



Homeless Shelters

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Background and needs overview

Homeless shelters vary considerably in the types of services they provide, the people they serve, and the types of buildings in which they are housed.



- Housing providers classify housing in various ways, including emergency shelters, transitional shelters, rapid re-housing, and permanent supportive housing.
- Some shelters provide food and shelter, but no other services. Other facilities provide a range of services on-site, including case management and chemical dependency recovery services.
- Some shelters serve a different group of clients every night on a first-come, first-served basis. Other shelters allow clients to stay for up to 6 months.
- Structures used as shelters may vary from a converted warehouse or tents sleeping 600 people to a self-contained trailer for 4 clients. Use of shared living spaces (e.g., kitchen, bathroom, indoor recreation room) may vary.
- Many shelters serve only adult male clients. A smaller number serve women, families, or teenagers.
- Documentation and record keeping across shelters varies from non-existent to paper-based systems to electronic information management systems.

Because of these factors, the likelihood that TB will spread varies from shelter to shelter.

Since the onset of the COVID-19 pandemic in 2020, a renewed focus on improving infection prevention and control (IPC) interventions within shelters and other congregate settings has resulted in greater awareness and updated national guidance.¹

Challenges in implementing strong IPC intervention with shelters, particularly for TB, have been long-standing. During 1996-1998, a mechanical engineer conducted on-site consultations at 19 California homeless shelters. These consultations included an evaluation of how ventilation, filters, and UV (when present) helped

reduce the risk of TB transmission. Consultations also included conversations with shelter managers and other staff to determine their knowledge and skills regarding TB control measures.²

The most common problems found with environmental control systems at homeless shelters included:

- Rooms without ventilation
- Broken ventilation equipment
- Heating, ventilation and air-conditioning (HVAC) systems operating below design capacity because the equipment needed cleaning or other routine upkeep
- Inadequate or improperly-sized air filters in central HVAC systems
- Inappropriate design and installation of germicidal ultraviolet-C light (UVC), also referred to as Ultraviolet Germicidal Irradiation (UVGI) lamps

The following barriers to more effective use of ventilation, filters, and UVC were identified:

- Limited knowledge among shelter staff and administrators about TB and how TB is spread
- Limited knowledge of the role of ventilation, filters, and UVC in reducing TB transmission risk
- High staff turnover rate and overworked staff
- Limited maintenance staff and budgets
- Older buildings and mechanical HVAC systems in need of repairs
- Limited funds to improve TB control through the use of ventilation, filters, and UVC

Following each consultation, the facility received a report recommending ways to reduce the likelihood of TB transmission in the shelter. Recommendations ranged from immediate no-cost steps, such as opening windows and doors, to suggested modifications of the shelter's ventilation equipment.

This chapter describes the challenges faced by shelter management and ways to reduce the risk of TB transmission in these settings.



Why TB is a problem in homeless shelters

TB is likely to spread in shelters. If a shelter client has infectious TB, it can place shelter staff and clients at risk. Shelters are especially vulnerable because:

- People experiencing homelessness are more likely to have TB than others in the general population.
- The congregate shelter environment often increases the chances that if a person with TB is present, TB will be spread.

In 2022, approximately 4.8% of reported TB cases in the United States were people who were experiencing homelessness at some time during the year before their TB was diagnosed.³ Over the past two decades, TB incidence was more than 10 times higher among people experiencing homelessness than those not experiencing homelessness.⁴ People experiencing homelessness are more likely than the general population to have TB because they have more risk factors for TB.⁵ The risk factors include:

- Contact with other people who are experiencing homelessness who have TB
- Poor access to on-site or referral to healthcare services
- Barriers to adherence to follow-up visits and prescribed treatment for latent TB infection (LTBI)
- Lack of permanent housing arrangement (e.g., movement between shelters or other temporary situations)
- Substance use, especially injection drugs and alcohol
- Limited access to HIV education and prevention measures, increasing the risk of poorly-controlled HIV infection among people experiencing homelessness

TB disease develops more quickly among people who are co-infected with TB and HIV. Because persons experiencing homelessness are at higher risk for HIV infection than the general population, TB can also develop among persons experiencing

homelessness more quickly and spread to others before it is even suspected. For persons experiencing homelessness, food, shelter, and personal safety may be higher priorities than TB and HIV prevention.

Characteristics of shelter environments often increase the chances that TB will spread. For example, building ventilation is often inadequate, and clients are crowded into close quarters, typically for 8 to 12 hours per night

The most important factor that contributes to TB transmission is that many shelters do not screen clients for TB symptoms. Without this screening, a client with symptoms of TB will not be:

- Referred for medical care and treatment
- Separated from other clients or asked to use a face mask to lessen the chance that TB, if present, will spread

Reducing the risk of TB transmission in homeless shelters

Although the likelihood of TB transmission in shelters is high, shelter operators and others can take steps to significantly reduce this risk. **All shelters should have an IPC plan** to limit the spread of TB. There are three main areas to consider:

- Administrative and work practice control measures
- Environmental controls (ventilation, filters, and UVC)
- Appropriate use of respiratory protection by staff and clients

In general, administrative and work practice control measures have the greatest impact on preventing TB transmission, followed by the use of ventilation, filtration, and UVC. Use of respirators by shelter staff may be important in certain situations, such as when transporting clients suspected of having TB of the lungs or larynx or entering a room in which such clients have been placed temporarily to separate them from other clients and staff. The local TB control program can help a shelter facility to assess its risk and develop a plan.

Administrative controls

Homeless shelter management and staff should employ the following control measures:

- Assign a health “point person” within the agency to coordinate TB and other health-related activities. This person can order and display educational brochures and posters throughout the agency, provide instructional webinars on TB, conduct or schedule client health groups, attend TB and other health workshops in the community, share health resources, serve as a health resource to other staff and residents, and contact the health department, when appropriate.

- Conduct a TB risk assessment for the facility.
 - See *Resources* for a sample Centers for Disease Control and Prevention (CDC) risk assessment worksheet for healthcare facilities that can be modified and adapted.
- Develop a written IPC plan for the program that includes clear policies for client screening and what to do in case symptoms are identified:
 - Clients entering shelter housing should be systematically screened for TB symptoms (and other transmissible respiratory disease) upon entry. Offer information for all shelter clients about TB symptoms and how to access care if needed.
 - In areas of high TB incidence, and if resources allow, additional screening with TB testing upon entry may be beneficial. Ideally, screening will be linked to a program to help clients complete preventive treatment should LTBI be identified.
 - Identify clients who have a cough (lasting 3 weeks or longer) and one or more other symptoms of TB disease of the lungs or larynx including fever, chills, night sweats, weight loss, fatigue, chest pain, or coughing up blood. *Basic TB Facts: Signs and Symptoms* (CDC) offers more information on the signs and symptoms of TB.⁶ See *Resources*.
 - Separate clients with symptoms of TB from other clients and staff by placing clients with symptoms in rooms by themselves until they can be medically evaluated.
 - Consider maintaining a cough log to document clients who are coughing, particularly at night, and their bed location.
 - Promptly refer clients with one or more symptoms of TB disease for medical care. Medical evaluation should take place as soon as possible, though is sometimes not feasible until the following day. Instruct clients to use masks over the nose and mouth to trap infectious particles and monitor clients to ensure they are wearing them.
 - Promptly report clients with potential or confirmed TB disease to the public health department. Keep contact information up to date and easily accessible for staff.
 - If possible, assist the local public health department in treating shelter clients for LTBI and TB disease. Examples include: providing transportation assistance and follow-up for healthcare appointments, providing incentives for clients to complete their full treatment, and helping clients cooperate with directly observed therapy (DOT) provided by the public health department to ensure TB treatment is taken as prescribed.
 - If a TB screening or formal clearance process is done, include client TB clearance records into the local electronic records system, e.g., the Department of Housing and Urban Development (HUD) Homeless Information Management Systems (HMIS), if available. Records should flag incomplete evaluations.

- State and local guidance on TB screening for shelter clients can vary; consult with the local TB program and/or public health department. See *Resources* for a listing of TB program websites and contacts.
- Make tissues (or surgical masks) readily available to clients, instructing them to cover their noses and mouths when coughing and sneezing.
- Reinforce “cover your cough” behavior with signs and verbal reminders. Signage is available in multiple languages. See *Resources*.
- Place each bed as far from neighboring beds as possible, with beds arranged head-to-foot, instead of head-to-head.
- Maintain a guest log and bed map (ideal if searchable and in downloadable electronic format); these items are essential if the health department conducts contact tracing or investigation to follow-up a TB outbreak in a shelter.
- Educate staff and clients about TB. See *Resources* for sample training materials and basic TB information.
- Documentation of baseline TB screening is recommended for new employees and volunteers. CDC 2019 recommendations for TB screening of healthcare personnel (HCP) applies to clinics within shelters and may be considered for at-risk congregate settings. The need for repeat TB screening or testing is dependent on facility risk assessments and the prevalence of TB in the community.
 - For most circumstances, particularly if TB prevalence is low, annual TB testing of employees is not recommended
 - For more information about general recommendations and resource links for HCP screening, see Chapter 5, *Clinics*, section, *TB screening program*.

Note: Shelters should not house clients who are being evaluated for, or known to have, active TB disease of the lungs or larynx until the clients are declared no longer infectious by the treating providers. This would not apply to a client who has a diagnosis of LTBI; i.e., has a history of a positive TB test (blood or skin test) with no TB symptoms and is not being considered for medical evaluation for TB disease. Consult with the local public health department to determine risk of infectiousness, or for assistance with alternative housing or transfer to an appropriate medical facility.

For additional administrative information and helpful links, see *Resources*.

- CDC’s *Administrative Controls: TB Control in Overnight Homeless Facilities Quick Reference Guide*
- *Preventing Tuberculosis and other Aerosol Transmittable Diseases in Shelters: A Guide for Preventing and Controlling TB and other Aerosol Transmissible Diseases in Los Angeles County Facilities*
- Example of a simple and concise toolkit: *Tuberculosis Prevention and Control Recommendations for Homeless Shelters in Maine – Toolkit*

Environmental controls

These measures will reduce the chances that others will inhale air containing *M. tuberculosis*. For more details about each of these measures and how they help to prevent TB from spreading, see Chapter 2, *Environmental Controls*.

- **Ventilation** can reduce the spread of TB through dilution and removal by supplying outside air and exhausting room air to the outdoors. Ventilation is either natural (employing windows, doors, skylights, and/or fans) or mechanical (HVAC or other forced air systems).
- **Filtration of recirculated air** can remove particles from the recirculated air. Many different levels of filtration are available and HVAC systems may have only one filter or have two or more. Using a suitable filter with your HVAC system helps reduce further the risk of spreading TB.
- **Room air cleaners (RACs)** can supplement HVAC systems by filtering or inactivating *M. tuberculosis* in the air. These are generally stand-alone systems.
- **UVC** uses a type of radiation that has been shown to kill or inactivate *M. tuberculosis* in the air. It is used in TB control either as in-duct UVC (using UVC lamps inside the duct of an HVAC system), in a RAC, or as upper-room UVC (mounting UVC lamps in the upper part of a room).

Evaluate the shelter's current system for effectiveness and modify as needed. The following information will help to determine if any changes are needed in a facility.

Natural ventilation

If rooms in a building are not served by a central HVAC system, see Chapter 2, *Environmental Controls: Part 1 – Ventilation* (sections on *Using directional airflow to reduce TB transmission*; *Natural ventilation*; and *Using fans with natural ventilation*) to learn how to check and improve natural ventilation, how to use exhaust and freestanding fans more effectively, and to learn about the advantages and disadvantages of natural ventilation and fans as compared to other types of ventilation.

Methods that help improve natural ventilation in the shelter include:

- Providing fresh outside air to all occupied rooms in homeless shelters.
- Keeping doors, windows, and skylights open as often as possible, and checking that they are easy to open. If possible, aim for keeping these at least 10% open on opposing walls.
- Adding fans to increase air mixing and directional airflow, placing them so air movement can be observed in all occupied parts of the room, and keeping them running as much as possible. In some cases (e.g., heating season), drafts might not be acceptable.
- Providing extra blankets to clients who complain of drafts so that ventilation can be used when the space is occupied.
- Increasing ventilation at times when the space is unoccupied if ventilation and fans cannot be used when the space is occupied because they are too noisy

or cause unacceptable drafts. For example, many shelters are closed during part of the day. This provides an opportunity to open windows and doors while running fans at high speed to “air out” dormitories.

Natural ventilation can be unpredictable and may not be practical in cold climates. If this is the case, consider adding a central HVAC system.

To learn how one homeless shelter director improved the natural ventilation in her building, see Chapter 2, *Environmental Controls: Part 1 – Ventilation*, section, *Case study: Natural ventilation and exhaust fans*.

Central HVAC systems

If rooms in the building have an existing central HVAC system, see Chapter 2, *Environmental Controls: Part 1 – Ventilation*, section, *HVAC systems*, to learn about the various parts of the central HVAC system, how they help control TB transmission, what to check and how to make improvements, and the advantages and disadvantages of central ventilation.

If the design of a central HVAC system is being considered for a new or an existing building, see Chapter 2, *Environmental Controls: Part 1 – Ventilation*, sections, *Recommendations for existing HVAC systems* and *Recommendations for the design of new HVAC systems*.

Methods that improve existing central HVAC systems in the shelter may include:

- Using higher-efficiency (e.g., pleated) filters while maintaining the intended design airflow rate
- Providing outside air intakes
- Setting outside air intakes to the fully open position
- Using thermostats and HVAC system controls that allow continuous fan operation whenever the building is occupied
- Providing natural ventilation to occupied rooms not served by HVAC systems and to all occupied spaces at times when HVAC systems are broken or otherwise not operating as designed
- Using in-duct UVC as a supplement to HVAC systems with filtration

In addition, perform regular checks of each HVAC system and the rooms that it serves, and conduct routine maintenance. See Chapter 2, *Environmental Controls: Part 1 – Ventilation*, section, *Checking an HVAC system* for more details if improvements to the central HVAC system are being considered and for a description of the checks to perform.

To learn how one homeless shelter director used these ideas and made immediate low-cost improvements to ventilation in his shelter, see Chapter 2, *Environmental Controls: Part 1 – Ventilation*, *Case study: HVAC systems*.

HVAC air filters

Three types of filters are used in central HVAC systems:

- Lint filter (removes large dust particles but does not remove particles as small as *M. tuberculosis*)
- Pleated filters (American Society of Heating, Refrigerating, and Air-Conditioning Engineers [ASHRAE]) minimum efficiency reporting value [MERV] 8 for supply air from outside, or MERV 13 for recirculated air
- High-efficiency particulate air (HEPA) or other high-efficiency filter (limited to specialized HVAC systems that are HEPA-friendly)

A pleated filter is the most suitable type of filter for many recirculating air systems, such as those in homeless shelters. Pleated filters are readily available from hardware stores in sizes that fit most HVAC systems. They are slightly more expensive than lint filters and cause more of an obstruction, which will reduce airflow slightly. To read more about filters, see Chapter 2, *Environmental Controls: Part 1 – Ventilation*, section, *Air filters*, and Table 3 for examples of ventilation filters and a comparison of filter efficiencies.

RAC air filters

RACs with HEPA or other high-efficiency filters allow the air quality in a room to improve rapidly. These units are useful in homeless shelters that may have inadequate or no HVAC system and limited funds for upgrades.

Ways to use RACs in your shelter:

- Provide portable RACs with HEPA or other high-efficiency filters for all poorly ventilated rooms frequented by clients.
- Place small RACs off the floor and next to staff so that the “clean air” they generate is delivered close to the breathing zone of the people that they are used to protect. For example, if clean air is exhausted from the front of a RAC, an ideal location is on a desk or on a file cabinet adjacent to a staff member. Consider the RACs primarily as a source of clean air and secondly as a removal device for contaminated air.
- Place units evenly throughout crowded rooms so that air movement can be observed in all parts of the room.
- Operate RACs continuously while rooms are occupied by clients and for approximately 1 hour after they leave.

To keep RACs operating efficiently, designate a staff person to be the in-house monitor of the units and to perform routine maintenance. This person should know the basic principles of RAC operation and should create a written schedule for changing the filters. To read more about RACs how to select suitable units, and their routine upkeep see Chapter 2, *Environmental Controls: Part 1 – Ventilation*, section, *RACs*.

UVC

Only an experienced professional, such as a UVC fixture manufacturer, should design and install UVC fixtures in a shelter. This type of installation (and the maintenance of such an installation) requires expertise and equipment that may be resource-intensive to acquire.

In-duct UVC is a useful option for a recirculating HVAC system that serves areas at high risk for TB transmission and areas without risk. The UVC lamps are installed inside an air duct. This type of UVC is usually less expensive to operate than a 100% outside air system. In-duct UVC is more useful when central HVAC systems cannot handle higher-efficiency filters. The usefulness of in-duct UVC goes down as the central HVAC filtration efficiency goes up. To read more about this type of UVC and advantages and disadvantages of in-duct UVC, see Chapter 2, *Environmental Controls: Part 2 – UVC*, section, *Irradiation of air in an HVAC system (In-duct UVC)*.

Upper-room UVC is a specialized technology that is particularly appropriate for homeless shelters but can only be used in certain rooms. UVC lamps are mounted high on walls or hung from the ceiling (at a height of at least 7 feet above the floor), resulting in disinfection of the upper-room air. UVC fixtures should not be installed in rooms with ceilings less than 8 feet high to avoid people looking into the lamps (safety risk) or bumping into them. In addition, bunk beds should not be used in rooms that have an upper-room UVC installation unless ceilings and placement of units are at a safe distance from the occupants of the upper bunks.

When using upper-room UVC, it is essential that the lamps and irradiation levels be checked on a regular basis.

- Have an expert use a radiometer with the appropriate UVC detector to check the irradiation levels in parts of the room where people are likely to be exposed. Irradiance levels should be below the recommended exposure limit (REL) set by the CDC/National Institute for Occupational Safety and Health (NIOSH).
- If irradiation levels are too high in any location, turn off the lamp or lamps causing the high irradiation levels. It may be necessary to add non-reflective paint to the ceiling and/or wall to adjust the “beam” of the UVC fixture and/or to relocate or replace the fixtures to correct the problem.
- Turn off lamps and check that lamps and fixtures are free of dust and lint.
- Check that the irradiation level at each fixture meets the lamp manufacturer’s recommendation. Protective clothing or special equipment may be needed to take these readings without overexposing the skin or eyes to the UVC irradiation. Replace the UVC bulbs if the irradiation levels are below the manufacturer’s recommended minimum levels.

To read more about upper-room UVC, how to determine whether a room is suitable, installation planning, routine upkeep, and the advantages and disadvantages of upper-room UVC, see Chapter 2, *Environmental Controls: Part 2 – UVC*, section, *Upper-room UVC*.

Respiratory protection

A CDC/NIOSH-approved respirator, e.g., N-95, fits over the nose and mouth of the user (i.e., HCP). In TB control, a respirator is designed to prevent the user from inhaling at least 90% of the infectious particles containing *M. tuberculosis*.

As described in Chapter 3, *Personal Protective Equipment: Respirators and Surgical Masks*, CDC has specific recommendations, and the Occupational Safety and Health Administration (OSHA) has requirements for staff use of respirators.^{7,8,9} See *Resources*.

While N-95 respirators need not be worn routinely by shelter staff, their availability for staff use in certain situations should be part of a respiratory protection program. Surgical masks should be available for clients presenting with respiratory symptoms. For example, if a client in a shelter becomes ill and is considered a potential TB case, a staff member attending to that person in close proximity should wear an N95 (or higher) respirator, if available, in the person's room while transport to a medical facility for evaluation is being arranged. Ensure the client wears a surgical mask and follows proper cough etiquette.

Contact Federal OSHA or the state OSHA for additional information. See *Resources*.



Resources

Administrative controls

Centers for Disease Control and Prevention (CDC)

- Administrative Controls: TB Control in Overnight Homeless Facilities Quick Reference Guide
<https://www.cdc.gov/tb/topic/populations/homelessness/AdminControls.htm>
 - Sample risk assessment worksheet for healthcare facilities that can be modified and adapted
https://www.cdc.gov/tb/publications/guidelines/pdf/appendixb_092706.pdf
 - Basic TB Facts: Signs and Symptoms
<https://www.cdc.gov/tb/topic/basics/signsandSYMPTOMS.htm>
 - Cover your cough signage
English: https://www.cdc.gov/flu/pdf/protect/cdc_cough.pdf
Multiple languages: <https://www.health.state.mn.us/people/cyc/hcposter.html>
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Los Angeles County Department of Public Health

- Preventing Tuberculosis and other Aerosol Transmittable Diseases in Shelters: A Guide for Preventing and Controlling TB and other Aerosol Transmittable Diseases in Los Angeles County Facilities
<http://ph.lacounty.gov/tb/docs/Shelterguidelines.pdf>
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The Maine Department of Health and Human Services, Bureau of Health

- Example of a simple and concise toolkit: Tuberculosis Prevention and Control Recommendations for Homeless Shelters in Maine – Toolkit
<https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/tuberculosis/documents/shelter-tool-kit.pdf#:~:text=If%20your%20shelter%20serves%20%E2%80%9Chigh%20risk%E2%80%9D%20guests%20%28See,special%20training%20in%20administering%20and%20reading%20skin%20tests>
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National Tuberculosis Coalition of America (NTCA)

- State and local guidance on TB screening for shelter clients
<https://www.tbcontrollers.org/community/statecityterritory/>

Respirators

Occupational Safety and Health Administration (OSHA)

- Requirements for staff use of respirators
<https://www.osha.gov/respiratory-protection/general#:~:text=General%20Respiratory%20Protection%20Guidance%20for%20Employers%20and%20Workers.,is%20needed%20for%20a%20respirator%20to%20provide%20protection.>
- State plans <https://www.osha.gov/stateplans>

Additional resources

CDC

- TB and People Experiencing Homelessness
<https://www.cdc.gov/tb/topic/populations/homelessness/default.htm>
- Guidance on Management of COVID-19 in Homeless Service Sites and in Correctional and Detention Facilities
<https://www.cdc.gov/coronavirus/2019-ncov/community/homeless-correctional-settings.html>

Curry International Tuberculosis Center/UCSF

- Homelessness and TB Toolkit (database of materials, resources, presentations)
<https://www.currytbcenter.ucsf.edu/products/view/homelessness-and-tb-toolkit>
- Shelters and TB: What Staff Need to Know, Second Edition (viewer's guide)
https://www.currytbcenter.ucsf.edu/sites/default/files/shelters_and_tb_viewers_guide.pdf

Public Health Reports, 2023 article

- Diagnosis, Treatment, and Prevention of Tuberculosis Among People Experiencing Homelessness in the United States: Current Recommendations
<https://journals.sagepub.com/doi/10.1177/00333549221148173>

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