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Feds reset HAI baseline, challenge IPs to prevent more infections

HAIs are touching our lives every day — these people need our help.'

By Gary Evans, Executive Editor

Two critically important infection control issues — injection safety and antibiotic resistance — are vying to be the top priority in the next phase of the Department for Health and Human Services (HHS) Action Plan to Prevent Healthcare-Associated Infections (HAIs), said **Don Wright**, MD, MPH, Deputy Assistant Secretary for Healthcare Quality at the HHS.

"Over the next year we will be tackling the next phase — the candidates for that are still being discussed," Wright said recently in Anaheim at the annual conference of the Association for Professionals in Infection Control and Epidemiology (APIC). "We are considering injection safety for a variety of reasons. There continue to be significant outbreaks related to injection safety and we also know with the demographics of increasing numbers of diabetics in the country there is an opportunity to [reduce HAIS] related to glucose monitoring and insulin injection. Another topic that is being considered is antimicrobial resistance and antibiotic stewardship. It is an issue that has great momentum in Washington, D.C., with the White House becoming interested as well as Congress."

This will be the fourth phase of the sweeping federal initiative, which has achieved some dramatic reductions in HAIs since it began in 2008 but is still struggling to affect *Clostridium difficile* and catheter-associated urinary tract infections (CAUTIs).

"It appears that we are on target to reach the 50% reduction in CLABSIs, the 25% reduction in SSIs, meet the SCIP process mea-

In This Issue

AHC Media

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sures — [and for] invasive MRSA — significant decreases," Wright said. "I have to credit you and the thousands of providers that have actually translated what we know are good practices into bedside care that's responsible for this. Clearly we are not making the headway with CAUTIs that we need to make, and there is a need for a great deal of improvement in the area of *Clostridium difficile* as well."

In that regard, the reduction targets for various infections are being finalized in the updated HHS plan, which will establish a new baseline in 2015 and set HAI percentage reduction goals for 2020. Though Wright said there may be some "tweaking" of the targets, they are expected to be finalized much as proposed, with the following goals set for 2020:

- Reduce central line-associated bloodstream infections in intensive care units and ward-located patients by 50% from 2015 baseline.
- Reduce CAUTIs in intensive care units and ward-located patients by 25% from 2015 baseline.
- Reduce the incidence of invasive health care-associated methicillin–resistant Staphylococcus aureus infections by 75% from 2007-2008 baseline.
- Reduce facility-onset methicillin-resistant MRSA in facility-wide health care by 50% from 2015 baseline.
- Reduce facility-onset *Clostridium difficile* infections in facility-wide health care by 30% from 2015 baseline.
- Reduce the rate of *C. diff* hospitalizations by 30% from 2015 baseline.
- Reduce Surgical Site Infection admission and readmission by 30% from 2015 baseline.

A challenge for IPs

"Concerning [resetting the baseline in] 2015, many of us have been looking to get a new benchmark to compare our information against," said the moderator of the APIC panel, **Susan Dolan**, RN, MS, CIC, an infection preventionist at Children's Hospital Colorado in Aurora. "It's really good to have those new targets, but I also think it makes it more challenging to then try to get your rates down even lower and meet them."

Dolan added a personal touch to the discussion, noting that her mother was recently hospitalized and "before we could get her home she developed *C. difficile*. She has now just finished a second round of antibiotics and we are hoping. We know we still have work to do. HAIs are still touching our lives every day — our patients' lives, our family lives, our friends' lives. These people need our help."

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CMS sounding alarm on unsafe needle practices

Inspectors told to call in public health officials

As outbreaks continue to be reported due to unsafe injection practices and improper use of medication vials, the Centers for Medicare & Medicaid Services (CMS) is telling its surveyors to contact public health departments immediately if they see such flagrant breaches of infection control.[1]

A recent memo from the CMS states that if State Survey Agencies (SAs) or Accrediting Organizations (AOs) witness the following practices it's time to cite and sound the alarm by calling in public health authorities:

- Using the same needle for more than one individual
- Using the same (pre-filled/manufactured/insulin or any other) syringe, pen or injection device for more than one individual
- Re-using a needle or syringe which has already been used to administer medication to an individual to subsequently enter a medication container (e.g., vial, bag), and then using contents from that medication container for another individual;
- Using the same lancing/fingerstick device for more than one individual, even if the lancet is changed.

According to the CMS, SAs should consult with their state's Healthcare Associated Infections (HAI) Prevention Coordinator or State Epidemiologist on the preferred referral process. Since AOs operate in multiple states, they do not have to confer with state public health officials to set up referral processes, but are expected to refer identified breaches to the appropriate state public health contact identified at: http://www.cdc.gov/HAI

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1. Centers for Medicare and Medicaid Services. Infection Control Breaches Which Warrant Referral to Public Health Authorities May 30, 2014: http://go.cms.gov/1vlKKKw

Indeed, Wright told APIC attendees they were "invaluable stakeholders" as the national HHS plan to reduce HAIs moves forward. All HHS forces are being brought to bear on HAIs, including "CMS financial incentives and the power of the purse — market driven incentives," he said.

The paradigm shift that has occurred with the national HAI plan can be largely traced to "two critical elements: accountability and transparency," said **Denise Cardo**, MD, MPH, director of the Division of Healthcare Quality Promotion at the Centers for Disease Control and Prevention. "We had goals before, but now we have national goals that are embraced by CMS with the alignment of their incentive programs, their regulations. It is really working together — stopping the parallel work — and moving together toward real prevention."

While reducing the target HAIs is an ongoing process, the annual top priority item will likely receive additional funding as the HHS agencies collaborate on the identified problem and redouble their efforts. Previous top priority items have included acute care hospitals, ambulatory surgery centers and long-term care.

Given the increasing emphasis on antibiotic resistant infections, some of which are becoming virtually untreatable, one would think that would be the obvious choice over injection safety as the HHS priority. However, recall that it was the massive hepatitis C exposure incident in 2008 in a Las Vegas endoscopy clinic that drove national demands for action to prevent HAIs. Making matters worse, as originally reported in *Hospital Infection Control & Prevention*, CMS inspectors had actually visited the Las Vegas clinic but failed to recognize the reuse of single dose vials and other flagrant infection control breaches. Another sign that injection safety is becoming a top HHS priority is a recent memo by the Centers for Medicare & Medicaid Services (CMS) instructing it's surveyors to contact public health departments if they see unsafe injection practices in health care settings. (*See related story above*) The Las Vegas HCV outbreak was followed shortly thereafter by a federal GAO report that essentially branded the HHS as a collection of agencies content to operate in their own silos.

"I think the title of that report tells it all: 'HAIs in Hospitals: Leadership needed by HHS,'" Wright said. "It indicated that there was not a coordinated strategy. The message I received

Seven ways to save fading antibiotics

Monitor prescribing, resistance patterns

Continuing to emphasize the importance of hospital adoption of antibiotic stewardship programs, the Centers for Disease Control and Prevention recommends seven key strategies to stem the tide of drug-resistant pathogens.[1] To protect patients and preserve the power of antibiotics, hospital CEOs/medical officers should form an antibiotic stewardship program that includes, at a minimum, this checklist:

1. Leadership commitment: Dedicate necessary human, financial, and IT resources.
2. Accountability: Appoint a single leader responsible for program outcomes. Physicians have proven successful in this role.
3. Drug expertise: Appoint a single pharmacist leader to support improved prescribing.
4. Act: Take at least one prescribing improvement action, such as requiring reassessment within 48 hours to check drug choice, dose, and duration.
5. Track: Monitor prescribing and antibiotic resistance patterns.
6. Report: Regularly report to staff prescribing and resistance patterns, and steps to improve.
7. Educate: Offer education about antibiotic resistance and improving prescribing practices.

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1. CDC. Antibiotic Rx in Hospitals: Proceed with Caution. Vital Signs March 2014: http://1.usa.gov/1pWNxdu

as the department's representative before [a Congressional committee] was 'You're not doing enough.' This was in the aftermath of the large outbreak in Nevada in ambulatory surgical centers where about 80,000 patients were [potentially] exposed to bloodborne pathogens through very poor infection control practices."

According to the CDC more than 50 outbreaks linked to reused and misused needles, syringes and medication vials have occurred since 2001, exposing tens of thousands of patients and leading to transmission of HCV, hepatitis and bacterial infections. In addition, patients have been infected with HCV and other pathogens by receiving contaminated solutions tainted by addicted health care workers diverting drugs for their own use. Outbreaks and patient notification events have occurred in hospitals, primary care clinics, pediatric offices, ambulatory surgical centers, pain remediation clinics, imaging facilities, oncology clinics, and health fairs.

'The topic of today, the topic of tomorrow'

If such highly publicized outbreaks continue, some patients may lose trust in the health care system, avoiding preventive and routine medical care that could leave them vulnerable to less treatable conditions later. Antibiotic stewardship is a more nebulous concept to many people, but the failure to reign in the massive overuse and misuse of the live-saving drugs could have devastating consequences.

"Antibiotic resistance is the topic of today and the topic of tomorrow," Cardo said. "It is a topic that you can talk to both Democrats and Republicans about and they both agree that it is important to address."

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.

The seriousness of this issue was driven home by another presentation at APIC, which revealed that a prolonged outbreak of CRE in a North Carolina hospital included three patients who acquired a CRE strain that was resistant to colistin — the absolute last line drug against many of these infections.[1] If such strains gain a foothold and spread, a true era of untreatable CRE infections could result.

"One [patient] passed away and two survived," **Catherine Passaretti**, MD, medical director of infection prevention at Carolina Medical Center in Charlotte N.C., told *HIC*. "One [survivor] was a colonization — not a clinical infection so they didn't require treatment. One with a surgical infection required amputation of the leg because we didn't have [alternative antibiotics]. We treated them with a carbapenem and colistin

regardless of the resistance pattern. That man is still alive."

In a recent CDC report on antibiotic pathogens,[2] two of the three highest-rated "urgent threats" to public health are HAIs: CRE and *C. diff*, both of which may not be stopped without improved antibiotic stewardship programs and better collaboration and communication across the health care continuum.

"There is a need to collaborate," Cardo said. "Infection prevention is now beyond what you do within the walls of your institution. Infections will be a reflection of what is going on in your community."

While CRE is threatening to become untreatable, *C. diff* presents a different but similarly formidable problem. Overuse of broad spectrum antibiotics can wipe out commensal bacteria in the gut, setting the stage for a *C. diff* infection to emerge. The emergence of the North American pulsed-field gel electrophoresis type 1 (NAP1) strain around the turn of this century has driven a *C. diff* epidemic that now claims some 14,000 lives annually in the U.S. NAP1 has become the predominant outbreak strain of *C. diff* via several selective advantages that include enhanced spore formation, a 20-fold increase in toxins, a lower infectious dose, and the ability to survive indefinitely in the environment. Common sequelae to infection include diarrhea, colitis, toxic megacolon, and sepsis.[3] As with any strain of *C. diff*, the spores are difficult to remove from the hands and switching from alcohol rubs to soap and water hand washing is frequently done during outbreaks. However, studies have shown the spores remain on the hands even after washing with soap,[4] making antibiotic stewardship all the more critical to prevent *C. diff* infections in the first place.

"Early detection, infection control, environmental cleaning are extremely important, but the places that have had really major decreases in *C. diff* — like England — have improved antibiotic use. It's a critical thing," Cardo said. "If you don't do that you don't prevent *C. diff*. That's the reason we have published key elements of an antibiotic stewardship program that we now recommend for all hospitals in the United States."[5] (*See related story, p. 76.*)

To improve surveillance for drug resistant pathogens, the CDC has developed an antibiotic use and resistance module and will soon be collecting data in its National Healthcare Safety Network (NHSN), she said. The CDC is shifting to more electronic data reporting, using indicators like lab-based "proxies" that will provide sufficient surveillance to develop prevention strategies without overburdening IPs with data collection. In this case, for example, the antibiotic data could come directly from the hospital's medication-use system into the NHSN module. "It's all electronic, you don't need to do anything," Cardo told APIC attendees.

While no IP wants more data collection duties, Dolan said there is some concern that these time-saving reporting methods may lose some level of accuracy.

"As IPs we have spent so much time trying to perfect and make sure we are doing everything correctly and reading those definitions and the changing definitions," she said. "Now that we are moving to more lab-based surveillance, [there is some] uneasiness that we may feel. These new lab-based definitions are not as detailed as the others. We always want to make sure we are capturing everything and not capturing the things we don't want. This movement to electronic surveillance — I understand the purpose and I get a lot of the reasons because that will hopefully free up our time so we can be out where we need to be and not sitting at the computer entering data."

Remember, the electronic surveillance data is for developing prevention strategies, not for making clinical decisions that require more detail, Cardo said.

"It's great to have a lot of details, but most of the time we don't use all of the details," she said. "We need to do this in a way in which we capture what is happening and use the data for prevention. Sometimes perfection is the enemy of action."

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Measles, mumps roar back as MMR shunned

'[We] had not seen measles since 1997'

Once virtually eradicated through routine immunization, measles and mumps are making a striking comeback in the U.S. in 2014 with a record number of post-vaccination era measles cases and several large mumps outbreaks on college campuses.

The reemergence of these once-common childhood diseases presents an unwelcome new challenge for infection preventionists, as the introduction of even a single undiagnosed case can set off a laborious and expensive follow-up of exposed patients and health care workers. For example, a single imported case of measles once cost two Arizona hospitals some $800,000, with much of the expense related to ensuring the immunity of employees and furloughing workers.[1] Similarly, a mumps outbreak in a Chicago hospital in 2006 racked up a bill of $262,788 or $29,199 per case.[2]

Within the first six months of 2014 there were a record 500 confirmed cases of measles, including more than 400 in Ohio, reports the Centers for Disease Control and Prevention. The previous record year for measles was 2011 with more than 200 cases, so at the current pace 2014 is heading into uncharted misery. Patients with reported measles cases in 2014 range in age from 2 weeks to 65 years, with 48% under age 20. In addition, in the first half of the year some 800 people were reported to have mumps in the U.S., with more than half of the cases occurring in Ohio. The CDC reported that mumps outbreaks have occurred this year at Ohio State University in Columbus, Fordham University in New York City, the University of Wisconsin-Madison and the University of Illinois at Urbana-Champaign. Mumps outbreaks can spread quickly in confined settings like college dorm rooms. For comparison, in 2013 there were 438 mumps cases and fewer than 200 measles infections.

The CDC reports that close to 70% of the people who had confirmed measles in 2014 were unvaccinated, and nearly all of the cases originated in one of 18 countries, including the Philippines, which is experiencing a large, ongoing measles outbreak that has infected more than 6,000 people this year.[3]

In that regard, while measles elimination in the U.S. was declared in 2000, there are about 20 million cases of measles each year globally. The US has greater than 90% MMR vaccine coverage among children aged 19-35 months and adolescents, but the anti-vaccine movement has contributed to pockets of vulnerability in some communities.

False fears

Indeed, while there can be vaccine breakthrough infections and enhanced transmission in crowded settings for mumps, the measles vaccine is considered highly effective. Thus there is little doubt that some of the infections and outbreaks can be traced to the influence of a high profile anti-vaccine movement that cites discredited research in falsely linking the MMR vaccine to autism. (*See related story p. 80*).

"That's all new parents needed to hear, and soon some were not vaccinating according to the guidelines, or they were spacing out their vaccines — which leaves a young toddler susceptible," says **Susan P. Hanrahan**, MS, CIC, manager of infection control at Jersey Shore University Medical Center in Neptune, NJ. "It took years to discredit [false] research, but the damage was already done. Compounding the public's mistrust of vaccine efficacy are high-end celebrities like Jenny McCarthy advocating not following the American Academy of Pediatric recommendations to follow the evidence-based schedule."

Childhood preventable diseases will inevitably circulate in communities if the current climate of vaccine non-compliance continues, she adds.

"Healthcare professionals need to be prepared for community outbreaks and have in place a system that addresses how their facility will respond, so patients and staff are not inadvertently exposed to suspect patients in waiting rooms and examination rooms," Hanrahan says.

In Monmouth County New Jersey, Hanrahan, clinical colleagues and public health officials dealt with a four-week mumps outbreak that began last August.

"We had young individuals in their mid-20's present with symptoms clinically significant for mumps, although not all were blaringly obvious and [some] had a subclinical presentation," she says.

One patient had visited a general practitioner

who recognized his symptoms as mumps and obtained the buccal swab culture, which is the gold standard for laboratory confirmed diagnosis, she notes.

"In any community outbreak it's not just one individual," she says. "The patient had roommates and people he worked with who were directly affected. They in turn had secondary contacts and so the virus kept perpetuating. Prolonged close contact with these individuals increased the mechanism of droplet transmission so that mumps passed around in the community pretty quickly."

Hanrahan and colleagues created a line list that included patients presenting to the facility with fever, parotid gland swelling, malaise, jaw pain, arthralgia, and complications such as orchitis, mastitis, pancreatitis, hearing loss, encephalitis and aseptic meningitis.

Culture confirmations were crucial to getting public health agencies involved in the outbreak. Having culture confirmation impacts how quickly officials speak with the infected patients' friends and family to identify additional cases and officially announce to the public that the disease is present in the community, she says. The public needs to be informed so they are educated regarding disease prevention strategies and what to do if mumps is suspected.

"The more lab confirmed cases you have the stronger the argument is that it's an outbreak," she explains. "A lot of times people have signs and symptoms but they're termed 'probable' or 'suspect' cases."

Among the mumps cases, some had received the full two doses of the MMR vaccine whereas some had only one dose of the vaccine, Hanrahan recalls.

Studies suggest that the mumps vaccine is 80% to 90% effective, leaving a significant portion of people vulnerable to infection even though they have received the recommended two-doses of MMR.

Though the CDC continues to recommend mumps vaccination using the current MMR shot, there has been some speculation that transmission is continuing because the attenuated mumps virus in the vaccine does not match the currently circulating strain. In a news release regarding a mumps outbreak on campus, the McKinley Health Center at the University of Illinois stated, "Some theorize that the current strain of the virus may be a new strain. Occasionally, slightly shifted strains of the mumps virus circulate in the United States. Because these new strains vary slightly from the strain originally used in the vaccinations provided to people during their childhood, it could explain some of the failure of the vaccine this year."

The first measles case in 17 years

The measles vaccine is effective, but does little good if people who refuse vaccination travel to areas of measles outbreaks and bring the highly contagious disease home, where transmission can explode in groups that have foregone immunization. Even a single case walking into a hospital can cause considerable chaos, particularly in areas that have not seen a measles case since the last century.

"Dallas County had not seen a case of the measles since 1997," says **Sharon Holmes**, MPH (ASCP), CIC, director of infection prevention and control at Children's Medical Center Dallas, TX.

That changed last year, when a 14-month old unvaccinated girl who returned from travel to Ethiopia was admitted to Children's with a persistent fever, rash, cough, and coryza.4 The patient was placed in contact and droplet isolation precautions for the first five days of admission.

The baby recovered, and certainly didn't seem as sick as a child with measles, but an alert hospitalist noticed a gap in vaccination records. (The first dose of MMR is recommended at 12 to 15 months.) A Rubeola IgM test was ordered and the positive results came back in a few days. The hospital's lab calls the infection preventionists if they have a positive result. When results for the baby with measles came in at 11 p.m., infection control specialists were paged at 8 a.m. the next day. One improvement suggested in the aftermath of the measles case was to have the hospital's electronic medical record automatically send a notice to the infection control department when a measles test is ordered, Holmes says.

"When we discovered it was measles — knowing that measles is so contagious that anyone sharing the same airspace could be infected — we considered everyone on the unit to be infectious," Holmes says. "We screened to make sure they had the vaccination, and, if not, we did titers to see if they were immune."

Hospital officials were not quite as worried about the staff becoming infected because all employees are required to have up-to-date immunizations, she notes. "This was more of an

issue for patients sharing the same air space, who may not have a vaccine history or who are immune incompetent," Holmes says.

Of course, the patient was upgraded to airborne precautions as soon as the measles diagnosis was known. "The patient was originally on contact droplet precautions because she had a history of sore throat and fever," Holmes says. "When the floor was notified of her positive measles results they moved her into a negative pressure room."

In all, 28 patients were subject to follow-up investigation. Three were post-renal transplant patients, so they were given prophylactic immunoglobulin from the state health department.[1] There was one measles case treated at an ancillary clinic that was likely linked to the hospital's case, she adds. "The key was to involve our local health department, who guided us towards notification to families who had been on the unit," Holmes says.

Shortly after the Dallas measles case, there was an outbreak at a large church in an adjacent county, but it was not connected to the hospital case. It goes without saying that the index of suspicion for measles will remain high for some time.

"We see a lot more testing for measles whenever there's a rash and persistent fever," Holmes says.

Providers — many of whom may have never seen these childhood infections — should be aware that the CDC recommends they consider measles when patients have a fever and rash and clinically compatible symptoms. However, since the vast majority of the population has been immunized the likelihood is still much greater that a suspect case will not be measles. Physicians can ask for a vaccine history or vaccination records from families, but obtaining this information can be difficult.

"Generally, people don't carry around their child's immunization records, so if they go to the emergency department and are asked if the child's vaccines are up to date, most people will say, 'Yes,'" Holmes says.

A better solution would be for states to develop immunization tracking histories that hospitals and community providers can access. Texas has such a voluntary program, she says. Parents enroll their child in the program, giving health providers the right to send information to their child's pediatrician and other health care facilities.

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MMR and autism: Myth and misinformation

In pre-vaccine era thousands of children died

An anti-vaccine movement that has been amplified by the Internet and endorsed by vocal celebrities has created a persistent public fear that the measles-mumps-rubella (MMR) vaccine causes autism in children.

As a result, some parents are avoiding MMR immunization of their children, joining other groups that reject the vaccine out of religious or personal beliefs. Unvaccinated travelers to areas of measles outbreaks (e.g., the Philippines) can bring the highly contagious disease home, where transmission may explode in one of these groups that has rejected immunization.

The Immunization Action Coalition (IAC) in Saint Paul, MI, a group that is funded by and affiliated with the Centers for Disease Control and Prevention, states the following: "There is no scientific evidence that measles, MMR, or any other vaccine causes autism. The question about a possible link between MMR vaccine and autism has been extensively reviewed by independent groups of experts in the U.S. including the National Academy of Sciences' Institute of Medicine. These reviews have concluded that there is no association between MMR vaccine and autism."[1]

Recent estimates from the CDC's Autism Developmental Disabilities Monitoring network found that about 1 in 68 children born in 2002 have autism spectrum disorders. This estimate is higher than estimates from the early 1990s, the CDC reports.[2]

"Over the years, some people have had concerns that autism might be linked to the vaccines

children receive," the CDC states. "One vaccine ingredient that has been studied specifically is thimerosal, previously used as a preservative in many recommended childhood vaccines. However, in 2001 thimerosal was removed or reduced to trace amounts in all childhood vaccines except for one type of influenza vaccine, and thimerosal-free alternatives are available for influenza vaccine. Evidence from several studies examining trends in vaccine use and changes in autism frequency does not support such an association between thimerosal and autism."

Indeed, the fact that autism has increased after thimerosal was largely removed from vaccines has led one study to conclude that the "increased prevalence of autism may be attributable to improved diagnostic criteria and increased awareness of autism."[3]

Though there have been concerns about various vaccines since the era of immunizations began, the current controversy linking autism to MMR vaccine can be traced to a 1998 paper in the British journal *The Lancet* that was subsequently retracted.[4] In retracting the article in 2010, the journal stated that "claims in the original paper that children were 'consecutively referred' and that investigations were 'approved' by the local ethics committee have been proven to be false. Therefore we fully retract this paper from the published record."[5]

Nevertheless, the damage done continues to echo on the Internet, where concerned parents may find a wealth of misinformation circulated by anti-vaccine groups.

Paul Offit, MD, a vaccine researcher and chief of the infectious disease department at Children's Hospital of Philadelphia, has led the fight against the growing anti-vaccine movement. He says the retracted *Lancet* paper "gave birth to the general idea that vaccines could cause autism. I think that will not go away until we know what the real cause or causes of autism are."

In the interim, Offit warns that childhood diseases could become reestablished and even polio could return through imported cases.

"We've seen outbreaks of pertussis," he says. "I think there's every reason to believe that you could see diseases like polio come back in the United States. It is certainly in the world, and international travel is common."

In his book, "Deadly Choices: How the Anti-Vaccine Movement Threatens us All," Offit offers a sobering reminder of the pre-vaccine era:

"In the early 1900s children routinely suffered and died from diseases now easily prevented by vaccines. Americans could expect that every year diphtheria would kill 12,000 people, mostly young children; rubella, (German measles) would cause as many as 20,000 babies to be born blind, deaf or mentally disabled. Polio would permanently paralyze 15,000 children and kill 1,000, and mumps would be a common cause of deafness. Because of vaccines all of these disease have been completely or virtually eliminated. But now because more and more parents are choosing not to vaccinate their children some of these diseases are coming back."[6]

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CDC's new sepsis site seeks to prevent deaths

'These patients are within our grasp'

The Centers for Disease Control and Prevention has created a new website to alert infection preventionists, clinicians and the public about a deadly but poorly understood syndrome: sepsis.

The CDC's ongoing sepsis initiatives have had some success, but there are good reasons to strive for improvement, says **Clifford McDonald**, MD, a medical epidemiologist at the CDC.

"We're at the point of beginning to educate the infection control community about aspects of sepsis and bringing them into the Surviving Sepsis Campaign," he explains.

"The campaign has been out there or a while, and we want to work in this area [with the website] and see what we can do [to complement that]."

Sepsis is essentially a systematic inflammatory

immune response to an infection that can quickly become life-threatening. Inflammation can lead to blood clots and leaky blood vessels, impairing blood flow and depriving organs of nutrients and oxygen, the CDC explains on the site. (http://www.cdc.gov/sepsis/) In severe cases, one or more organs fail. In addition, sepsis can cause the blood pressure to drop, affecting the heart and leading to septic shock. In this situation, organs may quickly fail and the patient has a high risk of death. Unfortunately, sepsis is very difficult to predict, diagnose, and treat.

The CDC notes that sepsis diagnoses in hospitals jumped from 621,000 in 2000 to more than one million cases in 2008. Moreover, "the number of cases of sepsis each year has been going up in the U.S," the CDC states. The CDC estimates a mortality rate of between 28% and 50%. Splitting the difference creates a mortality rate of 39%, meaning some 400,000 patients a year could be dying of sepsis.

Why is sepsis increasing? The CDC cites factors that include heightened awareness of the condition, an aging population with more chronic diseases, more invasive procedures and organ transplants, and greater use of immunosuppressive drugs and chemotherapy.

Different types of infections can lead to sepsis, including infections of the skin, lungs, urinary tract, and the abdomen (including appendicitis). Healthcare-associated infections (HAIs) cause some 30% to 50% of sepsis cases, but the issue is somewhat complicated, McDonald explains. Recent evidence suggests a more nuanced origin of the disease, as it appears it is primarily a community-onset infection that is related to previous care received in a health care setting, he adds.

"We have a better understanding now that many health care infections have onset in the community," McDonald says. "They may leave with a catheter or indwelling device and come back septic from that. We need to think more broadly because it may be that over half [of sepsis] originates in the community, but it could be resulting from very invasive outpatient work that's being done."

It's possible that as much as 60% of sepsis infections are related to health care, he adds. HAIs such as pneumonia and central line-associated bloodstream infections (CLABSIs) catheter-associated urinary tract infections, and surgical site infections can cause sepsis. Urinary tract infections also can lead to it, as can infections of the skin – including those caused by MRSA. Pneumonia and CLABSIs are among the most likely HAIs to lead to sepsis, McDonald says. In any case, the data underscore that any infection prevented could save the life of a patient who may have gone on to develop sepsis.

Shocking cases get headlines

While sepsis tragedies involving children and young people, such as 12-year-old Rory Staunton of Queens, NY, in 2012, make newspaper headlines, most sepsis cases are among the elderly and immunocompromised patients.

"Certainly the cases like that of a young person in the community with sepsis are very notable and tragic," McDonald says. "When you look at the whole [picture] of sepsis it will be older people and probably some with health care associated infection."

Staunton's death followed an emergency room visit, from which he was discharged without a potentially life-saving diagnosis of sepsis. The case highlights the need for clinicians nationally to learn more about the illness.

The important point is for clinicians to identify and manage people who have reached the septic state to prevent their deaths, McDonald says. Another goal is to prevent infections that lead to sepsis, and HAIs are largely preventable, he adds.

"These patients are within our grasp," he says. "They're interacting with the health care community, which leads to infections that are preventable."

Health care providers can recommend elderly patients receive the pneumonia and influenza vaccines, which can keep them from becoming infected with diseases that can lead to sepsis, he adds. Diabetes screening and treatment also can prevent sepsis as this population is at greater risk.

"Maybe we could identify large groups of sepsis patients by their chronic conditions," McDonald says. "Diabetes is one: what can we do with diabetes early on to prevent infection and manage those cases early?"

Secondary prevention

A key tenet of the CDC's sepsis campaign is so-called "secondary prevention," treating sepsis once it has occurred by recognizing it early and managing it immediately to prevent death, McDonald says..

"What the CDC wants to do is bring this further to the next step," McDonald explains, noting that

the current focus is on answering these questions:

- What are the infections leading to sepsis cases?
- What more can we do to focus on infections?
- Who are the people becoming infected with sepsis?

Another area under study is post-discharge sepsis. The CDC would like to learn more about sepsis cases in the one or two month post-discharge period.

"What can we do differently in discharge planning?" McDonald says.

Nevertheless, early diagnosis is still the chief concern.

"There are these diagnostic criteria called systemic inflammatory response," he says. "These are things like fever, high heart rate, rapid breathing rate, blood pressure dropping, and these things all in combination are one part of it, along with a suspicion of infection."

Diagnosing sepsis based on these criteria is challenging because these symptoms can indicate many different conditions.

"You can actually achieve some of the criteria by running up the stairs," he says. "Clinical judgment is required."

Hospital clinicians and infection preventionists should ask these questions when fever, high heart rate, and rapid breathing are present:

- Is there tenderness in the stomach area upon physical examination?
- Is there coughing with the rapid heart rate?
- Do you hear crackles in their lungs and suspect pneumonia?
- Is there a high white blood cell count?
- Is the lactic acid level elevated?

"A high level of lactic acid suggests the person is septic," McDonald says. "We need to get people to think of asking for the lactic acid level."

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

- Identify the clinical, legal, or educational issues encountered by infection preventionists and epidemiologists;
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- Cite solutions to the problems encountered by infection preventionists based on guidelines from the relevant regulatory authorities, and/or independent recommendations from clinicians at individual institutions. ■

COMING IN FUTURE MONTHS

■ Part 2 of our July report on infection prevention in the emergency dept

■ Joint Commission hones in on injection safety

■ CMS infection control survey lives! Expected in Oct. with new fiscal year

■ HAI public reporting: Truth and unintended consequences

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CNE/CME Questions

1. This federal HAI prevention plan has achieved some dramatic results, but which of the following infections is proving hard to reduce?
   A. central line-associated bloodstream infections
   B. catheter-associated urinary tract infections
   C. surgical site infections
   D. invasive MRSA infections

2. In a development that underscores the severity of antibiotic resistance, clinicians fighting a carbapenem-resistant Enterobacteriaceae (CRE) outbreak in a North Carolina hospital reported several patients had a CRE strain resistant to which last-line drug?
   A. vancomycin
   B. ciprofloxin
   C. gentamicin
   D. colistin

3. The measles vaccine is effective, but does little good if people who refuse vaccination travel to areas of measles outbreaks and bring the highly contagious disease home. Which country was cited as having a large outbreak of measles with some 6,000 cases?
   A. China
   B. Philippines
   C. India
   D. Guam

4. A key tenet of the CDC's sepsis campaign is "secondary prevention," treating sepsis once it has occurred by recognizing it early and managing it immediately to prevent death.
   A. true
   B. false

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