Public Health — Seattle & King County
Tuberculosis Control Program

Annual Report on Tuberculosis

2011

Published October 2012

For more detailed epidemiological and programmatic data,please see our online supplement that can be accessed at www.kingcounty.gov/health/TB

Public Health
Seattle & King County

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.

This report details key findings and accomplishments regarding TB in King County in 2011.

- 106 cases of TB were reported in King County in 2011, and the TB Control Program provided more than 9,000 patient-visits at its clinic. The rate in 2011 was the lowest over the past 30 years in Seattle and King County, with the number of TB cases in the homeless community at an all-time low.
- While rates for TB declined, there are an estimated 100,000 people with latent (or dormant) TB infection (LTBI) in King County. LTBI remains a challenge to the control of TB because the majority of new active TB cases come from this pool of people. Thanks to a 10-year grant from the Centers for Disease Control and Prevention (CDC), as well as new technologies and interventions, the TB Control Program has a renewed focus improving diagnosis and treatment of LTBI to help decrease the number of individuals progressing to active TB disease.
- In 2011, King County experienced its first case of extensively drug-resistant TB (XDR TB). XDR TB is resistant to the most potent TB drugs and is costly and difficult to treat. The XDR TB case was diagnosed overseas but had lived in King County. As a result, the TB Control Program collaborated with international, national and state agencies on the response to the exposure. No further cases of XDR TB were diagnosed in King County.
- In 2011, the TB Control Program incorporated a number of innovative strategies for treating patients with active and latent TB disease. These include expanding the use of web-based technology to virtually observe patients taking their TB medications and implementing a new, shorter treatment for people with latent TB infection.

THE TUBERCULOSIS (TB) CONTROL PROGRAM

The Public Health — Seattle & King County TB Control Program works to stop the transmission of TB in King County.

We view local TB control as a community effort, emphasizing public-private partnerships as part of the collaboration among local, state and national organizations.

Our services

Following national and international guidelines, priorities for the TB Control Program include:

- Ensuring persons with active TB disease, especially infectious cases, are identified in a timely manner, isolated if appropriate, and fully treated until cured.
- Ensuring contacts of persons with infectious TB are evaluated and offered appropriate preventive therapy.
- Partnering with health care professionals and agencies in King County to identify and treat persons who are at high risk for latent TB infection and for progression to TB disease.
- Monitoring TB trends in Seattle and King County.

Services for people who have— or are suspected of having — infectious TB disease

The TB Control Program ensures that cases of active infectious TB disease are diagnosed promptly and that their treatment is initiated in a timely manner and completed. We work with health care providers in King County to establish a treatment plan for all active TB cases.

Through specialized case management, we ensure that patients with active TB receive health care services associated with their TB management. Directly observed therapy (DOT) for infectious and other TB cases of public health significance is part of the standard of care in King County. A trained public health worker observes patients taking their prescribed TB medications to ensure adherence and completion of TB treatment in order to protect the public.

The TB Control Program also provides social services to address any psychosocial barriers that may interfere with a patient's adherence to TB treatment, ensuring appropriate referrals and counseling for our patients.

Contact Investigations

After someone is diagnosed with infectious TB disease, our program conducts and guides contact investigations to ensure that people who were exposed to TB are evaluated and treated, if appropriate. This is an effective approach to interrupting TB transmission in the community. Through evaluation of close contacts, we identify people who have developed active TB disease in a timely manner, as well as those who could benefit from treatment for latent TB infection. In 2011, 5% of active TB cases in King County were discovered as a result of contact investigations.

THE TUBERCULOSIS (TB) CONTROL PROGRAM

Follow-up TB Evaluation for Immigrants & Refugees

The TB Control Program evaluates new immigrants and refugees who had an abnormal chest X-ray prior to emigration. If they are diagnosed with latent TB infection, we either offer treatment or work with community partners to ensure these patients are treated as appropriate.

Epidemiological Surveillance

The TB Control Program conducts surveillance for all confirmed and suspected cases of TB in King County. Our program studies trends and indicators of TB cases to better understand the dynamics of the development and transmission of TB in our community. By analyzing data, we develop strategies to improve TB control services to our community.

Research

Our research projects seek to better understand TB control, as well as to improve treatment and management of TB and latent TB infection. Highlights of current research projects include a 10-year grant from the Centers for Disease Control and Prevention (CDC) to improve the diagnosis and treatment of latent TB infection, as well as a project to assess genetic variation immunity to TB.

Education and Outreach

Providing education to patients and health care providers is a fundamental element of our efforts to control TB. As part of our efforts, we participate in community events to provide information for a better understanding of TB. For example, in 2011 we began a project to develop innovative education materials geared toward foreign-born communities using a generous grant from the Firland Foundation. We also provide annual “TB Intensive” courses attended by approximately 40 health-care professionals.

Quality Improvement

The TB Control Program conducts both clinical and programmatic evaluation of its activities to ensure maximum effectiveness and efficiency. We conduct weekly case review and semi-annual cohort reviews to evaluate and measure our standards in the provision of care.

Consultation to Healthcare Professionals

The TB Control Program provides health care professionals with consultation regarding diagnosis, treatment and policy issues on latent TB infection and active TB disease and participates in developing state and national TB-related guidelines.

TB IN KING COUNTY

Patient care

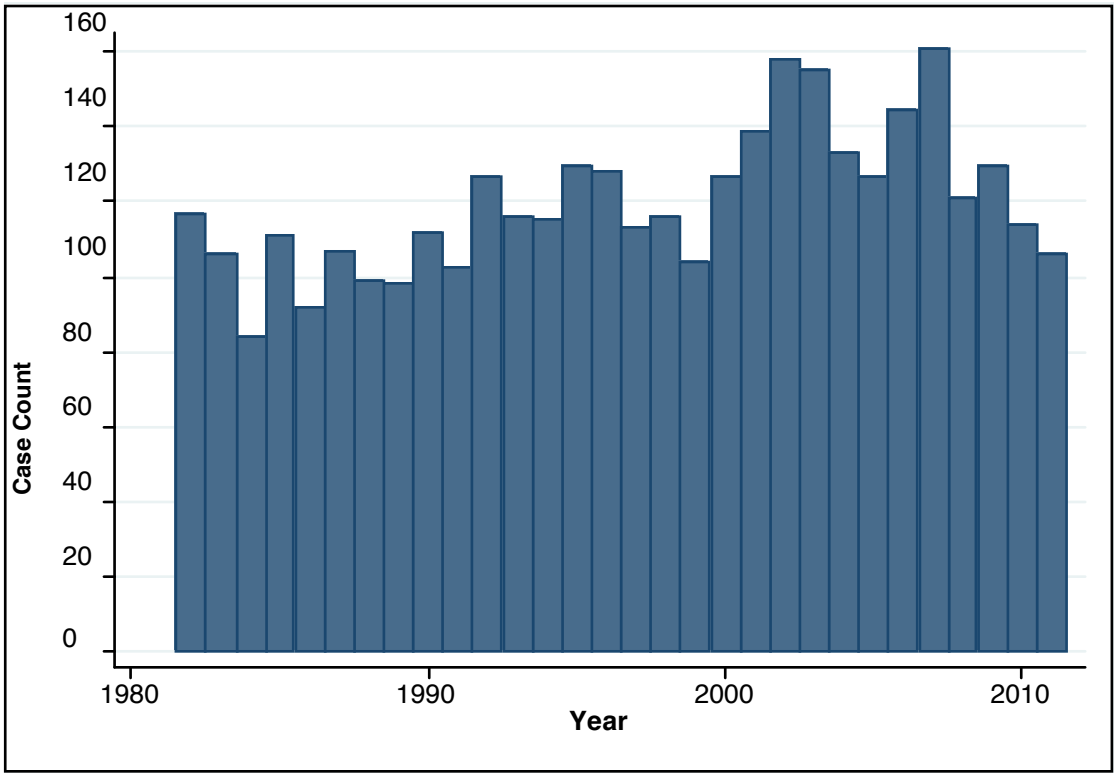
In 2011, 1,344 King County residents received direct services (9,386 patient-visits) from the TB Control Program. This includes medical evaluation for 152 patients who were suspected of having infectious TB disease.

The program has implemented a case management model using a team-based, regionalized approach consisting of public health nurses, disease intervention specialists, and outreach workers, who provide individualized, direct patient care. Directly observed therapy (DOT) is used for priority TB cases as the standard of care to ensure adherence and completion of TB treatment and to protect the public.

Case counts and rates

The number of reported TB cases decreased from 114 cases in 2010 to 106 cases in King County in 2011 (Figure 1).

Figure 1. TB case counts in King County, 1981-2011

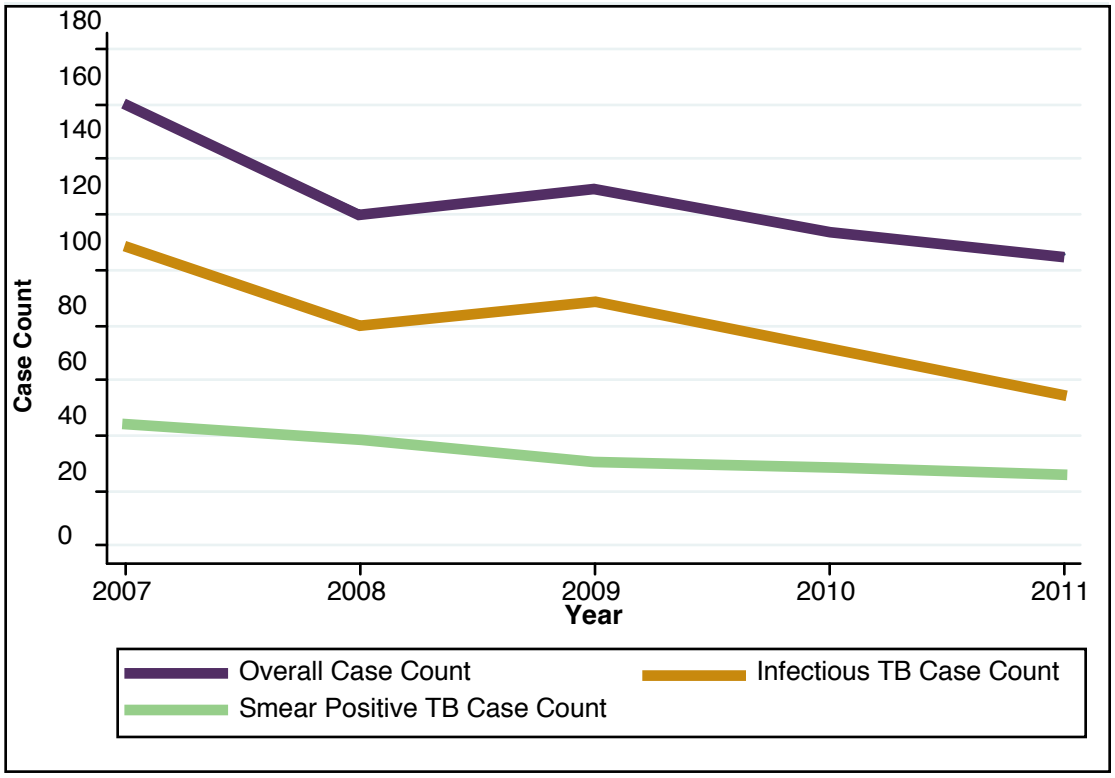


TB IN KING COUNTY

The proportion of highly infectious (smear positive) cases remained approximately the same over the last five years (Figure 2).

The case rate of active TB disease reached an all-time historical low for King County in 2011. The case rate of active TB disease in King County was 5.5 cases per 100,000 people in 2011, compared to 5.9 cases per 100,000 people in 2010.

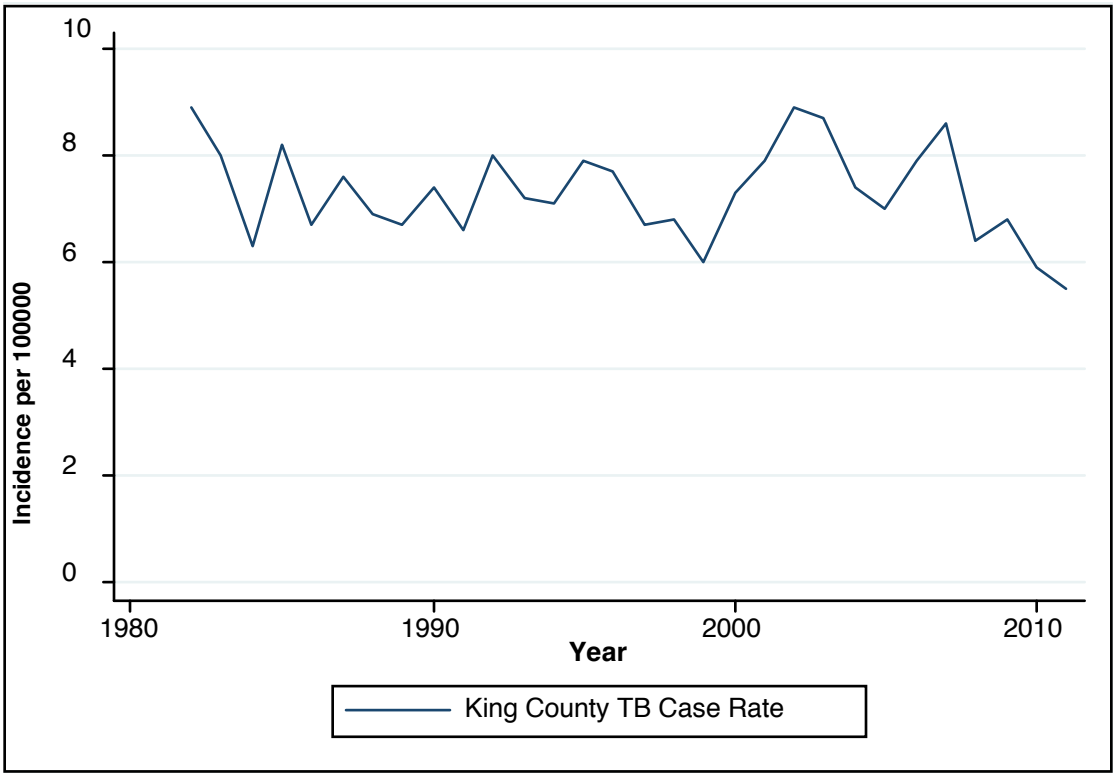
Figure 2. TB case counts in King County, 2007-2011



TB IN KING COUNTY

Figure 3 shows the TB case rate per 100,000 people in King County, Washington state, and the United States from 1969 to 2011.

Figure 3. TB case rates (per 100,000) in King County, 1981-2011



While at an all-time low, the case rate of TB in King County is higher than the overall case rates in Washington and the United States. In Washington, the TB case rate decreased from 3.5 per 100,000 in 2010 to 3.0 per 100,000 in 2011, reaching the all-time low for our state. Within Washington state, 53% of the total TB cases resided in King County.

TB incidence nationwide is also at the all-time low since national reporting began in 1953, with a continuing decline in case rates since the early 1990's. In 2011, 10,521 cases of TB were reported in the United States, with a case rate of 3.4 per 100,000 people.

Gender and Age

Historically, males comprise 55-65% of TB cases in King County. In 2011, 51% of TB cases were male. The TB case rate was 5.7 cases per 100,000 among males and 5.2 per 100,000 among females.

In Washington, similar to King County, males and females shared an equal proportion of TB cases in 2011. Nationally, males consistently comprise 60-65% of TB cases.

TB IN KING COUNTY

Table 1. TB case rate (per 100,000 population) by age group, 2007-2011, King County

Age Group	2007	2008	2009	2010	2011
	Rate	Rate	Rate	Rate	Rate
0-4	6.4	3.6	3.5	2.5	1.7
5-14	2.8	2.3	0.5	0.9	1.8
15-24	11.9	7.5	6.3	4.0	5.7
25-44	9.7	7.8	10.3	6.6	5.2
45-64	8.4	4.5	5.4	5.8	5.1
65+	9.5	11.6	9.4	13.8	12.4

In 2011, the median age of TB cases in King County was 46 years, with cases ranging in age from five months to 90 years. Locally and nationally, 25-44 year-olds comprised the largest proportion of cases and the highest case rate was among persons 65 and older (Table 1).

In King County, six children age 0-14 years, including two children under the age of five, were diagnosed with active TB disease. Both of the children under age five were diagnosed through contact investigations (associated adults had infectious TB disease).

Race and Ethnicity

All non-white races and ethnicities in King County continue to have disproportionately high rates of TB. For the past five years, the greatest proportion of TB cases in King County has occurred among people who identify as Asian (46% of all TB cases in 2011). The highest case rate in 2011 occurred among people who identify as Black or African American (29.2 cases per 100,000), which is 21 times greater than that of whites (1.4 cases per 100,000) (Table 2). Thirty-one of 35 (89%) black cases in King County were born outside of the United States. Case rates for U.S.-born and foreign-born blacks in King County are 4.5 and 114.0, respectively.

Among the racial groups, the largest decrease in TB case rate from 2010 to 2011 was seen among Native Hawaiian or other Pacific Islanders (48.3 in 2010 to 13.8 in 2011). This is a shift from the trend over the past four years where the highest incidence in King County occurred among people who identify as Native Hawaiian or other Pacific Islander.

TB IN KING COUNTY

Table 2. TB case rate per 100,000 population by race and ethnicity, 2007-2011, King County

Race	2007	2008	2009	2010	2011
American Indian or Alaska Native	27.9	11.1	16.5	12.4	6.2
Asian	27.9	15.9	24.5	20.2	17.4
Black or African American	46.2	37.5	32.0	25.9	29.2
Native Hawaiian or Pacific Islander	88.3	49.2	32.5	48.3	13.8
White	2.2	1.7	1.1	1.1	1.4
Hispanic	17.6	15.7	9.3	3.5	4.1

People who identify as Hispanic represented 7% of TB cases in King County in 2011, a slight increase from the 5% seen in 2010 but still decreasing from proportions seen in earlier years. The case rate for those who identify as Hispanic was 4.1 in 2011, compared to a low of 3.5 in 2010 and much higher rates in prior years.

In the U.S. in 2011, the highest incidence of TB was among individuals identifying as Asian (21.4) and Native Hawaiian or other Pacific Islander (16.8), compared to 6.3 among blacks and 0.8 among whites.

TB Among People Born Outside the United States

In 2011, 93 patients diagnosed with active TB disease in King County were foreign-born[1]. These individuals were born in 23 countries and one U.S. territory. A large proportion (56%) came from five countries: Ethiopia, Vietnam, the Philippines, Somalia and India.

The proportion of foreign-born cases (88% of all cases) in King County remains considerably higher than that of the U.S. (63% of cases) (Figure 4). In addition, while the rate of TB in the U.S. is 12 times greater among foreign-born persons than among the U.S.-born, it is much more disparate in King County: The TB rate among the foreign-born is close to 30 times greater than that of U.S.-born persons.

[1]Centers for Disease Control and Prevention and the U.S. Census Bureau define "U.S.-born" as "someone born in one of the 50 states or the District of Columbia, or someone born outside the United States to at least one parent who was a U.S. citizen." All other individuals are classified as "foreign-born."

Figure 4. Trends in TB Cases among Foreign-Born persons, 2007-2011, King County

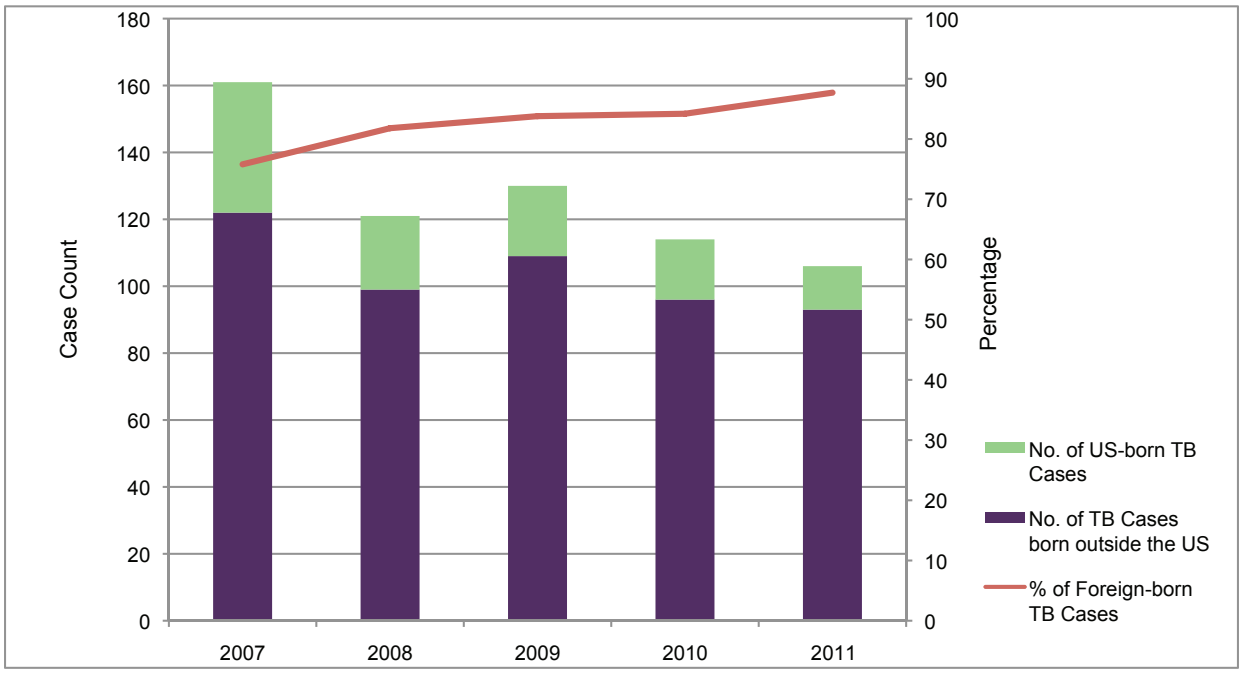
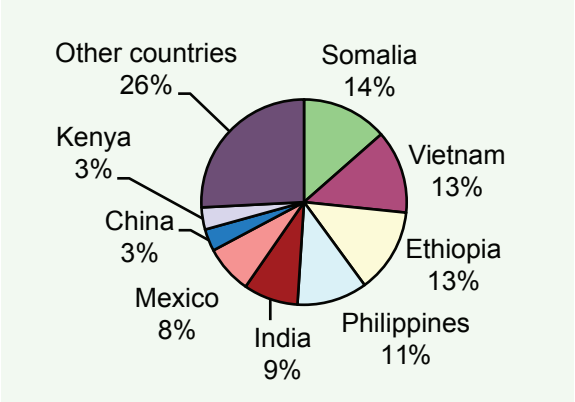


Figure 5 shows the country of origin among foreign-born cases in King County from 2007-2011. Patients from Somalia, Vietnam, Ethiopia, the Philippines, and India comprise 60% of foreign-born cases over the last five years.

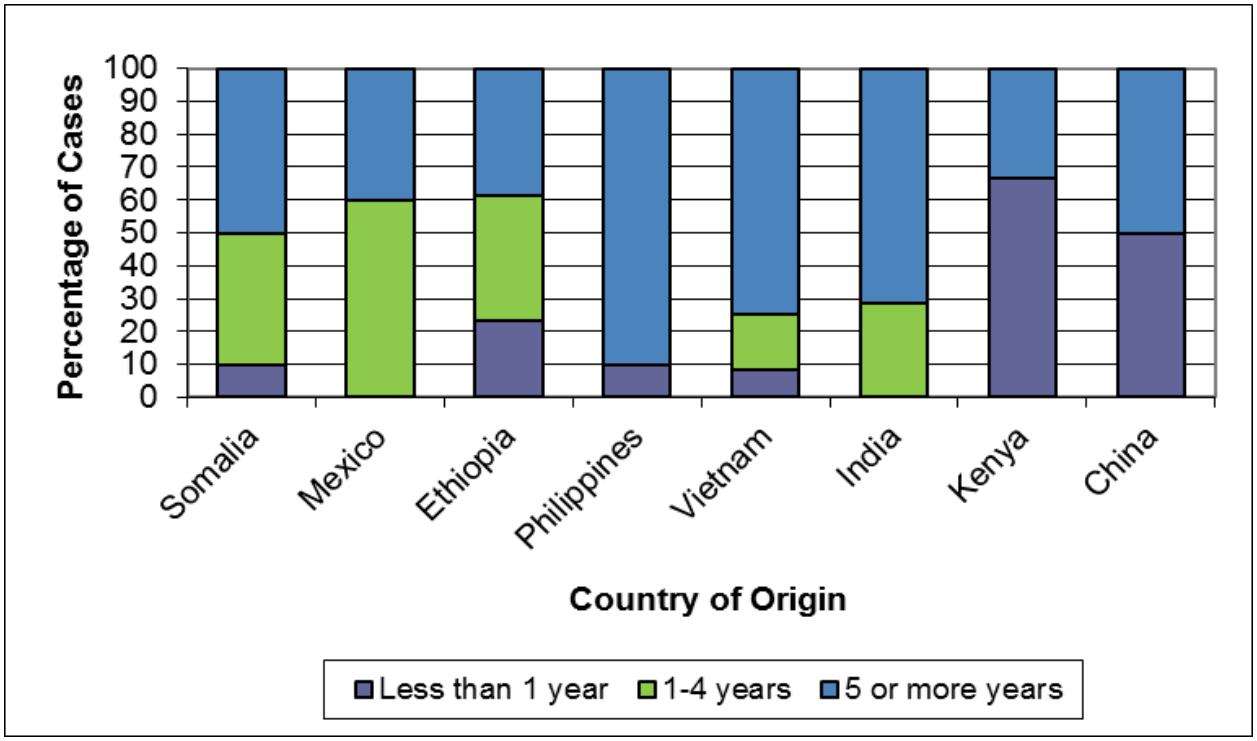
Figure 5. Country of origin among foreign-born TB cases, 2007-2011, King County



Among the foreign-born people diagnosed with TB in King County in 2011, 13% lived in the U.S. less than one year before diagnosis, 20% lived in the U.S. one to four years, and 67% lived in the U.S. five years or more when diagnosed. Nationally in 2011, 14% of adult foreign-born cases lived in the U.S. less than one year, 17% one to four years, and 59% five years or more at the time of TB diagnosis, with the remaining 10% unknown.

Figure 6 shows the 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 Kenya and China lived in the U.S. for a shorter duration than individuals from other areas before they received a diagnosis of TB.

Figure 6. Distribution of time between arrival in U.S. and TB diagnosis, foreign-born TB cases from select countries, 2011, King County



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 disease. In 2011 in King County, HIV test results were obtained for 85% of cases with active TB disease, four (4%) of whom were co-infected with HIV and TB (Table 3). All TB-HIV infected cases were foreign-born, representing 5% of foreign-born cases with HIV-test results available. Nationally, of TB cases with HIV status available for 2011 (81%), 8% are co-infected with TB and HIV.

Table 3. HIV status among TB cases, 2007-2011, King County

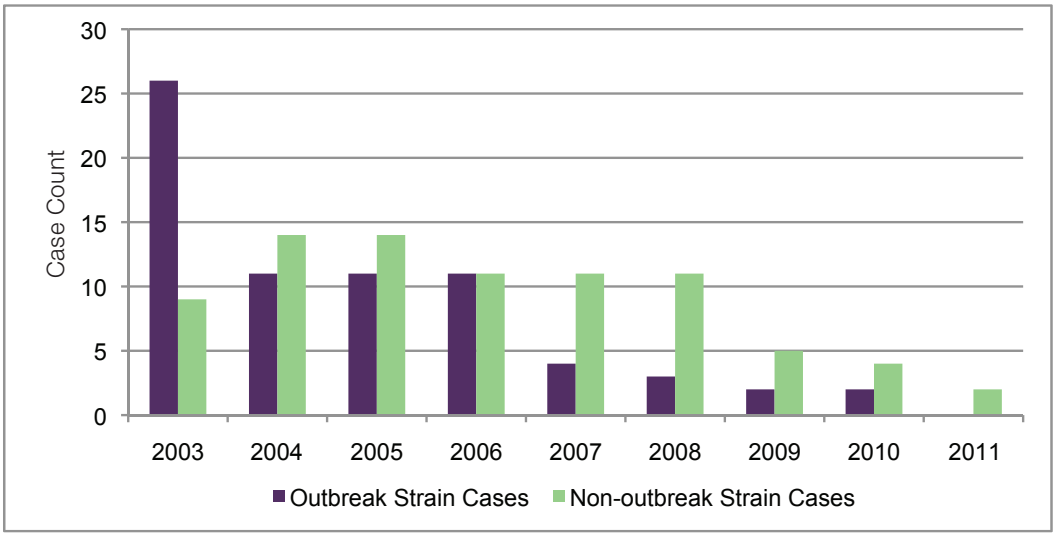
HIV Status	2007	2008	2009	2010	2011
	N(%)	N(%)	N(%)	N(%)	N(%)
Negative	141 (88)	98 (81)	107 (82)	89 (78)	86 (81)
Positive	9 (6)	8 (7)	3 (2)	3 (3)	4 (4)
Refused	3 (2)	4 (3)	3 (2)	1 (<1)	3 (3)
Not offered	5 (3)	8 (7)	11 (8)	8 (7)	10 (9)
Unknown	3 (2)	3 (2)	6 (5)	12 (11)	3 (3)

TB in People who are Homeless

In 2011, two people diagnosed with active TB disease identified themselves as homeless at the time of diagnosis or in the year prior to TB diagnosis (1.9% of TB reported cases). Both were adult males, one U.S.-born and one foreign-born. One was co-infected with HIV. The number of homeless cases with active TB disease has decreased since its peak during an outbreak among the homeless in King County (65 active TB cases in 2002-2003, where a single strain was responsible for 66% of homeless cases) (Figure 7). However, TB disease caused by the outbreak strain is still taking place, as indicated by genotyping results (an average of 6% of culture positive cases each year from 2007-2010). In 2011, the outbreak strain was found in one patient with active TB disease who had a history of homelessness. Although the persistence of the outbreak strain in the community is presumed secondary to progression from remote infection, current technology does not distinguish remote vs. recent transmission.

Nationwide in 2011, 5.8% of TB cases age 15 or older were reported as homeless, although case count and case rate varies widely between states.

Figure 7. Homeless case count by strain type, King County



Drug Resistance

In 2011, 18 cases (17%) treated for TB were resistant to at least one TB medication, and one individual was diagnosed and treated for multidrug-resistant TB (MDR TB) (1.2% of all cases whose drug susceptibility results were available). Multidrug-resistant TB (MDR TB) is defined as TB that is resistant to at least isoniazid 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.

Nationally 98 cases of MDR TB were reported in 2011 (1.3% of all cases whose drug susceptibility results were available). The proportion of MDR TB cases in the U.S. has been stable since 1997. In 2011, MDR TB continued to disproportionately affect people born outside the U.S., accounting for 83% of MDR TB cases nationwide.

There was exposure to one XDR TB case who was diagnosed overseas but had lived in King County. After collaboration with international, national and state agencies regarding the exposure, no further cases of XDR TB were found in King County. Extensively drug-resistant TB (XDR TB) is defined as resistance to INH and rifampin, plus any of the flouroquinolones, and at least one of the three second-line injectable TB medications (i.e., amikacin, kanamycin, capreomycin). Four cases of XDR TB were reported nationally in 2011, all among foreign-born persons.

POPULATIONS WE SERVE

There are an estimated 100,000 people with latent TB infection (LTBI) in King County. The TB Control Program promotes targeted TB testing among populations that are at high risk for recent infection, or, if already infected, are at increased risk for developing TB due to medical conditions. We collaborate with community health care providers to advance targeted testing and treatment for LTBI in King County.

Contact Investigations

Five percent of active TB cases in King County in 2011 were discovered as a result of contact investigations. Contact investigations are conducted in household settings for all cases with infectious TB disease (pulmonary, sputum AFB smear-positive cases). 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" include close friends, and relatives who spend many hours together in a confined space. Such contacts are prioritized for evaluation based on characteristics of the case, the environment in which they were exposed, the cumulative duration of their exposure, and their own health/immunological status.

Six-hundred and twenty-three household/close contacts were identified in investigations in King County in 2011. Of these, 481 (77%) individuals received an evaluation for TB. Evaluation consisted of medical history/symptom check and a test for latent TB infection (TB skin test or QuantiFERON Gold In-Tube [QFT]), if indicated. Among those evaluated, 111 (23%) were found to be infected with LTBI (38 with prior history of LTBI diagnosis and 73 newly diagnosed LTBI). Of those infected, 52 (47%) began treatment for latent TB infection. Of those, 67% have either completed or are still on treatment to date, and 29% discontinued LTBI treatment because of drug intolerance, relocation, and for other reasons.

In 2011, 1% of contacts evaluated were diagnosed as active TB cases.

TB Cases in Schools or Other Congregate Settings

Congregate setting investigations take place at workplaces, schools, vocational settings, and other settings such as religious organizations and homeless shelters. In 2011, the TB Control Program conducted contact investigations at 12 congregate settings (including educational institutions, worksites, and homeless shelters/sites), identifying 456 contacts. Investigations in medical facilities and nursing homes were conducted directly by agency medical staff and the role of the TB Control Program is to provide guidance and technical assistance to assure interruption of TB transmission in those settings.

POPULATIONS WE SERVE

Immigrant and Refugee Evaluations

The TB Control Program evaluates immigrants and refugees who are identified as inactive TB during overseas medical screenings (categorized as "Class B"). The majority of those cases have abnormal chest X-rays suggestive of untreated pulmonary TB and thus are at high risk of progression to infectious TB disease.

In 2011, 487 Class B applicants were reported to the TB Control Program by the CDC through the Washington State Department of Health (73% immigrant , 25% refugee, and 2% asylee). Of the 487 reported, 96% were reviewed by the TB Control Program, all within 90 days of the report (median of 10 days). Sixty-four percent (314) were seen for further evaluation by the TB Control Program, and 32% (155) were referred out to community providers (80% of those with an initial LTBI diagnosis). One patient (<1%) was diagnosed with active TB disease and began treatment.

Of the immigrants seen at an initial assessment visit, 51% were female. Fifty-seven percent were Asian, 5% were white, and 5% were black (race was unavailable for 33%). Eight percent were under the age of 18, 66% were age 19-64, and 26% were age 65 or older. The most represented countries of origin were Philippines (108 [34%]), Vietnam (49 [16%]), Bhutan (33 [11%]), China (30 [10%]), and Burma (16 [5%]).

Refugee Screening

Public Health-Seattle & King County's Refugee Health Screening Clinic provides health screening and care coordination for new refugee arrivals in King County, typically within 90 days of arrival in the United States. During the health screening visit, refugees are tested for latent TB infection using a skin test (TST) or blood test (QFT). All QFT results are reported to the TB Control Program for surveillance purposes, but we rely on community providers to notify us of skin test results. The Refugee Health Screening Clinic conducts follow-up for all refugees testing positive for latent TB infection to encourage treatment provision by community providers. Any refugees suspected of having active TB are seen by the TB Control Program.

In 2011, the Refugee Health Screening Clinic screened 1,369 refugees. The most represented countries of origin are Burma (347 [25%]), Bhutan (269 [20%]), Somalia (194 [14%]), Iraq (181 [13%]), and Iran (141 [10%]). Of 141 TSTs , we received notification from providers that 48 (34%) were read. Of those read, 9 (19%) were positive (10mm+). Of 1,200 QFT blood tests, 331 (28%) were positive. No new active TB cases were discovered among 2011 refugee arrivals.

ENHANCEMENT, ADVANCEMENT, AND INNOVATIONS

Technology

- In 2011, the TB Control Program expanded the use of web-based technology to virtually observe patients taking their TB medications. Patients call the TB clinic to alert staff when they are ready to take the medication. The patient then connects with the clinic online and takes the medication while a representative from the clinic observes that the accurate dosage has been taken. During the Web chat, patients also can talk to TB clinic staff about possible side effects they are experiencing or check in about the status of their treatment.
- The program began evaluating the use of text messaging (SMS) for appointment reminders. In the future, the program hopes to provide patients being treated for latent TB infection with timely and relevant appointment reminder messages in order to reduce missed appointments and increase treatment completion.

Treatment

New treatment options for treating latent TB infection (LTBI) are emerging that make it easier for patients to complete their medication regimens. Isoniazid has been used for treatment of LTBI for many years, but daily administration for nine months can be challenging for many patients. In 2011, we began using a new three month regimen for LTBI consisting of isoniazid and rifapentine (3-HP), thanks in part to supplemental funding from the CDC.

Research

- The TB Control Program was awarded a ten year CDC TBESC grant to assess the relative performance and cost of three diagnostic tests [the tuberculin skin test (TST), QuantiFERON-TB Gold In-Tube (QFT) and the T-SPOT.TB (T-SPOT)] for LTBI and to examine the rates of positive results among the cohort. This study will also determine the risk and rate of progression to active TB disease, overall and by the results of the three tests. Participants for this study are followed for a two year period.
- A National Institutes of Health (NIH) funded study identifies genetic and epidemiologic risk factors for latent TB infection. The study prospectively evaluates host genetic, pathogen and epidemiologic risk factors associated with LTBI. TB Control Program staff collect saliva specimens from close contacts who agree to participate in the study and use these specimens to assess genetic variation in immunity.
- A Keck Graduate Institute sponsored study was funded to develop and evaluate a new point of care diagnostic test for TB and drug-resistant TB. The TB Control Program has participated in protocol development and has recruited the study subjects who agreed to submit sputum specimens. The goal of the study is to develop a hand-held diagnostic device designed for simple, rapid, and inexpensive point-of-care use that can accelerate TB control in King County.

ENHANCEMENT, ADVANCEMENT, AND INNOVATIONS

Education

- The TB Control Program continues to engage with culturally diverse and marginalized communities and the providers who serve them. In 2011, the program was awarded a grant by the Firland Foundation to develop innovative educational materials geared toward foreign-born communities.
- The program has held focus groups with foreign-born communities to gain input into our messaging and to learn about cultural barriers to treatment.
- Over 40 medical providers attended the 8th annual Clinical TB Intensive in Seattle, in collaboration with the University of Washington and the Curry International Center based at the University of California San Francisco.

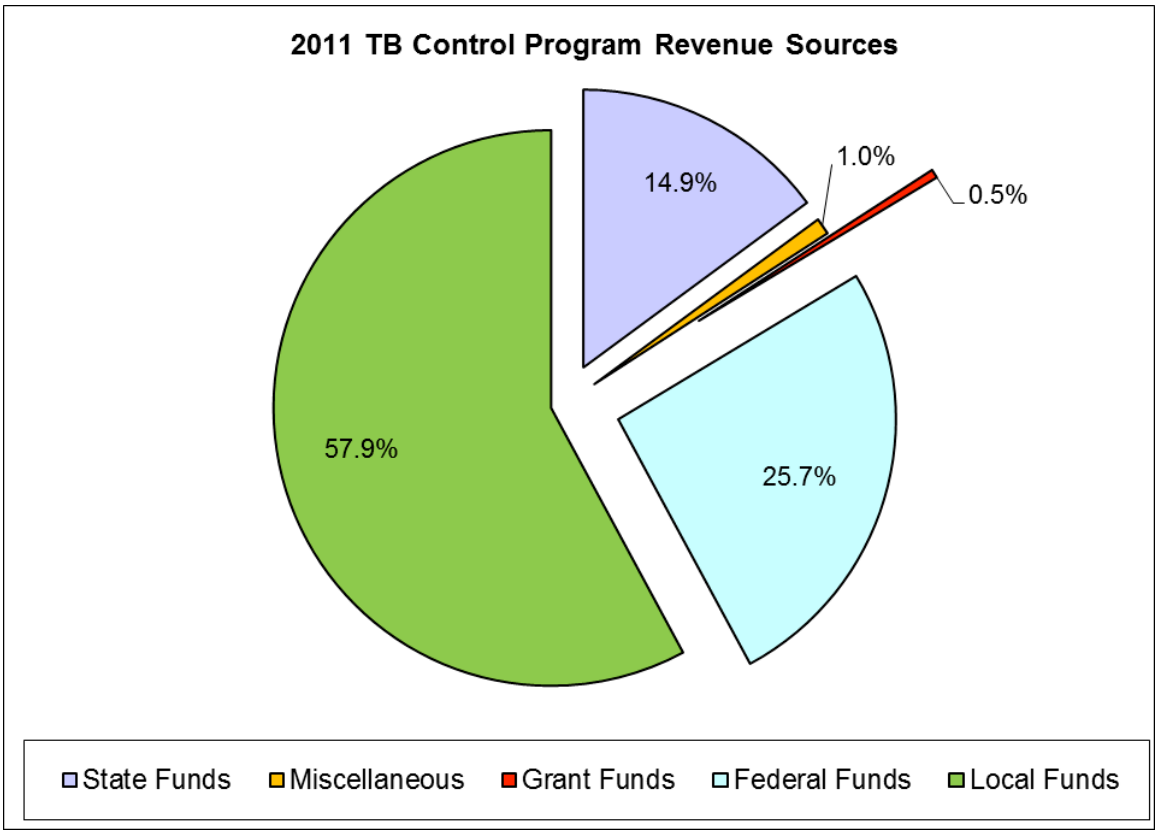
Partnerships

Since 2009, the TB Control Program has been working to enhance public-private partnerships to help control the spread of TB in King County. 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).

- The program undertook a novel project to collaborate with homeless shelters to provide targeted testing and treatment for latent TB infection among homeless individuals. Testing took place using QFT blood testing, as well as symptom screens for active TB disease at six different sites. Individuals diagnosed with LTBI were offered the new 3-HP regimen.
- We collaborate with HealthPoint Community Centers. We diagnose close contacts and Class B immigrants/refugees with LTBI and refer them to HealthPoint for treatment and clinical management of LTBI while the patients establish their medical home for management of other medical conditions. We are hopeful that this partnership will increase the number of individuals who are placed on and complete treatment for LTBI.
- In 2009 we augmented our partnership with the Infectious Disease Clinic at Harborview Medical Center. While the TB Control Program focuses its efforts and resources on infectious TB cases, the Infectious Disease Clinic at Harborview Medical Center has agreed to manage non-infectious extrapulmonary TB cases who were traditionally managed by the TB Clinic. We have also worked closely with many community medical providers to ensure extrapulmonary TB cases receive TB treatment and follow-up care by our community partners.
- The TB Control Program continues to explore opportunities for public-private partnerships with community health centers, private pharmacies and other community based organizations (e.g., homeless shelters) to co-manage our patients.

FUNDING TO SUPPORT TB CONTROL ACTIVITIES

In 2011, the TB Control Program had a revenue of $4,635,752 and employed a staff of 30.1 FTE (38 people). The Program received private and federal grant awards for a variety of projects including educational materials for cases and contacts; collaboration to develop a device to rapidly diagnose MDR TB; collaboration as part of the TB Epidemiological Studies Consortium (federal funding); and to provide adequate and sufficient contact investigations.



QUALITY ASSURANCE AND QUALITY IMPOVEMENT

The following describes quality assurance and quality improvement processes (QA/QI) of our clinical and programmatic activities.

- The TB Control Program tracks progress toward achieving the Washington state and national TB program objectives. The objectives include incidence rates among certain high-risk groups, outcomes of treatment for active TB cases, contact investigations, evaluation of immigrants/refugees and case data reporting.
- We work closely with the Washington State TB Program and participate in the semi-annual statewide cohort review where management of all active TB cases as well as overall program performance are systematically evaluated. The statewide cohort review enables TB programs to identify strengths and weaknesses that relate to state and national TB objectives, promotes accountability individually and as a group, and provides educational and training opportunities. The TB Control Program either met or was close to the Washington 2011 target for most measures, and is committed to improve to meet all the 2015 targets.
- In addition, all clinical staff meets weekly as a multidisciplinary team and discusses progress of TB treatment, contact investigations, and data accuracy for all active TB cases.
- Quality improvement in the intake process for all reported cases resulted in effective patient education and efficiency during clinic appointments. Improvement efforts targeting effective collaboration among all staff have taken place with an emphasis on operational clarity of roles, standardization of approach to service delivery and intra-team communication.
- The program has conducted customer satisfaction surveys regarding alternative forms of observed therapy provision, as well as participated in a pilot assessing the use of pharmacies in the observation of treatment.

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.

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.).

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/healthservices/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, 2011 and Trends in Tuberculosis-United States, 2011. MMWR Morb Mortal Wkly Rep 2012 Mar 23; 61:181–5. *http://www.cdc.gov/tb*

TECHNICAL NOTES

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 have changed 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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For more detailed epidemiological and programmatic data, please see our online supplement: ***www.kingcounty.gov/healthservices/health/communicable/TB***

This report was prepared by Eyal Oren, Ph.D., Lauren Abercrombie MPH and Masa Narita MD., as well as other staff of the Tuberculosis (TB) Control Program, Public Health — Seattle & King County

www.kingcounty.gov/health/TB