	MN24	0.8
Battery Park City Lower Manhattan	MN25	3.7
Chinatown	MN27	2.6
Lower East Side	MN28	3.9
Lenox Hill Roosevelt Island	MN31	6.2
Yorkville	MN32	3.8
East Harlem South	MN33	6.5
East Harlem North	MN34	9.9
Washington Heights North	MN35	1.7
Washington Heights South	MN36	1.5
Upper East Side Carnegie Hill	MN40	3.6
Stuyvesant Town Cooper Village	MN50	1.9
Manhattan Parks Cemetery Etc	MN99	N/A

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Neighborhood Tabulation Area (NTA)* name	Code	Age-adjusted average annual LD incidence per 100,000 residents
Queens		
South Jamaica	QN01	0.6
Springfield Gardens North	QN02	2.1
Springfield Gardens South Brookville	QN03	2.5
Rosedale	QN05	0.0
Jamaica Estates Holliswood	QN06	1.2
Hollis	QN07	2.7
St. Albans	QN08	2.6
Breezy Point Belle Harbor Rockwy Prk Broad Chnl	QN10	2.8
Hammels Arverne Edgemere	QN12	1.0
Far Rockaway Bayswater	QN15	1.3
Forest Hills	QN17	3.1
Rego Park	QN18	4.6
Glendale	QN19	0.9
Ridgewood	QN20	0.4
Middle Village	QN21	0.6
Flushing	QN22	15.1
College Point	QN23	6.7
Corona	QN25	4.2
North Corona	QN26	1.5
East Elmhurst	QN27	4.4
Jackson Heights	QN28	2.3
Elmhurst	QN29	2.7
Maspeth	QN30	2.1
Hunters Point Sunnyside West Maspeth	QN31	2.6
Cambria Heights	QN33	2.7
Queens Village	QN34	0.0
Briarwood Jamaica Hills	QN35	1.6
Kew Gardens Hills	QN37	1.0
Pomonok Flushing Heights Hillcrest	QN38	1.0
Fresh Meadows Utopia	QN41	1.4
Oakland Gardens	QN42	0.8

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Table 7. Average annual Legionnaires' disease incidence among NYC residents, by Neighborhood Tabulation Areas, 2015–2017

Source: NYC DOHMH Bureau of Communicable Disease, 2015 – 2017

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Neighborhood Tabulation Area (NTA)* name	Code	Age-adjusted average annual LD incidence per 100,000 residents
Queens		
Bellerose	QN43	1.0
Glen Oaks Floral Park New Hyde Park	QN44	0.6
Douglas Manor Douglaston Little Neck	QN45	0.8
Bayside Bayside Hills	QN46	0.8
Ft. Totten Bay Terrace Clearview	QN47	3.7
Auburndale	QN48	1.1
Whitestone	QN49	3.2
Elmhurst Maspeth	QN50	1.1
Murray Hill	QN51	5.1
East Flushing	QN52	2.1
Woodhaven	QN53	0.8
Richmond Hill	QN54	1.8
South Ozone Park	QN55	2.7
Ozone Park	QN56	2.8
Lindenwood Howard Beach	QN57	2.6
Kew Gardens	QN60	4.9
Jamaica	QN61	2.8
Queensboro Hill	QN62	4.0
Woodside	QN63	3.5
Laurelton	QN66	4.7
Queensbridge Ravenswood Long Island City	QN68	1.9
Astoria	QN70	1.9
Old Astoria	QN71	3.6
Steinway	QN72	2.4
Baisley Park	QN76	2.4
Airport	QN98	N/A
Queens Park Cememtery Etc	QN99	N/A
Staten Island		
Annadale Huguenot Prince's Bay Eltingville	SI01	2.1
New Springville Bloomfield Travis	SI05	2.8
Westerleigh	SI07	0.0

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Neighborhood Tabulation Area (NTA)* name	Code	Age-adjusted average annual LD incidence per 100,000 residents
Staten Island		
Grymes Hill Clifton Fox Hills	SI08	3.4
Charleston Richmond Valley Tottenville	SI11	4.0
Mariner's Harbor Arlington Port Ivory Graniteville	SI12	6.0
Grasmere Arrochar Ft. Wadsworth	SI14	7.3
West New Brighton New Brighton St. George	SI22	5.5
Todt Hill Emersn Hill Heartland Villg Lighthse Hill	SI24	6.2
Oakwood Oakwood Beach	SI25	1.0
Port Richmond	SI28	7.2
Rossville Woodrow	SI32	1.8
New Brighton Silver Lake	SI35	0.0
Old Town Dongan Hills South Beach	SI36	2.6
Stapleton Rosebank	SI37	0.9
New Dorp Midland Beach	SI45	1.0
Arden Heights	SI48	4.3
Great Kills	SI54	2.1
Staten Island Park Cemetery Etc	SI99	N/A

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