

Homeless Shelters



HOMELESS SHELTERS

Homeless shelters present considerable variation in the types of services they provide, the people they serve, and the type of buildings in which they are housed.

- **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**
- **Buildings used as shelters vary from a converted warehouse sleeping 600 people to a self-contained trailer for 4 clients**
- **Many shelters serve only adult male clients. A smaller number serve women, families, or teenagers**

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

This section describes the challenges faced by shelters and how to reduce the risk of spreading TB in these settings.

Background and Needs Overview

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.

The most common problems found with ventilation, filters, and UVGI at homeless shelters included:

- Rooms without ventilation
- Broken ventilation equipment
- Ventilation systems operating below capacity because the equipment needed cleaning or other routine upkeep
- Inadequate air filters in central ventilation systems
- Inappropriate design and installation of UVGI lamps

The following barriers to more effective use of ventilation, filters, and UVGI were encountered:

- Limited knowledge about TB and how TB is spread
- Limited knowledge of the role of ventilation, filters, and UVGI in reducing TB transmission risk
- High staff turnover rate and overworked staff
- Limited maintenance staff and budgets
- Dilapidated buildings and mechanical ventilation systems
- Limited funds to improve TB control through use of ventilation, filters, and UVGI

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

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:

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

In 2005, 6.1% of reported TB cases in the United States were people who were homeless at some time during the year before their TB was diagnosed.

The homeless are more likely than the general population to have TB because risk factors for TB, including the following, are more common:

- Contact with other homeless people who have TB
- Poor nutrition
- Poor access to health care
- Poor adherence to follow-up visits and prescribed treatment for TB infection
- Substance abuse, especially injection drug use and alcohol
- Limited access to HIV education and prevention measures, increasing the risk of HIV infection among the homeless.

TB disease develops more quickly among people who are infected with both TB and HIV. Because homeless persons are at higher risk for HIV infection than the general population, TB can also develop among the homeless more quickly and spread to others before it is even suspected.

For homeless people, food, shelter, and personal safety are often higher priorities than TB and HIV prevention.

In addition to increased TB among the homeless, characteristics of shelter environments often increase the chances that TB will spread. For example:

- Building ventilation is often inadequate
- Clients are crowded into close quarters, typically for 8 to 12 hours per night

Other factors contribute to the high likelihood that TB will spread in shelters. Among these, the most important 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 Spreading TB in Homeless Shelters

Although the likelihood of spreading TB in shelters is high, shelter operators and others can take steps to significantly reduce this risk. There are three main ways in which shelters can reduce the chances that TB will spread:

- Administrative and work practice control measures
- Ventilation, filters, and UVGI
- Staff use of respiratory protection

In general, administrative and work practice control measures have the greatest impact on preventing TB transmission, followed by the use of ventilation, filtration, and UVGI. Use of respirators by shelter staff may be important in certain situations, such as when transporting a client suspected of having TB of the lungs or larynx, or entering a room in which such a client has been placed temporarily to separate him or her from other clients and staff.

Administrative and Work Practice Control Measures

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

- Identify clients who have a cough and one or more other symptoms of TB disease of the lungs or larynx (see “When TB Is Infectious” on page 8)
- Promptly refer clients with one or more symptoms of TB disease for medical care
- Promptly report clients with suspected or confirmed TB disease to the public health department (a guest log and bed map should be maintained, these are essential if the health department conducts a contact investigation to follow-up a TB outbreak in a shelter)
- Separate clients with symptoms of TB from other clients and staff by placing them in rooms by themselves until they can be medically evaluated. (Medical evaluation should take place as soon as possible, though is sometimes not possible until the following day. Clients may also be instructed to use masks over the nose and mouth to trap droplet nuclei and be monitored to ensure that they are wearing them)
- Make tissues readily available to clients, instructing them to cover their nose and mouth with tissues when coughing and sneezing, and reinforcing this behavior with signs and verbal reminders

- Perform TB screening of shelter staff and clients, such as TB symptom screening, tuberculin skin testing or IGRA, chest x-ray, and medical follow-up, if indicated (See a sample screening questionnaire in Appendix D on page 146)
- Assign a health ‘point person’ for your agency to coordinate TB and other health-related activities. This person can order and display educational brochures and posters throughout your agency, provide instructional videos 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
- Require documentation of TB screening for new volunteers and employees
- Assist the local public health department in treating shelter clients for TB infection and disease (e.g., provide transportation assistance and follow-up for health-care appointments and provide incentives for clients to complete their full treatment, help clients cooperate with DOT provided by the public health department to ensure TB treatment is taken as ordered)
- Educate staff and clients about TB (sample curriculum and training materials are available from www.hhcla.org)
- Place each bed as far from neighboring beds as possible, with head-to-foot, instead of head-to-head, arrangement of beds

Note: *Shelters should not house clients who are being evaluated for, or known to have, TB disease of the lungs or larynx until the conditions listed in “When TB Is Infectious” (page 8) have been met. Consult with your local public health department for assistance with alternative housing.*

Using Ventilation, Filters, and UVGI

These measures will reduce the chances that others will inhale air containing *M. tuberculosis*.

- **Ventilation** can reduce the spread of TB through dilution and removal. Ventilation is either natural (employing windows, doors, skylights, and/or fans) or mechanical (air conditioning, heating, and other forced air systems). To read how ventilation can help prevent TB from spreading, see “Using Ventilation to Reduce the Risk of Spreading TB” on page 15
- **Filters** clean air by removing particles from air that is passed through them. Many different levels of filters are available and ventilation systems may have only one filter or have two or more. Using a suitable filter with your central ventilation system helps reduce further the risk of spreading TB. For more on filtration, see page 27
- **UVGI** 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 UVGI (using UVGI lamps inside an air duct or air cleaner) or as upper-air UVGI (mounting UVGI lamps in the upper part of a room). To read how UVGI can help prevent TB from spreading and potential hazards of UVGI, see “Using UVGI to Reduce the Risk of Spreading TB” on page 37

Your shelter's current system should be evaluated for effectiveness and modifications should be made, if needed. Read the following information to help you determine any changes that may work in your situation:

Natural Ventilation

If rooms in your building are not served by a central ventilation system, read "Natural Ventilation and Fans" on page 16 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 check that they are easy to open
- Adding fans to increase air mixing and directional airflow. Place them so air movement can be felt in all occupied parts of the room, and keep them running as much as possible
- 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. Many shelters are closed during part of the day, for example. 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 ventilation system.

To see how one homeless shelter director improved the natural ventilation in her building, see "Case Study: Natural Ventilation and Fans" on page 22.

Central Ventilation

If rooms in your building have an existing central ventilation system, read "Central Ventilation" on page 24 to learn about the various parts of your central ventilation system, how they help control the spread of TB, what to check and how to make improvements, and the advantages and disadvantages of central ventilation.

If you are considering the design of a central ventilation system for a new or an existing building, read "Recommendations for the Design of New Central Ventilation Systems" on page 34.

Methods that help improve existing central ventilation systems in the shelter include:

- Using pleated filters
- Providing outside air intakes
- Setting outside air intakes to the fully open position
- Using thermostats that allow continuous fan operation
- Running ventilation systems continuously whenever the building is occupied
- Providing a pressure gauge for ventilation units that have more than one filter
- Providing natural ventilation to occupied rooms not served by ventilation systems

and to all occupied spaces at times when ventilation systems are broken or otherwise not operating

- Considering the use of in-duct UVGI as a supplement to filtration and outside air dilution.

In addition to the above methods, perform regular checks of each ventilation unit and the rooms that it serves and perform routine upkeep. See “Checking a Ventilation System” on page 32 for a description of the checks to perform, and see “Summary of Ventilation Units Worksheet” on page 152 for a sample checklist that you can use. To learn about central ventilation upkeep, see “Routine Upkeep of Existing Ventilation Systems” on page 33.

To see how one homeless shelter director used these ideas and made immediate low-cost improvements to ventilation in his shelter, read “Case Study: Central Ventilation” on page 36.

Air Filters

There are three types of filters that are used in central ventilation systems:

- High-efficiency particulate air (HEPA) filter
- Pleated ASHRAE 25% efficient filter (MERV 7 or 8)
- Lint filter

See the graph in Figure 3 on page 27 for a comparison of filter efficiency.

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 ventilation 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 “Components: Air Filters” on page 26.

HEPA filter units allow you to improve the air quality in a room almost immediately. These units are especially useful in homeless shelters that may have inadequate or no ventilation and limited funds for upgrades.

The following describes ways to use HEPA filter units in your shelter:

- Provide portable HEPA filter units for all unventilated rooms frequented by clients unless the rooms have an operable window or door that is usually kept open
- Place small units off the floor and next to staff so that the purified air they generate is delivered close to the faces of the people that they are used to protect. An ideal location is on a desk or on a file cabinet adjacent to a staff member. Consider the HEPA filter unit 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 felt in all parts of the room
- Operate HEPA filter units continuously while rooms are occupied by clients and for approximately 1 hour after they leave

To keep HEPA filter units 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 HEPA filter unit operation and should create a written schedule for changing the filters. To read more about HEPA filter units, how to select suitable units, and their routine upkeep, see “HEPA Filter Units” on page 42.

UVGI

Only an experienced professional, such as a UVGI lamp manufacturer should design and install UVGI in your shelter. This type of installation (and the maintenance of such an installation) requires expertise and equipment that may be difficult and expensive to acquire.

In-duct UVGI is a useful option for a recirculating air system that serves areas at high risk for TB transmission and areas without risk. The UVGI lamps are installed inside an air duct. This type of UVGI is usually less expensive to operate than a 100% outside air system. To read more about this type of UVGI and advantages and disadvantages of in-duct UVGI, see “Components: In-Duct UVGI” on page 29.

Upper-air UVGI is a specialized technology that is particularly appropriate for homeless shelters but can only be used in certain rooms. UVGI lamps are mounted high on walls or hung from the ceiling (at a height of 7 feet), resulting in irradiating and disinfecting the upper-room air. UVGI lamps should not be installed in rooms with ceilings less than 8 feet tall to avoid having people look into the lamps or bump into them. In addition, bunk beds should not be used in rooms that have an upper-room UVGI installation.

When using upper-air UVGI, it is essential that the lamps and radiation levels be checked on a regular basis.

- Have an expert use a radiometer to check the radiation levels in parts of the room where people are likely to be exposed. Radiation levels should be below the NIOSH REL
- If radiation levels are too high in any location, turn off the lamp or lamps causing the high radiation levels. It may be necessary to add non-reflective paint to the ceiling and/or wall, and/or to relocate or replace the fixtures to correct the problem
- Check that lamps are not burned out or broken. If lamps are working, they emit a visible violet blue glow that can be seen from below
- Turn off lamps and check that lamps and fixtures are free of dust and lint
- Check that the radiation level at each fixture meets the lamp manufacturer’s recommendation. Protective clothing or special equipment may be required to take these readings without overexposing the skin or eyes to the radiation. Replace the bulbs if the radiation levels are below the manufacturer’s recommended minimum levels

To read more about upper-air UVGI, how to determine whether a room is suitable, about installation planning, routine upkeep, and the advantages and disadvantages of upper-air UVGI, see “Upper-Air UVGI” on page 38.

Staff Use of Respiratory Protection

A respirator is a CDC/NIOSH approved “mask” that fits over the nose and mouth of the user. In TB control, a respirator is designed to prevent the user from inhaling droplet nuclei containing *M. tuberculosis*.

The OSHA has specific requirements for staff use of respirators. Contact OSHA for additional information. <http://www.osha.gov>