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CHICAGO

CHICAGO DEPARTMENT OF PUBLIC HEALTH

HEALTHY CHICAGO REPORTS

Tuberculosis Annual Surveillance Report
2015

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

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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

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Abbreviations, Acronyms & Definitions

Cavitary/Cavitation: TB infection involving the upper lobes of the lung that causes destruction of the lung tissue, forming enlarged air spaces (cavities).

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, is 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 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.

LTBI: Latent tuberculosis infection, is an infection with *M. tuberculosis* without active tuberculosis disease.

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

M. tuberculosis: *Mycobacterium tuberculosis*, is a rod-shaped bacterium that causes tuberculosis infection.

Pulmonary: TB infection 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, infectious disease caused by *M. tuberculosis*.

XDR: Extensively drug-resistant tuberculosis, a form of tuberculosis infection caused by *Mycobacterium 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 2015, Chicago has seen an 84% decrease in reported TB cases from 798 to 124 per year, respectively. In 2015, there were 124 incident TB cases reported in Chicago producing a citywide rate of 4.6 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 since and in 2015, Chicago's citywide rate of 4.6 cases per 100,000 population was one and a half times that of the United States overall, 3.0 cases per 100,000 population.

Age

In 2015, 70% of incident TB cases in 2015 were diagnosed in persons aged 25-64 (29.0% and 40.3% in 25-44 and 45-64 year olds, respectively). Diagnosed incident TB disease in children remains relatively rare in Chicago with only one case (<1%) in 2015 occurring in persons aged 0-14.

Race and Ethnicity

African-American residents of Chicago have seen a marked decrease in TB over the last five years, from 35% of reported cases in 2011 to less than 27% in 2015. In 2015, Hispanics accounted for nearly 32% of reported incident TB cases. Of the remaining reported cases in 2015, Asians and Whites accounted for 30% and 13%, 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 on the incline since, accounting for 66% of reported cases in 2015. Mexico was the most common foreign country of origin in 2015, with 40% of foreign-born persons reporting it as their country of birth, followed by China (16%), India (10%), and the Philippines (10%).

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 HIV positive persons. Despite these reductions, HIV infection remains a strong risk factor for TB infection. In 2015, 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

More than one in five persons diagnosed with TB in Chicago in 2015 reported substance use. Alcohol was the most commonly used substance, with 17% reporting heavy drinking. Cases among homeless persons have been on a downward trend, from a 5-year high of 11% of cases in 2011 to 5% of cases in 2015.

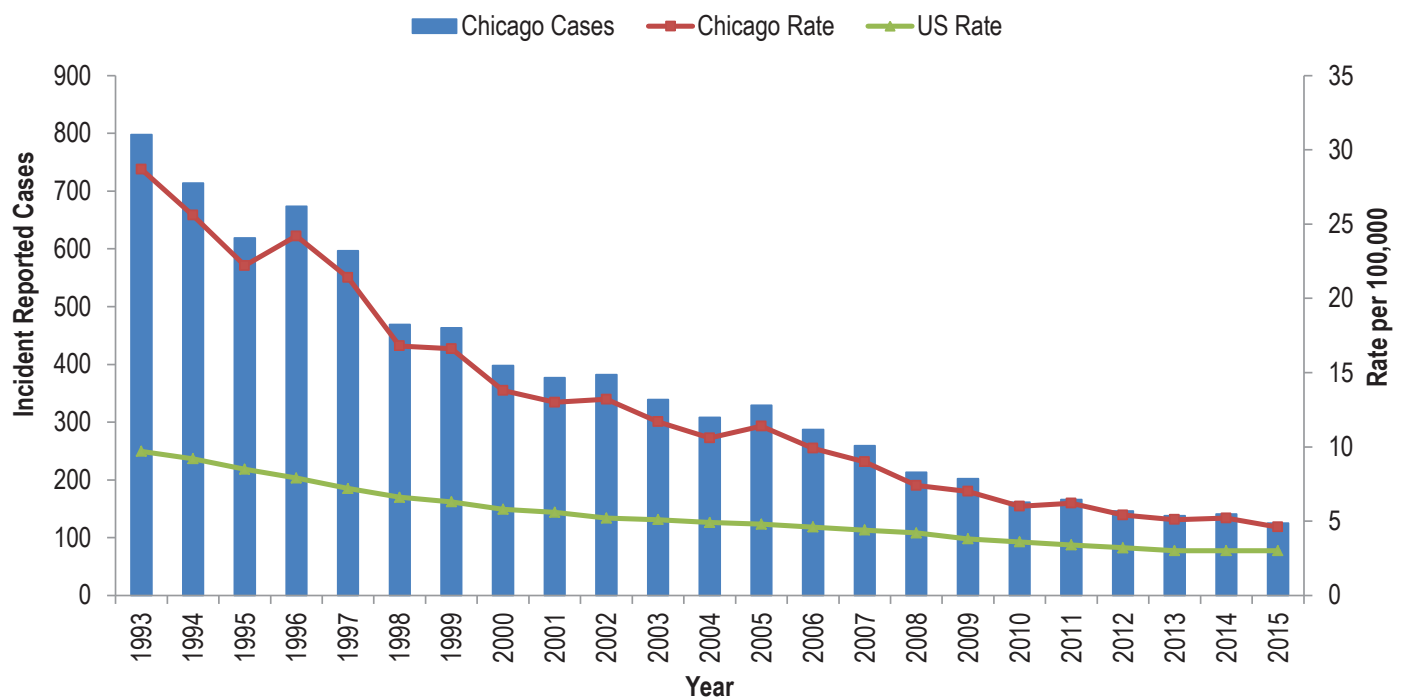
Tuberculosis Incidence

Table 1. Number and rates (per 100,000 population) of reported tuberculosis cases, 2011-2015

Area	2011		2012		2013		2014		2015		5-Year Median	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Chicago	166	6.2	146	5.4	138	5.1	141	5.2	124	4.6	141	5.2
Illinois	358	2.8	347	2.7	327	2.5	320	2.5	343	2.7	343	2.7
United States	10,521	3.4	9,940	3.2	9,562	3.0	9,406	3.0	9,563	3.0	9,563	3.0

▲ **Table 1.** In 2015, there were 124 incident TB cases reported in Chicago producing a citywide rate of 4.6 per 100,000 population. Chicago’s citywide rate was more than one and a half times that of both Illinois and the United States. Between 2014 and 2015, Chicago experienced a 12% reduction of incident TB cases.

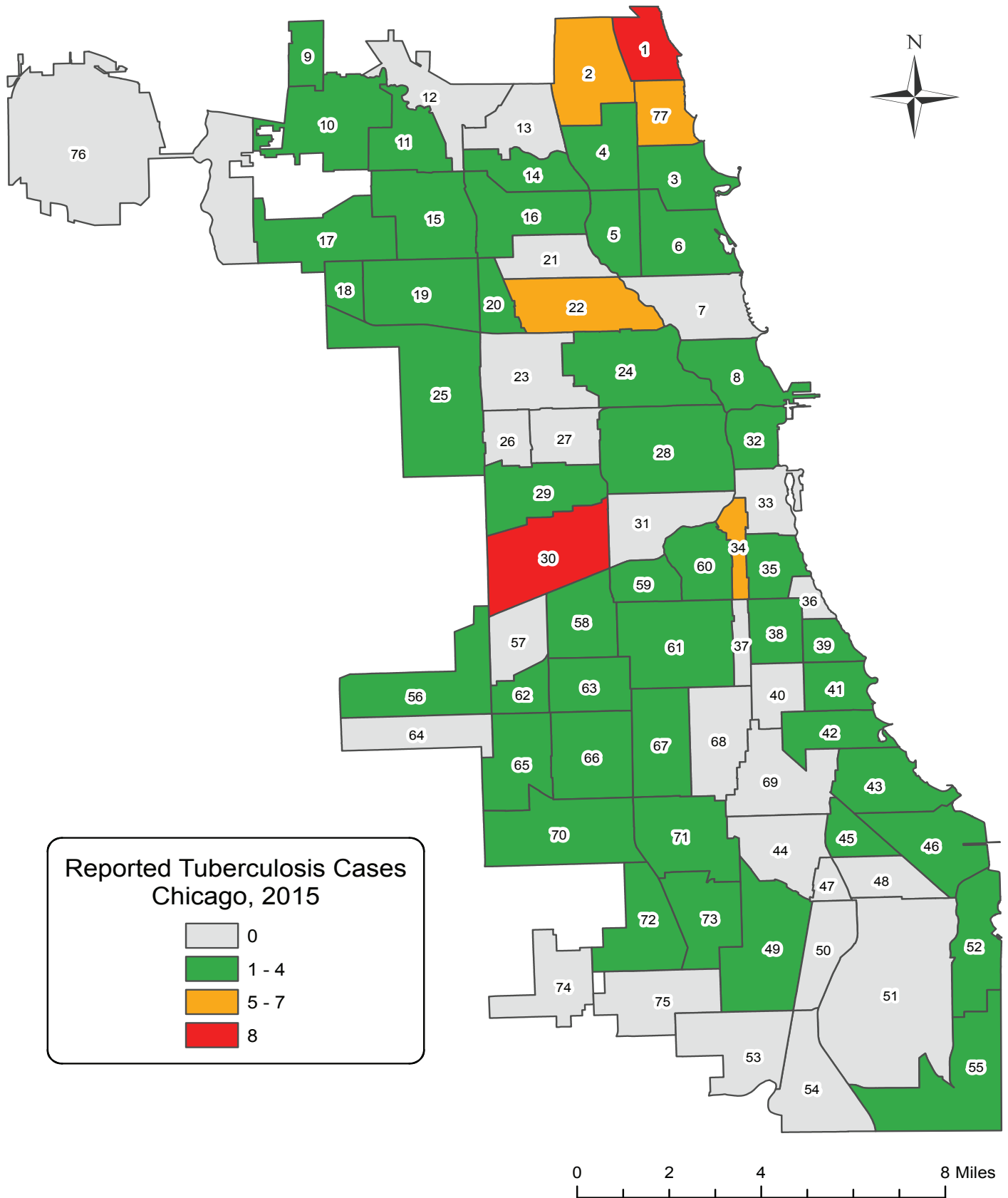
Figure 1. Trends in the number of reported tuberculosis cases, 1993-2015



▲ **Figure 1.** Incident cases of TB in Chicago have been on the decline since 1993. Between 2006 and 2015, Chicago has seen a 57% decrease in TB from 287 to 124 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 since and in 2015, Chicago’s citywide rate per 100,000 people was one and a half times that of the United States overall.

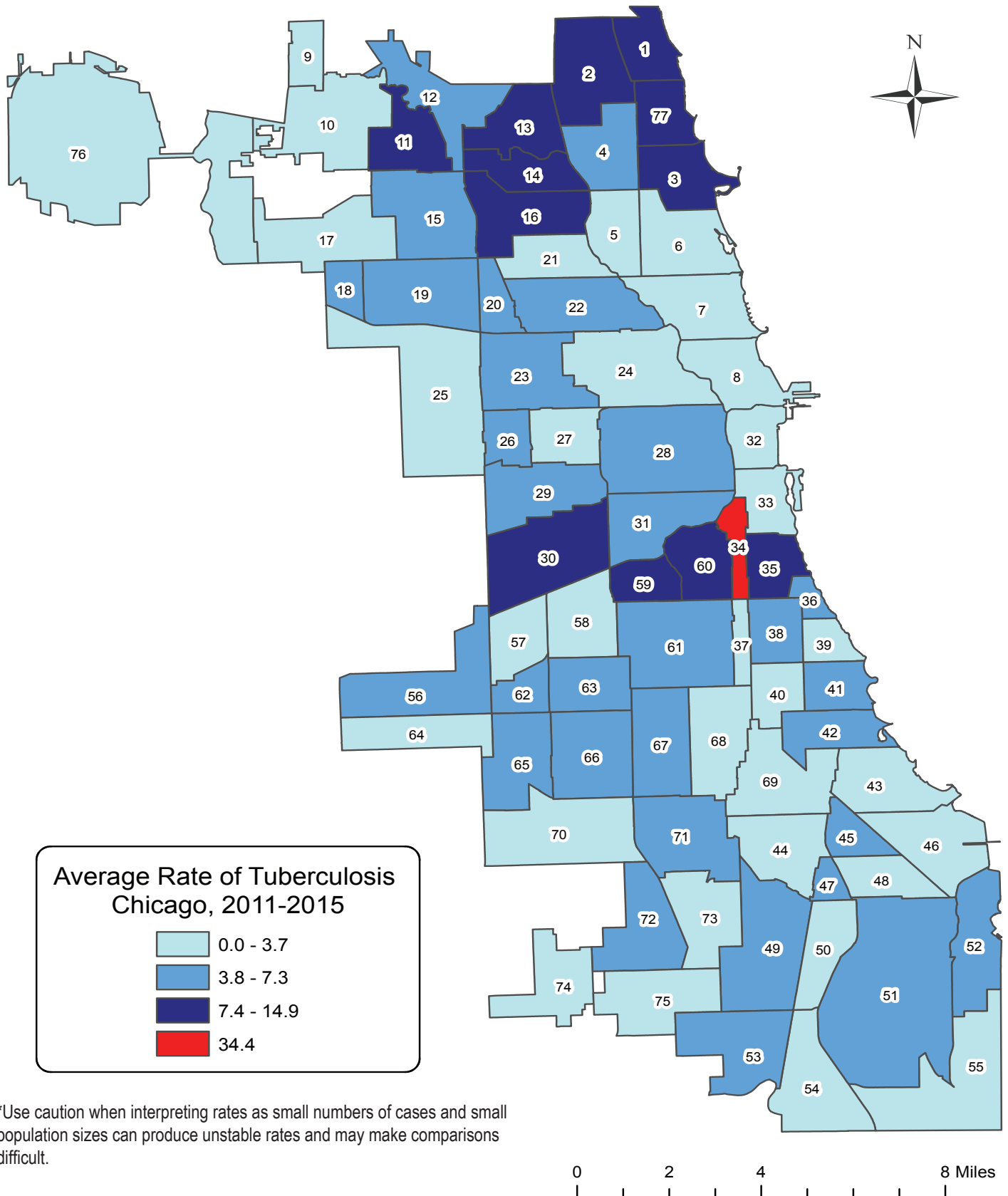
Chicago Community Area Tuberculosis Cases

Figure 2. Reported tuberculosis cases by Chicago Community Area, 2015



Chicago Community Area Tuberculosis Rates

Figure 3. Average rate of tuberculosis (per 100,000 population) by Chicago Community Area, 2011-2015*

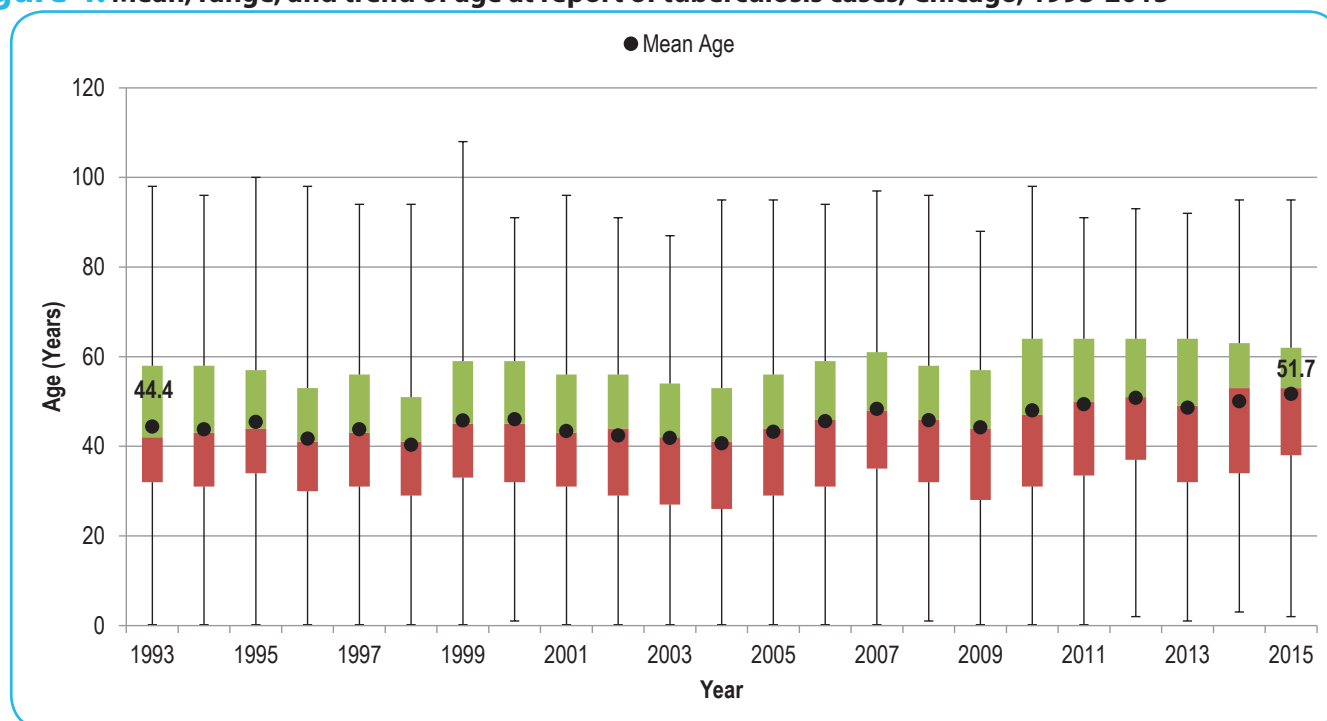


Characteristics of Tuberculosis Cases

Table 2. Number and proportion of tuberculosis cases by selected characteristics, Chicago, 2011-2015

Characteristic	2011		2012		2013		2014		2015		5- Year Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Age Group (Years)												
<5	4	(2.4)	1	(0.7)	3	(2.2)	1	(0.7)	1	(0.8)	10	(1.4)
5-14	4	(2.4)	2	(1.4)	3	(2.2)	0	(0.0)	0	(0.0)	9	(1.3)
15-24	13	(7.8)	9	(6.2)	12	(8.7)	12	(8.5)	7	(5.6)	53	(7.4)
25-44	40	(24.1)	45	(30.8)	36	(26.1)	42	(29.8)	36	(29.0)	199	(27.8)
45-64	64	(38.6)	59	(40.4)	50	(36.2)	53	(37.6)	50	(40.3)	277	(38.7)
>64	40	(24.1)	30	(20.5)	34	(24.6)	33	(23.4)	30	(24.2)	167	(23.4)
Sex												
Male	104	(62.7)	94	(64.4)	77	(55.8)	93	(66.0)	79	(63.7)	447	(62.5)
Female	62	(37.3)	52	(35.6)	61	(44.2)	48	(34.0)	45	(36.3)	268	(37.5)
Race												
Black	44	(26.5)	44	(30.1)	44	(31.9)	48	(34.0)	33	(26.6)	227	(31.7)
Asian	42	(25.3)	42	(28.8)	37	(26.8)	39	(27.7)	37	(29.8)	202	(28.3)
White	59	(35.5)	59	(40.4)	55	(39.9)	54	(38.3)	54	(43.5)	283	(39.6)
Other	1	(0.6)	1	(0.7)	2	(1.4)	0	(0.0)	0	(0.0)	3	(0.4)
Ethnicity												
Non-Hispanic	138	(83.1)	101	(69.2)	92	(66.7)	101	(71.6)	85	(68.5)	498	(69.7)
Hispanic	32	(19.3)	45	(30.8)	46	(33.3)	40	(28.4)	39	(31.5)	217	(30.3)
Total	166	(100.0)	146	(100.0)	138	(100.0)	141	(100.0)	124	(100.0)	715	(100.0)

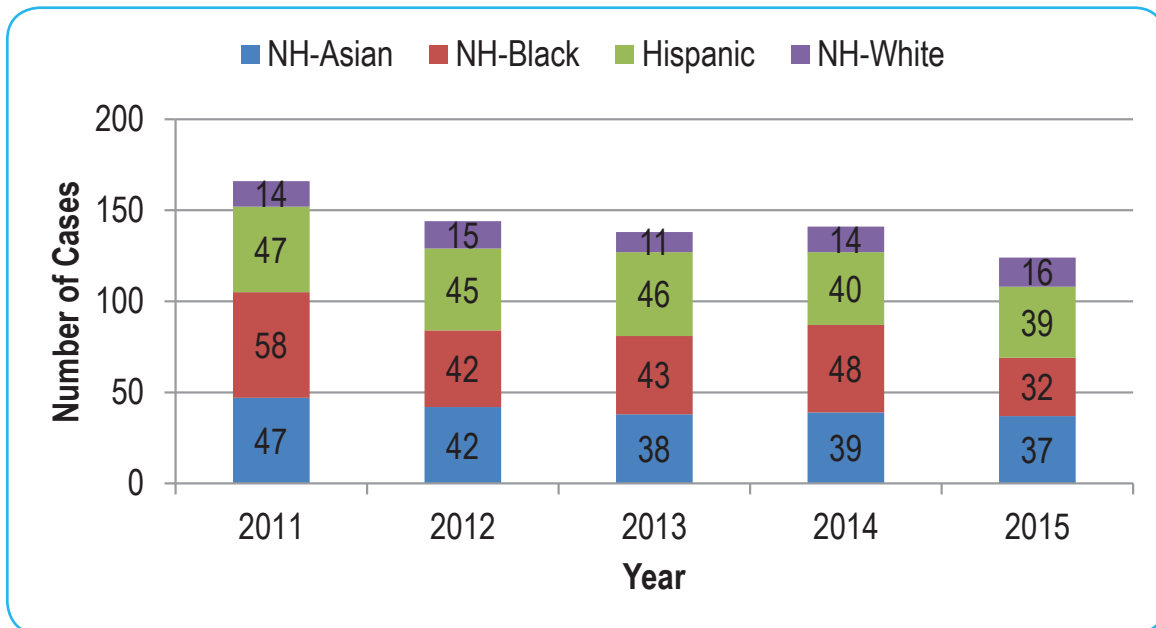
Figure 4. Mean, range, and trend of age at report of tuberculosis cases, Chicago, 1993-2015



▲ **Figure 4.** Half of the reported TB cases from 2015 were between the ages of 38 and 62, with a range of 2 to 95 years old. Between 1993 and 2015, there has been a significant trend of increasing mean age of reported TB cases, with a mean of 44.4 and 51.7 years, respectively.

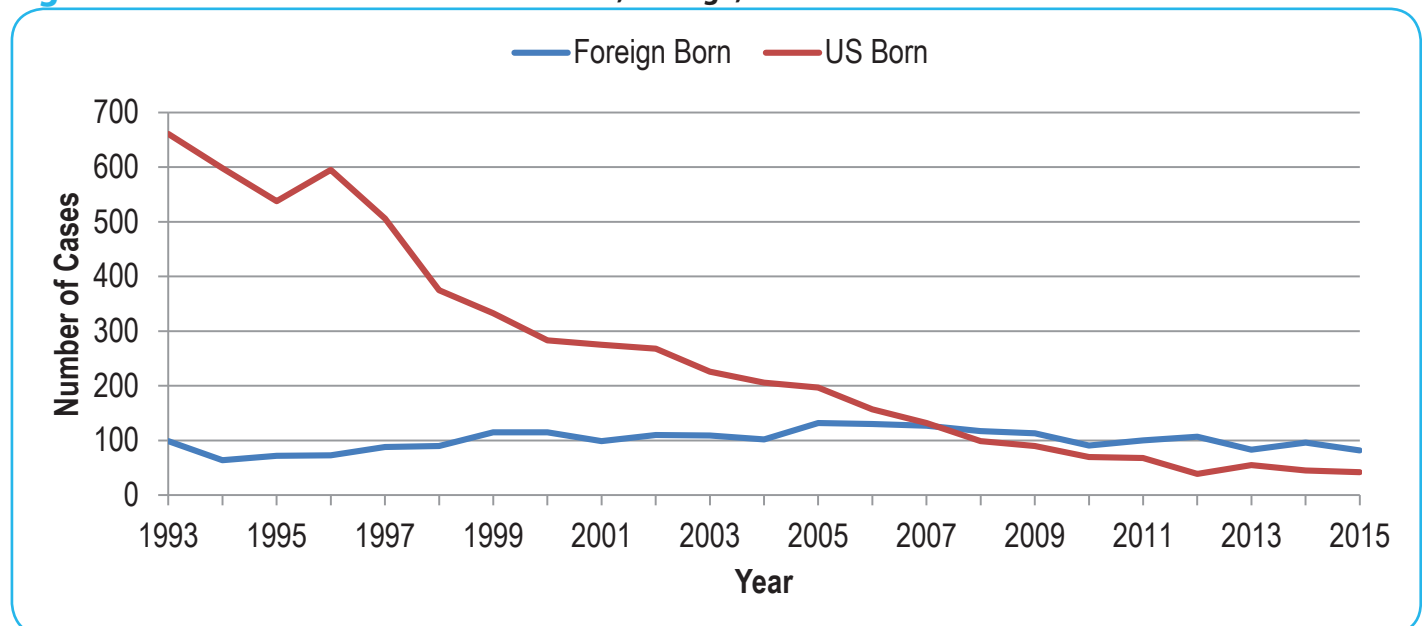
Race, Ethnicity, and Country of Origin

Figure 5. Tuberculosis cases by race and ethnicity proportions, Chicago, 2011-2015



▲ **Figure 5.** In 2015, Hispanics accounted for nearly 32% of reported TB cases. Non-Hispanic (NH) Blacks residents of Chicago have seen a marked decrease over the last five years, comprising of 35% of cases in 2011 to less than 27% in 2015. Of the remaining reported cases in 2015, NH-Asians and NH-Whites accounted for 30% and 13%, respectively.

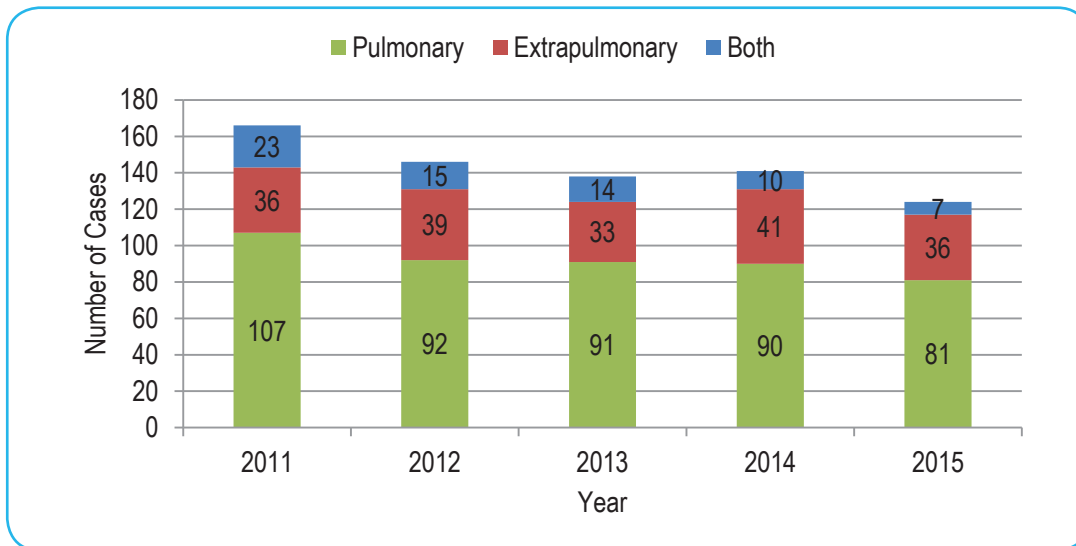
Figure 6. Place of birth for tuberculosis cases, Chicago, 1993-2015



▲ **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 2015, 2 out of 3 TB cases were among foreign-born persons (N=82). Mexico was the most common foreign country of origin accounting for 40% of all foreign-born cases, followed by China (16%), India (10%), and the Philippines (10%).

Tuberculosis Site of Disease

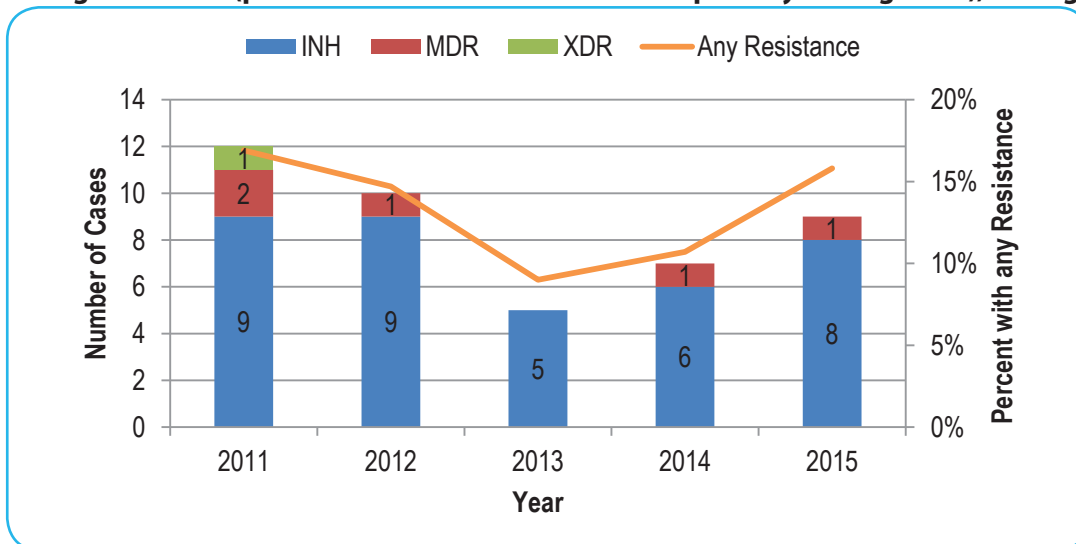
Figure 7. Tuberculosis cases by site of disease, Chicago, 2011-2015



▲ **Figure 7.** In 2015, 65% of Chicago’s reported TB cases were pulmonary followed by 29% with extrapulmonary and 6% with both pulmonary and extrapulmonary site of disease. Among the 89 pulmonary cases (including both), 48 (54%) were sputum-smear positive and 46 (52%) 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, 2011-2015



▲ **Figure 8.** In 2015 among TB cases with susceptibility testing results, one was multi-drug resistant (1.1%), 8 were isoniazid resistant (8.4%) and 15 were resistant to at least one anti-TB drug (15.8%). Since 2011, there have been 5 MDR cases and one XDR case.

Tuberculosis Co-morbidities

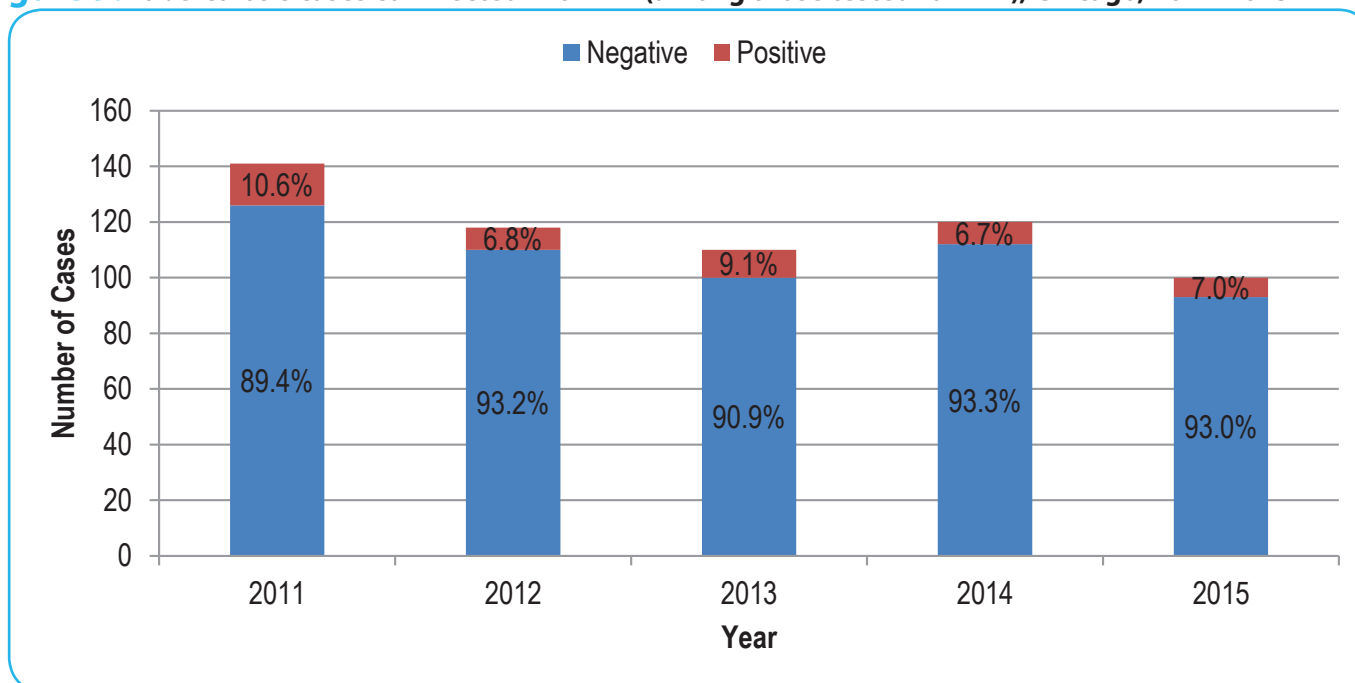
Table 3. Co-morbidities of tuberculosis cases, Chicago, 2011-2015

Year	HIV Co-infection (% of tested)		Diabetes		Immuno-compromised (Not HIV)		End-Stage Renal Disease	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
2011	15	(10.6%)	23	(13.9%)	12	(7.2%)	6	(3.6%)
2012	8	(6.8%)	23	(15.8%)	9	(6.2%)	3	(2.1%)
2013	10	(9.1%)	17	(12.3%)	13	(9.4%)	2	(1.5%)
2014	8	(6.7%)	26	(18.4%)	6	(4.3%)	3	(2.1%)
2015	7	(7.0%)	34	(27.4%)	6	(4.8%)	0	(0.0%)
Total	48	(8.1%)	123	(17.2%)	46	(6.4%)	14	(2.0%)

▲ **Figure 9.** More than one in four of TB cases reported in 2015 also suffered from diabetes which is 1.7 times higher than the national estimate of 16%. Additionally, 5% of 2015 TB cases were immuno-compromised not attributed to HIV infection.

Tuberculosis and HIV

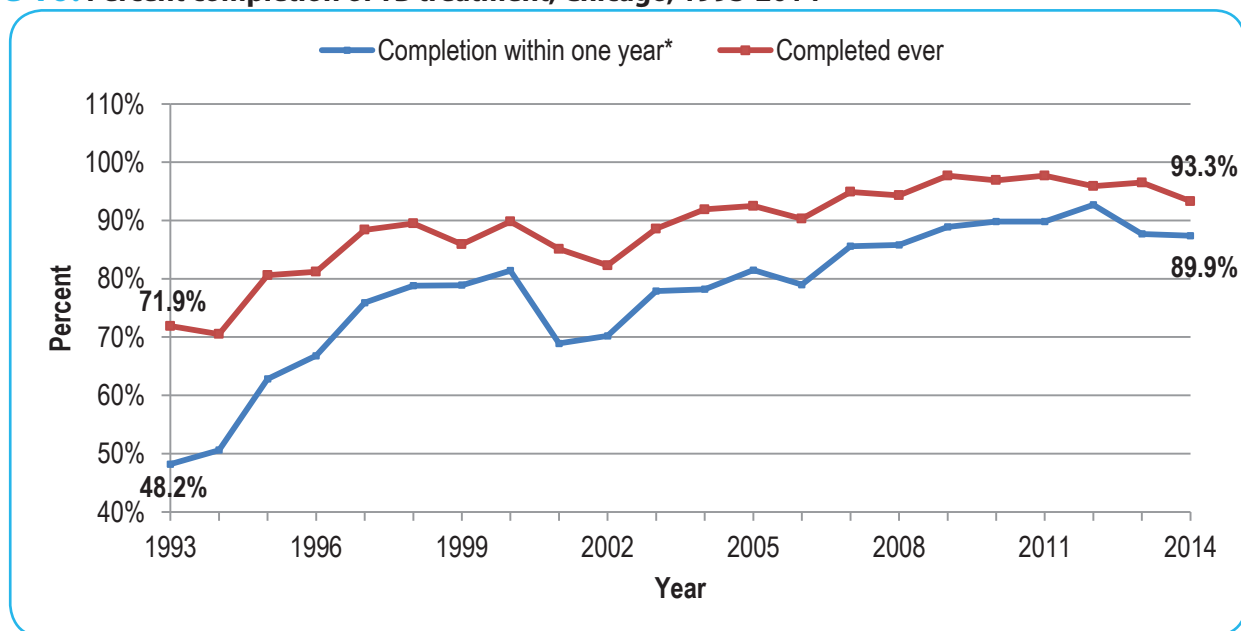
Figure 9. Tuberculosis cases co-infected with HIV (among those tested for HIV), Chicago, 2011-2015



▲ **Figure 9.** In 2015, the proportion of HIV co-infection with TB in Chicago was 7%, slightly above national estimates of 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, 1993-2014

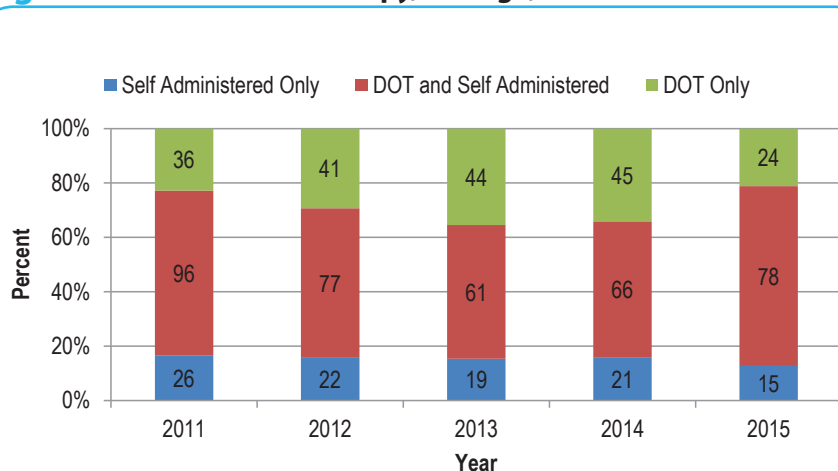


* Patients who died during or before treatment or who moved out of the country are excluded. Patients with resistance to rifampin, meningeal TB, TB of the bone or skeletal system, TB in the central nervous system and children with disseminated TB were also excluded due to expected longer duration of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

▲ **Figure 10.** In 2014, nearly 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 around 90% between 1993-2014. Overall treatment completion has also increased from 71.9% in 1993 to 93.3% in 2014.

Directly Observed Therapy

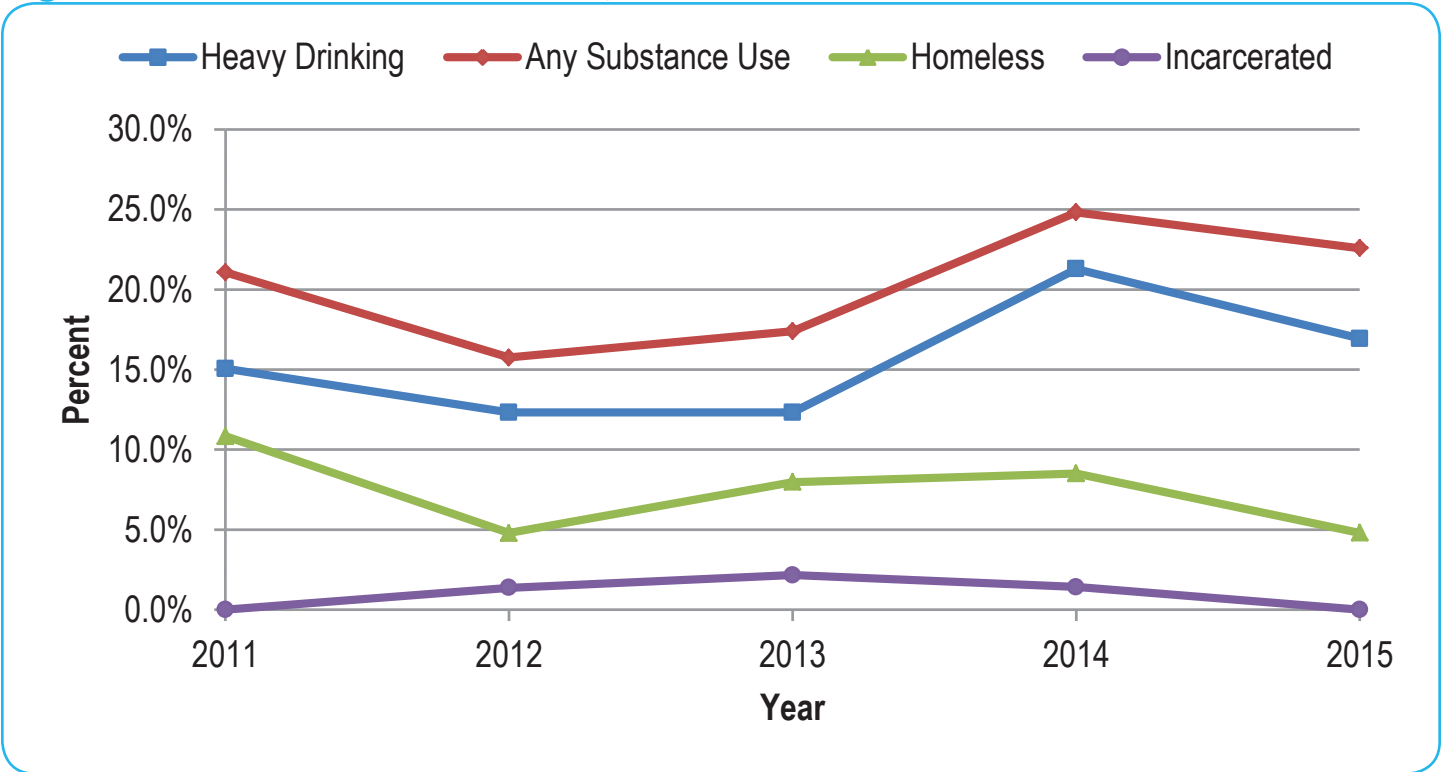
Figure 11. Mode of TB Therapy, Chicago, 2011-2015



◀ **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 2015, 87% of TB cases received either DOT only (20%) or a combination of both DOT and self-administered therapy (67%).

Risk Factors and Tuberculosis

Figure 12. Risk factors for TB disease, Chicago, 2011-2015



▲ **Figure 12.** More than one in 5 of TB cases reported substance use in 2015 (N=28). Among those, alcohol was the most commonly used substance with 17% of cases reporting heavy drinking. Cases among homeless persons have been on a downward trend from a 5-year high of 11% in 2011 to 5% in 2015.

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 2016.

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

