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Tuberculosis in Pregnancy

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Abstract

Tuberculosis (TB) in pregnancy poses a substantial risk of morbidity to both the pregnant woman and the fetus if not diagnosed and treated in a timely manner. Assessing the risk of having *Mycobacterium tuberculosis* infection is essential to determining when further evaluation should occur. Obstetrician–gynecologists are in a unique position to identify individuals with infection and facilitate further evaluation and follow up as needed. A TB evaluation consists of a TB risk assessment, medical history, physical examination, and a symptom screen; a TB test should be performed if indicated by the TB evaluation. If a pregnant woman has signs or symptoms of TB or if the test result for TB infection is positive, active TB disease must be ruled out before delivery, with a chest radiograph and other diagnostics as indicated. If active TB disease is diagnosed, it should be treated; providers must decide when treatment of latent TB infection is most beneficial. Most women will not require latent TB infection treatment while pregnant, but all require close follow up and monitoring. Treatment should be coordinated with the TB control program within the respective jurisdiction and initiated based on the woman's risk factors including social history, comorbidities (particularly human immunodeficiency virus [HIV] infection), and concomitant medications.

Tuberculosis (TB) is the leading infectious cause of mortality globally.[1] Although the incidence of active TB disease is lower in the United States than many other countries, active TB disease during pregnancy remains associated with a substantially elevated risk for poor maternal and fetal outcomes, including a threefold increase in maternal morbidity (eg, antenatal admission, anemia, and cesarean birth), ninefold increase in miscarriage, twofold increase in preterm birth and low birthweight, and sixfold increase in perinatal death.[2,3]

Between 3.1% and 5.0% of the U.S. population are estimated to be living with latent TB infection.[4] Only 5–10% of individuals with latent TB infection will progress to active TB disease over their lifetimes; most individuals with TB infection will remain asymptomatic.[4] It is difficult to predict who will progress from latent TB infection to active TB disease. Screening individuals at risk for TB infection or at risk for progressing to active TB disease

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and ensuring proper treatment are important to reduce complications of the disease and are critical to efforts to control TB in the United States.

The perinatal period is an important opportunity to screen, diagnose, and treat those at high risk for TB. The American College of Obstetricians and Gynecologists, the American Academy of Pediatrics, and the Centers for Disease Control and Prevention (CDC) recommend screening all women who are at high risk for TB at the initiation of antenatal care.[5,6] Obstetrician–gynecologists are in a unique position to identify individuals with infection and facilitate linkage to disease specialists and health departments for further evaluation and follow up as needed.

This article will review the pathophysiology, diagnosis, treatment, and unique complications of TB in pregnancy, with a focus on the epidemiology, manifestations, and management in the United States. Considerations for active TB disease and latent TB infection will be discussed separately because of the important distinctions between their manifestations and management.

EPIDEMIOLOGY AND SURVEILLANCE

Nearly one fourth of the world population has TB infection.[1] Although the incidence of active TB disease in the United States in 2018 was the lowest ever reported (2.8 cases/100,000 people), more than two thirds of cases were in people not born in the United States.[4] In 2017, one in seven people living in the United States were non–U.S.-born (more than 44 million individuals), with the five most common countries of origin being moderately to very high-burden TB countries (Mexico, Philippines, Vietnam, India, and China).[7] As the number of children in immigrant families in the United States has increased over time, understanding the implications for TB infection during pregnancy is important.[7–9]

The global burden of active TB disease and latent TB infection among pregnant women is not well-known. For 2011, global estimates reported 216,500 (95% CI 192,000–247,000) pregnant women diagnosed with active TB disease, with the greatest burdens being in World Health Organization African and Southeast-Asian regions.[3] Risk factors for TB infection in pregnant women are the same as risk factors among the general population and include recent exposure to active TB disease, being from a high-burden TB country, and living or working in a high-risk setting (Box 1 and Fig. 1).[10] Risk factors for progression from latent TB infection to active TB disease are also the same regardless of pregnancy status: human immunodeficiency virus (HIV) infection, TB infection acquired within the past 2 years, intravenous drug use, and being immunocompromised (Box 1).[10]

The CDC's Division of TB Elimination maintains the National TB Surveillance System which includes deidentified information on all people diagnosed with active TB disease in the United States and U.S. territories.[4] State and territorial health departments have reported these data using the Report of Verified Case of Tuberculosis since 1953. As such, health departments are an important resource for understanding local TB epidemiology (Box 2). Pregnancy status has not been included in the surveillance system in the past; thus, there are currently no national data on the number of women with TB who were also pregnant at or

around the time of diagnosis. Revisions of the Report of Verified Case of Tuberculosis are proposed every 5 years; the Report of Verified Case of Tuberculosis scheduled for use in 2020 will include pregnancy status and will allow more accurate description of incidence, treatment management, and outcome.[4,11]

PATHOPHYSIOLOGY

Tuberculosis is caused by infection with one of seven acid-fast bacilli that make up the *Mycobacterium tuberculosis* complex—most commonly *M tuberculosis* in the United States.[12] After exposure, a proportion of people will have *M tuberculosis* infection without experiencing any signs or symptoms of active TB disease.[12] These people have latent TB infection, which is not contagious, but without treatment latent TB infection can progress to active TB disease, most commonly in the first 2 years after infection (Table 1).[13]

Tuberculosis is usually acquired through airborne transmission of infectious droplet nuclei when a contagious person coughs, sneezes, laughs, or sings.[12] Pulmonary TB infection occurs when a person inhales droplet nuclei containing tubercle bacilli and these bacilli reach the alveoli of the lungs.[14] The tubercle bacilli are ingested by alveolar macrophages; most of these bacilli are destroyed or inhibited. A small number may multiply intracellularly and are released when the macrophages die. If alive, these bacilli may spread by way of lymphatic channels or through the bloodstream to more distant tissues and organs. The tubercle bacilli may reach any part of the body, including areas where active TB disease is more likely to develop (such as the brain, larynx, lymph node, lung, spine, bone, or kidney). Within 2–8 weeks, macrophages ingest and surround the tubercle bacilli. The cells form a barrier shell, called a *granuloma*, that keeps the bacilli contained. While the bacilli are sequestered, individuals will usually have no signs or symptoms of TB; they have latent TB infection.

Most people with a TB infection have latent TB infection and never experience any manifestations of their infection, that is, they never progress to active TB disease. In some people, the tubercle bacilli overcome the immune system and multiply, resulting in progression from latent TB infection to active TB disease. People who progress immediately after infection to active TB disease (ie, primary TB) often present with pleural or disseminated disease from hematogenous spread.[14] Most people with active TB disease will become symptomatic with pulmonary disease; this form of active TB disease is usually the most symptomatic and infectious. Symptoms of active TB disease include loss of appetite, weight loss, fever, night sweats, chills, and weakness. Pulmonary TB symptoms also include cough, chest pain, and hemoptysis. The clinical presentation reflects the organ system that is involved in disease. However, in both pulmonary and extrapulmonary active TB disease, clinical progression can be so gradual that people do not report symptoms.

EFFECTS OF PREGNANCY ON TUBERCULOSIS

Pregnancy does not appear to increase susceptibility to TB infection or progression from latent TB infection to active TB disease.[15] Pregnancy also does not affect susceptibility to any particular site of TB infection.[15] However, pregnancy can make the diagnosis of TB

more difficult owing to hesitancy to perform radiographs and the similarity of screening symptoms with those of the pregnant state, for example, weakness, weight changes, and shortness of breath.[2,13,16] A higher incidence of TB disease has been reported in the postpartum period than would otherwise be expected based on individual demographics.[16] This may be a reflection of the immunologic changes of pregnancy that may increase susceptibility to TB (eg, suppression of the T-helper inflammatory response); these changes may mask symptoms during pregnancy but reverse postpartum with a corresponding exacerbation of symptoms.[16,17]

EFFECTS OF TUBERCULOSIS ON PREGNANCY

Adverse maternal and neonatal outcomes are increased with inadequate treatment, advanced disease, and late diagnosis of TB in pregnancy compared with earlier diagnosis.[15] In a global systematic review and meta-analysis of 13 studies, including 3,384 pregnancies in which the pregnant woman had active TB disease, maternal and perinatal outcomes were consistently poorer with active TB disease than without.[2] There were higher odds of maternal death in pregnant women with active TB disease (odds ratio 4.1, 95% CI 0.65–25.2), and, of those who died, 50% had co-infection with HIV. Antenatal admission was also nine times higher in pregnant women with active TB disease than those without. Maternal anemia was four times more likely with active TB disease than without and cesarean birth twice as likely. Active TB disease was associated with a nine times greater rate of miscarriage. In pregnancies in women with active TB disease, perinatal death increased 4.2-fold, preterm birth increased 1.6-fold, acute fetal distress increased 2.3 fold, and low birth weight increased 1.7-fold.

The risk of untreated active TB disease on the pregnant woman and on the fetus is greater than the risks of treatment.[18] Congenital TB may be transmitted from a mother with active TB disease to the fetus transplacentally through the bloodstream or lymphatics; it is also possible for *M tuberculosis* to be aspirated or ingested through the amniotic fluid during birth.[15,19] Congenital TB may present in the early neonatal period with sepsis or in the first 3 months of life with bronchopneumonia and hepatosplenomegaly.[20] Although rare, congenital TB has a high mortality rate.[15] If congenital TB is suspected, evaluation should include histologic and mycobacterial culture of the placenta, in addition to the neonatal evaluation.[15] It is difficult to distinguish between TB acquired as a fetus and TB acquired in the neonatal period.[15] Current diagnostic criteria for congenital TB include a proven tuberculous lesion in the neonate and at least one of the following: lesions in the first week of life, a primary hepatic TB complex or caseating hepatic granulomas (due to transmission through the umbilical vein, hence, forming a primary TB complex in the fetal liver), TB of the placenta or maternal genital tract, or exclusion of postnatal transmission.[15,21]

DIAGNOSING TUBERCULOSIS IN PREGNANCY

Everyone should be evaluated for TB on initiating antenatal care by assessing symptoms, performing a physical examination, and ascertaining TB risk factors (Fig. 2).[5,12] Possible TB-related symptoms include loss of appetite, weight loss, fever, night sweats, weakness, coughing for longer than 3 weeks, chest pain, and hemoptysis (Table 1).[12] If any of these

symptoms are present, clinical judgement must be used to assess whether these symptoms are secondary to pregnancy or another possible etiology, including TB.[12] A physical examination should also be performed with an emphasis on the pulmonary examination, but also evaluating for any possible evidence of extrapulmonary TB (Fig. 2).[12]

Risk factors for TB infection should be assessed, including close contact to individuals with infectious TB, birth in or emigration from a high-burden TB country, or living or working in a setting where TB exposure may be possible (eg, correctional facility, long-term care facility or nursing home, homeless shelters, or health care facility with TB patients) (Box 1 and Fig. 1).[5,10] Providers can use World Health Organization lists to determine whether an individual is from one of the 48 high-burden countries (Fig. 1).[1] Additionally, pregnant women should be further evaluated if they have a high risk of progressing to active TB disease if they have infection; this includes people who have HIV infection, people who are intravenous drug users, and people who are immunocompromised (Box 1).[5,10]

If a person screens positive for a possible TB-related sign or symptom, or a risk factor for TB infection or progression to active TB disease, a TB test should be performed as soon as possible (Fig. 2). Testing is critical even if treatment might be delayed until postpartum to avoid missing a diagnosis in women who do not follow up postpartum. A Mantoux tuberculin skin test or a TB blood test (ie, interferon-gamma release assay) may be used to test for TB in pregnancy.[22] The Mantoux tuberculin skin test detects immunity to heat-inactivated tubercle bacilli (ie, purified protein derivative) and is considered both safe and valid in pregnancy.[23] The Mantoux tuberculin skin test response becomes positive 2–12 weeks after exposure.[24] The importance of testing during pregnancy is underscored by the fact that 14–47% of pregnant women tested for TB have a positive Mantoux tuberculin skin test result, and most pregnant women with active disease are unaware of their disease.[25,26]

An interferon-gamma release assay measures immune response to the ESAT-6 and CFP-10 antigens that are specific to the *M tuberculosis* complex.[24] Interferon-gamma release assays are the preferred test for people who have received the BCG vaccine for TB and people who may have difficulty returning for a second appointment to be evaluated for a reaction to the skin test.[5] The BCG vaccine is usually given to infants in countries with a high prevalence of TB and may cause a false-positive reaction to the Mantoux tuberculin skin test.

A positive Mantoux tuberculin skin test or interferon-gamma release assay result indicates TB exposure and infection, but neither can distinguish latent TB infection from active TB disease. A negative test result does not completely exclude the possibility of active TB disease, especially in the context of steroid treatments, renal failure, and other infections, including HIV.[13,27] It is important that active TB disease be excluded before initiating latent TB infection treatment. If a Mantoux tuberculin skin test or interferon-gamma release assay result is positive, a person should be clinically evaluated and undergo a chest radiograph to rule out active TB disease. Latent TB infection is diagnosed if the person has a positive TB test result, no signs or symptoms of active TB disease (eg, pulmonary or extrapulmonary), and a normal chest radiograph. Exposure to ionizing radiation from a chest radiograph is well below estimated threshold levels for adverse fetal effects.[28]

A diagnosis of active TB disease is based on a combination of clinical presentation and symptoms, chest radiograph, and acid-fast bacilli smear, culture, or pathologic data.[12] If possible, it is important to obtain clinical samples from the potential site of disease to culture *M tuberculosis* and assess for bacteriologic resistance to anti-TB medications.[12] Although multidrug-resistant TB is a growing problem internationally, only 1.5% of culture-proven TB cases in the United States are resistant to isoniazid and rifampin, the two most effective TB medications.[4] All diagnoses of TB should be reported to health departments, as required by local or state regulations (Box 2). If a person is referred for TB treatment, it is important to ensure care was established, as many barriers to care exist including perceived discrimination, financial barriers, lack of insurance, transportation, limited office hours, appointment wait time, language barriers, and unfamiliarity with local health care systems.[29]

TREATMENT OF TUBERCULOSIS DURING PREGNANCY

All four first-line medications used to treat TB (ie, isoniazid, rifampin, ethambutol, and pyrazinamide) were classified by the Federal Drug Administration's prior letter-based system of medications in pregnancy as category C.[30] However, the use of pyrazinamide during pregnancy is controversial in the United States given the lack of evidence about its safety.[30] If drug-susceptible active TB disease is diagnosed, a minimum of 9 months of therapy with isoniazid, rifampin, and ethambutol should be given.[14,30] Pyrazinamide is given in the standard four-drug regimen to people who are not pregnant; however, given possible risk, U.S. guidelines do not include this medication unless the pregnant woman has extrapulmonary or severe active TB disease or has co-infection with HIV.[30] All treatment for active TB disease should be with directly observed therapy, in which a health care worker watches as a person takes each medication, which can be facilitated by the health department (Box 2). Active TB disease treatment in pregnancy should occur with the support of an infectious disease specialist, especially in the context of antibiotic resistance, allergic reactions, extensive disease, or medication compliance concerns.[30]

Given poor maternal and fetal outcomes with untreated active TB disease, the benefits of treatment outweigh the potential risks from the medications.[20] When treatment of active TB disease is initiated in the first trimester, as compared with the second and third trimesters, the associated increased risk of preterm birth, low birthweight, and perinatal death are almost eliminated.[2] Maternal complications also decrease with treatment in the first trimester (29%) compared with in the second or third trimester (60%).[2]

A main reason immediate treatment for latent TB infection in pregnancy should be considered is if the woman contracted TB in the past 2 years owing to the high risk of progression to active TB disease.[31] If not, treatment for latent TB infection may be deferred until 2–3 months postpartum.[31] Hepatotoxicity with isoniazid treatment might occur more frequently in pregnancy and in the early postpartum period.[31–33] This risk must be balanced with the risk for developing active TB disease and the resultant potential consequences.[32] As such, many experts agree that TB treatment during pregnancy requires careful monitoring for signs and symptoms of hepatitis.[32] If it is decided that treatment for latent TB infection should occur during pregnancy, expert consensus recommends beginning treatment during the second trimester unless an individual situation warrants earlier treatment.[20] Latent TB

infection in a pregnant woman should be treated with isoniazid daily or twice weekly with directly observed therapy with supplemental pyridoxine (vitamin B6) as pregnant women are more likely to be deficient in pyridoxine which can result in neuropathy.[20,30,31]

Previous CDC guidelines on treatment of latent TB infection stated that the use of isoniazid was preferred in pregnancy.[32] Recently published CDC latent TB infection treatment guidelines reviewed the evidence to support preferred and alternative regimens to treat latent TB infection. The evidence reviewed supports the use of 6 or 9 months of isoniazid as alternative regimens to the rifamycin, shorter-course treatments. Because currently there are no data to support the use of rifamycin based regimens in pregnancy, 6–9 months of isoniazid remains the recommended regimen for pregnant women.[34] It is particularly important in pregnancy to ensure medication compliance, as pregnant women may associate the nausea of pregnancy with their anti-TB medications.[35]

Recent studies have demonstrated improved completion of latent TB infection treatment in people on shorter, rifampin-based latent TB infection treatment regimens.[36,37] These studies excluded pregnant women and thus there is limited information on efficacy and safety data of rifampin-based regimens in pregnancy. Based on use of rifampin during treatment of pregnant women with active TB disease, some providers who treat latent TB infection are considering use of rifampin-based regimens for latent TB infection treatment in pregnancy.

Few studies have examined teratogenicity of TB medications. Isoniazid crosses the placenta, although it is not teratogenic even when given during the first trimester.[32] Rifampin may have a small risk of teratogenicity; one study demonstrated that 3% of 446 exposed fetuses had abnormalities, including limb reductions, central nervous system abnormalities, and hypoprothrombinemia, as compared with 1% of those in the control group.[32] Additionally, hemorrhagic disease has been described in neonates born to a person taking rifampin.[32] A subset of 125 pregnant women from larger latent TB infection trials using rifapentine (another rifamycin) and isoniazid did not show any unexpected rates of fetal loss or congenital anomalies.[38] Given the decades of experience with rifampin and limited data about potential teratogenicity, most experts agree that using rifampin in pregnancy is appropriate.[32] Pyrazinamide has not been studied with regards to its effect on the fetus and, as such, is avoided in pregnancy unless a person has a co-infection with HIV.[32] Streptomycin, which is not commonly used in the United States as a result of former high rates of resistance, should not be used in pregnancy owing to potential eighth cranial nerve toxicity in the fetus.[20,30]

CO-INFECTION WITH HUMAN IMMUNODEFICIENCY VIRUS

Pregnant women living with HIV need to be screened for TB early in pregnancy and evaluated thoroughly. The same treatment for TB should be used as for a person with HIV who is not pregnant. It is recommended that pregnant women with untreated HIV (ie, not taking antiretroviral therapy) and active TB disease or latent TB infection should be treated for TB immediately.[33] People with untreated HIV and latent TB infection progress to active TB disease at a rate of 10% per year.[12] A recent study suggests that isoniazid treatment should be delayed until postpartum for women living with HIV infection, taking

antiretroviral medications and found to have latent TB infection because of the significantly decreased risk of progression to active TB disease.[39] Tuberculosis treatment in people with HIV is complex and should be managed by a specialist, given the potential for drug-to-drug interactions of TB medications with antiretroviral medications.

EXTRAPULMONARY TUBERCULOSIS

In the United States, 67% of TB cases are exclusively pulmonary, but TB can occur in any part of the body.[12,19] This is known as *extrapulmonary TB* and is usually not infectious unless the person also has pulmonary TB, or the extrapulmonary disease has contact with air such as in infections of the oral cavity or an open abscess.[12] The most common sites of extrapulmonary TB are lymph nodes, pleura, bones, meninges, and the urogenital tract.[19] Miliary TB is rare and occurs when the tubercle bacilli enter the bloodstream and disseminate, causing disease at multiple sites.[12] Central nervous system TB includes tuberculous meningitis, intracranial tuberculomas, and tuberculous spinal meningitis.[14] Although rare, tuberculous meningitis and intracranial tuberculomas must be considered in a pregnant or postpartum woman with known TB or risk factors for TB presenting with a headache.

Female genital TB is rare generally and even more so in pregnancy. A pregnancy that occurs in the presence of genital TB is often ectopic owing to adhesions in the pelvis resulting in a pathologic process that is similar to other reproductive tract infections.[14,27] Genital TB usually presents with infertility, menstrual disorders, or pelvic pain; systemic symptoms are uncommon.[14,27] Pelvic inflammatory disease may be initially diagnosed, but the woman will be unresponsive to first line antimicrobial treatment.[14] Genital TB may be diagnosed without a history of TB at another site.[14] Tuberculosis in the female reproductive tract may be spread through the bloodstream or lymphatics, although it usually begins with a hematogenous focus in the mucous membrane of the fallopian tube and then spreads to the endometrium (50%), ovaries (30%), cervix (10%), or vagina (1%).[14,19] There are rare cases of female genital TB thought to be transmitted from infected semen or sputum used as a sexual lubricant.[19] A diagnosis of female genital TB may be made using a culture of menstrual blood or endometrial scrapings, but it is usually made at the time of pathology review after reproductive organ removal.[14] Female genital TB may be incidentally diagnosed during an infertility evaluation; this possibility may increase as a result of rising use of assisted reproductive technologies.[40] Congenital TB has been described after in vitro fertilization; TB risk assessment should be performed and testing should be considered in women at risk for TB before proceeding with in vitro fertilization.[41] Female genital TB responds well to medical treatment with surgery only required for residual large tubo-ovarian abscesses.[14] However, conception rates remain low after female genital TB treatment, and assisted reproduction techniques are often needed.[15,19]

POSTPARTUM AND BREASTFEEDING

Notification of the pediatric team about maternal TB status is important for proper evaluation and care of the infant. Untreated active TB disease is a contraindication to breastfeeding.[42] Once treated with first-line agents for at least 2 weeks and noninfectious (ie,

negative sputum culture), women with latent TB infection or active TB disease are encouraged to breastfeed.[20] Pyridoxine supplementation should be given to all breastfeeding mothers taking isoniazid, and their infants should be monitored for jaundice.[12,30,43] Breastfed infants do not themselves require pyridoxine supplementation unless they are taking isoniazid.[20] No infant toxic effects of TB medications delivered in breast milk have been reported.[12,32] To minimize the dose the infant receives, a breastfeeding mother can take the medication immediately after a feeding and at the start of the infant's longest sleep period.[15,43] One study of breastfeeding while taking TB medications found that serum levels in the infant were below therapeutic levels (less than 20% of therapeutic level for isoniazid and less than 11% of therapeutic level for other TB medications).[32] The amount of isoniazid in breast milk is not prophylactic nor therapeutic for the infant.[12,20] Infants who require isoniazid therapy should receive their own therapeutic dose.[20]

There are rare case reports of tuberculous mastitis and breast abscesses.[20] If these conditions are diagnosed, breastmilk from the affected breast should be discarded until the mother is no longer contagious but breastfeeding can continue from the unaffected breast.[20,44]

CONCLUSION

Tuberculosis during pregnancy confers an elevated risk for maternal and infant morbidity. Diagnosis of TB is challenging and can be confounded during pregnancy by overlap with pregnancy symptoms, uncertain validity of available tests during pregnancy, and concerns by clinicians about performing chest radiographs during pregnancy. Clinicians who care for pregnant women should assess everyone for signs and symptoms as well as risk for TB infection or progression to active TB disease if they have infection. Further evaluation is indicated when signs, symptoms, or risk factors are present to ensure proper diagnosis of active TB disease compared with latent TB infection. Individuals with active TB disease should be treated during pregnancy. Strong consideration should be given to treatment of high-risk individuals with latent TB infection during pregnancy; if treatment is not initiated during pregnancy, it should be started within 2–3 months postpartum. Obstetrician–gynecologists may consult and collaborate with disease experts, including infectious disease specialists, TB control programs, TB medical consultants, and health departments, to ensure timely and accurate diagnosis, linkage to care, and treatment compliance.

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Box 1.

Risk Factors for Tuberculosis Infection and Progression From Latent Tuberculosis Infection to Active Tuberculosis Disease

High risk of tuberculosis infection

- Contacts of people with active tuberculosis disease
- People from a country where tuberculosis is common, including most countries in:
  - Africa
  - Asia
  - The Caribbean
  - Eastern Europe
  - Latin America
  - Russia
- Living or working in a high-risk setting (depending on local epidemiology), including:
  - Correctional facility
  - Health-care facility working with patients at increased risk for tuberculosis
  - Homeless shelter
  - Long-term care facility or nursing home

High risk of tuberculosis progression

- HIV infection
- Tuberculosis infection within the past 2 y
- Intravenous drug user
- Immunocompromise

HIV, human immunodeficiency virus.

Data from Centers for Disease Control and Prevention. Tuberculosis: who should be tested. Available at: https://www.cdc.gov/tb/topic/testing/whobetested.htm. Retrieved February 17, 2020.

Box 2.

Health Department Resources for Tuberculosis

Consult your local health department to:

- Review local epidemiology to know whom to screen for tuberculosis in your community
- Ask questions about tuberculosis screening, diagnosis, and treatment
- Report tuberculosis as required by local or state regulations

www.cdc.gov/tb/links/tboffices.htm.

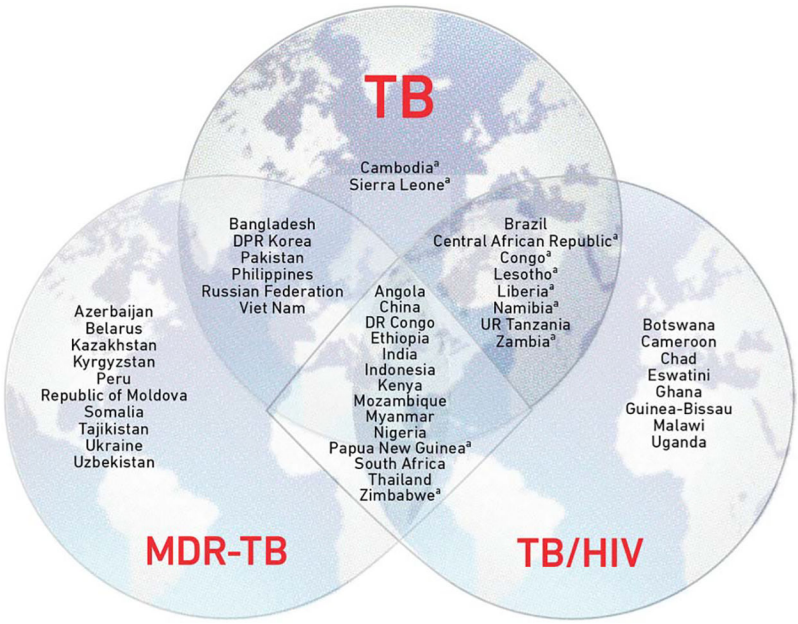

Fig. 1.

High-burden tuberculosis (TB) countries as reported by the World Health Organization.

[1] [a]Indicates countries that are included in the list of 30 high TB burden countries on the basis of severity of their TB burden (ie, TB incident cases/100,000 population/year), as opposed to the top 20, which are included on the basis of their absolute number of incident cases per year. MDR-TB, multi-drug-resistant tuberculosis; TB/HIV, tuberculosis and human immunodeficiency virus co-infection. © World Health Organization 2018. Available at https://reliefweb.int/sites/reliefweb.int/files/resources/9789241565646-eng.pdf.

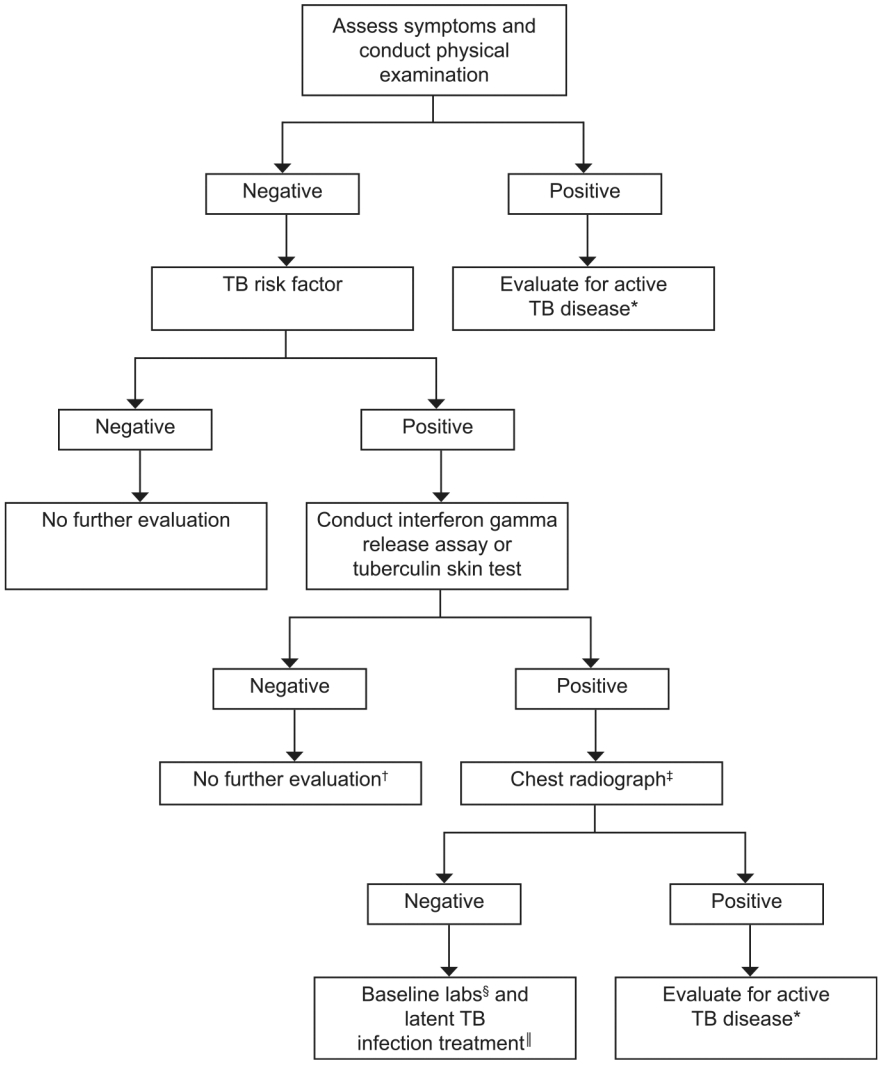

Fig. 2.

Evaluation for tuberculosis (TB) in pregnancy.[12] *Evaluation for active TB disease includes a medical history and physical examination, chest radiograph, sputum smears for acid-fast bacilli, cultures, nucleic acid amplification testing, and other diagnostics as clinically indicated. †If immunosuppressed, may still choose to perform a chest radiograph at the discretion of the provider, even if the interferon gamma release assay or tuberculin skin test result is negative. If a pregnant woman is a contact to a person with infectious TB, a repeat test should be performed 8 weeks after the last exposure. ‡Chest radiograph should be performed as soon as possible regardless of trimester if woman is immunocompromised but may be delayed until the second or third trimester based on epidemiologic risk factors and clinical judgment for all other pregnant women. Chest radiograph in pregnancy should be performed with a lead abdominal shield. §Baseline laboratory tests include liver function tests if treating with isoniazid and includes a complete blood count if using rifampin. ‖Latent TB infection treatment should be started at the discretion of the provider based on risk factors, local epidemiology, and other individual factors.

Table 1.

Differentiating Active Tuberculosis Disease and Latent Tuberculosis Infection

Feature	Active TB Disease	Latent TB Infection
Signs and symptoms	May include one or more: Chest pain Cough Decreased appetite Fatigue Fever Hemoptysis Night sweats Weight loss	None
IGRA or TST	Usually positive; negative test result does not rule out active TB	Usually positive
Chest radiograph	Usually abnormal*	Usually normal
Respiratory specimens	Usually smear- or culture-positive†	Smear- and culture-negative‡
Infectious	Yes	No

TB, tuberculosis; IGRA, interferon-gamma release assay; TST, Mantoux tuberculin skin test.

Data from Centers for Disease Control and Prevention. Latent TB Infection and TB Disease. Available at: https://www.cdc.gov/tb/topic/basics/tbinfectiondisease.htm. Retrieved February 17, 2020.

*Chest radiograph may be normal in persons with advanced immunosuppression or extrapulmonary disease.

†Respiratory specimen smears or cultures may be negative in persons with extrapulmonary disease or minimal or early pulmonary disease.

‡Respiratory specimens are obtained only if ruling out active TB disease based on abnormal chest radiograph, symptoms, or clinical suspicion.