



## TUBERCULOSIS

Tuberculosis (TB) is an infectious disease that continues to be a significant global health challenge that disproportionately affects the poor and people of color. According to the World Health Organization, the United Nations' Millennium Development Goal target to "halt and reverse the TB epidemic by 2015 has already been achieved", as the incidence of TB has been falling, but globally 1 in 3 people still have a latent TB infection and is the ninth leading cause of death worldwide.<sup>1,2</sup>

### GENERAL INFORMATION

#### Epidemiology

##### GLOBAL

- In 2016, an estimated 10.4 million people became ill with TB worldwide, with the majority of new cases occurring in southern and eastern Asia.<sup>3</sup>
- 1.7 million people died from the disease in 2016<sup>4</sup>. 95% of TB deaths take place in low- and middle-income countries.<sup>5</sup>
- Nearly half (45%) of new TB cases in 2016 occurred in China, India, and Indonesia.<sup>6</sup>
- The death rate from TB has dropped 41% from 1990 to 2011 globally.<sup>7</sup>

##### UNITED STATES

- In 2016, 9,272 new cases of TB were reported in the U.S., equating to an incidence rate of 2.9 cases per 100,000 population.<sup>8</sup>
- Foreign-born persons in the U.S. are much more likely to have TB: the TB rate in foreign-born persons in 2016 was 14 times higher than native-born persons. In 2016, 69% of all new TB cases were among foreign-born persons.<sup>9</sup>
- Compared to non-Hispanic Whites in 2016:
  - Non-Hispanic Asians had a TB rate 30.0 times higher
  - Non-Hispanic Blacks had a TB rate 8.2 times higher
  - Hispanics of any race had a TB rate 7.5 times higher
- Ninety-six cases of multidrug-resistant TB were reported in 2016, and one case of extensively drug-resistant TB was reported in 2016.<sup>10</sup>

#### Etiology

- Tuberculosis is caused by the bacteria *Mycobacterium tuberculosis*, which spreads through the air when persons with active TB of the lungs or throat laugh, sneeze, cough, speak, spit or sing.<sup>11,12</sup>

- The bacteria can remain airborne for several hours and anyone who breathes in the bacteria could become infected with latent TB, which means the bacteria is inactive and the person does not feel sick, nor can they spread the bacteria.<sup>13</sup>
- Other organs in the body can be affected by TB besides the lungs, such the kidneys, the brain, and the spine.<sup>14</sup>
- 5-10% of people who are infected with TB become sick (active TB).<sup>15</sup>

### **Signs & Symptoms**

Signs and symptoms of a TB infection will vary depending on which organ is affected.

General signs and symptoms of an active TB infection may include:

- Weight loss; little appetite
- Fever
- Chills
- Coughing (3 weeks or longer)
- Coughing up blood (if TB affects lungs)
- Night sweats
- Chest pain
- Fatigue/weakness<sup>16</sup>

### **Treatment**

- The standard treatment course for active TB infection is 6-9 months of antimicrobials. First-line anti-TB agents that are the cornerstone of treatment courses include isoniazid, rifampin, ethambutol, and pyrazinamide.<sup>17</sup>
- Treatment must be completed in full with good quality medicines, or the TB bacteria may become drug resistant, resulting in multidrug-resistant TB (MDR-TB) or in rare cases, extensively drug-resistant TB (XDR-TB).<sup>18</sup>
- MDR-TB is TB infection that does not respond to isoniazid and rifampicin, which are first-line TB drugs. Second-line drugs must be used to treat MDR-TB, and the chemotherapy can take up to two years and has severe side effects. <sup>19</sup> XDR-TB does not respond to first- or second-line anti-TB medications.<sup>20</sup>

### **TB and HIV/AIDS**

- HIV/AIDS and TB are a “lethal combination” as each causes the other disease to progress more quickly.<sup>21</sup>
- People infected with HIV and TB are 21-34 times more likely to have TB that progresses from being latent to active than people who do not have HIV.

## **AGRICULTURAL WORKER-SPECIFIC INFORMATION**

### **Epidemiology**

- Hispanics of all races in the U.S. had a TB incidence rate of 4.5 cases per 100,000 population in 2016, compared to a rate of 0.6 for non-Hispanic Whites.<sup>22</sup>

- Foreign-born persons in the U.S. had a TB incidence rate of 14.7 cases per 100,000 population in 2016.<sup>23</sup> Nearly three fourths of all agricultural workers are foreign-born.<sup>24</sup> Table 1 below lists the TB incidence rates for the U.S. and for common countries of origin for agricultural workers.<sup>25</sup>

Table 1.

Country	TB incidence rate per 100,000 population (2016)
U.S.A.	3.1
Mexico	22
Guatemala	24
Honduras	40
El Salvador	60
Nicaragua	48
Haiti	188

- Limited data is available on the prevalence of TB in agricultural workers, and much of what is available is outdated. Research by the Centers for Disease Control and Prevention from 1992 found that agricultural workers were six times as likely to develop an active TB infection compared to other adults employed in the U.S.<sup>26</sup>
- The number of agricultural worker patients diagnosed with TB at Migrant Health Centers in 2016 was 261, equating to a prevalence rate of 30.3 cases per 100,000 patients.<sup>27</sup> In comparison, non-agricultural worker patients at all Health Centers in 2016 had a prevalence rate of 35.2 cases per 100,000 patients,<sup>28</sup> and homeless patients had a prevalence rate of 76.4 cases per 100,000 patients.<sup>29</sup>
- Research conducted with migratory agricultural workers near the U.S.-Mexico border found that 55% of the 109 workers tested positive for a latent TB infection.<sup>30</sup>

### Risk Factors

- The culturally-acceptable consumption of unpasteurized milk and cheese may result in subsequent exposure to *Mycobacterium bovis*, which is a bovine form of tuberculosis and can cause TB in humans.<sup>31</sup> Research on dairy farm workers indicates that long exposure times to cattle may be the cause of a high prevalence rate of latent and active pulmonary TB, and one active TB infection was found to be occupationally acquired from cattle in a study of 311 dairy farm workers.<sup>32</sup> Additionally, high rates of TB infection with *M. bovis* have been documented in Hispanic immigrant communities in the U.S., particularly in children, with a strong correlation to consuming unpasteurized milk products.<sup>33</sup> *M. bovis* infection is especially disconcerting because it is intrinsically resistant to pyrazinamide, a first-line anti-TB medication.<sup>34</sup>

- 72% of agricultural workers were foreign-born in 2007-2009, and 15% were indigenous Mexicans or Central Americans.<sup>35</sup> Foreign-born persons in the U.S. are much more likely to have TB than U.S.-born persons.
- Malnutrition increases the chances of a latent TB infection progressing to an active infection. Agricultural workers have been found to experience high rates of food insecurity and hunger – a 2007 study in Texas and New Mexico found that 82% of agricultural workers experienced food insecurity, and 49% of those experienced hunger.<sup>36</sup>
- Diabetes has increasingly been found to greatly increase a person’s chances of developing active TB if infected. Research has found that along the Texas-Mexico border, the risk of developing active TB is three times higher in people with diabetes.<sup>37</sup> This is significant considering that Mexican immigrants have been shown to have up to four times greater chances of having diabetes than their U.S.-born counterparts.<sup>38</sup>
- Among migratory agricultural workers near the U.S.-Mexico border, a history of smoking was found to be associated with an increased risk of latent TB infection.<sup>39</sup>
- Seventy-one percent of agricultural workers interviewed on the Arizona-Mexico border reported that TB was a health concern for their community, and 64% considered TB to be a serious disease that could be fatal.<sup>40</sup>
- A lack of access to health care services, including TB screening and pharmaceuticals, may hinder the diagnosis and proper treatment of agricultural workers with TB. An estimated three-fourths of agricultural workers lack any source of health insurance.<sup>41</sup>

#### High-Risk Sub-Populations

- Livestock workers: Workers frequently exposed to cattle may be at an increased risk for contracting bovine tuberculosis.<sup>42</sup>
- Indigenous workers: Workers emigrating from Central American countries with a greater incidence of TB and from impoverished areas of southern Mexico may be more likely to have TB, and cluster outbreaks of TB in the U.S. have been documented among Central American immigrants working in agriculture.<sup>43,44</sup>

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<sup>4</sup> Ibid

<sup>5</sup> World Health Organization. (2017). Tuberculosis fact sheet. Retrieved from <http://www.who.int/mediacentre/factsheets/fs104/en/index.html>

<sup>6</sup> World Health Organization. (2017). Global tuberculosis report 2017. Retrieved from [http://www.who.int/tb/publications/global\\_report/en/index.html](http://www.who.int/tb/publications/global_report/en/index.html)

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- <sup>9</sup> Ibid
- <sup>10</sup> Ibid
- <sup>11</sup> World Health Organization. (2017). What is TB? How is it treated? Retrieved from <http://www.who.int/features/qa/08/en/>
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- <sup>19</sup> Ibid
- <sup>20</sup> Ibid
- <sup>21</sup> Ibid
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