

# Targeted Testing for Latent Tuberculosis Infection

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# Introduction

## Purpose

Use this section to understand and follow national and Alaska guidelines to conduct targeted testing to screen for latent tuberculosis infection (LTBI).

In the 2005 guideline “Controlling Tuberculosis in the United States: Recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America,” one of the recommended strategies to achieve the goal of reduction of tuberculosis (TB) morbidity and mortality is the identification of persons with LTBI at risk for progression to TB disease, and treatment of those persons with an effective drug regimen.<sup>1</sup>



For information on treatment, refer to the Treatment of Tuberculosis Disease **(6.2)** and Treatment of Latent Tuberculosis Infection **(8.2)** sections.

Reducing LTBI in high-risk populations is an important strategy to control TB. With an estimated 9.5–14.7 million persons with LTBI in the United States, continued progress toward eliminating TB in the United States and reducing TB among foreign-born persons requires effective strategies to meet this challenge.<sup>2</sup> Targeted testing for LTBI is a strategic component of TB control that identifies persons at high risk for developing TB who would benefit by treatment of LTBI, if detected. Persons with increased risk for developing TB include those who have had recent infection with *Mycobacterium tuberculosis* and those who have clinical conditions that are associated with an increased risk for progression of LTBI to active TB.<sup>3</sup>

## Policy

In Alaska

- Persons who show or report signs and symptoms of TB should be evaluated for TB disease as described in the “Diagnosis of Tuberculosis Disease” topic in this section and reported as suspected cases of TB as described in the “Reporting Tuberculosis” topic in the Surveillance section.
- Contacts should be evaluated as described in the Contact Investigation section.
- TB screening in certain employment settings is required by regulation and described under “Program Standards” in this section.
- Targeted testing for LTBI should be conducted only among persons in groups with identified risk factors for LTBI and/or progression to TB disease.

- For a list of groups with increased likelihood of infection with Mtb, refer to Figure 1: Paradigm for evaluation of those with latent tuberculosis infection (LTBI) based on risk of infection, risk of progression to tuberculosis, and benefit of therapy.



For roles and responsibilities, refer to the “Roles, Responsibilities, and Contact Information” topic in the Introduction **1.11**.

## State Laws and Regulations



See the Statutes and Regulations section for more information on:

7 AAC 27.213. Tuberculosis skin test (schools)

<http://www.legis.state.ak.us/basis/aac.asp#7.27.213>

7 AAC 12.571. Employee health program (home health agencies)

<http://www.legis.state.ak.us/basis/aac.asp#7.12.571>

7 AAC 12.650. Employee health program (facilities)

<http://www.legis.state.ak.us/basis/aac.asp#7.12.650>  
[Employee Health Program Regulations](#)



T7 AAC 27.213. Tuberculosis skin test

<http://www.legis.state.ak.us/basis/aac.asp#7.27.213>

The Alaska TB Program intends to seek repeal of this regulation which requires tuberculosis screening of students in school settings. See the Alaska TB Program website for current status:

<http://dhss.alaska.gov/dph/Epi/id/Pages/TB/schoolscreening.aspx>

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# **Tuberculosis Assessment / Screening of School Children: Program Standards**

The State of Alaska has moved away from universal tuberculosis (TB) screening for different ages of school children and intends to seek repeal of regulation 7 AAC 27.213 to require tuberculosis screening of students in school settings.

## **Background**

For many decades, school-based tuberculosis (TB) screening of students has been required as a tool to identify new active TB cases in Alaska. It is increasingly clear that school based screening does not enhance TB case finding in Alaska.

## **Evaluation of Data**

Alaska continues to have one of the highest rates of TB in the nation. In light of this, Alaska has maintained a more extensive school screening program than what is currently recommended by national guidelines and practiced in other states. Even with progressive refinement of the program over the past 5 years to implement a more risk-stratified approach to school-based screening, the program has not identified new cases of active TB, despite screening more than 10,000 students per year. The resource costs of time for school nurses, administrators, and public health nurses, as well as the cost of supplies (including PPD needed for skin tests), for school-based screening are substantial. These resources can be put to better use elsewhere, such as finding new TB cases through case contact investigations and focused community-based screening in areas of known TB activity, both of which have historically been of much higher yield. The American Academy of Pediatrics' Bright Futures preventive health guidelines recommends that TB risk assessment be done by healthcare providers at regular intervals in the setting of well-child visits. This more appropriately incorporates TB screening into the context of an overall health assessment in a child's medical home, rather than placing this burden on school districts.

## **Next Steps**

School-based TB screening in Alaska has not proven useful for identifying new cases of active disease. By transferring the responsibility of TB screening from school districts to healthcare providers, as per national guidelines, scarce public health resources can be redirected to help eliminate TB from Alaska. We will therefore seek to repeal the regulation that requires assessment of TB status by school districts.

While the process of repealing the regulation is in progress, there will be no requirement for school districts to assess the TB status of their students for the 2019-2020 or the 2020-2021 school year.

Note that school screening will still be included as part of community TB screening in response to investigations of active TB cases.

# High-Risk Groups

Certain factors identify persons at high risk for tuberculosis (TB) infection and/or for progression to TB disease. Testing for LTBI should be considered for persons with increased likelihood of infection with *Mycobacterium tuberculosis* (Mtb) as listed in Figure 1. Providers making treatment decisions should assess not only the likelihood of infection and risk of progression to active TB if infected, but also the benefit of treatment.

**Alaska Native persons**, particularly individuals from the Southwest and Northern regions, have an increased likelihood of infection with Mtb due to the current and historic epidemiology of tuberculosis in our state.

Figure 1. **PARADIGM FOR EVALUATION OF THOSE WITH LATENT TUBERCULOSIS INFECTION (LTBI) BASED ON RISK OF INFECTION, RISK OF PROGRESSION TO TUBERCULOSIS, AND BENEFIT OF THERAPY**<sup>4</sup>

Risk of Infection ↑	Groups with Increased Likelihood of Infection with Mtb	Benefit of Therapy	LTBI Testing Strategy							
			Likely to be Infected Low to Intermediate Risk of Progression (TST ≥ 10mM)	Likely to be Infected High Risk of Progression (TST ≥ 5mM)						
	Household contact or recent exposure of an active case	Yes	Likely to be Infected Low to Intermediate Risk of Progression (TST ≥ 10mM)	Likely to be Infected High Risk of Progression (TST ≥ 5mM)						
	Mycobacteriology laboratory personnel	Not demonstrated								
	Immigrants from high burden countries (>20 / 100,000)	Not demonstrated								
	Residents and employees of high risk congregate settings	Yes	Unlikely to be Infected (TST > 15mM)							
	None	Not demonstrated								
<b>Risk of Developing Tuberculosis if Infected</b> →										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;"><b>Low</b></td> <td style="width: 33%; text-align: center;"><b>Intermediate (RR 1.3 -3)</b></td> <td style="width: 33%; text-align: center;"><b>High (RR 3-10)</b></td> </tr> <tr> <td style="text-align: center;">No risk factors</td> <td style="text-align: center;">Clinical predisposition Diabetes Chronic renal failure Intravenous drug use</td> <td style="text-align: center;">Children age less than 5 HIV infection Immunosuppressive therapy Abnormal CXR consistent with prior TB Silicosis</td> </tr> </table>					<b>Low</b>	<b>Intermediate (RR 1.3 -3)</b>	<b>High (RR 3-10)</b>	No risk factors	Clinical predisposition Diabetes Chronic renal failure Intravenous drug use	Children age less than 5 HIV infection Immunosuppressive therapy Abnormal CXR consistent with prior TB Silicosis
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<b>Benefit of Therapy</b>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Not demonstrated</td> <td style="width: 50%; text-align: center;">Yes</td> </tr> </table>					Not demonstrated	Yes				
Not demonstrated	Yes									

**Figure 1.** In developing a diagnostic approach for the evaluation of those with suspected LTBI, we recommend the clinician weigh the likelihood of infection, the likelihood of progression to tuberculosis if infected, and the benefit of therapy (Horsburgh and Rubin, Clinical practice: latent tuberculosis infection in the United States. N Engl J Med 2011; 364:1441–8). Recommendations were formulated for each of the 3 groups illustrated above. These groups are concordant with current recommendations for the interpretation of the tuberculin skin test (American Thoracic Society, Targeted tuberculin testing and treatment of latent tuberculosis infection. MMWR Recomm Rep 2000; 49:1–51). Abbreviations: CXR, chest radiograph; HIV, human immunodeficiency virus; LTBI, latent tuberculosis infection; Mtb, *Mycobacterium tuberculosis*; RR, ; TB, tuberculosis; TST, tuberculin skin test.



Additional information on persons at risk for LTBI and progression to TB disease see: CDC. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. *MMWR* 2005;54(No. RR-17):1-141; CDC.

[https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s\\_cid=rr5417a1\\_e](https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s_cid=rr5417a1_e)



**Alaska Native persons**, particularly individuals from the Southwest and Northern regions, have an increased likelihood of infection with *M. tb* due to the current and historic epidemiology of tuberculosis in our state.

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## When to Conduct Targeted Testing

Alaska has a high prevalence of prior positive tuberculin skin tests among its highest risk populations – Alaska Natives, residents of the Southwest and Northern regions of the state, the homeless, and recent immigrants. Tuberculosis screening among these groups often cannot be done using tuberculin skin testing. Instead, a combination of symptom screening and sputa collection is done. Please consult the Alaska TB Program at 907-269-8000 for assistance in planning TB screening in these populations.

Targeted testing programs should be conducted only among groups, and testing should be discouraged for groups at low risk.<sup>5</sup> High-risk groups include persons likely to be infected with Mtb and those with increased risk for developing tuberculosis (TB).



Factors that identify persons at high risk of LTBI infection and/or progressing to TB disease are listed in **Figure 1**. Paradigm for evaluation of those with latent tuberculosis infection (LTBI) based on risk of infection, risk of progression to tuberculosis, and benefit of therapy.



Evaluate high-risk patients for LTBI as specified in the Diagnosis of Latent Tuberculosis Infection section **7.7**.



Offer treatment of LTBI to infected persons, irrespective of age, who are considered to be at high risk for developing active TB.<sup>6</sup> See the Treatment of Latent Tuberculosis Infection section **8.4**.

## Approaches to Increasing Targeted Testing and Treatment of Latent Tuberculosis Infection

The Centers for Disease Control and Prevention (CDC) describes two approaches to increasing targeted testing and treatment of LTBI. To plan and implement programs for targeted testing and treatment of LTBI, follow the recommended approaches outlined below.<sup>7</sup>

One approach is to promote clinic-based testing of persons who are under a clinician's care for a medical condition (e.g., human immunodeficiency virus [HIV] infection or diabetes mellitus) that also confers a risk for acquiring TB. This approach depends on a person's risk profile for TB.<sup>8</sup>

The other approach is to establish specific programs that target a subpopulation of persons who have a high prevalence of LTBI or who are at high risk for acquiring TB disease if they have LTBI, or both. This approach requires identifying the subpopulations

or areas with high TB risk through epidemiologic analysis and profiling.<sup>9</sup> This strategy might encourage providers serving these subpopulations and communities to “Think TB” and screen for TB during encounters, especially when patients present with compatible respiratory symptoms.



For information on the system for prioritizing persons for targeted testing, refer to “Controlling Tuberculosis in the United States: Recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America” (*MMWR* 2005;54[No. RR-12]:40–42) at <http://www.cdc.gov/mmwr/PDF/rr/rr5412.pdf>



The US Preventive Services Task Force published recommendations for LTBI screening and treatment “Screening for Latent Tuberculosis Infection in Adults: US Preventive Services Task Force Recommendation Statement” *JAMA* .969-962:(9)316;2016 .doi:10.1001/jama.2016.11046 <http://jamanetwork.com/journals/jama/fullarticle/2547762>



For assistance in planning targeted testing, contact the Alaska TB Program at 907-269-8000.

## Screening for Latent Tuberculosis Infection in Facilities

Screening for LTBI in health care settings should be conducted based upon the recent “Tuberculosis Screening, Testing, and Treatment of U.S Health Care Personnel: Recommendations from the National Tuberculosis Controllers’ Association and CDC, 2019.”<sup>10</sup>each facility’s risk for transmission of *Mycobacterium tuberculosis* (i.e., low risk, medium risk, or potential for ongoing transmission),<sup>11</sup> as determined in its TB risk assessment (both initial baseline assessment and periodic reassessments).



Risk assessment protocols and elements are outlined in the CDC’s “Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-care Settings, 2005” (*MMWR* 2005;54[No. RR-17]) at <http://www.cdc.gov/mmwr/pdf/rr/rr5417.pdf> .



Updated recommendations for health care worker screening are outlined in CDCs “Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019”. *MMWR Morb Mortal Wkly Rep* 2019; 68:439-443. DOI: <http://dx.doi.org/10.15585/mmwr.mm6819a3>



Screening determines if a person should be evaluated for LTBI or TB disease by asking questions to gather information about whether the person

- has signs or symptoms of TB disease;
- belongs to a group at high risk for LTBI or (if infected) for progression to TB disease; or
- has a prior positive tuberculin skin test (TST).

### **Indicators of risk\* for tuberculosis (TB) at baseline health care personnel assessment†**

Health care personnel should be considered to be at increased risk for TB if they answer “yes” to any of the following statements. Use this information when interpreting test results:

1. Temporary or permanent residence (for  $\geq 1$  month) in a country with a high TB rate (i.e., any country other than Australia, Canada, New Zealand, the United States, and those in western or northern Europe) Or
2. Current or planned immunosuppression, including human immunodeficiency virus infection, receipt of an organ transplant, treatment with a tumor necrosis factor (TNF)-alpha antagonist (e.g., infliximab, etanercept, or other), chronic steroids (equivalent of prednisone  $\geq 15$  mg/day for  $\geq 1$  month), or other immunosuppressive medication. Or
3. Close contact with someone who has had infectious TB disease since the last TB test

\* Individual risk assessment information can be useful in interpreting TB test results. (Lewinsohn DM, Leonard MK, LoBue PA, et al. Official American Thoracic Society/Infectious Diseases Society of America/Centers for Disease Control and Prevention clinical practice guidelines: diagnosis of tuberculosis in adults and children. Clin Infect Dis 2017;64:111–5).  
<https://academic.oup.com/cid/article/64/2/111/2811357><sup>external icon</sup>

† Adapted from a tuberculosis risk assessment form developed by the California Department of Public Health. <https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/TBCB-CA-TB-Risk-Assessment-and-Fact-Sheet.pdf>

A comparison of the 2005<sup>12</sup> and 2019<sup>13</sup> guidelines and recommendations for TB screening of health care workers is available in the table below.

**TABLE. Comparison of 2005\* and 2019<sup>1</sup> recommendations for tuberculosis (TB) screening and testing of U.S. health care personnel (HCP)**



Category	2005 Recommendation	2019 Recommendation
<b>Baseline (preplacement) screening and testing</b>	TB screening of all HCP, including a symptom evaluation and test (IGRA or TST) for those without documented prior TB disease or LTBI.	TB screening of all HCP, including a symptom evaluation and test (IGRA or TST) for those without documented prior TB disease or LTBI ( <b>unchanged</b> ); individual TB risk assessment ( <b>new</b> ).
<b>Postexposure screening and testing</b>	Symptom evaluation for all HCP when an exposure is recognized. For HCP with a baseline negative TB test and no prior TB disease or LTBI, perform a test (IGRA or TST) when the exposure is identified. If that test is negative, do another test 8–10 weeks after the last exposure.	Symptom evaluation for all HCP when an exposure is recognized. For HCP with a baseline negative TB test and no prior TB disease or LTBI, perform a test (IGRA or TST) when the exposure is identified. If that test is negative, do another test 8–10 weeks after the last exposure ( <b>unchanged</b> ).
<b>Serial screening and testing for HCP without LTBI</b>	According to health care facility and setting risk assessment. Not recommended for HCP working in low-risk health care settings. Recommended for HCP working in medium-risk health care settings and settings with potential ongoing transmission.	Not routinely recommended ( <b>new</b> ); can consider for selected HCP groups ( <b>unchanged</b> ); recommend annual TB education for all HCP ( <b>unchanged</b> ), including information about TB exposure risks for all HCP ( <b>new emphasis</b> ).
<b>Evaluation and treatment of positive test results</b>	Referral to determine whether LTBI treatment is indicated.	Treatment is encouraged for all HCP with untreated LTBI, unless medically contraindicated ( <b>new</b> ).

**Abbreviations:** IGRA = interferon-gamma release assay; LTBI = latent tuberculosis infection; TST = tuberculin skin test.

\* Jensen PA, Lambert LA, Iademarco MF, Ridzon R. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. MMWR Recomm Rep 2005;54(No. RR-17). <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm>.

<sup>1</sup> All other aspects of the Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings, 2005 remain in effect, including facility risk assessments to help guide infection control policies and procedures.

## Alaska Program Standards for Health Care Facilities, Staff and Long Term Care Facilities

### Health Care Facilities and Staff

Currently, in Alaska, health-care facilities licensed under Title 7, Chapter 12 of the Alaska Administrative Code (general acute care hospitals, specialized hospitals, nursing homes, intermediate-care facilities for the mentally retarded, ambulatory surgical facilities, birth centers, mental health centers, home health and home health agencies should have employee health programs that require each employee to be evaluated for TB within the first two weeks of employment and annually thereafter according to the Occupational Safety and Health Administration (OSHA) and/or state requirements.

### Plans to Amend Employee Health Program Regulations (7 AAC 12.650)

#### Background

Historically, health care personnel (HCP) in the United States were at increased risk for developing latent tuberculosis infection (LTBI) and tuberculosis (TB) disease from occupational exposures. State of Alaska regulations include requirements for annual TB screening of HCP (7 AAC 12.650); these regulations have not been updated since 1987. Current national and Alaska-specific epidemiologic data show that occupational exposures resulting in LTBI or TB disease among HCP are now rare events. As such, on

May 17, 2019, the U.S. Centers for Disease Control and Prevention (CDC) and the National Tuberculosis Controllers Association (NTCA) released updated recommendations<sup>14</sup> for TB screening, testing, and treatment of health care personnel. These recommendations update the HCP screening and testing section of the 2005 CDC Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings<sup>15</sup>. All other aspects of the 2005 Guidelines document remain in effect, including facility risk assessments to help guide infection control policies and procedures.

### Next Steps

The Alaska Division of Public Health TB Program supports the new 2019 CDC HCP TB screening and testing recommendations. The TB Program will collaborate with the Division of Health Care Services, Health Facility Licensing and Certification Unit to align the TB testing and screening regulations for Employee Health Programs as listed in 7 AAC 12.650 with CDC's updated recommendations. While these revisions are in process, health care facilities should continue to follow State of Alaska Health Facility Licensing regulations.



See the Statutes and Regulations section for more information on:  
7 AAC 12.571. Employee health program (home health agencies)  
<http://www.legis.state.ak.us/basis/aac.asp#7.12.571>

7 AAC 12.650. Employee health program (facilities)  
<http://www.legis.state.ak.us/basis/aac.asp#7.12.650>

### Long Term Care Facilities

Persons being admitted to long-term care institutions who have a positive skin test (i.e., >10 mm induration) and who have not had a recent chest x-ray (within 1 month of admission) should have a chest x-ray [MMWR 1990:39(RR-10);7-20]. A person who develops protracted cough or fever or who has abnormal chest x-ray findings compatible with tuberculosis, especially if there is a significant skin test reaction, should be evaluated further (with sputum specimens for acid-fast bacilli smear and mycobacterial culture) to exclude tuberculosis.



Two-step testing improves the interpretation of tuberculin skin tests and should be used for the **initial** skin testing of adults who will be retested periodically, such as healthcare workers. See the Infection Control section for more information (**17.11**).

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# References

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- <sup>1</sup> ATS, CDC, IDSA. Controlling tuberculosis in the United States: recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. *MMWR* 2005;54(No. RR-12):15.
- <sup>2</sup> ATS, CDC, IDSA. Controlling tuberculosis in the United States: recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. *MMWR* 2005;54(No. RR-12):40.
- <sup>3</sup> CDC. Targeted tuberculin testing and treatment of latent tuberculosis infection. *MMWR* 2000;49(No. RR-6):1.
- <sup>4</sup> ATS, CDC, IDSA. Diagnosis of Tuberculosis in Adults and Children. *Clinical Infectious Diseases* 2017; 64(2):1-33.
- <sup>5</sup> CDC. Targeted tuberculin testing and treatment of latent tuberculosis infection. *MMWR* 2000;49(No. RR-6):1-2.
- <sup>6</sup> CDC. Targeted tuberculin testing and treatment of latent tuberculosis infection. *MMWR* 2000;49(No. RR-6):1.
- <sup>7</sup> ATS, CDC, IDSA. Controlling tuberculosis in the United States: recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. *MMWR* 2005;54(No. RR-12):40.
- <sup>8</sup> ATS, CDC, IDSA. Controlling tuberculosis in the United States: recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. *MMWR* 2005;54(No. RR-12):40.
- <sup>9</sup> ATS, CDC, IDSA. Controlling tuberculosis in the United States: recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. *MMWR* 2005;54(No. RR-12):40.
- <sup>10</sup> Sosa, LE, Njie, GJ, Lobato, MN, et al. Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019. *MMWR Morb Mortal Wkly Rep* 2019; 68:439-443. DOI: <http://dx.doi.org/10.15585/mmwr.mm6819a3>
- <sup>11</sup> CDC. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. *MMWR* 2005;54(No. RR-17):10.
- <sup>12</sup> CDC. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. *MMWR* 2005;54(No. RR-17):10.
- <sup>13</sup> Sosa, LE, Njie, GJ, Lobato, MN, et al. Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019. *MMWR Morb Mortal Wkly Rep* 2019; 68:439-443. DOI: <http://dx.doi.org/10.15585/mmwr.mm6819a3>
- <sup>14</sup> Sosa, LE, Njie, GJ, Lobato, MN, et al. Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019. *MMWR Morb Mortal Wkly Rep* 2019; 68:439-443. DOI: <http://dx.doi.org/10.15585/mmwr.mm6819a3>
- <sup>15</sup> CDC. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. *MMWR* 2005;54(No. RR-17):10.