

How can UV lamps be used in TB control?

TB Transmission

TB is transmitted through the air. A person with TB disease of the lungs or larynx can release droplets containing *Mycobacterium tuberculosis* (*M. tb*) into the air by coughing, sneezing, talking, or breathing. These droplets, called droplet nuclei, can cause TB infection if inhaled by anyone who shares air with the person who has TB.

Ultraviolet Germicidal Irradiation (UVGI)

UVGI is the use of a type of UV radiation, known as UV-C, which has been shown to kill or in-activate *M. tb* in air. UVGI is generated by specially designed fixtures using bulbs that often look something like a fluorescent light. There are two ways that UV lamps are used in TB control:

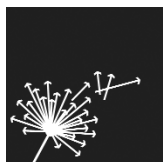
- **Upper-room UVGI** is the use of UVGI lamps directly in a room where there is a risk of *M. tb* being transmitted. It is a useful infection control technique for crowded spaces that may be occupied by a person with TB, such as prison day rooms, homeless shelters, and waiting rooms.
- **In-duct UVGI** is the use of UVGI lamps inside an air duct or air cleaner to disinfect air before it is recirculated. It is a useful upgrade for mechanical systems that recirculate air from high-risk congregate areas that may be occupied by a person with TB. However, in-duct UVGI is not equivalent to direct exhaust or high efficiency particulate air (HEPA) filtration for isolation rooms and high-risk procedure rooms.

Upper-Room UVGI

Upper-room UVGI uses lamps mounted at an elevation of seven or more feet. The fixtures are designed so that upper-room air is irradiated and disinfected. Cleaned air mixes with the air in the lower part of the room and dilutes infectious particles.

Radiation levels in the lower parts of the room should be measured to verify that they are within recommended parameters.

Care should be taken in the design, installation, and maintenance of upper-room UVGI because of safety concerns. Also, effectiveness can vary and every installation is unique.



Francis J. Curry National Tuberculosis Center
<http://www.nationaltbcenter.edu>

FAQ

Frequently Asked Questions

In-Duct UVGI

In-duct UVGI uses lamps mounted inside a duct perpendicular to airflow. An appropriately designed, installed, and maintained in-duct UVGI system should effectively disinfect most recirculated air. This will therefore significantly increase the effectiveness of the recirculating mechanical ventilation system in reducing the risk of *M. tb* transmission.

The UV intensities of lamps used inside a duct can be, and should be, greater than lamps used for upper-room UVGI. This is because the risk of UV overexposure is limited.

For a given airflow, the number and spacing of the lamps is selected to ensure that air in the duct is exposed to sufficient radiation. The exposure depends on the intensity of the radiation and the time of exposure.

A duct access door should be provided so that the lamps can be cleaned, checked, and replaced. To prevent exposure to the lamps, electrical interlock should shut off the lamps whenever the duct access door is open.

In-duct UVGI is also used in self-contained air cleaning units.

Safety Concerns

UVGI can cause temporary harm to the eyes and skin. However, newer fixture designs and compliance with guidelines can make UVGI use safe and effective.

Whenever UVGI is used, precautions should be taken to alert and protect staff and clients. Staff should also receive appropriate education. Warning signs in all appropriate languages should be posted on fixtures and wherever UVGI is used. For example:

CAUTION
HIGH INTENSITY ULTRAVIOLET ENERGY
PROTECT EYES AND SKIN

Routine Upkeep

Wherever UVGI is used, a routine maintenance program should be implemented to ensure that lamps are checked and replaced regularly.

Lamps should be replaced once a year or as directed by the manufacturer.

This information is available at our website: www.nationaltbcenter.edu