Disinfection Revolution

Interview by Amanda McGowan, editor

In recent years, recognition to the role the environment plays in spreading potentially infection-causing microorganisms around hospitals has grown. As a result, new technologies have emerged that look to disinfect surfaces such as keyboards, countertops, bedrails and more that are discreetly contributing to hospital-acquired infections in patients.

Healthy Environment Innovations, LLC is one company looking to make its mark by contributing to this cause. It has developed Sterilray™, a disinfection device that, according to the company's website, produces a wavelength in the Far-UV (FUV) band with more photon energy that breaks either the protein peptide bonds or the disulfide bonds of the DNA—totally killing the microorganism.

While Sterilray currently works to disinfect non-critical surfaces of a hospital, the company has begun studying the ability for the technology to disinfect human skin. The company has conducted some testing on skin and is moving to further testing to show that the wavelength used in Sterilray does not harm skin.

Recently, *Surgical Products* spoke with John Neister, EVP of sales and business development at Healthy Environment Innovations, LLC to discuss this new technology as it is being studies and used in hospitals today, and what it could mean for infection control in the future.

Surgical Products: **Why was this device originally developed and when did you start making your way into the healthcare space?**

Neister: The company's president and chief executive officer Edward Neister was originally looking at waste water treatment. He started looking at UV and found a good absorption at a lower wavelength that no one had utilized. That is in Far-UV range. It's a lower wavelength than 254, which is the commonly-used UVC. This wavelength gets absorbed very quickly in water, so it's not effective for waste water treatment, but it's very effective on surfaces and air. In fact, we've shown that it is 10,000 times more effective than UVC on surfaces and air.

We realized that we could disinfect a surface free of chemicals and by dry means in less than a couple of seconds using a Far-UV Sterilray lamp. For electronic medical equipment, plastics and fabrics that you can't use chemicals on right now, this could be a good solution. It's also much faster than the dwell time necessary for an acceptable reduction of pathogens with chemicals.

Surgical Products: **In the OR and around the hospital, what can this device be used to disinfect right now?**

Neister: Sterilray can disinfect anything that is a non-critical surface in two or three seconds, or even less than a second exposure time for some pathogens like MRSA. We do not have FDA approval to disinfect any critical surface—anything that touches or goes into a human body. Meanwhile, chemicals often have to stay wet for three to five minutes. Most surgical rooms don't have the time to keep surfaces wet for three to five minutes between surgeries, and they can't put chemicals on the equipment and the electronics in the room.

What we are trying to do is separate cleaning from disinfection. In between operations, you have to go in and clean up the OR, and clean up the fluids and all of the waste matter, and replace the different materials. Then, a Sterilray technician can come in and do a final disinfection on all of the high touch surfaces and the electronic equipment and get many of the areas that may have been missed in the cleaning. There is one study in Boston that shows that up to 49 percent of a patient room is missed—literally, those surfaces are not being touched, let alone cleaned.

This technology could also be very effective in the emergency room where the hospitals are trying to increase their throughput. The amount of time it takes to clean up a room and disinfect a room is very, very important to them.

Another important area is keyboards. This is the reason a VA hospital in California bought a unit, just to do the keyboards in their facility because they are a paperless facility. They did a study that showed that Sterilray were was able to reduce the pathogens on the keyboards. This is important for facilities that are doing paperless operations, and you have 50 or 60 doctors and nurses using the same keyboard all day long.

Surgical Products: **Can you speak to where you are in terms of disinfecting**

human skin with this device? What could this mean for the future of infection control in the surgical suite?

Neister: There is a possibility for disinfecting human skin. It will take FDA approval and research, but the preliminary results were very encouraging. We have found that we can expose skin for 10 minutes and not damage any of the underlying cells, which could be huge in surgery.

As far as which stage our device would be used in the patient prep process, the surgeons will need to tell us that as we research. Our research will consist of putting MRSA and C. diff on human skin and see how much of a dose it is going to take to kill them. If that shows promise, and we could do patients before they're cut, we could work in wound care, with burn care victims as well as diabetic patients. We don't know, and that's really what is going to be the challenge and have to evolve as we go forward with these tests.

We also have other tests scheduled to be sure we are not doing any long term damage to cells. Then, of course, clinical trials and all the additional steps to get FDA approval. It will take quite a long time but we believe it will be worth the effort.

Surgical Products: **Why is it important for facilities to be looking into these new disinfection solutions?**

Neister: We are right now looking for the pioneers. We don't have any proven track record that we are going to reduce HAIs. We are looking for facilities that will take Sterilray on and do studies to show we reduce HAIs. It's becoming more and more a understanding that if you reduce the microbial load in the environment, you are going to reduce your HAIs.

We know it's the call buttons and the bed rails and the doctors' ties and everything else that is spreading disease in a facility, so the environment has really just taken on a much greater importance in the last five years than it every has before. You can see that in 2002, at the SHEA convention, there were only 2 papers on environmental cleaning and in 2010, last March, there were 37 papers presented on environmental cleaning.

With all these superbugs that are plaguing these facilities, they have to find better ways to disinfect the high touch surfaces in their environment.

Surgical Products: **What do you see for the future?**

Neister: Skin disinfection is really our holy grail because there is such a need for a quick, chemical-free way of disinfecting skin. Hospitals have no way of decolonizing MRSA or C. diff patients. However, right now our focus is totally on the environment. We can disinfect all of the high touch surfaces in a facility even while people are present. It is the environment that is causing a major problem and we feel Sterilray can make a major contribution to lowering HAI's.

For more information please visit, www.he-innovations.com *[1].*

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