TB is an infectious disease caused by the bacterial germ *Mycobacterium tuberculosis*. TB can be latent and without symptoms for extended periods, and during this time a person with TB infection is not infectious. A person can transmit TB infection, primarily through coughing and sneezing, when he or she has symptoms of active disease. Symptoms generally include chronic coughing, fatigue, appetite and weight loss, swollen lymph nodes, fever, chest pain, breathing difficulty, malaise and night sweats. With treatment, the disease is nearly always curable; left untreated, it can be fatal.

An estimated 15 million, or 6%, of Americans are infected with TB. In 1991, there were more than 26,000 cases of active TB reported nationally, and 1,700 TB-related deaths. Based on national estimates and statewide case loads, at least 2 million Californians are believed to be infected with TB, and in 1991, there were 5,273 new TB cases. California had the nation’s third highest rate of active TB cases in 1991, with 17.4 cases per 100,000 people. Among American cities, San Francisco had the fifth highest rate of active TB in 1991 (46 cases per 100,000 people); Oakland, sixth (40.9); Los Angeles, ninth (30.6); and Santa Ana, 10th (30).

Between 1954, when national reporting of TB began, and 1985, the number of TB cases consistently declined. However, this trend reversed in 1986. The rise in people with active TB is seen, to a large extent, as a reflection of the AIDS epidemic. Rates of TB infection and active TB are disproportionately high for people with HIV infection and AIDS, with estimates that as many as 21% of people with AIDS are infected with TB.

Homeless people living in shelters, migrant and “sweat shop” workers, and incarcerated people are also at high risk of infection, as are users of alcohol and other drugs and people who are malnourished. These segments of the population are at high risk of infection because they are more likely to come in contact with someone who has infectious TB, and less likely to take precautions to prevent transmission. They are also at increased risk for developing active disease because they may not receive adequate health care.

**Research Update**

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Homeless people living in shelters, migrant and “sweat shop” workers, and incarcerated people are also at high risk of infection, as are users of alcohol and other drugs and people who are malnourished. These segments of the population are at high risk of infection because they are more likely to come in contact with someone who has infectious TB, and less likely to take precautions to prevent transmission. They are also at increased risk for developing active disease because they may not receive adequate health care.
TB infection rates are increasing for young people, especially children of immigrants or those living in poverty. In addition, the incidence of TB has increased rapidly among African Americans and Latinos aged 25 through 44.5 Higher infection rates are found among people born in Asia, Africa and Eastern Europe, as well as those from the Caribbean, Mexico and other Latin American countries. African Americans, Asians and Latinos made up almost 70% of the reported TB cases in the United States in 1991.

Transmission
The bacterium that causes TB is transmitted through the air; when a person with untreated, active TB of the lungs, larynx or trachea coughs, sneezes, shouts, or sings he or she emits aerosolized droplets containing the bacteria. A person must have active TB to spread the germ or show symptoms. Droplets containing the bacteria can stay suspended in unventilated air for hours. After being inhaled by another person, these droplets can enter the lungs, where they may lead to latent infection. Anyone, including health care workers, who has close contact in an enclosed setting with someone with active TB is at risk of becoming infected.

A latent infection may progress to active disease depending on the health of the newly infected person. A person with a healthy immune system usually will not become ill from TB infection, but he or she will remain infected indefinitely and will not be free of the infection without treatment with an anti-TB drug.

The risk of a latent TB infection becoming active increases dramatically for a person with HIV because of the compromising effects of HIV on the immune system. Someone with TB infection who is not infected with HIV and who has a healthy immune system has a 10% lifetime risk of developing active TB, while a person infected with both HIV and TB has a 10% annual risk of progressing to active TB.6 HIV testing is urged for people with TB infection.

Studies show the rapid rate at which TB infection spreads and progresses among people with HIV. A TB outbreak at a residential care facility for HIV-infected people in California reveals the severity of the problem. Within a six-month period, five of 17 patients at the facility developed active TB and four others became infected.7

TB Testing
People with HIV are urged to have a TB skin test at least once a year. Testing is also recommended for HIV-negative people who are at high risk for TB infection, but have not been screened for it in the past year.8 In addition, clinicians often recommend testing during routine medical visits for people who do not recall having previously tested.

The Mantoux tuberculin skin test is the most reliable and commonly used test to detect TB infection. With this test, purified protein derivative (PPD), which is a tuberculin antigen, is injected beneath the skin. If bacteria are present, the antigen causes immune system cells to trigger a reaction on the skin’s surface 48 to 72 hours later.

This test is reliable 80% of the time in detecting TB infection in people without HIV as well as in people with HIV who are free of symptoms. It is less reliable in people with symptomatic HIV because their immune systems may fail to produce a significant reaction.

While a test is generally considered positive for TB when the skin reaction measures at least 10 millimeters, in people with HIV, the Centers for Disease Control and Prevention (CDC) regards reactions of as little as five millimeters as evidence of infection.9 Some clinicians have recommended the threshold be lowered even more.

Some providers continue to use a multiple puncture test, which uses four prongs, or tines, to introduce either PPD or a neutralized form of tuberculin into the skin. This method does not require a patient to return for a follow-up visit for a result to be read; however, it is less reliable than a Mantoux test, and it should not be used for people at high risk for TB infection.

Anergy to Skin Testing
Reactivity to a TB skin test is dependent on an intact immune system, and HIV infection or any condition that compromises immunity can result in anergy, or a lack of response to antigens being test-

TB Progression
Study of 519 injection drug users

279 tested HIV positive:
12 (4.3%) progressed to active TB

240 tested HIV negative:
0 progressed to active TB

Source:
Blah, Blah, Blah
ed. It is believed that people with HIV are at least 10 times more likely to be anergic than uninfected people. HIV-infected people who test negative on TB skin tests can undergo skin tests for other antigens — such as mumps, candida and tetanus — to which most people have been exposed. The body’s failure to produce a response to these antigens is considered to confirm anergy. For someone who is anergic, diagnostic tests can generally confirm a diagnosis of active TB, inactive TB infection, however, cannot be diagnosed.

**Clinical Symptoms**

TB most commonly occurs in the lungs and respiratory tract, and this is referred to as pulmonary TB. Bacteria can spread to areas outside the lungs, and the disease is then referred to as extrapulmonary. Those with HIV have a higher risk of developing TB not only in the lungs, but also in the lymph nodes in the neck, underneath the arms and in the groin.

Clinical manifestations of TB may differ for someone with HIV, depending on the progression of his or her HIV infection. During early stages of HIV, a person with TB infection usually tests positive to a skin test, glands appear normal, and the immune system keeps TB infection from becoming active. As HIV progresses and the immune system becomes more suppressed, a person is more likely to test falsely negative on a TB skin test, glands become abnormal, and active disease is more likely to develop in the lungs and spread to other parts of the body.10

In addition to the general TB symptoms described above, people with symptomatic HIV infection may also experience rashes or ulcerations. Symptoms of active TB are not specific to TB, and they occur with other HIV-related infections. Because clinicians may mistake TB symptoms for symptoms of other illnesses, a diagnosis of TB may not be made for weeks or months after it becomes active. Autopsies have revealed that some people have died from TB without being diagnosed while alive.10

**Prophylaxis and Treatment**

To decrease the chances of TB infection advancing to active disease, clinicians generally recommend preventive therapy with isoniazid (INH) and Vitamin B-6 for people with HIV who have a positive Mantoux TB skin test. In some cases, treatment is recommended for people with HIV who are anergi-
Because TB is a serious public health threat, it is important that HIV test counselors be aware of TB, both in and of itself and in relation to HIV. This section addresses TB-related issues for both HIV-negative and HIV-positive clients. In addition, it addresses the effects of TB on the personal health of test counselors and others who provide HIV services.

**For All Clients**

Be prepared to discuss the need for TB testing and prevention both to avoid infection and to avoid progression from a latent infection to an active disease. Make this discussion a routine part of health education provided in the pre-test counseling session.

State that regardless of whether a person is infected with HIV, TB is a life-threatening, infectious disease. Assess clients’ risks for TB infection. For instance, learn if clients risk infection in the workplace, or if people in their personal lives are known to have or are at increased risk for active TB.

**Implications for Counseling**

Drug-Resistant TB in California

Study of cases January to March 1991.
620 cases tested for resistance: 95 resistant to any drug.

<table>
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<th>Breakdown of those with drug-resistant TB</th>
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<tr>
<td>Resistant to any drug</td>
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<td>15%</td>
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Source: State of California, Department of Health Services.

INH can effectively eliminate the small number of tuberculous organisms found in the body during a latent infection; before starting INH, doctors should perform a chest X-ray to ensure there is no sign of active disease. The recommended preventive dosage is 300 milligrams daily, or 900 milligrams weekly, and people with HIV continue on this regimen for at least 12 months; those without HIV continue for six months. Proper diet and regular exercise are important during this period.

For those with active TB confirmed by a chest X-ray and sputum culture, multiple drug therapy is often recommended. For HIV-infected individuals who have been previously treated, clinicians prefer a minimum nine-month regimen of INH and rifampin (RIF). To respond to previously untreated cases, they add a two-month regimen of pyrazinamide (PZA) at the start of therapy. A fourth drug, ethambutol (EMB), is appropriate if there is resistance to INH. Treatment must continue at least six months after TB cultures become negative.

People not infected with HIV who have active TB disease start on the same regimen as those with HIV. Treatment must last a minimum of six months and at least three months beyond the date cultures become negative.

Adherence to the full course of treatment is essential to prevent the development and transmission of more serious, drug-resistant TB strains. (See Related Issue: Threats of Drug-Resistant TB.) A person who has successfully eliminated TB disease is still at risk for being infected in the future.

In addition to dangers posed by INH, other anti-TB drugs can also cause serious side effects, including liver inflammation, peripheral neuropathy, fever, rashes and stomach problems. Careful monitoring of possible side effects is necessary. INH, RIF and EMB are generally safe and effective treatments for pregnant women, but PZA should be avoided during pregnancy.

Implications for Counseling

Because TB is a serious public health threat, it is important that HIV test counselors be aware of TB, both in and of itself and in relation to HIV. This section addresses TB-related issues for both HIV-negative and HIV-positive clients. In addition, it addresses the effects of TB on the personal health of test counselors and others who provide HIV services.
HIV test counselors, like other health care workers, are at risk for TB infection in the workplace. It is estimated that at some test sites visited by a significant percentage of clients at high risk for TB, as many as 20% of all clients may be infected with TB. While there are no published studies of TB transmission from clients to HIV test counselors, there have been studies that show TB transmission to other health care providers. Therefore, it is necessary for counselors and other staff to take precautionary measures to reduce the risk of infection.

The Centers for Disease Control and Prevention (CDC) has issued recommendations for preventing TB transmission in health-care settings. Among the recommendations: Be aware of symptoms of active TB in order to identify people who may be infected. When counselors notice clients in waiting areas or in the test counseling session who are coughing into the air, intervene and explain the importance of covering one’s mouth or using tissues to protect the health of others at the test site.

While respiratory masks, also known as “particulate respirators,” are used in some hospital settings to prevent transmission of some airborne infections, this option is nearly always considered impractical and ill-advised in an HIV test counseling session, especially considering that other options are available. Masks can inhibit a client’s trust in the counseling process and make him or her feel stigmatized and uncomfortable. This is especially damaging in a setting in which the counselor is seeking to provide support for a client who may already feel isolated and alienated.

There is even less reason for clients to wear masks to avoid infecting others because masks are more effective at keeping infectious particles from entering the respiratory system than they are at blocking particles from entering the air. Masks can also complicate breathing for a person with respiratory difficulties.

Airflow

The CDC also recommends that health care providers be alert to air circulation at the test site. Because air particles containing TB can remain airborne and infectious for an extended period, sufficient ventilation is important to circulate and filter air so that bacteria can dissipate and become non-infectious.

Air should flow from the cleanest areas of buildings to potentially contaminated areas, and then be exhausted outside the building. Open windows in buildings where this is an option, and use portable fans to aid in ventilating air to the outside. On a larger scale, air filters capable of removing tiny air particles containing TB can be installed in ventilation systems.

If air circulation feels stagnant, discuss with a supervisor the importance of proper ventilation and evaluating the test site’s ventilation system. If necessary, refer the supervisor to the CDC guidelines or to county health department TB programs, which can provide information about the need for proper ventilation. In addition, counselors or supervisors can contact the California Occupational Safety and Health Administration (Cal-OSHA) to learn more about laws and recommendations related to airflow.

Despite the hazards of poor ventilation, attempts to improve airflow are often met with resistance because they are not considered priorities, and they can be costly.

Infected Counselors

For counselors and other test site staff who have active TB of the lungs, larynx or trachea, it is important not to work until the infection has cleared and sputum tests are free of TB for three consecutive smears following treatment. Counselors with active, extrapulmonary TB can continue to work if they are being treated and it is known that they do not have TB of the respiratory tract.

Treatment is advised for counselors with HIV who are infected with TB, regardless of whether they have symptoms of active TB. Counselors who have been medically evaluated and determined to have latent infection can continue to work if they seek regular medical monitoring.

In addition, counselors and other staff who have contact with clients at HIV test sites should test at least once a year for TB.
It is recommended that those who have never tested be screened for TB infection, and screening is important for people at high-risk for TB infection who have not recently tested. Explain that testing is simple and harmless, and that it can be performed by general practitioners and public health clinics. Encourage people who, in personal or occupational settings, have repeated contact with those who are coughing to consult with health care providers about the advisability of TB testing once a year. In addition, some clinicians advise regular testing for people who work or live in crowded conditions with poor ventilation.

State that people who test positive on a TB skin test can undergo other tests to determine whether preventative treatment is necessary. Advise clients how TB infection is transmitted, and make sure they understand how it is not spread. For example, it is not spread by food, dishes, clothes, linens or other inanimate objects. It is important to note that TB infection is not transmitted unless a person has active, respiratory-tract TB disease. In such circumstances, it spreads through the airborne route when droplets containing the bacteria are released by an infectious person who is coughing or sneezing, or engaging in other actions, such as singing or shouting, that can release moisture from the mouth.

Coughing appears to be the most common route of transmission, partly because people often fail to cover their mouths when they cough. Discuss the need for self-protection from another person’s cough, particularly in the presence of someone who may have active TB and is not being treated. After several days of treatment for TB, a person is generally no longer infectious.

Acknowledge to clients that TB services can be difficult to obtain, and that some care providers lack adequate information about the infection.

Clients who Test Positive
While TB is a serious threat for people with HIV, in many cases there may be little time to discuss it in post-test counseling sessions. Clients likely will be unready or unwilling to discuss TB at the time they are responding to a positive HIV test result.

In post-test counseling sessions with people who test HIV positive, explain at a minimum the heightened TB risk for a person with HIV, and the need to seek medical monitoring to determine if a person is infected with TB, syphilis, parasites or other diseases. Explain the importance of discussing TB with a health care provider, and, if infected with TB, of taking preventive treatment. State that while some opportunistic infections for HIV may be preceded by a lengthy period of mild symptoms, the onset of TB can be sudden and serious.

It may be most useful to provide written information that explains the need to test for TB and to be aware of symptoms. Be careful not to alarm clients. During post-test counseling, clients face a myriad of issues, and it may be far more important to provide support and basic information about medical monitoring for HIV. Lengthy discussions with clients who are reluctant to discuss TB risks may raise untimely fear.

Clients with Active TB
Clients arriving at the test site who are known to have or are suspected of having active, untreated or inadequately treated TB should be told of the importance of seeking immediate medical care for their own and others’ health.

Direct clients with active TB who disclose that they are not being treated or not following treatment instructions to medical care immediately after their HIV test counseling session.

Counselors may not know if a client has active TB, and without such knowledge cannot assume that a client’s TB-like symptoms, such as a cough, are related to TB. Clients with TB-like symptoms can be asked about their symptoms and asked if these have been evaluated to confirm or rule out a TB diagnosis.
Case Study

José is 29 years old and has just learned he is HIV positive. He recently chose to enter a substance abuse treatment program for help in dealing with a history of chemical dependency. In discussing his health history, he states that he has previously tested positive for TB infection. He is unfamiliar with available medical treatments for HIV infection or other diseases, and he has had little contact with medical providers or trust for them.

Begin by supporting José for wanting to stop using drugs and for taking the significant steps he has taken to enter recovery. Stress the value of continuing in his course of recovery after learning that he is infected with HIV. Counseling and support related to this and to aspects of his HIV infection, including dealing with his response to learning he is infected, may take up most of the counseling session.

Because he is infected with both HIV and TB, make sure José is aware of the importance of medical follow-up. Explain to him his immediate risks for active TB and the value of follow-up tests and preventive therapy, as well as precautions to take to prevent transmission to others. Explain that it is important to be monitored on an ongoing basis to rule out or confirm active disease. Also, make him aware that, with treatment, TB infection can nearly always be cured.

Because he is distrustful of the medical system, José may wait an extended period to seek medical care. Understand his distrust of medical providers and the source of his distrust. Learn as well whether there have been providers with whom he has developed trust, including providers he has encountered as part of his recovery from substance abuse. Explore these relationships and try to provide referrals for medical care, including county TB programs or other providers with characteristics similar to medical providers he has trusted. In addition, provide referrals to social workers, nurse practitioners and others who may ease his entry into the healthcare system.

Present medical intervention to José as a way he can stay in control of his health. State that by working with health care professionals, and viewing providers of health care in the same way he sees substance abuse providers, he can manage the course of his health. Describe the process as similar to his seeking intervention after acknowledging his substance abusing history.

References
11. Centers for Disease Control, Center for Prevention Services, Division of Tuberculosis Control. TB Fact Sheet, Including Information on TB and HIV. 1990.
Test Yourself on Tuberculosis

**Review Questions**

1. True or False: Treatment for active tuberculosis can be terminated as soon as symptoms have disappeared.

2. True or False: Among people who are infected with TB, those with HIV infection are no more likely to progress to active TB disease than are those who are HIV seronegative.

3. Which of the following is the most widely used test to detect TB infection? a) chest X-ray, b) sputum culture analysis, c) multiple puncture, or four-prong, skin test, d) Mantoux TB skin test.

4. True or False: African Americans, Asians and Latinos are disproportionately affected by TB.

5. How many Californians are believed to be infected with TB? a) 2 million, b) 30,000, c) 5,000, d) 23 million.

6. True or False: Increased rates of active TB in the past six years have been related to the presence of HIV infection.

7. True or False: TB infection is transmitted in the same ways as HIV.

8. True or False: Some people with HIV may be infected with TB, but may be anergic, or unable to react to a TB skin test.

**Discussion Questions**

1. What precautionary measures can a counselor take with a client who has symptoms of TB without causing the client to feel shunned or stigmatized? How can a counselor determine if a client has such feelings?

2. What counseling can be provided to a client who states he or she has taken treatment for TB, but has been unwilling to follow a complete course of prescribed treatment?

3. How can a discussion of TB be integrated into a pre-test counseling session?

4. In a post-test counseling session with someone who has tested HIV positive, how can the counselor present information about TB without unnecessarily raising a client’s fears?

5. How can counselors and other test site staff investigate the air quality of their workplace and discuss workplace TB transmission risks with supervisors?

**Review Answers**

1. False. Treatment should be continued for at least three months after cultures become negative for HIV-negative people and for a minimum of 12 months for people with HIV.

2. False. People infected with TB and HIV are more likely to develop active TB. People with dual TB and HIV infection have a 10% annual risk of progressing to an active infection, while those who are TB-infected and HIV seronegative have a 10% lifetime risk.

3. D. For HIV asymptomatic and seronegative people, the Mantoux TB skin test is the most widely used test, and it is considered 80% effective in determining TB infection.

4. True.

5. A. It is believed that 2 million Californians are infected with TB.

6. True.

7. False. TB can only be transmitted when a person with active TB of the lungs, larynx or trachea coughs, sneezes, shouts or sings, thus releasing aerosolized droplets containing the bacteria that can be inhaled by others sharing the same enclosed air spaces.

8. True.
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