Designers Light Forum

Treat Your Building As A Patient

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14-Mar-18

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KENALL®

Indigo-Clean™
Continuous Environmental Disinfection

Learning Objectives

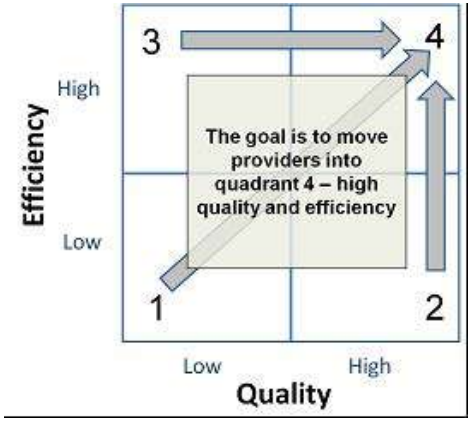
At the end of the this course, participants will be able to:

1. Identify the types of Healthcare Acquired Infections (HAIs) and their collective impact upon the US healthcare system
2. Explain how infections can be acquired through the built environment
3. Describe the range of solutions to improve environmental hygiene which are available to healthcare providers
4. List the characteristics of specification-grade light fixtures that can reduce the spread of pathogens within the environment
5. Recognize the benefits of continuous environmental disinfection and the areas within a healthcare setting where it is best used

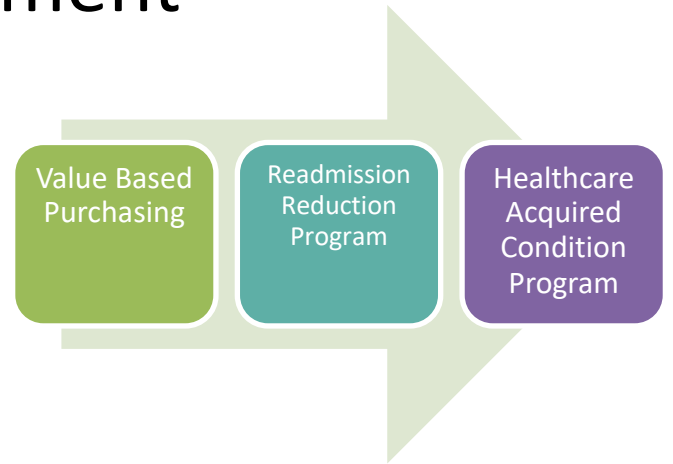
HEALTHCARE: THE NEW WORLD WE LIVE IN...

US Healthcare Is Being Driven By Changes In Reimbursement

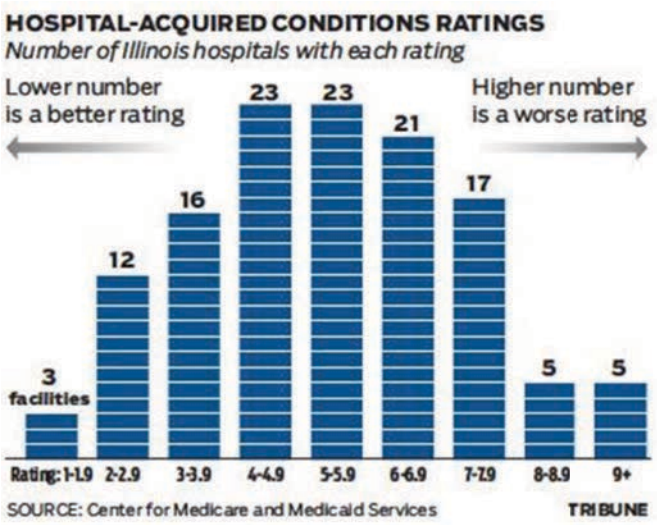
Objective



Policy



Assessment



Penalties

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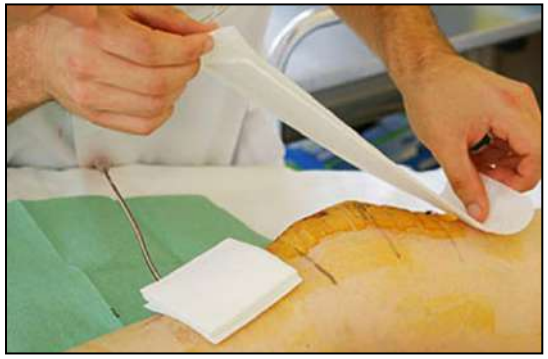
US Statistics on Healthcare Acquired Infections (HAI)

- 1 in 20 patients acquires an infection while in a US hospital
- 1.7M HAI's/year (US)
- 99,000 deaths/year (US)
- Consuming more health care dollars each year
- Estimates vary widely depending upon what is considered cost
- Typically accepted cost is ~$23K per infection
- 2,225 Hospitals = $227M in withheld compensation
- Excludes 26,000 US facilities such as:
  - Ambulatory Surgery Centers
  - Skilled Nursing Facilities
  - Long-Term Acute Care
  - Hospice
  - Dialysis Centers

What is an HAI?

Surgical Site Infection (SSI)



Catheter Associated Urinary Tract Infection (CAUTI)

Central Line Associated Bloodstream Infection (CLABSI)

Ventilator Associated Pneumonia (VAP)

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Every HAI Is Significant!

- Patient Suffering – Risk to Staff & Other Patients
- HCAPS Scores & Brand Reputation
- Risk of Significant Litigation (avg. settlement $2-4M)
- Value Based Purchasing Payment Reductions
- The #1 Preventable Cause of Readmissions
  - Up to 3% in Readmissions Penalties
- Many HAIs Progress to Sepsis; +30% mortality rate

Are We Doing All We Can?

- In high acuity areas where patients are immuno-compromised – **just a few** bacteria can be too many
  - Burn units, oncology, ICU, surgery, etc.

- Hand hygiene and terminal cleaning regimens have improved HAIs, but they are episodic
- Bacteria never takes a break – constantly growing and becoming more resistant
- Wouldn't it be great if we could disinfect 24x7, putting constant pressure on the bacterial load?

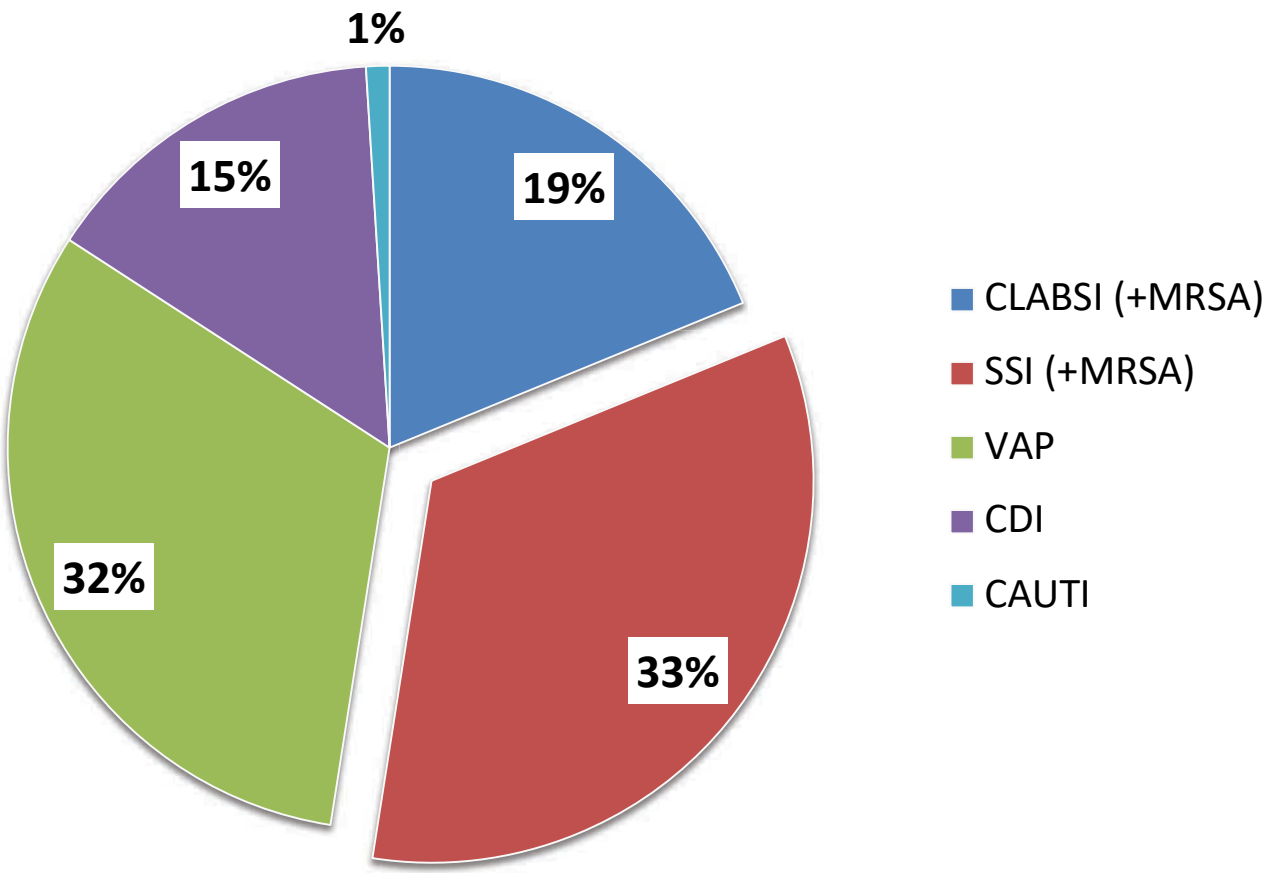
Hard Dollar Revenue Loss and Unreimbursed Expenses Affected by HAIs

Fiscal Year 2016		
Program	% payment at risk	$ at risk
Infection reporting to NHSN	2%	$1 million
Readmissions	3%	$1.5 million
Bottom quartile of infections	1%	$500,000
Value-based purchasing	2%	$1 million
Total payment at risk		**$4,000,000**
Cost of extended stay due to HAI**		**$2,800,000**
Total direct costs and penalties		**$6,800,000**

*** Assumes 10,000 admissions, 4% HAI rate, and 7 days of extended stay per HAI. Internal cost of additional patient day assumed to be $1,000.*

Sources: Centers for Medicare and Medicaid Services, Centers for Disease Control and Prevention, American Hospital Association

HAI Cost by Modality



[1]Zimlichman, E. et al. *"Health Care-Associated Infections: A Meta-analysis of Costs and Financial Impact on the US Health Care System"*, **JAMA Intern Med 2013; 173:2039-46**

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End of the Golden Age?

Science / Science Now

A 'slow catastrophe' unfolds as the golden age of antibiotics comes to an end

HUNTING THE NIGHTMARE BACTERIA

Dr. Arjun Srinivasan: We've Reached "The End of Antibiotics Period"

OCTOBER 22, 2013 / by SARAH CHILDRESS Senior Digital Reporter, FRONTLINE

HEALTH FACILITIES MANAGEMENT

Architecture Construction Engineering ES Interior Design Operations Products Regulatory Sus

Home » New E. coli strain reinforces need for effective ES, hand hygiene, experts say

Infection prevention

New E. coli strain reinforces need for effective ES, hand hygiene, experts say

Rigorous cleaning standards can help to prevent spread of new antibiotic-resistant bacteria

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ConsumerReports SPECIAL REPORT | *America's Antibiotic Crisis*

The Rise of Superbugs | How Your Hospital Can Make You Sick | Making The World Safe From Superbugs

THE RISE OF SUPERBUGS

Dangerous infections that are resistant to antibiotics are spreading and growing stronger, with dire consequences

The next time you're offered a prescription for antibiotics and ask yourself, "What harm could it do?" think about Peggy Lillis.

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Infection Prevention Modalities

Isolation Precaution Guidelines

Antimicrobial Stewardship

Patient & Staff Education

Improved Handwashing Compliance

Targeted Bundles

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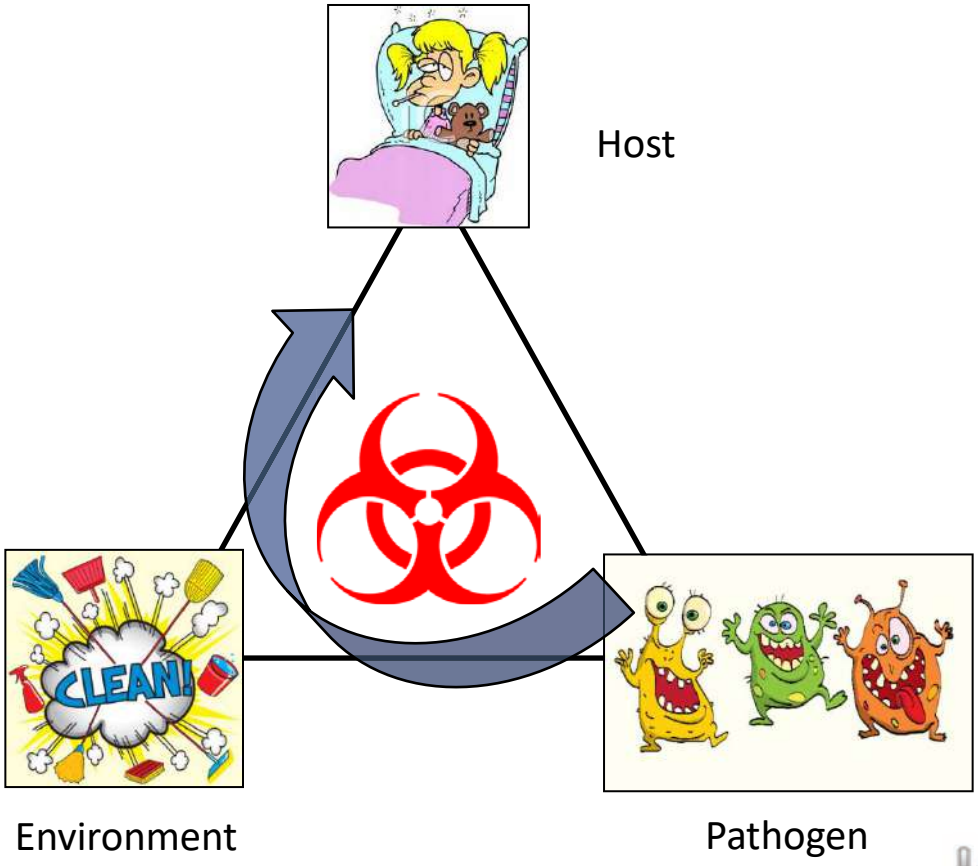
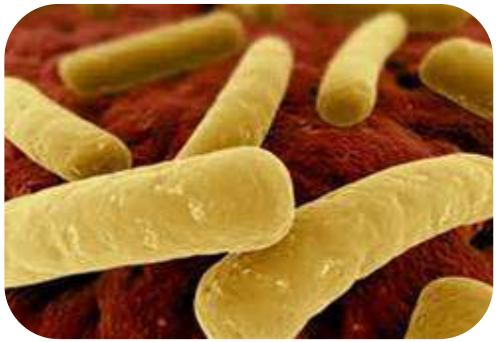
What's Missing?

- What about the environment?



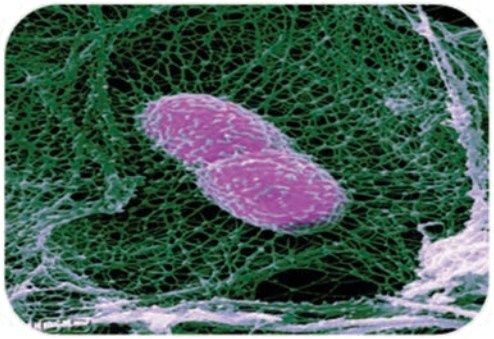
ROLE OF THE ENVIRONMENT IN HAI

Organisms Persist in the Environment

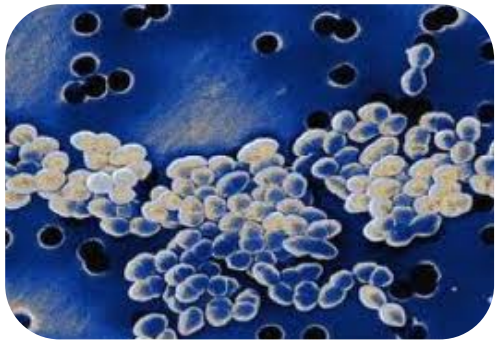


Clostridium difficile
> 5 months to years

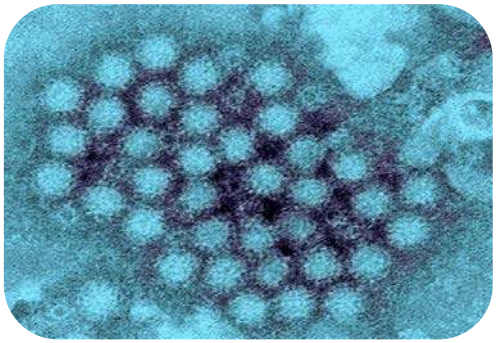
Methicillin resistant
Staph. Aureus (MRSA)
>12 months



MDR – Gram negative
(e.g *Acinetobacter)*
> 30 months



Vancomycin Resistant
Enterococci (VRE)
> 46 months



Norovirus
> 2 weeks

Adapted from
Kramer et. al.
BMC Infect Dis
2006;6:130

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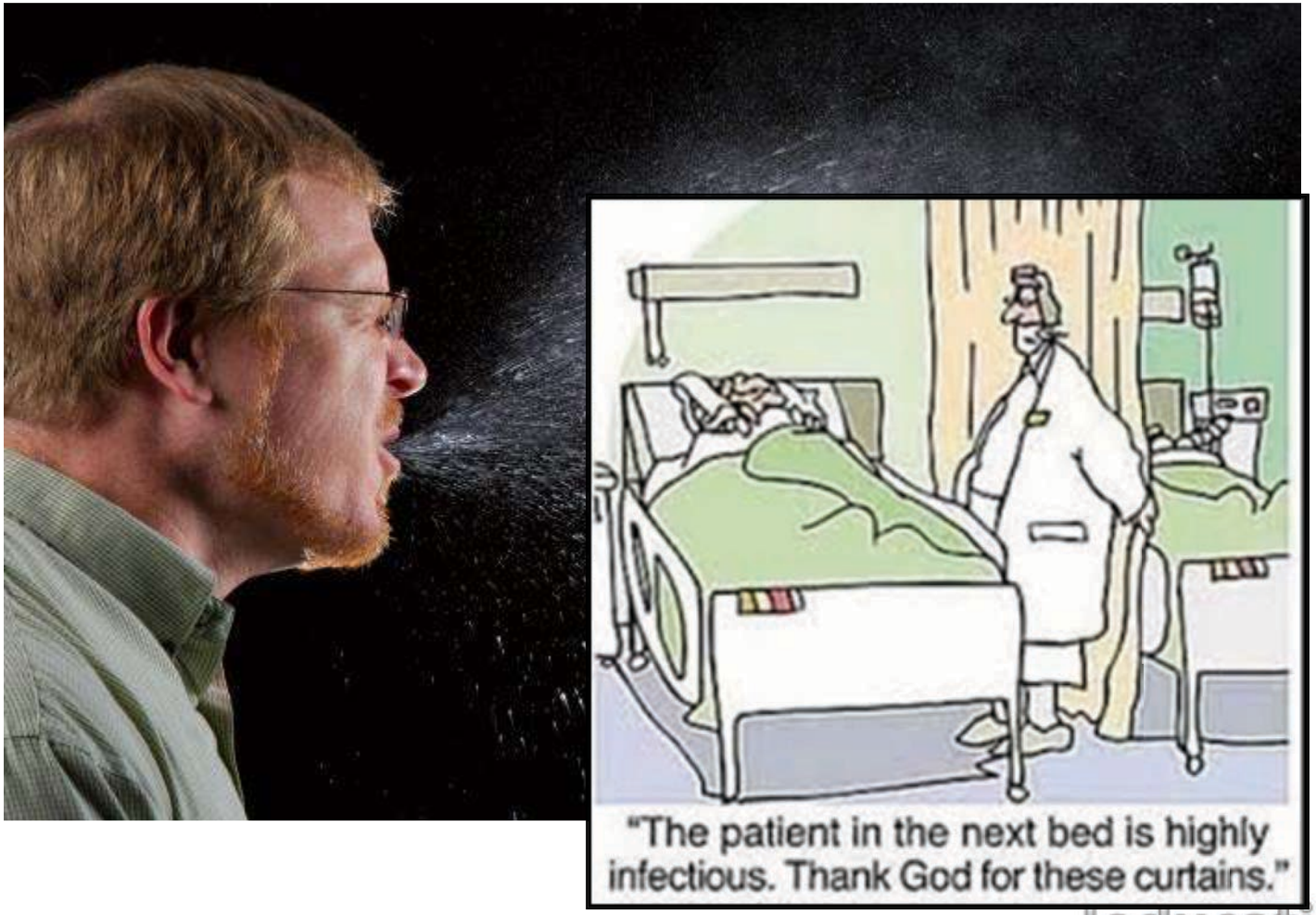
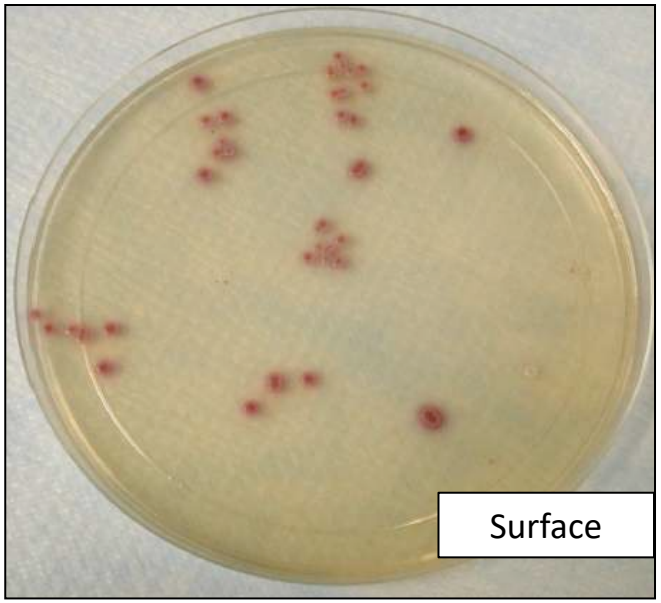
Have You Ever Wondered How Diseases Spread?



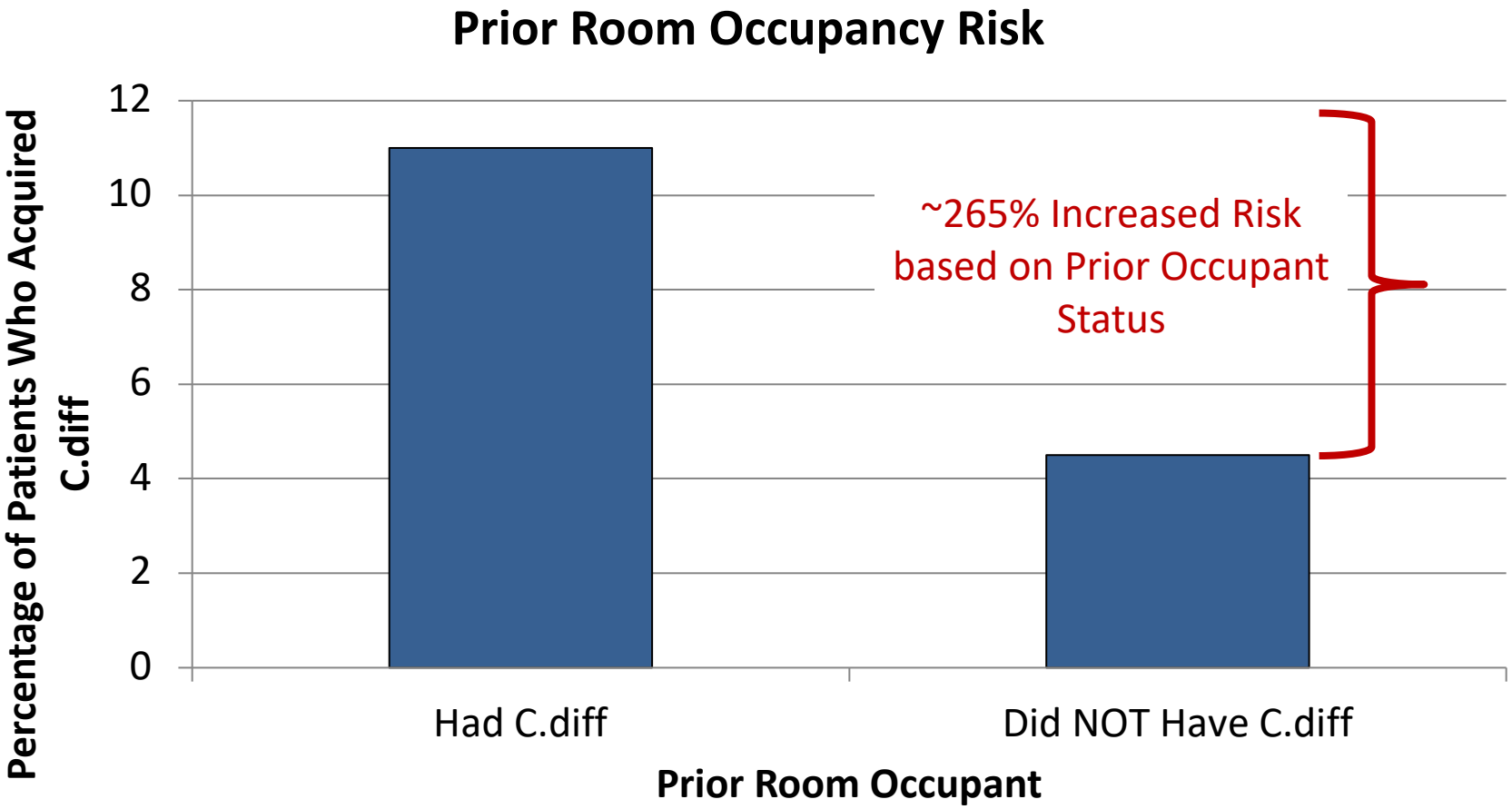
Contract Transmission from Patient to Environment

- Acquisition of MRSA after contact with colonized patient and terminally cleaned surface



1. Stiefel U, et al. Infect Control Hosp Epidemiol 2011;32:185-7
2. Donskey CJ, Eckstein BC. N Engl J Med 2009;360:e3
3. Boyce JM et al. Infect Control Hosp Epidemiol 1997;18:622-7
4. Bhalla A, et al. Infect Control Hosp Epidemiol 2004;25:164-7
5. Hayden MK, et al. Infect Control Hosp Epidemiol 2008;29:149-154

Role of the Environment in HAI



Shaughnessy *et. al*. Infect. Control Hosp. Epidemiology 2011;32:201-206

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A Different Approach…

- What if the building were treated as a patient?

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Your Building As A Patient

Patient		Building
Improved handwashing compliance	→	Improved surface disinfection compliance
Antimicrobial stewardship	→	Proper surface disinfectant
Isolation precaution guidelines	→	Rooms designed for infection prevention
Patient & Staff Education	→	Engineering & Facilities Education
Targeted Bundles	→	Location-specific Bundles

IMPROVING ENVIRONMENTAL HYGIENE

Improving Environmental Hygiene

Technology

Compliance Monitoring

Additional staffing

Policies & Procedures

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Potential Healthcare Applications

No Touch Disinfection Technology

Continuous

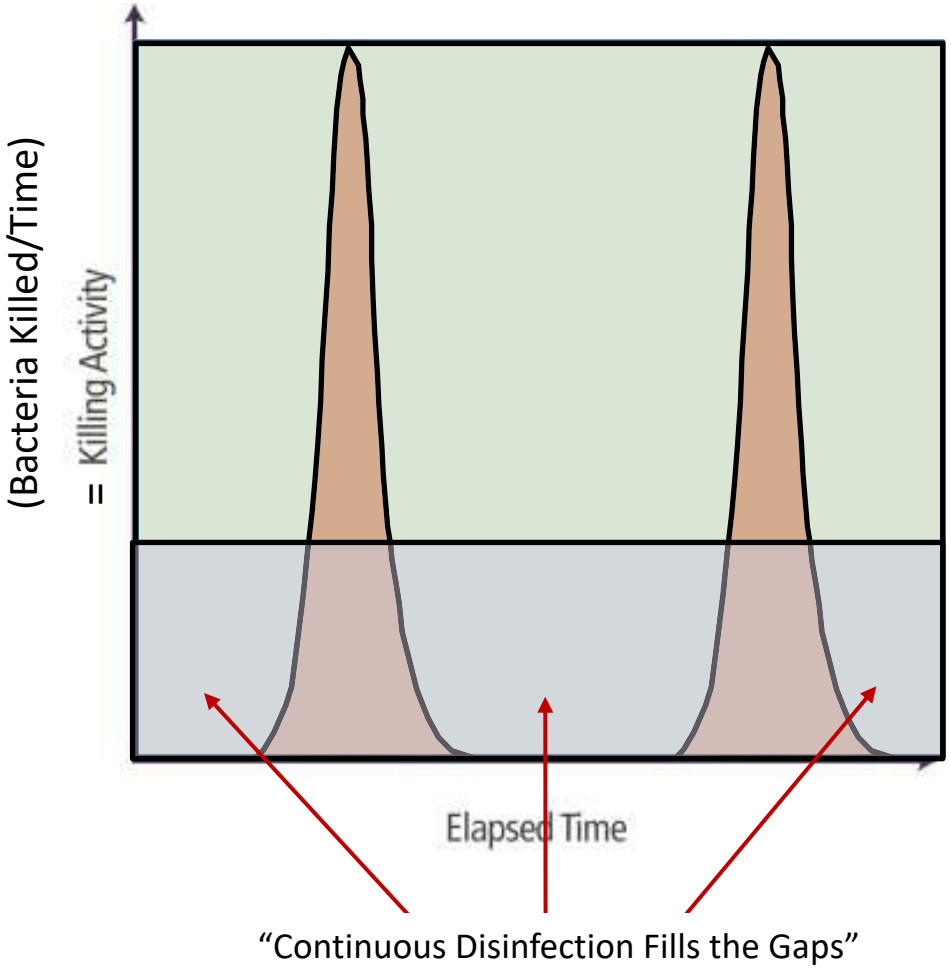
- Air Filters
- UV/Plasma air handlers
- Copper surfaces
- Environmental sprays
- Visible Light

Episodic

- UV Devices
- Chemical Vapor

EPISODIC VS. CONTINUOUS DISINFECTION

Episodic vs. Continuous- Definition



"Continuous Disinfection Fills the Gaps"

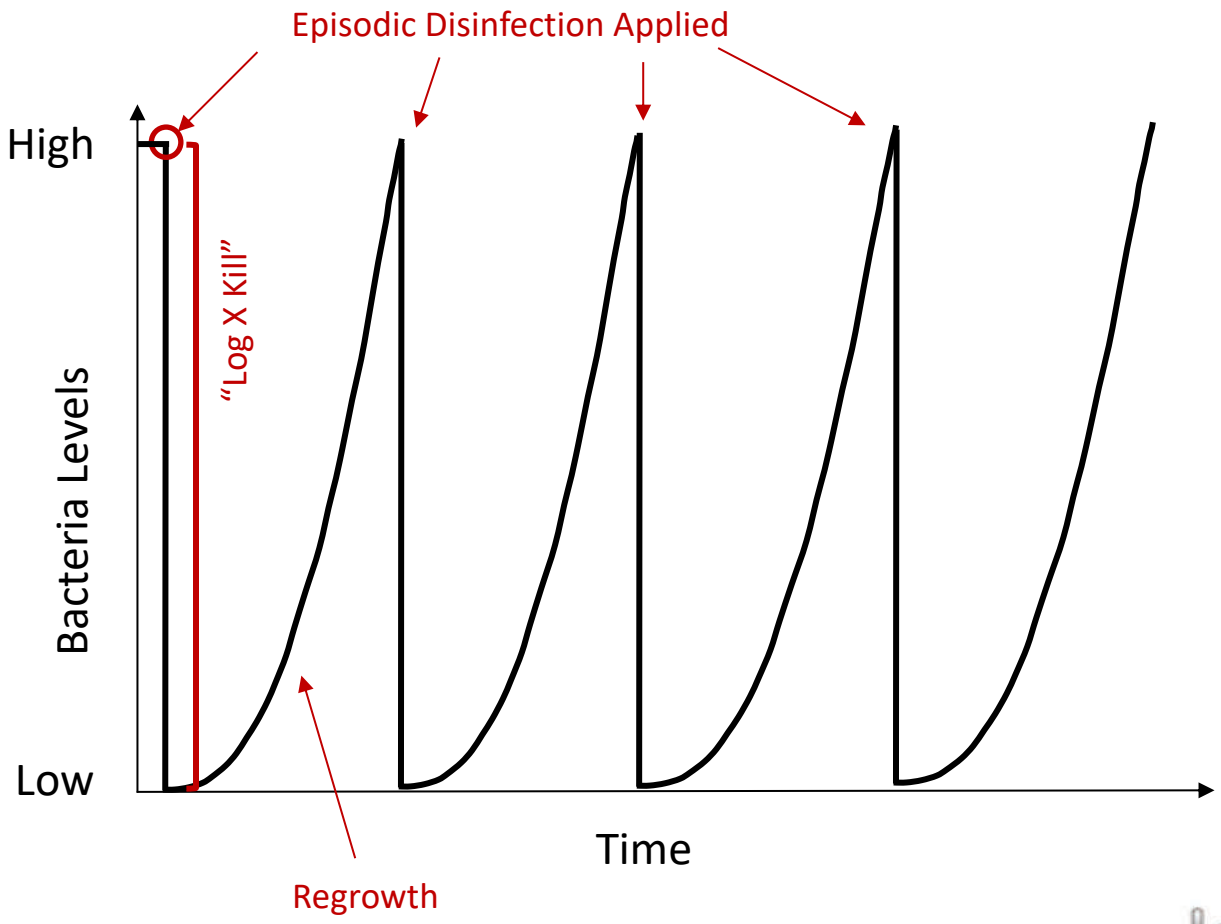
Shaded Area = Total Bacteria Killed

= Total Bacteria Killed (High-Level Continuous- Ideal, but not practical)

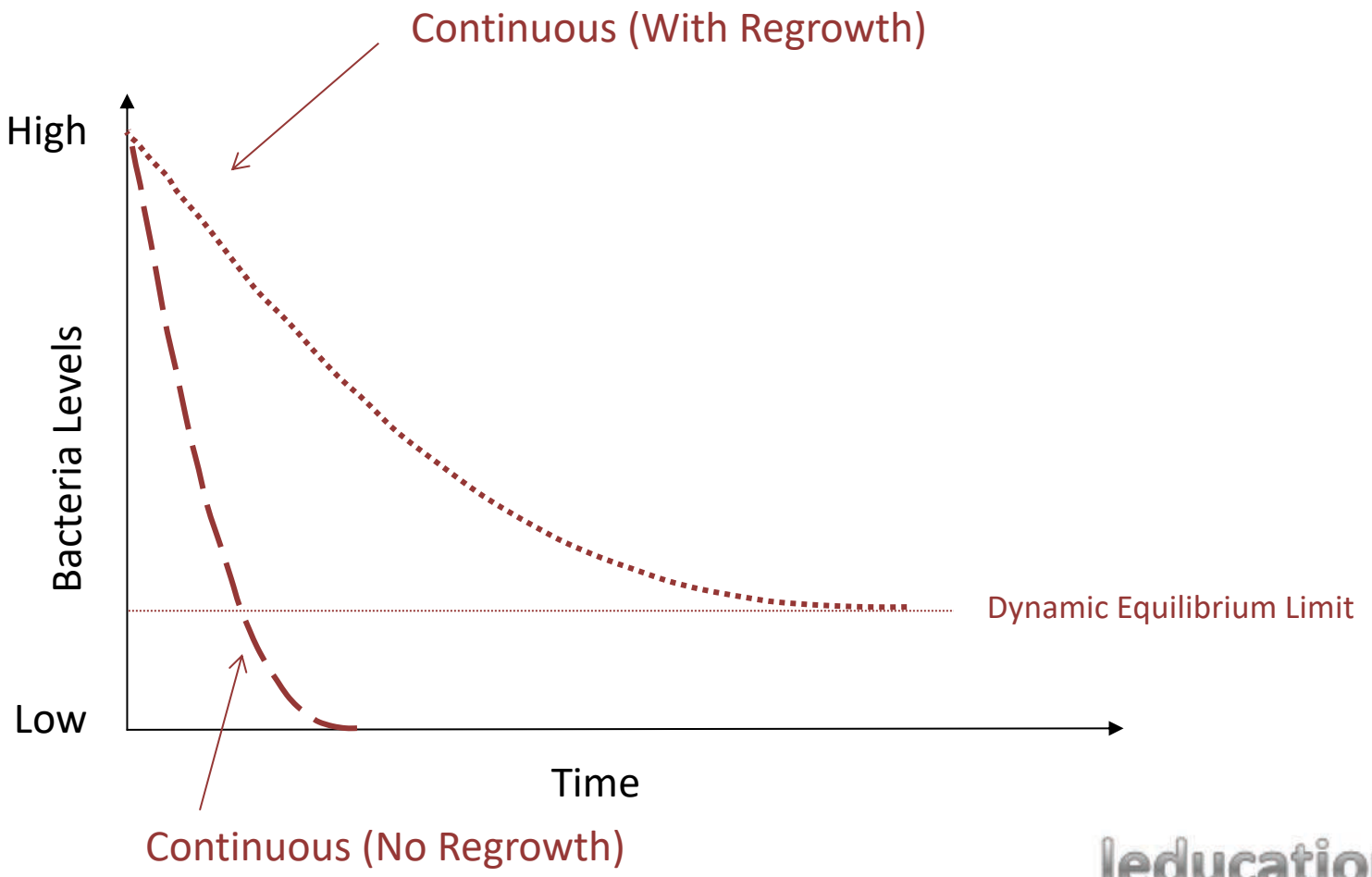
= Total Bacteria Killed (Episodic- Practical implementation of ideal solution)

= Total Bacteria Killed (Low-Level Continuous- Compliment to Episodic)

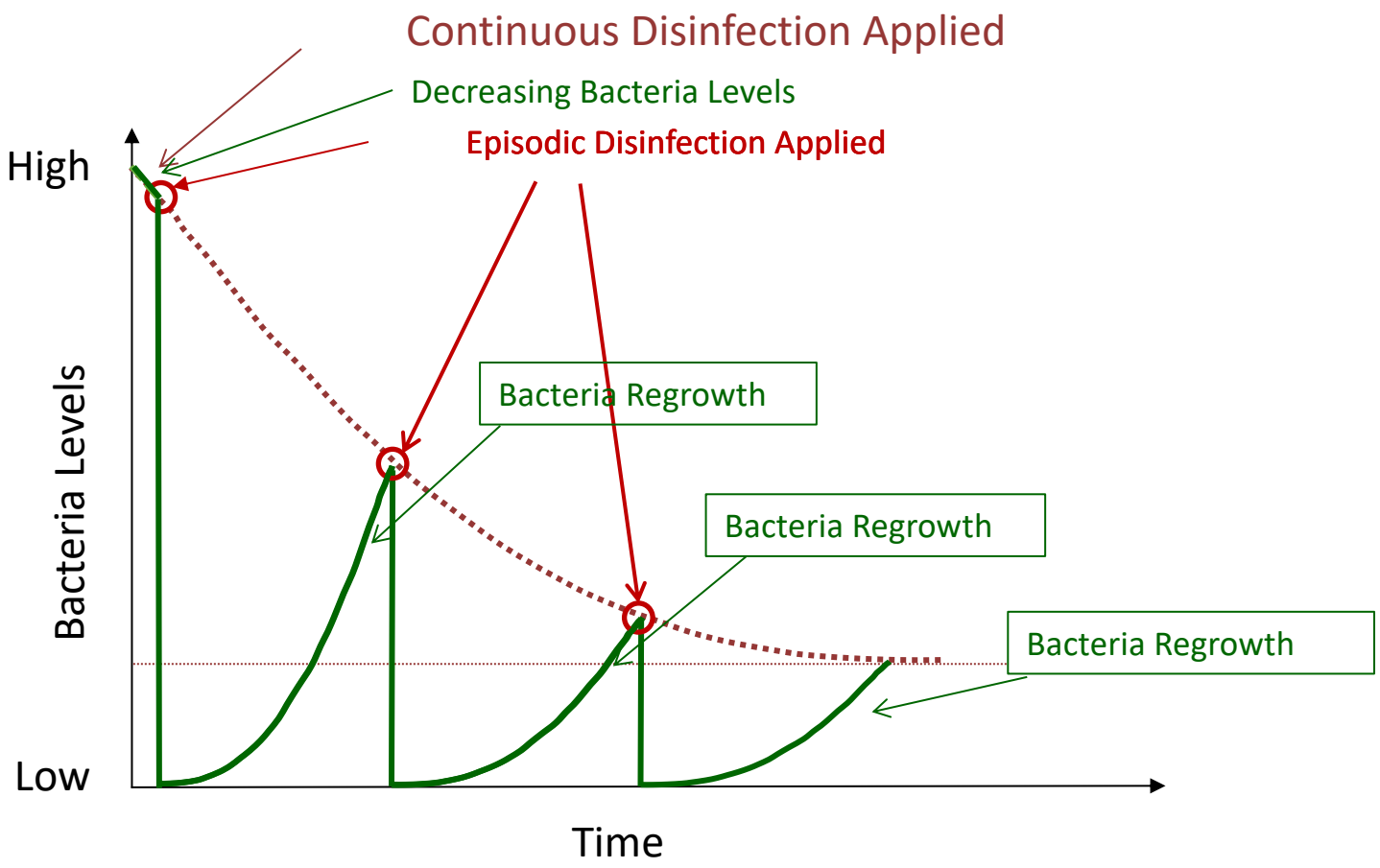
Effects of Episodic Disinfection Upon Bacteria Levels



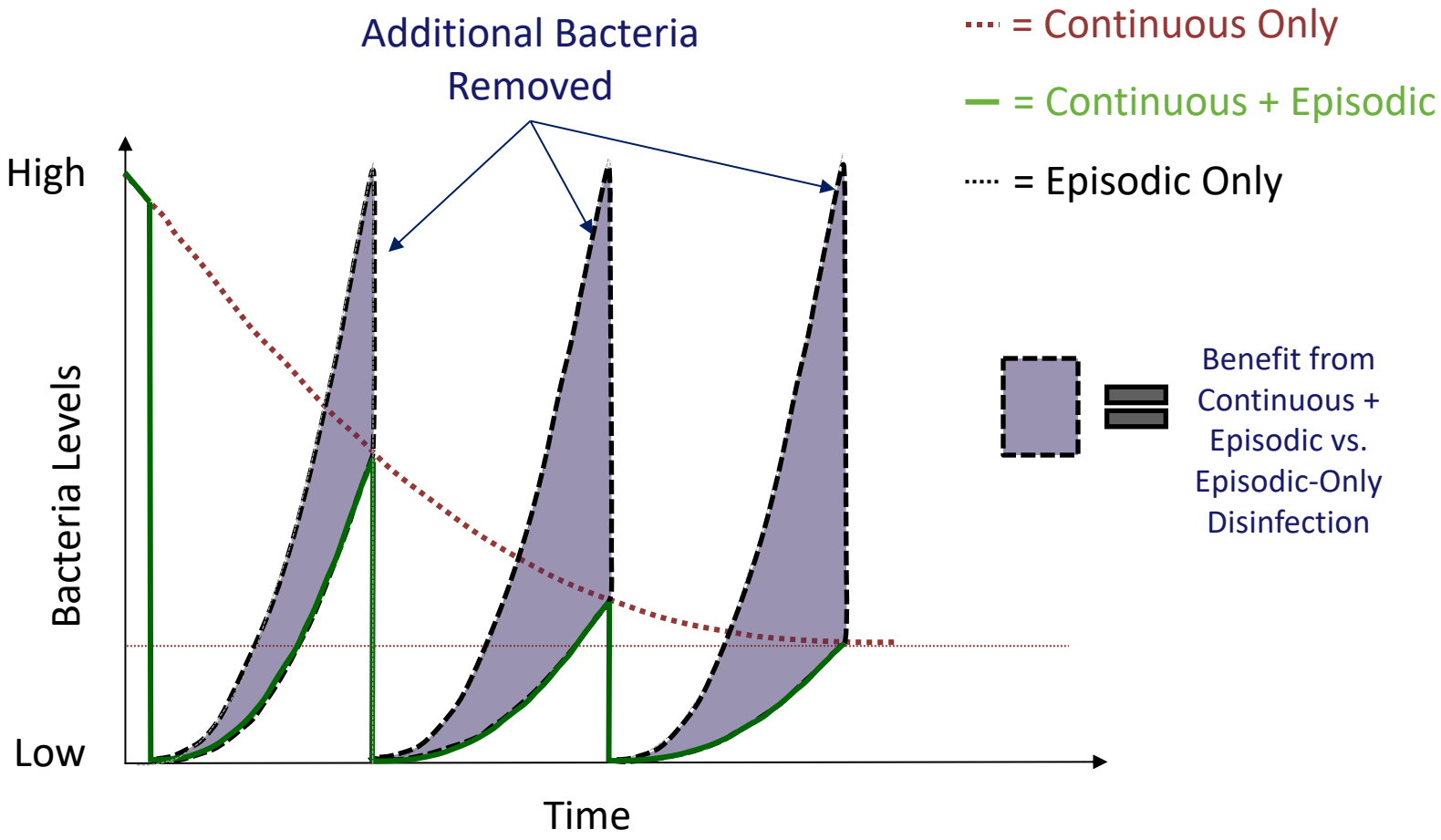
Continuous Disinfection



Continuous + Episodic Disinfection



Benefits of Continuous + Episodic



Episodic vs. Continuous

Episodic (UV)

- Useful in outbreak or terminal cleaning applications
- Often takes the room out of service
- Potential safety issues
- Potential compliance issues

Continuous (Visible)

- Useful in areas which must remain operational 24/7
  - Capacity Limitations
  - Quick Turnover
- Cleans even when people aren't in the room
- Designed to be safe for patients and staff
- Eliminates compliance issues

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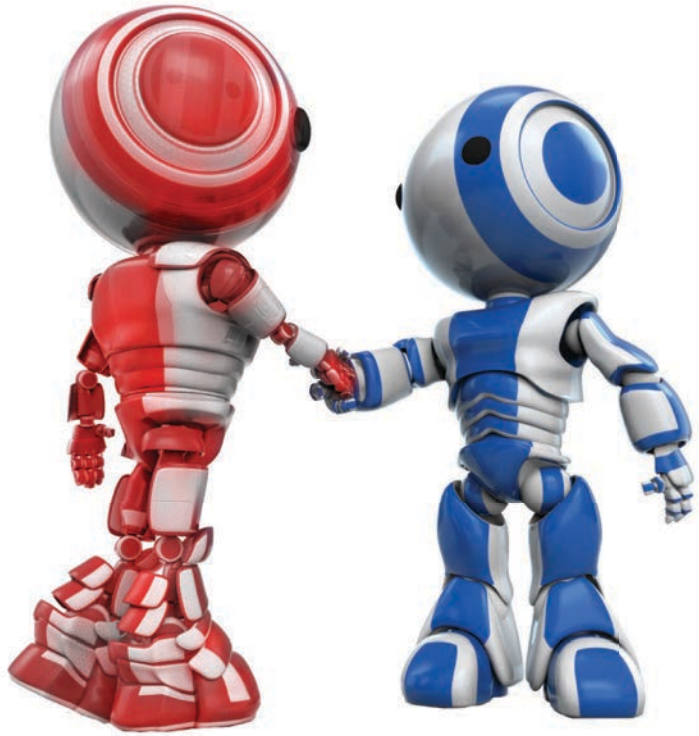
Which is Better?

Episodic VS. Continuous



Episodic + Continuous

CONTINUOUS ENVIRONMENTAL DISINFECTION USING VISIBLE LIGHT

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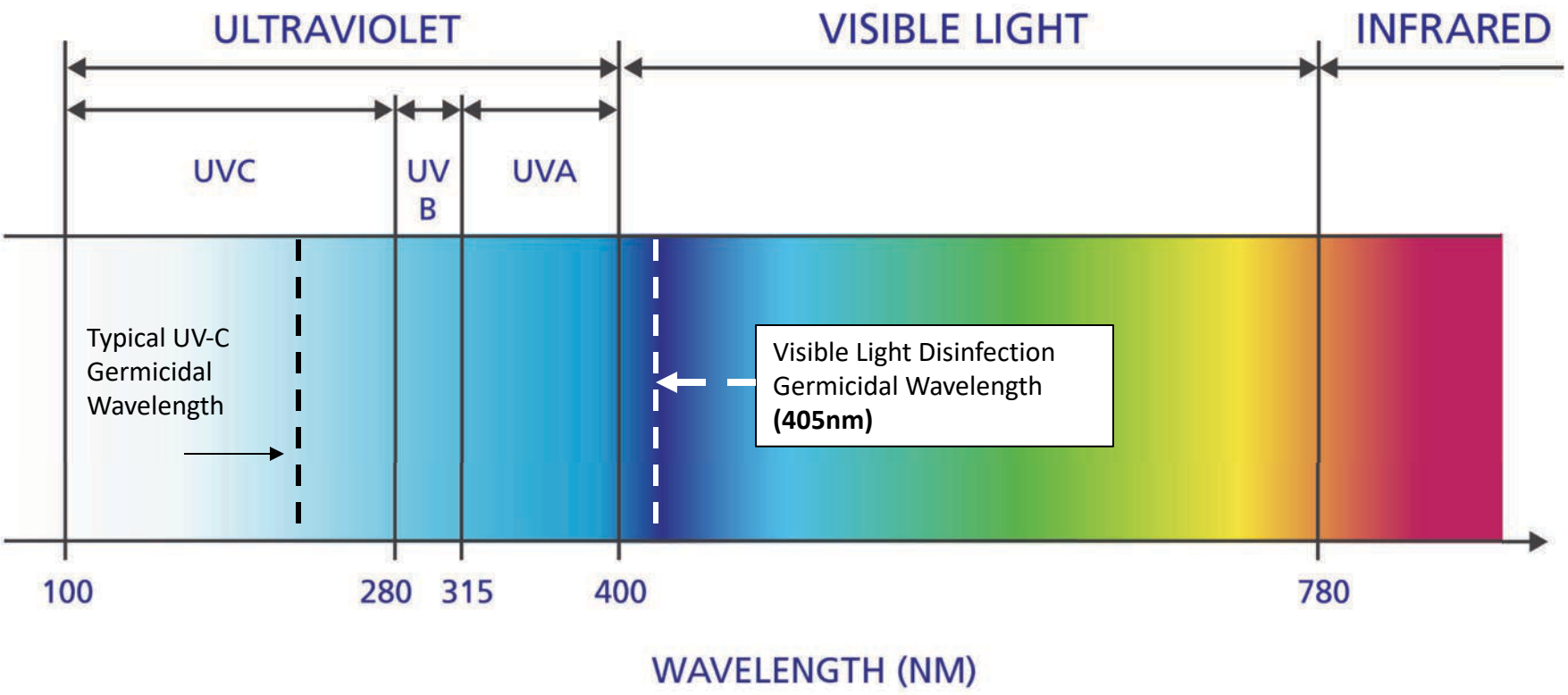
What is Visible Light Disinfection?



What is Visible Light Disinfection?

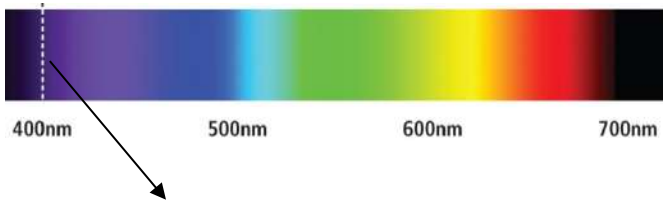
- A continuous environmental disinfection system which:
  - Uses safe, *visible* light
  - Can be integrated into normal, overhead lighting

White Disinfection Mode =
Ambient White Light + Disinfection

Indigo Disinfection Mode =
Increased Disinfection Only

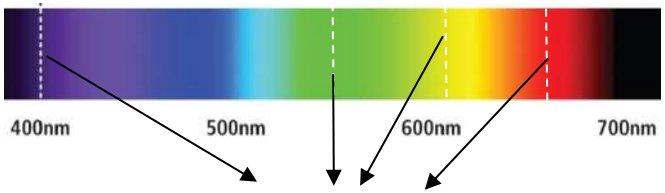
Types of Visible Light Disinfection

- Indigo-Only



- Disinfection only

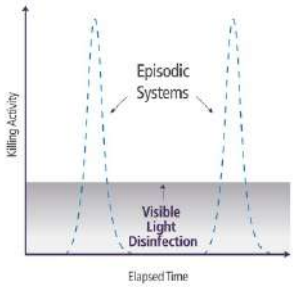
- Mixed White



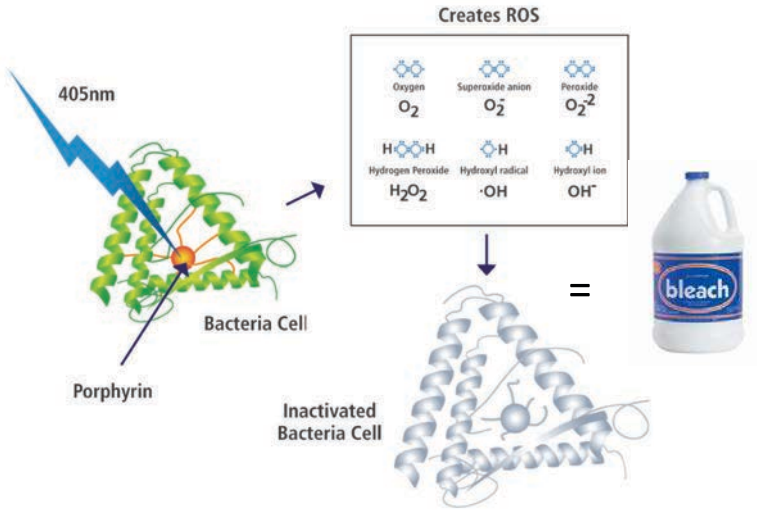
- Use of complimentary colors allows for ambient lighting applications

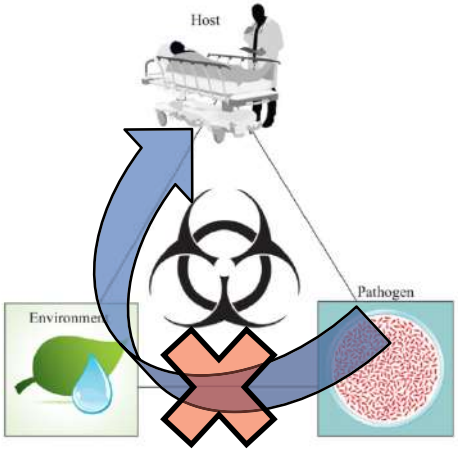
How Does Visible Light Disinfection Work?

1. Continuous, automatic, safe system creates hostile environment for bacteria

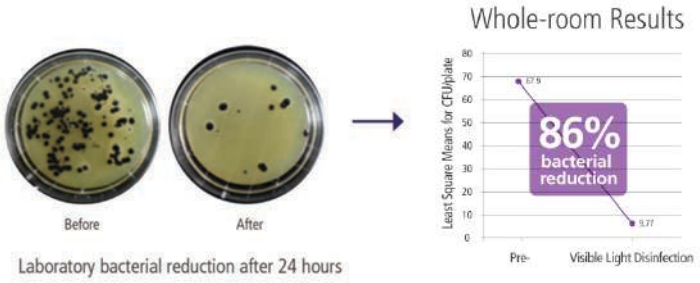


2. Environment creates Reactive Oxygen Species within bacteria causing inactivation





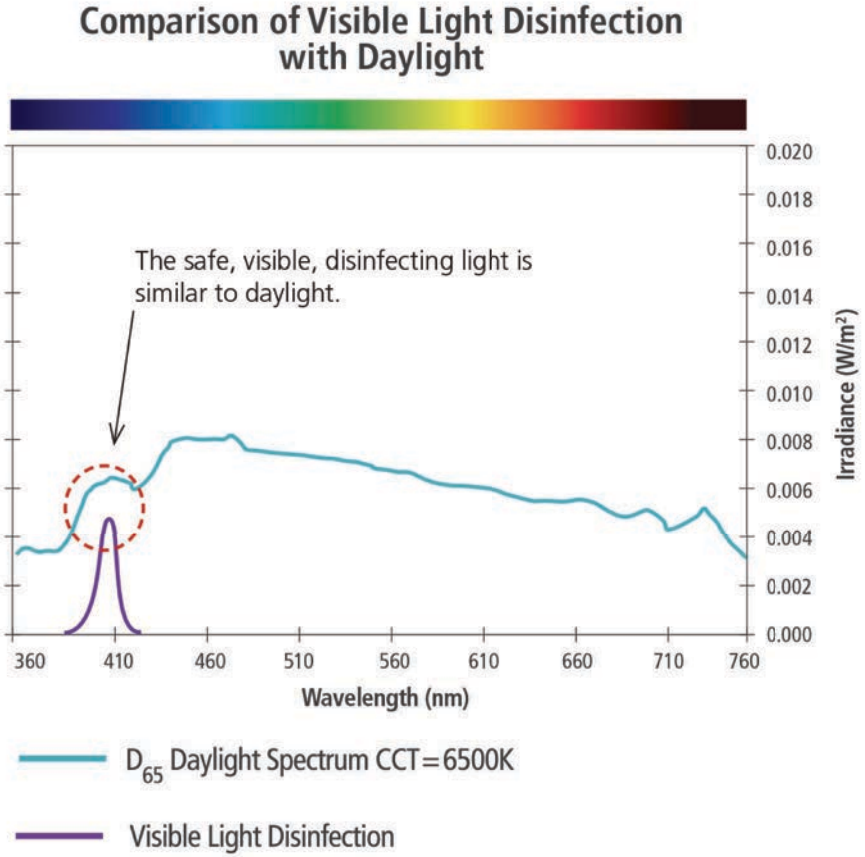
3. Pathogen inactivation breaks the environmental chain of infection



*4. Measured bacterial reduction**

**Maclean M., et. al. Environmental decontamination of a hospital isolation room using high-intensity narrow-spectrum light, J. Hosp. Infection Vol. 76, pp. 247-251 (2010)*

Visible Light Disinfection Safety



Safety Testing

Visible Light Disinfection has been evaluated against existing visible light safety standards.

Standard	Testing Method	Results
IEC 62471/62778[1,2]	Independent 3rd Party Laboratory	Pass (Exempt)
ACGIH[3]	Self-Assessment	Pass
ICNIRP[4,5]	Self-Assessment	Pass

1: *International Electrotechnical Commission – Photobiological safety of lamps and lamp systems, 2006*

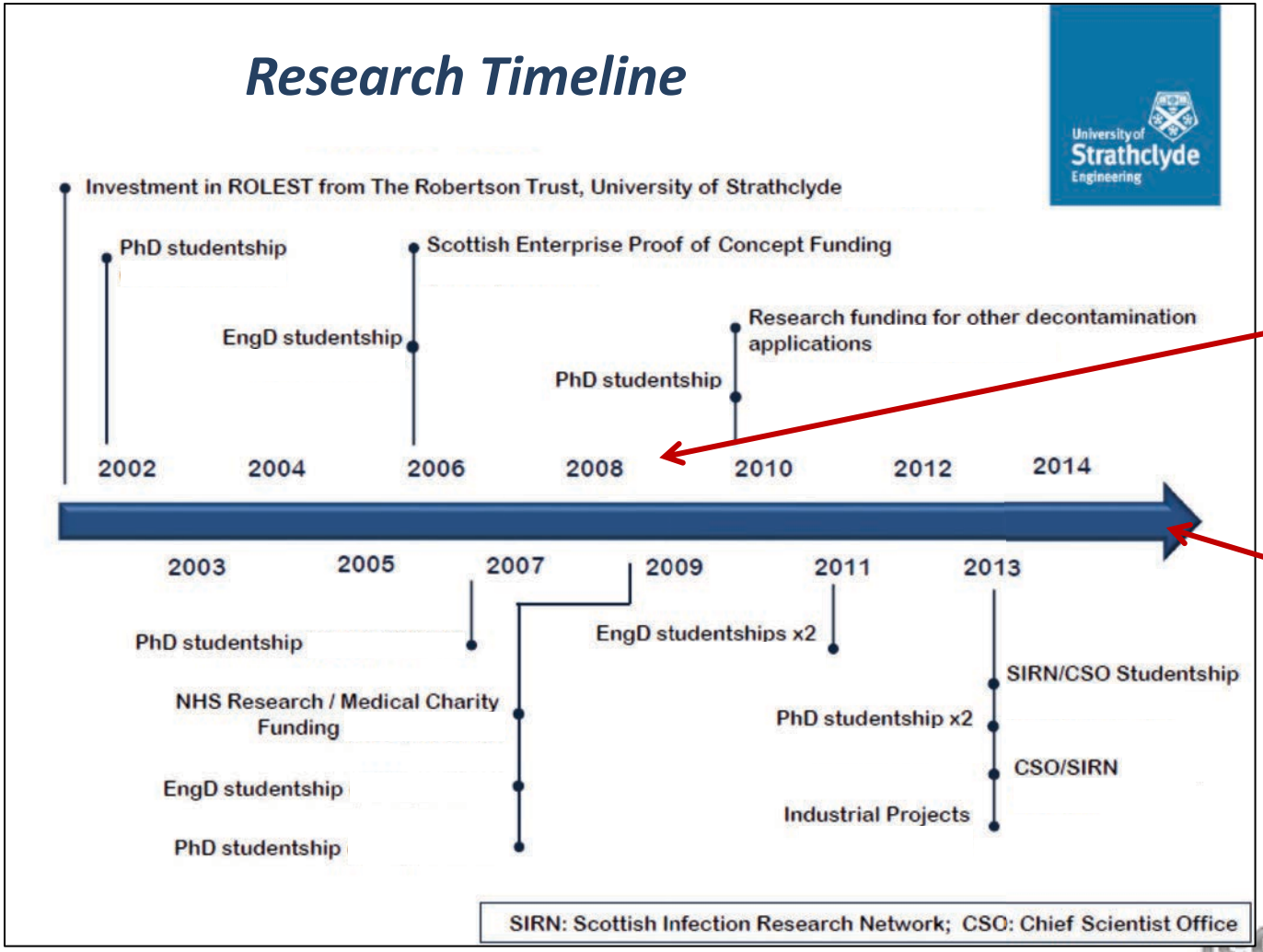
2: *International Electrotechnical Commission – Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires, 2014*

3: *American Conference of Governmental Industrial Hygienists – Threshold Limit Values (TLVs) & Biological Exposure Indicies Signature Publications, Cincinnati, 2007*

4: *International Commission on Non-Ionizing Radiation Protection – Guidelines on limits of exposure to optical radiation from 0.38 to 3.9 mm. Health Physics 73; 539-555; 1997*

5: *International Commission on Non-Ionizing Radiation Protection – Guidelines on limits of exposure to ultraviolet radiation of wavelengths between 180 nm and 400 nm (incoherent radiation) Health Physics 87, 171-186; 2004*

History of Academic Research & Investment in Visible Light Disinfection



More than 30 refereed publications and proceedings since 2008

Visible Light Disinfection Commercially Available

Visible Light Disinfection In An Operating Room

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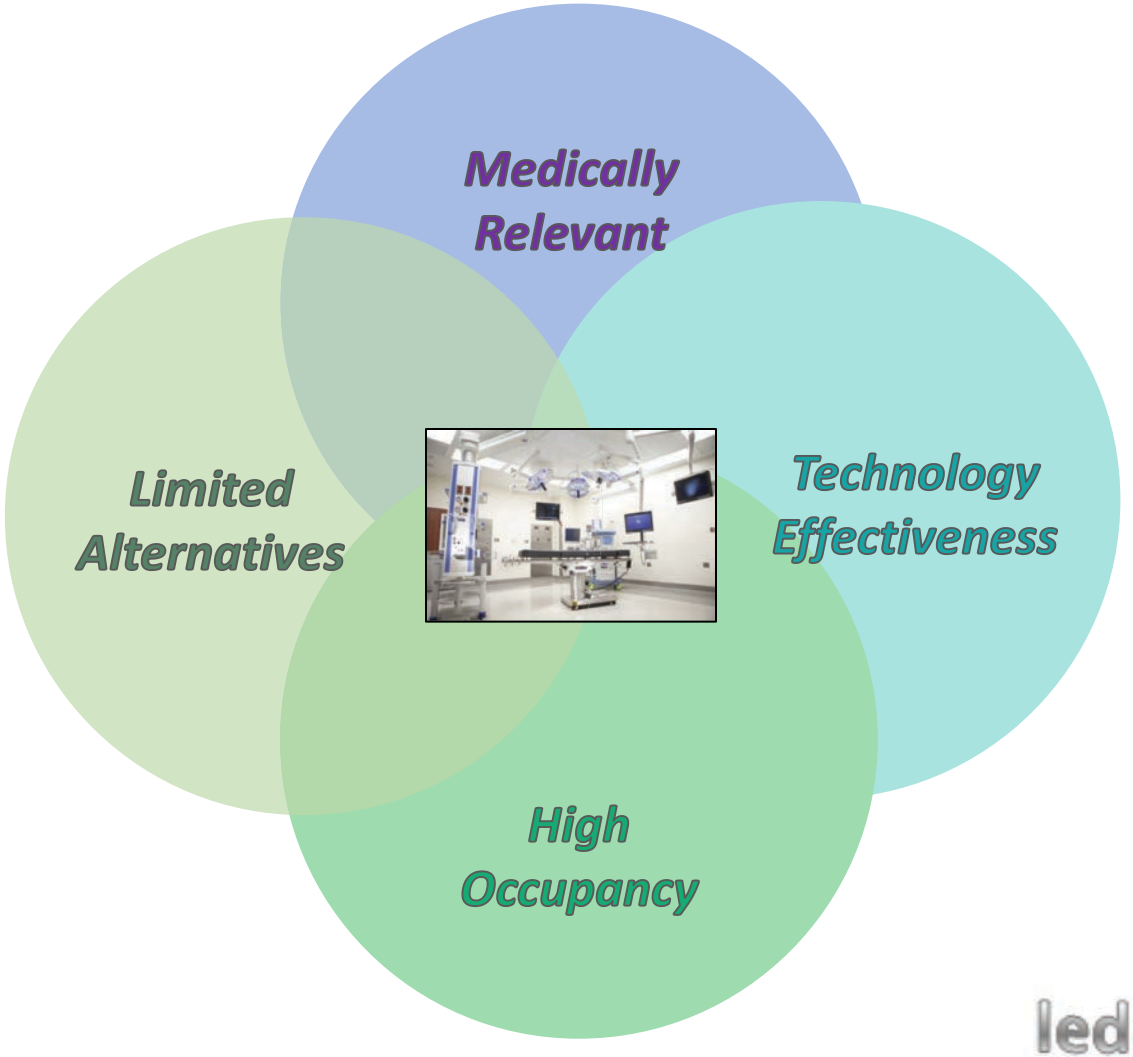
Why Visible Light Disinfection in the OR?



The Importance of Contaminated Air in the OR

ARTICLE IN PRESS

American Journal of Infection Control ■■ (2017) ■■-■■

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Cost-benefit analysis of different air change rates in an operating room environment

Thomas Gormley PhD [a,*], Troy A. Markel MD [b], Howard Jones MD [c], Damon Greeley PE [d], John Ostojic IH [e], James H. Clarke PhD [a], Mark Abkowitz PhD, PE [a], Jennifer Wagner PhD, CIC [f]

[a] Department of Civil and Environmental Engineering, Vanderbilt University, Nashville, TN
[b] Department of Surgery, Riley Hospital for Children at Indiana University Health, Indianapolis, IN
[c] Department of Obstetrics and Gynecology, Vanderbilt University, Nashville, TN
[d] Global Health Systems Inc, Fort Mill, SC
[e] ARTEC Environmental Monitoring, Indianapolis, IN
[f] Prism Environmental Health and Safety, Discovery Bay, CA

Key Words:
Air quality in operating rooms
Operating room ventilation rates
Air changes per hour
Surgical site infections
Mock surgical procedures

Background: Hospitals face growing pressure to meet the dual but often compet
a safe environment while controlling operating costs. Evidence-based data are nee
for facility management practices to support these goals.
Methods: The quality of the air in 3 operating rooms was measured at different
energy cost to provide the heating, ventilation, and air conditioning to the rooms wa

American Journal of Infection Control 45 (2017) 354-9

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Methodology for analyzing environmental quality indicators in a dynamic operating room environment

Thomas Gormley PhD [a,*], Troy A. Markel MD [b], Howard W. Jones III MD [c], Jennifer Wagner PhD [d], Damon Greeley PE [e], James H. Clarke PhD [a], Mark Abkowitz PhD [a], John Ostojic IH [f]

[a] Department of Civil and Environmental Engineering, Vanderbilt University, Nashville, TN
[b] Department of Surgery, Riley Hospital for Children at Indiana University Health, Indianapolis, IN
[c] Department of Obstetrics and Gynecology, Vanderbilt University, Nashville, TN
[d] Prism Environmental Health and Safety, Discovery Bay, CA
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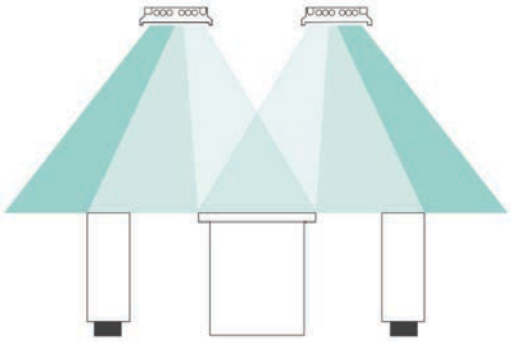
[f] ARTEC Environmental Monitoring, Indianapolis, IN

Key Words:
Air quality in operating rooms
Operating room ventilation rates
Air changes per hour
Surgical site infections
Mock surgical procedures
Environmental quality indicator (EQI)

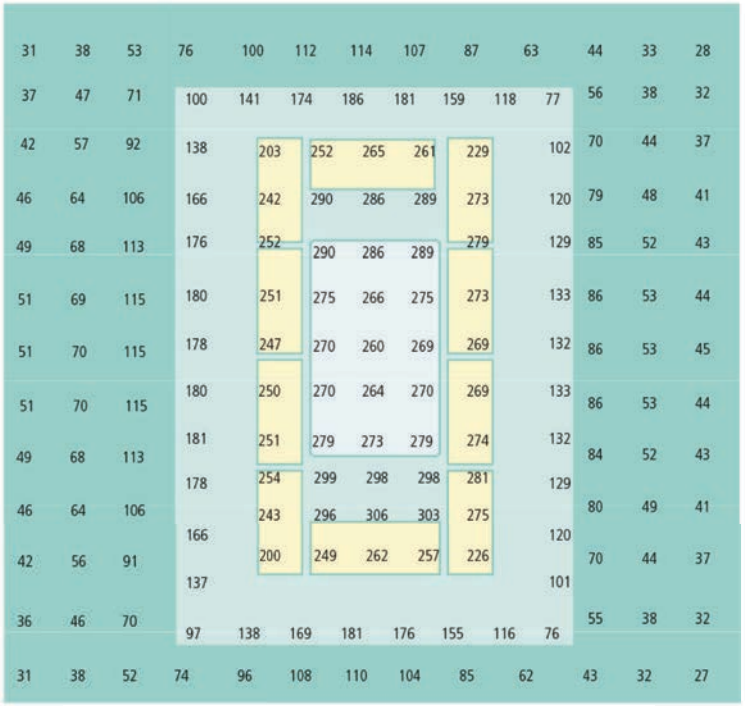
Background: Sufficient quantities of quality air and controlled, unidirectional flow are important elements in providing a safe building environment for operating rooms.
Methods: To make dynamic assessments of an operating room environment, a validated method of testing the multiple factors influencing the air quality in health care settings needed to be constructed. These include the following: temperature, humidity, particle load, number of microbial contaminants, pressurization, air velocity, and air distribution. The team developed the name environmental quality indicators (EQIs) to describe the overall air quality based on the actual measurements of these properties taken during

Visible Light Disinfection Application: Operating Rooms

- Ambient lighting levels in operating rooms are governed by IES guidelines



	IES Recommended FC
Zone 1	200–300
Zone 2	100–125
Zone 3	40–60



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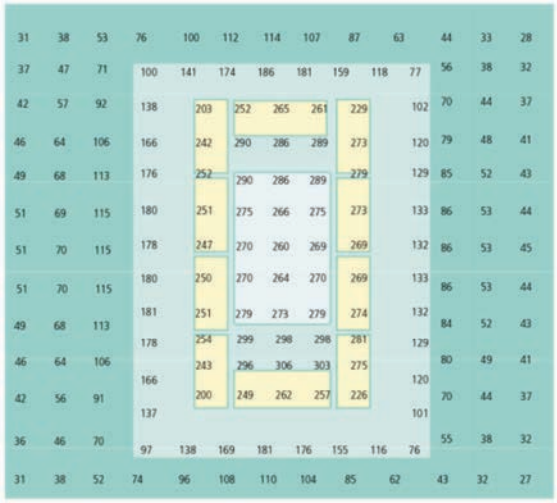
Deploying Visible Light Disinfection in the OR

- Contact manufacturer to ensure proper dosing of room based on 1:1 replacement

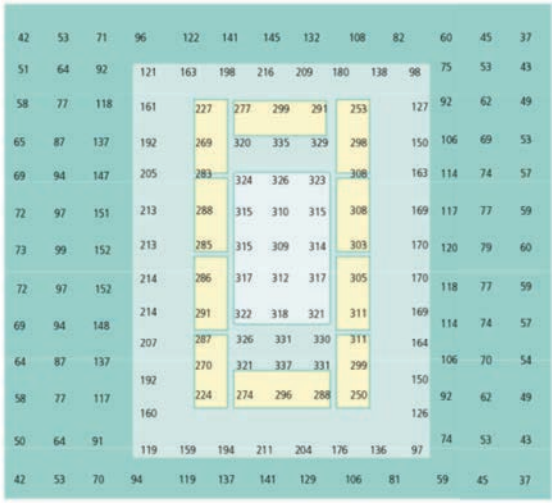


~625 sq. ft.

Average Illuminance

ZONE 1	ZONE 2	ZONE 3
270 fc	209 fc	61 fc

System Power Consumption
1890W

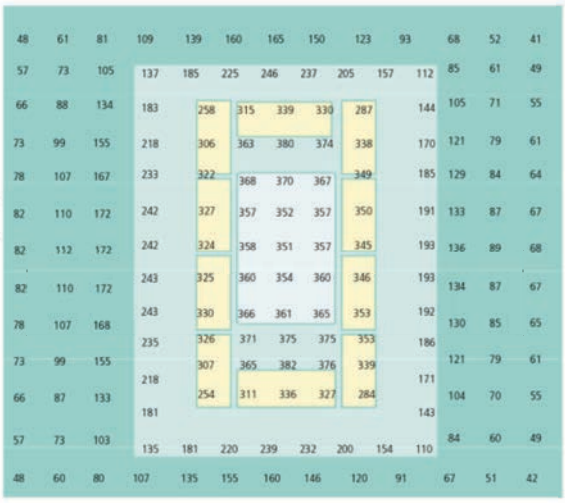


~625 sq. ft.

Average Illuminance

ZONE 1	ZONE 2	ZONE 3
317 fc	232 fc	84 fc

System Power Consumption
1150W



~625 sq. ft.

Average Illuminance

ZONE 1	ZONE 2	ZONE 3
360 fc	263 fc	96 fc

System Power Consumption:
- Mixed White Mode 1750W
- Indigo-Only Mode 1650W

Visible Light Disinfection Operating Room Solutions

2’x4’

2’x2’

1’x4’

Clinical Implementation of Visible Light Disinfection

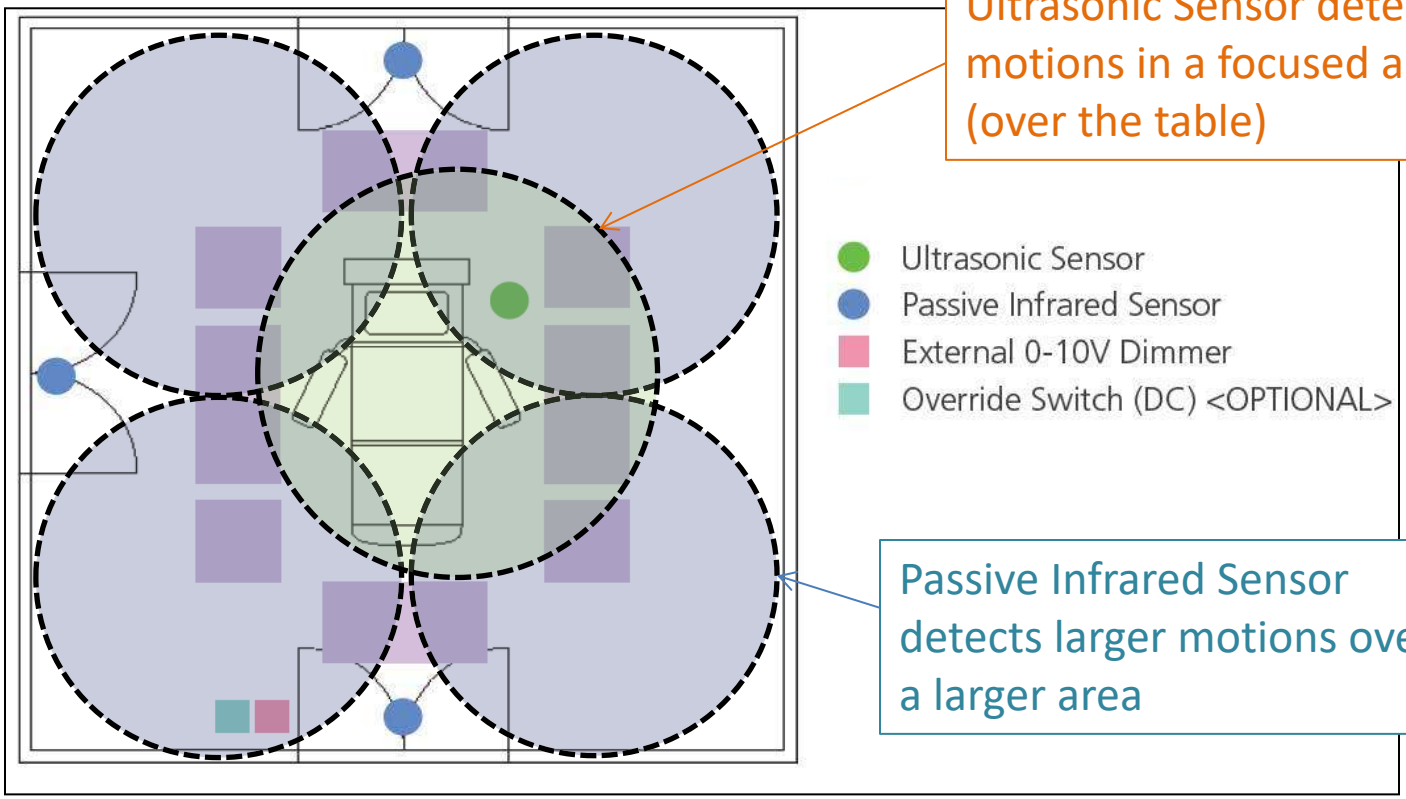
- Wall switch can be used to select desired mode *OR*
- Occupancy/vacancy sensor can automatically switch between modes

White Disinfection Mode =
Ambient White Light + Disinfection

Indigo Disinfection Mode =
Increased Disinfection Only

Control Solution(s)

- "Maximize Dose Without Impacting Visual Acuity"



CURRENT EVALUATION DATA FOR VISIBLE LIGHT DISINFECTION

Demonstrated Laboratory Susceptibility to Visible Light Disinfection

ESKAPE Pathogens

- *Enterococcus faecalis*
- *Staphylococcal Aureus* (including MRSA)*[1]
- *Klebsiella pneumoniae*
- *Acinetobacter baumannii*
- *Pseudomonas aeruginosa*
- *Enterobacter species*

***= Demonstrated clinical susceptibility to presumptive S. Aureus & MRSA**

Gram-Positive Bacteria

- *Clostridium perfringens*
- *Staphylococcus epidermidis* (CONS)
- *Staphylococcus hyicus* (CONS)
- *Streptococcus pyogenes*
- *Listeria monocytogenes*
- *Mycobacterium terrae*
- *Corynebacterium striatum*

Gram-Negative Bacteria

- *Proteus vulgaris*
- *Escherichia coli (E. coli)*
- *Campylobacter jejuni*
- *Salmonella enteritidis*
- *Shigella sonnei*
- *Serratia* spp

Yeast & Filamentous Fungi

- *Aspergillus niger*
- *Candida albicans*
- *Saccharomyces cerevisiae*

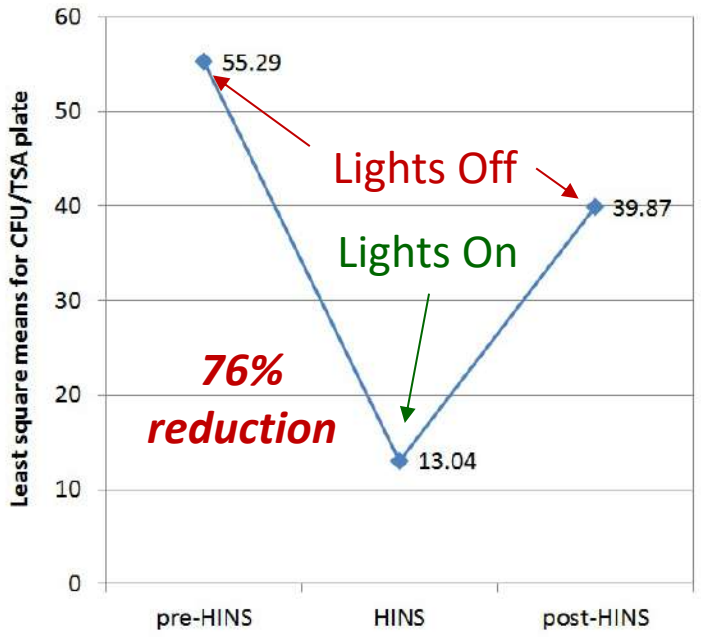
Bacterial Endospores

- *Clostridium difficile*
- *Bacillus cereus*

[1]Maclean M., et. al. Environmental decontamination of a hospital isolation room using high-intensity narrow-spectrum light, J. Hosp. Infection Vol. 76, pp. 247-251 (2010)

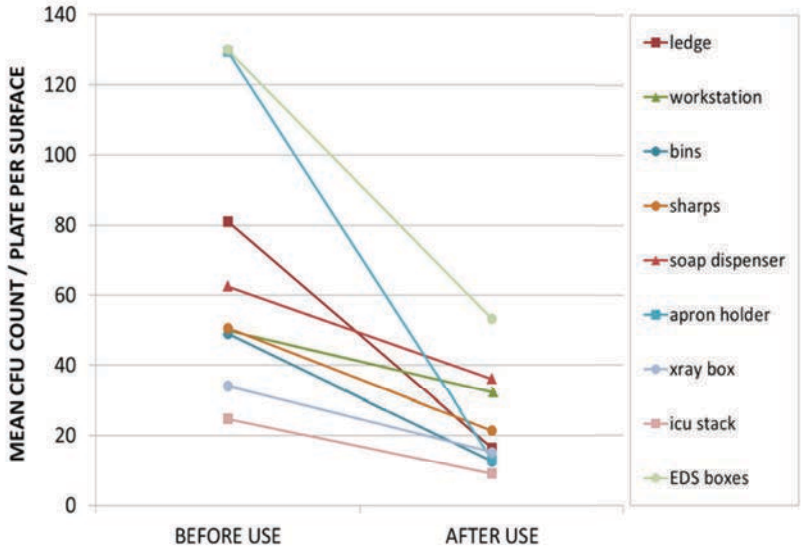
Glasgow Royal Infirmary: Intensive Care Unit (Initial Studies)[2]

Whole Room Results



Significant reduction of total bacterial contamination on surfaces around the room (2-day use)

Surface-Specific Results

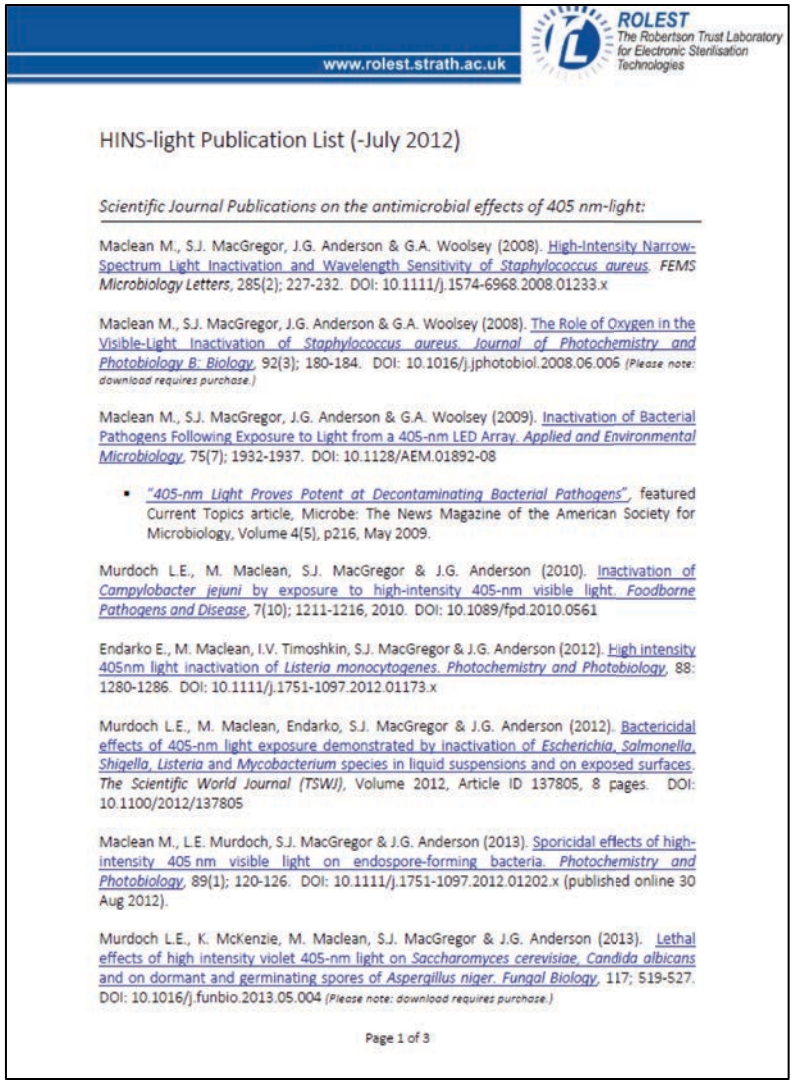


Bacterial reduction on a range of surfaces before and after use of the Visible Light Disinfection

All reductions in bacterial contamination were achieved over and above standard cleaning and infection control practices

[2]*Maclean M., et. al. Continuous decontamination of an intensive care isolation room during patient occupancy using 405nm light technology. Journal of Infection Prevention, 14(5); 176- 181 (2013)*

Additional Publication Data



www.rolest.strath.ac.uk

ROLEST
The Robertson Trust Laboratory for Electronic Sterilisation Technologies

HINS-light Publication List (-July 2012)

Scientific Journal Publications on the antimicrobial effects of 405 nm-light:

Maclean M., S.J. MacGregor, J.G. Anderson & G.A. Woolsey (2008). High-Intensity Narrow-Spectrum Light Inactivation and Wavelength Sensitivity of *Staphylococcus aureus*. *FEMS Microbiology Letters*, 285(2); 227-232. DOI: 10.1111/j.1574-6968.2008.01233.x

Maclean M., S.J. MacGregor, J.G. Anderson & G.A. Woolsey (2008). The Role of Oxygen in the Visible-Light Inactivation of *Staphylococcus aureus*. *Journal of Photochemistry and Photobiology B: Biology*, 92(3); 180-184. DOI: 10.1016/j.jphotobiol.2008.06.006 *(Please note: download requires purchase.)*

Maclean M., S.J. MacGregor, J.G. Anderson & G.A. Woolsey (2009). Inactivation of Bacterial Pathogens Following Exposure to Light from a 405-nm LED Array. *Applied and Environmental Microbiology*, 75(7); 1932-1937. DOI: 10.1128/AEM.01892-08

- *"405-nm Light Proves Potent at Decontaminating Bacterial Pathogens"*, featured Current Topics article, Microbe: The News Magazine of the American Society for Microbiology, Volume 4(5), p216, May 2009.

Murdoch L.E., M. Maclean, S.J. MacGregor & J.G. Anderson (2010). Inactivation of *Campylobacter jejuni* by exposure to high-intensity 405-nm visible light. *Foodborne Pathogens and Disease*, 7(10); 1211-1216, 2010. DOI: 10.1089/fpd.2010.0561

Endarko E., M. Maclean, I.V. Timoshkin, S.J. MacGregor & J.G. Anderson (2012). High intensity 405nm light inactivation of *Listeria monocytogenes*. *Photochemistry and Photobiology*, 88: 1280-1286. DOI: 10.1111/j.1751-1097.2012.01173.x

Murdoch L.E., M. Maclean, Endarko, S.J. MacGregor & J.G. Anderson (2012). Bactericidal effects of 405-nm light exposure demonstrated by inactivation of *Escherichia, Salmonella, Shigella, Listeria* and *Mycobacterium* species in liquid suspensions and on exposed surfaces. *The Scientific World Journal (TSWJ)*, Volume 2012, Article ID 137805, 8 pages. DOI: 10.1100/2012/137805

Maclean M., L.E. Murdoch, S.J. MacGregor & J.G. Anderson (2013). Sporicidal effects of high-intensity 405 nm visible light on endospore-forming bacteria. *Photochemistry and Photobiology*, 89(1); 120-126. DOI: 10.1111/j.1751-1097.2012.01202.x (published online 30 Aug 2012).

Murdoch L.E., K. McKenzie, M. Maclean, S.J. MacGregor & J.G. Anderson (2013). Lethal effects of high intensity violet 405-nm light on *Saccharomyces cerevisiae, Candida albicans* and on dormant and germinating spores of *Aspergillus niger*. *Fungal Biology*, 117; 519-527. DOI: 10.1016/j.funbio.2013.05.004 *(Please note: download requires purchase.)*

Page 1 of 3

For a full list of available publications, please visit:

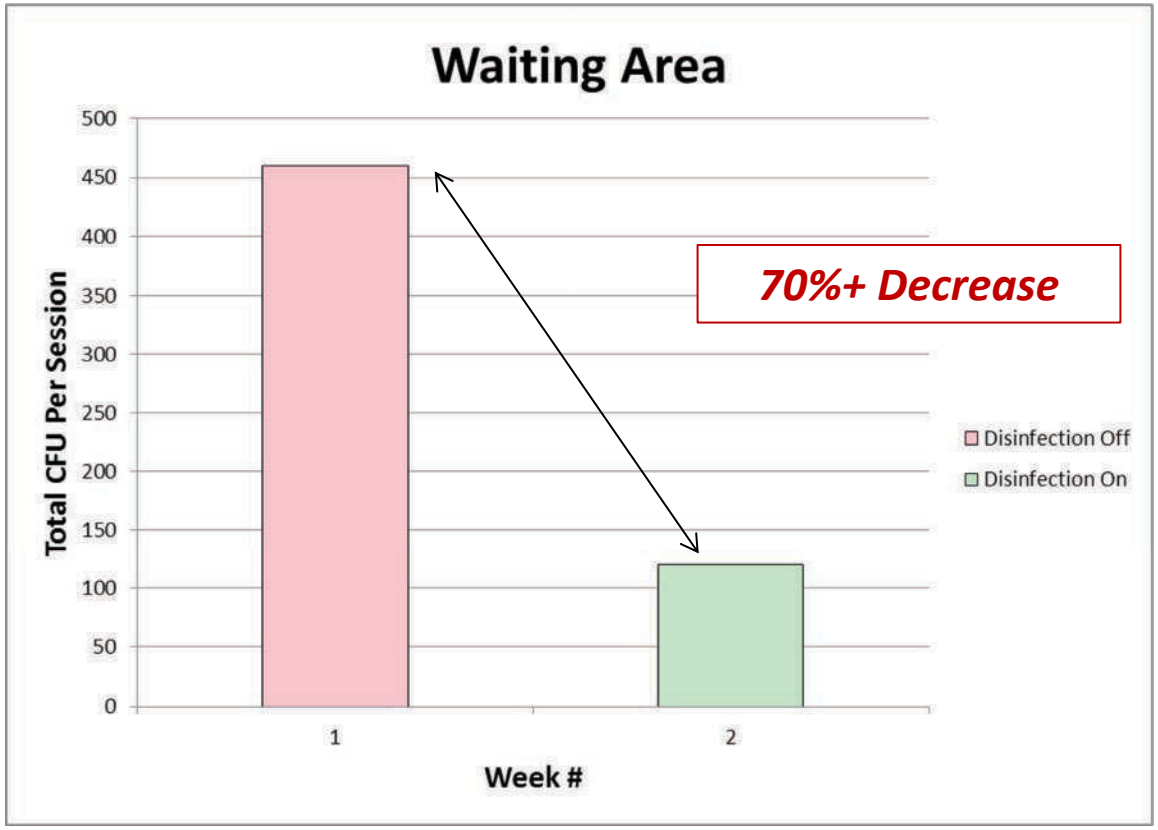
http://www.indigo-clean.com/resources-white-papers

Froedtert & The Medical College of Wisconsin Froedtert Hospital

- GI Diagnostic Waiting Area
  - Easier to show a reduction due to high amount of bacteria
  - Proximity to procedure rooms
  - Approximately 450 ft.^{2} (Equivalent to small OR)
  - Results consistent with previously published patient room results
  - Additional studies underway

Clinical Results for Visible Light Disinfection

- Inactivation of *S. aureus* in Waiting Room



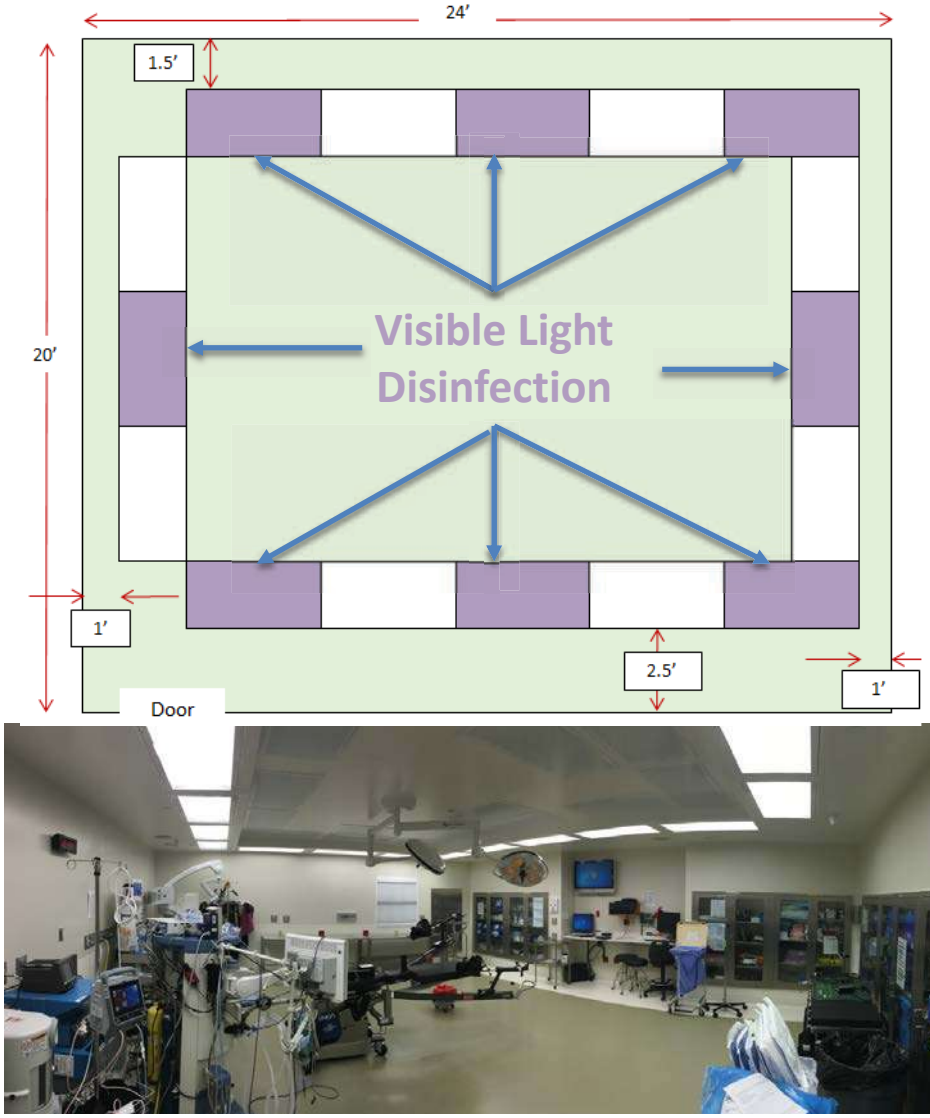
"In Phase 2 of the trial, where the lighting deployment was optimized across the room, we were able to improve the bacterial reduction to more than 70%."

- Dr. Nathan Ledeboer, Associate Professor of Pathology, Medical College of Wisconsin

Maury Regional Medical Center

- ~500 sq. ft.
- Primarily used for othropaedic applications
- Sampling conducted over 30 day period in two rooms
  - 15 days prior to installation
  - 15 days after installation
- Contact agar (BPA) media used
- Sampling performed on M, W, F of each week
- 50 samples per room per sampling day

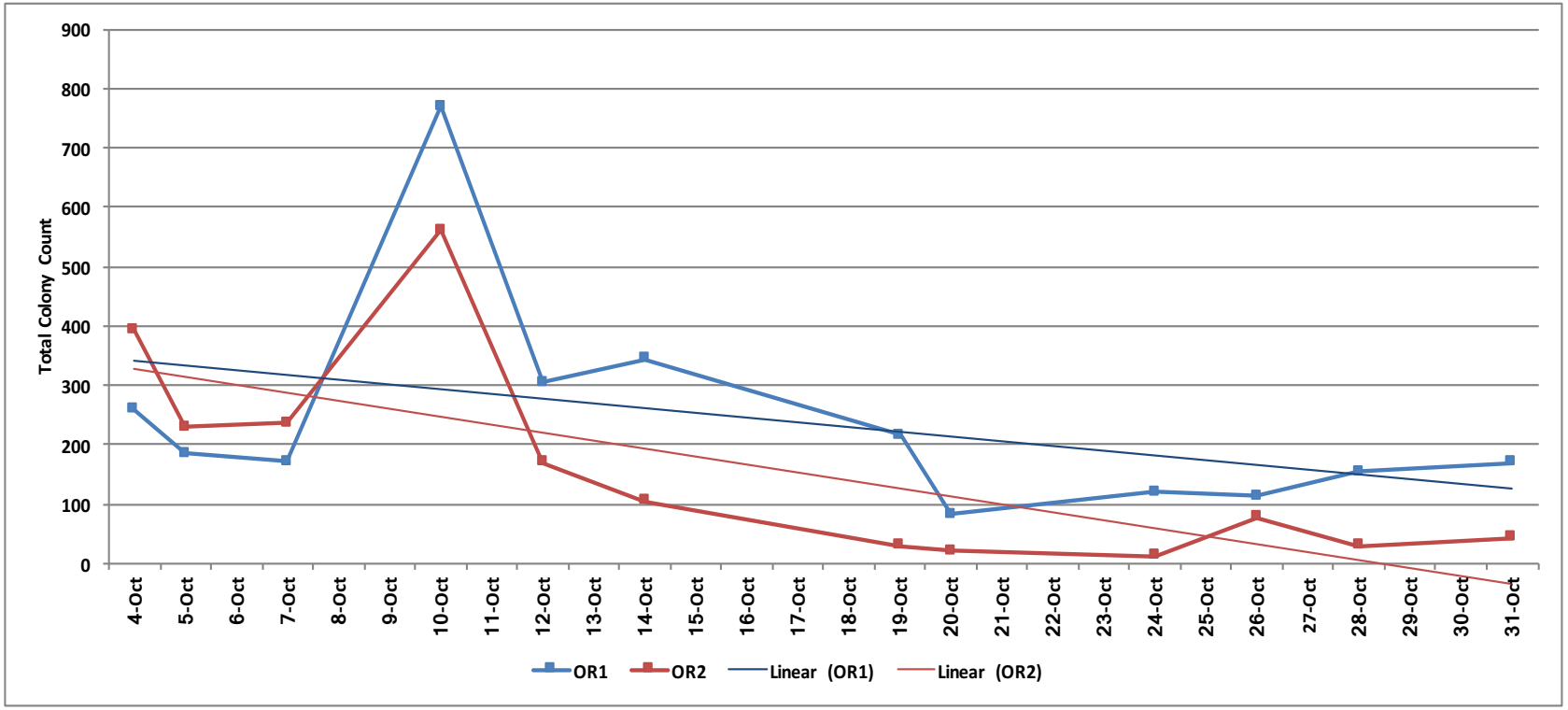
Installation



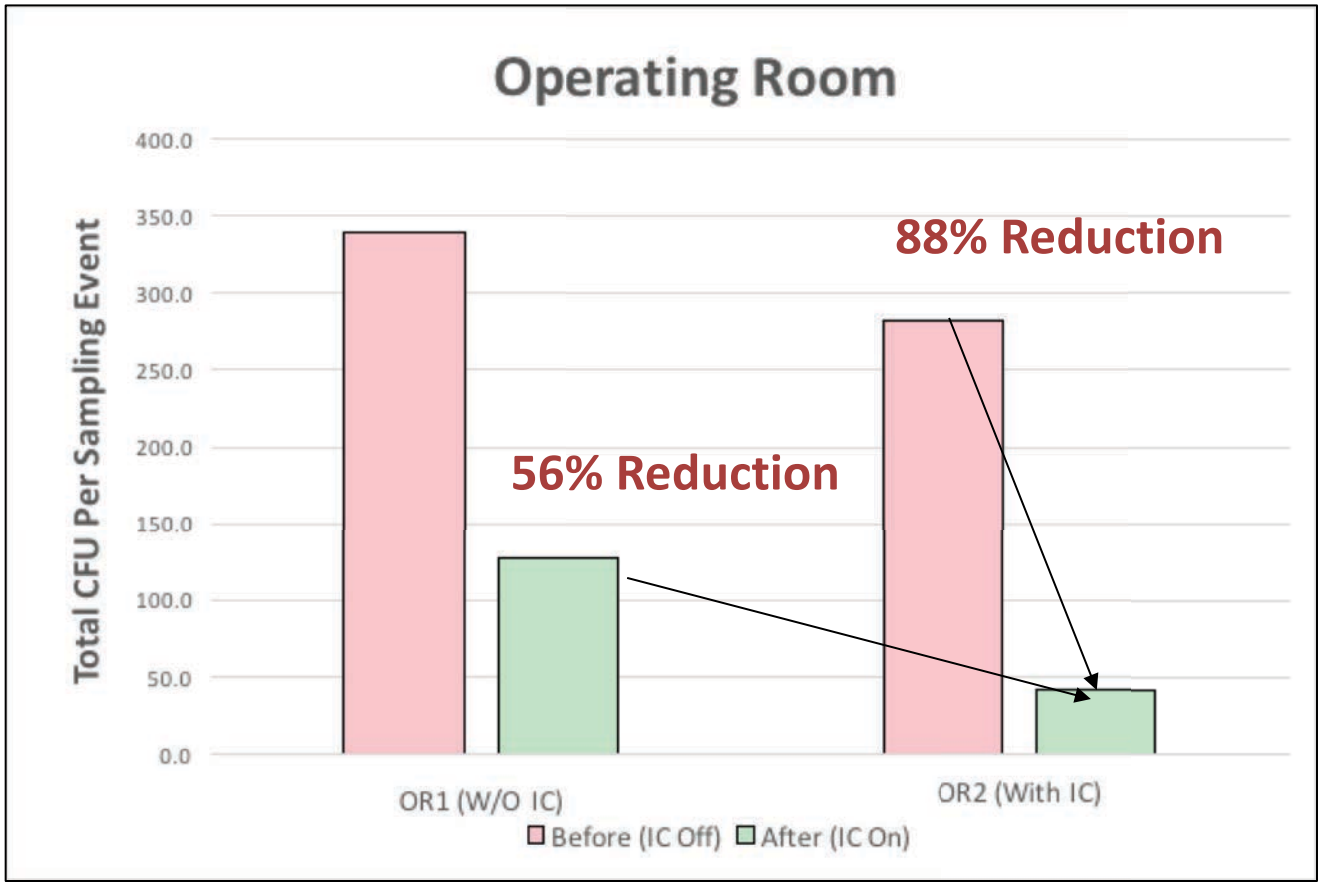
- Replaced 50% of existing fluorescent fixtures with Indigo-Clean (LED)
- Remaining fluorescent fixtures left in place but not needed to meet IES requirements

Continuous Environmental + Episodic Disinfection

- 88% less bacteria with Continuous Disinfection in use



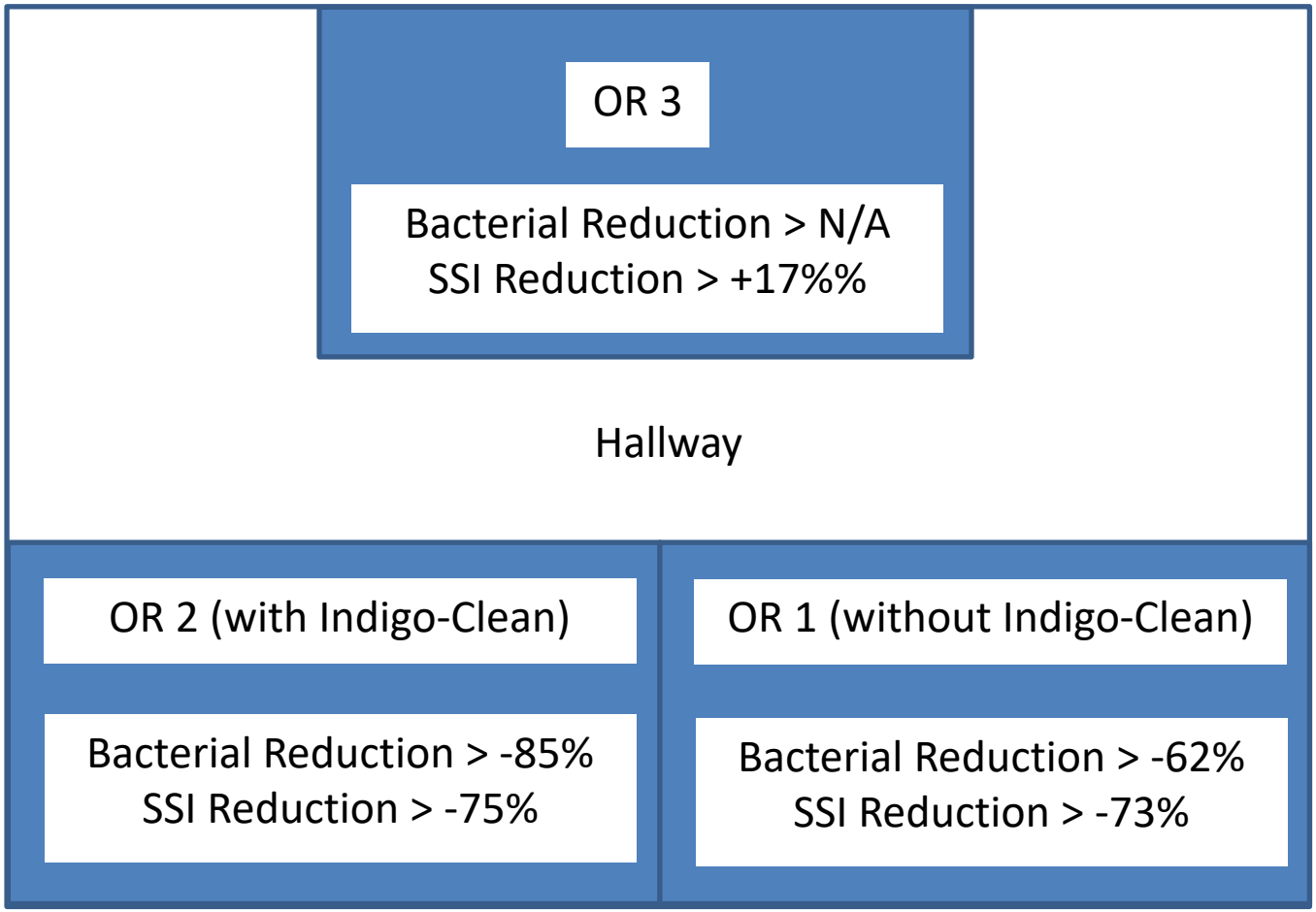
Clinical Results for Indigo-Clean



"Compared to the baseline, we saw an average, daily reduction of 88% in the operating room where Indigo-Clean was installed despite the fact that the room was used 54% more than in the baseline period."

- Lynnelle Murrell, BSN, RN, CIC Director, Infection Prevention, Maury Regional Hospital

OR Layout


OR 3
Bacterial Reduction > N/A
SSI Reduction > +17%%
Hallway
OR 2 (with Indigo-Clean)
Bacterial Reduction > -85%
SSI Reduction > -75%
OR 1 (without Indigo-Clean)
Bacterial Reduction > -62%
SSI Reduction > -73%

LEDucation

Clinical Results for Continuous Environmental Disinfection

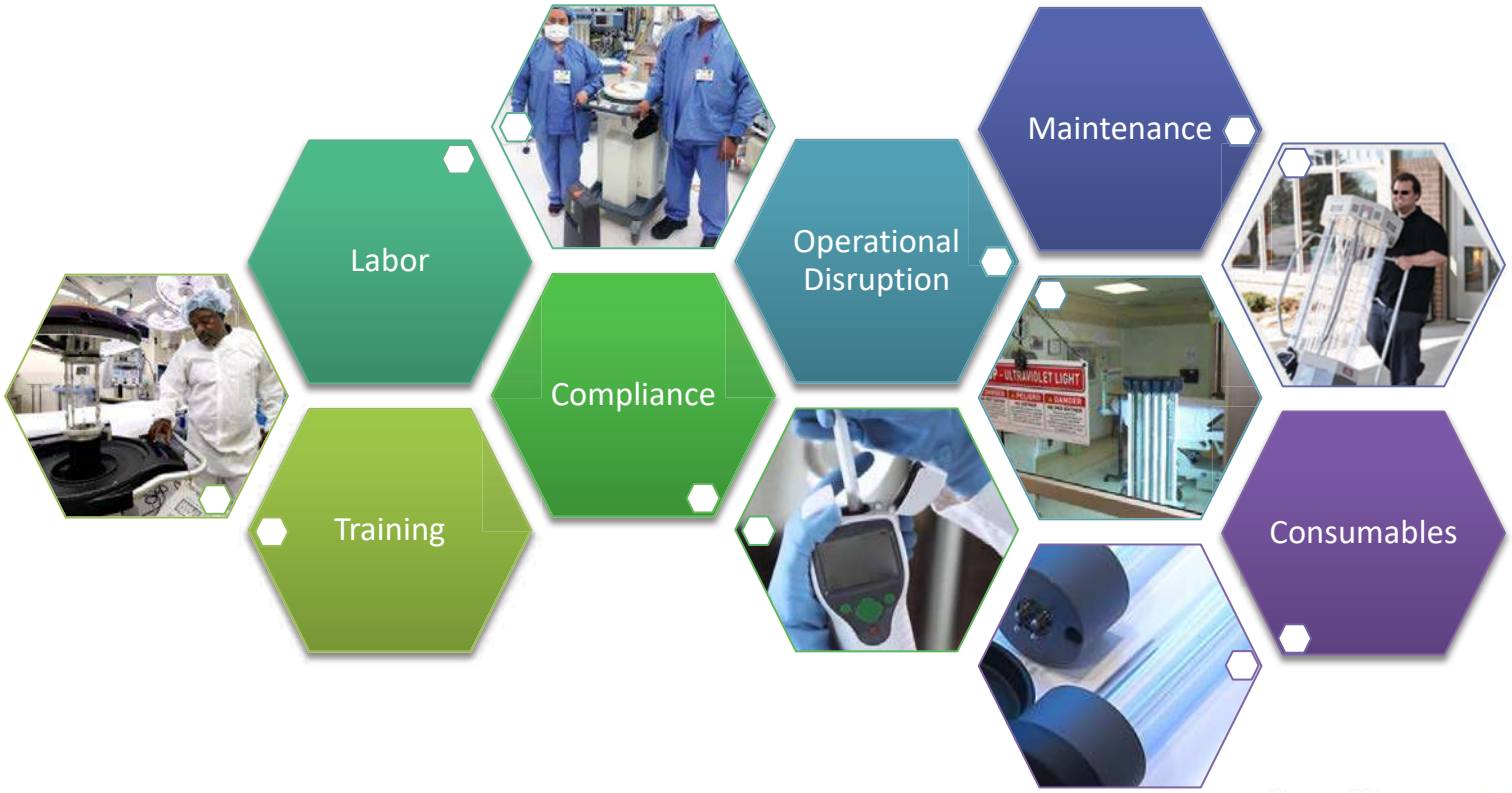
- Preliminary Results to be presented at AORN
  - SSI Reduction represents ~$300K in cost avoidance

	Oct-15 to Oct-16		Oct-16 to Oct-17			
Room	# of Cases	# of SSI	# of Cases	# of SSI	SSI Change	Bacterial Reduction
OR-1 (Adjacent Control)	662	8	660	2	>= -73%	>= -62%
OR-2 (w/IC)	788	11	850	3	>= -75%	>= -85%
OR-3 (Distant Control)	751	6	809	7	+17%	Not measured
Total	2201		2319			

leducation.org

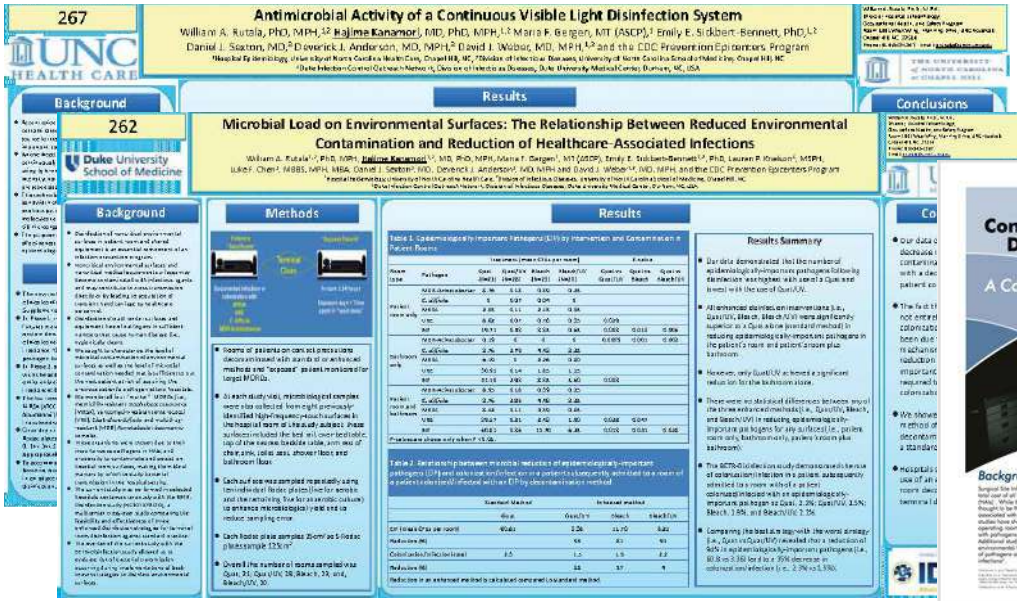
Visible Light Disinfection Is A One-Time Capital Purchase

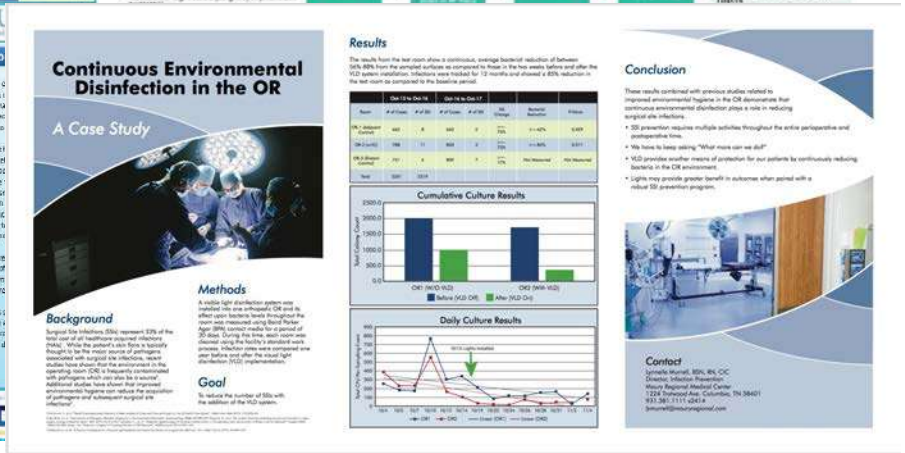
- Hidden costs typically associated with whole room disinfection



Clinical Publications for Visible Light Disinfection

- Publications demonstrating bacterial and HAI reduction





Other Applications – Patient Bathroom

- Highly infectious organisms such as *C.diff* are transmitted through this area
- Modes of Operation:
  - Room Occupied: Ambient Lighting
  - Room Unoccupied: Indigo Disinfection Mode
- Controls: Occupancy sensor

Other Applications – ED Trauma/Triage

- Constant use
  - Difficult to keep continuously clean
  - Can't shut room down for advanced disinfection technologies such as UV and/or H_2O_2
- Patients enter off the street
  - Unknown bacteria being brought into the facility
- Modes of Operation:
  - Room Occupied: White Disinfection Mode
  - Room Unoccupied: Indigo Disinfection Mode
- Controls: Occupancy sensor

Clinical *and* Commercial Deployment

- State-of-the-art facilities in Las Vegas
- Henderson Hospital and Spring Valley Hospital- Universal Health Services Inc.

LEDucation

Summary

- Visible Light Disinfection provides a way to improve environmental hygiene that compliments current efforts
- It is safe, contains no UV, and can be operated while people are in the room
- It can be integrated with overhead lighting and operated automatically without the need for additional people
- It uses reliable LED technology to increase lifetime and lower ongoing costs

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This concludes The American Institute of Architects
Continuing Education Systems Course

KENALL®

Indigo-Clean™
Continuous Environmental Disinfection

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Director, Clinical Affairs

Indigo-Clean

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