



Testimony of

Morris Miller, CEO

Xenex Disinfection Services

“Technology for Patient Safety at Veterans Hospitals”

Before the U.S. House of Representatives
Committee on Science, Space, and Technology
Subcommittee on Research and Technology
Subcommittee on Oversight

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Technology for Patient Safety at Veterans Hospitals -- Summary

1. Healthcare Associated Infections are a significant national problem when measured by cost (\$20 billion per year), infections (2 million per year) and lives lost (10,000 per year). Many of these HAIs are caused by “Superbug” pathogens that are antibiotic-resistant and lack known cures.
2. Xenex has provided an effective response to HAIs through the development of its “Germ-Zapping” Robot, which disinfects rooms using pulsating broad spectrum ultraviolet (UV) light technology.
3. The Xenex robot emits pulsating light that destroys the DNA of the pathogens so they cannot reproduce or spread. The germ-zapping robot uses xenon gas to produce intense bursts of UV light which destroys the most difficult to kill pathogens (e.g. *C. diff.*) in four minutes.
4. Xenex represents a significant advancement in UV disinfection technology, which has historically relied upon mercury bulbs requiring significantly greater exposure times to disinfect (as long as 45 minutes for *C.diff*).
5. Six (6) peer-reviewed studies have been published supporting the efficacy of the Xenex germ-zapping robot, including three where Xenex customers reported significantly reduced HAI rates after implementing the robot. No other UV technology has peer-reviewed studies demonstrating the impact of the technology on actual patient infection rates.
6. The Xenex germ-zapping robot is cost-effective and produces a significant ROI.
7. Congress has an opportunity to meaningfully improve the health of its veterans and citizens by promoting policies that accelerate the adoption of technologies that can effectively disinfect the hospital environment.

Testimony of Morris Miller, CEO

Xenex Disinfection Services

Thank you Chairman Smith, Chairmen Broun and Bucshon, Ranking Members Maffei and Lipinski and other distinguished Committee Members. It is an honor to be here today.

My name is Morris Miller. I am the CEO of XENEX DISINFECTION SERVICES, headquartered in San Antonio, Texas. With me today is Mark Stibich, one of our Co-Founders. Both Mark and Xenex co-founder Julie Stachowiak earned their Ph.D.s in epidemiology from the Johns Hopkins Bloomberg School of Public Health.

We are here today to present testimony about our Germ-Zapping Robot™ that kills the deadly pathogens that annually cause an estimated 2 million Healthcare Associated Infections, 100,000 deaths and \$20 billion in cost to the U.S. healthcare system. (<http://www.cdc.gov/HAI/surveillance/index.html>)

As requested, I will address how our company developed this technology and how it works to enable hospitals to prevent healthcare acquired infections known as HAIs. I will discuss the results of the usage of our robot and peer-reviewed studies explaining how more than 200 hospitals including 26 VA facilities use our technology with favorable cost-effective results. I will also discuss how Congress can motivate both VA and all hospitals to use this new cost-effective technology to eliminate pathogens that cause infections.

I will do so through 5 points:

1. The Problem
2. How Xenex Kills the Pathogens that Cause Infections
3. Proven Results of Xenex
4. Cost Savings and Return on Investment
5. Mandating Room Disinfection

1. THE PROBLEM

The Environment Matters

Over the past 2 years the evidence has become overwhelming that pathogens in the hospital environment cause the passage of infections from patient to patient. The scientific community now accepts as fact, that pathogens in the hospital environment cause infections. These germs are found on “High Touch” surfaces like bedrails, doorknobs, tray tables, remote controls, telephones and nurse call buttons, where they are easily transmitted to the patient.

These pathogens include “Staph” like MRSA (Methicillin-resistant *Staphylococcus aureus*), *C. diff* (*Clostridium Difficile*), VRE and new pathogens like MERS (Middle Eastern Respiratory Syndrome). These microorganisms are increasingly antibiotic resistant, and are commonly referred to as “superbugs.” The resulting infections from these pathogens frequently involve significant pain and suffering, and many end in death.

Infections typically occur when hospitals place patients in patient and treatment rooms where a previous occupant was infected. Extensive cleaning with mops, buckets and wipes doesn’t eliminate the germs. Some of these pathogens, like *C.diff*, can live up to 6 months on a hospital surface.

2. HOW XENEX KILLS THE PATHOGENS THAT CAUSE INFECTIONS

Xenex was founded to develop technology to stop the HAI epidemic by the fastest, most effective and most economical means possible. Our Germ-Zapping Robot™ has been repeatedly proven through peer-reviewed studies, trials and real-world usage to stop the spread of the pathogens that cause HAIs.

Ultraviolet (UV) light disinfection, using mercury lamps, has been around for decades. It can be an effective but often impractical disinfection tool, as the lamps must be used for a lengthy period of time. Our technology uses xenon gas to produce intense bursts of UVC light, resulting in a significantly faster disinfection cycle when compared to mercury disinfection systems. For example, Xenex kills *C.diff* spores in 4 minutes, as compared to 40 minutes for leading mercury products.

Xenon is an environmentally friendly inert gas. All other UV companies – and there are many – use toxic mercury bulbs. Every one. Hospitals are trying to eliminate the use of mercury in their facilities. Of the mercury providers, we cannot find a single provider, not a single one who has

published outcome studies demonstrating the effectiveness of their devices. We contend that is because the mercury systems take far too long to disinfect a single room and therefore it is not possible to disinfect enough rooms to bring down the bacterial load when you are using a mercury system.

The Xenex robot utilizes pulsed xenon to create UVC light – this flashing, germicidal light is 25,000 times brighter than sunlight. The bright light destroys the DNA of the microorganisms in 4 ways so they can't reproduce or mutate – they become harmless and unable to infect the next patient in that room.

Our device is simple to operate. A hospital employee wheels the robot into an empty patient room, places it on one side of the bed and turns it on. They return 5 minutes later, flip over the remote control, phone and other items to expose the surfaces to the light and run it for another 5 minutes. In just 5 to 10 minutes we have destroyed the microorganisms lurking in that room. That's it!

We developed this protocol in conjunction with MD Anderson and published our results in ICHE (*Infection Control & Hospital Epidemiology*). That study showed that our robot was 20 times more effective in disinfecting the room than traditional cleaning.

3. XENEX RESULTS ARE PROVEN

Today I am presenting to you the results of 6 peer-reviewed and published studies proving the efficacy of our device. These studies were performed at world-class hospitals. Before and after implementing Xenex, the hospitals followed standard CDC and professional society guidelines for infection prevention – a bundled approach of hand hygiene, antibiotic stewardship, and cleaning with bleach when appropriate. **IT WASN'T ENOUGH**. When they incorporated our germ-zapping robots into their cleaning protocol, they experienced significant reductions in their infection rates. 3 of the peer reviewed studies show dramatic improvements in patient satisfaction and superior environmental disinfection of VRE and MRSA when Xenex is used in hospitals.

- HCAHPS improved by 2 quartiles at Trinity Hospital (*Risk Management & Healthcare Policy*)

- **MRSA Reduced by 99% in 22% faster time** period than manual cleaning (Biomed Central Infection Diseases)
- **Xenex 20x better than standard cleaning at removing VRE** from patient rooms (*Infection Control & Hospital Epidemiology*)

In the last year we have had 3 peer-reviewed studies demonstrating the effectiveness of our robots. These studies reported that fewer patients contracted *C.diff* and MRSA infections when our robots were used to clean patient rooms. These studies were:

- **Cooley Dickinson Hospital Reduced *C.diff* Infections 53%**: *American Journal of Infection Control (AJIC)*
- **Cone Health Reduced MRSA Infections 56%**: *Journal of Infection Prevention*
- **Westchester Medical Center Saw 20% Drop in HAI Rates** (despite only treating a portion of rooms): *American Journal of Infection Control (AJIC)*

Most of our customers use our robots to disinfect their patient rooms, intensive care units, operating rooms, equipment rooms, procedure rooms, emergency rooms, public restrooms, nurse stations and changing rooms. The data shows that the more widespread use of the germ-zapping robots the better the results.

Our customers' stories are inspiring and show what is possible when dedicated people on the front lines of infection control are supported by their administration. An Infection Preventionist at a customer facility recently told me about a MRSA outbreak at her labor and delivery unit. They had 60 victims (women and their newborns who contracted MRSA infections) and didn't know what to do/how to stop it. On an emergency basis, we loaned the facility our robots, and three days later, the outbreak was halted.

The use of our robot in the Operating Room is producing very exciting results. A facility recently told us they went from 7 Surgical Site Infections (SSIs) to 0. That's meaningful. A study performed at Cambridge, a Harvard teaching facility, showed that our robot reduced surface contamination in the OR by 81%. It also showed that between-case contamination in the OR

continued to rise from case to case but was reduced to almost zero when the Xenex device was used between cases.

These reductions are not theoretical or in a lab. They are in real hospitals and have been peer reviewed.

4. BOTTOM LINE ON COST SAVINGS AND RETURN ON INVESTMENT

Treating a single HAI can cost \$4,000 - \$30,000. If just 2-3 infections are avoided per year the robot pays for itself. Another way to look at it: using our device costs approximately \$1.50 per occupied patient room day.

Hospitals using our device typically report a return on investment (ROI) in just 3 or 4 months and that's just the financial impact of reducing HAIs. Consider also the quality of life impact of the pain and suffering avoided by victims and their families.

Xenex has a direct impact on hospital financials including a shorter length of stay, an increase in revenue generating bed days, reduced re-admission, improved HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) scores, reduced chance of CMS penalties and reduced cost of care.

Dr. Jinadatha briefed you on his research that shows that our robot is significantly better than manual cleaning and we have a number of VA facilities reporting fewer infections. Dr. Jinadatha is also conducting numerous studies on the efficacy of the technology as well as other benefits such as room turnover time. We believe germ-zapping robots should be used system wide in the VA. Our Veterans deserve the highest quality care and state of the art technology. Especially when it saves both lives and taxpayer dollars.

5. INCENTIVIZING ROOM DISINFECTION

How can we motivate hospitals and VA patient care facilities to adopt new infection prevention technology?

Two potential starting points

First, some HAI data can be found online at the Hospital Compare website, which is a good starting point. Patients and their families can go online and see infection rates at the hospitals in

their areas. Requiring hospitals to report with greater infection specificity will result in an increased focus and effort by the hospitals to eliminate preventable infections.

Second, While CMS penalties are motivational; we don't think they are sufficient to force a change in infection control protocols. Value based purchasing can be effective. For example, if *C.diff* and MRSA infections were included in the value based purchasing criteria today, which they are not, we could stop a majority of the cases for about 20 times less than what it costs to treat them.

We believe the most effective means of combating HAIs is for Congress to provide an incentive for hospitals to adopt the strategies and technologies necessary to eliminate these infections. If hospitals are allowed to bill \$1.50 per occupied patient room day for advanced disinfection, you would quickly see a nationwide drop in the occurrence of HAIs. The ROI on this investment to the healthcare system could be 20-50 to 1 for each dollar spent.

Congress CAN incentivize hospitals to make room disinfection part of their standard of care. In 1991, Congress mandated automakers to include airbags, which to date has saved more than 14,000 lives. Stopping HAIs could save more lives than 23 years of airbags in less than 4 months.

Xenex brings you a proven solution to the problem of healthcare associated infections. We are working hard to deploy our robots nationwide and throughout our VA system. This solution would save money, destroy superbugs that cause infections, prevent suffering and save lives.

Every day delayed means another 274 people die in the U.S. and another 5,000 become infected! We have the technology, it is made in America, it has been used in U.S. hospitals and it is proven to work!

If you or your loved one ever has to go to the hospital I hope you will insist on the proper disinfection of your hospital room or procedure room with a germ-zapping robot. I hope you will support this initiative to get germ-zapping robots in use throughout our VA system and the entire federally supported healthcare system. Our veterans, their families and your constituents nationwide deserve no less.

Thank you.

Relevant Media Coverage

<https://www.youtube.com/watch?v=BOYhFE0rPKo> (CNN feature on Cooley Dickinson *C.diff* reduction)

http://www.salisbury.va.gov/SALISBURY/features/Xenex_UV_robot_enhancing_sanitizing_procedures.asp

<https://www.youtube.com/watch?v=vGJYAlySUQM> (Xenex robot credited for reducing infections at Jack C. Montgomery Muskogee VA)

Published Studies

Implementation and impact of ultraviolet environmental disinfection in an acute care setting – *American Journal of Infection Control*

[http://www.ajicjournal.org/article/S0196-6553\(13\)01432-6/fulltext](http://www.ajicjournal.org/article/S0196-6553(13)01432-6/fulltext)

The effect of portable pulsed xenon ultraviolet light after terminal cleaning on hospital-associated *Clostridium difficile* infection in a community hospital – *American Journal of Infection Control*

[http://www.ajicjournal.org/article/S0196-6553\(13\)00249-6/fulltext](http://www.ajicjournal.org/article/S0196-6553(13)00249-6/fulltext)

Implementation of innovative pulsed xenon ultraviolet (PX-UV) environmental cleaning in an acute care hospital – *Risk Management & Healthcare Policy*

http://www.dovepress.com/articles.php?article_id=15602

Impact of a multi-hospital intervention utilising screening, hand hygiene education and pulsed xenon ultraviolet (PX-UV) on the rate of hospital associated methicillin resistant *Staphylococcus aureus* infection – *Journal of Infection Prevention*

<http://bjj.sagepub.com/content/early/2013/06/05/1757177413490813.abstract>

Evaluation of a Pulsed-Xenon Ultraviolet Room Disinfection Device for Impact on Hospital Operations and Microbial Reduction – *Infection Control & Hospital Epidemiology*

<http://www.jstor.org/stable/10.1086/658329>

Evaluation of a pulsed-xenon ultraviolet room disinfection device for impact on contamination levels of methicillin-resistant *Staphylococcus aureus* – *BMC Infectious Diseases*

<http://www.biomedcentral.com/1471-2334/14/187>

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