Tuberculosis

Each year we recognize World TB Day on March 24th as the date in 1882 when Dr. Robert Koch announced his discovery of the bacteria that causes tuberculosis (TB). This discovery led to diagnostics and treatment for the prevention and cure of TB. However, TB remains the leading single infectious disease killer worldwide, presenting a risk for one quarter of the world’s population and responsible for an estimated 1.7 million deaths in 2016 globally, or over 4,000 deaths each day.

TB Infection and Disease

*Mycobacterium tuberculosis* is the primary cause of tuberculosis in humans. The bacteria are highly aerobic and are very slow growing (*M. tuberculosis* divides every 15–20 hours). The unusual waxy coating on the bacterial surfaces due to mycolic acid makes treatment and prevention of TB complex. Resistance to therapeutic agents is an additional challenge.

The bacteria are carried in airborne particles (infectious droplet nuclei) generated when persons who have pulmonary or laryngeal TB disease cough, sneeze, shout, or sing. Depending on local conditions, the particles can remain suspended in the air for several hours, TB transmission occurs when a person inhales droplet nuclei containing *M. tuberculosis* and they traverse the mouth or nasal passages, upper respiratory tract, and bronchi to reach the alveoli of the lungs.

TB infection occurs within two to eight weeks with granuloma formation. The infection may not progress any further (latent TB infection). If the bacteria spread the result is active disease. TB primarily affects the lungs but can involve as lymph nodes, genitourinary tract, bone, or other organs or body systems.
Two kinds of tests are used to detect TB bacteria in the body: the TB skin test (TST) and TB blood tests (interferon gamma release assays). A positive for either test only tells that a person has been infected with TB bacteria. It does not tell whether the person has latent TB infection or has progressed to TB disease. Other tests, such as a chest x-ray and a sample of sputum for microscopy, are needed to see whether the person has TB disease.

The presence of acid-fast bacilli (AFB) on a sputum smear or other specimen often indicates TB disease. Acid-fast microscopy is easy and quick, but it does not confirm a TB diagnosis because some acid-fast bacilli are not *M. tuberculosis*. A culture is done on all samples, regardless of AFB results. However, a positive culture is not always necessary to begin or continue TB treatment. All initial *M. tuberculosis* isolates should be tested for drug susceptibility, and testing should be repeated for patients not responding adequately to treatment or having positive culture results despite three months of therapy. Laboratories should report all positive test results and all susceptibility results within 24 hours by telephone or fax to the primary health care provider and to the state or local TB control program, as required by regulation.

**Risks for TB Infection and Disease**

The incidence and epidemiology of TB disease are driven by two sets of factors. One set of factors influences an individual’s risk of exposure to TB. The other set of factors influences the risk of progression from TB infection to TB disease once exposure has occurred. Certain groups are at increased risk of TB exposure and infection.

- **Foreign-born person from a country with an elevated TB rate:** all those except the United States, Canada, Australia, New Zealand, or countries in western or northern Europe.
- **Person with immunosuppression, current or planned.** Suppression of the immune system can result from HIV infection, organ transplant receipt, treatment with TNF-alpha antagonist (used for inflammatory conditions such as rheumatoid arthritis, psoriasis, or inflammatory bowel disease), use of steroids, or other immunosuppressive medication.
- **Close contact at any time to somebody with infectious TB disease**

Factors increasing the risk of TB disease after infection include a number of medical conditions:

- Diabetes mellitus
- End stage renal disease
- Silicosis
- Chronic malabsorption
- Gastrectomy
- Chest x-ray suggesting previous or inactive TB
- Smoker within past year
- Leukemia or lymphoma
- Cancer of the head or neck
- Intestinal bypass
- Body mass index ≤20

Public health agencies can use these factors to prioritize their TB investigations and testing. Local recommendations should also be considered in testing decisions. Healthcare providers should check with county TB programs for TB epidemiology in their area.
In Washington, an average of four cases of TB disease are diagnosed each week. Since 2007, incidence rates of TB disease in Washington State have progressed downward. While showing no change from the previous year, the rate of 2.9 (cases per 100,000) in 2016 remains considerably lower than the period peak of 4.5 seen in 2007 and the 204 cases represent a 1.4% decrease from the 207 cases counted in 2015.

Persons born outside of the United States account for more than 70% of TB cases in Washington. Snohomish, King, and Pierce counties typically report a majority of all Washington cases, with 77% of the cases in 2016 compared to 52% of the state’s population.

According to the Centers for Disease Control and Prevention, a total of 9,272 people with TB disease were reported in the United States in 2016. Despite this being the lowest case count on record in the country, progress toward further reduction of cases continues to be slow and current strategies are not enough to reach the goal of TB elimination in this century.

Historically public health agencies have shouldered the burden of TB infection diagnosis and treatment. To support the goals of TB elimination health care providers must also begin to engage their high risk patients in both diagnosis of TB infection and appropriate preventative therapy. This option is made easier with shorter course therapies available for TB infection.

Washington participates in TB Project ECHO® (Extension for Community Healthcare Outcomes), a collaborative model of medical education and care management supporting that provides healthcare professionals with the knowledge and support they need to manage patients with TB through one-hour learning sessions using easy-to-use teleconference technology:

- Weekly sessions offer case reviews and consultation for clinicians
- Twice monthly didactics on TB-related topics
- Mentorship from TB specialists on best practice standards in TB care

The epidemiology of both TB disease and TB infection in Washington point toward a strategy to achieve TB elimination by focusing on populations at risk for TB exposure and infection. In 2018, the Department of Health will convene a task force to assist in developing strategies for TB elimination. Much of this work will be built on a foundation developed by public health partners in California and Colorado, who have already developed their own TB elimination plans, and have shared their comprehensive strategies with other states. The Washington State Department of Health TB Program encourages healthcare professionals to support TB elimination efforts by promoting the use of risk assessment tools in all patient care settings to improve screening and treatment of those at highest risk for TB infection and TB disease.

**Resources**

TB in Washington: [https://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/Tuberculosis](https://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/Tuberculosis) and [https://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/Tuberculosis/DataReports](https://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/Tuberculosis/DataReports)

For more information, contact the TB Program at 360-236-3443 or tbservices@doh.wa.gov.