



HOSPITAL INFECTION CONTROL & PREVENTION

THE TRUSTED SOURCE FOR THE INFECTION PREVENTIONIST FOR MORE THAN FOUR DECADES

APRIL 2015

Vol. 42, No. 4; p. 37-48

➔ INSIDE

Long-term care workers avoiding seasonal flu shots 41

The challenge of drug stewardship in outpatient settings 42

CDC, ECRI devise culturing protocols for endoscopes linked to CRE infections 44

Using electronic monitoring to improve hand hygiene 45

Only one confirmed occupational HIV infection in healthcare since 2000 46

Seen our [Webinars] lately?



New Topics Added Weekly

Live & On Demand

Visit us at:
AHCMedia.com/Webinars
AHCMedia.com/OnDemand

Call us at:
800-688-2421

AHC Media

Spore wars: *C. difficile* takes a staggering toll as top HAI

'Difficult' to culture, diagnose, prevent, rid from rooms and hands

While CRE and other “super-bugs” have been much in the headlines of late, *Clostridium difficile* has quietly become one of the most deadly pathogens in the country. Some 500,000 people are infected annually in the United States, with 29,000 patients dying within 30 days of the initial diagnosis of a *C. diff* infection (CDI). That is three times the number of people that have died from Ebola since the epic outbreak began in December 2013.

The CDC winnows the toll to about 15,000 deaths “directly attributable” to CDIs in a new study, making *C. diff* the leading cause of healthcare-associated infections (HAIs) in the country.¹ A confluence of events has led to the CDI epidemic, including the emergence of the highly virulent NAP1 strain, the misuse and overuse of antibiotics, and the difficulty of removing *C. diff* spores from healthcare worker hands and contaminated surfaces. These dormant spores subsequently germinate in the gut of

susceptible patients, who start the cycle again by shedding spores in diarrhea. As a result, there is essentially no margin for error in fighting the pathogen.

“It really is multifactorial. It is antimicrobial use and stewardship, but also environmental services, and getting healthcare workers to what they should do in terms of gowns, gloves, and hand hygiene,” says **Jennie Mayfield**, BSN, MPH, CIC, a clinical epidemiologist at Barnes-Jewish Hospital in St. Louis and past president of the Association for Professionals in Infection Control and Epidemiology.

Mayfield concedes a begrudging respect for the resilient, relentless pathogen, which all but dares the infection preventionist to stop it from reaching vulnerable patient populations.

“It is very challenging — a worthy adversary,” she says. “I have been facing down this organism for almost 15 years now, and it is still a little bit ahead of me.”

Most of the burden of disease is

NOW AVAILABLE ONLINE! VISIT AHCMedia.com **or CALL** (800) 688-2421

Financial Disclosure: Executive Editor **Gary Evans**, Consulting Editor **Patrick Joseph**, MD, Nurse Planner **Kay Ball**, PhD, RN, CNOR, FAAN, and Associate Managing Editor **Jonathan Springston** report no consultant, stockholder, speaker’s bureau, research, or other financial relationships with companies having ties to this field of study.



HOSPITAL INFECTION CONTROL & PREVENTION

Hospital Infection Control & Prevention®

ISSN 0098-180X, is published monthly by
AHC Media, LLC
One Atlanta Plaza
950 East Paces Ferry Road NE, Suite 2850
Atlanta, GA 30326.
Periodicals Postage Paid at Atlanta, GA 30304 and at
additional mailing offices.

POSTMASTER: Send address changes to:
Hospital Infection Control & Prevention
P.O. Box 550669
Atlanta, GA 30355.

SUBSCRIBER INFORMATION:

Customer Service: (800) 688-2421.
customerservice@ahcmedia.com.
www.AHCMedia.com
Hours of operation:
8:30 a.m. - 6:00 p.m. ET Monday-Thursday,
8:30 a.m. - 4:30 p.m. ET Friday

EDITORIAL EMAIL ADDRESS:

Gary.Evans@AHCMedia.com.

SUBSCRIPTION PRICES:

U.S.A., Print: 1 year with free *AMA PRA Category 1 credits™* or Nursing Contact Hours (12 issues), \$499. Add \$19.99 for shipping & handling. Online only, single user: 1 year with free *AMA PRA Category 1 Credits™* or Nursing Contact Hours, \$449. Outside U.S., add \$30 per year, total prepaid in U.S. funds.

MULTIPLE COPIES: Discounts are available for group subscriptions, multiple copies, site-licenses, or electronic distribution. For pricing information, call Tria Kreutzer at (404) 262-5482. Missing issues will be fulfilled by customer service free of charge when contacted within one month of the missing issue date. Back issues, when available, are \$78 each. (GST registration number R128870672.)

ACCREDITATION: AHC Media is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation. This activity has been approved for 15 nursing contact hours using a 60-minute contact hour. Provider approved by the California Board of Registered Nursing, Provider #14749, for 15 Contact Hours.

AHC Media is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. AHC Media designates this enduring material for a maximum of 18 *AMA PRA Category 1 Credits™*. Physicians should only claim credit commensurate with the extent of their participation in the activity.

This activity is effective for 36 months from the date of publication.

Target audience: Infection control practitioners and infectious disease physicians.

Opinions expressed are not necessarily those of this publication. Mention of products or services does not constitute endorsement. Clinical, legal, tax, and other comments are offered for general guidance only; professional counsel should be sought for specific situations.

EXECUTIVE EDITOR: Gary Evans. (706) 310-1754.
Gary.Evans@AHCMedia.com.

CONTINUING EDUCATION & EDITORIAL DIRECTOR:
Lee Landenberger

Copyright © 2015 by AHC Media. Hospital Infection Control & Prevention® and Infection Control Consultant™ are trademarks of AHC Media. The trademarks Hospital Infection Control & Prevention® and Infection Control Consultant™ are used herein under license. All rights reserved.

striking the elderly, with about 65% of CDIs and 80% of deaths occurring in people age 65 or older. More than 100,000 CDIs develop among residents of U.S. nursing homes each year. Meanwhile, excess annual healthcare costs are in the billions, in part because 1 out of every 5 patients with a CDI will suffer a recurrence of the infection and require additional care, the CDC reports.

“One out of nine patients over 65 years old with healthcare-associated CDI dies within 30 days of diagnosis — that is a frightening statistic,” **Michael Bell**, MD, deputy director of CDC’s division of healthcare quality promotion, said at recent press conference. The study was conducted at 10 sites in the CDC’s Emerging Infections Program (EIP), meaning the 2011 data reflect a broad geographic distribution.

“Because [alcohol] hand sanitizers don’t kill spores, it’s essential that you thoroughly wash your hands with soap and water to remove them,” Bell said. “This is one reason why we recommend glove use when caring for patients with *C. difficile* — to make it easier to maintain good hand hygiene. There’s no room for error.”

Gloves gaining emphasis

Hand washing and *C. diff* have taken a long, circuitous route to get to the bottom-line advice in current thinking: emphasize glove use. In truth, neither alcohol rubs nor soap and water are really very effective at removing spores from hands. In the 2014 update to the compendium of infection control guidelines by leading infectious disease groups, wearing gloves was given as much emphasis as hand hygiene for preventing CDIs.

“Although in vivo studies demonstrate that *C. difficile* spores are

resistant to alcohol, they also show poor log reductions (less than 2) for hand washing with soap and water,” the compendium guidelines state.² “A 2013 study showed that only atypical products (e.g., ink and stain remover) could remove more than 1 log.”³

An earlier CDC report on the epidemiology of CDIs came to a similar conclusion: “Glove use, with strict adherence to changing between patient contacts, is the best proven method for preventing hand contamination with *C. diff* from symptomatic patients.”⁴

While the sequelae of any HAI can have some horrific presentations, it’s hard to imagine anything much worse than the hypervirulent NAP1 strain’s ability to spur life-threatening diarrhea and toxic damage to the colon.

“In the past, patients infected with *C. difficile* have had diarrhea that was often perceived as a nuisance but not a major problem,” Bell said. “Unfortunately, the type of *C. diff* circulating in the United States today produces such a powerful toxin that it can cause a truly deadly diarrhea — [an] intense illness that can include damage to the bowels so painful and severe that part of the colon needs to be surgically removed, a condition called toxic megacolon.”

Patients on broad-spectrum antibiotics are at risk for developing infections, as the drugs can wipe out commensal bacteria in the gut and leave the patient vulnerable to a CDI if spores are spread from an environmental surface or from another patient via hands of care workers. More than half of all hospitalized patients will get an antibiotic at some point during their hospital stay, but the CDC estimates that 30-50% of antibiotics prescribed in hospitals are unnecessary. Antibiotic misuse and imperfect infection control may

increase the spread of CDI within a facility, and from there it can move across the healthcare continuum.

“Although people receiving care in hospitals made up two-thirds of all [CDIs], two-thirds of those actually occurred after the patient went home,” Bell said. “It’s essential that patients and their clinicians be aware that they need to take any diarrhea following antibiotic use very seriously. Shorter hospital stays are driving this trend, as incubating *C. diff* in the gut becomes symptomatic after discharge,” Mayfield said.

“The mean incubation period for the onset of disease following acquisition is [about] two days,” she said. “So you’re exposed, you get it in your gut, gut flora are altered, and you don’t become symptomatic until you’re home or in the nursing home.”

That said, the role of *C. diff* emergence and transmission in the community is poorly understood, she added.

“We know it is carried in farm animals,” Mayfield said. “It is out there in the environment. But because it is a spore, it is difficult to grow in the laboratory — that’s why its name is ‘difficile.’ In the [community] situation, it is even more difficult to obtain an isolate to do DNA typing”

Indeed, about 150,000 of the half million infections in the CDC study were community associated and had no documented inpatient healthcare exposure. However, an earlier CDC study found that 82% of patients with community-associated CDIs reported exposure to outpatient healthcare settings, such as a physician or dental office, in the 12 weeks before their diagnosis, suggesting again that the trigger for infection may be outpatient antibiotics.⁴ Another intriguing possibility is that, in addition to outpatient antibiotic use, the ambulatory settings themselves

Survivors, families call for action

Clostridium difficile survivors and family members of patients killed by the disease are raising a collective voice in a call for action.

“Like most Americans, I was unaware of *C. diff*’s existence until it killed my mother **Peggy Lillis** on April 21, 2010,” **Christian Lillis** said at a recent press conference on *C. diff* infections (CDI) held by the CDC. “Unlike the majority of CDI victims, my mother was 56 years old and in good health. She had not been hospitalized until she gave birth to my brother in 1976. Her case, like tens of thousands recognized in the [CDC] study, was community acquired.”

There was a history of recent dental care, but whatever the source CDI struck quickly and the patient spiraled downward. “When Mom came down with diarrhea early one Friday morning she thought it was stomach flu,” Lillis said. “She called her doctor that weekend because it was so severe.”

Prescribed a strong anti-diarrhea medication to little effect, Lillis was severely dehydrated and in an ED that following Tuesday.

“It was there that I first heard the words ‘*Clostridium difficile*,’” Christian Lillis said. “Less than 36 hours later, despite the hospital’s best efforts, including extensive antibiotics [and] IV fluids, my mother was dead. Our grief was epic. Mom was one of nine siblings from an Irish Catholic family in Brooklyn. It felt like our entire community was in mourning as more than 500 people attended her funeral. We struggled for weeks to understand how our mother could die from a disease we’d never heard of.”

As family members became informed of the disease and its devastating effects, they formed the Peggy Lillis Memorial Foundation to raise awareness, educate patients, and shape public health policy to prevent CDIs.

“The numbers in this new study [with] 29,000 deaths are big, often abstract numbers,” Lillis said. “It’s important to keep in mind the actual people behind them. Every day we hear from citizens whose lives have been changed by *C. diff*.”

Another prevention advocate is **Nancy Caralla**, a nurse who acquired CDI occupationally from a patient. Now the founding executive director and president of the *C. Diff* Foundation, Caralla recently described her experience on the CDC’s Safe Healthcare blog (<http://1.usa.gov/1x19MWc>).

“I am a *C. diff* survivor. Tragically, our family lost my father from *C. diff*, too,” she wrote. “I know how fighting a *C. diff* infection can be exhausting on so many levels. It is a physically, mentally, and financially debilitating infection. It has the ability to steal away a loved one, tear away dreams, create added stress on families, diminish financial nest eggs, eliminate employment opportunities, build geographic mobility limitations, and create tears in even the strongest individuals. All aspects of one’s being are involved in fighting a *C. diff* infection. This is why I have dedicated myself to raising *C. diff* awareness worldwide.” ■

may be serving as environmental reservoirs for the transmission of *C. diff* spores — which can linger on antibiotic surfaces and fomites for prolonged periods.

“Studies have shown that CDI

patients that have recovered from their diarrhea can continue to shed these spores in their stool for weeks to a couple months,” says **Cliff McDonald**, MD, senior advisor for science and integrity at the CDC division of

healthcare quality promotion. “[Researchers have found that] examination tables and other ambulatory sites were contaminated with *C. difficile* spores. That is something that we’re very interested in understanding. Is it the exposure to the antibiotics — they receive the prescription in the doctor’s or dentist’s office — that led them to be vulnerable to *C. difficile*. Or was it also that they were exposed to the spores in that setting?”

A 2013 genome study revealed how poorly the routes of CDI transmission are understood, as researchers found that more than half of hospitalized cases did not acquire the organism from another patient in the hospital.⁵

“People have assumed that the vast majority of *C. diff* transmission comes from hospitals and goes out into the community,” **Victoria Fraser**, MD, co-director in infectious diseases at Washington University School of Medicine in St. Louis, said in describing the findings at a medical conference. “But what [these] identified really were dramatically [different] groups of acquisition, many of which could not be linked to another case — could not be linked to the hospital. We don’t completely understand the reservoir or the transmission for *C. diff* in and out of the hospital, the role of agriculture, or the role of food.”

Despite such unknowns, hospitals must reduce antibiotic use, practice meticulous infection control, and implement environmental cleaning to prevent CDIs. All those factors come with the caveat that they are dependent to some extent on the vagaries of human behavior, and it doesn’t take much of a breakdown in any of them for *C. diff* to find a victim.

There are system obstacles as well, as pressure to free and fill rooms may be a disincentive to rigorous envi-

ronmental cleaning, Mayfield said. “Environmental cleaning and disinfection is a major factor in continued transmission,” Fraser said, noting that viable *C. diff* spores have been found in rooms where the previous patient

DESPITE THE
UNKNOWN,
HOSPITALS
MUST REDUCE
ANTIBIOTIC
USE, PRACTICE
METICULOUS
INFECTION
CONTROL, AND
IMPLEMENT
ENVIRONMENTAL
CLEANING TO
PREVENT *C. DIFF*
INFECTIONS.

did not even have a CDI.

“Some of the newer technologies such as UV light and hydrogen peroxide are great ideas, but we run into problems in that there is some down time,” she said. “You put the hydrogen peroxide in the room and it takes an hour. Meanwhile, the ER has four patients backed up that they needed to admit 10 minutes ago. There is this tremendous push to get patients into beds. When you are in that situation it’s really difficult to say, ‘No, we have to close off this room [for cleaning and disinfection].’”

Given the barriers to prevention, Bell’s recommendations to best the bug were daunting.

“*C. difficile* infections must be diagnosed quickly and correctly so

that the infected patient can be cared for using the right infection control techniques, cleaning the environment near the patient with the right spore-killing disinfectants, ensuring perfect hand hygiene all the time, and also letting facilities know when a patient with *C. difficile* is about to be transferred to them so they can use the right infection control practices,” he said.

As noted, none of that is easy, and even the available tests have their own set of problems.

“There is no diagnostic test that makes the diagnosis for you,” McDonald said. “It’s a combination of the clinical symptoms of the patient, their situation, and a laboratory test. The old tests that were commonly being used all the time were the enzyme amino assays and they were generally not sensitive enough. PCR tests are now being more and more used ... they are much more sensitive. There is some controversy that sometimes they’re too sensitive.”

A case in point is the oncology population Mayfield works with. The chemotherapy these patients undergo can cause diarrhea similar to *C. diff*, but the PCR tests do not really differentiate whether someone has active CDI or is merely colonized, she said.

There are some forces at play that hold the potential to change this picture dramatically. For one, facilities working in concert can be effective, as CDIs dropped 20% among 71 hospitals in three states participating in targeted prevention collaboratives, the CDC reported.⁴

The Centers for Medicare & Medicaid Services (CMS) requires CDI reporting to the CDC surveillance system. Measuring typically precedes prevention in infection control, and *C. diff* should be no different. In 2017, the CMS will include CDI prevention in its value-based

purchasing or “pay for performance” programs. As previously reported in *Hospital Infection Control & Prevention*, CMS is moving quickly to issue regulatory requirements for antibiotic stewardship programs, and may have a proposed rule on the table as early as this year.

“If we can improve antibiotic prescribing we expect to see rates of *C. difficile* infections improve dramatically,” Bell said. “In England, over a three-year period, they were able to push *C. difficile* infection rates down

by over 60% just by doing a better job of managing how antibiotics are used.” ■

REFERENCES

1. Lessa FC, et al. Burden of *Clostridium difficile* Infection in the United States. *N Engl J Med* 2015; 372: 825-834.
2. Ellingson, K, et al. Strategies to prevent healthcare-associated infections through hand hygiene. *Infect Control Hosp Epi* 2014;35: 937-960.
3. Edmonds SL, et al. Effectiveness of hand hygiene for removal of *Clostridium difficile* spores from hands. *Infect Control Hosp Epi* 2013;34: 302-305.
4. Centers for Disease Control and Prevention. Vital signs: Preventing *Clostridium difficile* infections. *MMWR* 2012;61:157-162.
5. Eyre DW, et al. Diverse sources of *C. difficile* infection identified on whole-genome sequencing. *N Engl J Med* 2013;369:1195-1205.

LTC worker flu shot rates low due to false fears

Workers need to understand that vaccinated residents may still lack immunity

Whether it is due to apathy or ignorance, many workers in long-term settings have historically avoided seasonal flu shots, even though the residents under their care may be at high risk of experiencing complications of influenza infection.

“Often times in nursing homes, there are more tech nursing assistants, a less professional staff. They’re often young and healthy people who don’t realize that the real value of vaccination is to keep themselves well [so they do not] transmit disease to their elderly patients,” says **Linda Greene**, RN, MPS, CIC, senior advisor to the regulatory review committee for the Association for Professionals in Infection Control and Epidemiology (APIC).

Educate nursing home staff about how elderly patients have weaker immune systems, which makes them more susceptible to illness, Greene adds.

“If we’re going to make a dent in the vaccination rate, then we have to shore up what we do across the whole continuum of care, and APIC has been a leader in that area,” Greene says. “That’s been a goal of ours for a

long time.”

Of course, the residents certainly should be immunized unless they have contraindications, but the elderly are unlikely to mount a strong immune response despite being vaccinated.

Concurring with Greene, a researcher who recently published a study on the issue says long-term care workers must be educated about the vaccine’s lower effectiveness among elderly residents.

“About three-quarters of older people in nursing homes get the vaccine,” says **Jill Daugherty**, MPH, PhD, lead author of the study and formerly a graduate research assistant at the Rollins School of Public Health at Emory University. “There are some who do not get it because maybe they have cancer or are immunocompromised.”

But even those who are vaccinated have a greater probability of being infected with influenza than younger, healthier people, she adds.

“For all of those reasons, if you are working among a group for whom getting the flu could be really detrimental and deadly, it’s important you

do everything you can to prevent the spread of the virus,” Daugherty says. “We recommend that facilities that are struggling with their staff vaccination rates do more to educate their employees about the importance of vaccines and offer incentives to prop up those numbers as well.”

Vaccine myths and misconceptions

Healthcare workers in general have provided a variety of reasons for avoiding vaccination, and one could certainly argue that the flu shot is only marginally effective in seasons such as 2014-2015 when there is a mismatch between the vaccine and the predominantly circulating strains.

In looking at long-term care workers, Daugherty and colleagues found reluctance to receive a vaccine tied to the myths and misinformation that have been circulating for years.

The study examined flu vaccination rates among 1,965 workers at 37 nursing homes in Georgia, Florida, and Wisconsin.¹

“We found that approximately half

got the flu vaccine in the previous season,” Daugherty says. “This ranged widely, with Wisconsin having the overall highest rate of 97% in some facilities, and Florida having the overall lowest rate of 15% at certain sites.”

Healthcare workers in Wisconsin were more likely to believe the vaccine would be effective, she notes.

“There were more inaccurate beliefs among healthcare workers in Florida, and that corresponds with whether someone gets the vaccine,” Daugherty says.

No, the shot cannot give you influenza

One of the inaccurate beliefs was that the vaccine contained a live virus that could cause influenza in the immunized.

“We found that if a person believes the vaccine does not cause the flu

then they were more likely to receive it,” Daugherty says.

In addition, some workers thought they would not spread the flu to residents even if infected. Others rationalize that since they never get the flu, they won’t this season.

“If workers believed they were likely to get the flu or that they could spread it to the people they worked with they were more likely to get the vaccine,” Daugherty says.

Broad demographics seemed to initially predict who would be vaccinated and who would decline.

“Black respondents were much more unlikely to get the flu vaccine than white respondents,” she says. “But once we controlled for their beliefs about the vaccine, that association went away, so their beliefs about the vaccine were the driving factor.”

The survey was conducted after the 2009 H1N1 pandemic and also covered the flu seasons of 2010-2011

and 2011-2012.

“The flu was in the news a lot around then, and there certainly was more of an emphasis to get vaccinated in those years,” Daugherty says.

All of the nursing homes made vaccination convenient and free with onsite shots during daytime hours at several different times during the flu season. Some nursing homes offered incentives to employees to get vaccinated. The most common incentive was they could have their name put in a raffle for a \$100 gift card, she says.

None of the facilities studied mandate vaccination. ■

REFERENCE

1. Daugherty JD, et al. Influenza vaccination rates and beliefs about vaccination among nursing home employees. *Am J Infect Control* 2015;43:100-106.

Hospitals moving on antibiotic stewardship, but outpatient settings have a more difficult task

And then there’s China, where unneeded antibiotics are counted in billions

The analogy between antibiotic resistance and climate change is an apt one in the sense that both require local and global responses. Flagrant antibiotic prescribing in outpatient settings, for example, can certainly undermine a judicious hospital response. Similarly, what good is it if one country fights to save fading antibiotic efficacy but another nation passes out pills like candy?

Reaffirming an all-too-common theme, a recent study found that 45% of patients with respiratory tract infections (RTIs) were inappropriately prescribed antibiotics in an outpatient practice of general internal and family medicine.

The study found that family medicine providers were more likely than general internal medicine providers to engage in inappropriate antibiotic prescribing for treatment of RTIs.¹

“For a long time it’s been known that respiratory infections have been overprescribed,” says lead author **Tamar Barlam**, MD, MSc, director of the Antimicrobial Stewardship Program for Boston Medical Center. “Many studies show that acute bronchitis does not need an antibiotic — it’s definitely a viral process.”

Colds and nonspecific RTIs also do not require antibiotics, she adds. The researchers looked at data from family doctors and general internal

medicine doctors to assess their prescribing habits when presented with RTIs, which were coded in various ways.

“Prior studies have found that antibiotic prescribing practice is pretty good when they get out of medical school, and then it gets worse,” Barlam says. “We didn’t find that at all. We found the practice was pretty poor whether the physician was in practice for less than a year or for 30 years.”

The researchers conducted a retrospective analysis of outpatient visits for patients who sought care for respiratory tract infections within a general internal medicine and family

medicine practice at Boston Medical Center. During the two-year study, researchers recorded 4,942 visits.

Bronchitis was associated with the highest amount of inappropriate antibiotic use (71% of patients received an antibiotic), followed by sore throat (50%), and nonspecific upper RTI (28%). Additionally, the researchers found that women were prescribed antibiotics more often than men, and black patients were less likely to be overprescribed antibiotics than white patients.

“It is concerning that there may be a different approach to patients depending on race or gender, which may suggest inequities in care,” Barlam says.

Researchers also compared those who prescribed antibiotics for only 20% of visits with those who prescribed antibiotics for 65% of visits.

“High prescribers had young, white, and more likely to be privately insured patients,” Barlam says.

High prescribers also coded more often for bronchitis, and the low prescribers coded for unspecified RTIs, she adds. Researchers found that high prescribers tended to work in a practice with other high prescribers, and low prescribers worked with other low prescribers. This finding suggests that as hospitals acquire physician practices, they can have an effect on antimicrobial stewardship, Barlam says.

“Hospitals should not forget that overseeing hospital stewardship should extend into outpatient practices and the emergency room,” Barlam says.

Barlam and colleagues suggest implementing comprehensive education about antimicrobials and stewardship into medical school curricula to prevent establishment of poor prescribing practices. Other suggestions include enlisting low prescribers as physician leaders alongside high

prescribers to influence efficient use of resources.

Other approaches

Another possible antimicrobial stewardship intervention is a one-hour, on-site clinician education session, followed by a year of personalized, quarterly audit and prescription feedback.²

This intervention led to improved adherence to prescribing guidelines for common bacterial acute respiratory tract infections (ARTIs), according to a study led by **Jeffrey S. Gerber**, MD, PhD, an infectious disease physician at the Children’s Hospital of Philadelphia (CHOP).

“We have already translated this from research to a quality improvement initiative at CHOP,” Gerber says. “We have trained primary care pediatricians, who are members of these practice groups, to help implement this program, including educating their peers and serving as liaisons to help improve the data delivery for feedback reports.”

This generic approach should be generalizable when a health system has an electronic health record, staff to prepare and present antibiotic prescribing data, and willing, front-line clinicians, Gerber adds.

Another study reviewed parent and clinician views regarding prescribing decisions for acute childhood infections in primary care. Researchers found that pediatricians often prescribed antibiotics for childhood infections as a “just-in-case” precaution.³

“By ‘just in case’ we mean that even when doctors do not think antibiotics are likely to help the child get better, they sometimes prescribe them because they do not want to take any chances,” says **Patricia Lucas**, PhD,

senior lecturer at the University of Bristol in Bristol, United Kingdom.

For example, some clinicians said that if they feel a parent is very anxious, or if they are not certain a parent will be able to cope well with caring for their child, they might give antibiotics, she explains.

“In these cases, they are not prescribing according to their assessment of the child’s illness, but prescribing to avoid the possibility of negative outcomes, such as a repeat consultation, or a panicky parent,” Lucas says.

However, the researchers concluded that physician uncertainty was the most relevant factor.

“Actual pressure from parents is rare,” she says. “We think that parent demands for other things, such as reassurance, medical evaluation, information, and time, are misinterpreted by doctors as demands for antibiotics.”

The solution would be for doctors to spend more time establishing what parents are looking for in a consultation, Lucas says.

“Many parents have a no-treatment preference, but they want to make sure that a doctor agrees that it is OK to focus on symptomatic relief only,” she says. “A full examination and history taking, reassurance that the illness will pass without treatment, and clear information about the symptoms of severe illness helps parents feel confident that they are taking care of their child.”

Sometimes the language physicians use gets in the way of providing reassurance to parents, Lucas adds.

“When doctors call self-limiting illness ‘minor,’ this does not reflect the major impact it can have on family life if children are home from day care, work is missed, and no one in the family is sleeping very well,” she explains. “Focusing on what might help this child on this occasion feel

better should reduce the chances of miscommunication.”

More stick, less carrot

Back in the United States, a presidential advisory panel recently recommended that the Centers for Medicare & Medicaid Services (CMS) develop antibiotic stewardship regulations that would include quality measures assessing inappropriate antibiotic prescribing in the Physician Quality Reporting System (PQRS). This would tie best practices to reimbursement through the use of payment penalties for non-participation in PQRS. An antibiotic-reporting module would be mandatory.

“Most antibacterial drugs prescribed for humans are administered in outpatient settings rather than in hospitals,” the President’s Council of Advisors on Science and Technology (PCAST) reported.⁴ “The vast majority of antibiotics are used for ARTIs. Yet most RPIs are caused by viruses, against which antibacterial drugs are useless. Such inappropriate use contributes directly and substantially to increased antibiotic resistance, increased adverse drug reactions, increased *C. difficile* infections, and increased cost of care.”

Yet even if doctors muster the will and determination to put their own

formulary in order — both in hospitals and outpatient settings — there is that aforementioned global problem. It is now abundantly clear that a pathogen that emerges anywhere can very quickly cause problems just about anywhere else. A pan-resistant pathogen from a country that flagrantly disregards antibiotic stewardship will not respect any borders or boundaries.

Michael Bell, MD, a veteran epidemiologist at the CDC, recently wrote an editorial that cited a disturbing example of this problem, as evidenced by a study running in the same journal.^{5,6}

Wang et al describe “a striking and widespread example of medical misuse that can rapidly drive the acquisition and spread of antibiotic resistance,” Bell wrote. “They assessed China’s primary care system, a network of mostly rural facilities that provide two-thirds of that country’s healthcare — amounting to 3.7 billion outpatient encounters each year. More than 60% of antibiotic prescriptions were found to be inappropriate, with 78-93% of respiratory infections being treated with antibiotics. In addition, they describe a system supported by staff with little training and education; their ability to restrict antibiotic misuse is further hampered by an innate conflict of

interest wherein the facility must sell antibiotics to maintain its operating budget. Unfortunately, China’s situation is not unique.” ■

REFERENCES

1. Barlam T, et al. Antibiotics for respiratory tract infections: A comparison of prescribing in an outpatient setting. *Infect Control Hosp Epi* 2015; 36:153-159.
2. Gerber JS, et al. Effect of an outpatient antimicrobial stewardship intervention on broad-spectrum antibiotic prescribing by primary care pediatricians. *JAMA* 2013;309: 2345-2352.
3. Vodicka TA, et al. Reducing antibiotic prescribing for children with respiratory tract infections in primary care: A systematic review. *Br J Gen Pract* 2013;63:e445-e454.
4. President’s Council of Advisors on Science and Technology. Report to the president on combating antibiotic resistance. September 2014. Available at: <http://1.usa.gov/1qhDgF6>.
5. Bell M. Antibiotic misuse: A global crisis. *JAMA Intern Med* 2014;174:1920-1921.
6. Wang J, et al. Use and prescription of antibiotics in primary health care settings in China. *JAMA Intern Med* 2014;174:1914-1920.

CDC, ECRI Institute devise culturing protocols for duodenoscopes to prevent CRE infection

An ideal protocol, however, may call for more of the expensive scopes

Responding to a series of outbreaks of carbapenem-resistant enterobacteriaceae (CRE) linked to duodenoscopes, the CDC has developed an interim protocol for culturing the devices before use to

create a greater margin of safety for patients.

But as others have noted, the approach is not foolproof and could be costly if facilities determine they must purchase more scopes to adopt the

protocol. Duodenoscopes are priced in the \$40,000 range, according to researchers who came up with a similar protocol at the ECRI Institute, an independent research group.

The CDC protocol provides a

plan to determine how scopes may be sampled and how to test the samples in a lab. (<http://1.usa.gov/1MwdevG>)

“Like other proposed solutions to the problem of duodenoscope-related CRE infections, we recognize that there are both pros and cons associated with using screening cultures,” **Michael Bell**, MD, deputy director of CDC’s division of healthcare quality promotion, wrote in a blog post. “There can be concerns about cost, as using this method will mean that the duodenoscopes will not be available for use while waiting for the results of the cultures. This could mean that a facility would need to buy additional scopes in order to be sure they have the equipment available when needed. Additionally, the failure to grow bacteria from the areas sampled may not guarantee that there are no bacteria present anywhere on the scope.”

The ECRI Institute also proposed a solution that will allow medically necessary procedures to continue at considerably less risk to patients. The problem is that endoscopic retrograde cholangiopancreatography (ERCP) — a procedure performed on some half-million U.S. patients annually — poses a risk of transmission of CRE because the bug has found a way to survive in intricately designed, hard-to-clean duodenoscopes. The scopes are primarily used for ERCP, an upper endoscopy procedure to access the pancreas, biliary tract, and liver.

ECRI advises, in a nutshell, not to use the duodenoscopes until they culture negative. ECRI issued a Hazard

Report (<http://bit.ly/1EhdkDF>) that details the method, which would keep these important procedures available to patients at reduced risk of a CRE infection. In addition, ECRI recommends hospitals conduct regular CRE surveillance through duodenoscope culturing, regardless of which reprocessing method facilities use (e.g., high-level disinfection using a liquid chemical germicide or sterilization using ethylene oxide).

HOSPITALS SHOULD CONDUCT REGULAR CRE SURVEILLANCE THROUGH DUODENOSCOPE CULTURING, REGARDLESS OF WHICH PROCESSING METHODS FACILITIES USE.

This could be performed in many ways, but until further culture recommendations are available ECRI recommends one of the following approaches:

Culture every duodenoscope after reprocessing is completed and wait to release the cultured scopes until

negative results are received. Culture incubation typically takes up to 48 hours.

“We believe this will provide the highest assurance of preventing CRE infections,” ECRI reported.

Since few hospitals have the luxury of stocking enough scopes to have a few idle awaiting culture results, an alternative plan would be to culture scopes weekly, starting at the end of the day Friday so the bacteria may grow over the weekend.

“This will not provide the high degree of assurance that culturing after each reprocessing cycle provides,” ECRI noted. “It also bears the risk of unknowingly using contaminated scopes between culturing intervals. However, weekly culturing will be less likely to require increases to duodenoscope inventories. It will also limit the risk of potentially exposing a large number of patients to contaminated scopes as compared to less frequent culturing.”

If a duodenoscope culture is positive, ECRI recommends repeating reprocessing using a standard method and re-culturing the instrument. If this next reprocessing results in a positive culture, consider sending the duodenoscope back to the manufacturer for further assessment or retiring it. Notify infection preventionists of all positive CRE cultures, ECRI advised.

If cultures return positive on more than one scope, consider the possibility of a CRE reservoir in the reprocessing equipment or other sources, ECRI noted. ■

Hospital goes high tech, improves hand hygiene

An Alabama hospital greatly improved hand hygiene compliance and significantly reduced healthcare-associated infections (HAIs) after installing an automated

hand hygiene monitoring system.

“One surgical ICU kept raising the bar, and they’re at 100% compliance,” says **Brenda Brazzell**, RN, BS, lead author of the study and former

manager of infection control and employee health at Princeton Baptist Medical Center in Birmingham, AL.¹

On most units that used the electronic monitoring technology, hand

hygiene compliance doubled. Some areas achieved especially high rates of hand hygiene compliance, she says.

The surgical ICU achieved the optimal compliance rate due in part to a champion — a nurse manager who demanded hand hygiene compliance, Brazzell notes.

“She would say, ‘If you are going to work here, do hand hygiene,’” she says.

The hospital’s automated system involves hand sanitizer and soap dispensers that contain radio frequency identification (RFID) electronic devices. Nurses and other patient care staff, including patient care assistants, unit clerks, radiology techs, respiratory therapists, and phlebotomists, wear neck badges that connect electronically with the dispensers.

“When they walk up to a hand sanitizer dispenser, which is between every patient’s room, they stand in front of it, fully push the dispenser, and it recognizes the employee,” Brazzell explains.

The dispensers feature small screens that provide information about the weather and tips related to patient care and infection control.

The goal is to help staff create the habit of hand sanitizing within 30 seconds of entering a patient’s room and immediately after exiting.

“If you have gloves, you remove the gloves, wash hands with soap and water, and you do this before you leave the room,” Brazzell says.

The computerized system collects information about hand hygiene compliance, which managers can use to identify obstacles. The system could send alerts to pagers or phones when a worker fails to comply, but the hospital chose not to do this because the goal was to encourage and use positive reinforcement.

“We didn’t want to be the big brother looking over their shoulders,” Brazzell explains. “We wanted the information so we could ask them, ‘Can you tell me what obstacles prevented you from doing hand hygiene in these episodes?’”

The hospital used data collected about individual and unit hand hygiene compliance to fix obstacles and improve compliance.

“Hand hygiene is the number one way to prevent infection, and we had to make our patients the number one focus,” Brazzell says.

For instance, they found that some employees were too short to be recognized by the devices’ monitors. Other times, workers would say their badge wasn’t working, but instead of calling for help as they were instructed to do, they let it go. Another problem was having a low battery.

“We had some technical errors and had the company come out to fix these,” Brazzell says. “Our facilities engineer can fix most wiring problems.”

One of the hospital’s compliance strategies was to improve hand hy-

giene behavior through the electronic system, reinforcing positive behavior through incentives such as scheduling benefits.

“We give staff compliant in hand hygiene an extra weekend off,” Brazzell says. “If you are in the excellent category of compliance, then you might get an extra weekend off during a six-week period.”

This compliance could not be achieved by entering a room once and doing it correctly.

“There had to be a certain number of episodes of entry and exit in order to qualify,” she explains.

A prevention liaison team monitoring compliance added another layer, Brazzell says.

“They monitored without the staff knowing someone was observing their hand hygiene, and it could be anyone in their area — a resident, a doctor, another staff member,” she says.

Observation monitoring supplements the electronic monitoring and can be used in hospital areas that do not have the hand hygiene technology.

“Not all units have adopted it, but the units that did saw their compliance skyrocket,” Brazzell says. ■

REFERENCE

1. Brazzell BD. Improving high hand-hygiene compliance and reducing healthcare-associated infection in eight nursing units. *Am J Infect Control* 2014;42:S25-S26.

CDC: Only one confirmed occupational HIV infection in a U.S. healthcare worker since 2000

A dozen other workers listed as ‘possible’ occupational HIV infections

In the 1980s, when HIV infection was tantamount to a death sentence, healthcare workers bravely took care of the first epidemic waves

of AIDS patients.

Tragically, needlesticks and blood exposures then led to the first occupational HIV infections, propelling

the movement for sharps safety in healthcare.

Now, such infections are very rare, though 12 other healthcare

workers contracted HIV infections possibly through their occupations, the CDC reports.¹

The improvement in HIV treatment often means lower viral loads for patients and better post-exposure prophylaxis for healthcare workers, says **David Kuhar**, MD, medical officer with CDC's division of healthcare quality promotion. But healthcare workers must report exposures and receive prompt evaluation and follow up, he says.

Reporting needlesticks, exposures still critical

"It remains critical to report these injuries and take them seriously, and not just [out of concern] for HIV," he says. "There's also risk for infection with other bloodborne pathogens."

The only recent confirmed case of occupationally acquired HIV involved a technician in a research laboratory who sustained a needlestick with an HIV-positive culture in 2008.

For some reason, the technician did not take antiviral medications for post-exposure prophylaxis, says **M. Patricia Joyce**, MD, medical officer and epidemiologist with CDC's division of HIV/AIDS prevention.

"We don't know all the factors and decisions that were made in the clinical management of this case," she says, adding that testing, evaluation, and follow up must be conducted in a timely manner.

Between 1985 and 2000, 57 healthcare workers had documented cases of occupationally acquired HIV.

Twenty-four (42%) of them were nurses and 16 (28%) were laboratory technicians. Some 88% of the incidents involved hollow-bore needles.²

Five suspect cases in clinical lab techs

Of the 12 cases since 2003 that were deemed to have a possible occupational link, five were clinical lab technicians, two were nurses, and one was a non-surgical physician, Joyce says.

"Nurses are among the highest risk [groups] both for the confirmed and the possible [cases]," she says.

Joyce also notes that hospice nurses and health aides have potential exposure to blood and body fluids and also are at risk of HIV and other bloodborne pathogens.

The small number of occupationally acquired HIV cases shows the effectiveness of precautions, safer devices, and prophylaxis. But that shouldn't be interpreted as evidence that there's less risk of contracted

HIV from a needlestick or other exposure, say Joyce and Kuhar.

"We don't know how many people were at risk and because they followed [recommended protocols] and took post-exposure prophylaxis didn't get infected," says Joyce. ■

REFERENCES

1. Joyce MP, et al. Notes from the field: Occupationally acquired HIV infection among health care workers — United States, 1985–2013. *MMWR Morb Mortal Wkly Rep* 2015;63: 1245-1246.
2. Do AN, et al. Occupationally acquired HIV infection: National case surveillance data during 20 years of the HIV epidemic in the United States. *Infect Control Hosp Epidemiol* 2003;24:86-96.

CME/CE OBJECTIVES

After completing this activity, participants will be able to:

1. Identify the clinical, legal, or educational issues encountered by infection preventionists and epidemiologists;
2. Describe the effect of infection control and prevention issues on nurses, hospitals, or the health care industry in general; and
3. Cite solutions to the problems encountered by infection preventionists based on guidelines from the relevant regulatory authorities, and/or independent recommendations from clinicians at individual institutions.

COMING IN FUTURE MONTHS

- Live from Nashville: Full coverage of the APIC conference
- Joint Commission reacts to CMS hospital infection control survey
- Who will be the next generation of infection preventionists — and will there be enough of them?
- CDC taken to the woodshed over lab safety culture that lacks training and fears reporting
- Renewed push for a national safe patient handling standard
- Overcoming barriers to safe patient handling



HOSPITAL INFECTION CONTROL & PREVENTION

CONSULTING EDITOR

Patrick Joseph, MD

Chief of Epidemiology
San Ramon (CA) Regional Medical Center and
President, California Infection Control
Consultants
San Ramon

EDITORIAL ADVISORY BOARD

Kay Ball, PhD, RN, CNOR, FAAN

Associate Professor, Nursing
Otterbein University
Westerville, OH

Ruth Carrico, PhD, RN, FSHEA, CIC

Associate Professor
Division of Infectious Diseases
School of Medicine
University of Louisville

Patti Grant, RN, BSN, MS, CIC

Director: Infection Prevention/Quality
Methodist Hospital for Surgery
Addison, TX

Allison McGeer, MD,

Professor, Dalla Lana School of Public Health,
University of Toronto
Director, Infection Control and Microbiologist,
Mount Sinai Hospital, Toronto

William Schaffner, MD

Chairman
Department of
Preventive Medicine
Vanderbilt University
School of Medicine
Nashville, TN

Connie Steed, MSN, RN, CIC

Director, Infection Prevention
Greenville Health System
Greenville, SC

Katherine West,

BSN, MEd, CIC
Infection Control Consultant
Infection Control/
Emerging Concepts
Manassas, VA

To reproduce any part of this newsletter for promotional purposes, please contact:

Stephen Vance

Phone: (800) 688-2421, ext. 5511
Email: Stephen.Vance@AHCMedia.com

To obtain information and pricing on group discounts, multiple copies, site-licenses, or electronic distribution please contact:

Tria Kreutzer

Phone: (800) 688-2421, ext. 5482
Email: Tria.Kreutzer@AHCMedia.com

To reproduce any part of AHC newsletters for educational purposes, please contact The Copyright Clearance Center for permission:

Email: info@copyright.com
Website: www.copyright.com
Phone: (978) 750-8400

CME/CE INSTRUCTIONS

To earn credit for this activity, please follow these instructions:

1. Read and study the activity, using the provided references for further research.
2. Scan the QR code to the right or log on to www.cmecity.com to take a post-test; tests are taken after each issue. First-time users will have to register on the site using the 8-digit subscriber number printed on their mailing label, invoice or renewal notice.
3. Pass the online tests with a score of 100%; you will be allowed to answer the questions as many times as needed to achieve a score of 100%.
4. After successfully completing the test, your browser will be automatically directed to the activity evaluation form, which you will submit online.
5. Once the completed evaluation is received, a credit letter will be emailed to you instantly.



CME/CE QUESTIONS

1. **A combination of events has led to the *Clostridium difficile* epidemic, including which of the following?**
 - A. emergence of the highly virulent NAP1 strain
 - B. misuse and overuse of antibiotics
 - C. difficulty of removing spores from worker hands and the environment of care
 - D. all of the above
2. **What percentage of *Clostridium difficile* infections are occurring in people age 65 or older?**
 - A. 58%
 - B. 65%
 - C. 75%
 - D. 80%
3. **Long-term care residents may be at high risk of experiencing complications of influenza even if they get vaccinated for flu.**
 - A. True
 - B. False
4. **According to the CDC, how many other health workers with HIV were "possibly" occupationally infected?**
 - A. 12
 - B. 4
 - C. 9
 - D. 22