

INSTITUTE OF MEDICINE

Shaping the Future for Health

TUBERCULOSIS IN THE WORKPLACE

Tuberculosis (TB) is a communicable disease caused by the organism *Mycobacterium tuberculosis*. It has two general states, latent infection and active disease, but with few exceptions only those who develop active tuberculosis in the lungs or larynx can infect others.

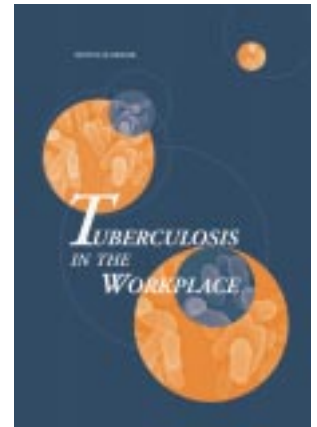
Though once the leading cause of death in the United States, treatment advances following World War II led to steadily decreasing rates of TB infection, disease, and death through the mid-1980s. Between 1985 and 1992, however, the number of new cases reported annually increased by 20 percent, and the number of TB deaths rose as well. Perhaps even more alarming was the marked increase in multi-drug resistant strains of the bacterium, which accounted for 3.5% of reported cases in 1991 (up from 0.5% of cases in the early 1980s).

This resurgence of TB was likely the result of the deterioration of public health programs designed to prevent the disease and to encourage patients to finish therapy. (Incomplete therapy contributes to the evolution of drug-resistant disease.) The decades-long success of screening and treatment programs had led to complacency, creating a favorable environment for the disease, especially in communities where high-risk factors (e.g., AIDS and HIV infection, diminished access to health care, immigration from countries where TB is prevalent) were also present. Outbreaks within hospitals and other workplaces, where deviations from recommended control measures were common, contributed to public health concerns about resurgent disease.

In response to a 1999 Congressional request, the Institute of Medicine convened the Committee on Occupational Exposure to Tuberculosis to study the risk of TB among health care workers and the possible effects of federal guidelines and regulations designed to reduce that risk. The policies under consideration were the 1994 revised control and prevention guidelines for health care facilities published by the Centers for Disease Control and Prevention (CDC) and the 1997 proposed regulations issued by the Occupational Safety and Health Administration (OSHA). The IOM committee was not charged with making recommendations for regulatory policy or for evaluating the cost or cost-effectiveness of implementing a regulatory standard, but instead approached the study with the goal of answering three questions.

Are health care and selected other categories of workers at a greater risk of infection, disease, or mortality due to tuberculosis than others in the communities in which they reside?

The data on occupational tuberculosis infection are limited, based on weak research methodologies, and derived mainly from hospital settings and, to a lesser ex-



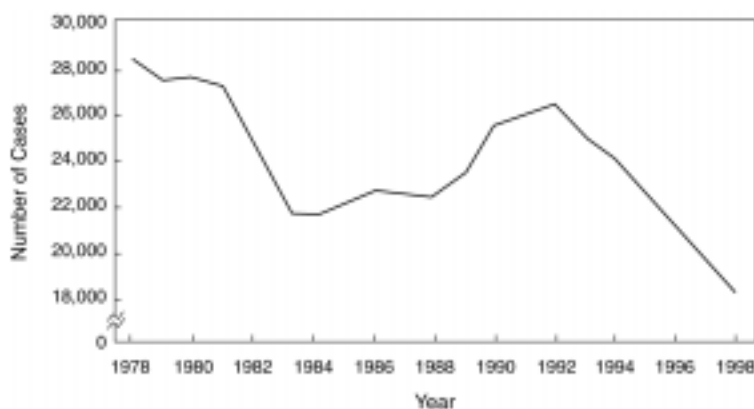
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tent, prisons. Other workplaces that serve people at increased risk for active infection are virtually unaccounted for, though outbreaks have occurred in nursing homes, outpatient centers, and homeless shelters.

Within that context, however, the committee was able to reach some conclusions regarding this question. Although health care workers were, through at least the 1950s, at higher risk of contracting tuberculosis than others in the surrounding community, current data indicate that where TB is uncommon or where basic infection control measures are in place, the risk to health care workers approaches the levels seen in the communities where they live. This is good news, since the overall rate of active TB in the United States declined by 35% and the incidence of multi-drug resistant TB decreased to 1.2% of cases between 1993 and 1999. In addition, rates of newly diagnosed active TB reported for health care workers have been similar to those reported for other employed workers during this period.



Reported Cases of Tuberculosis, 1978–1998.

What is known about the implementation and effects of the 1994 Centers for Disease Control and Prevention (CDC) guidelines for the prevention of tuberculosis in health care facilities?

The 1994 CDC guidelines are consistent with the principles of basic infection control and were built on a series of earlier recommendations. Although data are scarce, implementation of TB control policies based on the 1994 guidelines have very likely contributed to ending hospital outbreaks and preventing new ones.

Data indicate that administrative controls—which focus on prompt identification, isolation, diagnosis, and complete treatment of people with active TB—are the most widely implemented of the 1994 guidelines. Engineering controls, such as negative pressure isolation rooms, are being installed at higher rates than in the past, but daily testing of in-use rooms is not well documented. Data on the implementation of personal respiratory protection suggest that hospitals are providing some type of protective equipment.

Outbreak studies and biologic plausibility suggest that administrative controls are the first line of defense against exposure followed by engineering controls. Modeling studies support the use of personal respiratory protection tailored to the level of a worker's risk. The committee noted, however, that even the most conscientious implementation of guidelines cannot prevent all instances of worker exposure. Today, patients, inmates, and clients with unsuspected, undiagnosed, active TB pose the primary risk to workers. Unlike typical workplace health risks, such as those related to exposure to hazardous chemicals or dust, the likelihood of occupational exposure to tuberculosis is closely linked to the risk of exposure in the surrounding community. Worker risk is also influenced by job type (e.g., respiratory therapy) and site (e.g., prison medical unit) within a facility.

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What will be the likely effects on rates of tuberculosis infection, disease, and mortality of an anticipated OSHA standard to protect workers from occupational exposure to tuberculosis?

The committee worked without access to the final OSHA regulations, and it is unclear how these might differ from the proposed rules of 1997. Therefore, the committee

considered the general conditions that would need to be met in order for regulations to be effective in reducing workers' risk of TB infection, disease, or mortality. It identified three such conditions.

First, the implementation of TB control measures, such as those recommended by the CDC and previously proposed by OSHA, must significantly reduce the transmission of *M. tuberculosis* in hospitals and other regulated workplaces. As noted above, data appear to support the efficacy of the 1994 CDC guidelines in hospitals but are insufficient to assess their effectiveness in most other workplaces.

Second, the OSHA standard must increase or sustain adherence to the recommended infection control procedures. The committee expects that this condition will be met for three reasons. Organizations are more likely to comply with laws and regulations than with voluntary guidelines. A standard is also likely to be clearer and more hazard specific than guidelines. Finally, a standard will put workers on stronger ground in identifying and challenging an employer's inadequate implementation of mandated tuberculosis control measures.

Third, an OSHA standard must be flexible enough to allow reasonable adaptation of procedures appropriate to the different levels of risk faced by workers. The committee is concerned, however, that an OSHA standard based on the 1997 proposed rule may not meet this condition. The reservations expressed by the committee are based on several features of the proposed rule.

The category of low-risk employers that would be exempt from some of the rule's requirements is so narrowly defined that many low-risk organizations could be subjected to the full scope. In addition, the proposed rule requires that county-level incidence data be used as the indicator of risk in the community, even though a facility's service area may be different and have a dissimilar incidence of TB. Finally, the proposed rule allows little flexibility for organizations to adopt respiratory protection programs that reflect variability in the level of risk workers encounter. Under these regulations, facilities at negligible risk for occupational transmission of *M. tuberculosis* could be subjected to significant costs of implementation, from which employees would derive little or no benefit.

Overall, the committee concluded that tuberculosis remains a threat to some health care, correctional facility, and other workers in the United States. Although the risk has been decreasing in recent years, vigilance is still needed within hospitals, prisons, and similar workplaces, as well as in the community at large. Fortunately, tuberculosis control measures appear to be effective in limiting transmission of the disease.

Effective tuberculosis control measures in the workplace are one element of much broader national and international strategies to prevent and eventually eliminate the disease. The IOM addressed these issues in an earlier report titled, *Ending Neglect: The Elimination of Tuberculosis in the United States*, which recommended, among other steps, increasing U.S. engagement in global efforts to control TB, research to develop an effective vaccine and more effective testing and treatment for TB infection.

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