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Flu Vaccine Efficacy Poor as H3N2 Outbreak Surges

A disastrous flu season may take more than 50,000 lives

By Gary Evans, Medical Writer

With the nation reeling from an historically bad influenza outbreak, the Centers for Disease Control and Prevention is preparing the public for a dismal efficacy estimate for the 2017-18 vaccine against the predominant H3N2 A flu strain.

"I think it's important to say that we expect that the effectiveness against the H3N2 strains will be low," said **Anne Schuchat**, MD, acting CDC director.

Flu seasons dominated by H3N2 can be particularly deadly, and comparison with past seasons suggests a heavy toll will be taken in the final counting for this season.

"The H3N2 years are the ones that have the higher number of deaths and that upper level is about 56,000 for the total year," said **Dan Jernigan**, MD, director of the CDC's influenza division.

While the CDC had initially projected a season-end efficacy in the 30% range, a recent interim report by Canadian researchers found the vaccine was only 17% effective against H3N2 influenza A.

"[That] is less than half that reported for the same A(H3N2) vaccine in 2016-

17," the researchers reported.¹ "Our 2017-18 interim vaccine efficacy (VE) for influenza A(H3N2) is more comparable to the

THE CDC IS PREPARING THE PUBLIC FOR A DISMAL EFFICACY ESTIMATE FOR THE 2017-18 VACCINE AGAINST THE PREDOMINANT H3N2 A FLU STRAIN.

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2017 Southern Hemisphere interim VE of 10% reported from Australia.² Mutations that arise from egg adaptation of the vaccine strain may affect VE, an issue also identified for the current season's A(H3N2) vaccine component.”

Though most of this year's vaccine is egg-based, the CDC wants to assess the efficacy of the cell-based vaccines currently in use.

“[With eggs] you can get very high yield, and that's how we are able to get upwards of 151 million doses per year,” Jernigan said at a Feb. 2 CDC press conference. “There are some newer technologies that have been coming out. One is in the form of a recombinant vaccine with protein in the vaccine. The other one is grown in mammalian cells. Both the recombinant protein vaccine and the cell-grown vaccine don't have to use eggs to grow. Therefore, it's possible that those vaccine viruses may look more like what's actually circulating out in the community.”

In addition, the agency wants to look at the egg-based vaccine's effectiveness against the circulating strains of influenza B and H1N1 A that also are causing infections this year. The current vaccine should be more protective against those strains, which will figure into the CDC's ultimate efficacy estimate of the season.

“It's important with vaccine effectiveness estimates to know whether we're talking about the total or against a particular strain,” Schuchat said. “We have been expecting low effectiveness against the H3N2 strains. So, I can't say that I'm surprised about the Canada data. [We are] working hard to develop robust estimates for an interim look at effectiveness that we hope to release in the weeks ahead.”

The overall findings on vaccines

and flu strains will inform the continued push for a “universal,” cell-based vaccine less vulnerable to antigenic drifts during production.

Death in the Otherwise Healthy

It is worth reiterating that vaccine efficacy is based on prevented infections, meaning immunization could still lessen the severity or prevent death. In that regard, the CDC reports that 80% of the 53 children who had died of flu as this report was filed were not vaccinated.

“We're seeing serious influenza in children who really have no underlying conditions, including those who are very young,” Schuchat said. “[Some of the] warning signs are difficulty breathing, very high fever, rapid breathing — those are clues to call the doctor.” Children who seem to rebound only to rapidly decline again may have a bacterial coinfection that warrants immediate medical attention, she said.

In a CDC surveillance system that includes 2,800 physician offices and EDs, 7.1% of patients were reporting with flu-like illness. That represents a continuing increase from prior weeks as the current flu season approaches historic levels.

“We've had two seasons in the last 15 years that were higher than that,” Jernigan said. “The first was the 2009 H1N1 pandemic, which peaked at 7.8% and the [other was the] 2003-2004 season — a high severity H3N2 season — which peaked at 7.6%.”

By a different measure — hospitalizations — the current flu outbreak is approaching the 710,000 admitted with influenza in 2014-15. At the current pace, it was expected to surpass it. Another measure of

how unusual by pandemic standards H1N1 was in 2009 was the number of hospitalizations.

“It wasn’t our peak for hospitalizations because as you remember we had a relative ‘sparing’ of the elderly, and the elderly account for quite a large proportion of hospitalizations,” Schuchat said.

The 2017-18 season has reverted to form with the most severe cases in those over 65, though there is a somewhat unusual trend of “baby boomers” over 50 comprising more cases than young people. The second most affected group this season has been age 50 to 64 years, with a rate of 44.2 per 100,000.

“The hospitalization rate for 50- to 64-year-olds this season is significantly higher than what was observed during recent seasons in 2012-13 and 2014-15,” Jernigan said. “When we look at actually what influenza viruses are sending [this age group] to the hospital this season, we see that not only is it H3N2, but also the other influenza A virus H1N1 that is contributing to these higher rates.”

The influenza A infections in those 65 and over are about 90% H3N2, but the figure is closer to 80% in the age 50 to 64 group.

“So, there’s about twice as much H1N1 proportionally causing disease in the 50- to 64-year-olds,” he said.

Can’t Breathe Easy

In a new study that provides little reassurance in the midst of an epic influenza season, researchers found that people with flu can shed the virus by simply breathing — suggesting that cough and other symptoms are not necessary for transmission.

In tests of 142 cases with symptomatic flu, the researchers

found that infectious virus could be detected in 39% of fine-aerosol samples collected during 30 minutes of normal breathing. “[This] clearly establishes that a significant fraction of influenza cases routinely shed infectious virus, not merely detectable RNA, into aerosol particles small enough to remain suspended in air and present a risk for airborne transmission,” the report concluded.²

The study involved several institutions and was funded in part by the CDC. “Lack of human data on influenza virus aerosol shedding fuels debate over the importance of airborne transmission,” the researchers noted. “We provide overwhelming evidence that humans generate infectious aerosols.”

There are several intriguing findings in the data, but the study was not designed to determine, for example, whether patients with influenza should be on airborne precautions as opposed to contact and droplet isolation.

“We were sampling right up in the person’s face,” says lead researcher **Donald K. Milton**, MD, MPH, director of the Public Health Aerobiology, Virology, and Exhaled Biomarker Lab at the University of Maryland. “The CDC thinks that it is only up close that it matters. There is evidence from old experiments suggesting that flu can stay suspended in the air for a long time — for hours. I don’t understand why it wouldn’t be transmissible at a distance. It may be that as it gets away from the [source] person, it becomes more diluted.”

Regarding the isolation question, if subsequent research establishes flu as transmissible by exhaled aerosol over distance, it may be better to implement other engineering controls rather than adding another

layer of PPE for healthcare workers, Milton says.

“I think the question really is, ‘How do we make healthcare facilities resistant to transmission of airborne infections?’” he tells *Hospital Infection Control & Prevention*. “If we found out — and we don’t know this yet — that influenza was transmissible at a distance via aerosols, that there was airborne transmission, then I think we would have to turn our attention away from airborne isolation rooms and PPE and start thinking of making the hospital a safer environment.”

The CDC usually recommends respiratory protection equivalent of an N95 respirator when a new virus emerges like the 2009 H1N1 pandemic flu, SARS in 2003, and MERS currently. This would not seem practical for seasonal influenza, so high vaccination levels and engineering controls like HEPA filtered air may be a more long-term solution.

“I trained in internal medicine, and in occupational health you talk about the hierarchy of controls,” Milton says. “The last thing you do is PPE. Engineering controls are much higher in the hierarchy.”

While the cases studied all had symptomatic flu, the presence of virus in exhaled breath also raises the issue of whether those with mild symptoms or in the initial stage of infection could transmit flu.

“[Researchers] published a paper³ a few years ago showing that in Great Britain, three-quarters of people who had flu didn’t have any symptoms at all,” Milton said. “Only about 20% of the people had symptoms in that category of feeling like you got ‘hit by a train.’ [They said] people with severe symptoms are the tip of the iceberg. We were seeing people with pretty solid symptoms. They didn’t

all have fever, but they all had some significant symptoms and many of them had fever.”

The question of asymptomatic transmission goes beyond the scope of the study, but Milton has found evidence of this phenomenon in his work with ferrets, the preferred human surrogate in influenza research.

“There is data from the ferret model that suggests they shed virus in the air before they get sick,” he says. “Probably some people who do not have symptoms are shedding virus. How much? How infectious are they? We don’t know, but mathematical models suggest that they probably are.”

Curious Finding

There has been considerable coverage of the study’s principal finding that influenza can be spread from exhaled breath in the absence of cough and sneezing. However, there was a subset of data in this same study that received less attention. If replicated in subsequent research, the finding could lead to a much more heretical conclusion: repeated immunization with egg-based, mismatched flu vaccine may undermine the protective immune response to subsequent flu infections. Eleven cases with a history of flu vaccination in the current and prior year during the study actually shed more virus than those with no history of prior vaccination.

“The association of current and prior year vaccination with increased shedding of influenza A might lead one to speculate that certain types of prior immunity promote lung inflammation, airway closure, and aerosol generation,” Milton and colleagues concluded. “This first

observation of the phenomenon needs confirmation. If confirmed, this observation, together with recent literature suggesting reduced protection with annual vaccination, would have implications for influenza vaccination recommendations and policies.”

Indeed, that would certainly be a controversial finding if confirmed. Many healthcare workers are mandated to receive the annual flu vaccine, and the public anti-vaccine movement would no doubt seize on the finding as another reason to avoid immunization.

“It’s a robust finding even though it is only 11 people,” Milton says. “It’s one influenza season and the vaccine is different every year, so you can’t generalize very far from it. But there are animal models that suggest that when you have a mismatched vaccine and then antibodies that do not neutralize the virus, the antibodies can have the effect of blocking your cellular immune response from being as effective. My takeaway from it is that it is time to ditch the egg-based vaccine.”

Again, the current mismatch with H3N2 influenza A has been ascribed to a mutation of the vaccine virus while it is being prepared in eggs.

“The egg-based vaccine is repeatedly showing this problem of not being very effective, and this [finding in the 11 patients] is probably a corollary of that,” Milton says. “When the vaccine is slightly off, the virus has mutated within the eggs. It has to adapt back to a bird virus in order to grow in eggs. The [vaccine strain] is not what we are being infected with, and that’s the problem.”

The H3N2 flu strain, which first emerged 50 years ago in 1968, seems particularly prone to mutation during vaccine production, Jernigan

said. “This is something that we have been following for several years,” he said. “It’s something that has developed incrementally over time. It is a problem with H3N2. When you take these viruses and try and get them to grow in eggs, they make changes that make it very difficult for them to stay similar to what is actually out there circulating.”

As a result, H3N2 eludes human immunity and causes severe infections and a high mortality rate.

“We know that H3 causes worse disease,” Jernigan said. “Exactly why, still needs to be figured out. It’s amazing how much it’s still able to evade the human immune system.” ■

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A Call to Action to Prevent Non-vent Pneumonia

'This has gone undiscovered and unseen for quite a while'

What if there were a routine addition to patient care that could save some 10,000 lives annually? An increasing body of research says there is.

A new study at 21 hospitals nationally shows that routine oral care of hospitalized patients and other basic measures were strongly associated with decreases in non-ventilator hospital-acquired pneumonia (NV-HAP).

Eradicating bacteria in the mouth reduces the likelihood that patients' aspiration of oral fluids into their lungs will not seed a pneumonia infection in the lungs. Though long overshadowed by ventilator-associated pneumonia (VAP) in the ICU, NV-HAP has a comparable morality rate and can strike a broader, younger group of patients in all areas of the hospital.

These NV-HAP patients are 8-fold more likely to require intensive care "and/or die during hospitalization," the researchers reported. Even if discharged, NV-HAP patients were readmitted at a rate of 19%.

"If a U.S. national effort was made to address NV-HAP, we predict that with appropriate intervention to prevent [this infection] by even 50%, we could save approximately 9,886 lives, 487,622 extra hospital days, and \$2.43 billion annually," the authors concluded.¹ "When the morality rate from a preventable hospital harm is as high as 14%-31%, it is time for a call to action."

Interventions

The interventions to prevent NV-AP include oral/dental care,

elevation of the head of the bed, patient mobility, and deep breathing and coughing exercises. In particular, routine oral care such as brushing teeth and eradicating bacteria in patients' mouths should be a standard of care, the authors argued.

Unfortunately, that is not the case in many hospitals, as NV-HAP remains a "hidden harm" that could be addressed by these basic interventions.

"Oral care is not the only risk factor, obviously, but it is the only one that every single patient has when they are in the hospital," says co-author **Barbara Quinn**, RN, ACNS-BC, a clinical nurse specialist at Sutter Health in Shingle Springs, CA. "It is also the one we can control the most. We can't eliminate all micro-aspiration, but we know how to kill germs in the mouth and how to get biofilm off of teeth. So that is something we actually have control over, which is not always the case in healthcare."

Prior to publication of the study, Quinn presented data last year at the annual APIC conference in Portland showing oral care four times a day could dramatically reduce pneumonia. About three-quarters of patients can brush their own teeth, so that is not quite as labor-intensive as it sounds. Best practice oral decontamination for vented patients includes oral chlorhexidine washes. *(For more information, see the story in the October 2017 issue of Hospital Infection Control & Prevention.)*

In the 2018 published study, researchers conducted a retrospective chart review to identify 1,300 NV-HAP patients in the 21 participating hospitals. Most NV-HAP infections

(73%) were acquired outside of the ICU. However, once patients acquired pneumonia in other hospital units, 19% had to be admitted to the ICU. Somewhat surprisingly, 27% of NV-HAP cases were already in intensive care, where rigorous efforts to prevent pneumonia in vented patients are typically in place.

"That is, patients in the ICU, not on the ventilator, are acquiring HAP despite the preventive emphasis for patients who are on a ventilator," Quinn and colleagues reported.

In the 24 hours prior to diagnosis, most of the patients did not have the basic oral care and other measures associated with pneumonia prevention, they found. While pneumonia often is associated with elderly patients, the study found that 51% of NV-HAP cases were in patients younger than 66 years of age.

Q&A

We asked Quinn to tell us more about her continuing mission to try to prevent this underappreciated threat to patient safety.

HIC: VAP prevention has certainly been emphasized for years, and appropriately so. What are some of the reasons NV-HAP has been an underrecognized infection?

Quinn: When patient harms really began to hit the airwaves and raise awareness back in the 1990s, [public health officials] chose to work on things that they had the most control over and would be the easiest to measure. When they started asking people to measure and improve, they needed to come with infections that they could identify easily and have

clear metrics for. I think that is the reason they chose to first work on device-related infections, [like] VAP, catheter-associated UTIs, or central line infections.

We have made huge strides in reducing those. But I think now we are getting to the point — and several articles have pointed to this in the last few years — that is really time to move forward and look at other opportunities.

HIC: What are some of the challenges to preventing NV-HAP?

Quinn: NV-HAP is not a device-related infection. With VAP there is only one type of unit you have to monitor, and that is the ICU. That's the only place you can have patients on a ventilator. You can take a quick peek and know how many patients are [at risk]. NV-HAP happens in every unit of the hospital and every patient is at some risk. It is a little hard to just look at somebody and determine if they are at risk or not. It's a much more comprehensive and daunting task. And because it has not been required to be reported, people have been focusing on things that are required.

That's human nature and that's how we work. In a nutshell, that is why this has gone undiscovered and unseen for quite a while. Now, I think this is one of the big ones that has jumped out because the numbers [of infections] are so high.

HIC: How do interventions like oral care break the cycle that leads to pneumonia?

Quinn: If you look at the pathophysiology of pneumonia, what are the things that have to happen? One is that you have a pathogen in the mouth. It only takes 24 hours to get pathogenic bacteria in the mouth that can cause pneumonia. Number two, you need some type of aspiration, whether it is macro or

micro. Even healthy people micro-aspirate. And then the third is that you have to have a patient in a compromised situation, where their immune system is down and things are not working properly. That's why patients in the hospital are at higher risk. Then we set them up to aspirate even more by sedating them and keeping them in a bed.

Anybody who is in a hospital is there for a reason, but there are patients that are at greater risk than others. For example, elderly patients and patients with chronic conditions. But there are certain risk factors like germs in the mouth and micro-aspiration that every single patient is at risk for. That's why we really think of this as a standard of care for every patient.

HIC: This could be considered labor-intensive by those currently not doing it, but do you see this oral cleaning and disinfection eventually becoming integrated into routine care?

Quinn: Yes, I think as the awareness increases. That has to be the first thing that happens with any change. People have to become aware that it is an issue. We have been working really hard — this is our third publication on this. There are other [researchers] coming forward.

HIC: You mentioned you have other research underway on this.

Quinn: We have another paper we are working on that is looking at the whole national database. We are finding the same thing [as this paper], and that is up for review right now before publication. We are trying to get the word out and increase awareness.

What we have found in the last few years in speaking with other people in healthcare, is that once people know about this they want to do something. It makes perfect sense.

It is not highly technical and you don't have to hire new people to do it. You just have to help the caregivers understand the importance of it, and do some change management and make sure they have what they need to be successful. [To begin], measure how many times you are brushing patients' teeth and measure how many incidents of pneumonia you have.

HIC: You cited the lack of reporting. Would it help this effort to have some kind of required reporting of NV-HAP, say to the CDC's National Healthcare Safety Network (NHSN)?

Quinn: For pneumonia in the NHSN, there are two categories. One is required, and that is VAP. For patients on a ventilator, there are certainly things you have to monitor and be working on. NV-HAP is sort of a category B — if you want to work on it you can, but they are not requiring it. So, until that moves up to category A there will be some limit to what we can do. But for something with this kind of incidence in every hospital in the U.S. we can look at trends. You don't have to do the same type of surveillance that you do with device-related infections; you can just look at trends overall.

Rather than a required measure, I think of this more like a national patient safety goal from The Joint Commission. [For those] they say, "We are not going to tell you how to fix this, but when we come to accredit your institution we are going to be asking how are you looking at this and measuring it. How are you working to improve it and are you making progress?"

HIC: Have you suggested this idea to The Joint Commission?

Quinn: We have been in conversations with The Joint Commission. They have been

working with us to try to get the awareness out there with the best plan of action for them to support this. We have also worked with the American Dental Association because oral care is sort of up their alley. So, we are getting there at the national level.

HIC: The CDC has a high standard of evidence for their guidelines, so this is not something as simple as getting them to issue recommendations for all hospitals?

Quinn: There is limited [medical] literature out there about how to prevent non-ventilator hospital acquired-pneumonia. There is a lot of literature on VAP, but it is very limited on NV-HAP. That's one of the reasons here at Sutter Health we are getting ready to launch a systemwide initiative to

do standardized oral care for every hospital patient. We are going to be tracking frequency of oral care and occurrence of NV-HAP. So, hopefully we will have a high-level implementation study to help contribute, but right now there is really a lack of those type of studies on this particular HAI.

HIC: Given the potential savings in lives and dollars, it would seem the CDC would certainly be receptive once it has sufficient data to support guidelines.

Quinn: Yes, we have been in contact with CDC. They are definitely interested and engaged, but again they are in a difficult position when there is not a lot of literature out there on exactly how to prevent this. I think they are interested in helping with the awareness issue,

but we are really putting out a call for high-level implementation studies. I don't believe we need to do randomized control trials. Who wants their mother to be in the group that doesn't get comprehensive oral care? Most of the literature out there — even though it is not randomized control trials — shows that any oral care helps prevent pneumonia. I think we have evidence, but there are more studies we can do that will give this a high level of validity. ■

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APIC-SHEA Forming Formidable Partnership

Training joint teams, reaching out to patients

The two major infection control associations in the United States are forging a forward-thinking partnership. It includes several major initiatives that will be enacted this year, with efforts underway to bring in patient and consumer advocates and collaborate in presentations and published papers.

To be clear, the Association for Professionals in Infection Control and Epidemiology (APIC) and the Society for Healthcare Epidemiology of America (SHEA) are composed of, respectively, infection preventionists and hospital epidemiologists. There has always been a collegial but professional fault line, given that SHEA is comprised primarily of physicians and many APIC members come from nursing backgrounds.

However, it has become increasingly clear that APIC and SHEA need to unify on the considerable common ground they share, raising the profile of both organizations through the message that infection prevention is a critical component of patient care.

“We have been talking a lot about how to work together, and not just between APIC and SHEA, but how do we really think ‘big picture,’” **Sara Cosgrove**, MD, president of SHEA, said during a recent webinar. “Who else do we need to be engaging and who can help us really get our message across? Infection prevention is a critical patient safety issue and we must continue to advocate for resources for all settings.”

Joining Cosgrove at the webinar

was **Linda Greene**, RN, president of APIC, who said the two groups will collaborate on an educational initiative this year to provide training for infection prevention teams.

“Certainly, infection control and hospital epidemiology already have training in place, but we are really talking about leadership training,” Greene said. “We know that APIC and SHEA members have excellent technical skills, but when you are trying to get people [to comply] and your primary goal is to influence care at the bedside, you really need to have what some call socioadaptive skills.”

That means mastering the difficult art of changing human behavior, which has been a longstanding bane to IPs and epidemiologists alike.

“We will also be able to use

this to train people in the future,” Greene said. “As we get into the next generation of infection preventionists and epidemiologists, this skill set will help them.”

Antibiotic Stewardship

Another major area of collaboration is antibiotic stewardship, which has become the primary intervention to stop the rise of multidrug-resistant organisms (MDROs). As antibiotic stewardship programs continue to be implemented and refined in the nation’s hospitals, APIC and SHEA are issuing a joint position paper outlining the role of infection preventionists and epidemiologists in these programs.

Projected to be published in the coming months, the article will update a 2012 joint paper¹ by the two groups that called for measures such as identifying MDROs, monitoring and reporting drug resistance trends, and educating staff on appropriate antibiotic use.

In addition to APIC and SHEA, the article will be co-authored by a member of the Society for Infectious Disease Pharmacists.

“When the paper is published, you will be able to look at a really high-level overview,” Greene said. “It’s called ‘Antimicrobial stewardship and infection prevention: Leveraging the synergy.’”

As an adjunct to this paper, educational sessions on antibiotic stewardship will be held with speakers from both groups at the APIC and SHEA annual conferences in 2018.

Along these lines, executive officers of SHEA and APIC are collaborating on an article aimed at hospital administrators that will be published in a healthcare management journal.

“This will communicate the value of robust infection prevention and hospital epidemiology programs to healthcare executives,” Green said.

Overall, the key areas of support that can be shared by the groups come down to clinical, regulatory, and policy issues, she added.

Patient Stories

Another important collaborative goal is to meet with patient advocacy groups, who share powerful stories of the impact of infections. Groups have been formed for patients and family members affected by both MRSA and *Clostridium difficile*.

“We want to really develop a positive, trusting relationship with these groups and work in partnership around mutual infection prevention goals,” Greene said. “Our leadership has agreed that these groups are really integral to heightening the awareness of the need for infection prevention programs and timely, transparent, and accurate data. We are looking at this from a strategic perspective.”

More mundane partnerships — but ultimately important in terms of logistics and communications — are collaborations among association and society staff and committee members.

“We have become more organized with the SHEA and APIC staff meeting on a regular basis to discuss overlapping issues and ideas,” Cosgrove says. “In addition, we have added formal liaison positions to the public policy, government affairs, and guidelines committees of both organizations. It is a way to have more cross-talk, and also have more interpersonal relationships built between our memberships.”

The deepening partnership in the face of healthcare delivery challenges and budget woes seems very much like an idea whose time has come.

“We are obviously not identical organizations, but we feel strongly that we should identify the areas where we can work together to further the field of infection prevention,” Cosgrove said. “And we will identify where we have differences and can support each other. We want to be progressive and future-oriented in our thinking.” ■

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Mind the Gap: SHEA Guidance on Ending Isolation

A framework for making difficult policy decisions

The longstanding confusion about when it is safe to take patients with transmissible

pathogens out of contact precautions has led to the default position some infection

preventionists have called “isolation for life.”

That is, if you are unsure

whether a colonized or asymptomatic patient can spread an organism — particularly an emerging one — it has become common to err on the side of contact isolation.

On the other hand, contact precautions are labor- and resource-intensive and prolonged isolation can have adverse effects on patients.

While there is a dearth of data to make completely informed decisions on aspects of this issue, the Society for Healthcare Epidemiology of America (SHEA) has issued a guidance document¹ that hospitals can use as a framework for making policy.

“There is a lot of interest in areas where guidance is needed, but there is just very limited data,” says lead author **David Banach**, MD, MPH, MS, epidemiologist at the University of Connecticut Health Center in Farmington. “The goal of this was to provide guidance to hospitals based on the data that’s been published with acknowledged limitations. We tried to develop a process in which hospitals can apply practical recommendations for the duration of contact precautions.”

The document is specific and intentional in using the word “guidance” instead of “guidelines,” and avoiding an overly prescriptive approach.

“The general message is that hospitals should look at their own epidemiology and their patient populations and develop some process that they can use to make decisions, taking into account some of the principles and guidance in the document,” he says. “It is certainly not a one-size-fits-all process for hospitals.”

In addition, the question of whether isolation precautions

should be used for a given situation — an ongoing debate in its own right — is not addressed.

“That is still an area under study,” he says. “We are trying to provide some practical guidance based on the literature on duration of contact precautions. We tried to use the existing limited evidence base while thinking about the bigger picture on how contact precautions are used in healthcare settings.”

Based in part on a survey of SHEA members, the document addresses discontinuing contact isolation for precautions for MRSA, vancomycin-resistant enterococci (VRE), *Clostridium difficile*, and multidrug-resistant Enterobacteriaceae (MDR-E). The latter includes the emerging threats of carbapenem-resistant Enterobacteriaceae (CRE) and extended-spectrum beta-lactamase (ESBL)-producing organisms.

In that regard, the guidance recommends extending contact precautions at least six months after the last positive culture for CRE. In addition, SHEA recommended obtaining at least two consecutive negative rectal swab samples at least one week apart to consider an individual negative for ESBL-E or CRE colonization.

“A lot of that stemmed from the data that supports longer carriage with these organisms, as well as the practical aspects and the limited number of antibiotic options,” Banach says.

Clostridium difficile

With regard to *C. diff*, the SHEA guidance states the following:

- We recommend that patients

with *C. diff* infection (CDI) receive care with contact precautions (CP) for at least 48 hours after resolution of diarrhea;

- Hospitals should consider extending CP through the duration of hospitalization if elevated rates of CDI are present despite appropriate infection prevention and control measures;

- Insufficient evidence exists to make a formal recommendation as to whether patients with CDI should be placed on CP if they are readmitted to the hospital.”

In weighing the issue, consider that “patients that are [*C. diff*] carriers shed the organism in their stools for weeks after cessation of diarrhea,” SHEA advised.

“The shedding of *C. difficile* spores after resolution of diarrhea may contribute to the spread of this organism,” SHEA states. “Recent data suggest that isolation of asymptomatic carriers reduced the incidence of *C. difficile* in the hospital setting.”

Given these findings, some hospitals may want to extend precautions, SHEA recommends.

With *C. diff* at epidemic proportions nationally, we asked Banach, “Why not draw the line at discontinuing isolation at 72 hours after symptoms?”

“We did consider that,” he says. “I think that institutions should look at their *C. diff* rate and decide which option they think is more appropriate for their hospital. It is somewhat of a challenge weighing the practical aspects of prolonged isolation with contact precautions versus transmission risk. We say ‘at least’ 48 hours, and if hospitals have concerns they can certainly wait longer.”

Use of molecular testing to accurately confirm whether

someone was colonized or infected will eventually play much more of a role in these decisions, but SHEA thought there was insufficient data to provide detailed guidance. The situation was similar in looking at the research on decolonizing patients with the various organisms.

“There was another area we talked about,” he said. “We felt like the data was not sufficient enough to make a firm recommendation.

In a couple of the sections there is some [discussion] of the studies on decolonization and how they have been evaluated.” In any case, the document can serve as a useful framework for those that do not have discontinuation policies, which Banach was surprised to learn was not an insubstantial number of hospitals.

“That was really the goal,” he says. “At least hospitals can start

to think about their own patient population and epidemiology and use some of the guidance in the document to come up with an institutional policy.” ■

REFERENCE

1. Banach DB, Bearman G, Barnden M, et al. Duration of Contact Precautions for Acute-Care Settings. *Infect Control Hosp Epi* 2018;1-18:doi:10.1017/ice.2017.245.

Joint Commission Dings Hand Hygiene Lapses

‘Failure to wash hands prior to providing care will be cited’

Infection preventionists should be aware that as part of its ongoing enforcement of patient safety goals, The Joint Commission will be assessing hand hygiene compliance during 2018 accreditation surveys.

“Beginning Jan. 1, 2018, any observation by surveyors of individual failure to perform hand hygiene in the process of direct patient care will be cited as a deficiency resulting in a Requirement for Improvement (RFI) under the Infection Prevention and Control (IC) chapter for all accreditation programs,” The Joint Commission recently announced.

The observations can be made at any point during the survey visit.

“Our surveyors are trained so that during our onsite surveys, they follow the care of the patient in conducting what we call an individual patient tracer,” says **Mary Brockway**, MS, RN, director of clinical research and standards in TJC Division of Healthcare Quality Evaluation.

“So that allows them to observe the clinical staff providing direct patient care throughout the survey. Patient care is fluid, but any failure to wash hands prior to providing care will be cited.”

However, surveyors are not likely to correct or question a healthcare worker not following hand hygiene protocols.

“We’re there to help organizations improve, and conducting the survey is part of that process,” she says.

“We would not normally confront a healthcare worker about not washing their hands, but we may explore further with several workers about their handwashing programs. How is the access to sinks and soaps? Have they been educated? Those types of things. We would follow up with the organization to do this as we are doing the survey process.”

Those that receive an RFI citation may have the situation assessed again on a subsequent survey, Brockway says. ■

The High Cost of *C. diff* Infection and Relapse

A \$25K infection goes up another \$10K with readmission

Clostridium difficile claims a staggering toll in patient infections annually, and a new study estimates the cost of treatment is nearly \$25,000 based on five days of hospitalization. Recurrent infections, not an uncommon phenomenon with *C. diff*, add an additional two days and another \$10,500.

“This study is consistent with previous literature that has demonstrated a significant and substantial increase in [healthcare costs] for *C. diff* infection (CDI) over and above similar patients without CDI,” the authors reported. “It has also shown that having recurrent CDI is associated with

substantial healthcare resource use as compared to similar CDI patients who do not have a recurrence. A significant strength of this study is that our data were drawn from a [broad] sample of the U.S. population, which increases its external validity.”

Of 55,500 *C. diff* patients

analyzed in the study, roughly one-fourth were recurrent infections. In patients with at least one recurrence, the risk for subsequent infections increases to the 45% to 65% range. Risk factors for recurrent CDI include continuation of inappropriate antibiotics, advanced age, and the use of antacid medications, the authors reported.

Antibiotic stewardship is considered a prime preventive measure against *C. diff*, and almost two-thirds of the total patients received antimicrobials prior to their first infection.

“The most important risk factor for CDI is disruption of the normal intestinal flora by exposure to prolonged use of antibiotics,” the

authors concluded. “Reports have shown that 18%-25% of patients will experience their first primary episode of CDI recurrence following the completion of treatment with vancomycin or metronidazole.”

That still leaves one-third caused by other factors, including transmission in healthcare settings by a spore-former that can resist environmental eradication. As infection preventionists are aware, these difficulties are compounded by the inability of alcohol hand rubs to inactivate *C. diff* spores on healthcare workers’ hands.

“The rate of healthcare-associated CDI has been increasing, and the diagnosis of CDI is estimated to raise the cost of a hospitalization

stay by 54% in the United States,” they concluded.

“In addition, CDI has been associated with increasing morbidity and mortality, likely due to a combination of the changing virulence of *C. difficile* strains and the greater number of risk factors among vulnerable hospitalized patients.” ■

REFERENCE

1. Zhang D, Prabhu VS, Marcella SW, et al. Attributable Healthcare Resource Utilization and Costs for Patients with Primary and Recurrent *Clostridium difficile* Infection in the United States. *Clin Infect Dis* 2018; <https://doi.org/10.1093/cid/cix1021>. Published: 19 January 2018.

Antivaccine Attitudes: The Truth Is Out There

Study finds those who reject vaccines believe in conspiracies

In a fascinating study of the roots of psychological attitudes, researchers report that people who are against vaccinations are more likely to believe in conspiracy theories.

The anti-vaccine movement has resulted in the reintroduction of virtually eradicated childhood diseases like measles. Though there are many aspects of suspicion, a common concern is that the measles-mumps-rubella vaccine causes autism. Another recurrent claim is that the pediatric schedule of shots harms children due to the number of immunizations in the early years of development. Both of these myths have been thoroughly debunked, but apparently it is difficult to persuade those suspicious of science through additional science.

“Many intervention programs work from a deficit model of science communication, presuming that vaccination skeptics lack the ability

to access or understand evidence,” the researchers report.¹ “However, interventions focusing on evidence and the debunking of vaccine-related myths have proven to be either nonproductive or counterproductive.”

They examined the psychological factors behind this impasse, administering a questionnaire to more than 5,000 people in 24 countries. Across this dispersed global population, antivaccination attitudes were consistently highest among those who favored conspiratorial thinking. Those against vaccines also scored high in measures of a strong reaction to perceived infringements on individual freedom.

Instead of assailing these people with more science, the authors suggest a “jiu jitsu” approach of trying to align science communication with their “underlying fears, ideologies, and identities, thus reducing people’s motivation to reject the science.”

Strangely, they seem to conclude that it may be helpful to hint that the negative views of vaccines may be the result of a conspiracy.

“It is counterproductive to try to reduce people’s conspiratorial thinking — and there is no evidence that this is feasible,” the authors concluded. “Rather, one should work with people’s underlying worldviews to acknowledge the possibility of conspiracies, but to show how vested interests can conspire to obscure the benefits of vaccination and to exaggerate the dangers.” ■

REFERENCE

1. Hornsey MJ, Harris EA, Fielding KS. The Psychological Roots of Anti-Vaccination Attitudes: A 24-Nation Investigation Health Psychology. American Psychological Association 2018;1(2): <http://dx.doi.org/10.1037/hea0000586>.



HOSPITAL INFECTION CONTROL & PREVENTION

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CME/CE QUESTIONS

1. **The CDC initially projected a season-end flu vaccine efficacy in the 30% range. An interim report by Canadian researchers found what level of efficacy?**
 - a. 7%
 - b. 10%
 - c. 17%
 - d. 40%
2. **A new study found that people with flu can shed the influenza virus by simply breathing, suggesting that cough and other symptoms may not be necessary for transmission.**
 - a. True
 - b. False
3. **Which of the following can help prevent non-ventilator hospital-acquired pneumonia?**
 - a. Oral/dental care
 - b. Elevation of the head of the bed
 - c. Patient mobility
 - d. All of the above
4. **SHEA recommended that patients with *Clostridium difficile* infection stay in contact isolation for how long after the resolution of diarrhea?**
 - a. 24 hours
 - b. 48 hours
 - c. 72 hours
 - d. Until discharge

CME/CE OBJECTIVES

Upon completion of this educational activity, participants should 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 healthcare industry in general;
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.