

INFECTION PREVENTION

Progress against pathogens is promising though preliminary

Include people and products in your attack against HAIs

by Valerie J. Dimond

Late last year, the Department of Health and Human Services (HHS) released a report that shows hospital-acquired conditions are declining steadily – 3 million fewer adverse events between 2010 and 2015 to be exact. They also reported a savings of more than \$28 billion in healthcare costs over the same timeframe.¹ While this may sound like great news – and it is – it probably does little to sooth the millions of patients who did, and still do, get healthcare-acquired infections (HAIs), or countless loved ones who have lost friends and family members to *C.diff*, surgical site infections, blood stream infections and other preventable problems.

The National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination,² contains new targets for reducing HAIs in acute care hospitals, but hitting those targets will require a huge effort from not only infection prevention and clinical staff, but all healthcare staff, including Environmental Services, Sterile Processing, Supply Chain, Pharmacy – even the patients themselves. Here's a look at some major areas of concern and how healthcare facilities are addressing – or not addressing – the problems.

Resisting antibiotic resistance

Prescribing too many unnecessary antibiotics, or treating bugs with the wrong drugs, are a major cause of infection. As such, it would be very difficult to find a healthcare professional today that doesn't know this. Yet, a brief released in March from the The Pew Charitable Trusts shows use of broad-spectrum antibiotics in hospitals is on the upswing, a concerning fact considering that they have been shown to increase drug-resistant infections.³

Antimicrobial stewardship – No. 5 on ECRI Institute's Top 10 Patient Safety Concerns for Healthcare

Organizations in 2017 – is an integral piece of the infection prevention puzzle. According to the most recent Infection Prevention survey from *Healthcare Purchasing News* (May issue), 85 percent of respondents said that their facility has an established antimicrobial stewardship program (ASP) in place, up 13 percent from last year. However, 5 percent said they do not have an ASP and 9 percent are still considering it. For those who don't yet have a program, now's the time to get going.

"Antimicrobial use and resistance reporting (AUR) is one of the clinical quality measures (CQM) designated by CMS in their EHR incentive program," said Raymond Black, PharmD, BCPS, Senior Pharmacy Specialist at VigiLanz Corporation. "Beginning in 2018, in order to comply with this program's requirements (also known as Meaningful Use Stage 3), hospitals must electronically submit public health data, like AUR. Failure to comply may lead to significant payment reductions from CMS. AUR submission to the National Health Safety Network (NHSN) meets this requirement."

To help facilities with this endeavor, VigiLanz, a certified AUR report provider, provides the technology that can automatically collect antimicrobial utilization and resistance data and generate monthly reports that conform with NHSN requirements.

"NHSN has stated that manual data entry is not an option for the AUR Module," Black cautioned. "AUR must be calculated using

electronically documented medication administration data, and submitted in a special file format known as CDA. If this is not available from any of their current vendors, the hospital's IT department would need to build out a process in accordance with NHSN requirements. This would require a significant effort on their part."

Keeping CAUTI in check

Catheter-associated urinary tract infections (CAUTIs) are still on the rise nationwide. According to the Centers of Disease Control and Prevention, UTIs are the most widely reported HAI, particularly among ICU patients. Patients with indwelling urinary catheters often have fecal incontinence, but debris removal and basic cleansing doesn't seem to be enough to discourage colonization of harmful bacteria.

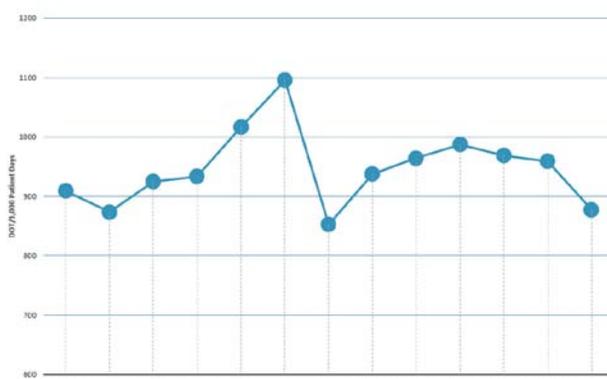
The Theraworx Technology line of reduced pH skin hygiene products from Avadim Technology are designed for insertion and subsequent care of cleaning of the perineum in Foley-catheterized patients. A newly published, **Theraworx Skin Care System by Avadim Technologies**



peer-reviewed multi-facility retrospective analysis of ten hospitals that tracked their CAUTI rates, comparing periods averaging 20 months prior to implementation of Theraworx products and protocols, to periods averaging 15 months post-implementation, showed a mean reduction in CAUTI rates of 53 percent.

In the study, published this year in *Clinical and Medical Investigations*, two hospitals were able to eliminate CAUTI completely after implementation of Theraworx products and protocols, and the majority of the others also experienced notable decreases. "Results of this aggregated data set demonstrate the clinical value associated with managing the acidity and the microbiome of the perineum with the use of Theraworx Technology at catheter insertion and for catheter maintenance," stated Steve

Antimicrobial Utilization per 1,000 Patient Days VigiLanz



AUR graph by VigiLanz Corporation

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Woody, CEO, Avadim. "We feel that, when combined with good nursing practice, our product and protocols for use can be helpful to health systems with improvement goals in this critical area."

CLABSI crusaders

On the CLABSI (central line-associated blood stream infection) front, infection rates continue to decrease. Utilizing maintenance bundles properly, which includes adopting evidence-based technology and education

and training of staff are attributed to the success rates facilities are having combating CLABSIs.

"We have seen the rates of CLABSIs decreasing for nearly a decade, largely due to the recognition that these infections are avoidable and there are steps to take that can reduce the infection risk," said Pat Parks, MD, PhD, Medical Director, 3M Critical and Chronic Care Solutions Division. "The successful CLABSI rate reductions can be attributed to behavior



changes and technology enhancements." Using the 3M Curox Disinfecting Port Protectors, which contain a 70 percent isopropyl alcohol solution, twist on easily, and can disinfect in as little as one minute, can help. Parks explains: "While traditional guidelines have recommended an alcohol pad scrubbing method to clean the surface of the needleless connector, there is a variability in scrubbing techniques that result in inconsistent disinfection outcomes. With the recent introduction of 3M Curox Stopper Disinfecting Cap for Open Female Luers, 3M offerings help reduce risk across all I.V. access points – including needleless connectors, male luers, and stopcocks – providing consistent, passive disinfection every time. Not only do the Curox port protectors disinfect quickly and provide protection against contamination between each access but they can, if required, remain in place for up to seven days to provide a physical barrier."



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DebMed Electronic Hand Hygiene Compliance System

REFERENCE: 1. Marchaim D, et al., Hospital bath basins are frequently contaminated with multi-drug resistant human pathogens. Poster presented at SHEA 21st Annual Scientific Meeting, April 2011. 2. Johnson D, Lineweaver, Maze L, Patients' bath basins as potential sources of infection: a multi center sampling study, AJCC, Vol 18, No 1, Jan 2009.

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"The upgrade also provides new, advanced features for administrators, including the ability to manage hospital unit goals and user information."

Based on user feedback, the system can now generate product usage reports for soap and sanitizer, information that Chappuis says can be used to ensure staff understand and follow proper protocol for *C. diff* cases.

"The [DebMed] badge-free system captures all hand hygiene events, via sensors in soap and sanitizer dispensers, and then uses clinically validated modelling to analyze the data and provide accurate compliance scores according to the standard for the hospital unit to use to improve and sustain performance," said Chappuis.

A study conducted at Greenville Memorial Hospital, a 746-bed tertiary referral hospital and academic center in South Carolina showed HH compliance increased 25.5 percent and hospital onset MRSA HAI rates decreased by 42 percent. This resulted in avoiding approximately \$434,000 in associated healthcare costs.⁴

Linda Homan, Clinical Services Manager at Ecolab, explained how her company's EnCompass Hand Hygiene Program, which includes a surveillance component, also helps increase hand washing com-

pliance rates, although she admits some hospitals are slow to adopt these types of systems. In fact, results from the HPN Infection Prevention Survey showed 53 percent of respondents work at a facility that uses a HH surveillance system; 28 percent do not have one in place and 17 percent of respondents said their facilities are considering it.

"There is an understanding that hand hygiene compliance is the most important way to prevent HAI's within hospitals. There is also an understanding that compliance rates are not as high as they should be in hospitals," Homan said. "Therefore, we need to start introducing and implementing systems that accurately measure hand hygiene compliance among individual healthcare workers to understand how to better change behavior. Just seeing 1 percent to 4 percent of hand hygiene events isn't enough, and when those 1 percent to 4 percent are impacted by the Hawthorne effect, then those results are clouded.

"Ecolab is excited to introduce the EnCompass Hand Hygiene Program; this programmatic approach involves a variety of



EnCompass Hand Hygiene Surveillance Program by Ecolab

elements including best-in-class hand sanitizer and soaps, including non-triclosan antimicrobial soap options," continued Homan. "Our new electronic Compliance Monitoring System offers patient-zone mon-

itoring that ensures that healthcare workers are compliant and patient safety is at the forefront. This is also done with minimal impact on the IT structure of the hospital and can be customized to each hospital so that we can change hand hygiene behavior without interfering with workflow."

Stepping up SSI treatment

With SSIs continuing to cause unnecessary suffering, physically and financially, last November the World Health Organization (WHO) released *The Global Guidelines for the Prevention of Surgical Site Infection* — 29 recommendations for stopping SSIs and avoiding superbugs. While SSI incidence is higher in poorer countries, WHO says it still hits the U.S. pretty hard, with SSI accounting for as many as 400,000 extra hospital stays at a cost of \$900 million annually.

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Based on reviews of the latest science, the new recommendations cover the periods before, during and after surgery and include hygiene, antibiotic use, pre-surgical skin disinfectants, suture type, and more.⁵

When put into practice, it works: South Carolina patient deaths decreased by 22 percent after hospitals across the state implemented the checklist.⁶

In May, the CDC also issued an update on its evidence-based recommendations for preventing SSIs, which covers 14 core areas. The last guideline issued was in 1999, before evidence-based grading became routine.⁷

"If a patient acquires an SSI, their hospital stay will be extended, on average 9.7 days, and an estimated \$20,000 in increased healthcare costs will be incurred,"⁸ asserted Phil Brewer, Senior Marketing Manager, Treatment, Wound Care Division, Molnlycke.

Wound dressings with aggressive adherence properties can strip and damage skin, leaving it susceptible to infection. Frequent dressing changes due to poor blood absorption also increases exposure to contaminants.

Released in April, Molnlycke's Mepilex Border Post-Op Ag dressings were made specifically to help surgical patients avoid these problems. The dressings are engineered with contour conforming, flex-cut pads that move easily with the body and have shower-proof seals. Optional antimicrobial versions containing soluble silver to inactivate pathogenic bacteria within 30 minutes are also available. The solution continues inactivating 99.99 percent of common microbial threats for seven days (data on file with Molnlycke).

"In a recent study of 262 CABG patients, Mepilex Border Ag (post op sizes) proved to be a valuable part of a bundled approach to SSI prevention," Brewer said. "Clinicians observed no blisters, skin irritation, redness or tissue damage at the incision site – as well as no incidence of SSIs – for the study's entire 30-month duration. The result was an 84.6 percent reduction in excess hospital treatment days compared to the previous year and an estimated total savings of \$606,498 in deep sternal wound infection costs compared to the previous year."⁹

Research also shows that wounds resulting from procedures such as laparotomy, sternotomy, spinal fusion, total hip and knee arthroplasty and lower extremity fractures heal more successfully when treated with an active, negative pressure incision management solution, compared

to conventional, passive dressings (e.g., gauze secured over the wound with medical tape).

"The World Health Organization commissioned a systematic review and meta-analysis of 21 studies including both randomized controlled trials and observational studies; conclusions, published in the September issue of *Medicine*, found that prophylactic negative pressure wound therapy (pNPWT), or closed incision negative pressure therapy [ciNPT]) significantly reduced the risk of SSIs compared to traditional dry gauze dressings," said Kurt Hudson, Franchise Director, Incision Management and Emerging Technologies, Acelity L.P. Inc. "In its announcement, the agency suggests use of pNPWT over conventional wound dressings on primarily closed surgical incisions in high-risk wounds for the prevention of SSIs."



**Acelity's PREVENA
Incision Management System**

Acelity's PREVENA Incision Management System is a powered negative pressure product that actively manages and protects surgical incisions for up to seven days postoperatively. "PREVENA Therapy optimizes the incision and surgical site biomechanically through its patented design by decreasing lateral tension, increasing appositional strength and normalizing stress distribution within the incision," Hudson explained.

What's lurking on surfaces

Hard and soft surfaces, especially high-touch items in patient rooms and other clinical areas, give bacteria plenty of opportunities to hide, proliferate and invade. Take the hospital mattress for example. Environmental Services professionals may do a terminal cleaning of beds between patients, mostly using a quat solution, but the process could be doing more harm than good. Some research indicates that the chemicals typically used eventually break down the integrity of the material. Add that to normal wear and tear and the mattress surface becomes a pathway for pathogens to collect and multiply.

"Mattress failures are a huge issue for hospitals from an infection prevention standpoint and patient safety [and



are] increasing due to use of aggressive disinfectants to kill germs like *C.diff*," said Bruce Rippe, CEO, Trinity Guardian, manufacturer of the Trinity Guardian Patient Protection System which consists of launderable protection for mattresses, bed decks and pillows. "The cover and pillowcase are made of polyurethane coated fabric that is impervious to fluid," said Rippe. "The mattress/deck cover has a four-way stretch scrim. Bacteria and viruses as small as Ebola cannot penetrate the fabric in either direction, which prevents a patient's bodily fluids, particles and pathogens from reaching mattress surfaces, and vice versa. These patient protection systems provide a microbarrier that prevents a 'failed' mattress from being a risk to a new patient occupant. After each patient is discharged, their Trinity Guardian system and flora are removed from the room, which protects the mattress and the next occupant, who will have a thoroughly clean patient protection system on the bed. "A time study has shown that the entire Trinity Guardian bed turnover process, which requires only soap-and-water cleaning of mattress surfaces between applications, takes far less time than the guidance-recommended, multi-step manual mattress cleaning, disinfection and drying process."

OR tables require strong protection from microbes too. Stephanie Nilan, Senior Product Specialist, Ansell, says when selecting OR linens, four factors to keep in mind are barrier effectiveness, lint shed, skin-friendliness and efficiency. Nilan asserts that reusable linens cannot provide a durable enough barrier between table and patient, suggesting facilities turn to disposables instead.

"Additionally, [reusables] are often found with rips, holes or stains. Disposable, impervious sheets not only guarantee quality, but are much more effective in preventing cross-contamination. And, linens with an added antimicrobial agent have been proven to prevent bacterial migration to the surface of the linen," said Nilan. "Lint is another concern in the OR because it can also lead to cross-contamination. Disposable linens help reduce lint whereas reusable linens can shed lint. It is also im-



Molnlycke's Mepilex Border Post-Op Ag antimicrobial dressing

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portant that linens have properties which will help maintain patient skin integrity



Ansell STAT-BLOC Table Sheet

such as absorption and quilting. Reusable linens require laundering and there can be delays in delivery or availability, but with disposable linens you can ensure ample supply and they can even be included in a turnover kit for added convenience and to help reduce turnover time."

Ansell's disposable STAT-BLOC linens contain antimicrobial technology that Nilan says is 99.9 percent effective against MRSA, CRE and E. Coli. They also wick fluid away from the patient's skin – absorbing up to five liters of fluid if necessary.

Hard surfaces are also magnets for microbes and need to be cleaned and disinfected constantly. Bleach-based solutions and other chemistries are the staples that facilities depend on to get the job done.

PDI Healthcare offers the Sani-Cloth line, which includes three different wipe varieties: Super Sani-Cloth, Sani-Cloth AF3, and Sani-Cloth Bleach. "Compatibility with medical devices and equipment continues to be a key challenge for healthcare facilities. Improper use of products may break down expensive equipment," said Allison Buldo, Marketing and Product Management, PDI Healthcare. "Additionally, when equipment breaks down or shows wear, it can harbor bacteria. Super Sani-Cloth wipes have been tested compatible with a broad range of surfaces and equipment found in healthcare environments, while also meeting the highest clinical guidelines of the industry."



PDI Healthcare's Super Sani-Cloth line

The product can be used safely on a wide range of non-porous surfaces to fight against 30 microorganisms. Buldo added, "Complemented by PDI's range of compliance tools, ongoing clinical support and comprehensive implementation training for staff, the Sani-Cloth Environment of Care system offers a complete solution for house-wide and situational use."

Susan Hapak, AB, MBA, President/Owner, Current Technologies Inc., maker of bleach-based HYPE-WIPES, says when it comes germicidal wipes, packaging matters.

"HYPE-WIPES are packaged in individual foil pouches which is advantageous as the wipes do not dry out and there is sufficient solution in one towelette for the wiped surface to remain wet the entire four minutes required to kill *C. diff.* spores, and by inference wet for the one to two minutes required to kill TB, hepatitis, MRSA, norovirus and numerous drug-resistant bacteria and viruses," said Hapak. "In contrast, bleach wipes in canisters dry out if the top is left open; even 'self-closing lids' may not fully prevent evaporation, which means there may not be enough solution in a single towel for the wiped surface to remain wet for the length of time required to kill all germs. The EPA is now requiring manufacturers of disinfecting



HYPE-WIPES by Current Technologies Inc

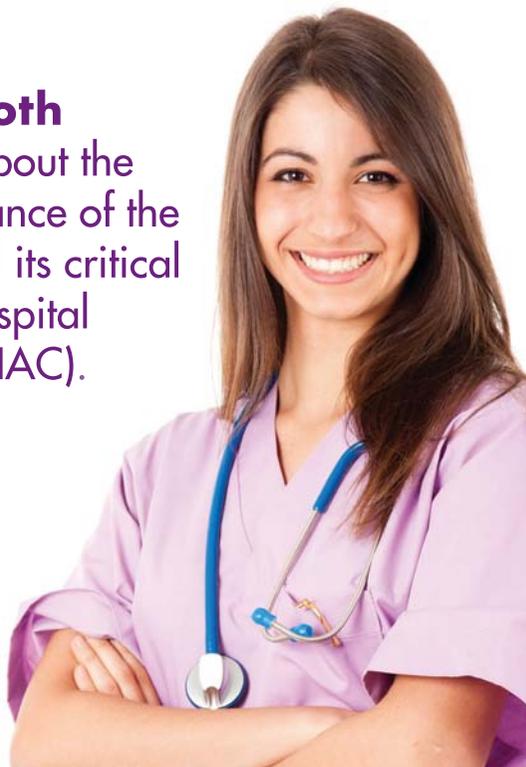
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Clorox Healthcare's bleach germicidal disinfectants

wipes with sporicidal kill claims to provide independent test data showing how many wipes are required to keep a surface wet long enough to meet the sporicidal kill time on that product's label."

Facilities could also incorporate Clorox Healthcare's line of bleach germicidal disinfectants into their IP plan.

"Clorox Healthcare bleach germicidal disinfectants are designed to be fast acting and kill a broad range of pathogens including *C. difficile* spores as well as emerging and reemerging pathogens like MERS-CoV, SARS-CoV, Enterovirus D68 and the Measles virus," said Laurie Rabens, Senior Product Manager, Clorox Healthcare. "They have also gained new EPA-registered disinfecting claims for common causes of HAIs including *Staphylococcus epidermidis* (CoNS), *Candida glabrata* and *Enterococcus hirae*. Clorox Healthcare Bleach Germicidal Wipes are now EPA-registered to kill 58 microorganisms in three minutes or less and Clorox Healthcare Bleach Germicidal Cleaners are now EPA-registered to kill 50 microorganisms in three minutes or less."

The wipes come in various sizes to accommodate different needs – the largest for terminal cleaning, bathrooms, etc. and smallest for clinical disinfection (e.g., glucometers, blood pressure monitors, etc.). "They also come in soft transport packs and individual packs that are ideal for portable equipment, transport vehicles and home health disinfecting needs," Rabens added.

Don't forget the floor

In the March issue of *American Journal of Infection Control*, researchers indicated that hospital floors are often overlooked as a source of infection. And while there may be plenty of chemistries that can be used to clean and disinfect hospital floors, when aiming for optimal results, choosing how those products are applied is also an important consideration. "For some time now, the evidence has been pretty clear and compelling that environmental surfaces harbor pathogens – all surfaces," said Warwick Spencer, Contec Healthcare Business Man-

ager. "And since floors represent a significant percentage of those healthcare surfaces, it's logical to conclude that cleaning and disinfecting them properly matters – a lot."

Spencer says research continues to show how common applicator textiles designed to eliminate debris and apply disinfectant often fail. "Why? Because reusable, laundered microfiber and fly-by-night disposables contain a nightmarish brew of residues, organics and degraded fibers that are incapable of cleaning and disinfecting effectively," he said, noting that Contec PREMIRA Microfiber grabs bioburden readily and disperses disinfectant without interfering with efficacy. "One-hundred percent synthetic, disposable Contec microfiber, made in the USA, doesn't bind quats, won't interfere with your disinfectant's efficacy, and eliminates the risks inherent in any laundry process, all while streamlining your logistics."

Adjunctive therapy

Ultraviolet light room decontamination is another weapon that more hospitals are using in conjunction with other protocols. And there are a growing number of manufacturers and technologies to choose from. *HPN* strives to cover them fairly and in-depth each year (look for our room decontamination story in the September issue).

One of the newest systems to become available is the Moonbeam3 by Diversey Care, a division of Sealed Air. "Its unique design was spurred by customer insight and a deep understanding of how UVC light is best applied to optimize efficacy," said Carolyn Cooke, Vice President, Healthcare North America, Diversey Care. "UV dosing is all about physics. To get the best possible dose onto surfaces, it is important to consider distance and angle of incidence. Most surfaces in patient care areas are horizontal – such as beds, over bed tables, toilets and other furniture surfaces. Tower designs limit the ability to adjust for angle of incidence.

"A key feature that makes the Moonbeam3 unique is the ability to individually adjust the three UV arms to optimize angle of incidence and coverage – allowing the user to target the dose of UV on to both horizontal and vertical surfaces," continued Cooke. "The system has been clinically tested by a third party and has demonstrated 3 to 5-log reductions in harmful pathogens such as MRSA, VRE, MDR Gram negative, norovirus and *C. diff* spores. In general, the Moonbeam3 will be effective against vegetative bacteria in three minutes or less and spores, such as *C. difficile*, in 10 minutes or less."

But is it really clean?

That seems to be the eternal question these days and one way to find out is with adenosine triphosphate (ATP) cleaning verification testing.

"ATP cleaning verification tests have shown to be a significant improvement over previous techniques, such as visual inspections, cell culture, and 'glow gel' technology," said Lauren Rody, Marketing Manager, Hygiene, an ATP supplier. "Hospitals can easily implement an ATP-based system by directing EVS management to designated areas and surfaces, measuring the swabs with a luminometer, and analyzing data from the instruments with software. Research has also proven that implementing a monitoring tool to systematically measure cleaning thoroughness can increase cleaning compliance from 40 percent to 82 percent.¹⁰

"Since Hygiene SureTrend data analysis software is easily customized, EVS and IP managers adapt it to their facilities' needs and get a clear understanding of what needs attention," continued Rody. "Studies have shown that using data collected with ATP monitoring systems in training meetings or huddles have reduced contamination and infection risks and increased employee engagement."¹¹ **HPN**



Moonbeam3 by Diversey Care



PREMIRA disposable microfiber by Contec Healthcare



Hygiene's ATP cleaning verification system

For references visit www.hpnonline.com/progress-against-pathogens-promising-though-preliminary.

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