KIRLIN
Lighting Innovators Since 1895

WHITE PAPER NO. 1

Hospital Airborne Contaminant Transmission Reduced By Innovative Lighting

June 2019

Palomar Medical Center West
(Palomar Pomerado Health)
Poway, CA

Patient Room

Patients who acquire infections from surgery are twice as likely to die.

– PatientCareLink

INTRODUCTION

For decades, the medical community has worked relentlessly to identify and eradicate the sources of healthcare-acquired infections that lead to 97,000 deaths each year in the U.S.

According to the Centers for Disease Control and Prevention (CDC), more than 1.7 million hospital patients contract an infection in a healthcare facility each year. The issue, according to the Columbia University Irving Medical Center, is a "serious and stubborn" challenge – with potentially lethal implications.

Hospital-induced infections can add thousands of dollars to the cost of treating a patient and can result in penalties for health care providers.

The additional cost of a surgical site infection exceeds $20,000 on average, reports Healthcare Facilities Today magazine. In addition, patients who acquire infections from surgery spend an average of 6.5 additional days in the hospital and are five times more likely

Annual U.S. Healthcare-Acquired Infections

1.7M patients contracted infection

+6.5 DAYS in hospital for surgery acquired infections

5x MORE likely to be **re**admitted

ADDITIONAL

$20,000

cost on average

per surgical site infection

97,000 DEATHS Each Year In The U.S.

to be readmitted after discharge, according to the New England-based PatientCareLink.

Even more alarming, patients who acquire infections from surgery are twice as likely to die, PatientCareLink said.

SPOTLIGHT TURNS TO LIGHTING

Now comes an intensified focus on lighting in healthcare facilities and the ways in which some designs can introduce airborne contaminants onto practitioners and into patients.

Without proper precautions, "bacteria are essentially raining down on the wound during the entire surgery," said Columbia's Dr. David J. Brenner, professor of environmental health sciences.

The problem is particularly acute with pull-down lights that physicians and nursing staff move during surgery or examinations in Intensive Care Units where patients are already seriously ill. Bacteria love to live in dark crevices and joints. When the pull-down arm joints open, contaminants may be released with potentially catastrophic consequences for patients. These infectious organisms fall onto the patient directly or are transported from practitioner to patient. In addition, practitioners may bump into the lights, dislodging contaminants that fall into body cavities or incisions or are breathed into lungs.

Working with the professional health, science and medical communities, companies specializing in medical lighting have developed improved designs that provide adjustable beams from fully recessed lights with sophisticated wireless or wall-mounted remote controls, eliminating the need for any physical handling of the light head.

The Kirlin Company, a global leader in healthcare lighting, offers a line of remote-controlled recessed aimable luminaires that makes arm-mounted lights obsolete. Instead, Kirlin provides LED lighting precisely where it's needed, with simple tactile membrane controls for directional positioning and adjustable intensity.

"It's gratifying to know that our lighting is an essential factor in preventing illness and suffering and in saving lives," says Jana Brownell, Kirlin's President. "Given the demonstrated effectiveness and availability of recessed IP65, IP66 and cleanroom-rated lighting (ISO 5 Class 100), there's no reason for pull-down lights to be used in any patient areas."

SHINING A LIGHT ON DISINFECTION

In assessing the cleanliness of surfaces of overhead arm-mounted lights in operating rooms, a 2013 study identified the growth of three bacterial strains: Staphylococcus, Streptococcus and Neisseria. "All three bacteria strains have been shown to cause many infections," the study said.

Researchers said the design of the lighting and inadequate cleaning methods may have contributed to cross-contamination "especially if the lights were cleaned with the same wipe that was used to clean other surfaces in the operating rooms." Improvements were necessary, the report said, to minimize

"It's gratifying to know that our lighting is an essential factor in preventing illness and suffering and in saving lives."

– Jana Brownell,
Kirlin's President

Children's Hospital Colorado (Denver Children's Hospital) Aurora, CO

NICU

the risk of a "bacterial or fungal shower" from the surfaces.

Methicillin-resistant Staphylococcus aureus (MRSA) is especially lethal. According to the CDC, MRSA "can survive on some surfaces, like towels, razors, furniture, and…equipment for hours, days, or even weeks. It can spread to people who touch a contaminated surface, and MRSA can cause infections if it gets into a cut, scrape, or open wound."

Surgical room recessed lighting that is aimable and cleanroom-rated reduces the migration of contaminants into a field intended to be sterile.

In a "Guide to Infection Control in the Hospital," the International Society for Infectious Diseases noted that handling lights above eye level in an operating room is a practice in need of review and improvement. Researchers agreed that bacteria are a

Miami Valley Hospital
Dayton, OH

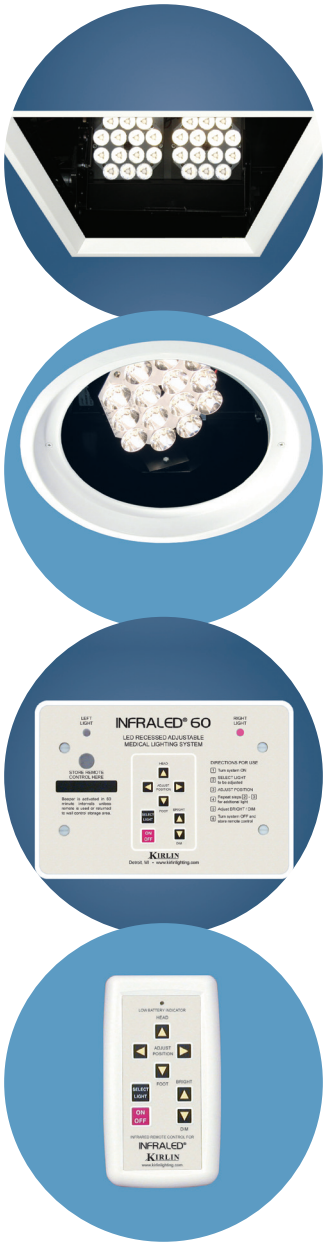
Cardiac Cath

threat when lights collect bacteria-laden dust particles and are physically moved to change illumination direction or intensity.

LIGHTING SOLUTIONS FOR INFECTION PREVENTION

Such findings serve as a call to action for advanced lighting companies and healthcare providers. The Kirlin Company, a renowned American innovator in lighting for more than a century, has made medical lighting a specialty by offering systems, design leadership and expertise. It strives to significantly reduce the spread of contaminants in healthcare settings through the development of thoughtful lighting features:

- **Recessed motorized adjustable fixtures** provide an open workspace. The lights physically never move into patient/practitioner space. The movement occurs above the ceiling in clean-room-rated luminaires.
- **IP 65/66 and clean-room-rated fixtures** protect against the transmission of pathogens from the room into plenum spaces -- and potentially throughout the facility. Additionally, this clean room design prevents the spread of plenum-base contaminants into medical treatment rooms.
- **Compact and smooth trims, surfaces and lenses** are easy to clean and disinfect with isopropyl alcohol.
- **Antimicrobial trim finishes** inhibit survival of pathogens.
- **Tactile membrane wall-mounted and remote controls** direct the beam precisely where it's needed without moving the light from its recessed position. Controls may be easily cleaned with isopropyl alcohol.
- **Invisible infrared signal-based remote controls** minimize unintended consequences, such as migraines and photosensitive epileptic seizures.
- **Maintenance-free high-CRI LEDs** promote efficiency, long life and accurate color-rendering.



NEW TOOLS FOR NEW THREATS

Products such as those developed by Kirlin are at the leading edge of the lighting industry's contribution to the campaign against healthcare-acquired infections.

The availability of such tools, tactics and techniques is timely as modern medicine confronts new threats and a frightening advance of "superbugs."

Among those, The New York Times reported, is the alarming spread of Candida Auris, a fungus that attacks people with weakened immune systems. It has proven difficult to treat. It's also proven to be deadly.

Such tenacious germs – often easily spread – are prompting medical and lighting leaders to double down in their war against infection.

To be sure, lighting has long been essential to optimal patient exams and treatments, including surgery. Breakthroughs and refinements in lighting systems have dramatically improved the efficiency, clarity, utility, precision and reliability of lighting in sophisticated

medical settings. Now it's time to ensure they also do no harm.

"We need all the tools we can get to reduce surgical wound infections, especially those involving drug-resistant strains of bacteria, which have become increasingly common," said Columbia's Brenner.

With recessed aimable remote-controlled LED lighting from Kirlin, help is on the way.

OSU Doan Hall
(University Hospital)
Columbus, OH

Labor & Delivery

Contact
info@kirlinlighting.com
(313) 259-6400, ext. 317
www.kirlinlighting.com

All Kirlin products are designed and manufactured in Detroit, Michigan, USA

KIRLIN