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→ INSIDE

Child Deaths by Flu: Add a palpable sense of urgency for immunization in an era when some parents are suspicious of vaccine efficacy and safety.....	124
CMS Stewardship Reg: The CMS recently finalized its 2016 rule requiring antibiotic stewardship programs in hospitals.....	127
Point Taken: CMS makes a few changes to stewardship regulation based on questions and comments.....	128
Drug Prophylaxis in Dentistry: With antibiotic stewardship now required in hospitals and increasingly normalized in other healthcare settings, dental offices are something of an outlier	130
Emerging Infections: While IPs get caught up in day-to-day concerns of a multifaceted job, there is always the next threat of an emerging infection a plane ride away from virtually anywhere on the globe.	131

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CDC: Flu Vaccination Can Keep You out of the Hospital, Morgue

Old safety myths, efficacy questions undermine immunization

By Gary Evans, Medical Writer

Given the nation's antivaccine movement and the annual safety myths and efficacy quibbles about the seasonal influenza vaccine, public health officials are keeping it simple this year: A flu shot can keep you out of the hospital and the morgue.

The Centers for Disease Control and Prevention (CDC) presented two studies recently in Washington, DC, at the IDWeek 2019 conference showing that flu vaccinations prevented hospitalization in children and deaths in adults.

"Last year [in the 2017-2018] flu season, about a million people were hospitalized and more than 79,000 died," **Kristina Bryant**, MD, IDWeek Chair, said at an Oct. 4, 2019, press conference. "New research presented at this meeting confirms why it is so important for everyone 6 months and older to get a flu shot every year. Vaccines work. Flu vaccine reduces the risk of hospitalization in children and the risk of death in adults."

In one study, flu vaccination of children in the 2016-2017 and 2017-2018 seasons reduced their risk of hospitalization by 48%.¹ In the other study² presented at IDWeek, prior flu vaccination reduced mortality by approximately one-third in adults hospitalized with influenza. The researchers analyzed data from more than 40,000 adults hospitalized with lab-confirmed flu across five influenza seasons in more than 250 acute care hospitals in 13 states.

"Our large population-based study showed that flu vaccine reduced the risk of severe outcomes, including death, among adults who were hospitalized despite getting vaccinated," said **Shikha Garg**, MD, MPH, lead author of the study and a medical officer in the CDC Influenza Division.

This message was also front and center at the annual flu meeting of the National Foundation for Infectious Diseases (NFID) in Washington, DC, recently. "We need to emphasize the importance of partial



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protection," said **William Schaffner**, MD, medical director at the NFID. "We need to remember that, even if you get influenza, after having received the vaccine, you are likely to benefit by having a less severe and shorter illness. And more important, you're less likely to suffer the complications, including pneumonia, hospitalization, and dying."

Ethical Obligation

Infection preventionists and their clinical colleagues should redouble efforts to immunize staff and patients for influenza, as an NFID national survey³ showed that almost half of U.S. adults said they will decline vaccination for the 2019-2020 flu season.

"The other point from the survey that I think is important to emphasize is that U.S. adults said they mostly turn to healthcare professionals for information about influenza and vaccines," Schaffner said. "It's a reminder for all of us that the recommendation of a healthcare professional matters. We need to insist — diplomatically — on vaccination for our patients."

The importance of immunizing healthcare workers was also stressed at the NFID meeting by **Alex Azar**, JD, Secretary of the Department of Health and Human Services (HHS).

"We estimate 81% of all healthcare workers got vaccinated last season. Which is great, but it's not uniform," he said. "Only 68% of long-term care workers got vaccinated. Many of them work with patients who are at the highest risk of serious flu complications. So we've really got to see this number increase."

Improving healthcare worker flu vaccination in long-term care settings remains a challenge, but there are signs of improvement. An increasing number of facilities are seeking "honor roll" status aimed at reaching higher immunization rates, **Amy Behrman**,

MD, FACP, FACOEM, told *Hospital Infection Control & Prevention*.

"There has been a leap forward in terms of the number of [long-term care] institutions providing proof that they belong on the honor roll," said Behrman, co-chair of the Influenza Working Group (IWG) of the National Adult and Influenza Immunization Summit.

The IWG partnered with the Immunization Action Coalition (IAC) to encourage nursing homes to join the flu immunization honor roll for healthcare facilities. To be included on the honor roll, a facility must require influenza vaccination for employees and must include "serious measures" to prevent transmission of flu from unvaccinated workers to patients, IAC states.⁴ "Such measures might include a mask requirement, reassignment to nonpatient-care duties, or dismissal of the employee."

Long-term care residents are vulnerable to flu outbreaks, because they may attain only marginal immunity if vaccinated and the virus spreads easily in communal settings.

"In my opinion, the evidence supporting vaccinating healthcare personnel to protect patients is actually the strongest in long-term care," Behrman said. "They tend to have a much higher staff turnover and, in general, their staff have much more physical contact on an ongoing basis as they help residents and patients with activities of daily living."

Hospital immunization rates have increased in recent years, driven by mandatory policies, education about myths and misinformation, and overall awareness of how vaccines are critical to protect vulnerable patient populations. Hospitals with mandatory requirements immunized 95% of workers in the 2017-2018 flu season, according to a CDC survey.⁵ However, some healthcare workers have successfully

challenged hospitals for failing to provide religious exemptions to flu vaccination. (See story, p. 126.)

"It is a patient safety issue," Schaffner said. "That's the principal reason healthcare workers should get immunized. I think it is both a professional and ethical obligation for us to be vaccinated."

Vaccination also is critical to ensure healthcare teams are able to stay on the job and care for a potential upsurge in flu patients, he says.

A Coin Flip on Flu Shot

In the NFID survey conducted in August, 1,002 adults responded to questions about their attitudes and intentions regarding the current season. Overall, 60% of respondents agreed that the flu vaccine is the best preventive measure against flu-related deaths and hospitalization.

However, the survey also indicated that only 52% of respondents planned to get vaccinated this flu season. About 45% of adults and 63% of children were immunized during the 2018-2019 season, Schaffner said.

"This public opinion poll reminds us that the perceptions about effectiveness, and to some extent, safety, also truly can be barriers," Schaffner said. "It's important to remember that, other than a soreness at the injection site, there really isn't any notable side effect."

The reasons for declining vaccination included a belief that flu shots do not work (51%) and concern about side effects (34%). In addition, 22% feared they would acquire influenza from the vaccine, a persistent myth that has no basis in fact.

"Most troubling is that nearly a quarter of individuals who said they didn't intend to get vaccinated this season are actually at greater risk for flu-related complications," he added. "They're either 65 years of age or older,

or have underlying health issues, such as diabetes, asthma, and heart disease, that actually predispose them to the complications of influenza."

Indeed, flu infection can aggravate underlying medical conditions and heighten the risk of heart attack and stroke, said **Bill Borden**, MD, a preventive cardiology specialist at George Washington (DC) University.

"An unrecognized danger of the flu is that the resulting inflammation may last for several weeks after the acute infection," Borden said at the NFID meeting. "In fact, a study⁶ showed that people with underlying heart disease who have the flu are six times more likely to have a heart attack within the first week of a lab-confirmed flu infection."

In addition, flu infection increases the risk of pneumonia for those with asthma, Borden said. In those with diabetes, influenza infection can undermine control of blood sugar levels.

"Patients with diabetes are three times more likely to die of flu complications, and six times more likely to be hospitalized," he said.

Vaccine Hesitancy'

The World Health Organization lists "vaccine hesitancy" as one of the top 10 threats to public health in 2019. "The reality is, that unless we start to prioritize prevention, vaccine-preventable diseases will persist in the United States," Schaffner said.

This "hesitancy" is being driven in part by a national anti-vaccine movement, which has driven down childhood immunizations for measles and other diseases by spreading false fears about autism and other adverse effects of vaccinations. Those concerns have been thoroughly debunked regarding the measles vaccine.⁷

Still, public health officials underscore the safety of the annual flu vaccine, which is manufactured every

season in attempt to hit a moving target — the projected or identified circulating influenza strains based on the flu season in the Southern Hemisphere. It is an imperfect science, but the vaccine is safe, if not fully effective. That makes the public health messaging difficult, as people point to the varying efficacy of the seasonal immunization in declining the shot.

"We all know that the flu vaccine isn't perfect, and we saw that last year's vaccine was more effective at the beginning of the season, but less so by April, when the H3N2 virus was circulating," Schaffner said. "That's why it's critical that we emphasize the importance of partial protection."

Over the last 15 flu seasons, the CDC estimates vaccine efficacy as low as 10% in 2004-2005 to a high of 60% in 2010-2011.⁸

The 2018-2019 vaccine was 29% effective overall, after a strain of H3N2 influenza A emerged that was a mismatch with the vaccine. The late emergence of the H3N2 caused more severe disease and lengthened the flu season beyond expected duration, with influenza activity elevated for more than five months.

In an effort to get the best H3N2 match possible this season, public health officials delayed adding that component to the vaccine from February until March this year. The delay allowed identification of a distinct strain of H3N2 that was increasing in the United States.

"H3N2 viruses have presented an increasing challenge for vaccine virus selection due to frequent changes in the viruses and difficulties in generating optimal candidate vaccine viruses for use in manufacturing," the CDC stated in explaining the delay.⁹

The H3N2 vaccine component in this season's vaccine is A/Kansas/14/2017. The CDC also added a new H1N1 strain, A/Brisbane/02/2018.

Both B/Victoria and B/Yamagata virus components from the 2018-2019 flu vaccine remain the same for the 2019-2020 flu vaccine. ■

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Child Deaths Spur Flu Vaccination Urgency

Mother of infected child: 'You mean I could have prevented this?'

Public health officials are underscoring the tragedy of severe influenza infections and deaths in children, adding a palpable sense of urgency for immunization in an era when some parents are suspicious of vaccine efficacy and safety.

At a recent flu press conference held by the National Foundation for Infectious Diseases (NFID), a pediatrician discussed the devastating impact of illness and death in children.

"This past winter, I remember standing next to a mother of a 9-month-old," said **Patricia Whitley-Williams**, MD, president-elect of NFID and a professor of pediatrics at Rutgers Medical School. "The child had been admitted and was diagnosed as having flu."

The child had difficulty breathing and was transferred to an intensive care unit and put on a ventilator. The patient required several more weeks of hospitalization to recover. "The mother looked at me during that first week, while her child was sedated and on the

breathing machine, and said, 'You mean I could have prevented this?'" Whitley-Williams said. "This mother did not believe in vaccinating, because she felt that the flu vaccine was not effective, and she was concerned about vaccine safety."

The 2018-2019 flu season saw high rates of pediatric hospitalization due to flu-related complications, with deaths reported even in healthy babies and children, she said.

"Recently, there was a pediatric flu-related death in a 4-year-old child who had an underlying health condition," Whitley-Williams said. "This past season, there were 135 pediatric deaths due to the flu, even though it was a moderate flu season."

In addition, a published study¹ found that the number of children younger than 1 year of age who are hospitalized with flu is at least double the current estimates, she added.

Another study² found that flu shots reduce mortality in immunized children who still acquire influenza. This 2017

study showed the flu immunization prevented death in 65% of healthy children and 51% of those at high-risk of influenza flu complications.

While it did not assess mortality, a study³ presented recently at the IDWeek 2019 conference found a flu vaccination protective effect that almost halved (48%) the risk of being hospitalized for influenza. The study included seven pediatric hospitals in the New Vaccine Surveillance Network. The researchers verified vaccine receipt from state immunization registries and/or provider records.

"Having received flu vaccine prevented children from being hospitalized with flu," said **Angela Campbell**, MD, MPH, a medical officer at the Centers for Disease Control and Prevention. "About 60% of the children hospitalized had an underlying medical condition. That means that 40% were previously healthy children."

The best way to protect newborn babies is to immunize pregnant women,

who are also at risk of influenza complications,⁴ Whitley-Williams said at the NFID meeting.

"If the pregnant woman is vaccinated, then the infant, for the first several months of life, receives protection from the mother," she said. "That's extremely important, because we do not vaccinate children for flu under 6 months of age."

Concerning pregnant women, the CDC recently released a report showing women with influenza are more than twice as likely to be hospitalized if they are expecting.

"CDC recommends all pregnant women receive flu vaccine at any time during pregnancy, and whooping cough vaccine (Tdap) early in their third trimester, during each pregnancy," the agency said in the report.⁵

Children who are between the ages of 6 months and 9 years of age — if they have never received a prior flu vaccine — require two doses to be protected, Whitley-Williams said.

"Those doses have to be separated by at least four weeks," Whitley-Williams said, "so it's important to give that first dose as early as you can."

Elephant in the Room

Skipping flu vaccination for children is like parents not strapping them in their car seats before driving, Whitley-Williams said.

"No good parent would do that," she said. "We all know that [flu vaccines] will not provide 100% protection. But it will reduce the severity and duration of disease. And it will save children's lives."

Echoing that theme at the NFID meeting was **Alex Azar**, JD, Secretary of the Department of Health and Human Services (HHS).

"I want to talk about flu deaths in children for a minute, because the death of a child is especially heartbreaking," he said. "Illness occurs very quickly. Sixty-

five percent of reported flu deaths in children happen within seven days after symptom onset. Thirty-eight percent of deaths occur before being admitted to the hospital. Half of the children had no preexisting medical conditions. These are frightening numbers, and each one represents a human tragedy."

Despite such sentiments, the elephant in the room was the U.S. Customs and Border Protection's (CBP) recent decision to not vaccinate migrants held in detention facilities against flu. The decision has been widely criticized in the infectious disease community both as unethical and as a perfect setup for an outbreak.

WOMEN WITH INFLUENZA ARE MORE THAN TWICE AS LIKELY TO BE HOSPITALIZED IF THEY ARE EXPECTING.

A letter⁶ submitted to Congress by clinicians at Harvard University and Johns Hopkins hospital said autopsy results show that three children have died in U.S. custody in part as the result of influenza since December 2018. (*See Hospital Infection Control & Prevention, October 2019*). Asked about the CBP policy at the press conference, Azar said the HHS provides vaccinations under its Unaccompanied Alien Children (UAC) program within 48 hours of their arrival at UAC facilities.

"Obviously, Customs and Border [Protection] has to deal with the logistics issues, and their own situation there," he said. "Our recommendations, from a public health perspective, though, are clear. Every individual over the age of 6 months for whom it's not

contraindicated should receive the annual seasonal flu vaccine."

Bill Borden, MD, a preventive cardiology specialist at George Washington (DC) University who spoke at the NFID flu meeting, said, "As a physician, as someone who works in public health, and as an American, I think that everyone — especially children — should have access to this potentially lifesaving preventive flu vaccine." ■

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Hospital Fined \$74k in Flu Shot Religious Exemption Case

Avoid arbitrary or inconsistent vaccination policies

As more facilities go to mandatory vaccination policies, infection preventionists must clarify what exceptions are allowed and under what conditions.

Some facilities require influenza vaccination as a condition of employment, while others allow specified exemptions. Medical exemptions may include allergies to vaccine components or a history of Guillain-Barré syndrome.

One key to these policies appears to be consistency in making equitable arrangements, as workers denied religious exemptions have successfully sued through the federal Equal Employment Opportunity Commission (EEOC).

Memorial Healthcare in Owosso, MI, recently paid \$74,418 to settle a lawsuit brought by the EEOC on behalf of a newly hired medical transcriptionist who claimed religious exemption to vaccines.

"Memorial refused to accommodate the sincerely held religious requirement of the transcriptionist, whose Christian beliefs require her to forgo inoculations," the EEOC stated.¹ "The transcriptionist offered to wear a mask during flu season. This was an acceptable alternative under hospital policy for those with medical problems with the flu shot, but Memorial refused to extend it to her. It then rescinded her offer of employment."

Under the consent decree settling the suit, Memorial will permit those with religious objections to wear masks in lieu of having a flu vaccine, the EEOC reported.

"The hospital will also train managerial staff participating in the accommodation process on the religious accommodation policy," the EEOC

stated. "In addition, the transcriptionist will receive \$34,418 in back pay, along with \$20,000 in compensatory damages and \$20,000 in punitive damages."

Accommodate Patients, Protect Workers

In light of such cases, healthcare facilities should carefully consider exemption policies and seek legal advice in developing a mandated flu shot program.

The EEOC cited the case as a violation of Title VII of the Civil Rights Act of 1964, which requires employers to "provide reasonable accommodations for religious observances and beliefs, absent undue hardship."

Douglas Opel, MD, assistant professor of pediatrics at the University of Washington School of Medicine in Seattle, outlined legal strategies in a review article on flu vaccine mandates and exemptions.²

"In our analysis, we found that hospitals prevailed in lawsuits when they developed ways to accommodate their employee's religious views and still protect patients," he says.

It makes sense for hospitals to tailor this accommodation based on where in the hospital employees do their work, he adds.

"For example, for employees with patient contact, reasonably accommodating them might mean having them wear a mask to prevent them spreading influenza to their patients," Opel says. "But for an employee without patient contact, it might be reasonable to simply require her to stay home if she had symptoms."

In general, avoid the appearance of

arbitrary or inconsistent vaccination policies that could be perceived as discriminatory by a healthcare worker seeking an exemption, he recommends.

"Influenza-vaccination mandates for healthcare workers represent good policy, but heavy-handed, context-free implementation does not," Opel and colleagues concluded in the paper.

The EEOC's definition of the word "religion" includes "moral or ethical beliefs as to what is right and wrong which are sincerely held with the strength of traditional religious views." Although the courts are not bound by the EEOC's definition, it is broad enough to create uncertainty about the line between religious and philosophical objections, Opel notes.

In the paper, Opel cites a case involving an employee who sued after being denied a vaccination exemption on the basis of strongly held beliefs in a vegan diet. The hospital filed to dismiss the suit, but agreed to settle after a court ruled it would allow the plaintiff "to try to show that veganism constituted a religious belief."

"Though the belief need not be theistic, it must relate to ultimate questions, not just vaccines," Opel and colleagues state. "At a minimum, hospitals should feel fairly confident in rejecting mere anxieties about vaccine safety. Providing a religious-belief definition in vaccination policies and explaining what does and doesn't qualify should also help reduce misguided requests and lawsuits."

Some hospitals require signoff by clergy regarding a religious exemption, though there have still been legal challenges in some of these cases. The issue is complicated on several levels,

including the fact that the flu vaccine changes every year and has varying levels of efficacy. Regarding the religious exemption issue, it is also fair to reiterate the moral imperative of protecting frail patients.

"My own opinion is that religious exemptions are rarely justified by scripture," says

Amy Behrman, MD, FACP, FACOEM, director of occupational medicine at the Hospital of the University of Pennsylvania in Philadelphia. "I am perfectly comfortable managing medical exemptions and certainly think it is crucial to be as evidence-based as possible. Religious exemptions are much more challenging."

In any case, there is considerable work involved in exemption reviews to make sure they are done fairly and to ensure that any administrative policies, like wearing a mask, are put in place and enforced.

"Effective mandates should take you close to 100% [flu vaccination rates]," she says. "In our institution, we have just over a 98% vaccination rate every year, with about a 1.5% exemption rate."

Mandatory flu vaccination policies nationally vary across a spectrum, going from work reassignment for the non-immunized, formal declination forms, masking, and immunization simply as a condition of employment. "My own reading of the literature, primarily in

acute care, is that any requirement — any mandate — is a huge and powerful tool for improving immunization rates, and in my view, normalizing them," Behrman says. ■

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CMS Finalizes Drug Stewardship Regulation for Hospitals

IPs well-positioned as key team player

In a long-anticipated action, the Centers for Medicare and Medicaid Services (CMS) recently finalized its 2016 rule requiring antibiotic stewardship programs in hospitals.

A CMS final regulation issued Sept. 30, 2019, requires that a hospital's "infection prevention and control and antibiotic stewardship programs be active and hospital-wide for the surveillance, prevention, and control of healthcare-associated infections and other infectious diseases, and for the optimization of antibiotic use through stewardship."¹

The news was welcomed by infection preventionists (IPs), who will work with clinicians and administrators on antibiotic stewardship teams designed to reign in the misuse and overuse of antibiotics.

"We are very excited about the final rule and the fact that antibiotic stewardship programs are now required," says **Connie Steed, RN**, president-elect of the Association of Professionals in

Infection Control and Epidemiology (APIC). "They also sort of integrated this — but still kept it separate — [with] the infection prevention and control program."

In that sense, the CMS rule gives IPs a seat at the stewardship table, but does not saddle them with an unfunded mandate to run the programs.

"We agree that careful coordination between the infection prevention and control and antibiotic stewardship programs is essential and this is stated explicitly in the regulatory text," the CMS states in the final rule. "However, we believe it is also important to highlight the distinctions between the two programs. Infection prevention and control programs are almost exclusively staffed by infection preventionists, the overwhelming majority of whom do not prescribe or manage antibiotics. Antibiotic stewardship programs must be staffed by people who are very familiar with antibiotics."

The Centers for Disease Control and Prevention (CDC) recommends that a pharmacist or physician leads the antibiotic stewardship team. While acknowledging this will most likely be the case in actual practice, the CMS regulation leaves flexibility at the local level to make such leadership decisions.

IPs in hospitals that have not established a stewardship program should certainly expect to play a role in implementing the new requirements, Steed says. First and foremost, the regulation requiring an antibiotic stewardship program falls under the CMS Infection Control Conditions of Participation.

"Infection prevention needs to be involved in the program and be a team player," she said. "It does not need to be run by an infection preventionist. Expertise is needed from the pharmacy area and infectious disease docs to help lead the program. IPs are clearly involved with day-to-day education,

surveillance, and other things with regard to antimicrobial stewardship.”

An area of importance to APIC was that in multihospital systems, each facility would have the expectation and resources to form a stewardship team, much as they have their own infection control programs, Steed says.

“To me, the way it is written affords that capability,” she says. “From an infection control standpoint, it indicates that each facility within a multihospital system has to have their own program employees, where their needs are being addressed and that they have a qualified individual or individuals designated at the hospital as responsible for communicating that program [within] the multihospital system.”

The CMS also left flexibility on which professional guidance facilities follow in implementing stewardship programs, though the CDC’s “seven core elements”² recommendations have already been widely adopted.

“The CDC has core measures for these programs, and at the present time that really is the national standard,” Steed says.

Heralding the CMS action, the Society for Healthcare Epidemiology of America (SHEA) said hospitals may now be able to achieve a national goal to reduce unnecessary antibiotic use by 20% in 2020.

There has been broad consensus for years that reining in the overuse and misuse of antibiotics will lessen the “selective pressure” that has driven a surge of multidrug-resistant bacteria. Moreover, some bacteria can transfer resistant plasmids to other microorganisms, leading to “superbugs” that are resistant to virtually all available antibiotics. Overuse of broad-spectrum antibiotics also blasts the commensal bacteria in the gut, clearing the way for *Clostridioides difficile* to proliferate and cause life-threatening enteric infections. The CDC estimates that *C. diff*

Point Taken: CMS Revisions in Stewardship Regulation

Specific comments led to CMS changes

In finalizing a regulation requiring antibiotic stewardship programs in hospitals, the Centers for Medicare and Medicaid Services (CMS) made several revisions based on comments from the field.

For example, an unidentified commenter urged CMS to modify the requirements for showing improvements in antibiotic stewardship.

“The commenter does not believe it is appropriate or accurate to solely use antibiotic resistance within the hospital to demonstrate antibiotic stewardship program success,” the CMS acknowledged.¹ “The commenter states that numerous external factors contribute to resistance patterns, including prescribing patterns of local practitioners who may not be connected to the hospital, community-onset infections, and patient transfers from other facilities.”

The point was taken and the CMS revised the document.

“We appreciate the suggestion and have modified and also deleted elements of this language,” the CMS states. “We agree that it would not be appropriate to use antibiotic resistance within the hospital as the sole criterion to demonstrate antibiotic stewardship program success or to evaluate a hospital’s antibiotic stewardship efforts. Therefore, we have deleted this portion of the regulatory language at §§ 482.42(b)(2)(iii) and 485.640(b)(2)(iii).”

With the revisions, the CMS acknowledged that external factors can undermine antibiotic resistance efforts in a facility, creating a negative impact in the short term. “Hospitals will still need to ensure that their antibiotic stewardship programs are following nationally recognized guidelines and best practices while documenting the evidence-based use of antibiotics.”

The CMS revision of this section now reads that the program “documents any improvements, including sustained improvements, in proper antibiotic use.”

Another change based on comments was the provision in the proposed rule requiring that the leaders of the infection prevention and control and antibiotic stewardship programs be specifically appointed by the governing body of a hospital.

“We appreciate this concern,” the CMS stated. “The goal of this proposed requirement was to ensure that the infection prevention and antibiotic stewardship leaders are vested with authority from the leadership of the hospital. To maintain this concept while allowing more flexibility, we have changed these requirements.”

The CMS revised §§ 482.42(b)(1) and 485.640(b)(1) to now require that the hospital ensure that the appointed leaders of infection control and antibiotic stewardship efforts are “qualified through education, training, or experience in infectious diseases and/or antibiotic stewardship. … The selection process must include meaningful opportunity for input from members of the medical, nursing, and pharmacy staffs.” ■

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infections strike half a million patients annually and cause about 15,000 deaths.

In a conservative estimate, a CDC study² published this year estimated that a CMS antibiotic stewardship mandate in hospitals would save \$25 billion a year after factoring in the societal costs of morbidity, mortality, and lost years of life.

One of the co-authors of that study, **Clifford McDonald**, MD, associate director for science in the CDC Division of Healthcare Quality Promotion, was enthusiastic about the CMS action.

"We're happy to see this, because we are trying to improve stewardship and we're glad to have a partnership with CMS," he says.

The regulation will push wider adoption of the CDC stewardship recommendations, which had been adopted by 76% of U.S. hospitals as of 2017, he says. That was the most recent data³ available as this report was filed, but it shows considerable progress. For example, in 2014 only 41% of hospitals had adopted all seven CDC core elements for antibiotic stewardship.

As measures to control the use and duration of antibiotics take hold, there are signs that "high-risk" antibiotics like fluoroquinolones are being cut back in clinical settings. A recently published paper⁴ McDonald coauthored showed a decline in fluoroquinolone use, which is notorious for setting up *C. diff* infections by disrupting the gut flora of patients.

"In this more recent [data] fluoroquinolones are no longer the number one class of antibiotics," he says. "Cephalosporins are now, but from this and other papers, we are seeing that fluoroquinolones have decreased."

Reduction in the use of fluoroquinolones has been credited with dramatic reductions in *C. diff* in the United Kingdom.

The CMS said its final rule will go into effect six months after the Sept. 30, 2019, publication date. ■

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et al. Hospital-level high-risk antibiotic use in relation to hospital-associated *Clostridioides difficile* infections: Retrospective analysis of 2016–2017

data from US hospitals. *Infection Control Hosp Epidemiol* 2019;1-7. doi:10.1017/ice.2019.236.

Routine Drug Prophylaxis in Dentistry Usually Unnecessary, May Cause Patient Harm

Researchers say 4% of patients have adverse reactions

With antibiotic stewardship now required in hospitals and increasingly normalized in other healthcare settings, dental offices are something out of an outlier.

Many dentists still routinely require antibiotic prophylaxis be taken before procedures, particularly for patients with joint replacements. A study presented recently in Washington, DC, at the IDWeek 2019 conference underscored that these routinely administered drugs may cause patient harm and contribute to the broader problem of antibiotic resistance.

The study included 168,420 dental visits with antibiotic prophylaxis, which the researchers describe as “unnecessary” in 80% of the cases.

Moreover, 3.8% of these unnecessary prescriptions were associated with an adverse event that included *Clostridioides*

difficile infection, allergic reaction, anaphylaxis, or a visit to an emergency department.

“If you look across the United States at a population level, dentists prescribe 10% of all antibiotics annually,” said **Katie J. Suda**, PharmD, MS, research health scientist at the Hines (IL) VA Hospital.

For comparison, pediatricians and internists prescribe about 10% to 12% of antibiotics annually, she added.

“Antibiotics are not benign and this 4% represents a large number of people,” said **Tom Talbot**, MD, MPH, the vice-chair of IDWeek who moderated the session on antibiotics in dentistry. “This study helps further the discussion, illustrating in a very large population that it is not a harmless decision to give somebody one dose of antibiotics. There can be consequences.”

Using an insurance claims database, the researchers analyzed patients with dental visits from 2011-2015. To meet criteria, patients with commercial dental insurance had to be without a hospitalization or oral infection 14 days prior to antibiotic prophylaxis, which was defined as given for two days or less within one week before a dental visit.

Unnecessary antibiotic prophylaxis was defined as antibiotic prophylaxis in patients “who both did not undergo a procedure that manipulated the gingiva/tooth periapex and did not have an appropriate cardiac diagnosis,” the authors reported.

The 3.8% of patients who had an adverse reaction likely did not return to the dentist’s office, Suda said.

“They are going to their primary care provider or perhaps an emergency department,” she said. “So, dentists

never really see these adverse outcomes. We think this is a conservative estimate because we did not include adverse events like nausea or diarrhea where the patient did not seek healthcare."

Antibiotic prescribing among dentists has remained stable, while drug administration is declining in physicians due to stewardship efforts. Dentists are the top prescriber of clindamycin in the United States, the authors report, noting that historically, clindamycin has been associated with the highest rate of *C. diff* infection.

"We found in this study that clindamycin was associated with about a 34% increase in risks of having an adverse drug event — when compared to amoxicillin," Suda said.

Of course, these dental prophylaxis decisions are not being made in a vacuum. Though the authors note there is no longer a standing recommendation to administer prophylactic antibiotics routinely before dental care, orthopedic surgeons may beg to differ.

"There is some controversy — especially in the orthopedic community — whether or not an antibiotic should

be prescribed in dental patients who have orthopedic implants," Suda said, "but those guidelines have changed, and it is no longer a recommendation for patients to routinely receive antibiotics prior to dental visits even if they do have a prosthetic joint."

While there has been some historical divergence in the guidance on this issue, there was an attempt to reconcile the issue in a 2017 document by both surgical and dental groups.² The conventional wisdom seems to be that routine, blanket prophylaxis is unnecessary, but antibiotics may be part of a dental plan of care in some orthopedic patients.

"Dentists should be part of the antibiotic stewardship conversation, but overall in healthcare we should try to provide dentists with more streamlined access to the patient's medical information," Suda said. "Very few dental practices have that kind of information available to them."

Guidelines for antibiotic prophylaxis for heart patients under dental care have also been tapered down, Suda noted. Prophylaxis is recommended only for

"those patients with cardiac conditions at the highest risk of an adverse outcome if they do get an endocarditis infection," she said.

The IDWeek researchers urged patient involvement in the issue, raising awareness so an informed decision can be made on antibiotic prophylaxis with their doctors and dentists.

"We suspect that the dentists are prescribing the majority of these of course in what is often a multidisciplinary decision," said co-author **Alan E. Gross, PharmD**, clinical assistant professor at the University of Illinois-Chicago. ■

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When Will the Next Emerging Infection Hit?

MERS has 16% mortality rate in healthcare workers

While infection preventionists get caught up in day-to-day concerns of a multifaceted job, there is always the threat of an emerging infection one plane ride away from virtually anywhere on the globe.

In less than 20 years, this century as already seen a Severe Acute Respiratory Syndrome (SARS) outbreak that moved quickly from China to Canada and inflicted both patients and healthcare workers with fatal infections. There is a similar virus lurking in the Middle East, much in the same way that we now see Ebola again in Africa after thousands died in the 2014-2015 epidemic.

The SARS coronavirus has not been seen again since it emerged in 2002, but another coronavirus — a cousin, if you will — is percolating, trying to make that next evolutionary step that could facilitate ease of transmission between humans.

Middle East Respiratory Syndrome (MERS) coronavirus threatened emergence in the United States in May 2014, when two healthcare workers became symptomatic after returning from working in Saudi Arabian hospitals.

The emerging infection was identified and stopped, but it is a little shocking to note that healthcare workers in Saudi

Arabia and the surrounding region are still acquiring MERS — sometimes fatally.

A recently published analysis¹ of reported MERS cases between December 2016 and January 2019 revealed that 26% of 403 cases in the region were in healthcare workers. The case fatality rate was a disturbing 16% among healthcare workers — compared with 34% among patients. Only 1.9% of the healthcare workers infected had comorbidities compared to 71% in other MERS cases over the period.

"Healthcare workers constitute a high-risk group owing to continued



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exposure at healthcare settings," the authors warn. "It is important to screen exposed healthcare workers prior to allowing them to resume medical duties and multiple samples may be needed. In addition, there is a need for continued vigilance and identification of suspected cases."

The review period included a large outbreak in Saudi Arabia in 2017 involving three hospitals, with healthcare workers acquiring the virus from admitted patients.

"All healthcare facilities should adopt strategies for early detection and isolation of patients suspected to have MERS infection," the authors reported.

Most healthcare workers who acquire MERS have mild or asymptomatic infections. However, there have been cases of asymptomatic workers transmitting MERS to their colleagues.

In addition to Saudi Arabia, MERS cases were reported from

Lebanon, Malaysia, Oman, Qatar, and United Arab Emirates. Though most likely of bat origin, the coronavirus has established an animal reservoir in camels in the region. Camel exposures, primarily consuming camel milk, were reported in 64% of community MERS cases.

The first MERS cases emerged in 2012 and the link to dromedary camels is now well-established. The beast is deeply entrenched in the Saudi culture, which has thus far resisted the kind of large cull of animal reservoirs done for emerging infections like SARS and H5N1 avian flu. ■

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CME/CE QUESTIONS

1. In the National Foundation for Infectious Diseases survey of U.S. adults, the top reason for declining flu vaccination was a belief that:
 - a. the vaccine causes flu.
 - b. flu shots do not work.
 - c. side effects are a concern.
 - d. prior flu vaccination was still protective.
2. According to Bill Borden, MD, people with what underlying condition were six times more likely to have a heart attack within the first week of a flu infection?
 - a. Diabetes
 - b. Asthma
 - c. Obesity
 - d. Heart disease
3. Clifford McDonald, MD, in the CDC Division of Healthcare Quality Promotion, said usage was declining in which class of antibiotic often linked to *Clostridioides difficile*?
 - a. fluoroquinolones
 - b. cephalosporins
 - c. carbapenems
 - d. glycopeptides
4. Dentists prescribe what proportion of antibiotics nationally?
 - a. 4%
 - b. 7%
 - c. 10%
 - d. 15%