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IPs are Key Collaborators in the Fight Against Sepsis

A non-traditional role against a deadly syndrome

By Gary Evans, Senior Staff Writer

With everything else they are tasked to do, infection preventionists may question why they are now being called upon as key collaborators in the national effort to reduce sepsis, a syndrome traditionally more associated with critical care than infection control.

The short answer — proven by the IPs who have joined sepsis prevention collaborative teams — is that they can make a difference. An IP speaking at a sepsis session recently in Charlotte at the annual APIC conference summed up the current situation for the audience.

"For those of you sitting here thinking, 'I'm an IP. I know nothing about sepsis. My quality, ICU, and ID teams lead sepsis at my hospital.' Two years ago I was where you are, [but] you learn as you go the vital role we can play," says **Laura Anderson**, RN, MSN, CIC, manager of infection prevention at Newton Medical Center in Denville, NJ. "As IPs, we know that we are collaborative and very interdisciplinary. I am the only IP in my facility, so I very much rely on the people I work with to get the job done."

> "AS IPS WE KNOW THAT WE ARE COLLABORATIVE AND VERY INTERDISCIPLINARY. I AM THE ONLY IP IN MY FACILITY SO I VERY MUCH RELY ON THE PEOPLE I WORK WITH TO GET THE JOB DONE."

Getting the job done against sepsis means saving lives and dollars, as the deadly but poorly understood condition has become one of healthcare's most dreaded outcomes. The increasing

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use of rapid detection and intervention strategies have lowered mortality to some degree, but sepsis still takes a staggering toll.

"I think it's important to remember that sepsis is the single most expensive condition treated in the United States — about $20.3 billion in 2011," **Mitchell Levy**, MD, MCCM, FCCP, chief of the division of critical care at Brown University in Providence, RI, recently noted at a press conference at the CDC. "The mortality rate, although going down, still remains quite high — it's 15% to 25% or so. That's a significant number. About 300,000 people in the U.S. die of sepsis every year. So, although the mortality rate seems to be going down based on appropriate treatment, we still have a long way to go."

Thus, IPs are being drafted to join a national effort to prevent, detect, and rapidly treat sepsis before it becomes the fatal sequelae of what could begin as a simple infection. Sepsis is essentially a systematic inflammatory immune response to an infection that can quickly become life-threatening. In severe cases, organs begin to fail as blood pressure drops, affecting the heart and leading to septic shock. At that point, the patient's life hangs in the balance and rapid interventions must be brought to bear to avert death.

CMS Requirements

Giving hospitals a sense of urgency in responding to sepsis, CMS issued regulations last year that define severe sepsis and require intervention bundles at three hours and six hours. The definition includes a temperature of more than 100.9 F or less than 96.8 F, pulse exceeding 90 beats per minute, respiration rate at more than 20 breaths per minute, and signs of organ failure. Interventions include measurement of lactate, obtaining blood cultures, administering broad spectrum antibiotics, fluid resuscitation, and vasopressor administration. The new sepsis regulations have not been without controversy, particularly among emergency care providers, some of whom say the CMS sepsis "reporting rules are rigid and onerous and may not always reflect best clinical care for all patients."[1] In addition, the CMS has established measures for Sequential Organ Failure Assessment for diagnosing sepsis.[2]

Some 20% of sepsis infections have hospital onset, so enforcing basic infection control principles like hand hygiene remain critically important. However, the CDC is finding that the majority of the remaining cases are community onset, though the key caveat is that most of these patients have recently received healthcare or they a have chronic condition that requires frequent medical care. When these patients present in the ED or develop sepsis after admission, time is of the absolute essence.

To respond quickly, Anderson and colleagues at Newton Hospital formed a Code Sepsis Team to get all critical hands on deck once a patient with suspected septic shock is identified.

[About 300,000 people in the U.S. die of sepsis every year.]

"Ours is a silent alert, not a code that is called overhead," she says. "It's a page that goes to the cell

phones of certain key members of the sepsis team, including myself, the ED medical director, and our ICU manager. It lets the ICU know we have a patient they need to get a bed ready for. It alerts our critical care physician who is on call so they know they have an admission, and the same for the hospitalist. It alerts the pharmacy so we will have the antibiotics we need. It also triggers the lab so they know we need to have the blood work run STAT."

The patient record goes into a bright red folder that stays with the patient and documents the various aspects of sepsis response, she notes.

Collaboration Skills

Also speaking at the APIC sepsis session was **Shannon Davila**, RN, MSN, CIC, CPHQ, a former hospital IP now with the American Hospital Association. A look at some of the skills in collaboration described in the APIC competency model for IPs underscores their valuable role on sepsis teams.

"Certainly in our roles we are collaborating all the time with medical staff, ID, nurses, environmental service," she says. "We are really skilled at that, and that is one of the things we can pride ourselves on. And when you think of sepsis, it is no different. It really takes a collaborative approach and involves many of the same key stakeholders that are at the table for HAI prevention."

IPs also have experience in dealing with electronic medical records, and "sepsis is all about building alerts, looking for those signs and symptoms of when the patients are deteriorating," Davila says. "I know when I worked in a hospital, my IT department became my best friends when we were building tracking systems and running reports."

Another IP competency that applies to sepsis is performance improvement and implementation science.

"I think this may be one of the most important parts of our role, and certainly over time we have really looked at how we can advance implementation of HAI prevention and really build those teams including the folks at the bedside," she says. "With sepsis it is no different. You need to engage physicians, ED, and senior leadership to provide the support that you need to really do some of these interventions."

While many sepsis cases will come in with the condition, it is important to remain alert for sepsis developing in the hospital, Davila says.

"When patients on a medical-surgical ward develop sepsis and end up going to the ICU, they have a higher mortality rate than a patient coming in through the emergency department," she says. "So we really had a big push to engage nurses and hospitalists and physicians in the med-surg area to say, 'We need to identify sepsis early and [begin] those treatment bundles quickly.'"

Prioritizing Infection Prevention

Establish strong link between infection prevention and sepsis

In a message sure to be welcomed by infection preventionists, a new report on sepsis by the CDC urges healthcare administrators to "make infection control a priority."[1]

Hospital CEOs should establish a "strong link between infection control and prevention, sepsis early recognition, and appropriate antibiotic use programs," the CDC emphasized in the document. In general recommendations, the CDC cited the following key steps for sepsis prevention.

- **Prevent infections.** Follow infection control requirements (e.g., hand hygiene) and ensure patients receive recommended vaccines (e.g., flu and pneumococcal).
- **Educate patients and their families.** Stress the need to prevent infections, manage chronic conditions, and seek care if signs of severe infection or sepsis are present.
- **Think sepsis.** Know sepsis signs and symptoms to identify and treat patients early.
- **Act fast.** If sepsis is suspected, order tests to determine if an infection is present, where it is, and what caused it. Start antibiotics and other medical care immediately. Document antibiotic dose, duration, and purpose.
- **Reassess patient management.** Check patient progress frequently. Reassess antibiotic therapy 24-48 hours or sooner to change therapy as needed. Be sure the antibiotic type, dose, and duration are correct. ■

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Staunton Death

Though sepsis usually strikes the elderly, a case that drew national attention to the problem was the shocking death of 12-year-old Rory Staunton of Queens, NY, in 2012.

"After this really tragic case, his parents have gone on to be national and international patient advocates for sepsis," Davila says. "I believe New York was the first state to legislate and mandate that all hospitals have treatment protocols in place for all pediatric and adult cases of sepsis. All New York hospitals have to report every case of sepsis and adhere to the [state] protocols in addition to the CMS bundle."

Adding a personal emotional context to the clinical discussions at the recent press conference, CDC Director **Tom Frieden**, MD, described the time he faced sepsis as a father.

"Twenty-two years ago when our older son was just 4 months old, I came home from work one day to find him near death," he said. "He was completely pale, I didn't know if he was breathing or not, and it turned out he had bacteria in his blood. We were able to recognize it rapidly, treat it rapidly and he did fine and recovered completely. But he could have died from it. And far too many people do die from sepsis today."

Some of the general signs that herald sepsis onset include shivering or feeling cold, pain or discomfort, clammy or sweaty skin, being confused or disoriented, shortness of breath, and rapid heartbeat, he said.

"Sepsis most often occurs in people over the age of 65, or infants under the age of one," Frieden said. "People with chronic diseases such as diabetes, or weakened immune systems from things like tobacco use, are at higher risk of sepsis. But even healthy people can develop sepsis from an infection especially if it's not treated properly and promptly."

The CDC is finding that the four infection sites most likely to lead to sepsis are the lungs, urinary tract, skin, and the gut. Basic prevention measures include increasing immunization rates for pneumococcal disease and for influenza, and improving handwashing in healthcare facilities and the community, he says. Heightened awareness by providers and education of the public can also improve detection of sepsis.

"For example, if a patient with diabetes goes to their regular doctor and is found to have increased blood sugar and a small wound on their foot, this is a prime opportunity to think about infections and reduce the risk of sepsis," Frieden said. "In addition to treating the infection, the clinician can inform the patient and family members about how to care for the wound, how to recognize signs that the infection may be getting worse, and when to seek additional medical care."

No Simple Test

Since sepsis is caused by a variety of bacteria, there is no single test to make the diagnosis. Thus, clinicians look at the panoply of symptoms and begin antibiotics if they suspect a bacterial infection.

"Some published reports estimate that there are between one and three million people a year in the U.S. diagnosed with sepsis, and between 15% and 30% of these patients will die," Frieden said. "[But sepsis] is challenging in terms of both its recognition and enumeration. We expect that doctors will draw blood cultures if they think someone has sepsis and then, if clinically appropriate, start them on board spectrum antibiotics, and then reassess 24 to 48 hours later to determine whether they need any antibiotics or more narrowly targeted antibiotics."

Though given these unknowns it may be a surveillance artifact, the general trend points to an increase in sepsis, but also a diminishment in mortality in those with the syndrome.

"We know that there are certain trends that are very positive," Frieden said. "For example, *Haemophilus influenzae* sepsis has been dramatically reduced. We know that, for example, staph or MRSA in intensive care units has come down by half. But in terms of the overall numbers, it's challenging because there is no standard definition of sepsis or reporting of sepsis, and that's one of the things that we will be working on to improve going forward. What we know is that, however much there is, it's too much and we can do a better job preventing it, recognizing it early, treating it effectively, and preventing deaths." ■

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CDC: IPs Should Be Vigilant for Legionnaires' Disease

One confirmed case should trigger outbreak investigation

With outbreaks of Legionnaires' disease increasing, hospitals should establish water management teams that include infection preventionists and launch an investigation even if they detect only one confirmed case of *Legionella*, according to recently updated guidelines[1] by the CDC.

The CDC analyzed 27 building-related outbreaks between 2000-2014, finding that 15% occurred in hospitals and 19% in long-term care facilities.[2]

"The outbreaks in long-term care facilities and hospitals affected more people and caused more deaths than outbreaks in other locations," **Tom Frieden**, MD, director of the CDC, noted at a recent press conference. "They accounted for 85% of deaths, while hotel and resort outbreaks accounted for 6%. This reflects the higher rate of underlying illness in patients who are infected in healthcare facilities."

In analyzing the outbreaks, the CDC determined that most are preventable by improving water management systems. Problems identified included inadequate water disinfectant levels and other maintenance and equipment breakdowns. As IPs are well aware, *Legionella* can proliferate in a water supply that is not sufficiently treated or allows reservoirs to back up and form. The pathogen can be aerosolized and inhaled in mist from showers, sinks, and other sources of the potable water supply.

The disease gets its name from an outbreak at a meeting of the American Legion in 1976 in Philadelphia. In one of its more famous investigations, the CDC cracked the case by tracing the then-novel pathogen to the air conditioning system in the hotel.

"Legionnaires' disease is a serious lung infection," Frieden said. "It causes pneumonia, and symptoms include cough, shortness of breath, high fever, muscle pains, and headaches. About 10% of people who get this infection will die from it, and it's of particular risk to the elderly and those with suppressed immune systems or other underlying health problems."

Sporadic Cases Under the Radar

As part of the analysis, the CDC looked at 415 cases of Legionnaires' disease and 65 deaths. Although the analysis looked at outbreak-associated cases, it is thought that sporadic cases of *Legionella* are occurring under the proverbial radar.

"It's just easier to identify the problem if you have many cases in an outbreak," Frieden said. "While we still need to learn more about Legionnaires' disease, it's clear that people are unnecessarily getting sick and dying from preventable infections."

Though some confounding factors may be at play, Legionnaires' disease is increasing, with the number of cases quadrupling from 2000 to 2014. About 5,000 people are infected annually in the U.S. during an average of 20 outbreaks a year.

"We believe that the increase is real and it's likely due to a combination of factors including the increasing number of people who are at risk for Legionnaires' disease because of the aging of the population, the increase in chronic illness, and the increase in immune suppression through use of medications to treat a variety of conditions," Frieden said.

Other factors include aging plumbing infrastructure, increased diagnostic tests, and more reliable reporting of infection.

"The outbreaks are costly — for one year alone, insurers paid an estimated $434 million in hospitalization claims for Legionnaires' disease nationally," he says.

While outbreaks in healthcare are usually traced back to the potable water system, community outbreaks can occur if *Legionella* is aerosolized in plumes from HVAC cooling towers atop buildings, decorative fountains, and hot tubs.

Healthcare providers should test for Legionnaires' disease in people with pneumonia, especially those requiring intensive care or who recently stayed in a healthcare facility, hotel, or traveled on a cruise ship, Frieden said. The CDC recommends testing by culture of lower respiratory secretions or the *Legionella* urinary antigen test.

Hospital Outbreaks

Hospitals with frail patient populations may figure prominently in outbreaks in the community. For example, a Legionnaires' disease outbreak in Flint, MI, in 2014 and 2015 totaled 91 cases.

"Fifty of those — so more than half — were linked to a single hospital," says **Cindy Whitney**, MD, chief of the CDC respiratory diseases branch. "I want to emphasize that hospitals really are vulnerable to Legionnaires' disease outbreaks.

They have patients that are older and have susceptible conditions, so it's really important for every hospital to have a water management plan and to be actively looking for Legionnaires' disease among their patients."

Hospitals should take a multifaceted approach that includes testing periodically, checking water temperatures and chlorine levels.

"Testing can be a good adjunct to really make sure your water is clean, but we want to emphasize that you can't rely too much on testing," she says. "You really need all these other things that you're checking to make sure your water is safe and you're preventing *Legionella* growth."

In that regard, hospital water management teams should identify areas where *Legionella* could grow and spread, including patient rooms, ICUs, dialysis, and hydrotherapy.

"Think about all of the places where patients can be exposed to contaminated water," according to the CDC's new guidelines. "Don't forget about ice machines, heater-cooler units used on cardiopulmonary bypass, and respiratory therapy equipment."

IPs and their colleagues should also be watchful for any signs of *Legionella* in immune-suppressed patients, such as those receiving bone marrow and other transplants, as well those in treatment for cancer.

The CDC recommends beginning a *Legionella* outbreak investigation if one or more cases of "definite" healthcare-associated Legionnaires' disease is detected. That is defined as a patient who has spent at least 10 days prior to onset of illness in the facility, which accounts for the pathogen's incubation period. Outbreak investigations should also be initiated upon detection of two or more "possible" cases of healthcare-associated Legionnaires' disease. Possible cases are defined as patients who spent part of the 10-day incubation period before symptoms began at the same facility and are identified within six months of each other.

According to the CDC, key elements of a full investigation include the following:

- working with local and/or state health department staff,
- reviewing medical and microbiology records,
- actively identifying all new and recent patients with healthcare-associated pneumonia and testing them for *Legionella*,
- developing a line list of cases,
- evaluating potential environmental exposures,
- performing an environmental assessment and conducting environmental sampling,
- subtyping and comparing clinical and environmental isolates, and
- decontaminating environmental sources ■

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MERS Still Simmers on the Back Burner

Have U.S. hospitals become complacent since 2014 cases?

While the disease du jour remains Zika, another virus with a much greater ability to spread in hospitals continues to simmer in an arid region a plane ride away: Middle East Respiratory Syndrome (MERS) coronavirus.

Though eclipsed by Zika virus, MERS is still causing infections in hospitals, some of them begun by "super spreaders" that cause explosive outbreaks. The quasi-medical term was coined to describe a single person who infects an unusually large number of contacts, including other patients and healthcare workers.

WHO recently reported an outbreak of MERS in a hospital in Riyadh, Saudi Arabia, where a single patient infected 24 contacts — 13 patients and 11 healthcare workers.[1] A WHO report on June 22, 2016, stated the index patient was admitted to a Saudi hospital in critical condition with MERS undiagnosed because it was "masked by other predominant symptoms." She was admitted through the ED and began showing signs of respiratory illness before death. MERS symptoms commonly include fever, cough, and shortness of breath. Pneumonia develops in many cases, and gastrointestinal symptoms like diarrhea have also been reported.

"Following admission, the patient showed signs of respiratory illness and MERS was suspected," the WHO states. "The hospital diagnosed and confirmed MERS on June 12, 2016, within 48 hours of her original admission."

Investigators of a 2015 outbreak of MERS in Samsung Medical Center in Seoul, South Korea, recently published a study that revealed one patient exposed hundreds of patients,

visitors, and healthcare workers while in the ED between May 27 and May 29.[2] MERS infection was confirmed in 33 patients, 41 visitors, and eight healthcare workers.

"Our results showed increased transmission potential of MERS from a single patient in an overcrowded emergency room and provide compelling evidence that healthcare facilities worldwide need to be prepared for emerging infectious diseases," the authors concluded.

Super-spreaders

These transmissions to numerous contacts from a single infected case reopened discussions of super-spreaders, a phenomenon also observed in the 2003 outbreak of a similar coronavirus, Severe Acute Respiratory Syndrome (SARS). The concept goes back at least to "Typhoid Mary," a food server in the early 20th century, but was popularized during the 2003 SARS outbreak. Indeed, the global outbreak of SARS began when a Chinese doctor infected more than a dozen other people staying on the ninth floor of the Metropole Hotel in Hong Kong. They departed to their home countries with SARS in tow.

A patient with undiagnosed SARS was admitted to one hospital and then transferred to another in Singapore in 2003. A total of 62 people with probable SARS, including 37 additional patients, were linked to this single case.[3]

"With respiratory infections, TB included, the concept of a super-spreader being extremely dangerous in terms of transmission has some real credence," says **William Schaffner**, MD, an epidemiologist in the department of preventive medicine at Vanderbilt University Medical Center in Nashville, TN. "I think the general infectious disease community is very accepting of that, though it is not as well-documented as we would like. Of course, in addition to that, the longer a patient goes undiagnosed — 'super-spreader' or not — and they have the opportunity to have face-to-face contact with more and more people, that obviously increases the risk of transmission."

Super-spreaders are related to a variety of factors, from the viral titer in the patient's system, the frequency and type of contacts, and the air currents in the room where they are awaiting or receiving care.

"I think it is a perfectly valid concept, but there is still a little bit of controversy about them," says **Allison McGeer**, MD, a microbiologist and infectious disease consultant at Mount Sinai Hospital in Toronto. "I think the events themselves are a combination of [factors influencing] transmission from individual patients and the environmental space, airflow, and infection control practices. I don't think there is any question that they are real, but a lot of the time they are really complex events."

The number of newly infected patients resulting from a single infected patient over a defined period of time is found in some variety for most infectious diseases, she adds. With SARS, maps of transmission showed most infections resulting in few, if any, additional cases, and then one or two patients who infect 20 other people.

WHO and individual epidemiologists have cited "doctor shopping" and other practices of the Korean healthcare system by way of explanation of the large outbreak after importation of MERS by a returning traveler.

"That was a big part of it — not only that patient's visit to a lot of institutions and individual providers, but the entire structure and tradition of infection control simply was not as robust in Korea as it was in other parts of the world," Schaffner says. "This was true also initially in Saudi Arabia and the Middle East, and those countries have been working very hard to introduce the kind of infection control that we are used to in the U.S. into those countries. They have still not been entirely successful. It takes a very sustained effort."

Having experienced the 2003 SARS outbreak in Toronto firsthand, McGeer is unconvinced that the Korean MERS outbreak was an anomaly.

"It's fine to say people in South Korea shop for hospitals, but we do the same thing," she says. "I think South Korea with MERS looked a lot like Toronto with SARS: a competent healthcare system that just wasn't paying enough attention to the possibility [of a MERS introduction]. Things can go wrong."

'It Ain't Over Yet'

In that regard, some complacency may have set in at U.S. facilities, as MERS was contained in 2014 when two unrelated cases were admitted to hospitals in Indiana and Florida. Those cases involved healthcare workers who had recently worked in Saudi Arabian hospitals, but next time MERS may not be so obviously identified. Crowded EDs in the U.S. could certainly be vulnerable to an undiagnosed MERS patient, thus a familiar colloquialism applies to the situation.

"It's true it ain't over till it's over — and MERS ain't over yet," says Schaffner. "We can all use a reminder that it is not over and to stay alert."

Camels in Saudi Arabia are the likely reservoir host for the virus, which appears to be originally of bat origin. MERS does not spread effectively in the community, but can cause hospital outbreaks that endan-

ger other patients and often include transmission to healthcare workers. It is striking that MERS has emerged in the Middle East but has not been able to really establish an endemic foothold in another region in the absence of its camel reservoir. That said, as we have seen with Zika virus, the longer the MERS coronavirus is loose in the world and causing infections, the greater the likelihood that it could eventually mutate to become more transmissible between humans.

"There is no question that primary cases are continuing to occur at a steady rate," McGeer says. "I think there are far fewer secondary cases and that there are presumably fewer exported cases. There is still a risk of travel-associated cases and there is no evidence that that risk is going to go away. All of us around the world are still at risk of a travel-associated case triggering an outbreak."

MERS Travels to 27 Countries

As of Sept. 8, 2016, the WHO reported that MERS has caused 1,800 laboratory-confirmed cases of infection with 640 deaths related to MERS-CoV since September 2012. The pathogen remains primarily in Saudi Arabia, though 27 countries have reported cases via travelers from the region. The overall case count translates to a mortality rate of 35%, with deaths occurring primarily in those with underlying medical conditions.

"I think even with a really good healthcare system, you can miss an index case and then detect a case as part of a nosocomial outbreak," McGeer says. "Twenty-five years ago, detecting dengue in my hospital was not an issue, but now it is. Detecting things like MERS has been helpful, because travel history is not just something needed in terms of infection control — it is helpful in terms of individual-level diagnosis [and treatment]."

Complicating the situation, a study published last year raised the possibility of transmission from those with asymptomatic MERS. There appear to be thousands of asymptomatic or mild MERS cases — primarily young men who have frequent contact with camels — who may be transmitting the virus to those with underlying medical conditions in Saudi Arabia, according to a seroprevalence study.[4] That said, U.S. hospitals may have to run that risk as long as they can at least pick up incoming symptomatic MERS cases.

"In North America you just have to pick up the travelers to get the people at risk, but in Saudi Arabia you have to treat everybody who might have a respiratory infection as if they had a MERS infection — that it is a huge burden," says McGeer, who has traveled to the kingdom to investigate the hospital outbreaks. "From my perspective, it has been really hard for Saudi Arabia to get this far, but the good news in this latest outbreak is that less than a week from what appeared to be the index case, there was a report to WHO [disclosing that a case was missed and transmission occurred]. That's as good as it is going to get in Saudi Arabia. They are going to miss cases."

Though no transmission has occurred in the U.S., the 2014 MERS introductions caused considerable chaos and concern. The CDC initially reported that an Indiana man with MERS transmitted it via handshake to a man from Illinois, but more refined testing revealed the suspected secondary case did not have the coronavirus. No other patients were infected, but healthcare workers exposed to the first two MERS cases were subject to rapid follow-up and home quarantine policies following the exposures.

The emotional toll on healthcare workers during a MERS outbreak can be considerable. A hospital outbreak of MERS caused emotional turmoil and stress in healthcare workers, particularly after some of their own colleagues became so seriously infected they had to be put on ventilator support, a recent study reports.[5]

The unusual study looked at the emotional toll and stress on healthcare workers during a 2014 MERS outbreak in King Faisal Specialist Hospital & Research Center, a 420-bed tertiary care hospital in Jeddah, Saudi Arabia. The three severely infected workers survived, but seeing their condition with the knowledge that healthcare workers had died of MERS in other outbreaks was unsettling to staff, **Imran Khalid**, MD, a pulmonary and critical care physician at the hospital and lead author of the study, said via email.

"The healthcare workers were really disturbed to see that MERS is able to cause fatal infections in previously healthy people and transmit from asymptomatic patients," Khalid said. "However, fears were eased once the outbreak came under control in 2014, and also since then, no more cases have been seen in our hospital. There were 12 healthcare workers who were infected with MERS. Three required ICU [treatment] but all survived and are back to work."

The three severely infected workers suffered respiratory failure, leading to intubation and mechanical ventilation to keep them alive.

How deadly can MERS be? Eight patients infected with coronavirus developed pneumonia

and died during the outbreak.

Keep up Index of Suspicion

The 2014 U.S. introductions certainly raised MERS awareness, as hospitals like Vanderbilt follow-up rapidly when they identify a suspect case, Schaffner says. The travel piece is critical because the initial onset of MERS can be virtually indistinguishable from other severe respiratory infections.

"We have not had any MERS, but we have had several 'alerts' on patients who have been evaluated as possible MERS introductions," he says. "That system has worked very well. The patient immediately gets put into isolation, infection control is notified, and they are on the scene. Specimens are obtained and the state health department laboratory is notified, and the specimens are sent to the state lab and are managed with appropriate security. We get answers pretty darn quick."

Likewise, McGeer sees about one case a month of a patient with severe respiratory symptoms and a travel or contact history that would raise the possibility of MERS infections.

"The screening question in our emergency department is, 'Have you or any of your close contacts traveled?'" she says. "That testing gets done in six hours and the second that testing result is available, every hospital in the province will know what's going on in my hospital. I would say we send testing for MERS once a month."

Of course, many patients and healthcare workers may already be exposed by the time a MERS case is diagnosed. To prevent these exposures from the outset, the CDC recommends respiratory "etiquette" signs and posters, reminding patients to adhere to respiratory hygiene and cover coughs while practicing hand disinfection and following triage procedures.[6]

"Instructions should include how to use face masks or tissues to cover nose and mouth when coughing or sneezing, to dispose of tissues and contaminated items in waste receptacles, and how and when to perform hand hygiene," CDC recommends. "Implement respiratory hygiene and cough etiquette (i.e., placing a face mask over the patient's nose and mouth) and isolate those at risk for MERS-CoV infection in an airborne infection isolation room." ■

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FDA: States Should Begin Testing Blood for Zika

Florida first, 11 other states on fast track

Underscoring the threat of Zika virus transmission via the blood supply, the FDA is calling for all states to screen donations, with Florida to do so immediately.

"Test all donations collected in the U.S. and its territories with an investigational individual donor nucleic acid test for [Zika] under an investigational new drug application, or when available, a licensed test, or implement pathogen reduction technology for platelets and plasma," the FDA stated.[1] "Blood establishments that collect whole blood and blood components in U.S. states and territories with one or more reported locally acquired mosquito-borne cases of [Zika] should implement the recommendations immediately. You should cease blood collection until testing or the use of pathogen reduction technology is implemented, consistent with the recommendations in this guidance."

That translates to Florida and Puerto

Rico, the latter of which has already been screening blood for the virus. However, 11 other states were told to implement blood testing as soon as feasible and no later than four weeks from the issuance of the guidance.

Because of their proximity to areas with locally acquired mosquito-borne cases of Zika or the number of travel-associated cases, the following states must meet the four-week deadline for blood testing: Alabama, Arizona, California, Georgia, Hawaii, Louisiana, Mississippi, New Mexico, New York, South Carolina, and Texas.

Other U.S. states and territories should follow suit no later than 12 weeks after the guidance issue date of Aug. 26.

Meanwhile, public health officials in Florida confirmed seven new cases of local Zika virus infection spread by mosquitoes, bringing the total of non-travel-related cases to 56 in the state as of Sept 6, 2016. In addition to the local transmission cases, Florida had 577 travel-related cases and 80 Zika infections in pregnant women.

Six of the new cases were associated with an ongoing investigation in Miami Beach and the other is a new investigation in Miami-Dade County.

"[We believe] ongoing transmission is only taking place within the small identified areas in Wynwood and Miami Beach in Miami-Dade County," the department said in an update statement. ■

REFERENCE

1. FDA. Revised Recommendations for Reducing the Risk of Zika Virus Transmission by Blood and Blood Components: *Guidance for Industry*. August 2016: http://bit.ly/2ceAS8E.

FDA Bans Over-the-Counter Antibacterial Washes

Ruling does not affect products used in hospitals

Citing a lack of efficacy data, the FDA has banned marketing of over-the-counter consumer antiseptic and antibacterial hand and body wash products in a final rule that will not affect healthcare settings.

In a final rule issued Sept. 6, 2016, the FDA closed a prolonged comment and analysis period by concluding that "manufacturers did not demonstrate that the ingredients are both safe for long-term daily use and more effective than plain soap and water in preventing illness and the spread of certain infections."[1]

The rule applies to 19 specific ingredients, including the commonly used triclosan and triclocarban.

"These products are intended for use with water, and are rinsed off after use," the FDA stated. "This rule does not affect consumer hand 'sanitizers' or wipes, or antibacterial products used in healthcare settings."

Last year, the FDA issued a proposed rule[2] to address data gaps in active ingredients in healthcare antiseptics, but said the products should continue to be used for infection control while additional data are collected.

The final rule on the consumer antibacterial soaps follows a proposed rule in 2013 that raised the issue of whether the products were no better than traditional soaps and may even pose health risks and increased bacterial resistance.

In response to comments submitted by industry, the FDA has deferred rulemaking for one year on three ingredients used in consumer wash products: benzalkonium chloride, benzethonium chloride and chloroxylenol (PCMX). The grace period will give manufacturers using those ingredients more time to submit new safety and effectiveness data. Thus, products containing those three ingredients will continue to be marketed to consumers in the interim.

In comments submitted on the proposed rule in 2014, the Society for Healthcare Epidemiology of America said it agreed that there are insufficient data to show the antibacterial consumer products are any better than soap and water. However, SHEA noted that triclosan has demonstrated some efficacy in healthcare facilities, particularly in the reduction of surgical site infections. Again, those products would not be affected by the FDA rule.

For its part, APIC expressed concern to the FDA about industry marketing efforts that suggest an "unproven effect" of consumer antiseptics on preventing infections. APIC called for "clear data to demonstrate clinical benefit," and apparently finding none, the FDA issued the final rule banning marketing of the products. The FDA rule is effective Sept. 6, 2017. ■

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1. FDA. Safety and Effectiveness of Consumer Antiseptics; Topical Antimicrobial Drug Products for Over-the-Counter Human Use. *Fed Reg* 2016;81 FR:61106 -61130.
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ABSTRACT & COMMENTARY

C. difficile Burden Varies By Facility, Sometimes Only Miles Apart

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Dr. Kemper reports no financial relationships relevant to this field of study

SOURCE: Brown KA, Jones M, Daneman N, et al. Importation, antibiotics, and *Clostridium difficile* infection in veteran long-term care: A multi-level case-control study. *Ann Intern Med* 2016;164:787-794.

While the risks for *Clostridium difficile* infection (CDI) are well-recognized, the basis for the significant variation in CDI incidence found in long-term care across the United States is poorly understood. These authors examined regional risk factors for CDI across Veteran Health Administration long-term care facilities (LTCFs) from 2006 to 2012. VHA is divided into 86 different regions, and there are significant differences between them in the risk of CDI.

Cases of CDI were defined by a positive toxin test three or more days after admission to LTCF or a positive toxin test eight or more weeks after a previous positive result. Various risk factors were included in the analysis, including patient age and comorbidities, use of antibiotics within 28 days, and use of proton pump inhibitors. Estimates of importation of cases were based on the prevalence of CDI within the local acute care facility within the previous eight weeks.

A total of 6,012 CDIs were identified across the VHA regions, ranging from a minimum of 0.6 cases per 10,000 days to a maximum of 31.0 cases per 10,000 days. In unadjusted analyses, the strongest predictors for CDI were total antibiotic use within an LTCF (incidence risk ratio [IRR] 2.86, R2 = 0.63) and importation of cases from the acute care setting (IRR 1.59, R2 = 0.5). Both of these factors varied considerably: Estimated importation of cases varied 100-fold and antibiotic use varied six-fold across regions. Not surprisingly, individual use of antibiotics within the previous 28 days also was a significant risk factor. Other risk factors examined, including age, comorbidity, and proton pump inhibitor use, had little effect on the variability of CDI across regions.

In complex weighted analyses, antibiotic use and importation of cases explained 75% of the regional variability in the incidence of CDI in LTCF. Regional differences in antibiotic use suggested that not only was antibiotic use associated with an increased risk of CDI, but with an increased risk of spreading CD. The authors surmised that the remaining 25% of geographic variability, which was unexplained by their data, may be due to factors such as improved infection control practices and environmental measures at specific facilities.

Certainly a "community burden" of CD must play a significant role in the risk of active CDI within a facility. Our acute care hospital, with two campuses located 17 miles apart, screens all high-risk hospital admissions with rectal swabs for CD PCR (e.g., admissions from SNF or other facilities, dialysis patients, anyone with a history of CDI). The prevalence of CD colonization on admission between the two campuses is 19% vs. 9.7%, and the difference in CD colonization for SNF admissions between the two campuses is 18% vs. 6%. Despite the use of the same infection control and environmental procedures at both facilities, significant differences in CD rates between the two facilities are frequently observed. ■

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HOSPITAL INFECTION CONTROL & PREVENTION

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CME/CE QUESTIONS

1. Sepsis is a systematic inflammatory immune response caused primarily by infections that are resistant to most broad-spectrum antibiotics used for empiric therapy.

a. True
b. False

2. Approximately what percentage of sepsis cases have onset in the hospital?

a. 20%
b. 40%
c. 60%
d. 80%

3. Which of the following were cited as likely explanations for the increase in Legionnaires' disease?

a. Aging of the population
b. Increase in chronic illness
c. Increase in treatment causing immune suppression
d. All of the above

4. According to the FDA, which of the following states should begin testing the blood supply for Zika virus no later than four weeks after the agency announcement?

a. Florida
b. New York
c. Missouri
d. Iowa

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.