HEALTHY CHICAGO

CHICAGO DEPARTMENT OF PUBLIC HEALTH

HEALTHY CHICAGO REPORTS

Tuberculosis Annual Surveillance Report

2018

CHICAGO DEPARTMENT OF PUBLIC HEALTH

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Chicago Department of Public Health
Making Chicago a safer and healthier place by working with communty partners to promote health, prevent disease, reduce environmental hazards and ensure access to health care for all Chicagoans.

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Abbreviations, Acronyms & Definitions

Cavitary/Cavitation: TB infection causing destruction of the lung tissue, forming enlarged air spaces (cavities), typically signifies long-standing disease.

CDPH: Chicago Department of Public Health. Jurisdiction includes all areas within the city limits of Chicago, Illinois.

CDC: Centers for Disease Control and Prevention.

DOT: Directly observed therapy. A World Health Organization endorsed strategy to improve treatment adherence by requiring health care workers to observe and record patients taking each dose of medicine.

Extrapulmonary: TB infection that occurs outside of the lungs of the affected person.

HIV: Human immunodeficiency virus.

INH: Isoniazid. An antibiotic used as a first-line drug for the prevention and treatment of LTBI and active TB, respectively.

LTBI: Latent tuberculosis infection. An infection with *M. tuberculosis* without active tuberculosis disease.

MDR-TB: Multi-drug resistant tuberculosis. A form of tuberculosis infection caused by *M. tuberculosis* that is resistant to the first-line anti-tuberculosis drugs isoniazid and rifampin.

***M. tuberculosis*:** *Mycobacterium tuberculosis*. A rod-shaped bacterium that causes tuberculosis infection.

Pulmonary: TB infection that occurs in the lungs of the affected person.

Race/Ethnicity: For this report, persons identified as White, Black, Asian, or of other races are all non-Hispanic. Persons identified as Hispanic may be of any race.

Rates: Rates are expressed as the number of cases reported per 100,000 population.

TB: Tuberculosis. An infectious disease caused by *M. tuberculosis*.

XDR-TB: Extensively drug-resistant tuberculosis. A form of tuberculosis infection caused by *M. tuberculosis* that is resistant to isoniazid, rifampin, and any fluoroquinolone and at least one of three injectable second-line anti-tuberculosis drugs.

Executive Summary

Tuberculosis in Chicago

Reported incident cases of TB in Chicago have been on a steady decline since 1993. Between 1993 and 2018, Chicago has seen an 86% decrease in reported TB cases from 798 to 115 per year, respectively. In 2018, there was a historic low with 115 incident TB cases reported in Chicago producing a citywide rate of 4.2 cases per 100,000 population. In 1993, the rate of TB in Chicago was 28.7 cases per 100,000 population, nearly 3 times that of the United States rate, which was 9.7. The rate gap between the United States and Chicago has steadily decreased; however, Chicago's rate in 2018 (4.2 cases per 100,000 population) continues to be greater than that of the United States overall (2.8 cases per 100,000 population).

Age

In 2018, 63% of incident TB cases were diagnosed in persons aged 25-64. Older individuals above the age of 64 accounted for 29% of reported TB cases in 2018. Diagnosed incident TB disease in children under the age of 5 years decreased from 4 cases in 2016 to 2 cases occuring in 2018.

Race and Ethnicity

Proportions of reported TB cases in Chicago for all races and ethnicities have remained relative stablity over the last five years. In 2018, Non-Hispanic Blacks accounted for most reported TB cases with 32% . Of the remaining reported cases in 2018, Hispanics and Non- Hispanic Asians both accounted for 30% of cases and Non-Hispanic Whites accounted for 9%. Rates among Asians were 23.5 cases per 100,000 population which is more than 5 times greater than Hispanics and Non-Hispanic Blacks, 4.4 cases per 100,000 population and 4.2 cases per 100,000 population, respectively.

Country of Birth

With TB transmission remaining high in many countries, reported incident cases in Chicago are now largely diagnosed in Non-US-born persons. In 2008, TB cases in Non-US-born persons surpassed cases in US-born persons for the first time in Chicago, and this percentage has been increasing since, accounting for 69% of reported cases in 2018. Mexico was the most common country of origin among Non-US-born persons in 2018, with 35% reporting it as their country of birth, followed by India (11%), the Philippines (11%), and China (6%).

HIV

Nationally, HIV co-infection with TB has been on the decline since the early 90's, when nearly half of reported TB cases were among HIV positive persons. Despite these reductions, HIV infection remains a strong risk factor for TB infection. In 2018, the proportion of HIV co-infection with incident TB in Chicago was 12%, more than twice the national estimate of 5% for the same year.

Risk Factors for TB

More than one in four persons diagnosed with TB in Chicago in 2018 reported substance misuse. Alcohol was the most commonly misused substance, with 18% reporting heavy drinking. Cases among persons experiencing homelessness has fluctuated over the past 5 years with a high of 10% in 2016 and low of 5% in 2015. Diabetes is a known risk factor for TB disease and affected one in five of 2018 TB cases.

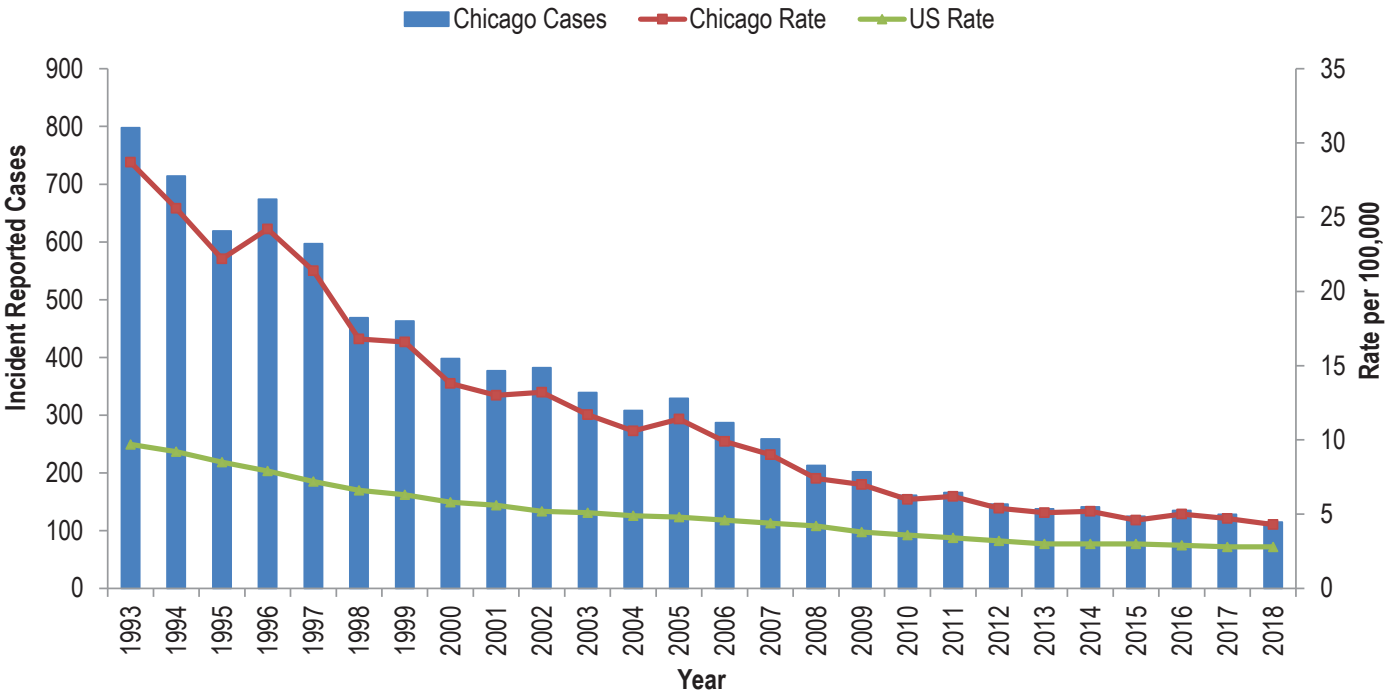
Tuberculosis Incidence

Table 1. Number and rates (per 100,000 population) of reported tuberculosis cases, 2014-2018

	2014		2015		2016		2017		2018		5-Year Median	
Area	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Chicago	141	5.2	124	4.6	135	5.0	128	4.7	115	4.2	128	4.7
Illinois	320	2.5	343	2.7	342	2.7	337	2.7	319	2.5	337	2.7
United States	9,406	3.0	9,563	3.0	9,287	2.9	9,093	2.9	9,029	2.8	9,287	2.9

▲**Table 1.** In 2018, there were 115 incident TB cases reported in Chicago producing a citywide rate of 4.2 per 100,000 population. Chicago's citywide rate was more than one and a half times than that of both Illinois and the United States. Between 2017 and 2018, Chicago experienced a 10% decrease of incident TB cases.

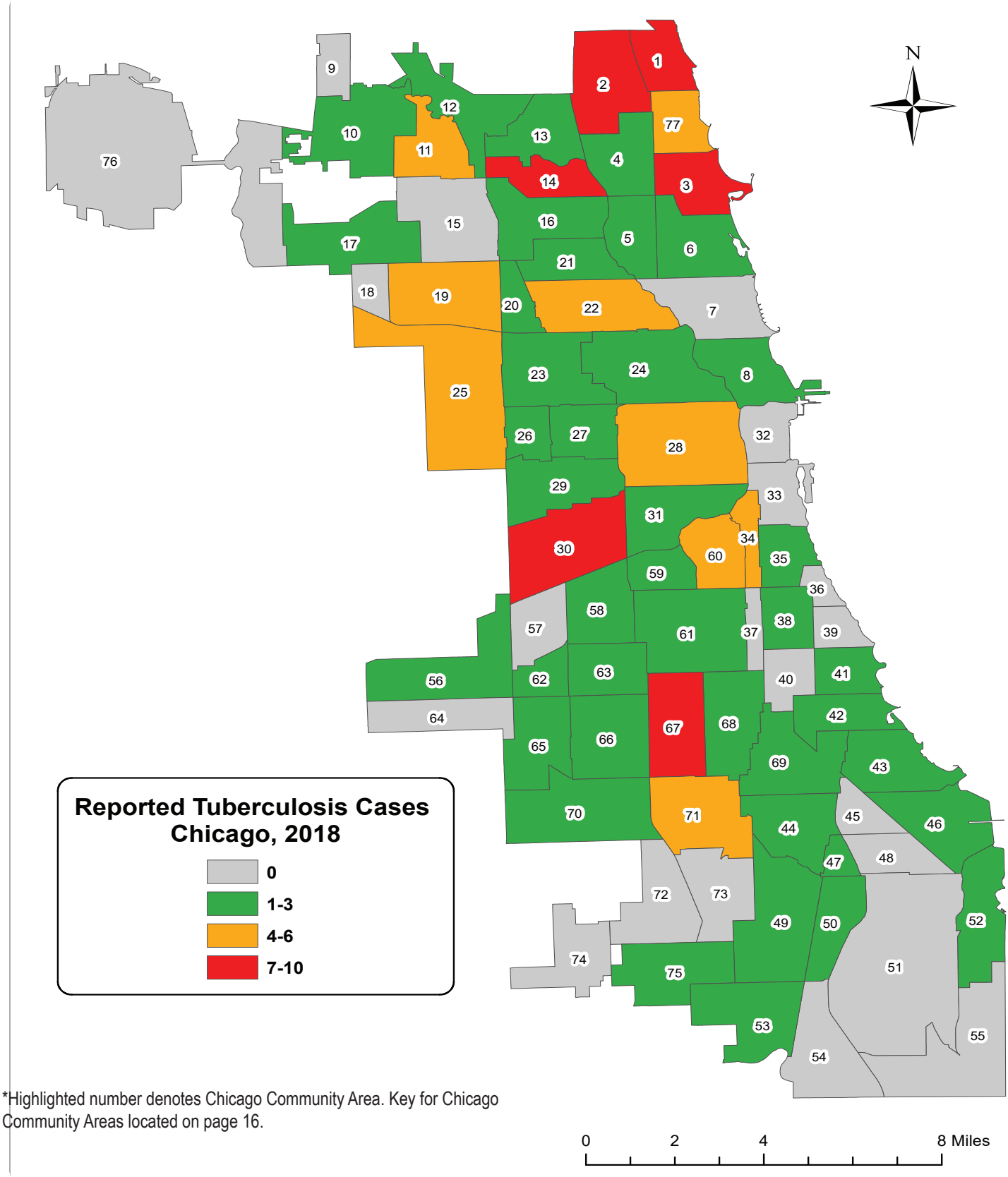
Figure 1. Trends in the number of reported tuberculosis cases, 1993-2018



▲**Figure 1.** Incident cases of TB in Chicago have been on the decline since 1993. Between 2008 and 2018, Chicago has seen a 46% decrease in TB from 213 to 115 reported incident cases respectively. In 1993 the rate of TB in Chicago per 100,000 people was nearly 3 times that of the United States rate, 28.7 compared to 9.7. The rate gap between the United States and Chicago has steadily decreased; however, Chicago's rate in 2018 (4.2 cases per 100,000 population) continues to be greater than that of the United States overall (2.8 cases per 100,000 population).

Chicago Community Area Tuberculosis Cases

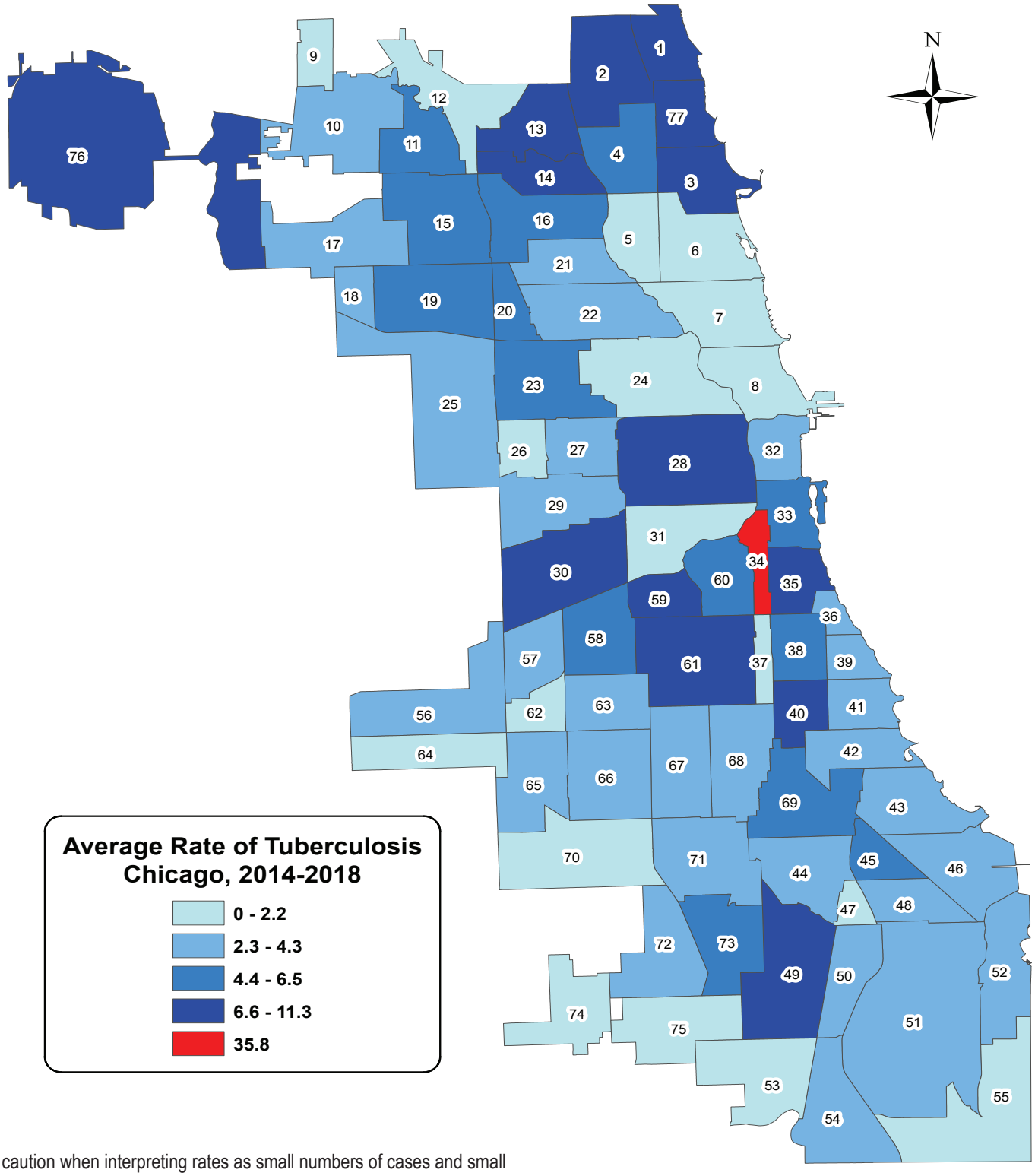
Figure 2. **Reported tuberculosis cases, Chicago, 2018***



*Highlighted number denotes Chicago Community Area. Key for Chicago Community Areas located on page 16.

Chicago Community Area Tuberculosis Rates

Figure 3. **Average rate of tuberculosis (per 100,000 population) by Chicago Community Area, 2014-2018***



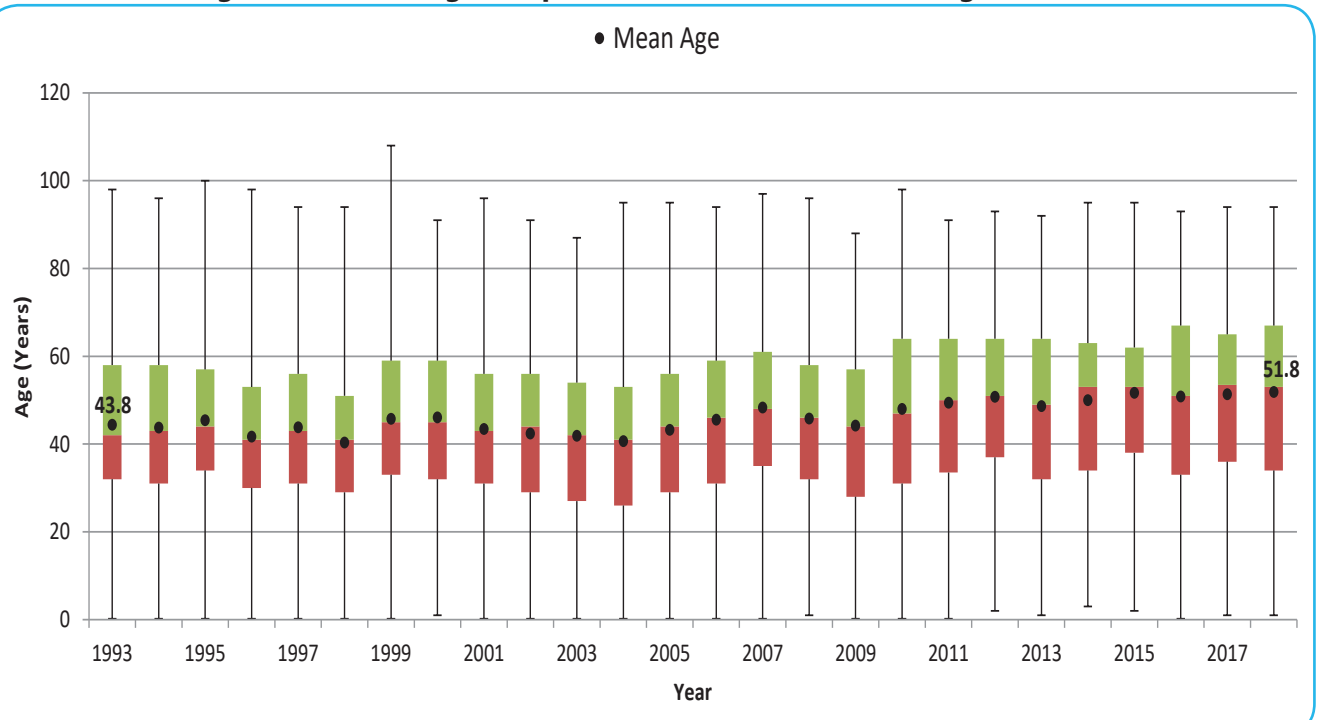
*Use caution when interpreting rates as small numbers of cases and small population sizes can produce unstable rates and may make comparisons difficult. Highlighted number denotes Chicago Community Area. Key for Chicago Community Areas located on page 16.

Characteristics of Tuberculosis Cases

Table 2. Number and proportion of tuberculosis cases by selected characteristics, Chicago, 2014-2018

	2014		2015		2016		2017		2018		5- Year Total	
Characteristic	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**
Age Group (Years)												
<5	1	(0.7)	1	(0.8)	4	(3.0)	2	(1.6)	2	(1.7)	10	(1.6)
5-14	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.8)	1	(0.9)	2	(0.3)
15-24	12	(8.5)	7	(5.6)	12	(8.9)	7	(5.5)	6	(5.2)	44	(6.8)
25-44	42	(29.8)	36	(29.0)	38	(28.1)	39	(30.5)	37	(32.2)	192	(29.9)
45-64	53	(37.6)	50	(40.3)	41	(30.4)	46	(35.9)	36	(31.3)	226	(35.1)
>64	33	(23.4)	30	(24.2)	40	(29.6)	33	(25.8)	33	(28.7)	169	(26.3)
Sex												
Male	93	(66.0)	79	(63.7)	85	(63.0)	89	(69.5)	73	(63.5)	419	(65.2)
Female	48	(34.0)	45	(36.3)	50	(37.0)	39	(30.5)	42	(36.5)	224	(34.8)
Race and Ethnicity												
NH-Black	48	(34.0)	33	(26.6)	39	(28.9)	44	(34.4)	37	(32.2)	201	(31.3)
NH-Asian	39	(27.7)	37	(29.8)	43	(31.9)	37	(28.9)	34	(29.6)	190	(29.5)
NH-White	14	(9.9)	15	(12.1)	10	(7.4)	11	(8.6)	10	(8.7)	60	(9.3)
Hispanic	40	(28.4)	39	(31.5)	43	(31.9)	36	(28.1)	34	(29.6)	192	(29.9)
Total	**141**	**(100.0)**	**124**	**(100.0)**	**135**	**(100.0)**	**128**	**(100.0)**	**115**	**(100.0)**	**643**	**(100.0)**

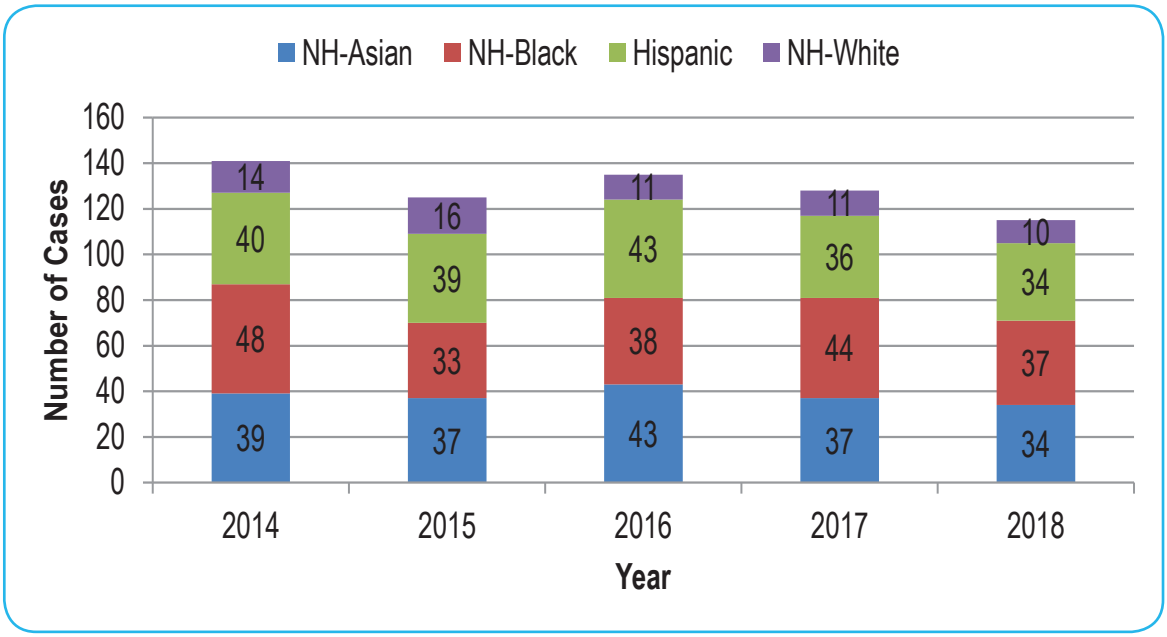
Figure 4. Mean, range, and trend of age at report of tuberculosis cases, Chicago, 1993-2018



▲**Figure 4.** Half of the reported TB cases from 2018 were between the ages of 34 and 67, with a range of 1 to 94 years old. Between 1993 and 2018, there has been a signficant trend of increasing mean age of reported TB cases, with a mean of 44.4 and 51.8 years, respectively.

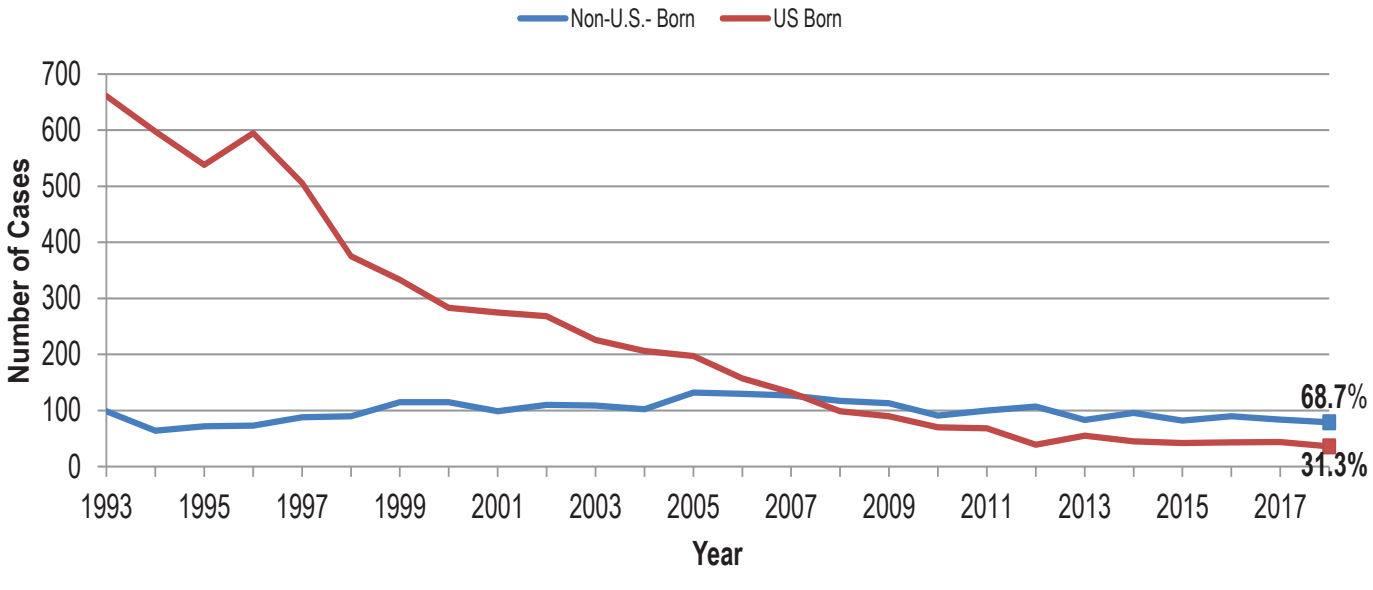
Race, Ethnicity, and Country of Origin

Figure 5. **Tuberculosis cases by race and ethnicity proportions, Chicago, 2014-2018**



▲**Figure 5.** Proportions of race and enthinicity have remained relatively steady over the past 5 years. In 2018, Non-Hispanic (NH) Black residents of Chicago accounted for 32% of reported TB cases. Hispanic and NH- Asian residents both comprised of 30% of cases in 2018. Of the remaining reported cases in 2018, NH-Whites accounted for 9%.

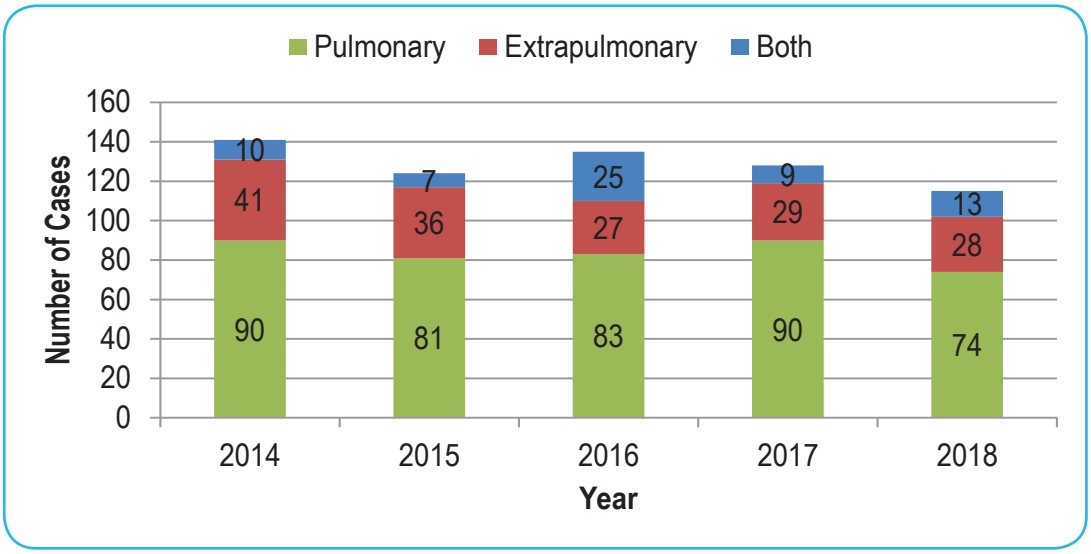
Figure 6. **Place of birth for tuberculosis cases, Chicago, 1993-2018**



▲**Figure 6.** 2008 was the first year in Chicago that the number of reported TB cases in those who are Non-US-born surpassed that of US-born cases. In 2018, more than 2 out of 3 TB cases were among Non-US-born persons (N=79). Mexico was the most common foreign country of origin accounting for 35% of all Non-US-born cases, followed by India (11%), the Philippines (11%), and China (6%).

Tuberculosis Site of Disease

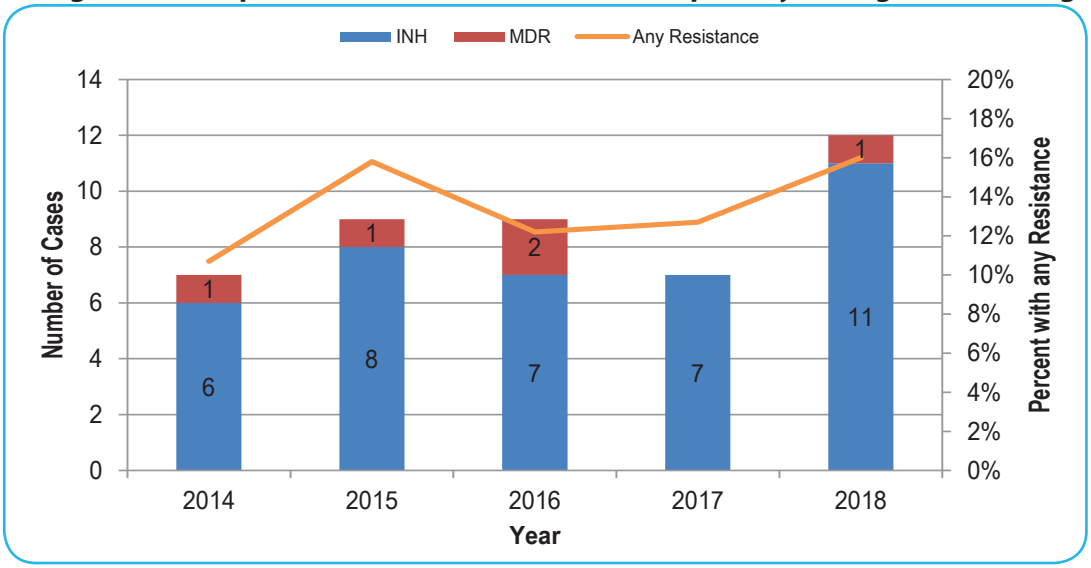
Figure 7. **Tuberculosis cases by site of disease, Chicago, 2014-2018**



▲**Figure 7.** In 2018, 64% of Chicago's reported TB cases were pulmonary followed by 24% with extrapulmonary and 11% with both pulmonary and extrapulmonary site of disease. Among the 87 pulmonary cases (including both), 43 (49%) were sputum-smear positive and 43 (49%) had cavitation/s on their chest x-rays. Cavitary disease and sputum-smear positivity are strong indicators of TB infectiousness.

Tuberculosis Drug Resistance

Figure 8. **TB drug resistance (percent is of TB cultures with susceptibility testing done), Chicago, 2014-2018**



▲**Figure 8.** In 2018 among TB cases with susceptibility testing results (N=94), 11 were isoniazid resistant (12%) and 15 were resistant to at least one anti-TB drug (16%). Since 2011, there have been 8 MDR cases and one XDR case.

Tuberculosis Co-morbidities

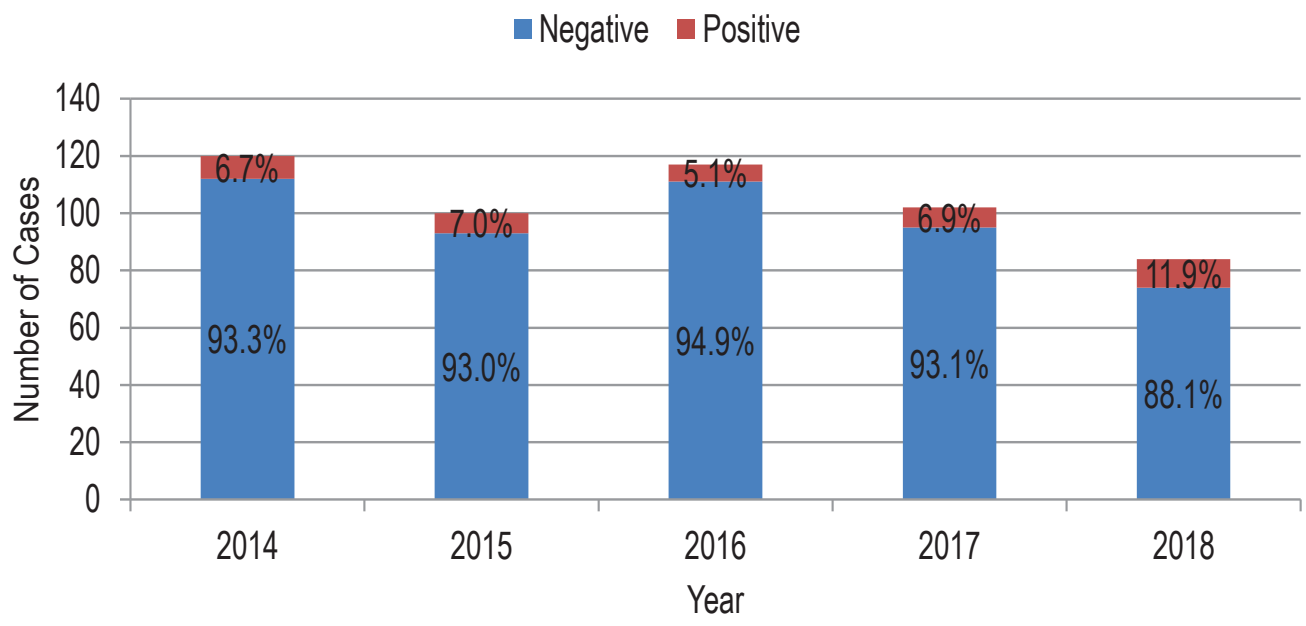
Table 3. Co-morbidities of tuberculosis cases, Chicago, 2014-2018

	Diabetes		Immuno-compromised (Not HIV)		End-Stage Renal Disease	
Year	No.	(%)	No.	(%)	No.	(%)
2014	26	(18.4%)	6	(4.3%)	3	(2.1%)
2015	34	(27.4%)	6	(4.8%)	0	(0.0%)
2016	27	(20.0%)	7	(5.2%)	8	(5.9%)
2017	25	(19.5%)	5	(3.9%)	5	(3.9%)
2018	23	(20.0%)	13	(11.3%)	6	(5.2%)
Total	**135**	**(21.0%)**	**37**	**(5.8%)**	**22**	**(3.4%)**

▲**Figure 9.** One in five of TB cases reported in 2018 also suffered from diabetes which is equal to the national estimate of 20%. Additionally, 11% of person with TB were immuno-compromised outside of HIV and 5% had end-stage renal disease.

Tuberculosis and HIV

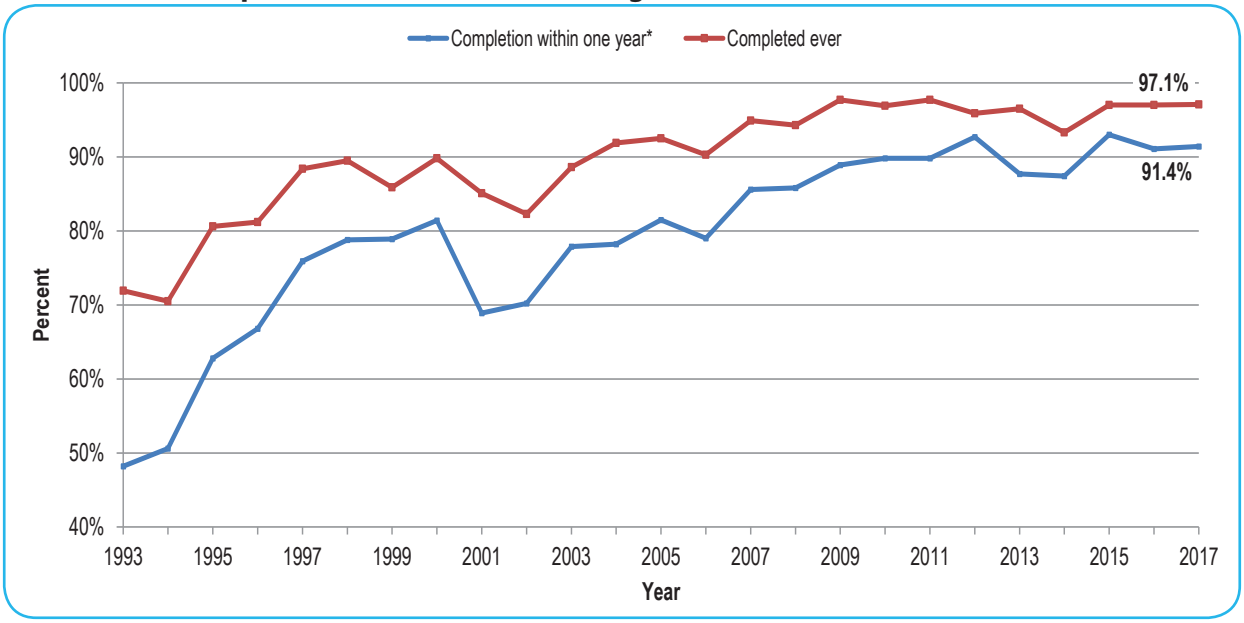
Figure 9. Tuberculosis cases co-infected with HIV (among those tested for HIV), Chicago, 2014-2018



▲**Figure 9.** In 2018, the proportion of HIV co-infection, among those tested, with TB in Chicago was 12%, more than two times the national estimates of 5% for the same year. Since the early 1990's, HIV co-infection has been on the steady decline both in Chicago and the United States, however there was a marked increase in Chicago between 2017-2018.

Tuberculosis Treatment Completion

Figure 10. Percent completion of TB treatment, Chicago, 1993-2017

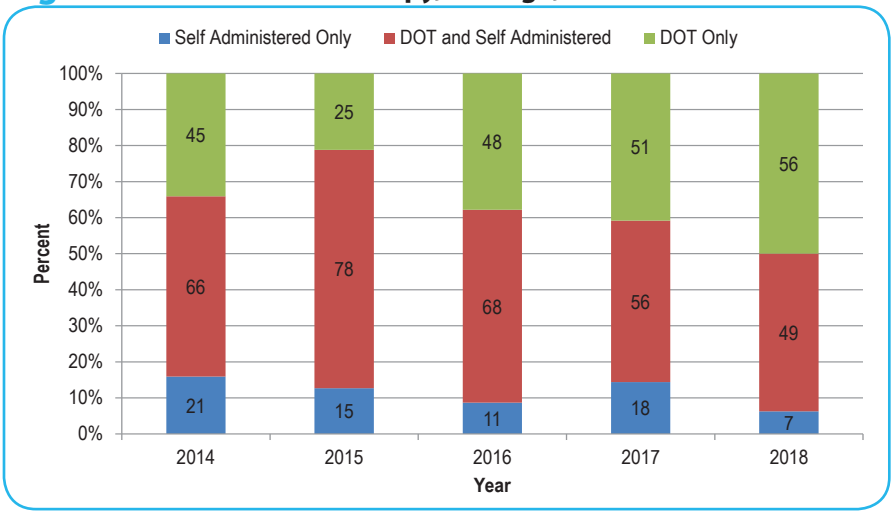


* Patients who died during or before treatment or who moved out of the country are excluded. Patients with resistance to rifampin, meningeal TB, TB of the bone or skeletal system, TB in the central nervous system and children with disseminated TB were also excluded due to expected longer duration of treatment. Treatment duration varies based on clinical presentations of each individual patient and the nature of their TB disease.

▲**Figure 10.** In 2017, 91% of eligible cases completed treatment within one year. Since 1993, treatment completion within a year for those eligible has drastically increased from less than half to greater than 90% between 1993-2017. Overall treatment completion has also increased from 72% in 1993 to 97% in 2017.

Directly Observed Therapy

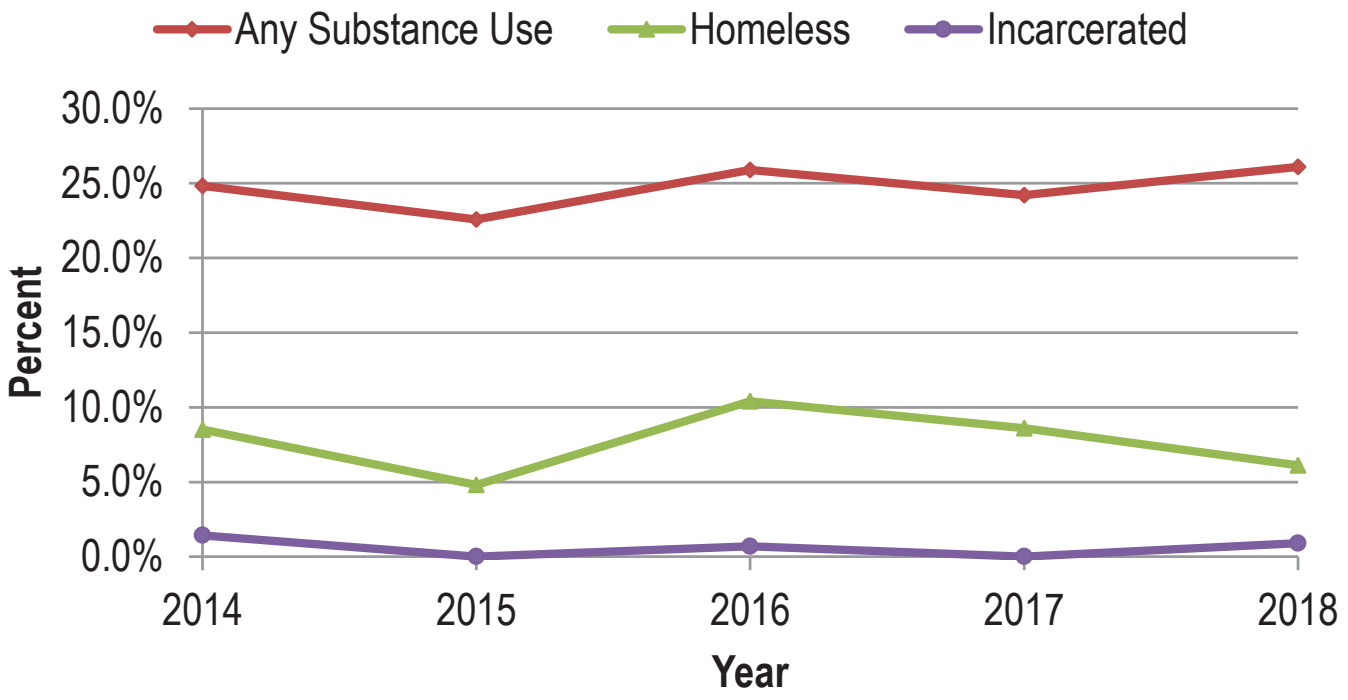
Figure 11. Mode of TB Therapy, Chicago, 2014-2018



◄**Figure 11.** Directly observed therapy is the standard of care for treatment of TB. CDPH's TB program prioritizes patients to receive DOT based on infectiousness and risk factors for treatment adherence. In 2018, 94% of TB cases who started TB treatment received either DOT only (50%) or a combination of both DOT and self-adminstered therapy (44%).

Risk Factors and Tuberculosis

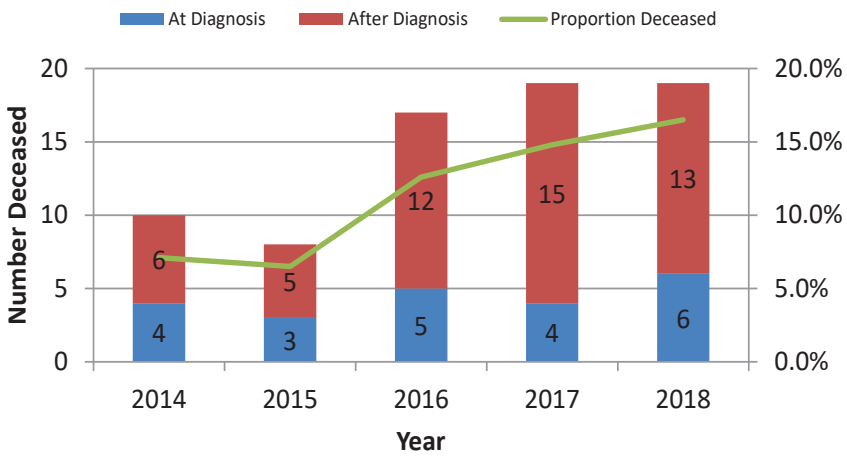
Figure 12. Risk factors for TB disease, Chicago, 2014-2018



▲**Figure 12.** More than one in four of TB cases reported substance misuse in 2018 (N=30). Among those, alcohol was the most commonly misused substance. Cases among persons experiencing homelessness has fluctuated over the past 5 years with a high of 10% in 2016 and low of 5% in 2015.

Mortality

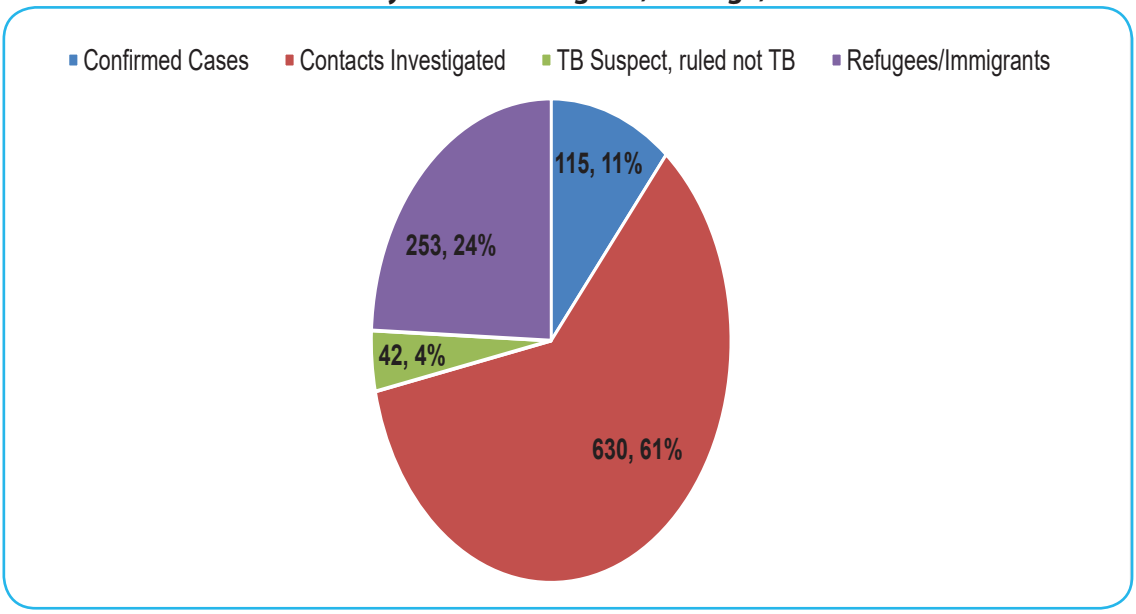
Figure 13. Mortality, Chicago, 2014-2018



◄**Figure 13.** There were 19 deaths from TB in 2018, which was a 5-year high. This was a 90% increase from 2014 with 10 deaths.

Individual Persons Serviced

Figure 14. **Individual Persons Served by CDPH TB Program, Chicago, 2018**



▲**Figure 14.** In 2018 the CDPH TB Unit served 1,040 unique persons in the city of Chicago. Of those serviced, 11% were incident TB cases (N=115), 61% were individuals identified in contact investigations (N=630), 24% were refugees or immigrants (N=253) and the remaining 4% (42) were suspects determined not a case or interjurisdictional transfers from other areas.

Chicago Community Areas

Table 4. Map Key- Chicago Community Areas

Ref #	Chicago Community Area	Ref #	Chicago Community Area
1	Rogers Park	40	Washington Park
2	West Ridge	41	Hyde Park
3	Uptown	42	Woodlawn
4	Lincoln Square	43	South Shore
5	North Center	44	Chatham
6	Lake View	45	Avalon Park
7	Lincoln Park	46	South Chicago
8	Near North Side	47	Burnside
9	Edison Park	48	Calumet Heights
10	Norwood Park	49	Roseland
11	Jefferson Park	50	Pullman
12	Forest Glen	51	South Deering
13	North Park	52	East Side
14	Albany Park	53	West Pullman
15	Portage Park	54	Riverdale
16	Irving Park	55	Hegewisch
17	Dunning	56	Garfield Park
18	Montclaire	57	Archer Heights
19	Blemont Cragin	58	Brighton Park
20	Hermosa	59	McKinley Park
21	Avondale	60	Bridgeport
22	Logan Square	61	New City
23	Humboldt Park	62	West Elsdon
24	West Town	63	Gage Park
25	Austin	64	Clearing
26	West Garfield Park	65	West Lawn
27	East Garfield Park	66	Chicago Lawn
28	Near West Side	67	West Englewood
29	North Lawndale	68	Englewood
30	South Lawndale	69	Greater Grand Crossing
31	Lower West Side	70	Ashburn
32	Loop	71	Auburn Gresham
33	Near South Side	72	Beverly
34	Armour Square	73	Washington Heights
35	Douglas	74	Mount Greenwood
36	Oakland	75	Morgan Park
37	Fuller Park	76	O'Hare
38	Grand Boulevard	77	Edgewater
39	Kenwood		

Technical Notes

Data presented in this report come from Illinois' National Electronic Disease Surveillance System (I-NEDSS). Data as are of December 2019.

Percentages may not sum to 100 due to rounding.

Age is calculated based on date TB case was reported to CDPH.

Tuberculosis Case Definitions:

1. Laboratory case definition

a. Isolation of *M. tuberculosis* complex from a culture of a clinical specimen, using an FDA-approved test

or

b. Demonstration of *M. Tuberculosis* from a clinical specimen using FDA-approved nucleic acid amplication test (NAAT). (A positive test means that the probe detected ribosomal RNA from the M. tuberculosis complex in the clinical specimen.)

2. Clinical case definition

a. Full diagnostic evaluation

i. Tuberculin skin test (TST) or interferon gamma release assay (IGRA) test
ii. Chest X-ray/imaging
iii. Clinical specimens for culture/NAAT
iv. Risk factor evaluation: host factors (e.g., documented immunosupression) and environmental factors (e.g., contact to active case, born in country with endemic TB, travel to endemic country)

and

b. Lab test indicative of infection

i. Positive TST and/or
ii. Positive IGRA or
iii. Negative TST or IGRA with reason for not positive (immunosupression)

and

c. Signs or symptoms compatible with TB disease

and

d. Improvement of signs or symptoms after treatment with two or more anti-TB drugs

For more information on tuberculosis in Chicago, please visit our website at: http://www.cityofchicago.org/city/en/depts/cdph/provdrs/clinic/svcs/tb_prog.html

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