



HEALTHY
CHICAGO

CHICAGO DEPARTMENT OF PUBLIC HEALTH

HEALTHY CHICAGO REPORTS

Tuberculosis Annual Surveillance Report
2017

CHICAGO DEPARTMENT OF PUBLIC HEALTH

Julie Morita, MD

Commissioner, Chicago Department of Public Health

Theodore Bonau, MPH

Epidemiologist III,
Tuberculosis Control Program

Kathy Ritger, MD, MPH

Medical Director,
Tuberculosis Control Program

Copyright Information

All materials contained in this report are in the public domain and may be used and reprinted without special permission; citation as to source, however, is appreciated.

Suggested Citation

Chicago Department of Public Health. Tuberculosis Surveillance Report, 2017. Chicago, IL: 2018.

Chicago Department of Public Health

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

Tuberculosis Program

Chicago Department of Public Health
2160 W Ogden Avenue
Chicago, IL 60612

Table of Contents

Abbreviations, Acronyms and Definitions	4
Executive Highlights	5
Technical Notes	17

LIST OF TABLES

Table 1. Number and Rates of Reported Tuberculosis Cases, Chicago, Illinois, and United States, 2013-2017	6
Table 2. Number and Proportion of Tuberculosis Cases by Selected Characteristics, Chicago, 2013-2017	9
Table 3. Co-morbidities of Tuberculosis Cases, Chicago, 2013-2017	12
Table 4. Map Key - Chicago Community Areas	16

LIST OF FIGURES

Figure 1. Trends in the Number and Rates of Reported Tuberculosis Cases, Chicago and United States, 1993-2017	6
Figure 2. Map of Reported Tuberculosis Cases by Chicago Community Area, 2017	7
Figure 3. Map of Average Rate of Tuberculosis by Chicago Community Area, 2013-2017	8
Figure 4. Average, Range, and Trend of Age at Report of Tuberculosis Cases, Chicago, 1993-2017	9
Figure 5. Tuberculosis Cases by Race and Ethnicity Proportions, Chicago, 2013-2017	10
Figure 6. Place of Birth for Tuberculosis Cases, Chicago, 1993-2017	10
Figure 7. Tuberculosis Cases by Site of Disease, Chicago, 2013-2017	11
Figure 8. Tuberculosis Drug Resistance, Chicago, 2013-2017	11
Figure 9. Tuberculosis Cases Co-infected with HIV, Chicago, 2013-2017	12
Figure 10. Percent Completion of Treatment within One Year, Chicago, 1993-2016	13
Figure 11. Mode of TB Therapy, Chicago, 2013-2017	13
Figure 12. Risk Factors for TB, Chicago, 2013-2017	14
Figure 13. Mortality, Chicago, 2017	14
Figure 14. Individual Persons Served by CDPH TB Program, Chicago, 2017	15

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 2017, Chicago has seen an 84% decrease in reported TB cases from 798 to 128 per year, respectively. In 2017, there were 128 incident TB cases reported in Chicago producing a citywide rate of 4.7 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 2017 (4.7 cases per 100,000 population) continues to be greater than that of the United States overall (3.0 cases per 100,000 population).

Age

In 2017, 36% of incident TB cases were diagnosed in persons aged 45-64. Older individuals above the age of 64 accounted for one out of four reported TB cases in 2017. Diagnosed incident TB disease in children under the age of 5 years decreased from 4 cases in 2016 to 2 cases occurring in 2017.

Race and Ethnicity

Non-Hispanic Asian and Non-Hispanic White residents of Chicago have seen relative stability in TB cases over the last five years, accounting for 29% and 9% of TB cases in 2017, respectively. In 2017, Non-Hispanic Blacks accounted for 34% of reported incident cases which was an increase from 28% in 2016. Of the remaining reported cases in 2017, Hispanics accounted for 28% of cases, a 5-year low. Rates among Asians are 25.5 cases per 100,000 population which is more than 5 times greater than Hispanics and Non-Hispanic Blacks, 5.0 cases per 100,000 population and 4.6 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 foreign-born persons. In 2008, TB cases in foreign-born persons surpassed cases in US-born persons for the first time in Chicago, and this percentage has been increasing since, accounting for 66% of reported cases in 2017. Mexico was the most common country of origin among foreign-born persons in 2017, with 32% reporting it as their country of birth, followed by the China (15%), the Philippines (8%), India (7%), and Nigeria (5%).

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 2017, the proportion of HIV co-infection with incident TB in Chicago was 7%, slightly above the national estimate of 6% for the same year.

Risk Factors for TB

Nearly one in four persons diagnosed with TB in Chicago in 2017 reported substance use, up from 17% in 2013. Alcohol was the most commonly misused substance, with 19% reporting heavy drinking. Cases among homeless persons increased from 5% in 2015 to over 9% in 2017. Diabetes is a known risk factor for TB disease and affected one in five of 2017 TB cases.

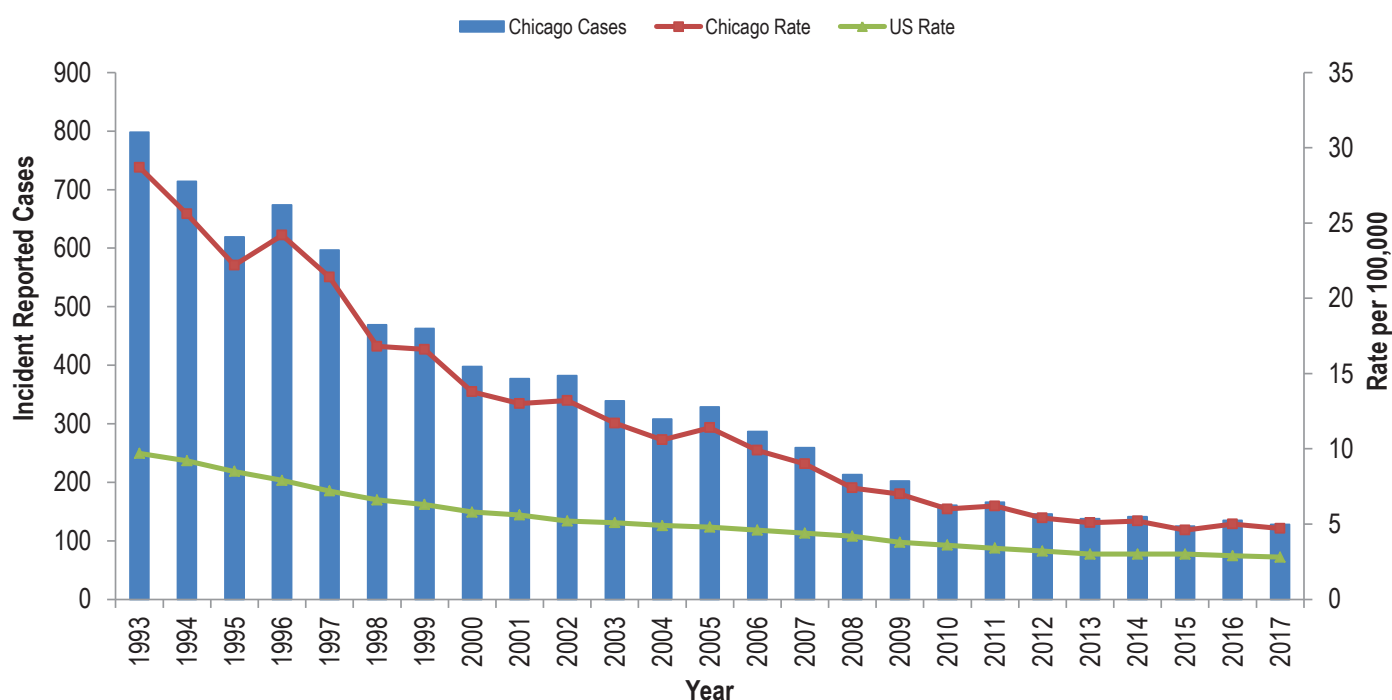
Tuberculosis Incidence

Table 1. Number and rates (per 100,000 population) of reported tuberculosis cases, 2013-2017

Area	2013		2014		2015		2016		2017		5-Year Median	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Chicago	138	5.1	141	5.2	124	4.6	135	5.0	128	4.7	135	5.0
Illinois	327	2.5	320	2.5	343	2.7	342	2.7	337	2.7	337	2.7
United States	9,562	3.0	9,406	3.0	9,563	3.0	9,287	2.9	9,093	2.9	9,406	3.0

▲ **Table 1.** In 2017, there were 128 incident TB cases reported in Chicago producing a citywide rate of 4.7 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 2016 and 2017, Chicago experienced a 5% decrease of incident TB cases.

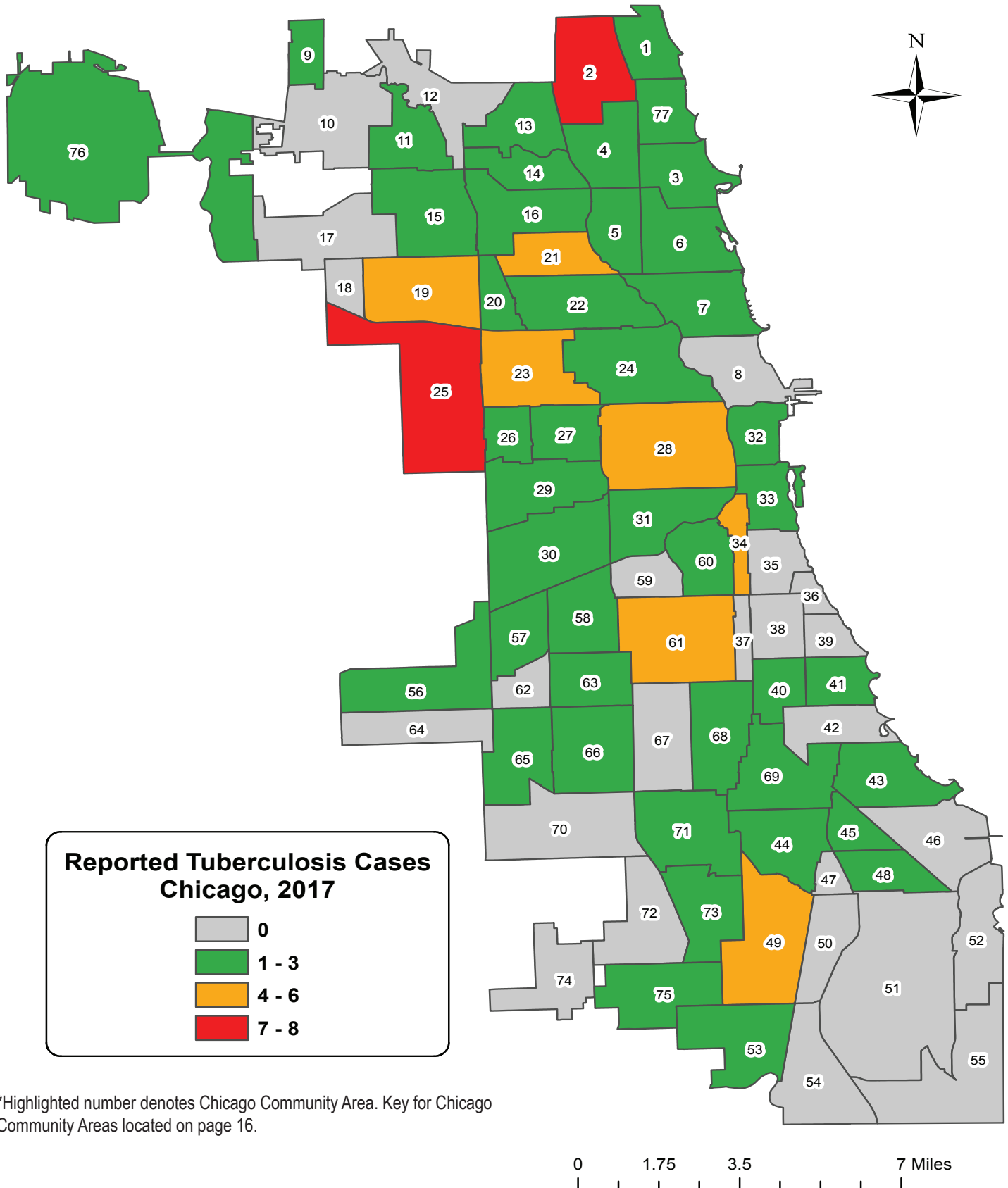
Figure 1. Trends in the number of reported tuberculosis cases, 1993-2017



▲ **Figure 1.** Incident cases of TB in Chicago have been on the decline since 1993. Between 2007 and 2017, Chicago has seen a 51% decrease in TB from 259 to 128 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 2017 (4.7 cases per 100,000 population) continues to be greater than that of the United States overall (3.0 cases per 100,000 population).

Chicago Community Area Tuberculosis Cases

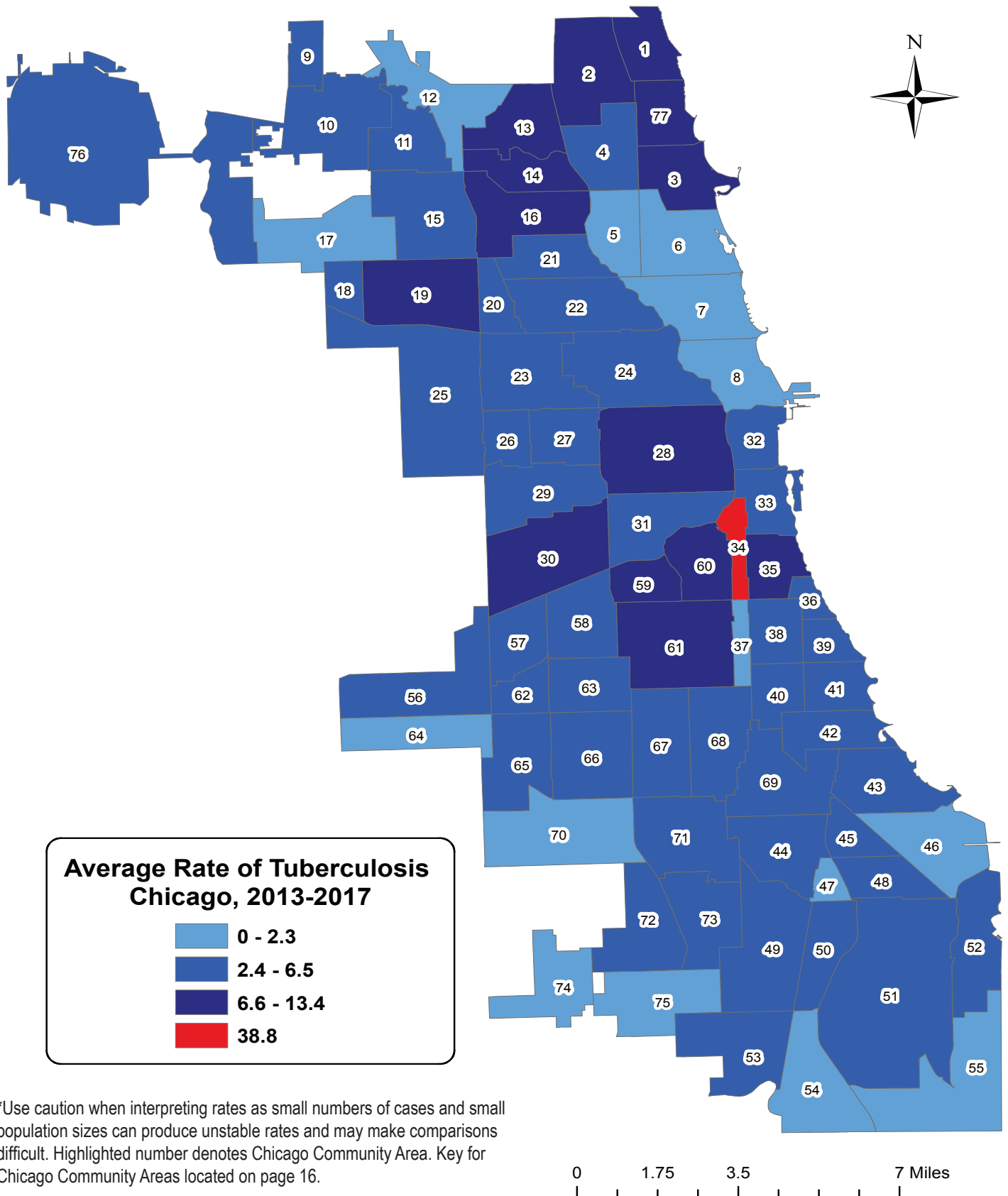
Figure 2. Reported tuberculosis cases, Chicago, 2017*



*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, 2013-2017*



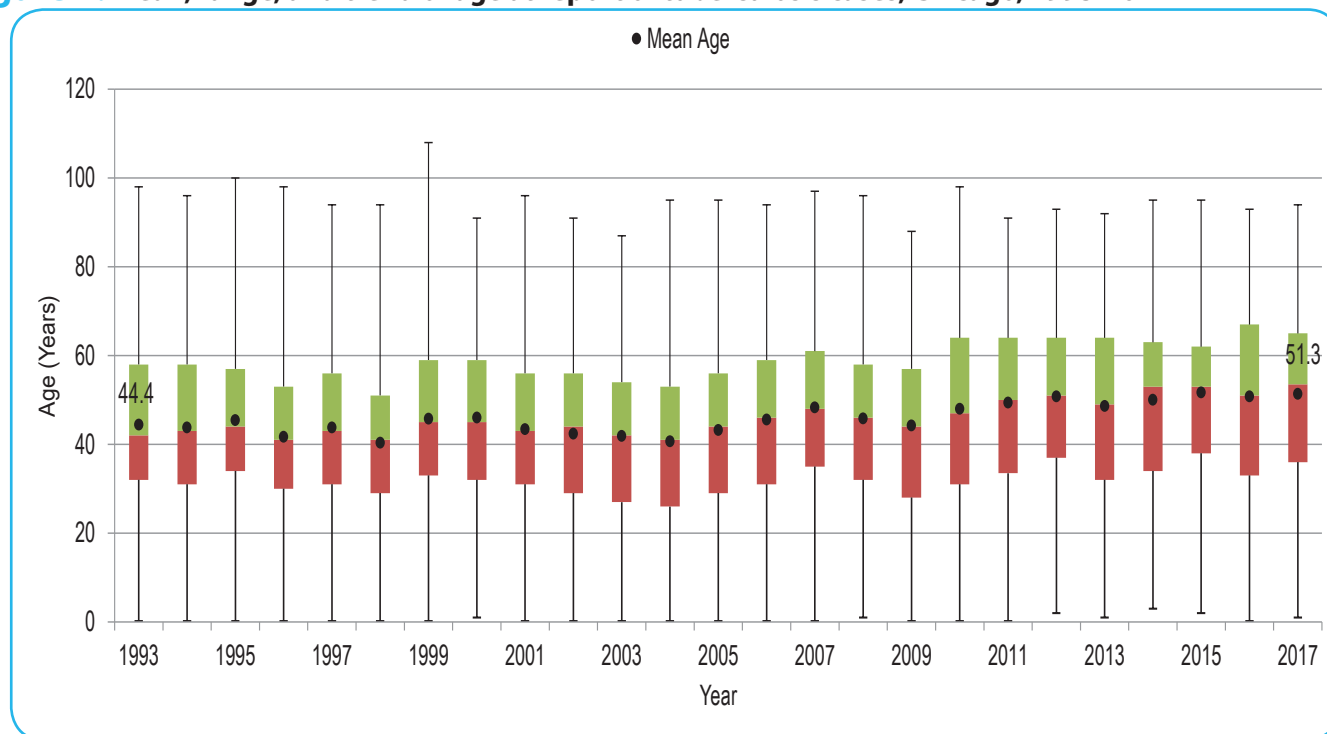
*Use caution when interpreting rates as small numbers of cases and small population sizes can produce unstable rates and may make comparisons difficult. Highlighted number denotes Chicago Community Area. Key for Chicago Community Areas located on page 16.

Characteristics of Tuberculosis Cases

Table 2. Number and proportion of tuberculosis cases by selected characteristics, Chicago, 2013-2017

Characteristic	2013		2014		2015		2016		2017		5- Year Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Age Group (Years)												
<5	3	(2.2)	1	(0.7)	1	(0.8)	4	(3.0)	2	(1.6)	11	(1.7)
5-14	3	(2.2)	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.8)	4	(0.6)
15-24	12	(8.7)	12	(8.5)	7	(5.6)	12	(8.9)	7	(5.5)	50	(7.5)
25-44	36	(26.1)	42	(29.8)	36	(29.0)	38	(28.1)	39	(30.5)	191	(28.7)
45-64	50	(36.2)	53	(37.6)	50	(40.3)	41	(30.4)	46	(35.9)	240	(36.0)
>64	34	(24.6)	33	(23.4)	30	(24.2)	40	(29.6)	33	(25.8)	170	(25.5)
Sex												
Male	77	(55.8)	93	(66.0)	79	(63.7)	85	(63.0)	89	(69.5)	423	(63.5)
Female	61	(44.2)	48	(34.0)	45	(36.3)	50	(37.0)	39	(30.5)	243	(36.5)
Race												
Black	44	(31.9)	48	(34.0)	33	(26.6)	39	(28.9)	44	(34.4)	208	(31.2)
Asian	37	(26.8)	39	(27.7)	37	(29.8)	43	(31.9)	37	(28.9)	193	(29.0)
White	55	(39.9)	54	(38.3)	54	(43.5)	53	(39.3)	47	(36.7)	263	(39.5)
Other	2	(1.4)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	2	(0.3)
Ethnicity												
Non-Hispanic	92	(66.7)	101	(71.6)	85	(68.5)	92	(68.1)	92	(71.9)	462	(69.4)
Hispanic	46	(33.3)	40	(28.4)	39	(31.5)	43	(31.9)	36	(28.1)	204	(30.6)
Total	138	(100.0)	141	(100.0)	124	(100.0)	135	(100.0)	128	(100.8)	666	(100.0)

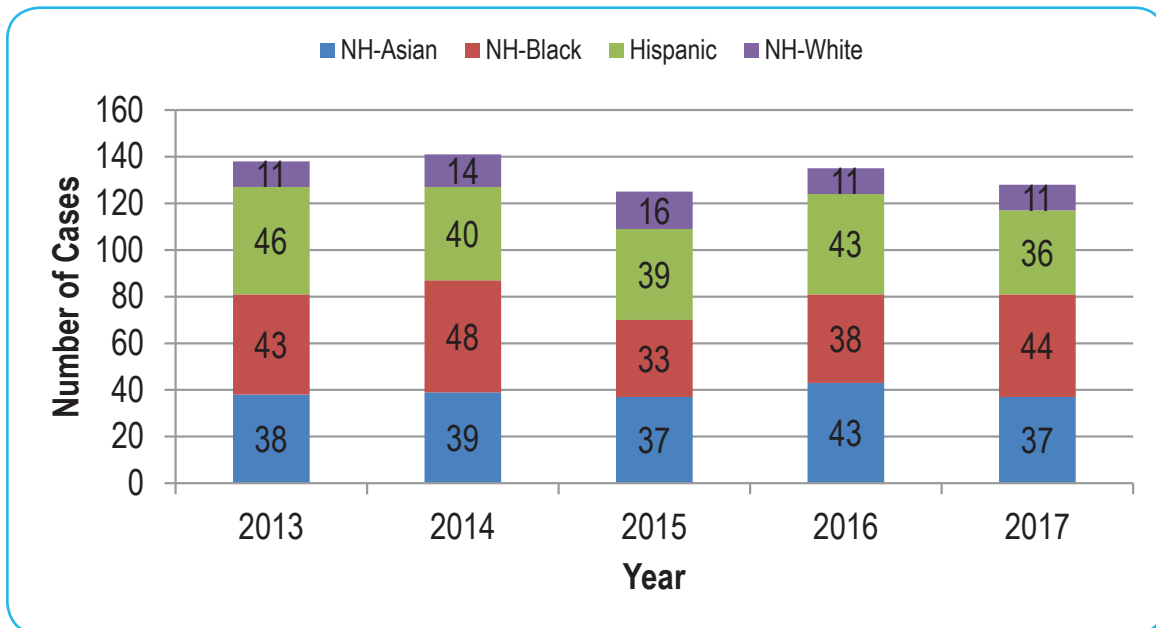
Figure 4. Mean, range, and trend of age at report of tuberculosis cases, Chicago, 1993-2017



▲ **Figure 4.** Half of the reported TB cases from 2017 were between the ages of 36 and 65, with a range of 1 to 94 years old. Between 1994 and 2017, there has been a significant trend of increasing mean age of reported TB cases, with a mean of 44.4 and 51.3 years, respectively.

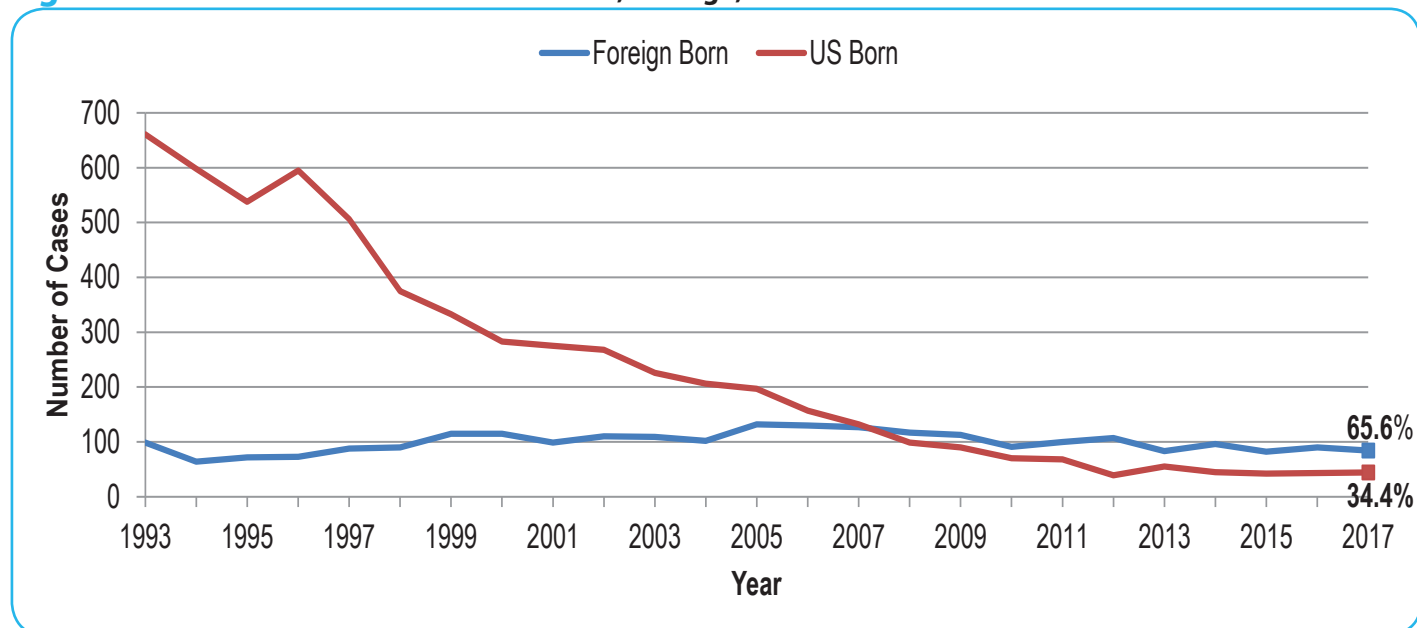
Race, Ethnicity, and Country of Origin

Figure 5. Tuberculosis cases by race and ethnicity proportions, Chicago, 2013-2017



▲ **Figure 5.** In 2017, Non-Hispanic (NH) Black residents of Chicago accounted for 34% of reported TB cases. Hispanic residents of Chicago have seen a marked decrease over the last five years, comprising of 33% of cases in 2013 to 28% in 2017. Of the remaining reported cases in 2017, NH-Asians and NH-Whites accounted for 29% and 9%, respectively.

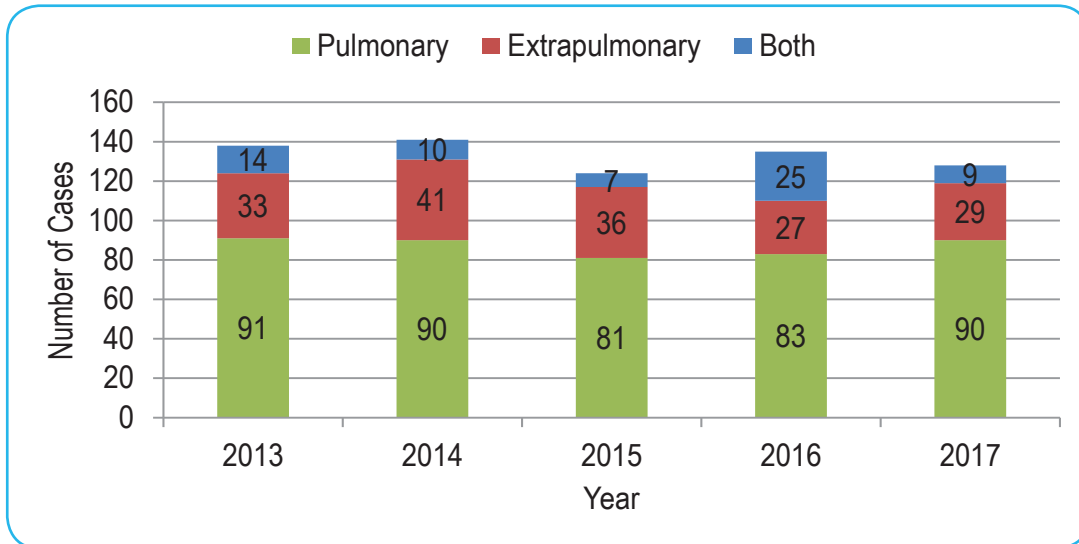
Figure 6. Place of birth for tuberculosis cases, Chicago, 1994-2017



▲ **Figure 6.** 2008 was the first year in Chicago that the number of reported TB cases in those who are foreign-born surpassed that of US-born cases. In 2017, almost 2 out of 3 TB cases were among foreign-born persons (N=84). Mexico was the most common foreign country of origin accounting for 32% of all foreign-born cases, followed by the China (15%), the Philippines (8%), and India (7%).

Tuberculosis Site of Disease

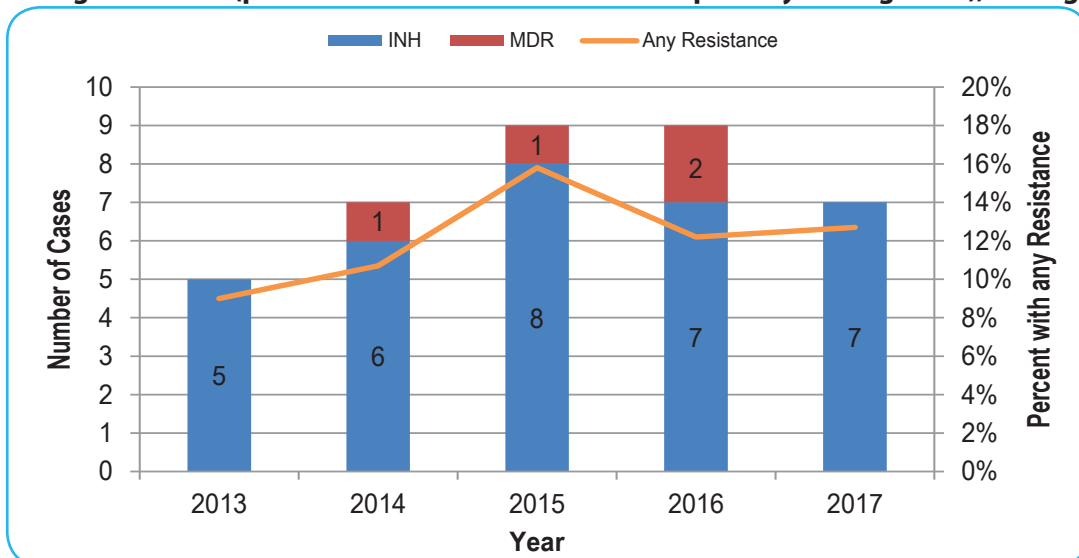
Figure 7. Tuberculosis cases by site of disease, Chicago, 2013-2017



▲ **Figure 7.** In 2017, 70% of Chicago’s reported TB cases were pulmonary followed by 23% with extrapulmonary and 7% with both pulmonary and extrapulmonary site of disease. Among the 99 pulmonary cases (including both), 51 (52%) were sputum-smear positive and 50 (51%) had cavitation/s on their chest x-rays. Cavitory 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, 2013-2017



▲ **Figure 8.** In 2017 among TB cases with susceptibility testing results (N=102), 7 were isoniazid resistant (6.9%) and 13 were resistant to at least one anti-TB drug (12.7%). Since 2011, there have been 7 MDR cases and one XDR case.

Tuberculosis Co-morbidities

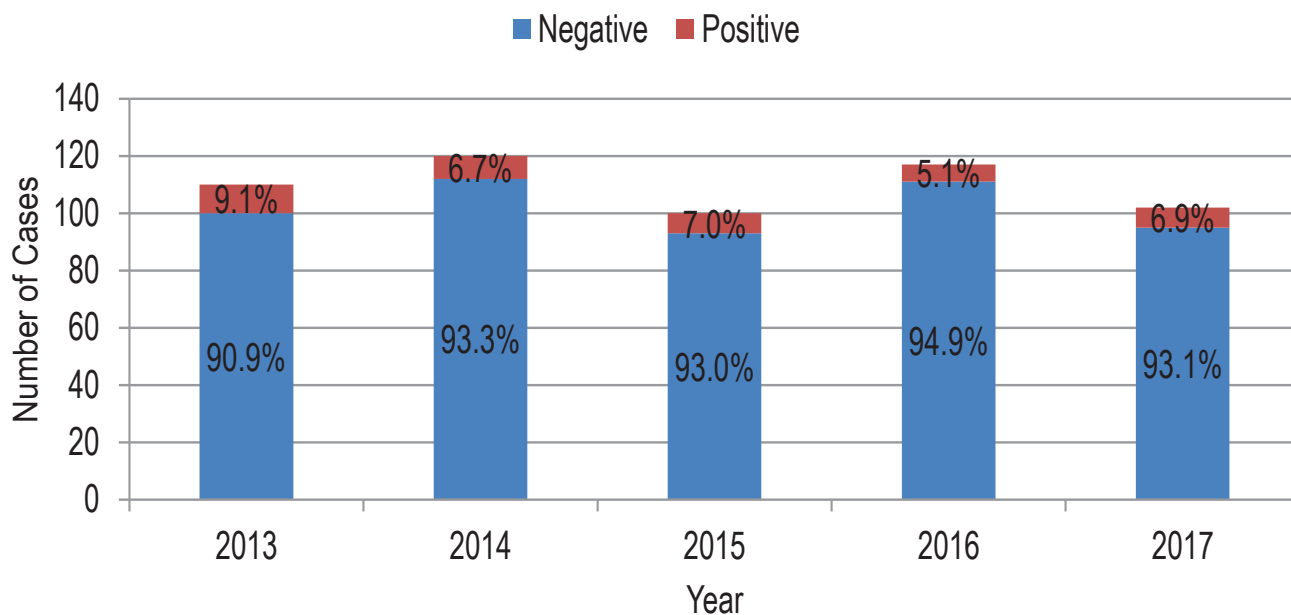
Table 3. Co-morbidities of tuberculosis cases, Chicago, 2013-2017

Year	Diabetes		Immuno-compromised (Not HIV)		End-Stage Renal Disease	
	No.	(%)	No.	(%)	No.	(%)
2013	17	(12.3%)	13	(9.4%)	2	(1.5%)
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%)
Total	129	(19.4%)	37	(5.6%)	18	(2.7%)

▲ **Figure 9.** Almost one in four of TB cases reported in 2017 also suffered from diabetes which is slightly higher than the national estimate of 16%. Additionally, 5% of 2017 TB cases were immuno-compromised not attributed to HIV infection and 4% had end-stage renal disease.

Tuberculosis and HIV

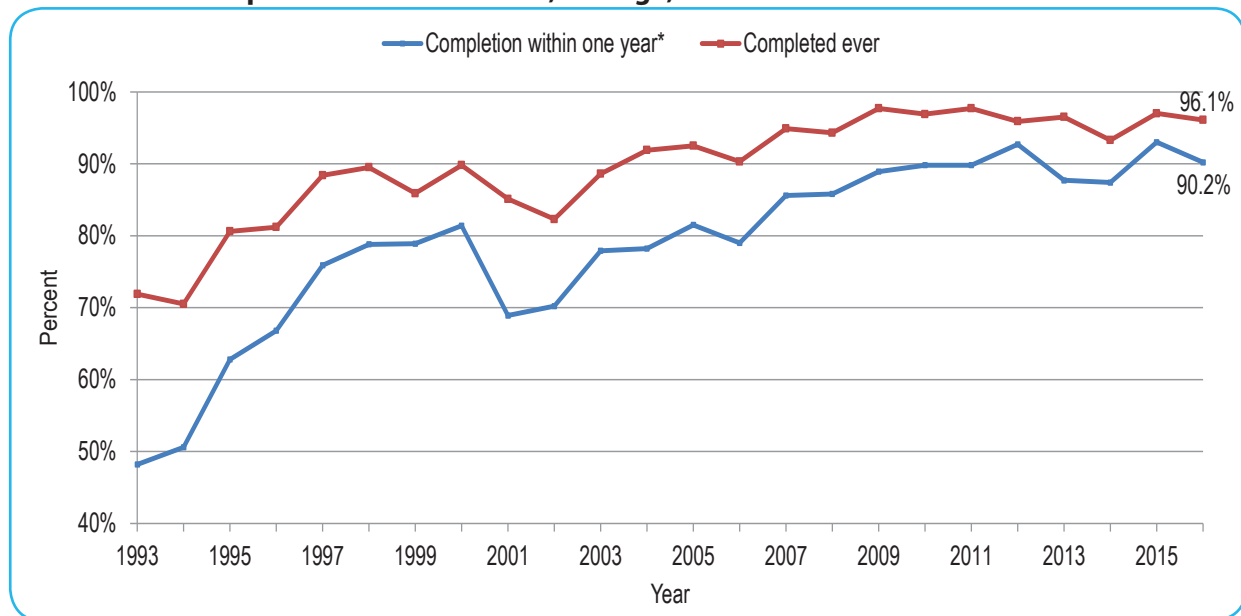
Figure 9. Tuberculosis cases co-infected with HIV (among those tested for HIV), Chicago, 2013-2017



▲ **Figure 9.** In 2017, the proportion of HIV co-infection with TB in Chicago was 6.9%, slightly higher than national estimates of 5.6% 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 HIV infection still remains a significant risk factor for TB.

Tuberculosis Treatment Completion

Figure 10. Percent completion of TB treatment, Chicago, 1993-2016

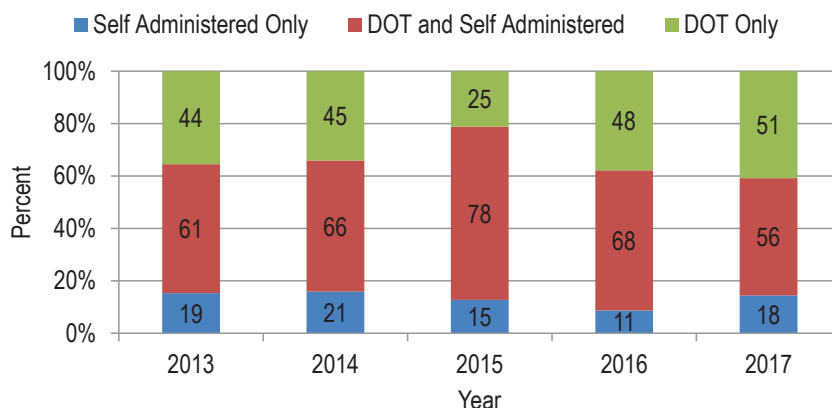


* Patients who died during or before treatment or who moved out of the country are excluded. Patients with resistance to rifampin, meningeal TB, TB of the bone or skeletal system, TB in the central nervous system and children with disseminated TB were also excluded due to expected longer duration of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

▲ **Figure 10.** In 2016, 90% 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 1993-2016. Overall treatment completion has also increased from 71.9% in 1993 to 96.1% in 2016.

Directly Observed Therapy

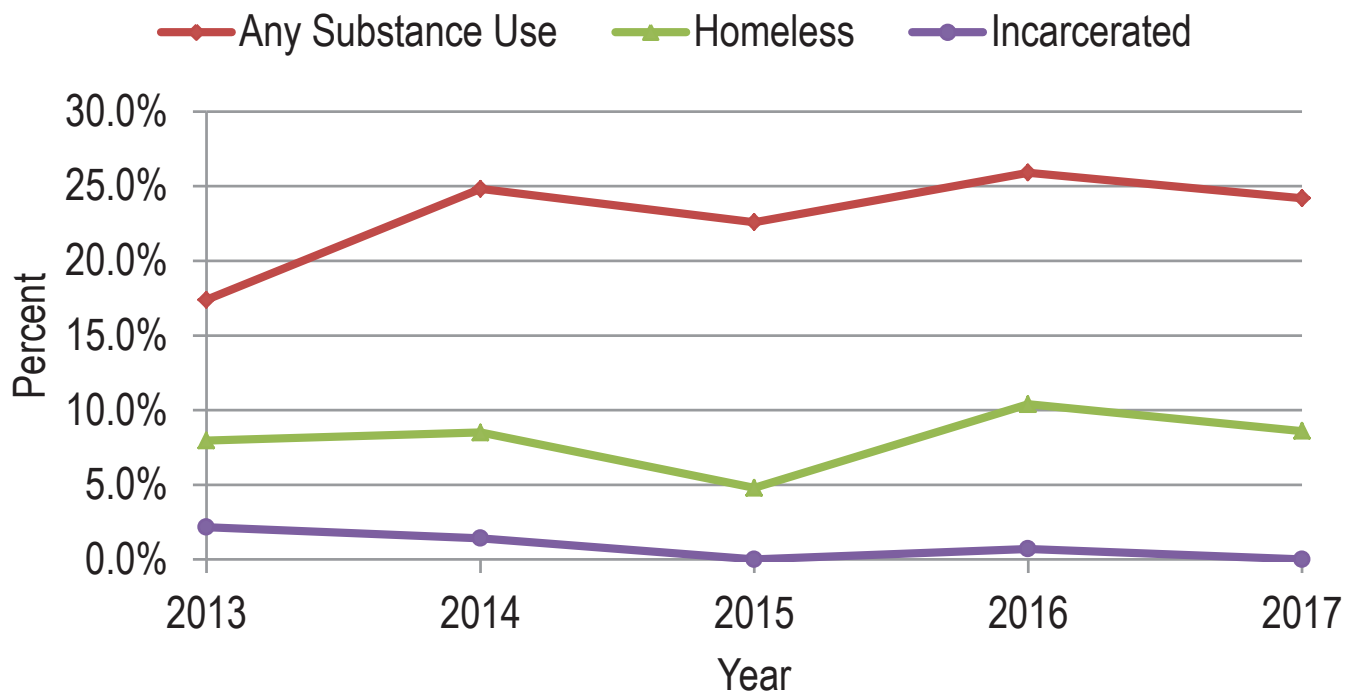
Figure 11. Mode of TB Therapy, Chicago, 2013-2017



◀ **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 2017, 86% of TB cases who started TB treatment received either DOT only (41%) or a combination of both DOT and self-administered therapy (45%).

Risk Factors and Tuberculosis

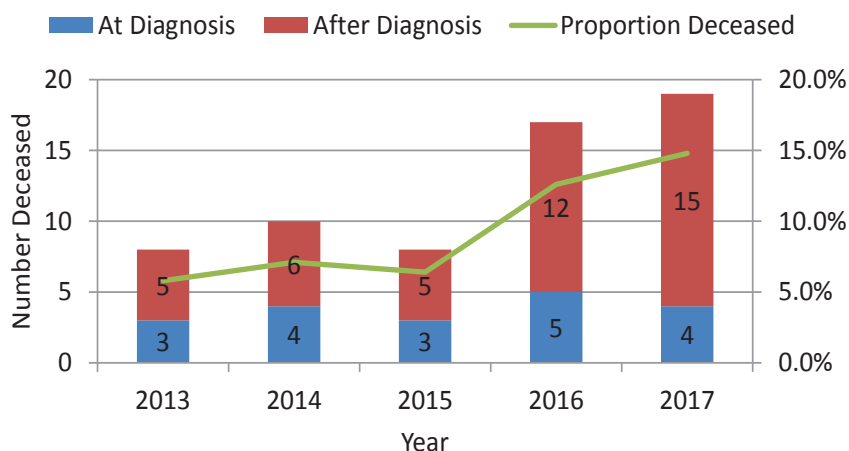
Figure 12. Risk factors for TB disease, Chicago, 2013-2017



▲ **Figure 12.** Nearly one in 4 of TB cases reported substance use in 2017 (N=31). Among those, alcohol was the most commonly misused substance. Cases among homeless persons have risen from less than 5% in 2015 to 9% in 2017.

Mortality

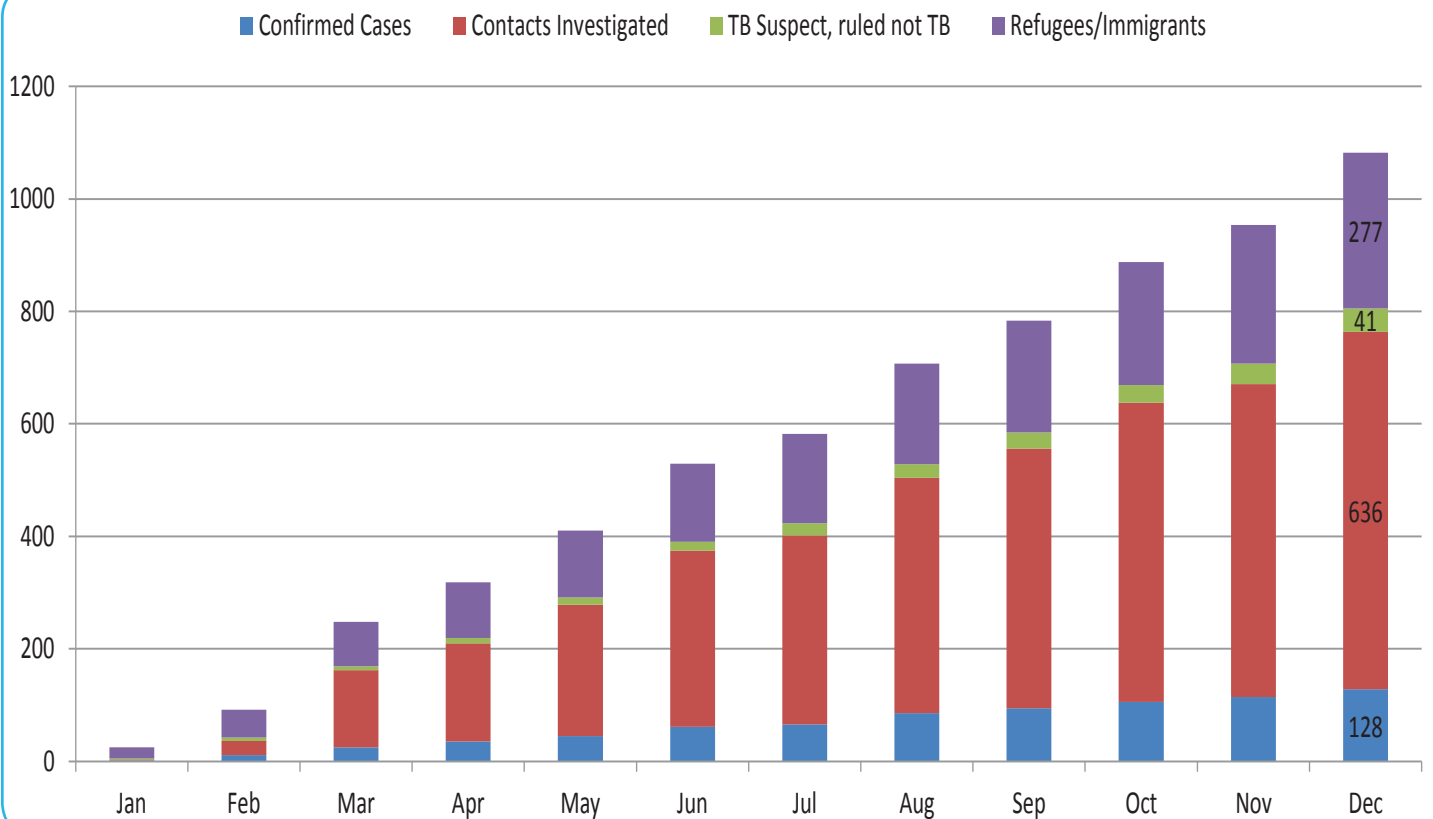
Figure 13. Mortality, Chicago, 2013-2017



◀ **Figure 13.** There were 19 deaths from TB in 2017, which was a 5-year high. This was a 138% increase from 2013 with 8 deaths.

Individual Persons Serviced

Figure 14. Individual Persons Served by CDPH TB Program, Chicago, 2017



▲ **Figure 14.** In 2017 the CDPH TB Unit served 1,082 unique persons in the city of Chicago. Of those serviced, 12% were incident TB cases (N=128), 59% were individuals identified in contact investigations (N=636), 26% were refugees or immigrants (N=277) and the remaining 4% (41) 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	Montclair	57	Archer Heights
19	Blemond 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 July 2018.

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 amplification 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 immunosuppression) 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 (immunosuppression)
- 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

