



UVGI: USING INNOVATIVE TECHNOLOGY TO FIGHT TB

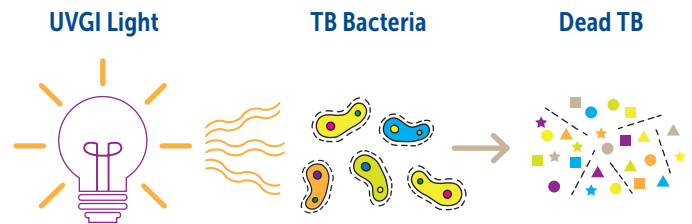
Background

TB (Tuberculosis) caused 9.6 million people to fall ill in 2014, and killed 1.5 million people.¹ Infection control is a critical for preventing TB transmission. TB is spread by bacterium that can travel in the air from one person to another.² Those with weak immune systems are highly susceptible to developing TB if they come into contact with TB bacteria.² Healthcare facilities are challenged with treating patients with TB, while simultaneously preventing other ill patients from contracting TB. Technologies, such as UVGI, have been adapted to help healthcare systems in protecting their patients from TB. However, the introduction of new technology requires the development of guidelines, local manufactures, and experts to maintain it.

Goal

TB CARE II implements UVGI technology in high TB burden areas around the world. There are no internationally-adopted standards on the application of UVGI system for TB infection control. Protocols for testing and validating UVGI systems need to be developed to ensure they are installed correctly. The overall goal of this activity is to accelerate the implementation of upper room UVGI globally by addressing these barriers:

- A lack of usable evidence-based applications guidelines.
- A lack of performance criteria for upper room UVGI fixtures, specifically data on total UV output per fixture and full gonioradiometry output.
- A lack of manufacturers of quality fixtures in key application areas.
- A lack of plans for maintenance of fixtures in the field.



What is UVGI ?

Ultraviolet germicidal irradiation (UVGI) is a method that uses UV light to kill microorganisms and disinfect an area.

Implementation

The upper room UVGI air disinfection method is an environmental infection control measure that when combined with air mixing has proven to be highly effective in real hospital settings in Peru and South Africa. Although natural ventilation is the most widely available control strategy, it is highly dependent on external factors. UVGI is also variable, but has more controllable factors.

UVGI efficiency depends on:







- Proper deployment in the correct settings
- Availability of quality UVGI equipment
- Application of evidence-based guidelines
- Commissioning before use for safety and efficacy
- Ongoing evidence-based fixture maintenance and lamp replacement.

Global experience shows that hospital technical staff generally lack the capacity to properly plan, purchase, install, and maintain upper

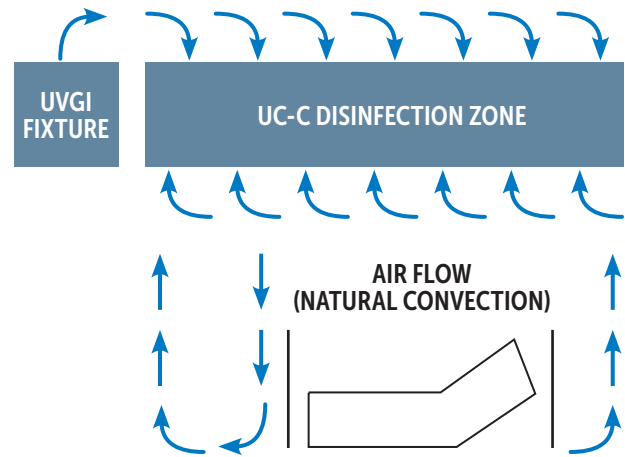
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The Benefits of UVGI

-  Delivers steril air 24/7
-  Destroys rather than traps pathogens
-  Environmentally friendly and chemical free
-  Suitable for existing or new buildings
-  Inexpensive to operate and maintain
-  Does not depend on maintaining air seals

Sample Upper-Room UVGI



Source: <http://www.sahealthinfo.org/tb/guidelines.pdf>

room UVGI systems. If these barriers can be overcome, UVGI is an otherwise highly effective TB control intervention.

Over the last two years, TB CARE II and collaborators have developed guidelines for safe and effective use of UVGI fixtures in healthcare settings of various configurations (room size, temperature, humidity, air mixing, and number of occupants). A workshop was held in 2015 to introduce the guidelines to an international audience and seek feedback. A clear concern at the meeting was the availability of quality fixtures and local maintenance, which led to the design-lease-maintenance model.

Through a partnership with Harvard's Brigham and Women's Hospital (BWH), which combines more than 30 years' experience in UVGI research, TB CARE II plans to design an implementation strategy for UVGI, transfer sustainable UVGI technology to South Africa and India as well as other high-burden TB settings, and address long-term maintenance globally.

Next Steps

The key outcomes and next steps include:

- Proposing the guidelines to be adopted by an international body;
- Developing demonstration projects for teaching and implementation;
- Advocating for investment in UVGI practitioners and professionals; and
- Identifying leading individuals and companies.

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1. *2015 Global Tuberculosis Report* (Rep.). (2015). Retrieved July 13, 2016, from World Health Organization website: http://apps.who.int/iris/bitstream/10665/191102/1/9789241565059_eng.pdf
2. <http://www.cdc.gov/tb/topic/basics/howtbspreads.htm>
3. <http://www.sahealthinfo.org/tb/guidelines.pdf>
4. Remarks by Nelson Mandela: "Confronting the Joint HIV/TB Epidemics", XV International AIDS Conference, Bangkok 2004 <http://quod.lib.umich.edu/c/cohen/aids/> – See more at: <http://www.tbfacts.org/global-tb/#sthash.DxfNpmeV.dpuf>

The **USAID TB CARE II** project, which began in 2010, implements activities in 15 countries. The project, led by University Research Co., LLC (URC), aims to provide global leadership and support to national TB programs and other in-country partners to decrease TB rates through the implementation of new technologies, the integration of TB and HIV diagnosis and treatment, better programmatic management of drug resistant TB, and through health systems strengthening.