SUMMARY OF PEER REVIEWED STUDIES AND EFFECTIVENESS
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 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 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)

SUMMARY OF STUDIES

Xenex takes pride in the highest level of validated evidence: peer reviewed studies published in respected scientific journals.
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. baumanii, 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 (Ghantoji, 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 Blaauwberg - 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.**

**Disinfecting With Light**

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

**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.*

**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 - SAID, 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)