

*Public Health - Seattle & King County
Tuberculosis Control Program*

*Annual Report
on Tuberculosis*

2010

Public Health 
Seattle & King County

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*For more detailed epidemiological and programmatic data please see our online supplement
www.kingcounty.gov/health/TB*

EXECUTIVE SUMMARY

As members of a global community, residents of King County are vulnerable to tuberculosis (TB), a disease that infects one-third of the world's population and kills nearly two million people every year. Public Health – Seattle & King County's TB Control Program ensures that people with active TB disease are diagnosed and treated, and that people who are exposed to TB are also evaluated and treated, if appropriate, to prevent further spread of TB.

Key findings regarding the epidemiology of TB in King County in 2010 include:

- The incidence of TB is notably higher in King County than in Washington state or the U.S., reflecting that as an international community, King County is more vulnerable to global diseases like tuberculosis. In 2010, King County reported 114 cases of active TB. For every 100,000 residents of King County, 5.9 developed active TB disease, compared to a U.S. rate of 3.6 and a Washington state rate of 3.5.
- People of color continue to have disproportionately high rates of TB, with the highest incidence among individuals who identify their race as Native Hawaiian or Pacific Islander (48.3 cases per 100,000) or black (25.9). Black people born outside the U.S. made up 87% of the black cases in King County in 2010. TB incidence rates were also higher among Asians (20.2), American Indian/Alaska Natives (12.4) and Hispanics (3.5). The rate among whites was 1.1.
- The vast majority of King County TB cases were born outside the U.S. Tuberculosis is endemic in many parts of the world, and individuals diagnosed in King County were born in 23 different countries and two U.S. territories. Of the 96 foreign-born people diagnosed with TB (84% of all active cases), 54% came from five countries: Ethiopia, the Philippines, Vietnam, India, and Somalia.
- Twenty patients (18% of all TB cases) treated for TB were resistant to at least one TB medication. Further, two cases of multi-drug resistant TB were diagnosed in King County in 2010. The treatment of multi-drug resistant TB is much more complex and expensive with an estimated cost of approximately \$250,000 to cure.

The TB Program remains committed to controlling the spread of TB in King County, but narrowed its focus in 2009 to managing the highest-priority cases of public health significance in response to funding reductions due to fiscal challenges. In 2010, the TB Control Program augmented partnerships with local community agencies for the care and management of less-contagious TB cases to local community partners and began looking at alternative methods of service delivery.

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Tuberculosis Control Program Mission Statement

The mission of the Public Health - Seattle & King County TB Control Program is to prevent the transmission of TB in Seattle & King County.

Background: Tuberculosis is an infectious disease that spreads by airborne transmission. One unique aspect of TB is that the latency period (i.e., time between acquisition of TB infection and the development of active TB disease) is highly variable. If active TB disease is untreated, the five-year survival rate is approximately 50%, but with effective antibiotic treatment, the cure rate is close to 100%. As one-third of the world's population has latent TB infection and globally two million people die each year of TB disease, TB remains a serious public health threat worldwide.

The Seattle & King County TB Control Program views local TB control as a community effort, emphasizing public-private partnerships as part of the collaboration among local, state and national organizations.

Priorities: Following national and international guidelines, the TB Control Program prioritizes its functions in the following order:

1. Ensure persons with active TB are identified, isolated if appropriate, and fully treated until cured.
2. Ensure contacts of persons with infectious active TB are evaluated and offered appropriate preventive therapy.
3. Partner with health care professionals and agencies in King County to identify and treat persons who are at high risk for TB infection and reactivation of TB disease.
4. Monitor TB trends in Seattle and King County.

Challenges: The bleak economic picture forced the TB Control Program to reassess its service delivery system for the control of TB in King County in 2009. In response to fiscal challenges for 2009 and beyond, the TB Control Program has refocused its resources on the management of the highest-priority cases of public health significance:

Priority 1	Priority 2	Priority 3
<ul style="list-style-type: none"> • Highly infectious pulmonary TB cases (i.e. sputum AFB smear positive and cavitation on chest x-ray) • Multi-drug resistant TB cases • HIV co-infected TB cases 	<ul style="list-style-type: none"> • Less infectious pulmonary cases (i.e. sputum AFB smear negative and no cavitation on chest x-ray) 	<ul style="list-style-type: none"> • Extra-pulmonary TB • Recently exposed contacts to infectious TB cases

THE TB CONTROL PROGRAM MISSION AND FUNCTION

2010 Focus

In 2009, the TB Control Program began to enhance public-private partnerships for the control of TB in King County. This has remained a focus for our program in 2010. We are also looking at alternative methods of service delivery and taking a more active role in engaging community partners in the management of latent TB infection (LTBI).

In 2010 we explored alternative methods of service delivery and started providing directly observed therapy (DOT) in two Public Health pharmacies (North Public Health and Downtown Public Health). We continue to explore opportunities for partnering with community health centers, private pharmacies and other community based organizations (e.g., homeless shelters) to co-manage our patients. We are exploring ways we can use web-based

technology to provide observed therapy while carefully assessing the protection of privacy.

Treatment of LTBI greatly reduces the risk that TB infection will progress to disease. It is estimated that there are approximately 100,000 individuals with LTBI living in King County. Certain groups are at a high risk of developing TB disease once infected, including children less than five years of age, immunosuppressed individuals, and previously untreated cases of healed TB. The management of LTBI in King County is a monumental task that the TB Control Program cannot manage alone. We continue to explore ways to forge public-private partnerships to improve the management, treatment, and follow-up evaluation of people with LTBI.

DATA SUMMARY

In 2010, clinical services were provided to 1,148 King County residents during 8,360 patient visits to the TB Control Program. The TB Control Program medically evaluated 186 patients for high suspicion of TB disease.

King County reported 114 cases of active TB in 2010. In addition to the 114 cases diagnosed in King County, 10 cases transferred from other jurisdictions completed treatment through King County's TB Control Program or other King County medical providers.¹ For every 100,000 residents of King County, 5.9 developed active TB disease. The King County TB incidence rate is notably higher than the U.S. incidence rate of 3.6 cases per 100,000 population.

Age, race, and ethnicity

The median age of TB cases in 2010 was 46 years. Among the age categories (0-4 years old, 5-14, 15-24, 25-44, 45-64, and 65 or older) the largest proportion (35%) of cases was in people age 25-44 years old, but the highest incidence was among those age 65 and older with 13.8 cases per 100,000.

Five children aged 0-14 years, three of whom were under the age of five, were diagnosed with active TB disease. Active

TB in children under the age of five is often considered to represent recent TB transmission. Two of three children under age five were diagnosed through contact investigations (i.e., family members or caretakers had active TB) and the remaining case under five years old had a history of homelessness and matched the TB genotype strain from the homeless outbreak in King County during 2002-2003.

Non-white races continue to have disproportionately high rates of TB. The highest incidence was 48.3 cases per 100,000 among Native Hawaiian or other Pacific Islanders, followed by blacks at 25.9 cases per 100,000. Twenty-seven of 31 (87%) black cases in King County were born outside the United States. Rates for U.S.-born and foreign-born blacks in King County are 4.5/100,000 and 91.3/100,000, respectively.

The TB incidence in Asians and American Indian/Alaska Natives was 20.2 and 12.4 per 100,000 people, respectively. Rates among Hispanics decreased to 3.5 per 100,000 people in 2010 after a rate of 9.3 in 2009. The TB incidence among whites was 1.1 per 100,000.

¹ Cases transferred in from other areas are not included in King County's yearly count or data analyses.

DATA SUMMARY

Country of birth

In 2010, 96 (84%) of King County TB cases were born outside the United States, 52 of whom (54% of foreign-born) came from five countries: Ethiopia, the Philippines, Vietnam, India, and Somalia.

The TB Control Program evaluated 371 immigrant applicants and refugees who were identified through overseas medical screening as high risk for active TB ("Class B"). Of these, 364 (98%) were first seen within 90 days of referral to the TB Control Program. Four (1%) of the Class B immigrants/refugees evaluated were found to have active TB disease.

Drug resistant TB

In 2010, 20 cases (18%) treated for TB were resistant to at least one TB medication. TB strains that are resistant to at least isoniazid and rifampin, two primary TB drugs, are called multidrug-resistant TB (MDR TB). MDR TB is exceedingly costly and difficult to treat. Two MDR TB cases were diagnosed in King County in 2010.

TB-HIV co-infection

In 2010, HIV test results were obtained for 81% of cases with active TB in King County. Among this group, three cases were co-infected with HIV, representing 3% of TB cases. Nationwide, 65% of TB cases in 2010 had HIV test results obtained, and 6% of those with known HIV status were HIV co-infected.

Homelessness

In 2010, six people were diagnosed with active TB who identified as currently homeless or homeless in the year prior to TB diagnosis. One was co-infected with HIV. The number of homeless cases with active TB has decreased since its peak during an outbreak among the homeless in King County (65 cases over the years 2002-2003). However, the TB strain that caused the TB outbreak among the homeless in 2002-2003 was still found in seven cases with active TB diagnosed in King County in 2010.

Contact investigations

In King County contact investigations are conducted for all infectious TB cases. In 2010, 456 contacts were evaluated. These include contacts from household investigations, four investigations at shelters/homeless sites and two investigations completed at congregate settings (e.g., work site or school).

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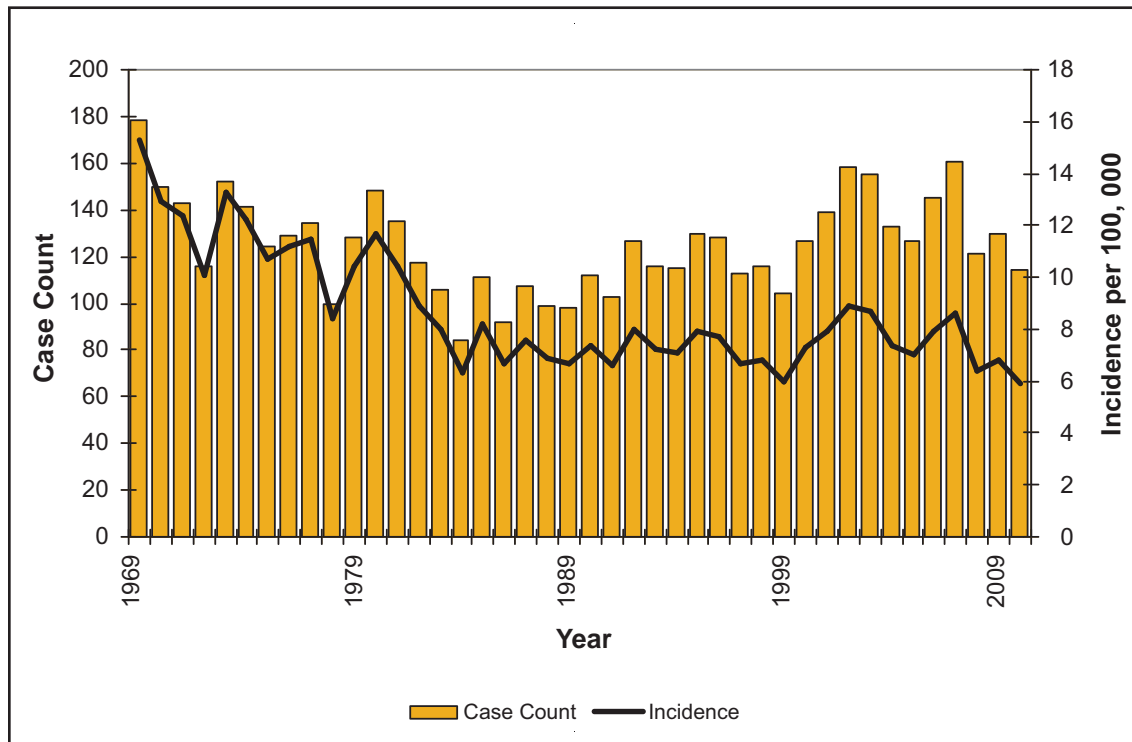
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Tuberculosis in King County

TB morbidity in 2010

The incidence rate of active TB disease in King County was 5.9 cases per 100,000 people in 2010, compared to 6.8 cases per 100,000 people in 2009. The incidence rate in 2010 is the all-time low for King County. The number of reported TB cases decreased from 130 cases in 2009 to 114 cases in 2010. Figure 1 shows the TB case count and incidence rate per 100,000 people in King County from 1969 to 2010.

Figure 1. TB case counts and incidence rates (per 100,000), 1969-2010, King County, Washington



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Incidence Rate in King County, Washington State, and the United States

The incidence rate of TB in King County is higher than the overall incidence rates in Washington and the United States. In Washington, the TB incidence rate decreased from 3.8 per 100,000 in 2009 to 3.5 per 100,000 in 2010, matching the all-time low from 2008 (Table 1). Within Washington state 48% of the total TB cases reside in King County.

TB incidence nationwide is also at an all-time low. In 2010, 11,182 cases of TB were reported in the United States, with

an incidence rate of 3.6 per 100,000 people. This number represents a continual decrease in TB incidence in the United States since the early 1990's.

In 2010, TB incidence rates in the 51 reporting areas of the U.S. (50 states plus the District of Columbia) ranged from 0.6 (Maine and Montana) to 8.8 (Hawaii) cases per 100,000 population. Thirty-seven reporting areas had lower or equal TB rates compared to the national rate in 2010, while 13 states and DC had higher rates than the national rate.

Table 1. TB case count and incidence rate (per 100,000 population), 2006-2010, in the U.S., Washington state, and King County

		2006	2007	2008	2009	2010
U.S.	Case count	13,734	13,280	12,906	11,545	11,182
	Incidence rate (per 100,000)	4.6	4.4	4.2	3.8	3.6
Washington	Case count	262	291	228	256	236
	Incidence rate (per 100,000)	4.1	4.5	3.5	3.8	3.5
King County	Case count	145	161	121	130	114
	Incidence rate (per 100,000)	7.9	8.6	6.4	6.8	5.9

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Age

In 2010, the mean age of TB cases in King County was 47 years (median 46 years), with a range from 9 months to 92 years. The greatest proportion of cases was among 25-44 year-olds (35%), with those age 45-64 and 65 or older each representing approximately 25%. The highest incidence rate per 100,000 people was in the 65 or older age group (13.8 per 100,000) (Table 2).

In Washington in 2010, the greatest proportion of people who had TB was 25-44 year-olds (33%) with the 45-64 age group comprising 27% and persons 65 and older making up 19% of cases. The highest TB incidence rate in Washington was in adults age 65 and older, with 5.5 cases per 100,000 people.

Nationally in 2010, the greatest proportion of cases was seen among 25-44 year-olds (33%) followed by 45-64 year-olds (31%) and adults age 65 and older (20%). The highest incidence rate of TB was seen in adults age 65 and older, with 5.5 cases per 100,000 people. Individuals in the 25-44 years age group had the second highest incidence rate, with 4.4 cases per 100,000 individuals.

Table 2. TB case count and incidence rate (per 100,000 population) by age group, 2006-2010, King County, Washington

Age Group	2006		2007		2008		2009		2010	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
0-4	<5	1.9*	<10	6.4	<5	3.6*	<5	3.5*	<5	2.5*
5-14	<5	0.9*	<10	2.8	<10	2.3	<5	0.5*	<5	0.9*
15-24	18	7.2	30	11.9	19	7.5	16	6.3	10	4.0
25-44	55	9.4	57	9.7	46	7.8	61	10.3	40	6.6
45-64	38	7.8	42	8.4	23	4.5	28	5.4	30	5.8
65+	30	15.3	19	9.5	24	11.6	20	9.4	29	13.8

**Incidence rates in the 0-4 and 5-14 age groups may be unstable due to a small case count; therefore they should be interpreted with caution*

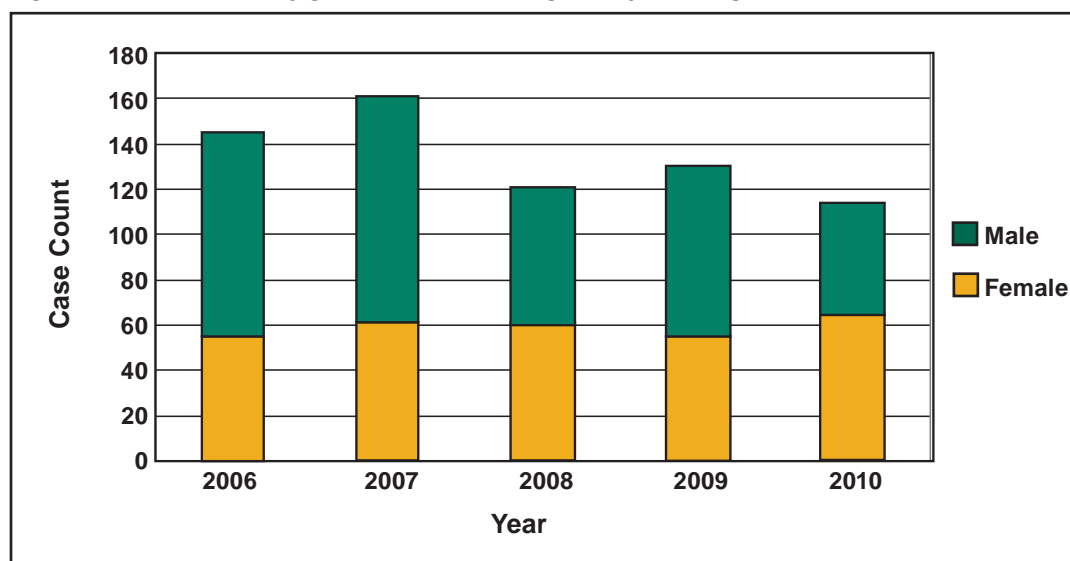
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Gender

Historically in King County males comprise 55-65% of TB cases. In 2010, for the first time in over a decade, females comprised a larger proportion than males, representing 56% of the cases (Figure 2). The TB incidence rate was 5.2 cases per 100,000 among males and 6.6 per 100,000 among females.

In Washington, males were 52% of all TB cases. Nationally in 2010, males represented 61% of all TB cases.

Figure 2. TB case counts by gender, 2006-2010, King County, Washington



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TB Among People Born Outside the United States

Country of origin

In 2010, 96 patients diagnosed with active TB in King County were born outside the United States (foreign-born).² These individuals were born in 23 countries and two U.S. territories. A large proportion (54%) came from five countries: Ethiopia, the Philippines, Vietnam, Somalia, and India. In 2010, 31% of people with TB in King County were born in Southeast Asia, 21% in East Africa, 5% in Central America and 27% from other countries outside the United States.

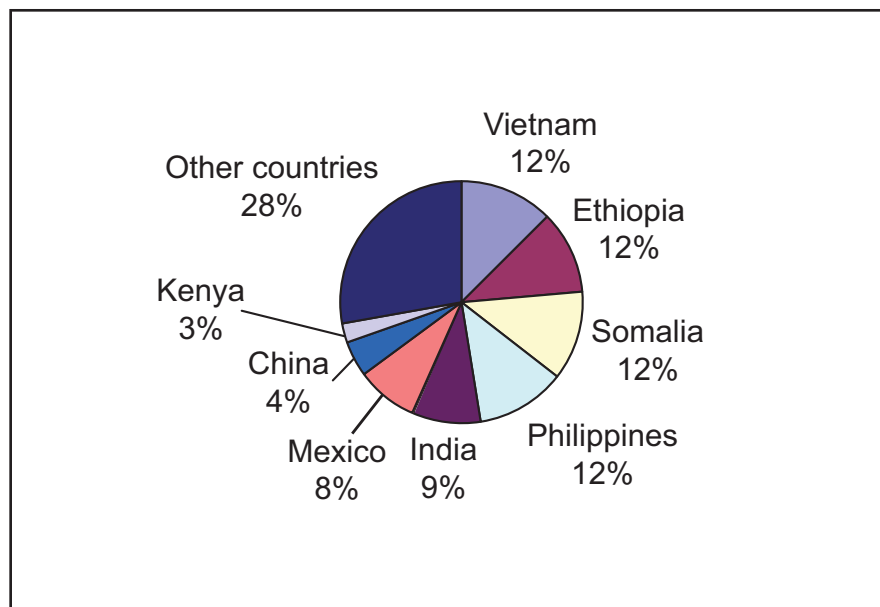
The proportion of foreign-born cases (84% of all cases) in King County remains higher than that of the U.S. in 2010 (60% of cases).

Age and gender in foreign-born cases

The greatest number of foreign-born people diagnosed with TB in King County in 2010 was in the 25-44 age group (37% of foreign-born cases). Among U.S.-born cases the age group with the highest representation was 45-64 year-olds (29%).

Females made up a similar proportion of foreign-born (56%) and U.S.-born (53%) cases.

Figure 3. Country of origin among foreign-born TB cases, 2006-2010, King County, Washington



² Centers for Disease Control and Prevention and the U.S. Census Bureau define "US-born" as: if "he or she was born in the United States or associated jurisdictions or was born in a foreign country but at least 1 parent was a U.S. citizen." All other individuals are classified as "foreign-born."

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Duration of stay in U.S. prior to diagnosis

In 2010 in King County, the length of time since arrival in the U.S. was available for all TB cases born outside the United States. Of this group, 8% lived in the U.S. less than one year when they were diagnosed with TB, 22% lived in the U.S. one to four years, and 70% resided in the U.S. five years or more when diagnosed. Nationally in 2010, 15% of adult foreign-born cases lived in the U.S. less than one year, 18% one to four years, and 55% five years or more at the time of TB diagnosis.

Figure 4 shows the 2010 distribution of time between immigration and TB diagnosis for cases born outside the U.S. for whom an arrival date is known and who are from select high-TB burden countries. Proportionally, individuals from Ethiopia and Kenya lived in the U.S. for a shorter duration than individuals from other areas before they received a diagnosis of TB.

Class B applicant evaluations

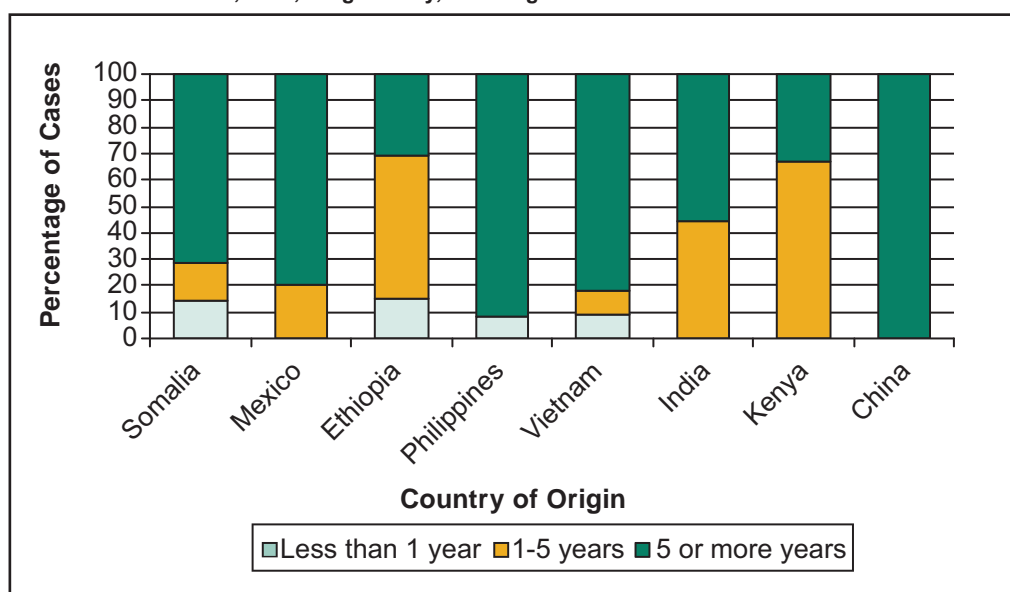
It is the policy of the TB Control Program to evaluate the immigrant applicants and refugees who are identified as

high risk for active TB ("Class B") during overseas medical screening. During the time period of this report (2010), there were two Technical Instructions (1991 and 2007) from the Centers for Disease Control and Prevention (CDC) that guided overseas medical screening.³

In 2010, 585 Class B immigrants/refugees were reported to the TB Control Program from CDC through the Washington State Department of Health. Of these, 371 (63%) were evaluated at the TB Control Program, and 142 (24%) were referred out to community providers. Ninety-eight percent of Class B immigrants/refugees evaluated by the TB Control Program were first seen within 90 days of the report (median of 31 days). Four (1%) of those evaluated were diagnosed with active TB and began treatment.

Of the immigrants seen at an initial assessment visit, 52% were male, 61% were Asian, 8% were white, and 6% were black (where race was available). Fifteen percent were under the age of 18, while 65% were age 35 or older. The most represented countries of origin for this population were Philippines (126 [34%]), Vietnam (65 [18%]), Bhutan (29 [8%]), Burma (22 [6%]), and China (21 [6%]).

Figure 4. Distribution of time between arrival in U.S. and TB diagnosis, foreign-born TB cases, from select countries, 2010, King County, Washington



³<http://www.cdc.gov/immigrantrefugeehealth/exams/ti/civil/tuberculosis-civil-technical-instructions.html>

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Racial Disparities and TB

Race and ethnicity

In the U.S. in 2010 the highest incidence of TB was among individuals identifying as Asian (22.4 cases per 100,000) and Native Hawaiian or other Pacific Islander (20.8 cases per 100,000).

All non-white race and ethnicities in King County continue to have disproportionately high rates of TB. For the past four years, the greatest proportion of TB cases in a single racial group in King County occurred among people who identify as Asian, yet the highest incidence rate occurred among people who identify as Native Hawaiian or other Pacific Islander. In 2010, Asians represented 50% of all TB cases in King County, and the incidence rate among people who identify as Native Hawaiian or other Pacific Islander was 48.3 cases per 100,000 (Table 3).

Table 3. TB incidence per 100,000 population by race and ethnicity, 2006-2010, King County, Washington

Race/Year	2006	2007	2008	2009	2010
American Indian or Alaska Native	17.0	27.9	11.1	16.5	12.4
Asian	31.8	27.9	15.9	24.5	20.2
Black	26.6	46.2	37.5	32.0	25.9
Native Hawaiian or Pacific Islander	26.8	88.3	49.2	32.5	48.3
White	2.7	2.2	1.7	1.1	1.1
Hispanic	16.1	17.6	15.7	9.3	3.5

People who identify as Hispanic represented 5% of TB cases in King County in 2010, a decrease from the 9% seen in 2009, 17% in 2008, and 13% in both 2007 and 2006. The incidence rate for those who identify as Hispanic has steadily decreased over the past five years, from 16.1 per 100,000 in 2006 and 17.6 in 2007 to 3.5 per 100,000 in 2010.

Among the racial groups, the largest decrease in TB incidence rate from 2009 to 2010 was seen among American Indian or Alaska Natives (16.5/100,000 in 2009 to 12.4/100,000 in 2010). The only increase was among Native Hawaiian or other Pacific Islanders (32.5 to 48.3 per 100,000 from 2009 to 2010).

Drug Resistance of TB

Multi-drug resistant TB (MDR TB) is defined as TB that is resistant to at least isoniazid (INH) and rifampin, the two most effective first-line TB antibiotics. While treatment for a fully-susceptible (i.e., non-drug resistant) case of TB typically lasts from six to nine months, treatment for individuals with MDR TB typically lasts from 18 to 24 months, or even longer depending on the response to treatment. Cost estimates for a typical case of MDR TB are \$250,000 or more to cure.

There were two individuals (2% of all cases) diagnosed as having MDR TB in King County in 2010. For comparison, nationally 107 cases of MDR TB were reported in 2010 (1.3% of cases with drug susceptibility results available). The proportion of MDR TB cases in the U.S. has been stable since 1997. In 2010, MDR TB continued to disproportionately affect people born outside the U.S., accounting for 82% of MDR TB cases.

Extensively drug-resistant TB (XDR TB) is defined as resistance to INH and rifampin, as well as any of the fluoroquinolones, and at least one of the three second-line injectable TB medications (amikacin, kanamycin, or capreomycin). No XDR TB cases were reported in King County in 2010. One case of XDR TB was reported nationally in 2007, five in 2008, none in 2009 and one in 2010.

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TB and Human Immunodeficiency Virus (HIV) Co-infection

In order to provide concurrent medical care for TB and HIV infection in a timely manner and to minimize morbidity and mortality, it is important to know the HIV status of every person who has active TB. In 2010 in King County, HIV test results were obtained for 81% of cases with active TB, three (3%) of whom were co-infected with HIV and TB (Table 4). All TB-HIV infected cases were foreign-born, which represented 4% of foreign-born cases with HIV-test results available. In 2010, HIV and TB diagnosis occurred at the same time for all three cases.

The CDC reported that over one-third of 2010 U.S. TB cases did not have the results of a recent HIV test available (within three months of TB report). Nationally, of those with HIV status available for 2010, about 6% are co-infected with TB and HIV.⁴

Table 4. HIV status among TB cases, 2006-2010, King County, Washington

HIV Status	2006 N (%)	2007 N (%)	2008 N (%)	2009 N (%)	2010 N (%)
Negative	113 (78)	141 (88)	98 (81)	107 (82)	89 (78)
Positive	10 (7)	9 (6)	8 (7)	3 (2)	3 (3)
Refused	6 (4)	3 (2)	4 (3)	3 (2)	1 (<1)
Not offered	8 (6)	5 (3)	8 (7)	11 (8)	8 (7)
Unknown	7 (5)	3 (2)	3 (2)	6 (5)	12 (11)

⁴California and Vermont did not report HIV status to the Centers for Disease Control and Prevention.

TB in People Who are Homeless

Six homeless persons were diagnosed with active TB in 2010, comprising 5% of all TB cases in King County. Screenings took place at four congregate setting sites as part of these investigations. Seven homeless cases with TB were reported in King County in 2009, also representing 5% of all cases that year.

Nationwide in 2010, 5.6% of TB cases aged 15 or older were reported as homeless, although case count and incidence rate varies widely between states.

Homelessness is defined as lacking a fixed, regular, and adequate night-time residence or occupying a primary night-time residence that is a supervised shelter designed to provide temporary living accommodations. For the purpose of reporting at the national level, cases reported as homeless must be homeless within the 12 months prior to the initiation of their TB diagnostic evaluation. It should be noted that there were two more individuals reporting a recent homeless history beyond 12 months prior to evaluation that did not fall under this definition.

The median age (49) of homeless people who were diagnosed with active TB in 2010 was similar to that of 2009 (48).

Four homeless cases in 2010 were female and two were male. In both 2009 and 2008, all homeless cases were males.

In 2010, four of the six homeless cases were born in the U.S. (67% of homeless cases). In 2009, three of the seven (43%) homeless cases were born in the United States.

Three of six homeless cases (50%) identified as black or African American. One identified as American Indian or Alaska Native (17%), compared to none in 2009 and two of thirteen cases in 2008 (15%). The number and proportion of American Indian/Alaska Native cases has remained low since the 2002-2003 TB outbreak among the homeless subsided (in 2002-2003, 43% were Native American).

None of the six homeless cases identified as Hispanic, representing a decrease from the Hispanic homeless cases reported in the last two years (one of seven in 2009 and seven of thirteen in 2008).

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Note on TB outbreak among the homeless

In late 2002, a TB outbreak was detected among the homeless. Based on diagnosis date, a single strain was responsible for 17 (57%) of 30 cases among the homeless. In 2003, this outbreak strain was responsible for 26 (74%) of 35 homeless cases. Since 2003, the TB Control Program, community health care providers, and various agencies that serve this population have made intensive efforts to control this outbreak. The number of homeless TB cases matching the outbreak strain dropped considerably (between nine and 11 cases yearly between 2004 and 2006, four cases in 2007, three in 2008, two in 2009, and two in 2010).

Reactivation of TB disease caused by the outbreak strain is still taking place, as indicated by genotyping results (7% of culture positive cases in 2007, 3% of culture positive cases in 2008, 7% in 2009, and 7% in 2010). It is uncertain whether remote or recent transmission is playing a larger role in the persistence of the outbreak strain.

TB Contact Investigations

Contact investigations are conducted in household settings for all cases with infectious TB. A team comprised of nurse case managers and disease intervention specialists is responsible for identifying and evaluating all household contacts and “very close social contacts.” In general, household contacts are family members of a pulmonary TB case and “very close social contacts” including close friends, relatives, and coworkers who spend many hours together in a confined space. Such contacts are then prioritized for evaluation based upon characteristics of the case, the environment in which they were exposed, the cumulative duration of their exposure, and their own immunologic status.

An estimated 494 close contacts were identified in King County in 2010. Of these, 456 (92%) individuals received an evaluation for TB. Evaluation consisted of history, symptom check and a test for latent TB infection (TB skin test or Quantiferon Gold In-Tube [QFT]), if indicated). Of the contacts evaluated, 360 (79%) had a TB skin test or QFT administered and read. Twenty-one percent (76) were skin test or QFT positive on first round (or immediately

after being identified as a contact). On second round (or 8–10 weeks after the last exposure to the infectious TB case), 10% (36) were skin test or QFT positive. Among those with two rounds of testing, a TST/QFT conversion rate of approximately 11% was observed, indicating potential transmission among these close contacts. The overall TB infection rate was 23% positive among close contacts. Ninety-six infected contacts (86%) began treatment for latent TB infection, of whom 29% have completed treatment, 36% are still on treatment, with the remainder either moved, lost to follow-up, or treatment discontinued for other reasons.

In 2010, five of 456 (1%) contacts evaluated were diagnosed as active TB cases; thus, of all 114 cases in 2010, five (4%) were discovered as a result of contact investigation. When an index case was highly infectious, or a household contact investigation suggested TB transmission (i.e., TB infection rate higher than expected), the contact investigation was expanded to the second tier of people who were less intensely exposed to the index case. Additionally, when necessary, if the index case spent prolonged hours in congregate settings, contact investigations were expanded and people at the setting were evaluated.

TB cases in schools or other congregate settings

The TB Control Program’s Outbreak Prevention Section is responsible for investigating TB exposure in congregate settings, outbreak response, and surveillance. Congregate setting investigations take place at workplaces, schools, vocational settings, and other settings such as religious organizations and homeless shelters. The number of congregate site investigations decreased in 2010 due to both a reduction in resources as well as in caseload. Investigations in medical facilities and nursing homes were typically conducted by facility staff rather than by the TB Control Program.

In 2010, the TB Control Program conducted contact investigations at six congregate settings (including educational institutions, worksites, and homeless shelters/sites), identifying 155 contacts.

TECHNICAL NOTES

Since TB is a reportable disease, all 2010 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). The case count for 2010 presented in this summary differs from earlier publications by King County and Washington state, as two cases previously counted were removed upon preparation of this report due to a determination that they were not true cases of TB.

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.

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 2010 population, age, gender, race and ethnicity are from the 2010 Census (DP-1 - King County, Washington: Profile of General Population and Housing Characteristics: 2010). http://factfinder2.census.gov/bkmk/table/1.0/en/DEC/10_DP/DPDP1/0400000US53.05000

King County 2006-2009 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: 1990-2010.

<http://www.ofm.wa.gov/pop/coagemf/default.asp>

2006-2009 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.).

U.S./Foreign-Born black are from the American Community Survey Selected Population Profiles (1 yr estimates), 2006-2009. 2010 ACS data are replicated from 2009 numbers, which are the most recent data available.

http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts=http://www.kingcounty.gov/healthservices/health.aspx

Washington data are courtesy of the Washington State Department of Health.

<http://www.doh.wa.gov/cfb/TB/default.htm>

National data are from the CDC's Reported Tuberculosis in the United States, 2010.

<http://www.cdc.gov/tb>

Hispanic ethnicity is of any race. Race is single race only, regardless of ethnicity. Race definitions are changed from previous years' reports, 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.

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www.kingcounty.gov/health/TB