MAYO CLINIC

Center for Tuberculosis

From Exposure to Action:
Nurse Management of Occupational Tuberculosis Exposures

Jennifer A. Anderson, APRN, C.N.P., D.N.P.
April Loeffler, BSN, R.N.

May 6, 2025
Rochester, Minnesota
Siebens Building
Leighton Auditorium

Learning Objectives

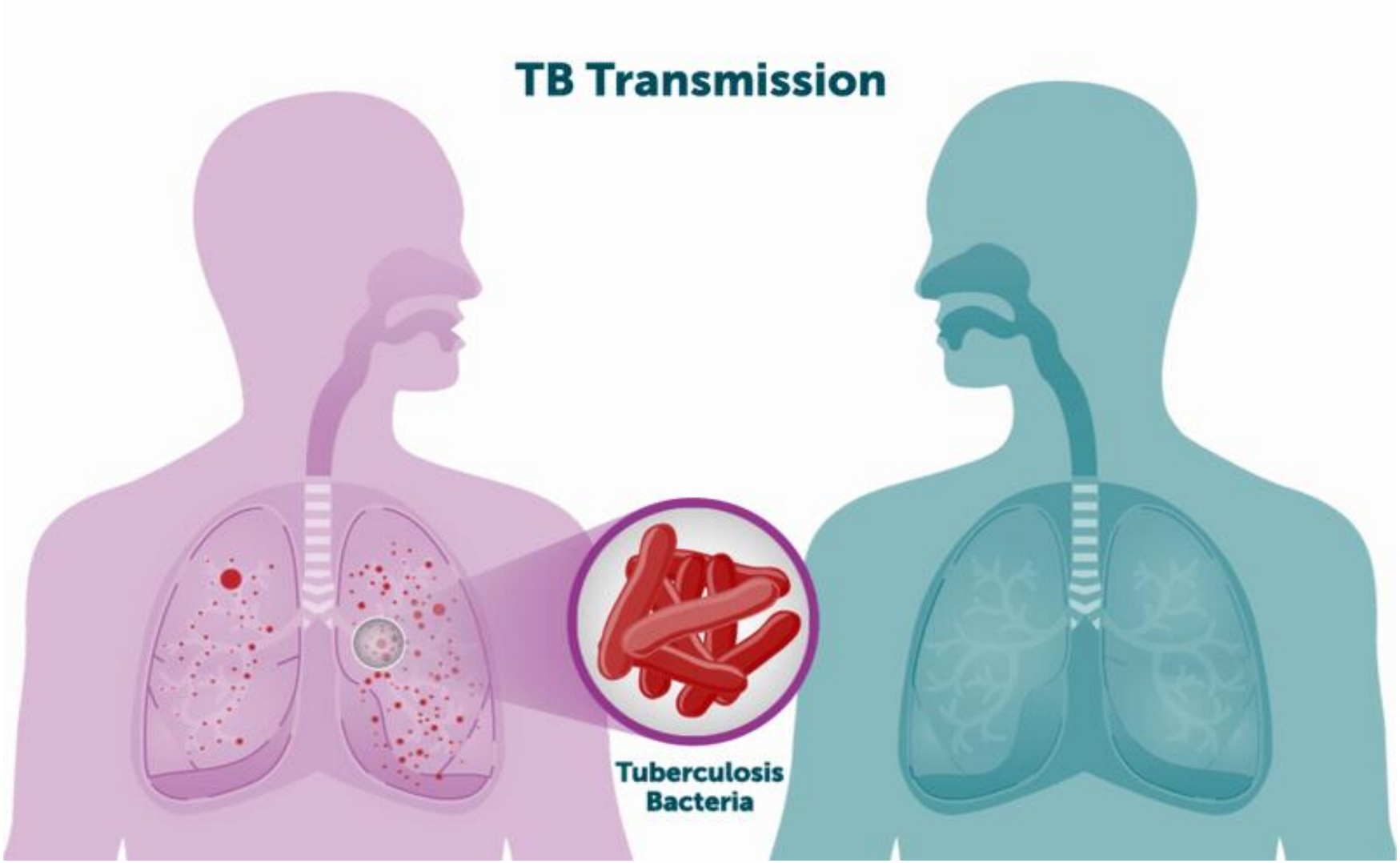
- Recognize the importance of managing occupational Tuberculosis (TB) exposures

- Identify key steps in occupational TB post exposure management for healthcare workers, focusing on:
  - Risk assessment
  - Screening
  - Monitoring

Tuberculosis

- TB is spread from person to person through the air
- The disease is caused by the bacteria *Mycobacterium tuberculosis*
  - The bacteria usually attacks the lungs, but can attack other parts of the body such as the kidney, spine, brain
- Not everyone infected with TB becomes sick
  - Latent (inactive) TB infection (LTBI)
  - Active TB disease

(Centers for Disease Control and Prevention [CDC], 2025a)



(CDC, 2025a)

What are the TB Facts?

- TB is one of the leading infectious disease killers in the world
- The United States (U.S.) has one of the lowest TB rates globally
  - 10,347 active TB cases reported in the U.S. in 2024 (preliminary report)
  - 9,633 cases of active TB reported in 2023 for the U.S.
  - Estimated 13 million people in the U.S. live with LTBI

(CDC, 2023; CDC, 2025b)

What does this mean for healthcare workers?

- TB conversion rates among healthcare workers in the U.S. are low
  - Rates may vary based on occupation, setting, and exposure type
  - Effective infection control measures help reduce conversion rates

(Swaminathan et al., 2021)

Occupational Health Perspective

- Occupational Safety & Health Administration (OHSA)
- National Institute for Occupational Safety and Health (NIOSH)
- Centers for Disease Prevention and Control (CDC)

OSHA

- "The general duty clause of the Occupational Safety and Health Administration (OSHA) OSH Act requires employers to **provide their employees with a workplace free from recognized hazards causing or likely to cause death or serious physical harm**."

29 CFR 1904

- Recording & Reporting Occupational Injuries & Illnesses
  - Recordkeeping Forms & Recording Criteria

29 CFR 1910

- General Industry
  - PPE
  - General Environmental Controls
  - Toxic & Hazardous Substances

(United States Department of Labor, n.d.b).

OSHA Recommendations for TB

- Avoid unprotected contact
- Wear respiratory protection
- Infection control training
- Monitor after possible exposure

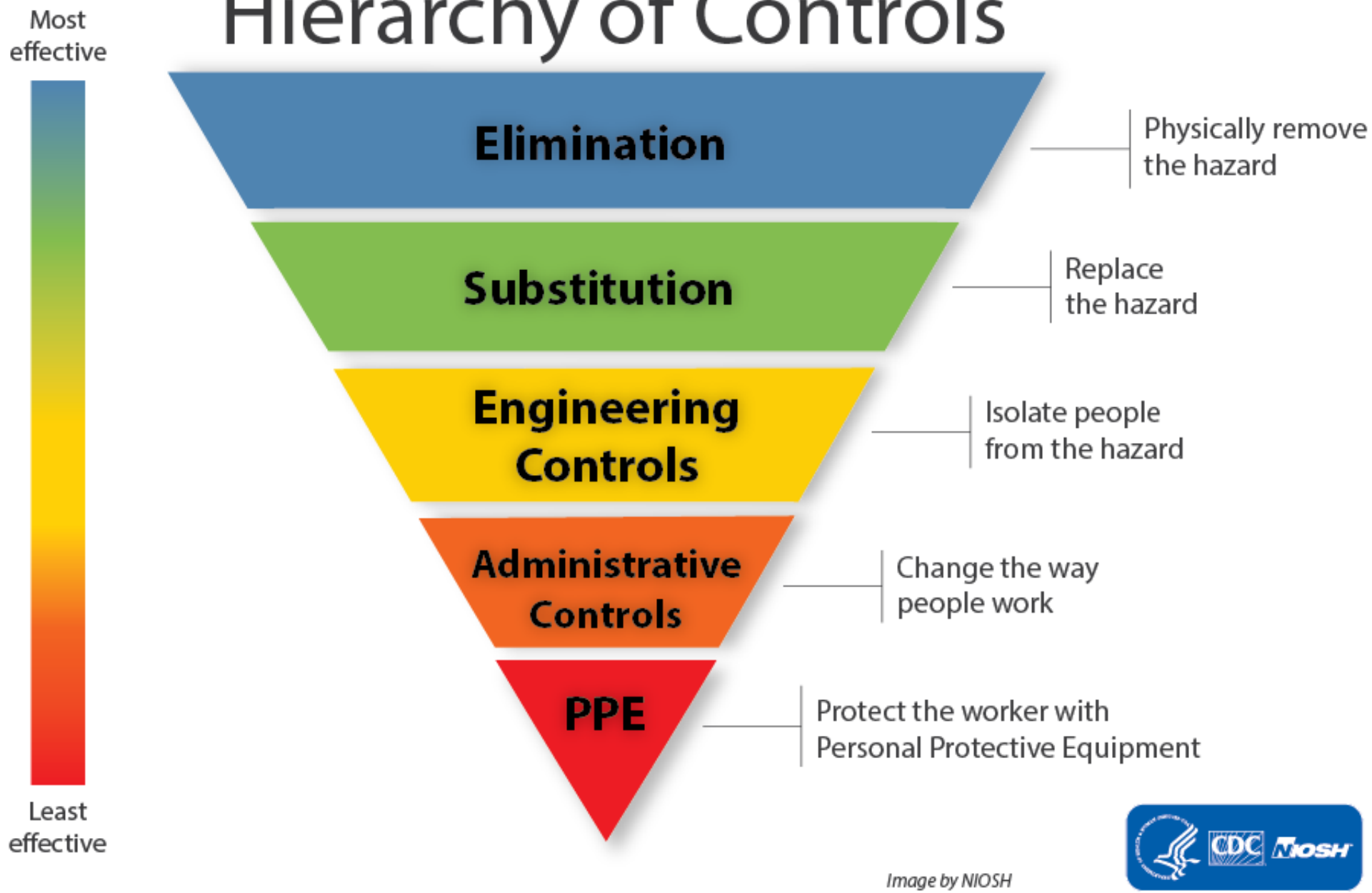
(United States Department of Labor, n.d.a)

OSHA Recommendations

- Air-handling systems & local exhaust
- Airborne Infection Isolation Room
- Supplemental Controls
- UV Irradiation
- Policies and practices to reduce risk of exposure
- Track healthcare workers and staff
- Additional considerations for laboratory workers

(United States Department of Labor, n.d.a)

Hierarchy of Controls



(CDC, n.d.)

TB Screening and Testing Recommendations

Baseline (preplacement)	Post Exposure	Serial

• All HCP
• Symptom evaluation
• Test (IGRA/TST)
	• Exposed HCP
	• Symptom evaluation
	• Test (IGRA/TST)
	  • Baseline
	  • 8-10 Weeks
		• Annual education
		• Can consider select HCP groups

(Sosa et al., 2019)

TB Post Exposure Occupational Management

- Risk Assessment
  - Case Review
  - Risk Stratification
  - Contact Tracing
- Post Exposure Screening & Monitoring
  - Baseline and 8-10 weeks Post Exposure Testing

Definitions

- **Source patient**: Patient who was contagious and potentially exposed others
- **Contact tracing**: Process of identifying exposed employees
- **IPAC**: Infection Prevention and Control

Case Study

Patient Information:

- **Age**: 78 years old
- **Gender**: Male
- **Presenting Date**: January 1, 2025 at 12:46 pm
- **Setting**: Emergency Department (ED)

Initial Symptoms:

- Fatigue, fever, night sweats, unexplained weight loss, and loss of appetite
- No cough, no significant respiratory symptoms

Initial Diagnosis:

- The patient was initially diagnosed with chronic fatigue syndrome and generalized viral infection, given the absence of a cough and respiratory distress

Risk Assessment

Case Review

Case Overview

- **Source Information:**
  - Age, gender, relevant history
  - Diagnosis date
  - Type of TB: Pulmonary/Extrapulmonary
  - Smear and culture results
  - Infectious period
- **Date of Exposure**
- **Location of Exposure:** (e.g., hospital room number, unit)

Risk Stratification

- Definition Exposure
- Isolation Precautions
- Procedures
- Pulmonary vs Extrapulmonary TB

Contact Tracing

- Identify exposed employees
- Distinguish work areas affected
- Communicate with supervisors and employees
- Collaborate with IPAC and supervisors

Case Study

Patient Information:

- **Age**: 78 years old
- **Gender**: Male
- **Presenting Date**: January 1, 2025 at 12:46 pm
- **Setting**: Emergency Department (ED)

Initial Symptoms:

- Fatigue, fever, night sweats, unexplained weight loss, and loss of appetite
- No cough, no significant respiratory symptoms

Initial Diagnosis:

- Diagnosed with chronic fatigue syndrome and generalized viral infection, given the absence of a cough and respiratory distress

Source Information:

- Abnormal chest x-ray; sputum cultures obtained - pending; acid-fast bacilli (AFB) smear resulted positive
- Diagnosed with Pulmonary TB

Airborne Isolation Precaution:

- Ordered on January 3, 2025 at 4:12 pm

Dates of Exposure:

- January 1, 2025 at 12:46 pm – January 3, 2025 at 4:12 pm

Location of Exposure:

- ED; inpatient 1st floor nursing unit

Post Exposure Screening & Monitoring

Post Exposure Screening & Monitoring

1. Assess employee’s TB history
2. Testing or symptom monitoring
3. Test result follow up
4. Evaluation and Treatment
5. Data Reporting

Post Exposure Screening & Monitoring

1. Employee TB History

- **No TB testing history**
- **Baseline testing or negative TB history**
- **History LTBI or TB**

Post Exposure Screening & Monitoring

2. Testing or Symptom Monitoring

- **IGRA or TST**
  - Baseline
  - 8-10 weeks post exposure
- **Symptom Questionnaire**
  - 8-10 weeks post exposure

Post Exposure Screening & Monitoring

3. Follow-up on Test Results

- **8-10 Week Testing (IGRA/TST):**
  - Negative- Complete
  - Positive- Further evaluation and/or treatment
- **Symptom Assessment**
  - Asymptomatic- Complete
  - Symptomatic- Further evaluation and/or treatment

Join: **vevox.app** ID: **139-210-555**

POLL OPEN

Polling Question

What is the appropriate next step if an asymptomatic healthcare worker (without a history of TB) has a confirmed exposure to active TB?

1. Start them immediately on treatment for TB
2. ✓ Order an IGRA/TST now and 8-10 weeks after the exposure
3. Monitor employee for symptoms of TB
4. Remove employee from work

Post Exposure Screening & Monitoring

4. Evaluation and Treatment

- **Latent TB Infection (LTBI):**
  - Treatment regimen offered
  - Continuing monitoring for symptoms
- **Active TB Cases Identified Among Contacts:** (if any)
  - Treatment for active TB
  - Additional isolation measures taken (e.g., initiating work restrictions)
  - Source investigation if different from index case

Join: **vevox.app** ID: **139-210-555**

POLL OPEN

Polling Question

Which of the following best describes the purpose of IGRA/TST testing at baseline and 8-10 weeks after a TB exposure?

1. To check for symptoms of active TB
2. To confirm a diagnosis of LTBI
3. To determine if a person is contagious
4. ✓ To detect a new TB infection after an occupational exposure

Post Exposure Screening & Monitoring

5. Reporting

- **Number of Healthcare personnel**
  - Exposed
  - Tested (IGRA/TST)
  - Positive tests
  - Symptomatic
- **Conversions Identified**

Join: **vevox.app** ID: **139-210-555**

POLL OPEN

Polling Question

A healthcare worker calls, concerned they may have been exposed to TB and is wondering if they can come to work. What should be assessed first before making a recommendation?

1. Assess employee for symptoms of active TB
2. ✓ Ask the employee about the details of the suspected exposure
3. Ask what patient population they work with
4. Assess if the healthcare worker has received the BCG vaccine

Key Takeaways

- Partnerships & Collaboration
- Challenges
- Future Opportunities

Partnerships in TB Post Exposure Management

- Infection Prevention and Control (IPAC)
- Infectious Disease Colleagues
- State and Local Health Departments

Challenges in TB Exposure Management

- Contact tracing
- Confidentiality
- Compliance and follow-up
- Limitations in resources

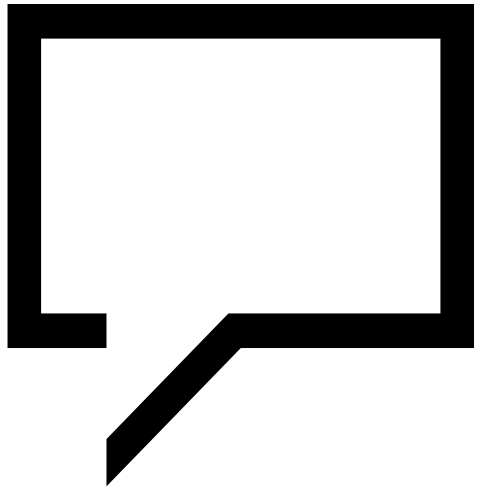
Future Directions

- Leverage current technologies in contact tracing
- Log of where patients have been transported to (e.g., tests, procedures)
- Community education and awareness
- LTBI treatment education

Final Thoughts

- Thorough contact tracing is essential in TB control
- Early case detection saves lives and limits spread
- Effective management requires coordination (healthcare institution and public health)

Questions



References

Centers for Disease Control and Prevention. (n.d.). *About hierarchy of controls.* Retrieved April 22, 2025, from https://www.cdc.gov/niosh/hierarchy-of-controls/about/index.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fniosh%2Ftopics%2Fhierarchy%2Fdefault.html

Centers for Disease Control and Prevention. (2024). *Reported Tuberculosis in the United States, 2023*. https://www.cdc.gov/tb-surveillance-report-2023/summary/index.html

Centers for Disease Control and Prevention. (2025a). *About tuberculosis.* https://www.cdc.gov/tb/about/index.html

Centers for Disease Control and Prevention. (2025b). *Provisional 2024 Tuberculosis Data, United States*. https://www.cdc.gov/tb-data/2024-provisional/index.html

Sosa, L. E., Njie, G. J., Lobato, M. N., Bamrah, S., Buchta, W., Casey, M., Goswami, N., Gruden, M., Hurst, B., Khan, A., Kuhar, D., Lewinsohn, D., Matthew, T., Mazurek, G., Reeves, R., Paulos, L., Thanassi, W., Will, L., & Belknap, R. (2019). Tuberculosis screening, testing, and treatment of U.S. health care personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019. *MMWR. Morbidity and Mortality Weekly Report, 68*, 439–443. https://doi.org/10.15585/mmwr.mm6819a3

Swaminathan, N., Perloff, S. R., & Zuckerman, J. M. (2021). Prevention of *Mycobacterium tuberculosis* transmission in health care settings. *Infectious Disease Clinics of North America, 35*(4), 1013–1025. https://doi.org/10.1016/j.idc.2021.07.008

United States Department of Labor. (n.d.a). *Tuberculosis: Control and prevention.* OSHA. Retrieved April 22, 2025, from https://www.osha.gov/tuberculosis/control-prevention

United States Department of Labor. (n.d.b). *Tuberculosis: Standards.* OSHA. Retrieved April 22, 2025, from https://www.osha.gov/tuberculosis/standards

Thank you

Thank you

Thank you