



SEMMELWEIS TIMES



September/October
 2016
 Volume 5

Part 1 - Why Implement Antimicrobial Stewardship in Your Hospitals?

Misuse and Over-Use of Antibiotics

The last 50 years have witnessed the golden age of antibiotic discovery and their widespread use in hospital and community settings. Regarded as very effective, safe and relatively inexpensive, antibiotics have saved millions of lives. However, this has led to their misuse through use without a prescription and overuse for self-limiting infections and as predicted by Alexander Fleming in his Nobel Prize lecture, bacterial resistance has appeared and is growing fast.

The Rising Threat of Antimicrobial Resistance

Antimicrobial resistance has been identified as a major threat by the World Health Organization due to the lack of new antibiotics in the development pipeline and infections caused by multi-drug resistant pathogens becoming untreatable.

Antimicrobial stewardship (AS) is one of the key strategies to overcome resistance. It involves the careful and responsible management of antimicrobial use.

What is Antimicrobial Stewardship?

An inter-professional effort, across the continuum of care that involves timely and optimal selection, dose and duration of an antimicrobial for the best clinical outcome for the treatment or prevention of infection with minimal toxicity to the patient and minimal impact on resistance and other ecological adverse events such as *C. difficile*.

Goals of Antimicrobial Stewardship and Evidence for Success

There are four goals of antimicrobial stewardship, improve patient outcomes, improve patient safety, reduce resistance, and reduce healthcare costs.

Goal 1: IMPROVE PATIENT OUTCOMES

- Improve infection cure rates
- Reduce surgical infection rates
- Reduce mortality and morbidity

Goal 1 Example of how appropriate antibiotics improve patient outcome and reduce healthcare costs.

CHARACTERISTIC	Inappropriate Antibiotics (n=238)	Appropriate Antibiotics (n=522)
DEMOGRAPHICS		
Age, mean ± SD (yr)	57.7 ± 15.8	59.9 ± 16.5
Male	48.7%	54.2%
CHRONIC HEALTH STATE		
Immunosuppressed	32.4%	34.3%
Chronic dialysis	14.7%	7.1%
Nursing home resident	13.4%	18.2%
Coronary artery disease	11.7%	7.9%
Chronic obstructive pulmonary disease	21.6%	17.2%
Congestive heart failure	21.6%	18.1%
Malignancy	23.1%	34.1%
Diabetes mellitus	27.5%	20.1%
Charlson score, mean ± SD	4.8 ± 3.7	4.8 ± 3.7
DISEASE SEVERITY		
Acute Physiology and Chronic Health	23.2 ± 6.6	23.9 ± 6.7
EVALUATION II, MEAN ± SD		
Need for mechanical ventilation	62.6%	51.5%
Need for vasopressors	59.9%	58.0%
Organ failures, mean ± SD	2.3 ± 1.0	2.2 ± 1.1
Treatment with drotrecogin alfa (activated)	3.8%	4.4%
INFECTION CHARACTERISTICS		
Nosocomial	69.3%	48.7%
Community-acquired	5.9%	11.1%
Healthcare-associated	24.8%	40.2%
ADDITIONAL FACTORS		
Length of stay before infection (mean ± SD)	15.3 + 20.7	7.5 + 14.9
Length of stay before infection (median)	9	1
Hospital mortality	51.7%	36.4%

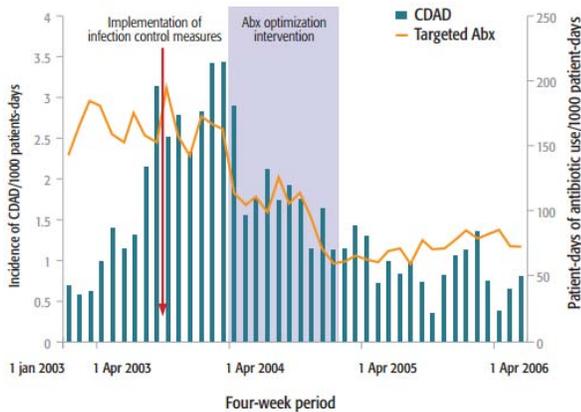
Adapted from Shorr AF, et al., Crit. Care Med. 2011;39:46-51.

Part 1 - Why Implement Antimicrobial Stewardship in Your Hospitals?

Goal 2: IMPROVE PATIENT SAFETY

- Reduce antimicrobial consumption, without increasing mortality or infection-related readmission reduction in antimicrobial use.
- Reduce *C. difficile* colonization or infection by controlling the use of “high-risk” antibiotics

Goal 2 Example of robust stewardship program with strict implementation of infection control measures leading to sustained reduction in *C. difficile* infection [CDI] cases during an epidemic.



Adapted from Valiquette L et al., Clin. Infect. Dis. 2007;45:S112-121.

Goal 4: REDUCE HEALTHCARE COST

(without adversely impacting quality of care)

- Saving achieved by reducing antibiotic costs can be greater than the cost of the intervention or program.

Goal 4 Example of annual savings associated with the implementation of an Antimicrobial Stewardship Program.

YEAR	METHOD A*	METHOD B**
2000 ^a	158,161	229,076
2001	548,002	1,267,638
2002	806,393	1,446,883
2003	473,174	1,354,129
2004	244,160	1,555,048
2005	419,613	2,005,202
2006	983,690	2,172,756
2007	675,036	1,990,967
2008	817,503	2,557,972
2009	1,278,301	2,782,519
2010	2,175,927	3,456,373
2011 ^b	1,770,827	2,406,399
Yearly average	920,070	2,064,441
Total savings	10,350,787	23,224,961

Note: data are US dollars
^a April-December 2000
^b January-June 2011

* Method A: Inflation rate determined using the annual US consumer price index for Medical Care Commodities.

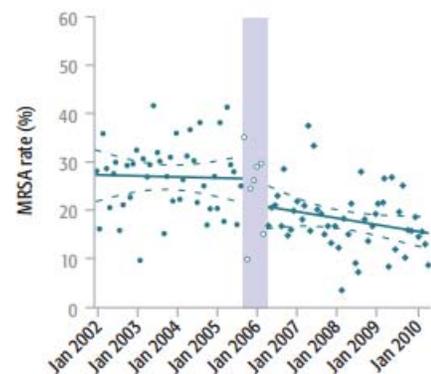
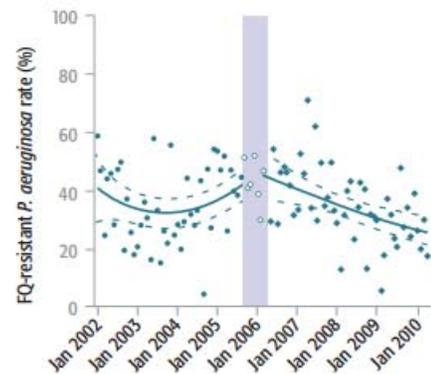
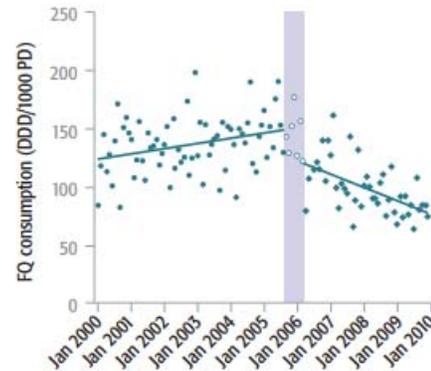
** Method B: Inflation rate determined using an Anti-Infective Specific Index (see article).

Adapted from Beardsley J et al. Inf. Control. Hosp. Epidemiol., 2012;33:398-400.

Goal 3: REDUCE RESISTANCE

- Restricting relevant agents can reduce colonization or infection with Gram-positive or Gram-negative resistant Bacteria.

Goal 3 Example of a reduction of fluoroquinolone use associated with decreased MRSA and fluoroquinolone-resistant *P. aeruginosa* isolation rates.



Adapted from Lafaurie et al., J. Antimicrob. Chemother. 2012;67:1010-5.

We will continue the discussion, “Why Implement Antimicrobial Stewardship in Hospitals?” with “The Implementation of Antimicrobial Stewardship Program”, in the November/December edition of **Semmelweis Times**.

A Pharmacist's Role in an Antimicrobial Stewardship Program

We live in an era where the drugs in our antimicrobial arsenal sometimes have close to no clinical efficacy against the bacteria they're intended to destroy. The question of how to best manage this phenomenon remains. Pharmacists can play a critical role in coordinating better strategies to enhance antimicrobial stewardship. Often, they are already working directly with medical and nursing staff to ensure that patients are prescribed the best treatment by advising on drug selection, dose, and administration method.

Nevertheless, the International Pharmaceutical Federation (FIP) published a report that called for greater pharmacist involvement in antimicrobial stewardship efforts and detailed specific contributions that pharmacists can make. Some of the ways pharmacists practicing in all care settings can continue to fight antibiotic are:

1. Counsel Patients in Community Pharmacy Settings

Community pharmacists are usually a patient's most direct point of contact with respect to their medications. This accessibility affords pharmacists the opportunity to play a pivotal role in community education efforts. Last year, independent pharmacies garnered the best ratings for speed, accuracy, helpfulness, and pharmacist's knowledge, according to a survey by Consumer Reports. Patients reported appreciation for independent pharmacies shorter wait times and greater availability of medications in stock. Results like these indicate that enhanced stewardship strategies could reach a wider patient network if they were implemented independently in community pharmacies.

2. Make Sure Everyone Knows How Important Immunizations

Are All 50 US states plus the District of Colombia have statutes permitting pharmacists to administer vaccines at some level, and many of those statutes are evolving to keep pace with changing patient attitudes towards pharmacists and immunizations. Education about the seriousness of influenza transmission is also a potential role for pharmacists. In light of this, the US Centers for Disease Control and Prevention (CDC) has urged pharmacists to recognize and optimize their role in promoting influenza vaccines ahead of flu seasons. Pharmacists can also help improve vaccination rates by making concerted efforts to quell misguided fears of vaccines, including the link between autism and thimerosal—the mercury preservative that was found in some vaccines.

3. Prevent Unnecessary Antibiotic Use for Non-Bacterial Infections

As many as 1 in 10 health care providers prescribe antibiotics for almost every patient they see presenting with cold or bronchitis, so it should come as no surprise that many patients just assume that antibiotics will cure any ailment. As pharmacists already know, antibiotics are not effective against viruses and therefore should never be used to treat them. It's important for pharmacists to debunk this misconception and guide patients on proper antibiotic usage. This is especially prevalent in the context of geriatric care, as "over the course of a year, 50% to 70% of [nursing home] residents will receive 1 or more courses of antibiotics, and 25% to 75% of antimicrobial use in nursing homes may be inappropriate," according to CDC medical epidemiologist Nimalie Stone, MD, MS

4. You Can't Spell "Hospital Health Care Team" Without "Team"

Because of changing payment models, many facilities are now recognizing the value of the pharmacist in optimizing patient outcomes, though many others are still lagging on forming pharmacist collaborations. Pharmacist engagement on health care teams in hospitals can help ensure that antimicrobial stewardship efforts are embedded into hospital infection control practices at every level. Why else should pharmacists be closely integrated into hospital antibiotic stewardship efforts? "It's very clear why: The pharmacist is looking at the entire picture, not just the antibiotics, so they're picking up things like drug interactions and have access to drug information as fast as anyone," J. Russell May, PharmD, FASHP, told Pharmacy Times. As the authors of the FIP report "All hospitals should have an antimicrobial lead pharmacist who promotes antimicrobial stewardship. This is a perfect scenario where pharmacists can manage the correct use of antimicrobials, and have a remarkable and positive impact on [antimicrobial resistance] prevention."

Source: Pharmacy Times



Interim Guidance for Protecting Workers from Occupational Exposure to Zika Virus

Read the recommendations and descriptions of mandatory safety and health standards at:

http://www.cdc.gov/niosh/topics/outdoor/mosquito-borne/pdfs/osha-niosh_fs-3855_zika_virus_04-2016.pdf

CDC Issues New Report On Sepsis

The Centers for Disease Control and Prevention (CDC) released a new [Vital Signs report](#) focusing on sepsis, emphasizing the importance of prevention and early recognition. According to this report, sepsis begins outside of the hospital for nearly 80 percent of patients; yet, the report found 7 in 10 patients with sepsis had recently interacted with healthcare providers or had chronic diseases requiring frequent medical care. Two free webinars on sepsis will be available in September for Sepsis Awareness Month, one for [all healthcare professionals](#) (September 13) and a second specific to [nurses](#) (September 22). Visit CDC's [sepsis webpage](#) and read the new [Vital Signs report](#) for more information.

Source: Center for Disease Control and Prevention (CDC)

Household MRSA Controlled Through Treatment Compliance, Patient Education

A new study found that following basic hygienic practices and complying with protocols for methicillin-resistant *Staphylococcus aureus* (MRSA) decolonization reduces the time to clearance of the bacteria more quickly than a treatment regimen of antibiotic ointment and antiseptic body wash. The findings, published in *Infection Control & Hospital Epidemiology*, demonstrate the importance of educating patients in hygienic practices, in addition to encouraging adherence to decolonization protocols in the treatment of MRSA.

"MRSA is particularly dangerous because it can colonize in others without causing infection; and those in close contact, such as family members, are more likely to transmit MRSA to each other," said Valerie Cluzet, MD, an instructor in the division of Infectious Diseases at the Perelman School of Medicine at the University of Pennsylvania, and lead author of the study. "As a result, household members could be an ongoing source of MRSA, leading to recurring infections."

The three-arm non-blinded randomized control trial was conducted at five academic medical centers in southeastern Pennsylvania among members of 223 households. It compared three different interventions: education on personal and household hygiene; education with treatment and reminders with daily phone calls and text messages; and education with treatment, but no reminders.

Researchers observed no significant difference in time to clearance of MRSA between the group that received only education and the groups of patients that received antibiotic treatment. However, secondary analyses found that the biggest impact on decolonization was compliance to treatment (>100%). When patients followed the antibiotic treatment guidance, the bacteria were cleared more quickly (23 days) compared with non-compliant households (27 days).

Based on these findings, the researchers recommend clinicians emphasize to patients the importance of compliance with decolonization treatment for successfully clearing MRSA, and spend time educating patients with MRSA about its transmission and measures to control it. Practices such as washing linens regularly, wiping down high-touch surfaces, avoiding sharing personal hygiene items, and practicing hand hygiene can reduce household spread.

"We believe that our study leads to other crucial questions that deserve attention, such as the role of other parts of the household, including pets and the environment, in MRSA transmission, the importance of compliance with decolonization protocols, and the optimal timing, duration, and frequency of decolonization," said Cluzet.

Source: Society for Healthcare Epidemiology of America (SHEA)

Infant Anti-Gas Medication Linked to Spread of Hospital Infections

A surprising ingredient — infant gas relief drops — may be contributing to the contamination of medical scopes nationwide and putting more patients at risk of infection, according to a small but provocative [study](#).

Researchers in Minnesota unexpectedly found cloudy, white fluid inside several colonoscopes and gastroscopes after they had been disinfected and deemed ready for use on the next patient.

Further analysis revealed the fluid contained simethicone, the main ingredient in over-the-counter anti-gas medications available at grocery stores and pharmacies. Doctors nationwide regularly inject the liquid drops into gastrointestinal scopes during colonoscopies and other procedures to reduce bubbles inside the body that can impede visibility.

However, that routine practice may be helping bacteria grow inside a wide variety of scopes and making the bacteria hard to remove. The authors of the study, published in August in the *American Journal of Infection Control*, recommend that hospitals and doctors minimize the use of these products pending further research into their effect on patient safety. Read the full story at <http://www.pbs.org/newshour/rundown/infant-anti-gas-medication-linked-spread-hospital-infections/>

Source: PBS Newshour

Avoiding A Dirty Scope Crisis: 5 Steps To Improve Quality Assurance With Enhanced Visual Inspection

Recent incidents of bacterial infections in patients linked to dirty arthroscopic shavers and endoscopes have spurred dramatic change in device reprocessing and sterilization strategies. Yet many healthcare organizations' central processing departments have yet to follow suit, endangering both patients and hospital personnel. Fortunately, advanced technology and intentional visual inspection practices can greatly improve hospitals' processing quality, Stephen Kovach, director of education at Healthmark Industries.

Some scope and shaver-related infections have occurred at hospitals where staff meticulously followed processing protocol. For particular instruments, such as some endoscopes, processing guidelines recommended by device manufactures have proved inadequate at eliminating infection-causing bacteria and residual organic contaminants, said Mr. Kovach. This has prompted infection control agencies to reform reprocessing recommendations as new surgical instruments prove harder to clean. Organizations such as the Association for the Advancement of Medical Instrumentation, the Association of periOperative Registered Nurses, the Society of Gastroenterology Nurses and Associates, and Instructions for Use now advise hospitals to enhance their visual inspection processes using advanced visual support technology and cleaning verification methods. Still, many hospitals have yet to implement quality assurance practices that align with new industry guidelines, said Mr. Kovach. A 2014 survey by Healthmark Industries found only 7 percent of respondents said staff performed enhanced visual inspection methods in their healthcare facilities.

"Enhanced visual inspection and cleaning verification methods are ways hospitals can build quality assurance into processing of flexible endoscopes," shavers and other reusable surgical devices, said Mary Ann Drosnock, manager of clinical education for endoscopy at Healthmark Industries. Mr. Kavech and Ms. Drosnock elaborated on the five key steps in enhanced visual inspection that align with AAMI, IFU, AORN and SGNA recommendations.

Visual inspection. Visual inspection involves using the unaided eye to inspect medical devices for defects in functionality, pitting, stains, residue and other imperfections during devices' processing cycles. If the device is dirty, personnel may manually re-clean the device at this point.

Magnification. Sterilization and central processing staff should employ magnification tools during inspection for added visual support. Simple devices, such as a magnifying glass, help staff discover organic contaminants or other defects on devices that are undetectable to the naked eye.

Enhanced visual support tools. Today's advanced technology enables personnel to examine medical devices in a more thorough and effective way. AAMI, AORN and IFU recommend using visual support technology to examine internal and difficult-to-see areas of surgical instruments. An investigation of a hospital's endoscope devices by research firm Ofstead & Associates found by using a boroscope to look inside reprocessed endoscopes, 71 percent of endoscopes failed the criteria for a patient-ready device. With advanced examination tools, such as flexible boroscopes and USB-enabled microscopes, central processing staff can examine contaminant-prone areas previously inaccessible to the naked eye.

Verification methods. When central processing personnel discover foreign contaminants, staff should employ methods to identify unknown contaminants or stains found on surgical devices. This enables staff to derive actionable insights into problematic processing procedures and implement revised, improved quality control methods. Staff can use flush, swab or ATP systems to perform identification tests. Verification methods to detect organic matter include protein, hemoglobin and carbohydrate tests.

Documentation. Processing staff should consistently document each step during reprocessing of reusable instruments. This is important for the hospital to show adherence to quality control protocol and record images or processing notes for teaching purposes. Some enhanced visual support tools even have documentation capabilities built in. For instance, USB-enabled microscopes allow staff to instantly record images during examinations for department records.

To download Healthmark Industries & Becker's Publications, "Enhanced Visual Inspection" slides, highlight and open [here](#).

Checklists and Bundles: Patient Safety Tools Require Appropriate Implementation

Evidence-based practice is being implemented through a variety of patient-safety tools, but perhaps checklists and bundles remain one of the best ways to drive down infection rates and boost compliance among healthcare personnel that leads to better patient outcomes.

The American Hospital Association and the Health Research & Educational Trust (2013) observe that "Checklists used in the medical setting can promote process improvement and increase patient safety. Implementing a formalized process reduces errors caused by lack of information and inconsistent procedures. Checklists have improved processes for hospital discharges and patient transfers as well as for patient care in intensive care and trauma units. Along with improving patient safety, checklists create a greater sense of confidence that the process is completed accurately and thoroughly."

Sue Hohenthauer, the enterprise infection prevention director, PPS hospitals and clinics for Dakotas-based Sanford Health, says that check-lists and bundles are very effective tools based on reliability science and are crucial to basic standardization efforts as relating to the daily care of patients," she says. "Checklists such as the 'time out' prior to any surgical procedure - enable processes of patient care to have the right people and the right materials available every time, in every place and with every patient encounter. They are therefore foundational to process improvement and promote and increase overall quality at the bottom of which is patient safety. The surgical time out has been proven conclusively and internationally to reduce mortality and morbidity in surgical patients. Bundles in conjunction with the checklist capture all elements that should occur every time and so mitigate errors caused by our human factors dense industry. Checklists and bundles are therefore routinely a part of best practice/evidence-based healthcare delivery-because we are humans caring for humans."

Hohenthauer says that bundles and checklists are used for central line/Foley catheter placement and ongoing care as well as ventilator management in her facility. "The goal of both is to promote compliance with best practices," she says. "When an infection is identified, a group of unit leadership, direct care givers, infection preventionists and quality improvement staff meet and utilize a defect tool (mini RCA) to help identify opportunities for improvement such as gaps in communication, reliability of processes, and education. Always a part of these efforts is to look at compliance with the bundles that are in place (*CLABSI*, *CAUTI* and *VAP*). Currently, we are able to run reports from the defect tools for *CLABSI* and *CAUTI*. This assists in looking at common themes and/or trends. Checklists are also routinely used for competencies for nurses and other healthcare staff members. Some examples of competencies that are used include Trophon, high-level disinfection, accessing and de-accessing central lines and insertion of Foley catheters."

Critics of checklists claim they encourage healthcare personnel to merely check boxes on technical elements while ignoring "socio-adaptive" elements. As Bosk, et al. (2009) explain their concerns, "Safer care is achieved when all three—not just one—of the following are realized: summarize and simplify what to do; measure and provide feedback on outcomes; and improve culture by building expectations of performance standards into work processes. We propose that widespread deployment of checklists without an appreciation of how or why they work is a potential threat to patients' safety and to high-quality care."

In what was to become one of the most-cited studies on the benefits of patient-safety-tools, Berenholtz and Pronovost, et al. (2004) designed a quality improvement model for central line-associated infections (*CLABSI*) that featured a checklist and a bundle of evidence-based practices, which included proper hand hygiene, chlorhexidine for skin antisepsis, use of maximal sterile barriers, and avoidance of the femoral site. The bundle was accompanied by the provision of education regarding these infection control practices, a catheter-insertion cart, daily review and prompt removal of unwarranted CVCs and empowerment of nurses to enforce adherence to these practices.

A study of multiple checklists at different stages in the perioperative period showed impressive improvements in surgical complications and mortality at six hospitals in The Netherlands. These dramatic results, in ICUs and operating rooms, made checklists virtually synonymous with safer innovative care."

Reducing the Risk of Healthcare-Associated Infections

It's never been more important to insure the care of a patient's health in our hospitals and healthcare systems. The environment plays a critical role in the transmission of disease causing germs which can affect patient healing and wellness. Such risks can include methicillin-resistant *Staphylococcus aureus* (*MRSA*), Vancomycin-resistant *Enterococcus* (*VRE*), *Clostridium difficile*, carbapenem-resistant *Enterobacteriaceae* (*CRE*), norovirus and others.

Research published during the past few years demonstrates the critical importance of effective environmental cleaning along with appropriate disinfection practices in breaking the chain of infection transmission in the healthcare setting. The reality of the research is that lapses in cleaning and disinfection processes used routinely in healthcare have been identified. In fact, multiple studies have shown that less than 50 percent of hospital room surfaces tested were cleaned effectively upon terminal room cleaning, despite having the appearance of being cleaned and prepared for the next patient admission.

Hospitals are meant to be a healing and safe haven for people and not a breeding ground for unwarranted illness. The importance of the role of the environmental service (EVS) department has moved beyond making sure a patient's room is sanitary and prepped properly for the next customer. Paramount now is the testing of cleaned surfaces to reassure the risks of HAIs are reduced and what is left behind is a healthy environment for both patient and staff.

In December 2010, the CDC launched a new expectation of evaluating the effectiveness of environmental cleaning in the healthcare arena with the publication of the "Options for Evaluating Environmental Cleaning". Healthcare environmental services profession, are called upon to redefine what the "norm" of daily cleaning of patient rooms should be. The good news is that in the intervention studies conducted in numerous hospitals, it has been shown that providing environmental service staff with feedback about the results of such monitoring and educating them about the importance of their activities has led to significant improvements in the proportion of surfaces that are cleaned by the front line staff.

With the widely reported outbreak of the "superbug" bacteria *CRE* at the National Institute of Health in Baltimore in 2011, it became increasingly clear to all of us working in healthcare that despite environmental cleaning, the problem of persistent contamination of healthcare surfaces with invisible pathogens was one that we all shared across the country.

The goal should be to reduce the environmental bioburden in patient care areas. This reduction in the count of invisible organisms on patient care surfaces is the critical key to reducing the HAI risk from environmental pathogens to patients. Key to reducing the risk of disease transmission is to reduce the number of environmental organisms and promoting enhanced hand hygiene opportunities for healthcare workers and patients.

What are the best practice recommendations for environmental surface monitoring as we move forward? The first step is the continuation of using the "visual inspection" at the point of service and supplementing it with cleaning validation technology such as ATP measuring devices. These additional tools utilized by the EVS supervisors and Infection Preventionists (IP) are quickly becoming the gold standard in the industry. These enhancements allow the EVS supervisors and IP's the ability to evaluate how effective the cleaning practices of the front line staff are in the removal of contaminants on healthcare surfaces. Providing this feedback to the frontline staff can lead to improved effectiveness of cleaning practices.

Future considerations for improving the cleaning efficacy of the EVS staff include enhancing the fundamental cleaning disinfection practices with no-touch decontamination technology such as Ultra Violet Light and Hydrogen Peroxide Vapor processes. The infection prevention experts recommend that this type of cutting edge technology be considered when challenges with environmental pathogens continue despite adherence to the regular processes of the environmental cleaning program.

Quality EVS programs include:

- Employing a workforce of highly trained and competent Environmental Service managers, supervisors and front line staff.
- Assure that your program is providing effective surface cleaning and disinfection. This includes providing staff with the appropriate tools for the appropriate job including microfiber technology and use of tools to measure cleanliness of high-touch surfaces such as fluorescent marking gel or ATP technology.
- Following the recommendations of the Centers for Disease Control and Prevention (CDC) in the "*Options for Evaluating Environmental Cleaning*" publication, 2010.
- Forming collaborative partnerships between EVS, infection prevention and control and nursing leadership.
- Promoting enhanced hand hygiene awareness programs facility wide for all members of the healthcare team.

Through re-evaluating the current processes in place in our healthcare organizations and the addition of new technologies and processes in the performance of the role of environmental services in healthcare, we are providing a healthier healing environment while leading the way to improving the cleaning efficacy of the patient care areas, reducing the HAI risk to patients and staff and reducing costs to the healthcare system through these efforts.

Study Explains Why MRSA Kills Influenza Patients

Researchers have discovered that secondary infection with the methicillin-resistant *Staphylococcus aureus* (*MRSA*) bacterium often kills influenza patients because the flu virus alters the antibacterial response of white blood cells, causing them to damage the patients' lungs instead of destroying the bacterium. The study, which will be published online August 15 ahead of issue in the *Journal of Experimental Medicine*, suggests that inhibiting this response may help treat patients infected with both the flu virus and *MRSA*.

Many influenza patients develop severe pneumonia as a result of secondary infections with *MRSA*. Over half of these patients die, even when treated with antibiotics that are usually capable of clearing *MRSA* infections. Keer Sun, an assistant professor at the University of Nebraska Medical Center, previously discovered that mice infected with influenza are susceptible to *MRSA* because the ability of their macrophages and neutrophils to kill bacteria by releasing hydrogen peroxide and other reactive oxygen species is suppressed. But it remained unclear why *MRSA*-infected influenza patients often die, even after receiving an appropriate antibiotic treatment.

Sun and colleagues now reveal that this may be because the patients' white blood cells cause extensive damage to their lungs. Though the macrophages and neutrophils of mice co-infected with influenza and *MRSA* were defective at killing bacteria, reactive oxygen species released by these cells induced the death of inflammatory cells within the lungs, lethally damaging the surrounding tissue. Inhibiting *NADPH* oxidase 2 (*Nox2*), the enzyme that produces reactive oxygen species in macrophages and neutrophils, reduced the extent of this damage and, when combined with antibiotic treatment, boosted the survival of co-infected mice.

"Our results demonstrate that influenza infection disrupts the delicate balance between *Nox2*-dependent antibacterial immunity and inflammation," says Sun. "This not only leads to increased susceptibility to *MRSA* infection but also extensive lung damage. Treatment strategies that target both bacteria and reactive oxygen species may significantly benefit patients with influenza-complicated *MRSA* pneumonia."

Source: The Rockefeller University Press, *ICT Infection Control Today*

More is Better When It Comes to Hand Hygiene

Hand hygiene is a simple, effective way to prevent infection. In healthcare facilities, compliance with hand hygiene is high (averages about 80 percent). However, researchers wanted to know if more would be better (that is, would an increase to about 95 percent compliance decrease healthcare-associated infections even more). To find out, they compared compliance before and after implementation of a new hand hygiene program at a hospital in North Carolina. The program involved improving hand hygiene of healthcare workers and having them monitor that of others. During the 17-month study period, hand hygiene compliance increased from high to very high and healthcare-associated infections decreased significantly, indicating that with regard to hand hygiene, more is indeed better.

Sickbert-Bennett, et al. (2016) note, "When the CDC Hand Hygiene Guideline was published in 2002, hand hygiene compliance was summarized on the basis of then-current studies to be very low (average 40 percent, range 5 percent to 81 percent). Investigators have demonstrated reductions in HAI and MDRO infections when compliance increased from low to medium levels (48 percent to 66 percent). More recently, hospital epidemiologists and infection preventionists have worked to achieve and sustain higher compliance by using shared accountability, incentives, and feedback strategies, but until now, no analysis has demonstrated whether an improvement in hand hygiene from a baseline high level (>80 percent) to an even higher level (>95 percent) would lead to hospital-wide decreases in HAI. Demonstrating the importance of continuously improving hand hygiene compliance is critical for staff and hospital leaders who may underestimate the impact on HAI."

As the authors concluded, "A program designed to improve hand hygiene compliance among hospital staff successfully engaged all healthcare personnel in monitoring and improving their own hand hygiene compliance. This pursuit of excellence for hand hygiene compliance led to substantial HAI reductions hospital wide."

Source: *Hand Hygiene, Research, Hand Hygiene Monitoring*

Articles of Interest

Access the revised Roadmap for the Novice Infection Preventionist

Developed for APIC members, the newly revised [Roadmap for the Novice Infection Preventionist](#) now follows the CBIC 2015 Examination Content Outline. This tool outlines the tasks, knowledge, skills, abilities, and resources to take an infection preventionist from the first day on the job through passing the CIC® exam. Access this revised [member-only guide](#) (member login required)

Infection Prevention Week (IIPW), October 16-22, 2016. IIPW, which is the third week of October, raises awareness of the role infection prevention plays to improve patient safety. The 2016 theme is "Break the Chain of Infection." [Read more about the history of IIPW.](#) Log onto <http://consumers.site.apic.org/iipw/> for promotional toolkit, logos and web buttons, online resources.

How do you celebrate International Infection Prevention Week?

Do you get a special cake when you've gone 100 days without a CAUTI?

Have you worn a giant hand costume and walked the units to spread the word on hand hygiene?

Transmission of Mycobacterium chimaera From Heater-Cooler Units during Cardiac Surgery despite an Ultraclean Air Ventilation System

[http://www.medscape.com/viewarticle/865104?](http://www.medscape.com/viewarticle/865104?nliid=108892_805&src=WNL_mdplsfeat_160816_mscpedit_inf&uac=168212MY&spon=3&impID=1179622&faf=1)

[nliid=108892_805&src=WNL_mdplsfeat_160816_mscpedit_inf&uac=168212MY&spon=3&impID=1179622&faf=1](http://www.medscape.com/viewarticle/865104?nliid=108892_805&src=WNL_mdplsfeat_160816_mscpedit_inf&uac=168212MY&spon=3&impID=1179622&faf=1)

Outbreaks Associated With Duodenoscopes

[http://www.medscape.com/viewarticle/865733?](http://www.medscape.com/viewarticle/865733?nliid=108892_805&src=WNL_mdplsfeat_160816_mscpedit_inf&uac=168212MY&spon=3&impID=1179622&faf=1)

[nliid=108892_805&src=WNL_mdplsfeat_160816_mscpedit_inf&uac=168212MY&spon=3&impID=1179622&faf=1](http://www.medscape.com/viewarticle/865733?nliid=108892_805&src=WNL_mdplsfeat_160816_mscpedit_inf&uac=168212MY&spon=3&impID=1179622&faf=1)

Antibiotic Strategies in the Era of Multidrug Resistance

http://www.medscape.com/viewarticle/865979_1?nliid=108892_805

International Infection Prevention Week is less than two months away!

2016 National Influenza Vaccination Week December 4-10, 2016

All 2016-2017 influenza vaccines are made to protect against the following three viruses:

- an A/California/7/2009 (H1N1) pdm09 like virus
- an A/Hong Kong/4801/2014 (H3N2) like virus
- a B/Brisbane/60/2008-like virus. (This is a B/Victoria lineage virus)

Some of the 2016-2017 flu vaccine is quadrivalent vaccine and also protects against an additional B virus (B/Phuket/3073/2013-like virus). This is a B/Yamagata lineage virus.

Vaccines that give protection against three viruses are called trivalent vaccines. Vaccines that give protection against four viruses are called quadrivalent vaccines.

More information about influenza vaccines is available at [Preventing Seasonal Flu With Vaccination](http://www.cdc.gov/flu/protect/vaccine/index.htm)(<http://www.cdc.gov/flu/protect/vaccine/index.htm>).

Webinars

The 3 webinars below are available to view at your convenience.

Antimicrobial Stewardship: Infection Prevention's Role

Linda Greene, RN, MPS, CIC discusses: Antimicrobial stewardship (AS) programs – multidisciplinary efforts to measure and optimize the use of antimicrobials – are key to helping healthcare organizations reduce the risk of acquiring multidrug-resistant organisms (MDROs) and *C.difficile*. A robust AS program requires a team approach. The infection preventionist (IP) is pivotal to a well-functioning team. Because IPs are often the first to identify a problem and have a broad perspective on the prevalence and incidence of drug resistant organisms, *C.difficile*, and other healthcare-associated infections (HAIs) within the organization, their contribution to the program cannot be underestimated.

Advances in the Treatment of Multidrug-Resistant Pathogens: Where are We Now?

In this presentation, Jason Gallagher, Pharm.D., FCCP, BCPS will outline some of the more troubling antibiotic-resistant bacterial pathogens facing society and describe approaches in their management. He will focus on areas in which advancements have been made in our understanding on the optimal treatment of resistant infections and will not serve as a thorough review of all areas. Discussion will involve both therapies that have been shown to be improvements in therapy and, where appropriate, "what not to do."

Antimicrobial Stewardship Has Arrived! Regulations, Guidelines, Penalties and Preparation

Steven M. Riddle, PharmD, BCPS, FASHP and Justin Clark, PharmD will discuss how to design a process for progressive delivery of antimicrobial stewardship services based on best practices including prioritization of activities around regulatory timelines. Improve the awareness and knowledge related to antimicrobial stewardship services with a focus on regulatory, quality and payment drivers.

Source: Pharmacy OneSource

New webinar exposes pathogen hideouts that can be source of SSIs

Register now for the [Addressing Exogenous Factors in Preventing Surgical Site Infections](#) webinar taking place Wednesday, September 21 at 1 p.m. EDT.

Registration is also open for the [NHSN Update Fall 2016 \(October 6\)](#) webinar. Hear directly from Centers for Disease Control and Prevention (CDC) subject matter experts on the most commonly asked questions and scenarios received from NHSN users reporting HAIs.

Contact Information

If you have comments, questions, have suggestions for articles, or would like to contribute an article for this newsletter, please contact:

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