

Delayed Tuberculosis Diagnoses During the COVID-19 Pandemic in 2020 – King County, Washington

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In 2020, a total of 92 tuberculosis (TB) cases were reported in Seattle and King County, Washington, 5% fewer than the median of 97 (range = 94 -132) reported during the same period 2015-2019 and 30% fewer than 132 cases reported in 2019. Interviews and chart reviews were completed as part of a public health investigation. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.^{1§} Results for SARS-CoV-2 tests performed prior to TB diagnosis were available to TB public health officials for 40 (43%) patients with TB: three had a positive result; 37 had negative results, with 12 having been tested twice or more. We were not able to verify SARS-CoV-2 testing status or results prior to TB diagnosis for 52 TB cases. We attempted to reach out to all pulmonary TB cases diagnosed in March 2020 or later and were able to interview 29 patients by telephone or in person about how pandemic COVID-19 affected their medical care. Four of them stated that their TB diagnosis had been delayed because of pandemic-related problems. Of these, three waited to seek care because of fear of contracting COVID-19, and one, Patient 1, was told that she probably had COVID-19 by at least two health-care providers. The stories of the following three patients who had prolonged respiratory illnesses with fever illustrate delays in TB diagnosis during the COVID-19 pandemic.

Patient 1. A woman in her late teens, originally from an African country with a World Health Organization (WHO)-estimated TB incidence of >80 cases/100,000 persons* [1], sought medical care five times starting in May 2020 because of cough, night sweats, and weight loss beginning in March 2020. She was tested for SARS-CoV-2 four times with negative results. Chest radiography was not performed until June, when pulmonary TB was diagnosed with findings of bilateral extensive pulmonary

[§] See e.g., 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq.

opacities and cavities and numerous acid-fast bacilli (AFB) on sputum-smear microscopy.

Patient 2. A woman in her eighties, originally from a Southeast Asian country with a WHO-estimated TB incidence of >500 cases/100,000 persons* [1], was admitted to different hospitals four times beginning in May 2020 with multiple problems, including staphylococcal bacteremia, cognitive impairment, and lack of appetite. Bilateral diffuse opacities were reported on chest radiography in July, with aspiration pneumonia diagnosed. She was tested 13 times for SARS-CoV-2 with negative results, including three times ≤ 2 months before her TB diagnosis. In September, chest computerized tomography revealed diffuse bilateral interstitial reticular nodular infiltrates, characteristic of miliary TB, and she died 6 days after TB was confirmed by polymerase chain reaction for *Mycobacterium tuberculosis* in bronchoalveolar lavage fluid.

Patient 3. A woman in her fifties, originally from a Pacific Island nation with WHO-estimated TB incidence of >400 cases/100,000 persons* [1], sought medical care twice in July 2020 for cough, weight loss, fever, night sweats, and dyspnea that began in June 2020. The result of a SARS-CoV-2 test at each visit was negative. A chest radiograph at the second visit revealed right-upper-lobe opacities without cavities, but TB was not considered. She had been treated for TB disease in King County 7 years before, and she had poorly controlled diabetes, which predisposes patients to TB progression. Pulmonary TB was diagnosed in August, with worsening opacities and new cavities in the right-upper-lobe on chest radiography and numerous AFB on sputum-smear microscopy.

Globally, COVID-19, with >108 million cases and >2.3 million deaths as of February 15, 2021 [2], has eclipsed TB, with its estimated 10 million cases and >1.4 million

deaths in 2019 [1]. Clinicians can miss TB in patients who have respiratory illness while the focus is on COVID-19, as shown by the examples in this report. Patients sometimes are delayed in seeking care either because they fear COVID-19 exposure or because access to health care is reduced. The response to the COVID-19 pandemic has diverted public health staff from TB control [3]. The decrease of TB reports in King County supports concern for more instances of late TB case detection; diagnostic delays worsen TB morbidity and mortality and increase *M. tuberculosis* transmission potential [4], especially because TB persists as a chronic contagious infection when the diagnosis is missed, in contrast to COVID-19, which self-resolves in the majority of cases.

The three patients described here came from countries with high incidence of TB. In King County, 117 (87%) of the 134 patients with TB in 2019 were born outside the United States, and the incidence among non-U.S.-born persons was 24.0 cases/100,000 persons, compared with 1.0 case/100,000 for U.S.-born persons [5]. The onset of active TB disease can be insidious, compared with the acute onset of COVID-19, but the possible symptoms of cough, fever, and fatigue are similar between the two diseases. While typical radiographic findings of COVID-19 pneumonia include multifocal peripheral consolidation, or ground glass or nodular opacities [6], classic manifestations of TB include fibronodular opacities in upper lobes often with cavitation. However, as the patient may present with atypical radiographic findings, clinicians should consider further medical evaluation (e.g., sputum collection) when anyone with an epidemiologic risk factor for TB has radiographic abnormalities. Clinicians should also consider the possibility of simultaneous infection with SARS-CoV-2 and *M. tuberculosis*. For a patient who has cough for >2 weeks with fever and weight loss and an epidemiologic risk factor (e.g.,

origin in a country with high TB incidence), if the chest radiograph findings are suggestive of TB, a sputum bacteriology for *M. tuberculosis*, should be undertaken at the time of SARS-CoV-2 testing [7].

* The U.S. TB incidence was 2.7 cases/100,000 persons in 2019.

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Table:

Comparison of clinical characteristics between symptomatic COVID-19 and pulmonary tuberculosis

	Symptomatic COVID-19	Pulmonary tuberculosis
Exposure history and incubation (patients with either condition might be unaware of exposure)	Even brief exposure to someone with SARS-CoV infection, 2–14 days before symptoms; easily spread in congregate settings	Hours to months in an enclosed space with someone who has infectious TB disease, can be months to years before symptoms; may occur as a result of birth or residence in a TB-endemic country or from congregate living
Conditions associated with severity (both have serious consequences in the elderly and immunocompromised)	Diabetes; chronic renal failure; chronic obstructive pulmonary disease; obesity; pregnancy; heart conditions; smoking; cancer; cerebrovascular disease; additional conditions continue to be added ¹	Diabetes; chronic renal failure; silicosis; prior TB with abnormal chest x-ray; intravenous drug use; children age <5; HIV; immunosuppressive treatment ²
Symptoms onset	Rapid, over 1–2 days	Gradual, may be more than a few weeks
Typical symptoms	Cough, fever, dyspnea, fatigue, muscle aches, headache, new loss of smell or taste ³	Cough, fever, weight loss, night sweats, poor appetite, hemoptysis, chest pain
Duration of the illness	Symptoms and infectiousness resolve after a week or so except for severe cases	Symptoms and infectiousness may persist for weeks to months, or longer if untreated
Typical chest x-ray pattern	Multifocal peripheral consolidation, or ground glass or nodular opacities	Opacities in the upper lobe(s) often with cavitation
Diagnostic tests	Nasal, nasopharyngeal, oropharyngeal, sputum, or saliva for SARS-CoV-2 (1) nucleic amplification test, or (2) antigen test ⁴	Sputum for (1) rapid <i>M. tuberculosis</i> nucleic amplification test and (2) acid-fast bacilli (AFB) smear and culture ²

Note: A patient can have TB disease at the same time as COVID-19, or have one after another. Radiographic findings of pulmonary TB are also highly variable, and certain findings overlap with those often present in COVID-19. Clinicians should undertake medical evaluation for both conditions when appropriate.

1. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/underlyingconditions.html>
2. <https://www.cdc.gov/tb/publications/guidelines/testing.htm>
3. <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>
4. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/testing-overview.html>

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