# A breakdown of two hospital cleaning technologies: Activated Ionized Hydrogen Peroxide vs. Ultraviolet Light

Both AIHP and UV light take a unique approach to controlling the spread of pathogenic bacteria but one is proven to be the better technology for the job.

There are a number of ways to kill bacteria, ranging from sprays to mists to chemical treatments to radiation. But not all of them are equally capable, practical, cost-effective and applicable. In the realm of healthcare facilities, these discrepancies are a big deal - they can be the difference between protecting a patient from harmful pathogens and causing an outbreak to occur.

In this article, we'll compare two methods of eliminating dangerous bacteria from a healthcare space: Activated Ionized Hydrogen Peroxide and Ultraviolet light. Each takes a unique approach to controlling the spread of pathogenic bacteria but one is proven to be the better technology for the job.

*"Not all hospital cleaning techs are equally capable, practical, cost-effective and applicable."*

**The Method**
Anyone with sensitive skin knows the radiative power of UV light. This is the radiation from the sun that causes sunburns, wrinkling, blistering and skin cancer. But when channeled in a different way, UV light can also kill bacteria. How exactly does it accomplish this task? Professor Anne Rammelsberg of Milliken University explains:

"Ultraviolet light kills cells by damaging their DNA. The light initiates a reaction between two molecules of thymine, one of the bases that make up DNA," Rammelsberg told Scientific American. As a cell is exposed to continued UV light, more damage occurs. "If the damage is not too extensive, cancerous or precancerous cells are created from healthy cells. If it is widespread, the cell will die."

Hospital-grade UV cleaners rely on this property to eliminate bacteria from a room. On the other hand, AIHP technology converts a less-than-8-percent hydrogen peroxide solution into a high concentration of Reactive Oxygen Species (ROS). To do so, the solution passes through an atmospheric cold plasma arc, creating an Activated Ionized Hydrogen Peroxide (AIHP) that kills bacteria on contact. It can be deployed via handheld spray applicator or a complete room fogging system.

*"AIHP's price tag is only a fraction of the UV cost."*

**The Efficacy**
For a small, completely empty room, UV light could be highly effective in killing unwanted bacteria - it can even do so in a relatively short period of time, usually 15 to 30 minutes. But

in a hospital setting, the technology can run into major issues. The main problem is that UV light cannot pass through solid objects - these blockades will create shadows. Wherever there is a shadow in a room treated with UV light, bacteria can survive.

To combat this, operators will use reflective paint, multiple lights or move equipment around to reduce the chance of missing an area. This requires an extra investment of time, personnel, and effort, but also of money - UV systems can be quite expensive, running $80,000 to $125,000 per unit. To work around those shadows could require more than one unit, resulting in astronomical costs. Additionally, light bulbs have a limited lifespan, adding to the already unwieldy expense.

AIHP comes with fewer issues in a healthcare space. The time requirement is about the same, but the complete room fogging systems will kill bacteria where ever they may be in a room. The handheld method is also a fast, easy and effective way to pinpoint high touch surfaces for cleaning. Best of all, the price tag is approx. a 1/4th the UV cost –

Shadows from furniture and equipment can undermine UV light, the way an umbrella can block the sun.

**The Application**

While setting up and implementing a UV light is fairly straightforward, there are side effects the operator and facility should be aware of. For one thing, as mentioned earlier, a system must be in line of sight to guarantee the UV light will reach all of its targets. Shadows are an issue, but even dirt or debris will prevent the light from reaching and killing bacteria, according to Arizona State University. Additionally, prolonged exposure to UV light can be detrimental to plastics and rubbers.

Beyond these drawbacks there is also a safety concern. One ASU lab worker was burned by a UV light in a laminar flow hood. While better lab safety protocol might have prevented this incident from occurring, it does show the dangers of working with radiation.

Meanwhile, AIHP comes with none of those concerns for personnel, damaged materials, or blockages. There is some preparation time required for implementing a room fogging system - the space must be sealed so the AIHP can generate a sufficient concentration of ROS. However, the handheld system does not require any room set-up and both system are safe for medical equipment and electronics.

**The Verdict**

Though UV light may have a time and place to be implemented as a hospital-grade cleaning technology, it is not sufficient to rely on this system alone to eliminate bacteria from a room. There are the dangers to equipment and users and the potential for equipment and debris to block the light. There is also the issue of cost - especially for hospitals that want to clean multiple spaces simultaneously and must invest in more than one system.

The AIHP process used in SteraMist™ BIT™ from TOMI Environmental Solutions, Inc. gets the nod here because it is easier and safer to use, non-corrosive and more cost-effective. Plus, the ability for the facility to choose between the handheld Surface Unit for smaller tasks and the Environmental System for complete room treatment offers a higher degree of versatility.

SteraMist™ BIT™ ultimately provides better value and a more effective solution for hospital cleaning than UV light.