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CDC: 'The game has changed' on looming antibiotic resistant bugs

Pick your poison: Hypervirulent KPC, untreatable E. coli *in the community*

By **Gary Evans**, Executive Editor

After reporting that a hypervirulent, near pan-resistant strain of *Klebsiella pneumoniae* was created with relative ease in the lab, we asked a public health expert on antibiotic resistance whether this new superbug could be a real "game changer." His answer was somewhat surprising.

"I think the game has already changed," says **Arjun Srinivasan**, MD, a medical epidemiologist in the CDC's Division of Healthcare Quality Promotion.

The CDC has been repeatedly warning that we are entering a post-antibiotic era, particularly as gram negative bacteria like carbapenem-resistant Enterobacteriaceae (CRE), exchange resistance plasmids and enzymes that can render most antibiotics useless. CRE that produce *Klebsiella pneumoniae* carbapenemase (KPC) have been responsible for much of the increase of CRE in the United States, thus the concern when researchers showed KPC could be easily conjugated with a hypervirulent strain of *K. pneumoniae* that is primarily found in Asia. *(See* HIC, *Feb. 2014, cover.)*

While that is another worrisome development, in truth the continued

In This Issue

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emergence of a variety of multidrug resistant bacteria have already dramatically altered the public health landscape, Srinivasan notes. Infections are occurring that are nearly impossible to eradicate. (*See related story, p. 28.*)


Arjun Srinivasan, MD

"As of last year we really began sounding the alarm on this," he says. "To me that was the game changer — the recognition that we already have these highly resistant bacteria that in most cases are difficult to treat, and in some cases impossible to treat. So I really don't think that there is an issue of waiting for a game changer — the game has changed."

Lead researcher in the aforementioned conjugation experiment is **Tom Chiang**, MD, an assistant professor at Rutgers University and infectious disease physician at the VA New Jersey Health Care System in East Orange. Chiang and colleagues combined a CRE enzyme *Klebsiella pneumoniae* carbapenemase (KPC) — which has increased dramatically in the U.S. — with a hypervirulent but drug susceptible isolate of *K. pneumoniae* from a patient who had returned to New Jersey from the Philippines.[1] The resulting conjugated microorganism retained the high drug resistance of the KPC and the powerful virulence of the Asian *K. pneumoniae* isolate. Dubbing the hybrid strain Hypervirulent KPC, Chiang said he did the experiment because there are reports of the bug occurring in nature. Indeed, a recently published paper by researchers in China reports the phenomenon, warning that "this will eventually become a global health threat."[2]

Researcher: Hypervirulent strains already in U.S.

The likelihood of more conjugation events occurring between the microbes in nature may increase as KPC continues to become more prevalent worldwide. However, another group of U.S. researchers think that hypervirulent *K. pneumoniae* strains are already circulating at low levels in the U.S., but are going unrecognized for the most part because of inadequate testing mechanisms and an unclear clinical definition.[3]

"We don't have an optimal test for this right now," says **Thomas Russo**, MD, head of infectious diseases at the University of Buffalo (NY) School of Medicine and Biomedical Sciences. "I think it's under-recognized because clinically the labs can't test for it. But given all of that, we have

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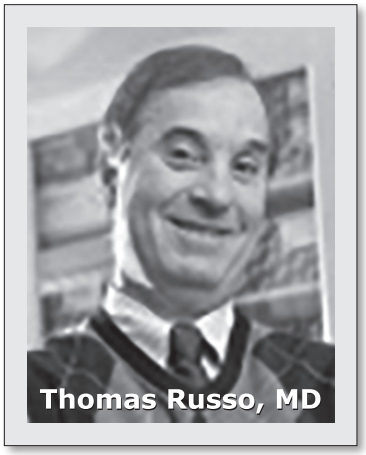
already recognized three cases in Buffalo [and other sporadic cases have been reported]. I think there are many more [hypervirulent] strains in the U.S. than we recognize."

With funding from the National Institutes of Health, Russo and colleagues are studying the microbiology of hypervirulent *K. pneumoniae* and may be close to developing a much better diagnostic test.

Again, hypervirulent *K. pneumoniae* strains are drug susceptible at present, but as Chiang and colleagues showed could easily acquire the KPC resistance mechanisms now widespread in the U.S. Even without acquiring a high level of drug resistance, hypervirulent *K. pneumoniae* can strike young, healthy people and has the unusual ability to metastasize and infect other parts of the body.

"If someone gets infected with this strain it really would behoove [clinicians] to know whether it is hypervirulent on two accounts," Russo says. "One is that it has this metastatic potential — fortunately in the minority of cases — to spread to the eyes and the central nervous system. So it would help in terms of monitoring outside the initial site of the infection. Also patients may relapse even on therapy, so treatment regimens [have to be resumed or changed.]"


Thomas Russo, MD

That description seems dire enough without adding antibiotic resistance, but that is the prospect we are now facing based on Chiang and colleagues' research and the report out of China.

"Add on top of all of this antimicrobial resistance and there ought to be some system of heightened vigilance for these strains," Russo says. "I think a lot of people are not aware of it – it hasn't hit their radar screen. The focus has been on the classical [gram negative] strains that have acquired increasing antimicrobial resistance, but people are sort of oblivious to these hypervirulent strains because they have a very low incidence in the U.S., although I think it's higher than we think. Without a good test you can't do surveillance."

Regarding Chiang and collegues experiment to combine resistance and hypervirulence in a conjucated superbug, Russo says he thought of attempting something similar but decided against it. Research that alters pathogens in ways that could make them more of a threat to public health has certainly drawn controversy over the years, though many researchers say such work is necessary to develop counter measures and treatments.

"It's an extremely difficult question at the present time," says **William Schaffner**, MD, chairman of the department of preventive medicine at Vanderbilt University School of Medicine in Nashville. "There will be debates about this just as there was about [recreating] the 1918 flu."

The CDC's Srinivasan says he has no objection to such research as long as all the biosafety precautions and protocols are followed. For his part, Chiang clarified that the research was done under all appropriate laboratory and biosafety precautions and the conjugated organism was destroyed after the experiment was concluded.

"After this [KPC] was conjugated with the virulent *Kleb pneumo* to show that the possibility does exist, the KPC hypervirulent conjugate was destroyed," he told *HIC*. "Both strains, however, were from clinical isolates here in New Jersey. The virulent strain came from a Filipino patient who came back from the Philippines where he went for vacation."

E. coli a major concern

While the CDC is now certainly aware that such a pathogen could arise in nature, Srinivasan says the essential finding that drug resistance plasmids can move between gram negative bacteria is a well-established concern.

"We know that is already the case," he says. "That's one of the reasons why we are sounding the alarm about CRE organisms — because we know that these resistant genes move very readily from one organism to another. And it is not just between different strains of Klebsiella but also between other types of bacteria."

Consider that *Escherichia coli* — a frequent cause of community-acquired urinary tract infections — has already shown the ability to absorb resistance plasmids and become more difficult to treat with antibiotics.

"*E. coli* is in the same family as Klebsiella and is capable of having resistant genes transferred in to it," Srinivasan says. "That would create really big problems for us because it is a bug that is already out there in the community. So I think what the researchers identified – the phenomenon of these resistance genes moving — is very well recognized as an important problem already."

Regarding Russo's concerns about the lack of adequate testing and surveillance for hypervirulent *K. pneumoniae*, Srinivasan says that has really been a recurrent theme with a lot of the emerging drug resistant pathogens.

"One of the things we are very concerned about at CDC is that a lot of times [clinicians] don't

obtain proper cultures before they start therapy," he says. "Obviously if you don't send in the culture before you start the therapy then you won't be able to recover the organism. You are left in the position of not knowing what you are treating. So whether that is a hypervirulent Klebsiella or any other type of bacteria that could go on to develop resistance if you don't send in cultures beforehand then you won't [identify it]."

Of course, if an infection clears after empiric therapy the actual etiologic agent may remain unknown if no initial culture was taken. That can go the other way, say if the infection worsens and the patient is clearly not on the right antibiotic.

"That can become a problem, but also in some cases the question is does this person even need an antibiotic to begin with?" Srinivasan says. "A lot of times antibiotics are given in situations where they are not needed, and one of the best ways that we know that they are not needed is because the cultures don't grow any organisms. Also, the best way we can be sure we have the right antibiotic is to test the susceptibility of the organism. But again, if we don't have the culture result then we can't do either one of those things."

REFERENCES

1. Eng R, Chiang T, et al. KPC Conjugation into Virulent Klebsiella pneumoniae. Session: 110. Antimicrobials: Resistance Mechanisms. IDWeek 2013. San Francisco, CA; Oct.2-6.

2. Liu Y, Li XY, Wan LG, et al. Virulence and transferability of Resistance Determinants in a Novel Klebsiella pneumoniae Sequence Type 1137 in China. *Clin Microbiol Infect* 2013;19(11):E509-15. doi:0.1111/1469-0691.12275.

3. Shon AS, Bajwa RP, Russo TA. Hypervirulent (hypermucoviscous) Klebsiella pneumoniae: A new and dangerous breed. *Virulence* 2013; 15;4(2):107-18. doi:10.4161/viru.22718. ■

The battler: CRE can't beat an indomitable spirit

Our money is on David Ricci becoming a doctor

Of all the motivations to become an infectious disease doctor, this is one of the more unusual paths taken: lose most of one leg and nearly all of your life to a series of recurrent near pan-resistant bacterial infections that you've finally fought into remission — but still have a 30% chance of coming back and trying to kill you.

Meet **David Ricci**, a twenty-something Seattle kid with a kind heart and immeasurable resilience: the battler.

"Absolutely, I'm hoping to become a doctor," he tells *Hospital Infection Control & Prevention*. "I am studying my pre-med requirements to get those out of the way and I am hoping to go into infectious disease. I just started getting really passionate about it. Before any of this happened, before I went to India I wasn't a hundred percent sure what I wanted to do."


David Ricci

Yes, India, where in June 2011, Ricci was a 19-year-old volunteer trying to do some good in the world.

"I was working at an HIV orphanage over there in the Calcutta slums," he recalls. "It was so condensed with people and so dirty."

Taking a shortcut to work one morning, Ricci began crossing some train tracks when he was hit by a rail car. As a result his mangled leg had to be amputated above the knee, but his ordeal was only beginning.

The many-headed hydra

Returning to the States he was told his wounds were infected with multiple drug-resistant bacteria — including *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Escherichia Coli.* Remarkably, each pathogen apparently carried the New Delhi metallo-β-lactamase (NDM) enzyme. That meant Ricci had several varieties of carbapenem-resistant Enterobacteriaceae (CRE) and had effectively left the world where miracle antibiotics easily clear infections of all stripes. He was in the post-antibiotic era.

Ricci recalls that his first impression after being diagnosed with the NDM variety of CRE was seeing the hospital staff go into scramble mode and quickly isolate him in a room. Thus the battle was joined. A series of infections, failed treatments, and surgeries ensued.

"It came back three or four different times," he says. "They soaked me in antibiotics basically and drugged me to the point of almost death because the antibiotics were so extreme. It was surgically cut out many times. They assumed they got it and a few months later it came back. They doubled up

on the [antibiotic] dosages and cut more of my leg away. It came back again six months later."

The last drugs of choice were not good choices, and he suffered at times as much from drugs like colistin as the recurrent infections.

"I was on colistin for a long time — it was horrible," he says. "I was on it four different times, and every single time they pushed it because they couldn't really test with 100% accuracy whether I still had the infection. Basically they would keep me on colistin as long as they could to make sure it was doing its job. So they would wait until my white blood cells and everything were at the lowest possible level and then they took me off it. "

He is not on antibiotics now and has been infection free for about two years.

"As far as I know it's not present right now, but [my doctors] don't have 100% certainty," Ricci says. "There is still a 30 percent chance that it will come back. They don't really know because of how complicated it is to test for this gene. We don't know whether it has been eradicated or if it's just lying dormant."

Focusing on what remains

The residual limb that once was his leg, limits him from doing some things that even other amputees do. And he had to give up travel to stay in the Seattle area and have access to his medical team. However, Ricci chooses to focus not on what has been taken away, but what remains.

"I can still ride a bike. I can still walk," he says. "It is really all about perspective. I only lost one leg — I could have lost both. I could have shattered my spine. I don't feel limited in any way really."

His ongoing trial has engendered a passion for medicine, particularly for infectious diseases.

"It has really inspired me," he says. "If I have the opportunity and the mind capable of going into medicine it would be a crime not to. Infectious disease is a big thing around the world, especially in the Third World, whether it is TB, HIV/AIDS, malaria — a lot of this is preventable stuff. I feel obligated almost."

It tells you all you need to know about Ricci's undaunted spirit that after so much suffering he sees himself as having an opportunity that many people don't.

"I want to become a doctor because I can become a doctor — there are many people that can't even if they wanted to," he says. "They just don't have the means or the opportunity. If anything this has given me the opportunity to open more doors and talk to more people. To me it is an opportunity to really just give back because I have first-hand experience of what these patients are going through."

Ricci has medical checkups every three to six months. He believes the squalid conditions in the Calcutta slums are the likely explanation for his subsequent aggressive infections. However, he says he may go back there some day — as a doctor. ■

New era of infection prevention in long term

The challenge: 380,000 infection deaths annually

For years scarce data on health care associated infections in long term care has been extrapolated from small studies and published reports, but a new era of infection prevention is opening that may eventually produce the kind of benchmarking and national comparative HAI rates used in hospitals.

Indeed, the current situation in nursing homes is somewhat analogous to hospitals in the 1970s, when facilities began reporting infection data to the old NNIS system at the Centers for Disease and Prevention. That surveillance system grew into what is now called the CDC National Healthcare Safety Network (NHSN), which has added a nursing home reporting component on the CDC's new website on infection prevention in long term care. (http://www.cdc.gov/longtermcare/)


Nimalie Stone, MD,

"The website is a really important first step for our promotion of HAI prevention in long term care settings," says **Nimalie Stone**, MD, MS, a medical epidemiologist specializing in long term care at the Centers for Disease Control and Prevention. "I think it is arranged in a way that will allow us to expand the content as we develop more long term care resources and guidance. It is similar to how NHSN evolved for acute care hospitals, and at this point it is just a voluntary reporting option — a tool for nursing home providers. The fact that we are seeing facilities getting involved and using the [surveillance] system is really exciting to us."

A variety of factors contribute to increased risk for infections in the elderly, including declining immune response, incontinence, poor hygiene, and dementia. "Breaks in the skin, wounds, dependence upon others for hygiene, use of catheters, and decreased nutrient and fluid intake also may increase risk," according to a new guide book on infection prevention in long term care by the Association for Professionals in Infection Control and Epidemiology (APIC).[1]

"The other thing that is changing drastically is our patient population," says **Deborah Patterson Burdsall**, MSN, RN-BC, CIC one of the authors of the APIC book and corporate infection preventionist for Lutheran Life Communities in Arlington Heights, IL. "We have about 500 residents and we have approximately 110 beds that are acute short-day rehabilitation. The average length of stay is about 20 days. These patients we have now in basically a quarter of our rooms are the same kind of patients that I was taking care of when I worked in a medical oncology cardiac step-down at an acute care hospital. Our patient population has changed and the acuity that we

CDC trying to rein in antibiotic use in LTC

Antibiotic stewardship is one of the important infection prevention strategies emphasized on the Centers for Disease Control and Prevention's new website on long term care, where up to 70% of residents receive an antibiotic every year.

The CDC is trying to raise awareness about the need for stewardship programs to curtail the overuse and misuse of antibiotics in nursing homes by reminding administrators and clinicians to consider these key points:

- Estimates of the cost of antibiotics in the long-term care setting range from $38 million to $137 million per year.
- Among the antibiotic-resistant organisms most commonly found in nursing home populations are multidrug-resistant Gram-negative bacteria, methicillin-resistant *Staphylococcus aureus* (MRSA), and vancomycin-resistant enterococci (VRE).
- Antibiotic resistance in long-term care is associated with increased risk of hospitalization, increased cost for treatment, and increased risk of death.
- Many long-term care residents may be colonized with bacteria rather than infected. The challenge of separating colonization from true infection can contribute to antibiotic overuse in this setting. For example, studies have consistently shown that about 30%-50% of frail, elderly long-term care residents can have a positive urine culture even without any symptoms of a urinary tract infection. Unfortunately, many of these patients are placed inappropriately on antibiotics.
- Poor communication when patients transfer facilities, for example from a nursing home to a hospital, can result in antibiotic misuse.
- Antibiotic-related complications, such as diarrhea from *Clostridium difficile* infections, can be more severe, difficult to treat, and lead to more hospitalizations and deaths among people over 65 years. Long-term care facility residents are particularly at risk for these complications.

Nursing homes administrators should

- Have clear policies and practices to ensure that patients are not started on antibiotics unless they are needed.
- Review the facility's microbiology reports and antibiogram to detect trends in antibiotic resistance.
- Implement policies that encourage prudent antimicrobial prescribing, including establishment of minimum criteria for prescribing antibiotics and review of antibiotic appropriateness and resistance patterns.
- Implement nursing protocols for monitoring patients' status for an evolving condition if there is no specific indication for antibiotics.

Nursing home providers should

- Obtain microbiology cultures prior to starting antibiotics when possible so antibiotics can be adjusted or stopped when appropriate.
- Remember that treatment with antibiotics is only appropriate when the practitioner determines, on the basis of an evaluation, that the most likely cause of the patient's symptoms is a bacterial infection.
- Use antibiotics only for as long as needed to treat infections, minimize the risk of relapse, or control active risk to others. Antibiotics are generally not indicated to treat colonization.
- Avoid use of antibiotics to treat viral illnesses such as colds, influenza, and viral gastroenteritis.
- Engage residents and their family members in addressing the need to improve antibiotic use in your facility. ■

are dealing with is just like acute care."

Fledgling network reporting to NHSN

With the risk of infections clearly established, facilities participating in the fledgling long term care surveillance network are reporting multidrug resistant organisms and *Clostridium difficile* as picked up in "laboratory-identified events" that serve as a proxy for infections, Stone explains.

"This is a strategy that we have used in acute care settings for a long time — using microbiologic reports and a positive lab tests for *C. diff*, for example, as a proxy indicator for the burden of those infections in that facility," she says. "They are reporting the same multidrug resistant organisms that acute care hospitals are reporting to NHSN."

In addition, the participating nursing homes are reporting urinary tract infections (UTIs). "And it's all UTIs -- not just catheter-associated events — because there is a substantial burden of non-catheter [UTIs] in long term care populations," Stone says.

With reporting beginning last year, the goal is gradually expand the network over the next few years until about 5% of the nation's nursing homes are linked to the NHSN surveillance system.

"We are just starting to build out the surveillance and prevention infrastructure for these providers," she says. "We'll learn a lot working with them to see how we can move the needle on HAI prevention."

In addition to the surveillance component, the CDC website includes educational materials, tools and checklists specifically designed for preventing infections in long term care. The challenge is a formidable one, as the CDC estimates that 1 to 3 million serious infections and 380,000 HAI related deaths occur annually in the nation's 15,000 long term care facilities. While "zero infections" campaigns are common in hospitals — where the prevailing perception is that most HAIs can be prevented — it is an open question how many infections and deaths are preventable in long term care.

"That's a very good question that we really need more information and research in order to answer," Stone says. "The estimates of this problem are still often based on experiences in a small number of facilities. When you try to apply it across a spectrum of over 15,000 facilities you have to be careful about generalizing. But I will say this, there are groups like the Advancing Excellence in America's Nursing Homes, which has been working for many years on improving the quality of care."

Indeed, the Advancing Excellence group is a key partner on the CDC's new long term care website. The partnership between CDC and Advancing Excellence grew through a joint effort to prevent *C. diff* infections in nursing home residents. Adding considerable momentum to the effort, long term care – particularly preventing *C. diff* infection (CDI) – is now a top priority of the Department for Health and Human Services (HHS) National Action Plan to Prevent HAIs. Long-term care represents the third phase of the HHS plan, which began with hospitals in 2009 and then added ambulatory care settings.

"*C. diff* has gotten a lot of attention — appropriately so — because it is such a significant health care priority," Stone says. "It is the leading cause of acute diarrheal infection in nursing homes. Also the population cared for in nursing homes tends to be vulnerable to severe *C. diff* infections. So it is very relevant, and the prevention strategies that you promote for reducing *C. diff* infection also will positively impact the reduction of the emergence and spread of other resistant organisms."

For example, hand hygiene promotion, cleaning and disinfection of the environment and antibiotic stewardship programs can all reduce *C. diff* and other infections. Antibiotic stewardship efforts in particular, including limiting the frequent and prolonged use of broad spectrum antibiotics, are needed to preserve the patients commensal gut bacteria which help prevent *C. diff* emergence. (*See related story, p. 30*).

The HHS action plan estimates that more than half of all health care-associated [*C. diff* infections] are occurring in nursing homes, where reported rates are between 1.7 and 2.9 infections per 10,000 resident days.[2] Moreover, recent data indicates that 75% of health care-associated *C. diff* is occurring in non-hospital settings, with a "substantial portion" of these infections occurring in long term care, the HHS notes. Thus it is critical to use antibiotics judiciously in the nursing home population, the HHS plan states.

CMS putting the heat on

On another federal agency front, the Centers for Medicare and Medicaid Services (CMS) is also stepping up oversight of long term care facilities, according to APIC. As noted in the APIC guide book, "the CMS Division of Nursing Homes is currently working with strategic partners to develop strategies to reduce preventable healthcare-associated infections. This means that the focus on infection prevention and control will increase. It is critical to have a systematic, evidence-based approach to preventing infections within long-term care."

Asked which areas the CMS is particularly

focusing on, Burdsall says, "Antimicrobial stewardship and interfacility communication. Those are the two biggies."

Indeed, with CMS penalties now in place for excess hospital readmissions, communication between facilities about the status of residents and patients moving across the health care continuum has become particularly important.

"The way that CMS is modifying its payment structures is forcing interfacility communication – which is a positive thing," says Burdsall.

In that regard, some 25 state collaboratives between hospitals, nursing homes and state public health departments are cited on the CDC website as evidence that connections across the health care continuum are growing stronger.

"These [collaboratives] are a critically important piece of improving communications and detection of problems in care transitions," Stone says. "Your prevention activities are going to be much more effective when you have all of the partners working in concert with one another."

In any case, CMS is forcing more than just interfacility communication, Burdsall notes, addressing a recurrent myth that nursing homes have long flown under the regulatory radar. That may have been the case at one time, but public outrage at nursing home conditions has been followed by increasing regulation and oversight over the years.

CMS is certainly enforcing the regulations that are currently required, citing F441 citations for infection control lapses observed in unannounced inspections. *(See CMS questions, right)* For nursing homes, ongoing readiness is a must.

"CMS inspectors showed up here two weeks ago at 7:30 in the morning on a Sunday," Burdsall says. "They come in and they hit the floors immediately. You have to be survey ready at all times."

The isolation conundrum

CMS inspectors may ask about residents under isolation precautions, raising a difficult, longstanding issue in long term care. "Restricting residents to their room when colonized or infected with certain organisms includes both advantages and disadvantages," APIC notes in the guide book. "Isolation, even for a brief period, may have unintended psychological risks such as depression, anxiety, and fear of healthcare personnel and may pose a greater risk of adverse events. Therefore, there must be a balance between the consequences of social isolation and the need to prevent the possible spread of disease within the LTCF."

The assessment should also include clinical risk factors such as wounds, indwelling devices, secretion containment, the ability to follow instructions, and personal hygiene. The least restrictive approach, including the use of a private room as available, that balances these multiple priorities should be used, APIC recommends.

The situation is reminiscent of the old restraint policies that were once widely used in nursing homes, Burdsall says. The original idea was to protect residents from falls, but the practice was abandoned when research indicated that restrained residents were more likely to be depressed and may even injure themselves trying to free their bonds. As the restraint practice was abandoned, the feared injuries due to falls did not turn out to be a significant issue.

"It took a regulation to stop a practice," she says. "That's what is going to have to happen

CMS questions during a nursing home survey

According to a new guide book on infection prevention in long term care by the Association for Professionals in Infection Control and Epidemiology (APIC) the following questions may be asked during a survey by the Centers for Medicare and Medicaid Services (CMS):

- Are proper hand washing techniques followed by the staff? Are gloves worn if there is contact with blood, specimens, tissue, body fluids, or excretions?
- Are gloves changed between resident contacts?
- Are staff who are providing direct care free from communicable diseases or infected skin lesions?
- Are precautions observed for the disposal of soiled linens, dressings, disposable equipment
- (sharps, etc.), and for the cleaning of contaminated reusable equipment?
- Are linens and laundry handled or transported in a manner to prevent the spread of infection?
- Are Isolation Precautions implemented when it is determined that a resident needs isolation?

REFERENCE

1. Association for Professionals in Infection Control and Epidemiology (APIC). Infection Preventionist's Guide to Long-Term Care 2013 First edition, November 2013; ISBN: 1-933013-59-1 Washington, DC. ■

with infection control. Overly aggressive isolation when the door is [always] shut is the same thing as restraints. You can't do that. You have to look at the whole person. What is going on with this person biologically? Look at their psychological, social and cognitive abilities. How can you promote health for this individual without jeopardizing others in your community?"

REFERENCES

1. Association for Professionals in Infection Control and Epidemiology, Inc. (APIC) Infection Preventionist's Guide to Long-Term Care 2013 First edition, November 2013; ISBN: 1-933013-59-1 Washington, DC.
2. Department of Health and Human Services (HHS). National Action Plan to Prevent Health-care associated Infections: Road Map to Elimination. April 2013;8:204 ■

Only a 50% adherence rate to infection control in ICUs

Researchers find more policy than practice

Hospital intensive care units (ICUs) in the U.S. report a high level of infection prevention policies in place, but the numbers fall off sharply when actual adherence to the interventions are factored in, researchers report. While that implies that some ICU patients are more protected on paper than in actual practice, the lead author of the study says the vast majority of health care workers are trying to "do the right thing" in a very challenging environment.


Pat Stone, PhD, FAAN

"I think we're doing well with getting the policies in place, but we still have work to do to make sure the clinicians at the bedside can and do follow the policies," says **Pat Stone**, PhD, FAAN, director of the Center for Health Policy at Columbia University School of Nursing. "We need to support them so they can comply every time. I'm not saying there are bad clinicians out there. It's not easy to do the right thing all of the time."

Stone and colleagues at Columbia collaborated with the Centers for Disease Control and Prevention to conduct a nationwide survey of 1,534 ICUs at 975 hospitals.[1] The survey inquired about the implementation of 16 recommended infection prevention measures at point-of-care, and clinician adherence to these policies for the prevention of central line-associated bloodstream infections (CLABSIs), ventilator-associated pneumonia (VAP), and catheter-associated urinary tract infections (CAUTIs). The three health care associated infections (HAIs) are among the most commonly acquired by ICU patients.

According to the survey, hospitals have more policies in place to prevent CLABSIs and VAP, than CAUTIs. The presence of infection control policies to prevent CLABSIs ranged from 87% to 97% depending on the measure being counted. The presence of policies for VAP ranged from 69% to 91%. The well-established use of a checklist for CLABSI insertion practices was reported by the vast majority of hospitals (92%). Uptake was less for a ventilator bundle checklist, as 74% of the ICUs reported having the policies in place. Of particular concern, only 27% to 68% of the ICUs reported having policies in place for prevention of CAUTIs.

"CAUTIs are the most common health care infection, but the policies don't have the uptake yet like for CLABSIs," Stone says. "We still have work to do there and then the adherence [for CAUTIs] is worse. Rightly so, we have seen a lot of attention from the infection control departments and the federal government on CLABSIs, but we have to put that emphasis in other places."

Indeed, in survey results for adherence, only 6% to 27% of the ICUs reported compliance with practices to prevent CAUTIs. Adherence numbers are better for the other two infections, but still show a considerable gap between policies and adherence. Adherence to prevention policies ranged from 37% to 71% for CLABSIs, while VAP adherence was reported by the ICUs at 45% to 55%.

Stone and colleagues noted in the paper that "Establishing policies does not ensure clinician adherence at the bedside. Previous studies have found that an extremely high rate of clinician adherence to infection prevention policies is needed to lead to a decrease in healthcare-associated infections. Unfortunately, the hospitals that monitored clinician adherence reported relatively low rates of adherence."

However, it should be noted that the survey did not ask how adherence was measured and so a variety of common infection control breakdowns could be considered as lack of adherence.

"We didn't ask how you measure it, but the last time you measured it what was it?," she says. "One thing about infection prevention is that these

are data people, and they know their data. [Lack of adherence] could be hand washing lapses, breaks in sterile technique, all different sorts of things.

The electronic survey was sent to infection prevention departments through the CDC's National Healthcare Safety Network (NHSN). The department director was asked to fill it out, reporting policies specific to the ICUs and then their assessment of adherence to them.

"The CLABSI policies are pretty much getting out there and we know that the rates have been going down, but still the adherence (for all three HAIs) was about 50%," Stone says. "We need to focus on how we can help the clinicians, both the nurses and doctors and decrease these infections. There is a whole science in human engineering to try to make the right thing the easiest thing to do."

The lack of adherence is multifactorial, but could include education and insufficient support for infection preventionists to work with bedside clinicians, she says.

"It is important to ensure that [infection control] is something on everybody's mind all of the time," Stone says. "We know when the top administrators and everybody in the C suite are on board it trickles down. It takes leadership to change the culture at the bedside."

The survey was part of the larger Prevention of Nosocomial Infections and Cost Effectiveness Refined (P-NICER) study, which is funded through the National Institute of Nursing Research. Several more studies are forthcoming from the same project, she says.

"This is the largest survey of infection control departments, and eventually the data will be linked with infection rates," Stone says. "We have four [other] papers under review right now."

REFERENCE

1. Stone PW, Monika Pogorzelska-Maziarz, Herzig CTA, et al. State of infection prevention in US hospitals enrolled in the National Health and Safety Network. *AJIC* 2014;94-99 ■

Hospitals restrict visitors as H1N1 flu resurges

Thanks but no thanks

The return of the 2009 H1N1 influenza pandemic strain this flu season has prompted many hospitals to tighten visitor restrictions. Though it is covered in the current vaccine, H1N1 was noted for causing serious flu infections in young, healthy people during the 2009 pandemic.

"It's definitely worse than it was last year, which was a very mild season," says **Joan Ivaska**, MPH, senior director of infection prevention for Banner Health in Phoenix, AZ. "But we have seen a fair number of hospitalizations this year in several of our facilities. We have hospitals in seven states and we have applied the same restrictions in all of them because they all are showing a high level of influenza activity."

The hospital system has issued visitor restriction policies that include the following:

- Do not visit the hospital if you have a fever, cough, vomiting or diarrhea
- Please, no visitors under the age of 13.
- Siblings who do not have cold and flu symptoms may visit a new baby on the Obstetrics Unit. Your child may be screened for illness by staff before being allowed to visit.
- Children 12 and under must be supervised by an adult at all times in public waiting areas and cafeterias.
- Please wash or sanitize your hands frequently while at the hospital

"Children can shed virus longer than adults and we just want to make sure we are providing the safest environment possible for our patients and staff," Ivaska says.

All Banner Health employees, employed physicians, volunteers and students received a flu vaccination by Dec. 1 of last year. Those who were unable to receive the vaccination due to medical or religious reasons are required to wear a mask in care areas during the flu season. ■

CDC: Test workers for HBV immunity

As many as 10% may be non-responders

A growing number of health care workers are coming into their profession with childhood vaccination against hepatitis B virus (HBV). Yet 5% to 10% of them may unknowingly be non-responders to the vaccine, leaving them at risk if they have a bloodborne pathogen exposure, according to the Centers for Disease Control and Prevention.

The most protective strategy would involve serologic testing of these previously vaccinated employees at hire, the CDC says in newly released guidance.[1] If they do not have antibody levels of at least 10 mIU/ml, they should receive a booster dose of the vaccine and retesting, CDC says. They may receive up to three new doses of HBV vaccine, the agency says.

Yet CDC also says employers may adopt a post-

exposure approach, based on risk and cost factors. "The risk in certain occupations is an important consideration, as well as whether the person is a trainee or a non-trainee," says **Trudy Murphy**, MD, a medical epidemiologist and unit leader for CDC's vaccine unit and a co-author of the guidance.

For example, some communities or hospital units may have a low prevalence of hepatitis B, and employees who are not involved in direct patient care would have a lower risk, she notes. Conversely, trainees have a higher rate of blood-borne pathogen exposures and therefore would be at higher risk, she says.

In a post-exposure program, health care workers would receive HBV serologic testing at the time of an exposure and would be revaccinated if they have antibody levels below 10 mIU/ml. If the source patient is hepatitis B surface antigen-positive or the HBsAg status is unknown, those exposed health care workers also would receive one dose of hepatitis B immune globulin.

A post-exposure approach hinges on prompt reporting and follow-up. Yet only about half (54%) of percutaneous and 17% of mucocutaneous exposures are reported, CDC notes.

"The only way to ensure protection is to take a pre-exposure approach or to have exposures reported and managed at the time of the exposure," says Murphy. "The goal here is to make sure that all health care workers or personnel are protected against hepatitis B."

The CDC guidance does not affect the U.S. Occupational Safety and Health Administration requirement for employers to offer the hepatitis B vaccine to all employees who have a risk of exposure. Employees who decline the vaccine must sign a declination statement.

Only about 64% of health care workers reported having been vaccinated against hepatitis B in a 2011 survey.[2] Vaccination rates are somewhat higher among health care workers in direct patient care, but they're still well below the HealthyPeople 2020 goal of 90%.[3]

In addition, the CDC recommends pre-vaccination serologic testing of health care workers who may have a higher risk of being infected with hepatitis B, including HCWs born in geographic regions where HBV is endemic (eastern Europe, Asia, Africa, the Middle East and Pacific Islands) or people who were not vaccinated as infants and whose parents were born in those regions; HCWs who received the HBV vaccine as adults or adolescents, after they began engaging in high-risk behaviors; people who are HIV-positive or who receive hemodialysis. They should be tested for HBV surface antigens as well as HBV antibodies, CDC says.

REFERENCES

1. Schillie S, Murphy TV, Sawyer M, et al. Centers for Disease Control and Prevention. CDC guidance for evaluating health-care personnel for hepatitis B virus protection and for administering post-exposure management. *MMWR* 2013; 62(RR10): 1-19.
2. Centers for Disease Control and Prevention. Non-influenza vaccination coverage among adults – United States, 2011. *MMWR* 2013; 62:66-72.
3. Byrd KK, Lu PJ, and Murphy TV. Hepatitis B vaccination coverage among health-care personnel in the United States. *Public Health Reports* 2013; 128:498-509. ■

CNE/CME Instructions

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CNE/CME Questions

1. Which frequent cause of community urinary tract infections was cited by **Arjun Srinivasan**, MD, of the Centers for Disease Control and Prevention, as a public health threat if it acquired antibiotic resistance?
   A. *Staphylococcus aureus*
   B. *Escherichia coli*
   C. *Klebsiella pneumoniae*
   D. *Acinetobacter baumanii*

2. Which of the following factors were cited as increasing the risk for infections in the elderly?
   A. declining immune response
   B. incontinence
   C. dependence upon others for hygiene
   D. All of the above

3. According to CDC estimates how many serious infections occur each year in long term care settings?
   A. 100,000
   B. 250,000
   C. 380,000
   D. 1 to 3 million

4. According to **Pat Stone**, PhD, FAAN, a survey of ICUs found that the overall reported adherence to infection control policies for three common infections was approximately:
   A. 80%
   B. 30%
   C. 50%
   D. 65%

CNE/CME Objectives

Upon completion of this educational activity, participants should be able to:

- Identify the clinical, legal, or educational issues encountered by infection preventionists and epidemiologists;
- Describe the effect of infection control and prevention issues on nurses, hospitals, or the health care industry in general;
- 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. ■

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