

Public Health - Seattle & King County
Tuberculosis Control Program

Epidemiological Profile Supplement

2011

Published October 2012

Please see our annual report
www.kingcounty.gov/health/TB

Public Health
Seattle & King County



PROGRAM EVALUATION

Table 1. Washington state and national TB objectives for 2011/2015 with performance by King County in 2011

Objective	WA 2011 Target	US 2015 Target	Seattle & King County 2011 Performance
Treatment completion within 12 months	87.0	93.0	90.1*
Incidence**			
Among US-born	1.3	0.7	0.8
Among foreign-born	22.5	14.0	23.6
Among US-born non-Hispanic blacks	5.2	1.3	4.6
Among children younger than 5 years of age	1.7	0.4	1.7
Contacts identified to sputum smear positive cases	100.0	100.0	100.0
Contacts evaluated to sputum smear positive cases	81.0	93.0	75.6
Contacts newly diagnosed starting LTBI treatment	74.0	88.0	59.4
Contacts completing LTBI treatment among newly diagnosed	5.0	79.0	65.6*
Initial drug susceptibility results reported for culture-positive cases	99.0	100.0	100.0
Treatment initiation within 7 days of specimen collection for sputum smear-positive cases	88.0	n/a	68.0
Sputum culture conversion documented within 60 days of treatment initiation for sputum culture-positive cases	63.0	61.5	78.0
Completeness of core RVCT data variables	99.0	99.2	96.4
Started on recommended initial 4-drug regimen when suspected of having TB	92.0	93.4	88.8
Reporting of genotype results for culture-confirmed cases	94.0	94.0	95.2
Reporting of HIV status	86.0	88.7	84.9
Evaluation initiation for Class B immigrants within 30 days of arrival	32.0	n/a	78.1***
Evaluation completion for Class B immigrants within 90 days of arrival	81.0	n/a	78.5***
Reporting of sputum-culture results in cases age 12 or older with pleural or respiratory site of disease	95.7	95.7	94.7

All units are in percent except where otherwise indicated.

*Data is from 2010 cases as treatment regimen is not completed for some 2011 cases

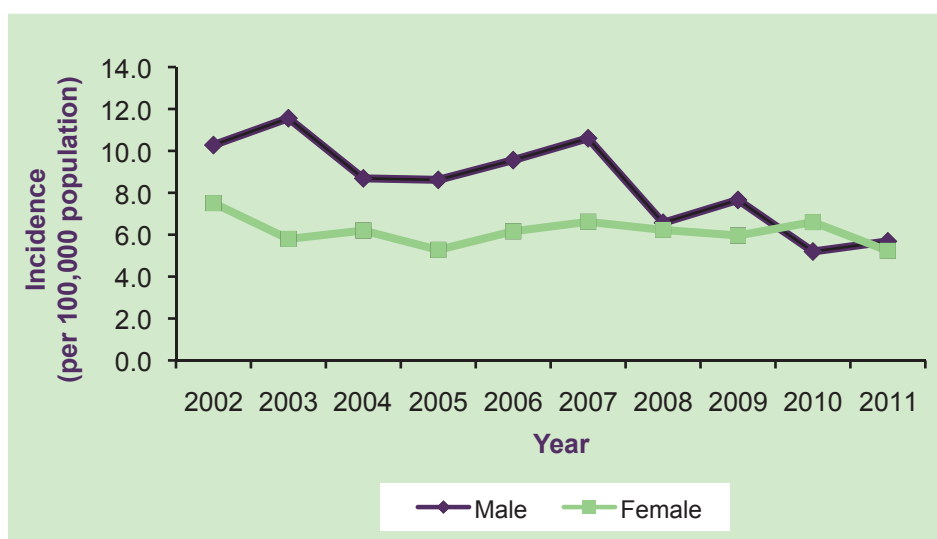
**Case rate per 100,000 people

***Class B1 only

10-YEAR SUMMARY

Table 2. TB case counts by gender and year, 2002-2011, King County, Washington

	MALE	FEMALE	TOTAL
	n (%)	n (%)	n
2002	91 (58)	67 (42)	158
2003	103 (66)	52 (34)	155
2004	78 (58)	56 (42)	134
2005	78 (62)	48 (38)	126
2006	88 (61)	57 (39)	145
2007	99 (61)	62 (39)	161
2008	62 (51)	59 (49)	121
2009	73 (56)	57 (44)	130
2010	50 (44)	64 (56)	114
2011	55 (52)	51 (48)	106

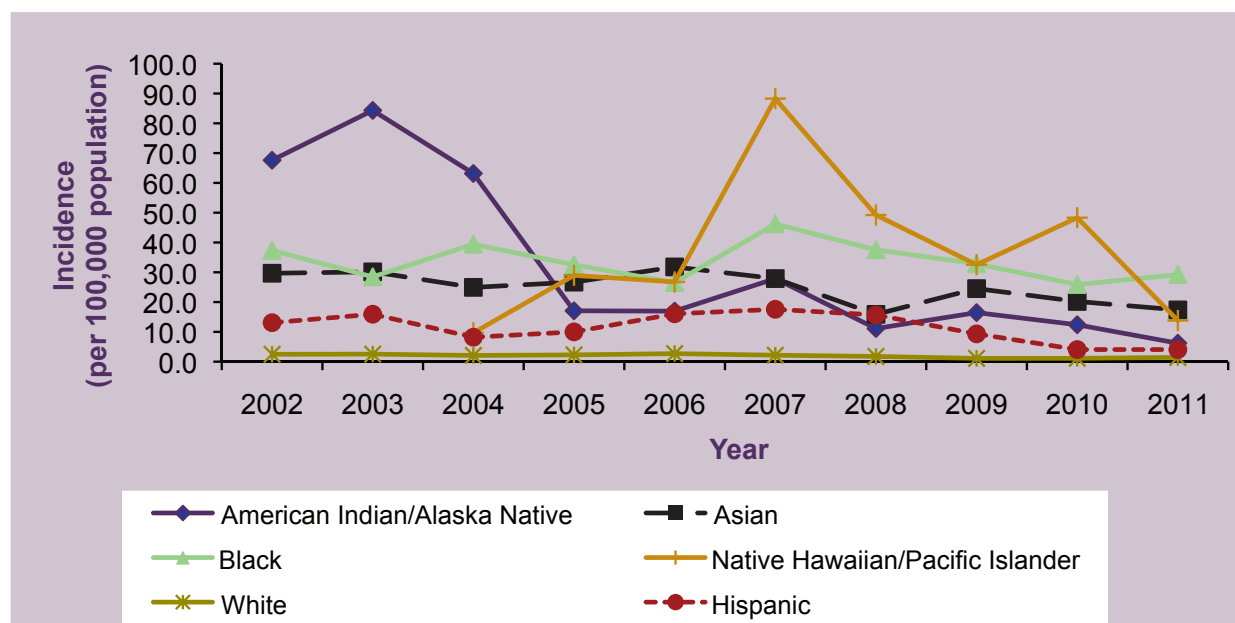
Figure 1. TB incidence (per 100,000 population) by gender and year, 2002-2011, King County, Washington

10-YEAR SUMMARY

Table 3. TB incidence (per 100,000 population) by race or ethnicity and year, 2002-2011, King County, Washington

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
American Indian/ Alaska Native	67.6	84.3	63.2	17.1	17.0	27.9	11.1	16.5	12.4	6.2
Asian	29.7	30.1	24.9	26.7	31.8	27.9	15.9	24.5	20.2	17.4
Black	37.3	28.5	39.4	32.5	26.6	46.2	37.5	32.8	25.9	29.2
Native Hawaiian/ Pacific Islander	*	*	9.7	29.0	26.8	88.3	49.2	32.5	48.3	13.8
White	2.5	2.5	2.1	2.3	2.7	2.2	1.7	1.1	1.1	1.4
Hispanic	13.1	15.9	8.2	10.0	16.1	17.6	15.7	9.3	4.1	4.1

*Population data not available

Figure 2. TB incidence (per 100,000 population) by race or ethnicity and year, 2002-2011, King County, Washington

CHARACTERISTICS OF FOREIGN-BORN CASES BY REGION OF BIRTH

5

Table 4. Characteristics of TB cases born in Southeast Asia, 2007-2011, King County, Washington

Year	2007	2008	2009	2010	2011
Total n Foreign-Born	n=123	n=99	n=110	n=96	n=93
SOUTHEAST ASIA	n(%)	n(%)	n(%)	n(%)	n(%)
n, (% of foreign-born)	32 (26)	21 (21)	40 (36)	35 (36)	29 (31)
Male	18 (56)	11 (52)	24 (60)	16 (46)	15 (52)
Female	14 (44)	10 (48)	16 (40)	19 (54)	14 (48)
Age Group					
0-4 years	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
5-14 years	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
15-24 years	1 (3)	2 (10)	6 (15)	3 (9)	2 (7)
25-44 years	15 (47)	5 (24)	15 (38)	9 (26)	6 (21)
45-64 years	11 (34)	7 (33)	11 (28)	11 (31)	12 (41)
65 years and older	5 (16)	7 (33)	8 (20)	12 (34)	9 (31)
Length of US Residency					
<1 year	6 (20)	1 (5)	9 (23)	2 (6)	2 (7)
1-4 years	3 (9)	1 (5)	8 (20)	4 (11)	3 (10)
5+ years	23 (72)	19 (90)	23 (58)	29 (83)	24 (83)
Country of Origin					
Burma	1 (3)	0 (0)	5 (13)	4 (11)	1 (3)
Cambodia	3 (9)	3 (14)	0 (0)	4 (11)	6 (21)
Indonesia	0 (0)	0 (0)	1 (3)	2 (6)	0 (0)
Laos	4 (13)	0 (0)	1 (3)	1 (3)	0 (0)
Malaysia	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Philippines	3 (9)	9 (43)	20 (50)	12 (34)	10 (34)
Thailand	0 (0)	0 (0)	2 (5)	1 (3)	0 (0)
Vietnam	21 (66)	9 (43)	11 (28)	11 (31)	12 (41)

CHARACTERISTICS OF FOREIGN-BORN CASES BY REGION OF BIRTH

6

Table 5. Characteristics of TB cases born in East Africa, 2007-2011, King County, Washington

Year	2007	2008	2009	2010	2011
Total n Foreign-Born	n=123	n=99	n=110	n=96	n=93
EAST AFRICA	n(%)	n(%)	n(%)	n(%)	n(%)
n, (% of foreign-born)	35 (28)	34 (34)	31 (28)	24 (25)	28 (30)
Male	16 (46)	18 (53)	15 (48)	9 (38)	12 (43)
Female	19 (54)	16 (47)	16 (52)	15 (63)	16 (57)
Age Group					
0-4 years	0 (0)	0 (0)	1 (3)	0 (0)	0 (0)
5-14 years	3 (9)	4 (12)	0 (0)	0 (0)	2 (7)
15-24 years	12 (34)	9 (26)	5 (16)	3 (13)	6 (21)
25-44 years	13 (37)	15 (44)	20 (65)	11 (46)	14 (50)
45-64 years	4 (11)	4 (12)	2 (6)	6 (25)	5 (18)
65 years and older	3 (9)	2 (6)	3 (10)	4 (17)	1 (4)
Length of US Residency					
<1 year	10 (29)	5 (15)	7 (23)	3 (13)	8 (29)
1-4 years	15 (43)	20 (59)	11 (35)	10 (42)	9 (32)
5+ years	10 (29)	9 (26)	13 (42)	11 (46)	11 (39)
Country of Origin					
Eritrea	0 (0)	0 (0)	1 (3)	1 (4)	2 (7)
Ethiopia	14 (40)	12 (35)	13 (42)	13 (54)	13 (46)
Kenya	3 (9)	6 (18)	2 (6)	3 (13)	3 (11)
Somalia	17 (49)	16 (47)	15 (48)	7 (29)	10 (36)
Tanzania	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)

CHARACTERISTICS OF FOREIGN-BORN CASES BY REGION OF BIRTH

7

Table 6. Characteristics of TB cases born in Central America, 2006-2010, King County, Washington

Year	2007	2008	2009	2010	2011
Total n Foreign-Born	n=123	n=99	n=110	n=96	n=93
CENTRAL AMERICA	n(%)	n(%)	n(%)	n(%)	n(%)
n, (% of foreign-born)	14 (11)	15 (15)	9 (8)	6 (6)	7 (8)
Male	10 (71)	9 (60)	4 (44)	3 (50)	2 (29)
Female	4 (29)	6 (40)	5 (55)	3 (50)	5 (71)
Age Group					
0-4 years	0 (0)	0 (0)	1 (11)	0 (0)	0 (0)
5-14 years	0 (0)	0 (0)	0 (0)	0 (0)	1 (14)
15-24 years	5 (36)	3 (20)	0 (0)	2 (33)	1 (14)
25-44 years	4 (29)	8 (53)	7 (77)	3 (50)	3 (43)
45-64 years	3 (21)	3 (20)	1 (11)	1 (17)	1 (14)
65 years and older	2 (14)	1 (11)	0 (0)	0 (0)	1 (14)
Length of US Residency					
<1 year	1 (7)	1 (11)	0 (0)	0 (0)	0 (0)
1-4 years	6 (43)	4 (27)	3 (33)	1 (17)	3 (43)
5+ years	7 (50)	10 (67)	6 (67)	5 (83)	4 (57)
Country of Origin					
El Salvador	2 (14)	0 (0)	0 (0)	0 (0)	0 (0)
Guatemala	3 (21)	0 (0)	3 (33)	0 (0)	2 (29)
Honduras	1 (7)	1 (11)	0 (0)	1 (17)	0 (0)
Mexico	7 (50)	14 (93)	6 (67)	5 (83)	5 (71)
Nicaragua	1 (7)	0 (0)	0 (0)	0 (0)	0 (0)

CHARACTERISTICS OF CASES AMONG THE HOMELESS

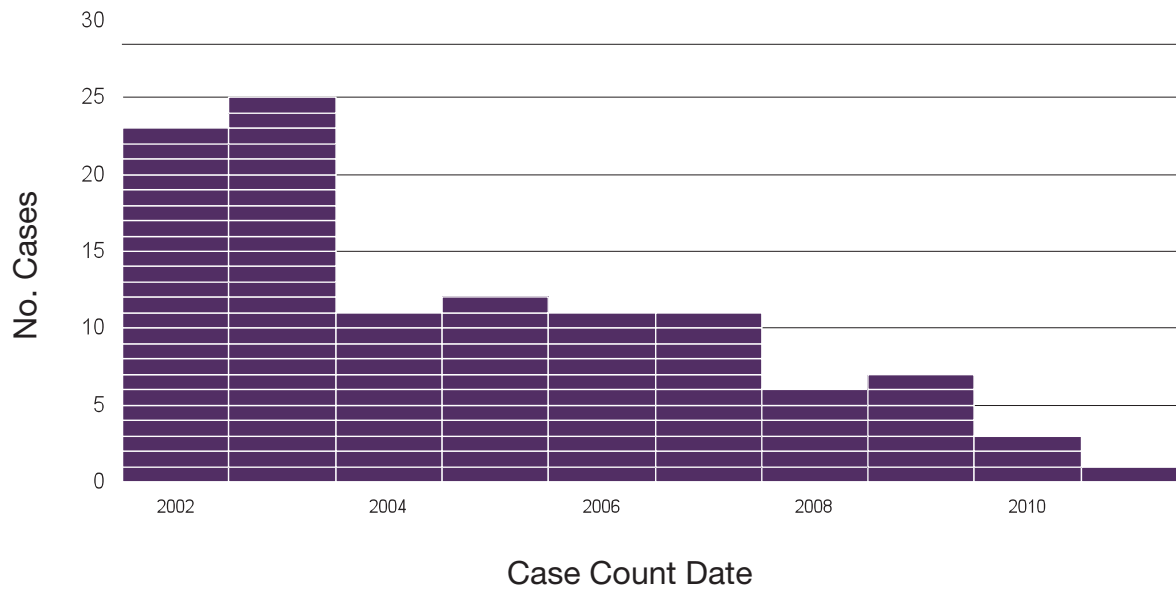
Table 7. Characteristics of homeless people diagnosed with TB, 2002-2011, King County, Washington

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total n	(n=29)	(n=35)	(n=25)	(n=25)	(n=22)	(n=15)	(n=14)	(n=7)	(n=6)	(n=2)
Foreign-Born										
	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Gender										
Male	25 (86)	28 (80)	22 (88)	23 (92)	21 (95)	11 (73)	13 (93)	7 (100)	2 (33)	2 (100)
Female	4 (14)	7 (20)	3 (12)	2 (8)	1 (5)	4 (27)	1 (7)	0 (0)	4 (67)	0 (0)
Age group										
0-4 years	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
5-14 years	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (7)	0 (0)	0 (0)	0 (0)	0 (0)
15-24 years	0 (0)	2 (6)	7 (28)	1 (4)	0 (0)	0 (0)	1 (7)	0 (0)	0 (0)	0 (0)
25-44 years	16 (55)	15 (43)	7 (28)	8 (32)	9 (41)	3 (20)	8 (57)	2 (29)	2 (33)	1 (50)
45-64 years	13 (45)	16 (46)	10 (40)	15 (60)	13 (59)	11 (73)	4 (29)	5 (71)	4 (67)	1 (50)
65+ years	0 (0)	2 (6)	1 (4)	1 (4)	0 (0)	0 (0)	1 (7)	0 (0)	0 (0)	0 (0)
Race										
White	6 (21)	11 (31)	4 (16)	10 (40)	14 (64)	3 (20)	8 (57)	2 (29)	1 (17)	1 (50)
Black	11 (38)	10 (29)	12 (48)	11 (44)	5 (23)	8 (53)	3 (21)	3 (43)	3 (50)	1 (50)
Asian	0 (0)	0 (0)	1 (4)	1 (4)	0 (0)	1 (7)	0 (0)	0 (0)	0 (0)	0 (0)
American Indian/ Alaska Native	11 (38)	14 (40)	8 (32)	1 (4)	3 (14)	3 (20)	2 (14)	0 (0)	1 (17)	0 (0)
Native Hawaiian/ Pacific Islander	1 (3)	0 (0)	0 (0)	2 (8)	0 (0)	0 (0)	0 (0)	1 (14)	1 (17)	0 (0)
Ethnicity										
Hispanic	3 (10)	4 (11)	1 (4)	5 (20)	6 (27)	2 (13)	7 (50)	1 (14)	0 (0)	0 (0)
Birthplace										
US-born	24 (83)	32 (91)	13 (52)	14 (56)	14 (64)	12 (80)	6 (43)	4 (57)	4 (67)	1 (50)
Foreign-born	5 (17)	3 (9)	12 (48)	11 (44)	8 (36)	3 (20)	8 (57)	3 (43)	2 (33)	1 (50)
HIV Positive	9 (31)	2 (6)	0 (0)	3 (12)	4 (18)	2 (13)	5 (36)	1 (14)	1 (17)	1 (50)

CHARACTERISTICS OF CASES AMONG THE HOMELESS

9

Figure 3. Homeless TB Outbreak Strain, 2002-2011, King County, Washington



TB DISEASE CHARACTERISTICS AND TREATMENT

Table 8. Disease characteristics, 2007-2011, King County, Washington

Year	2007	2008	2009	2010	2011
	n=161	n=121	n=130	n=114	n=106
	n(%)	n(%)	n(%)	n(%)	n(%)
Exclusively Pulmonary	72 (45)	55 (45)	71 (55)	54 (47)	42 (40)
Both Pulmonary and Extrapulmonary	36 (22)	25 (21)	17 (13)	18 (16)	12 (11)
Exclusively Extrapulmonary	53 (33)	41 (34)	42 (32)	42 (37)	52 (49)
Sputum smear-positive*	44 (41)	39 (49)	31 (35)	29 (40)	25 (46)
Sputum smear-negative*	54 (50)	38 (48)	52 (59)	35 (49)	23 (43)
DISEASE SITE**					
Pulmonary	108 (67)	80 (66)	88 (68)	72 (63)	54 (51)
Pleural	25 (15)	12 (10)	12 (9)	12 (11)	12 (11)
Lymphatic	43 (26)	27 (22)	25 (19)	25 (22)	24 (23)
Bone and/or Joint	10 (6)	7 (6)	2 (2)	7 (6)	10 (9)
Genitourinary	3 (2)	2 (2)	3 (2)	3 (3)	1 (1)
Meningeal	3 (2)	1 (<1)	0 (0)	3 (3)	1 (1)
Peritoneal	1 (1)	1 (<1)	6 (5)	3 (3)	9 (8)
Other	8 (5)	21 (17)	18 (14)	10 (9)	8 (8)
PROVIDER IF PULMONARY DISEASE*					
Health Department	98 (91)	57 (64)	73 (83)	58 (81)	47 (87)
Private/Other	3 (3)	3 (4)	2 (5)	7 (14)	1 (2)
Both	7 (6)	19 (20)	12 (11)	7 (5)	6 (11)
PROVIDER IF PULMONARY DISEASE*, SPUTUM SMEAR POSITIVE					
Health Department	40 (91)	30 (77)	28 (90)	27 (93)	24 (96)
Private/Other	1 (2)	2 (5)	0 (0)	1 (3)	0 (0)
Both	3 (7)	7 (18)	3 (10)	1 (3)	1 (4)
PROVIDER IF PULMONARY DISEASE*, SPUTUM SMEAR NEGATIVE					
Health Department	51 (94)	25 (66)	42 (81)	27 (77)	20 (87)
Private/Other	1 (2)	1 (3)	2 (4)	5 (14)	0 (0)
Both	2 (4)	11 (29)	8 (15)	3 (8)	3 (13)
PROVIDER IF EXTRAPULMONARY DISEASE					
Health Department	35 (66)	18 (44)	11 (26)	7 (17)	8 (15)
Private/Other	13 (25)	5 (12)	3 (7)	30 (71)	34 (65)
Both	5 (9)	18 (44)	28 (67)	5 (12)	10 (19)

*Of cases with any pulmonary disease.

**Categories not mutually exclusive; one case may have multiple sites of disease.

TB DISEASE CHARACTERISTICS AND TREATMENT

Table 9. Treatment of TB disease, 2007-2011, King County, Washington

Year	2007	2008	2009	2010	2011
	n=161	n=121	n=130	n=114	n=106
	n(%)	n(%)	n(%)	n(%)	n(%)
TREATMENT					
Initiation of Four Drug Therapy*	142 (88)	111 (92)	119 (92)	100 (88)	93 (88)
DRUG RESISTANCE					
Any Initial Resistance	19 (12)	9 (7)	19 (15)	20 (18)	18 (17)
Multi-Drug Resistance**	2 (1)	3 (2)	0 (0)	2 (2)	1 (1)
DEATHS					
Dead at Diagnosis	1 (1)	2 (2)	1 (1)	1 (1)	1 (1)
Died During Treatment	6 (4)	6 (5)	6 (5)	9 (8)	8 (7)
TREATMENT COMPLETION***					
Ever Completed	142 (95)	105 (96)	113 (96)	99 (99)	69 (75)
Completed Within 12 months	134 (90)	98 (90)	107 (91)	90 (90)	66 (72)
Lost to Follow-up/Moved/Refused	7 (5)	4 (4)	5 (4)	1 (1)	3 (3)
METHOD OF TREATMENT†					
Directly Observed Therapy Only	97 (66)	61 (56)	74 (64)	59 (57)	40 (57)
Directly Observed Therapy & Self Administration	28 (19)	25 (23)	15 (13)	7 (7)	8 (11)
Self Administration Only	21 (14)	22 (20)	27 (23)	38 (37)	22 (31)

*Recommended initial treatment with isoniazid, rifampin, pyrazinamide, and ethambutol

**Resistant to at least isoniazid and rifampin

***Per CDC National Tuberculosis Indicators Project (NTIP), this includes all TB patients, for whom 12 months of treatment or less is recommended, alive at diagnosis, initiated treatment with one or more drugs, and counted in the year of interest. Patients with any rifampin-resistant TB or meningeal TB, and children age 14 or younger with disseminated TB are excluded. Disseminated TB is defined by having "miliary" checked in RVCT form as a major site of disease or a positive blood culture. Patients who died during treatment or moved out of the U.S. before finishing treatment are excluded.

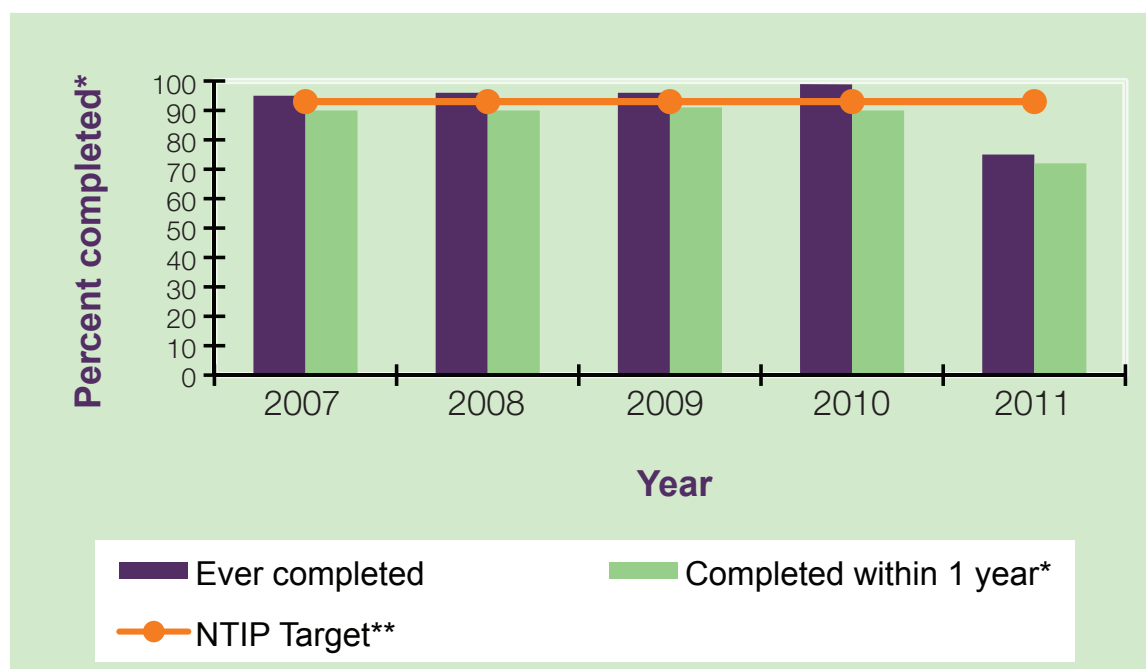
†Among those who completed treatment

Note: Treatment for patients from 2011 may still be ongoing.

TB DISEASE CHARACTERISTICS AND TREATMENT

12

Figure 4. Completion of TB treatment, 2007-2011, King County, Washington



*Per CDC National Tuberculosis Indicators Project (NTIP), this includes all TB patients, for whom 12 months of treatment or less is recommended, alive at diagnosis, initiated treatment with one or more drugs, and counted in the year of interest. Patients with any rifampin-resistant TB or meningeal TB, and children age 14 or younger with disseminated TB are excluded. Disseminated TB is defined by having "miliary" checked in RVCT form as a major site of disease or a positive blood culture. Patients who died during treatment or moved out of the U.S. before finishing treatment are excluded.

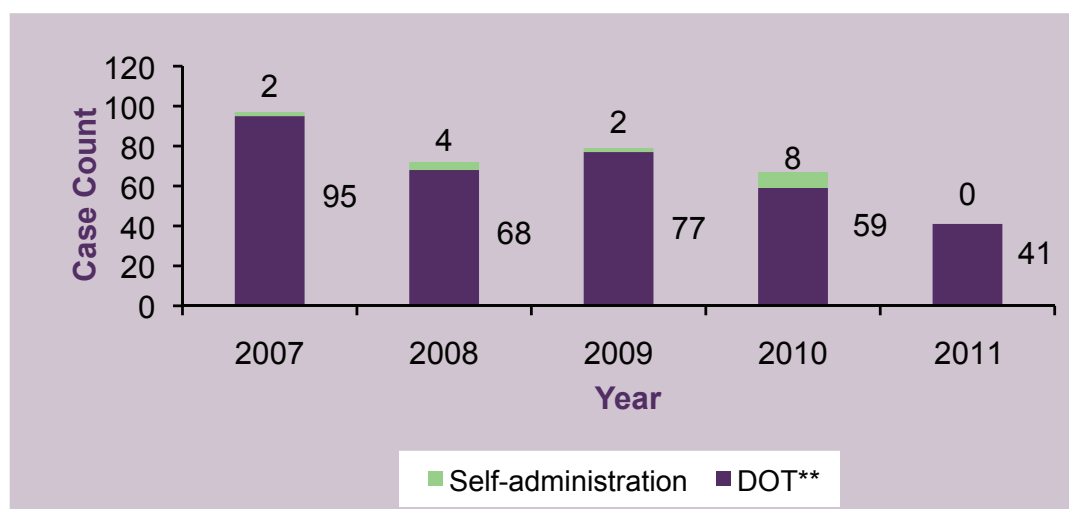
**NTIP 2015 goal is 93% completion within one year or less.

Note: Treatment for patients from 2011 may still be ongoing.

TB DISEASE CHARACTERISTICS AND TREATMENT

13

Figure 5. Pulmonary* TB cases by treatment method, 2007-2011, King County, Washington

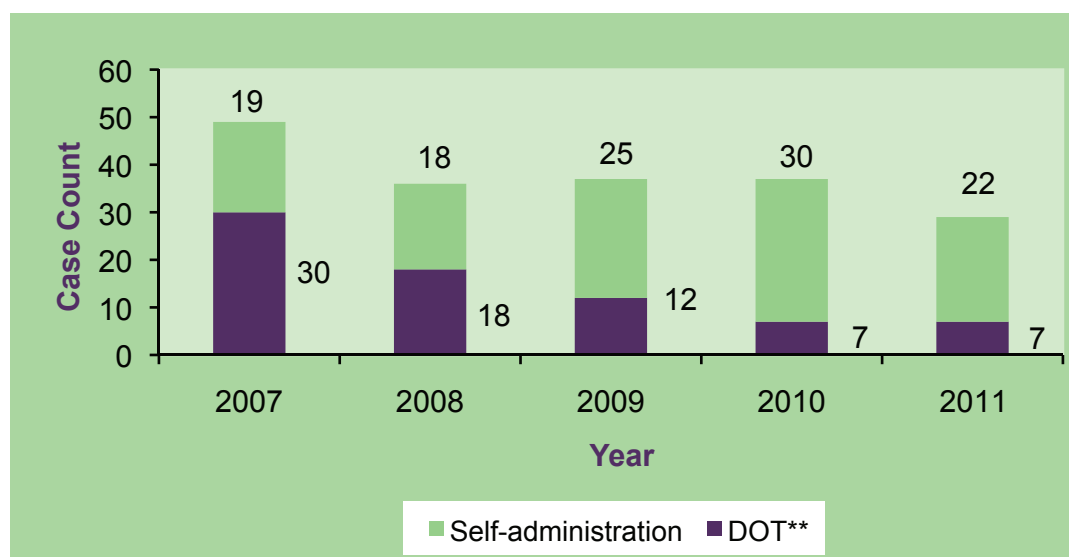


*Includes patients with only a pulmonary site of disease or pulmonary and extra-pulmonary sites of disease.

**Includes patients treated with DOT only and a combination of DOT and self-administered therapy.

Note: Treatment for patients from 2011 may still be ongoing.

Figure 6. Extrapulmonary* TB cases by treatment method, 2007-2011, King County, Washington



*Includes patients with only an extra-pulmonary site of disease.

**Includes patients treated with DOT only and a combination of DOT and self-administered therapy.

Note: Treatment for patients from 2011 may still be ongoing.

TECHNICAL NOTES

Since TB is a reportable disease, all 2011 cases are assumed to have been included in this report. For detailed reporting requirements, see the TB Control Program Resource Guide found on our website. Case verification is determined by the Washington State Department of Health using TB case classifications defined by the Centers for Disease Control and Prevention (CDC).

All case data came from the Public Health Information Management System database (PHIMS). This database was designed to allow counties and states to report TB surveillance data to the CDC. PHIMS uses data from the Report of Verified Case of Tuberculosis (RVCT) case report form, submitted by all reporting areas. Additional information is supplemented by internal program databases.

Washington state 2011 performance indicators are courtesy of the Washington State TB Epidemiological Report, 2010. <http://www.doh.wa.gov/Portals/1/Documents/Pubs/343-112-WATBEpiReport2010.pdf>

National 2015 performance indicators and data are courtesy of the Centers for Disease Control and Prevention, Division of Tuberculosis Elimination National Tuberculosis Indicators Project (NTIP). <http://www.cdc.gov/tb/programs/Evaluation/Indicators/default.htm>

Patient-level genotyping data came from the CDC's Genotyping Information Management System (GIMS) database. GIMS provides TB genotyping information data for TB patients nationwide. <http://www.cdc.gov/tb/programs/genotyping/default.htm>

King County 2007-2009 and 2011 total population, age and gender are from the Washington State Office of Financial Management Intercensal and Postcensal Estimates of April 1 County Population by Age and Sex: 1990-2011. <http://www.ofm.wa.gov/pop/coagemf/default.asp>

King County 2010 population, age, gender, race and ethnicity and 2011 race/ethnicity (replicated from the 2010 data, which is the most recent available) are from the 2010 Census (DP-1 - King County, Washington: Profile of General Population and Housing Characteristics: 2010). http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_DP_DPDP1&prodType=table

2007-2009 Race/ethnicity are from the Washington State Community Health Assessment Tool (1990-2009 Population Estimates: Population Estimates for Public Health Assessment, Washington State Department of Health and Krupski Consulting. December 2009.).

TECHNICAL NOTES

15

U.S./Foreign-Born black are from the American Community Survey Selected Population Profiles (1 yr estimates), 2007-2010. 2011 ACS data are replicated from 2010 numbers, which are the most recent data available. http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuid=&_lang=en&_ts=http://www.kingcounty.gov/health-services/health.aspx

Washington data are courtesy of the Washington State Department of Health. <http://www.doh.wa.gov/cfh/TB/default.htm>

National data are from the CDC's Reported Tuberculosis in the United States, 2010 and Trends in Tuberculosis-United States, 2011. MMWR Morb Mortal Wkly Rep 2012 Mar 23; 61:181-5. <http://www.cdc.gov/tb>

Hispanic ethnicity is of any race. Race is single race only, regardless of ethnicity. Race definitions are changed from reports prior to 2010, which used "Black alone or in combination with one or more other races" (all ethnicities) and may result in a change in rates reported in previous years.

All charts and tables are from TB Control Program, Public Health - Seattle & King County.

Data reported for previous years may change slightly from what was reported in the respective year's summary, as population data are updated with current statistics upon preparation of this report.

Some percentages may not sum to 100 percent due to rounding.

ACKNOWLEDGEMENTS

16

We express gratitude to our community-based medical colleagues for their diagnosis, reporting, and collaboration in the management of TB cases, as well as to the various institutions and agencies that support our case management and contact investigation efforts. We also acknowledge the staff of Public Health - Seattle & King County TB Control Program for their dedication to providing high-quality patient service in order to prevent transmission of TB in King County

This report is prepared by the Tuberculosis (TB) Control Program, Public Health - Seattle & King County
www.kingcounty.gov/health/TB