XDR-TB and UVGI

In the 1930's and 1940's Ultraviolet Germicidal Irradiation was standard equipment in tuberculosis wards. Irradiation of upper room air proved valuable at helping to stop the spread of TB. As effective drugs were developed to fight the disease, UVGI fell out of vogue.

While TB is relatively under control in this country, it claims the lives of 1.7 million people around the world each year. Unfortunately a new strain of TB that is virtually untreatable has surfaced. Known as Extensively Drug Resistant TB (XDR-TB), the strain is impervious to first and second line drugs such as Isoniazid and Rifampicin. At this time there are no third line drugs available.

In a hospital ward in one South African province, XDR-TB infected 53 patients—killing 52 of them. And experts say this outbreak may just "be the tip of the iceberg." In fact, recent reports from the World Health Organization say that XDR-TB is spreading in South Africa and is suspect in the hospital isolation of two men and a woman in Gauteng.

Why are outbreaks in South Africa so acute? Part of the problem is the high rates of HIV among the population. Immune compromised HIV patients are at the wrong place at the wrong time, and in the wrong condition to fight off this opportunistic strain of TB.

Another piece of the puzzle is inadequate healthcare that plagues poorer countries such as South Africa. 50% of South Africans treated for TB will find themselves back at the hospital again because their treatment failed. The longer these people stay in the hospital, the more likely they are to come in contact with, and contract, XDR-TB. In essence, the South African situation appears to be an instance of Hospital Acquired Infection. That's where Ultraviolet Germicidal Irradiation could play a role.

While microorganisms mutate and build resistance to drugs, they do not build such immunity against UVGI. UVGI damages genetic material making it impossible for a microorganism to reproduce. While organisms vary in their susceptibility to UV, there is no evidence indicating that organisms can mutate and build immunity to UV. A Harvard Review article on the topic says, "Additionally, the proliferation of multidrug-resistant TB is further hampering therapeutic options, both here and abroad. The beauty of ultraviolet is that it doesn't discriminate between regular and drug-resistant TB, killing both with equal abandon."

UVGI is not the sole answer to fighting nosocomial infections. But it is an excellent complimentary technology to other measures that include pharmaceuticals, hand washing, etc. UVGI helps to break one of the links of transmission inside a hospital without deleterious side effects (e.g. building antibiotic immunity).

It is certain that over dependence on drugs alone to fight infectious disease is a strategy that nature will attempt to, and succeed in, counteracting. For hospital acquired infections such as XDR-TB, UVGI could play a substantial role and potentially save many lives.