



SUMMARY OF PEER REVIEWED STUDIES AND EFFECTIVENESS



SUMMARY OF STUDIES

Xenex takes pride in the highest level of validated evidence: peer reviewed studies published in respected scientific journals.



Peer Reviewed SSIs Outcome Studies

- **100% reduction in total joint SSIs** and \$290,990 saved in 12 months - *AJIC*, February 2016 (Fornwalt, Trinity Medical Center)
- **46% reduction in rate of Class I SSIs**, \$478,055 saved - *AJIC*, June 2016 (Catalanotti, Lowell General Hospital)

Peer Reviewed HAI Outcome Studies

- **47% reduction in C. diff** infection rates and **52% reduction in VRE** rates in a controlled trial, 2 year sustained *C. diff* SIR score reduction from 0.77 to 0.57 at Mayo Clinic, Rochester MN - *AJIC*, April 2019 (Sampathkumar, Mayo Clinic)
- **87% reduction in ICU VRE** infection rates, **combined VRE+MRSA+C. diff** infection rates **reduced 61% in ICU and 29% facility-wide**, 390 bed days generated, \$730,000 saved - *AJIC*, March 2016 (Vianna, South Seminole Hospital - Orlando Health)
- **70% reduction in ICU C. diff** infection rates - *AJIC*, September 2015 (Nagaraja, Westchester Medical Center)
- **57% reduction in C. diff** infection rates in an LTAC - *AJIC*, December 2015 (Miller)
- **57% reduction in MRSA** infection rates after 18 months - *JIP*, September 2013 (Simmons, Moses Cone Health)
- **53% reduction in C. diff** infection rates after 12 months - *AJIC*, August 2013 (Levin, Cooley Dickinson Hospital)
- **71% reduction in UTI rates** and **100% in skin infection rates, 54% drop in hospital readmissions from nursing home** - *BMC Infectious Diseases*, March 2017 (Kovach, Jewish Home and Care Center)
- **20% reduction in C. diff + MDRO** infection rates, 22% of discharge rooms treated - *AJIC*, June 2014 (Haas, Westchester Medical Center)

Peer Reviewed Studies - Policy and Process

- **HCAHPS score increased** from 52nd percentile to 78th percentile (**10% increase**) for 3 quarters after LightStrike patient awareness campaign - *Risk Management and Healthcare Policy*, January 2014 (Fornwalt, Trinity Medical Center)
- **Best practices for containing MDROs in the hospital environment** - *Therapeutic Advances in Infectious Disease*, July 2014 (Chemaly, MD Anderson Cancer Center)

Peer Reviewed Environmental Studies

- **93% reduction in bacteria recovered from portable medical equipment after 5-min cycle in the LightStrike Disinfection Pod** - *AJIC*, In Press August 2019 (Reid, Trinity Medical Center)
- **86% reduction in contamination in ORs at 23 hospitals and 1464 samples** - *AJIC*, September 2018 (Simmons, Several U.S. Healthcare Facilities)
- **84% reduction of surface MRSA, ~2X better reduction than manual cleaning** - *AJIC*, June 2018 (Zeber, 4 U.S. Healthcare Facilities)
- **72.5% reduction in OR high-touch surface contamination with single 2-minute cycle between cases** - *BMC Infectious Diseases*, October 2017 (El Haddad, MD Anderson Cancer Center)
- Significant reductions in burn unit ORs and patient room contamination, **longest duration with no cases of hospital acquired C. diff infections in burn ICU in 2 years** - *BURNS*, March 2017 (Green, San Antonio Military Medical Center)
- **Elimination of Ebola (>4 log) and Anthrax (>3 log), >6-log reduction of MRSA, CRE, MDR-A. baumannii, and more** - *SAJID*, January 2016 (Stibich, CNB/CSIC-Spain & TXBiomed Biosafety Level 4 Lab-US)
- **LightStrike effective in absence of manual cleaning** - *AJIC*, April 2015 (Jinadatha, Central Texas VA Health Care System)
- **LightStrike effective against MRSA even in absence of manual cleaning** - *AJIC*, August 2015 (Jinadatha, Central Texas VA Health Care System)
- 99.6% reduction in real-world hospital bioburden and **LightStrike efficacy not affected by shading**, pathogen concentration, or surface protein load - *ICHE*, February 2015 (Nerandzic, Louis Stokes Cleveland VA Medical Center)
- Bleach removed 70% of *C. diff* spores while **no-bleach clean plus LightStrike removed 95%** - *JMM*, February 2015 (Ghantaji, MD Anderson Cancer Center)
- **7X more effective than traditional cleaning, 16X more effective at deactivating MRSA, and 23% faster than traditional cleaning** - *BMC Infectious Diseases*, April 2014 (Jinadatha, Central Texas VA Health Care System)
- **LightStrike eliminated all VRE from the environment** - *ICHE*, March 2011 (Stibich, MD Anderson Cancer Center)

Peer Reviewed International Studies

- **72% decrease in recovered MRSA counts** when compared to manual cleaning alone - *AJIC*, October 2019 (Kitagawa, Hiroshima University)
- **Reduced environmental contamination** in the absence of manual cleaning - *International Journal of Environmental Research and Public Health*, September 2019 (Casini, University of Pisa, Italy)
- **75% reduction in environmental contamination** compared to manual cleaning and disinfection - *BMC Infectious Diseases*, December 2019 (Villacis, Enrique Garcés General Hospital - Quito, Ecuador)
- **No growth of Candida auris and Candida parapsilosis** after a 15-minute disinfection cycle with LightStrike - *BMC Infectious Diseases*, June 2019 (Maslo, Netcare Hospitals, South Africa)
- Enhanced bundle with use of Pulsed Xenon UV to **control an outbreak of multidrug-resistant Pseudomonas** in a burn unit - *Annals of Burns and Fire Disasters*, March 2019 (Aguilera-Sáez, Vall d'Hebron University Hospital, Barcelona, Spain)
- **90% reduction in surface contamination** in NICU human expressed milk feed prep areas - *BMC Infectious Diseases*, February 2018 (Dippenaar, Netcare Blaauwerg - South Africa)
- **5 log reduction of MRSA, VRE, Acinetobacter and CRE** in 10 minutes - *AJIC*, September 2016 (Hosein, Queen's Hospital - Romford UK)
- **Reduced contamination in hematology and BMT units** in UK - *Journal of Hospital Infection*, June 2016 (Beal, Nottingham University Hospitals NHS Trust)

EFFECTIVENESS



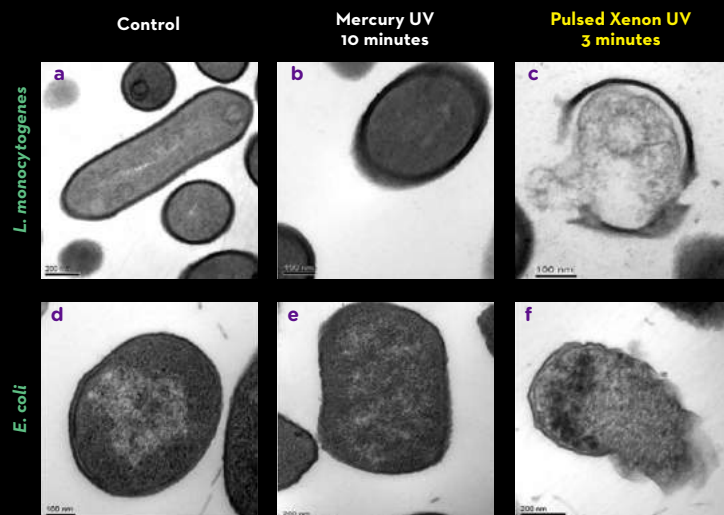
Time Matters

LightStrike™ Germ-Zapping Robots™ are the only UV light disinfection technology shown to help hospitals reduce infection rates in multiple peer reviewed published outcome studies. LightStrike Robots kill *C. diff* spores in 5 minutes.

Comparative Cell Damage

In a published third party comparison test, exposure to a Pulsed Xenon lamp showed cellular damage and lysis while no cellular damage was detected by exposure to the Mercury lamp.*

In a separate lab comparison study, the LightStrike Pulsed Xenon lamp produced 4300X more intensity than the Mercury lamp tested.**



*Cheigh, Food Control, 2012 **Based on Xenex testing of Xenex's Pulsed Xenon lamp and the Phillips RUV325HO Mercury lamp.

Efficacy and Real-World Effectiveness

Microorganism

- Acinetobacter baumannii*
- Aspergillus niger* (black mold)
- Bacillus anthracis*
- Bacillus cereus* spores
- Bacillus pumilus* spores
- Bacillus subtilis* spores
- Candida albicans*
- Candida auris*
- Candida parapsilosis*
- Carbapenem-resistant *Enterobacteriaceae* (CRE)
- *Clostridioides difficile "C. diff" spores (NAP1)**
- Coronavirus
- Ebola virus
- Escherichia coli* & *E. coli* (KREC)
- Infectious bursal disease virus (IBDV)
- Influenza A virus (Flu)
- Klebsiella oxytoca*
- Klebsiella pneumoniae* & ESBL-producing *K. pneumoniae*
- Middle East Respiratory Syndrome-Coronavirus (MERS-CoV)
- *Methicillin-resistant Staphylococcus aureus (MRSA)**
- MS2 bacteriophage virus
- Mycobacterium fortuitum*
- Mycobacterium tuberculosis* (TB)
- Feline calicivirus (norovirus surrogate)
- Pseudomonas aeruginosa* & Carbapenem-resistant *P. aeruginosa*
- Proteus mirabilis*
- Proteus morganii*
- Proteus vulgaris*
- *Staphylococcus aureus**
- Staphylococcus epidermidis*
- *Vancomycin-resistant enterococci (VRE)**
- Vaccinia virus
- Vesicular stomatitis virus (VSV)

* Rate reductions for these organisms demonstrated in hospital peer reviewed outcome studies.

Disinfecting With Light

Studies explain why multiple positions are necessary for optimal room disinfection of high-touch surfaces and items.



Multiple positions optimize disinfection on high-touch surfaces.

Boyce, ICHE 2011

Ebola and Anthrax

Ebola >4 log reduction in one minute at 1 meter
 Anthrax >3 log reduction in 15 minutes at 1 meter
 (Stibich, Stachowiak -SAJID, April 2016)

Candida auris or Candida parapsilosis

No growth of *Candida auris* or *Candida parapsilosis* in 15 minutes at 2 meters
 (Maslo - BMC Infectious Diseases, June 2019)