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OSHA *REVIEW*



**Regulatory
Compliance
and
Employee
Training
Information
for the
Dental
Profession**

IMPORTANT NOTE: To ensure your office policy and procedure manual is up to date and complete, file this issue of the *OSHA Review* in your binder in accordance with the instructions below:

Place this issue in Section Tab X of the *OSHA REVIEW* binder.

TB or Not TB

What Every Dental Office Needs to Know

Prevalence of Mycobacterium Tuberculosis or TB

TB is one of the world's most common infectious diseases; nearly 2 billion people or one-third of the world's population have latent TB infection. In the U.S., the prevalence of TB is comparatively low. Today, 10 to 15 million Americans are infected with TB, including about 3.4 million residents of California, which represents about one-tenth of the state's population.

About 20,000 cases of active TB disease occur annually in the U.S. California has the nation's highest number of TB cases, with 3,855 cases reported during 1998. The prevalence of TB is not evenly distributed

throughout the U.S. or California population. For example, a growing proportion of TB cases occurs among people born in parts of the world, such as Africa, Asia, the Caribbean and Latin America, where TB is most prevalent. Between 1986 and 1998, the percentage of TB cases involving

foreign-born U.S. residents rose from 22 percent to 42 percent nationwide. In California, more than two-thirds of all TB cases are reported in foreign-born people.

Resurgence of TB

In the mid-1980s, a 35-year decline in the number of reported cases of tuberculosis

ended abruptly. Between 1985 and 1992, the number of reported cases of TB nationwide jumped by 20 percent. In California, the number of cases reported between 1985 and 1991 increased by 51 percent.

Federal, state and local public health officials and public interest groups such as the American Lung Association responded to the increase in TB cases by renewing prevention and control efforts. A primary focus of these efforts involved ensuring that every active TB case completes therapy, since the failure to complete therapy promotes drug-resistant strains of *M. tuberculosis* that require more extensive and costly treatment.

California, like many other states, adopted a strategic plan for the control and elimination of TB. The state's plan to halt and prevent TB transmission calls for prompt diagnosis and treatment of TB; expanded use of directly observed therapy; greater coordination of TB programs; greater attention to TB cases among immigrants; more comprehensive treatment for homeless TB patients; and measures to improve program accountability.

As a result of these efforts, the number of TB cases began falling steadily in the early 1990s; 1999 was the seventh consecutive year of decline in reported TB cases. In 1999, there were 17,528 cases of TB reported in the U.S., declining 5 percent from 18,361 cases in 1998. Seven states, including California, which has the highest number of TB cases in the nation, account for about 60 percent of that decline. Today, the number of reported TB cases per 100,000 population nationwide is the lowest in 20 years.

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After nearly a decade of concern among dental and medical professionals about the potential for occupational exposure to TB in the outpatient setting such as dental offices, the exposure risks are now considered to be low.

EMPLOYEE TRAINING AGENDA

FORMAT: Issue &
Staff Discussion

SUBJECT: Tuberculosis

Lesson Plan Objectives:

The purpose of this lesson is to address the risks of occupational exposure to TB among dentists, dental auxiliaries and dental office staff working in outpatient settings. By completing this lesson, dentists, dental auxiliaries and dental office staff will be able to describe:

- Methods of transmission;
- Groups and individuals most at risk of becoming infected with TB and of progressing from infection to active illness;
- Occupational exposure risks, including those in inpatient and outpatient health care settings;
- Steps for controlling occupational exposure risks specific to dental treatment in outpatient settings.

Transmission of Mycobacterium Tuberculosis

Tuberculosis is caused by *Mycobacterium tuberculosis*, which is primarily transmitted in tiny airborne particles called *droplet nuclei*. These particles can be produced when a person with pulmonary or laryngeal TB sneezes, coughs, speaks or sings. Droplet nuclei can also be produced when TB wounds or lesions are surgically drained, irrigated or debrided; when tissue or secretions containing *M. tuberculosis* are processed, such as in a laboratory or during autopsy; or when a person with active TB

undergoes a medical procedure that induces coughing.

Because of droplet nuclei are so small (1 to 5 microns), normal air currents can keep them aloft for prolonged periods and carry them throughout a room or building. Infection occurs when a susceptible person inhales droplet nuclei containing *M. tuberculosis*, and these droplet nuclei travel through the mouth or nasal passages, upper respiratory tract and bronchi, and reach the alveoli of the lungs..

Note: tuberculosis is transmitted by airborne particles rather than from contact with hard surfaces. Because the transmission is airborne, OSHA does not mandate specific tuberculocidal disinfectants for surfaces to prevent the transmission of the disease. The OSHA Standard recommends either soap or water or a non-tuberculocidal disinfectant for cleaning and disinfecting surface

Latent Infection

Usually within 2 to 10 weeks after initial infection with *M. tuberculosis*, the immune response limits further multiplication and spread of the tubercle bacilli. Some of the bacilli remain dormant and viable for many years. This condition is referred to as latent TB infection. Persons with latent TB infection usually have positive purified protein derivative (PPD)-tuberculin skin-test results, but they do not have symptoms of active TB, and they are not infectious.

Active Infection

Persons infected with *M. tuberculosis* have a 10 percent chance of developing active TB during their lifetime. Their risk is greatest during the first two years following infection. The common symptoms of active TB include a persistent cough, bloody sputum, fever, night sweats, loss of appetite, weight loss, abnormal chest x-rays and skin lesions.

Persons who are immunocompromised have a greater risk for progressing from latent TB infection to active TB disease; HIV infection is the strongest known risk factor for this progression. About 10 to 15 percent of TB cases nationwide are reported in persons infected with HIV.

Likelihood of Infection

New reported cases of TB generally come from two groups of people within the general population who are known to have a higher risk for TB. These include persons who face a greater likelihood of being exposed to and infected with TB, as well as persons with characteristics that make them more likely to progress from infection to illness. In some cases, both of these factors may be present.

Persons who are more likely to have been exposed to and infected with TB include:

- Persons who have contact with persons suffering from active TB;
- Foreign-born persons from areas of the world with a high prevalence of TB (e.g., Africa, Asia, the Caribbean, and Latin America);
- Medically underserved populations within the U.S., including some African-Americans, Hispanics, Asians and Pacific Islanders, American Indians, and Alaskan Natives;
- The homeless;
- Current or former inmates of jails or prisons;
- Alcoholics;
- IV-drug users; and
- The elderly.

Infected persons more likely to progress to illness

Certain persons who are infected with TB are known to face a higher risk that their infection will progress to active illness. These include:

- Persons who have been infected within the past 2 years;
- Children younger than age 4;
- Persons with fibrotic lesions on chest radiographs; and

- Persons with certain medical conditions, such as HIV infection, abnormally low body weight, chronic renal failure, diabetes mellitus, immuno-suppression resulting from immunosuppressive therapy, and some cancers.

Probability that exposure will result in infection

The probability that a person exposed to *M. tuberculosis* will become infected depends primarily on two factors: the concentration of infectious droplet nuclei in the air and the duration of exposure. These factors, in turn, depend on the characteristics of the TB patient, the environment where exposure occurs, and the characteristics of the person exposed to TB.

Characteristics of the TB patient

The characteristics of the person with active TB that enhance the risk of transmission to others include:

- Disease in the lungs, airways or larynx;
- Symptoms such as coughing or sneezing, including the patient's failure to cover his or her mouth and nose;
- Presence of acid-fast bacilli (AFB) in the sputum;
- Presence of cavitation on a chest radiograph;
- Treatment for TB that was inappropriate or of short duration

Transmission risks also increase when a person with active TB undergoes medical procedures that can induce coughing or cause aerosolization of *M. tuberculosis*. Dental procedures, however, do not meet the CDC's definition for "cough-inducing" procedures and therefore are not thought to increase the risk of transmission.

Environmental factors

Transmission risks are affected by the environment in which exposure occurs, including:

- Exposure in relatively small, enclosed spaces;
- Inadequate ventilation in those spaces that results in insufficient dilution and/or removal of infectious droplet nuclei; and
- Recirculation of air containing infectious droplet nuclei.
- Hospitals and mycobacteriology labs; and
- Other facilities that use medical procedures resulting in aerosolization of respiratory secretions from patients, or that primarily treat populations at increased risk for TB.

Characteristics of the person exposed to TB

The characteristics of the person exposed to TB that affect his or her chance of becoming infected are not well defined. Prior infection TB makes a person less susceptible to becoming reinfected, although the risk of reinfection is higher if the person is immune system is severely. And while it is well established that HIV infection increases the likelihood of progressing from latent TB infection to active TB, it is unknown whether HIV infection increases the risk for becoming infected as the result of exposure to *M. tuberculosis*.

Occupational exposure risks

TB transmission is theoretically possible in any workplace where infectious droplet nuclei are present. However, given the generally low prevalence of TB in the U.S. and its uneven distribution throughout the U.S. population, imposing TB infection control measures on every workplace has been deemed impractical and unnecessary.

The proposed OSHA rule on TB infection control specifically focuses on workplaces recognized by the CDC as having an increased risk for transmission of infectious TB due to the nature of their clientele and/or services. These include:

- Prisons and jails;
- Residential facilities for HIV-infected persons (e.g., hospices or group housing);
- Residential facilities for the elderly;
- Homeless shelters;
- Drug treatment clinics;

Inpatient health care settings

The CDC, OSHA and Cal-OSHA recommend extensive infection control efforts to prevent the spread of TB within inpatient settings. These involve developing a detailed infection control plan; assessing, diagnosing and managing patients with active TB; installing isolation facilities and special ventilation, as well as implementing the use of respirators to prevent inhalation of infectious droplet nuclei; and vaccinating and testing employees at regular intervals.

These measures are specifically not intended to apply in outpatient settings such as most dental offices. For more information about TB infection control for inpatient settings, see the CDC's *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Facilities, 1994*.

Outpatient health care settings; most dental office settings

The CDC, OSHA and Cal-OSHA consider most outpatient settings, including most dental and medical offices, to be at low risk of occupational exposure to TB. Therefore, these settings are not currently addressed in the CDC guidelines and are not covered by the proposed OSHA rule or interim Cal-OSHA rule governing TB infection control in the workplace.

Dental offices in particular represent a low risk because dentists do not treat patients for symptoms caused by infectious TB and do not perform procedures that are classified as "cough-inducing" by the CDC. In some instances, however, the population served by a dental practice or the employees of the practice may be at relatively high risk for TB, which may increase the risk of occupational exposure.

Since there exists some potential for the transmission of *M. tuberculosis* in dental

offices, dentists should follow a general infection control protocol that includes the following features:

- Risk assessment leading to the adoption of appropriate infection control policies;
- Routinely screening patients through the process of taking and updating a patient health history;
- Referral to a physician based on the patient's medical history or symptoms;
- Postponing elective care or performing urgently needed care in an appropriate setting, such as a hospital, when indicated by the patient's medical history or symptoms;
- Evaluating employees who present with symptoms consistent with active TB; and
- Implementing appropriate engineering controls in practices that provide care to populations at high risk of active TB.

NOTE: Most dental practices have implemented universal precautions as the way to prevent the spread of infectious disease in the dental office. However, universal precautions are designed specifically for bloodborne pathogens like the hepatitis B and C viruses and HIV, not for airborne pathogens like M. tuberculosis. Therefore, additional infection control measures are needed to prevent transmission of TB in dental offices.

Risk assessment

Every dental practice should periodically evaluate factors that affect the risk of transmission of TB. These factors include the patients served by the practice, the nature of treatment provided, and the employees working in the practice. Information about the prevalence of TB within a given area or population can be obtained from the local public health department.

As a result of this assessment, each practice should adopt policies that make provisions for:

- the protection and referral of patients who may have undiagnosed active TB;
- urgent dental treatment for patients with active TB; and
- employer-sponsored education, counseling and screening for employees of the dental office.

The purified protein derivative (PPD) is used to determine tuberculosis infection. The OSHA regulations, however, do not mandate that employees are tested by PPD unless a specific exposure and symptoms occur in an employee. PPD tests are not necessary or required on an annual or regular basis. If the office serves a population with a known high risk of tuberculosis the PPD might be offered to employees to establish a baseline that they are free of tuberculosis.

Health histories

The process of taking and updating a patient health history remains an adequate way to screen patient for any disease or condition, including TB, that can affect the course of treatment and the health of staff and other patients. The health history questionnaire should include questions about past TB infection and common symptoms of TB such as persistent cough, bloody sputum, fever, night sweats, loss of appetite and weight loss.

If a patient discloses or shows symptoms of active respiratory illness, the dentist or staff should ask more questions to determine the cause, since the nature of the condition (regardless of whether it is TB) could compromise patient care and potentially endanger other patients and staff. Specifically, they should ask the patient about the nature of his or her symptoms, whether the cause has been diagnosed by a physician, and whether he or she is receiving medical treatment for the condition.

NOTE: Even when a patient's symptoms seem to point to TB, the dentist and staff should refrain from speculating with the patient about the possible cause of illness until a physician makes a positive diagnosis. TB is a medical condition that dentists and dental auxiliaries are not trained, equipped or legally authorized to diagnose. Instead, the dentist and staff should

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explain the office policy against performing elective dental procedures while a patient has a severe respiratory infection, emphasizing that active illness of any kind can compromise treatment outcomes and patient safety, as well as spread disease to other patients and staff.

Physician referral

A patient with a medical history or symptoms suggestive of undiagnosed active TB should be referred promptly to a physician to determine whether the patient is infectious. Such patients should not remain in the dental office any longer than necessary to arrange a referral. While in the office, such patients should be given surgical masks and instructed to cover their mouths and noses when coughing or sneezing.

Postponing treatment or treating elsewhere

Elective dental treatment should be deferred until a physician confirms that the patient does not have infectious TB. If the patient is diagnosed as having active TB, elective dental treatment should be deferred until the patient is no longer infectious.

Most persons with active TB are no longer infectious after several days of initiating drug treatment, at which point after consultation with the patient's physician dental care can be safely resumed.

If urgent dental care must be provided for a patient who has, or is strongly suspected of having, infectious TB, such care should be provided in facilities that can provide TB isolation, such as a hospital. Dentists and dental auxiliaries should use approved respiratory protection devices while performing procedures on such patients. Personal respiratory equipment is typically provided by the facility where the treatment is being performed.

Engineering controls

In dental practices that serve populations known to be at high risk for active TB, it may be appropriate to implement engineering controls similar to those used in general-use areas (e.g., waiting rooms) of medical facilities that have a similar risk profile. These include making improvements to the ventilation system to ensure that the room is adequately ventilated and prevents recirculation of air containing infectious droplet nuclei. Offices that believe they serve populations with high risk for tuberculosis should consult with local medical officers to determine the specific engineering control necessary, as this is a highly technical area.

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OSHA REVIEW

Regulatory Compliance and Employee Training Information for the Dental Profession

Test your knowledge

Test your knowledge about TB infection control in the dental office by reviewing the following highlights from this issue's lesson plan. These questions can also serve as an instructor's guide for a group discussion of this issue's lesson plan.

1. How is TB most commonly transmitted? What are the primary symptoms of active TB infection? What are the chances that a person with latent TB infection will develop active TB within his or her lifetime? Name the strongest risk factor for progression from infection to active disease.
2. How prevalent is TB worldwide? In the U.S.? In California Name three groups within the general population known to be more likely to be infected with TB.
3. What are the factors that increase the likelihood of transmission of TB?
4. What workplaces were considered to present the highest risk for TB? Why is the risk for TB in most dental practices considered to be low?
5. What should you do if a patient tells you have tuberculosis?
6. What is the primary means of protecting yourself from contracting TB?
7. Why aren't surface disinfectants effective in controlling TB?
8. Which part of the body does tuberculosis attack?
9. Is tuberculosis infections increasing or decreasing in the United States?
10. Does a dental face mask provide you with adequate protection from tuberculosis infection?

Action Plan

Once you've reviewed the highlights of this issue's lesson plan, consider the following ways to put the information into action in your practice.

1. Review the health history questionnaire used in your practice to confirm that it includes question about a patient's past history of TB as well as the common symptoms of infectious TB.
2. Make it an office policy to postpone elective dental treatment for any patient who presents with an active respiratory illness such as a cold or flu.
3. Adopt office policies that enable employees who are ill to remain at home until they are no longer infectious.
4. Consider your practice patient population for the likelihood that it is a high-risk group.
5. Practice responding to a potential patient whose health history indicates exposure to tuberculosis.