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JANUARY 2017 Vol. 44, No. 1; p. 1-12

INSIDE

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IDWeek 2016: Connections Drive Infections, as Bugs Move with Pts

Frieden keynote outlines a formidable array of problems

By Gary Evans, Medical Writer

Pathogens and patients move together across an interconnected healthcare continuum, meaning no matter how high a level of infection prevention is achieved in one hospital, it is still at the mercy of a wide variety of transferring facilities, said **Tom Frieden**, MD, director of the CDC.

Delivering the keynote address recently in New Orleans at IDWeek 2016, Frieden emphasized that healthcare facilities must communicate and collaborate across the diverse continuum if an emerging array of multidrug-resistant and problematic pathogens are to be kept at bay.

"Healthcare facilities are not islands," he said, showing a slide heavily criss-crossed with lines depicting the movement of patients between hospitals and other healthcare facilities. "Every line depicts at least 10 patient transfers within a single year. So, you get a sense of the complexity of patient movement within facilities, and this is important because we will only be able to make substantial progress in reducing drug-resistant infections and nosocomial infections if there is good work among facilities. Even if you are practicing at the best facility in the world, you are in many ways at the mercy of the nursing home down the block, the healthcare provider across the town, and the long-term acute care facility that sends patients to you.

> INDEED, THE MICROBIOME OF COMMENSAL BACTERIA MAY FUNCTION IN SOME SENSE AS A "SEPARATE ORGAN" IN THE HUMAN BODY.

Financial Disclosure: Senior Writer **Gary Evans**, Editor **Dana Spector**, Editor **Jill Drachenberg**, Reviewer **Patti Grant**, RN, BSN, MS, CIC, Reviewer **Patrick Joseph**, MD, and AHC Editorial Group Manager **Terrey L. Hatcher** report no consultant, stockholder, speaker's bureau, research, or other financial relationships with companies having ties to this field of study.

HOSPITAL INFECTION
CONTROL & PREVENTION

Hospital Infection Control & Prevention®, ISSN 0098-180X, is published monthly by AHC Media, a Relias Learning company
111 Corning Road, Suite 250
Cary, North Carolina 27518.

Periodicals Postage Paid at Atlanta, GA 30304 and at additional mailing offices.

POSTMASTER: Send address changes to:
Hospital Infection Control & Prevention
P.O. Box 550669
Atlanta, GA 30355.

SUBSCRIBER INFORMATION:
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AHCMedia.com
Hours of operation: 8:30-6. Monday-Thursday, 8:30-4:30 Friday EST

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Patients move and the bacteria and infections move with them. By working together, coordinating within a community, facilities can make a [big] difference — much more than any one facility can make on its own."

Another presentation that drove this point home at IDWeek showed how *Clostridium difficile* infections (CDIs) are being spread by patients across facilities in Oregon and Washington. *C. diff* is being spread by colonized or infected patients moving between skilled nursing facilities, nursing homes, and various types of hospitals. Again, the lines of connection virtually blackened the slide between the colored nodes that represented the various facilities.

"When we look at rates of CDI, you think of it as a problem within a hospital," said **Rachel Slayton**, PhD, MPH, an epidemiologist in the CDC Division of Healthcare Quality Promotion. "But these data suggest that healthcare facilities are tightly connected to one another with the patients that they share. Over an interval of time, colonization from a previous stay [may] affect patients' risk of colonization or infection at a subsequent stay. I think this suggests when we look at interventions that we should look at how patients are moving more broadly rather than a siloed approach within individual facilities."

In the study, Slayton and colleagues concluded that connectedness to other healthcare facilities was independently associated with facility-level CDI incidence. Hospitals that were most highly connected had significantly higher rates. Hospitals with high connectivity might provide a target group for coordinated public health interventions to reduce CDI regionally, they noted.[1]

"The hospitals that were most highly connected to other facilities through patient sharing had higher rates of incidence of facility-wide CDI even when you control for bed size, teaching status, and CDI test type," Slayton said. "So, it is not just your large academic medical centers. We think that systematically assessing facility connectedness can provide insight into prioritizing facilities for identifying novel strains and implementing enhanced prevention measures."

In this highly interconnected healthcare system, public health departments can serve as a neutral space for coordination among facilities, Frieden says. The CDC is finding that these types of collaborative networks can make a significant difference in infection rates.

"It's not just what one hospital can do — it is about the coordination among facilities," he says.

For example, an analysis done by the CDC projected the level of carbapenem-resistant Enterobacteriaceae (CRE) that would result in five years if it entered 10 healthcare facilities that were sharing patients. If everything stays at the status quo — meaning the facilities don't improve infection control or collaborate to control the CRE — the pathogen would increase by 12% and result in 2,000 infections in five years.

"If each facility does a really good job, but they don't coordinate among themselves, you'll do better than that, cutting infections to about a quarter to 8% — 1,500 infections," Frieden said. "But if you have a coordinated approach where the facilities are working together, you can drive those numbers down considerably. We have seen progress in communities across the U.S. driving CRE down by 75% or more. This is because in many circumstances, the increase in drug resistance is not merely a general evolutionary trend of the bacteria. It's a clonal expansion because of an outbreak of individual organisms. And that is something that can be

identified more quickly and stopped, but only if it is done across an entire community, including addressing the [patient] referral patterns."

That raises the old issue of communicating thoroughly about patients coming and going between various types of facilities.

"We need information-sharing," he said. "When you send a patient with CRE to the long-term care facility, they need to know in advance, and vice versa."

Turning Back the Clock

As represented by CRE, *C. diff,* and other pathogens, antibiotic misuse and the resulting resistant bacteria are among the top threats to patient safety.

"Antibiotic resistance, as you know, risks turning back the clock," he said. "[We are at risk of] going from a pre-antibiotic, to an antibiotic, to a post-antibiotic era. And it is not only that pneumonia and urinary tract infections could be fatal — it is also that modern medicine could be undermined."

For example, 600,000 patients undergo chemotherapy for cancer every year.

"And we presume that we will just be able to treat their infections until their immune system reconstitutes, but that may not always be the case," Freiden said. "We need to act now because we cannot know with certainty that we will have new and better drugs in the future."

The accumulating evidence of this crisis finds that one out of every six central line-associated bloodstream infections is caused by bacteria resistant to antibiotics. Similar rates are occurring in surgical site infections, and increases in *C. diff* are being driven by antibiotic overkill that wipes out the commensal bacteria that protect the gut flora.

"The metaphor of a 'war' against bacteria is really misleading," Frieden said. "If you look at the microbiome, our 23,000 or so genes are up against 1 million or so bacteria that call each of our bodies home. Until a few months ago, around 80% of the bacteria in our intestines had never been cultured, though we knew they were there from sequencing. [But] we don't have to go to the bottom of the ocean or to Mars to look for unusual bacteria — they are within us. And they may contain within them important messages on what maintains health and what can be used to control infections. There are many more friendly bacteria around than there are unfriendly ones, and we disrupt them at our peril. The dictum of 'above all, do no harm' also relates to the microbiome. We are just beginning to scratch the surface of what we need to know to do that."

Indeed, the microbiome of commensal bacteria may function in some sense as a "separate organ" in the human body.

"It may protect us," he said. "It may have metabolic functions. It may help us with digestion. There are a lot of things that the healthy microbiome does. When we use antibiotics, we wipe out the good with the bad and we leave behind a system that doesn't have the usual protectors. Because of the relative absence of our friendly bacteria, the body becomes susceptible to infection and resistant bacteria can thrive in that disrupted microbial environment."

One of the most compelling examples of the critical role of gut flora is the increasing use of fecal transplants to fend off recurrent CDI.

"The dramatic effectiveness of this type of intervention is a hint of the type of strategies that may become widespread in the future," Frieden said.

All the while novel pathogens continue to emerge, with one of the most recent being a multidrug-resistant strain of *Candida auris* that is emerging globally and has been reported in the United States.[2]

"There is a lot we don't know about *C. auris*, but it proves that the old way of doing business to combat resistance isn't enough," Frieden told IDWeek attendees. "We don't know why unrelated *C. auris* strains have recently emerged in various countries. They have caused invasive healthcare-associated infections with high mortality in debilitated patients. Some strains have been identified that have elevated MICs [minimum inhibitory concentrations] to the three major antifungal [drug] classes, which obviously severely limits treatment options."

The CDC is uncertain whether the sudden emergence represents a new type of *C. auris* or one that has somehow adapted to "either longstanding practices or emerged through [more recent] changes in clinical practice," he said. "It requires specialized identification methods so it could now, and could have in the past, been missed with our standard microbiology."

Just as hospitals and other healthcare facilities must collaborate and recognize their interconnectedness, individual countries cannot hope their borders will protect them from pathogens that emerge in other parts of the world.

Citing a personal example, Frieden recalled once treating a patient from India with an extremely multidrug-resistant (MDR) strain of tuberculosis. It took nearly two years of expensive interventions and surgeries to save him, but years later, traveling to India, Frieden realized that basic, inexpensive interventions at the local level could have stopped the TB infection at its source.

"We are all connected by trends around the world," he said.

Thus, the efforts of the World Health Organization include surveillance for MDR-TB, which

can arise through failure to treat patients or by exposing them to anti-TB drugs without completely eradicating the infection.

"No program, no well how well-resourced, can treat MDR-TB faster than a bad program can create MDR-TB," Frieden said.

Critical to the success of public health programs in the U.S. and internationally are three characteristics: technical rigor, operational excellence, and political will, he said. Though global response and communications have improved with a series of emerging infections in recent years, there is little margin for error when a potential pandemic is on the horizon.

"A blind spot anywhere is a vulnerability everywhere," Frieden said.

To turn the tide on antimicrobial resistance, improvement is needed in several fundamental areas, he said.

"First, we need to find [drug-resistance] faster and more completely in many different venues — hospitals, nursing homes, the community, animals, and our food supply," Frieden said. "We need to figure out where it is and find it when it first emerges."

The need to prevent drug-resistant bacteria much more thoroughly, of course, means the major national emphasis on antibiotic stewardship must continue and expand.

"That means much better antibiotic stewardship than we have today," he said. "A third or half of all the antibiotics prescribed in this country are either unnecessary or of an overly broad spectrum. We need systemwide infection control. Clearly, I think if we look back in 20 or 30 years, we will look at the hospitals today — despite a lot of great efforts — [and think] 'how could they have been so cavalier about the risk of cross infections?' Because 75,000 Americans a year dying of infections picked up in the hospital is not an acceptable situation."

Infection preventionists can't do it alone. New vaccines and diagnostic tests are needed as well as wider application of molecular epidemiology to break down outbreaks at the granular level.

"We criticize doctors for giving necessary antibiotics, but if you could with a simple, rapid test [determine drug resistance], we would see much less inappropriate prescribing," he said. "Bacteria are very effective at evolving. As [late Nobel Laureate] Josh Lederberg used to say, 'They outnumber us and we'd better outsmart them.' They have evolved to survive using natural selection. For us to outsmart them, we need to use rigorous collection and analysis of data to hone our practices so that we can stay ahead of the bacteria." ■

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Clinicians Warn of Deadly Measles Complication

Parents who skip vaccine put kids at grave risk

While undermining herd immunity in their communities, parents who decline measles vaccine for their children may be putting them and other kids at risk of a serious complication that is more common than once thought, researchers reported recently in New Orleans at IDWeek 2016.

A measles complication called subacute sclerosing panencephalitis (SSPE) may manifest years after the initial viral infection and appears to be uniformly fatal, the researchers reported. Long thought to be rare, SSPE incidence fell further off the radar with higher rates of routine measles vaccination. Measles vaccination is recommended at 1 year old, with a booster usually timed to occur at school entry. However, unvaccinated infants are at risk of acquiring measles and possibly SSPE.

The researchers looked at death certificates in California from 1998 to 2015 and found 17 cases of SSPE. SSPE is insidious, as the initial measles infection subsides, but the average age of the complication was 12 years. The age range of the SSPE cases was from 3 to 35, with patients typically displaying cognitive or ambulatory problems before the diagnosis was made, they reported.

Herd Immunity

The findings suggest that the complication may be much more common than previously thought, and certainly underscores the importance of vaccination in an era when false concerns about autism have undermined the uptake of the

MMR vaccine. In that regard, herd immunity is critical, as infants too young for measles vaccination can get infected and later develop SSPE.

The condition may be dormant for years and was once thought to be as rare as only 1 in 100,000 cases following measles infection in young children. Subsequent research began suggesting the risk was much higher, and the findings presented at IDWeek indicate that SSPE could occur in about 1 in 600 children who acquire measles as infants before they can be vaccinated. Researchers do not know what triggers the virus to reactivate and cause SSPE.

Clinicians should be aware of the possibility of SSPE in patients with the aforementioned symptoms, even if found in older patients with no specific history of measles infection, the authors advised. Calling the findings "alarming," co-author **James D. Cherry**, MD, MSc, professor of pediatrics and infectious diseases at the University of California, Los Angeles, emphasized the importance of herd immunity in an IDWeek press conference.

"For measles vaccine, the first dose is about 95% [effective] and the other 5% remain susceptible," Cherry said. "Right now, we don't give the second dose of measles vaccine until school entry, roughly age 5. So, you have 1 in 20 children between the age of one and five that are susceptible. There is no reason you can't give them the vaccine earlier. [Pediatric experts] say give the second dose if you are going to be traveling, and things like that. What we have been talking about in California is going ahead and giving the second dose. So, you give the first dose at 12 months and then the second dose at 15 months. This is a gap in herd immunity that we could fix."

The problem is that false fears of the vaccine have overridden the real dangers of measles infection, he observed.

"For parents who are not vaccinating their children because they are concerned about the risk of vaccines, we need to do an educational program," Cherry said. "Where many people fall down on this is we start talking about risk of vaccines when we should be talking about risk of measles."

The threshold to achieve measles herd immunity is estimated to be around a 90% vaccination rate, said **Gary S. Marshall**, MD, of the University of Louisville School of Medicine in Louisville, KY.

"In other words, if you have a large community of a million people and 90% of them are immune to measles, then theoretically an introduction of measles into that community shouldn't propagate," Marshall said. "However, non-immune people tend to geographically and spatially cluster. So, there may be 90% immunity in the community, but at [a particular] school it's only 70%. Then a case is going to cause an outbreak. So, parents who are not vaccinating their children are really thinking very much of their own children, but not realizing that every unvaccinated child takes another chip away from the wall that prevents outbreaks of measles in the community." ■

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CDC Studies Hospital-acquired Influenza

Study design probably underestimates count

In the historical debate about whether healthcare workers should be required to have seasonal influenza shots, sometimes the issue of whether and how much flu is actually transmitted by caregivers has been viewed with some skepticism.

For example, an oft-cited 2013 Cochrane review concluded that there were "no accurate data" supporting the vaccination of healthcare workers to prevent laboratory-confirmed influenza in long-term care residents age 60 years and older.[1]

The point may have become somewhat moot as more hospitals mandate flu vaccination, but there is accumulating evidence that healthcare workers do transmit flu to patients, some of whom are in ICUs and may end up dying. That's something of a broad takeaway from a study[2] presented recently in New Orleans at IDWeek 2016, as investigators with the CDC reported that 1% of flu cases reviewed were acquired in the hospital.

"Hospital-acquired influenza cases continue to occur and are likely underestimated," said **Charisse Cummings**, MPH, an epidemiologist at the CDC who presented the study. "Clinicians should think to test patients for influenza in patients admitted for non-respiratory issues, who then develop respiratory illness during hospitalization."

That percentage should be considered an undercount because the study design ruled out many cases

for insufficient data, erring on the side of a conservative case count that was also limited by whether a provider decided to order a flu test on a given patient. Vaccination rates of healthcare workers or possible factors contributing to transmission were not assessed as part of the study.

"Hospital-acquired (HA) influenza represented 1% of patients in our hospital surveillance over four influenza seasons," the researchers reported. "Since testing was clinician-driven, prevalence may have been underdetected if influenza was not suspected and tested. Influenza vaccination in healthcare workers and family members of high-risk persons, good hospital infection control [to prevent transmission from other patients], and limiting ill persons from visiting or working in hospitals should be encouraged."

The study included patients from the CDC's Influenza Hospitalization Surveillance Network from 2011 to 2015. The flu had to be confirmed by symptoms and testing more than three days after admission to be considered hospital-acquired.

Overall, 41,974 patients had flu and the researchers determined that 463 (1%) of them acquired it in the hospital. Those hospital-acquired cases included 417 adults and 46 children. Of interest regarding discussions of the healthcare continuum, 31 (7%) of the cases determined to be hospital-acquired had been transferred from another hospital, and 66 (14%) came in from a nursing home, the researchers reported.

Overall, 91% of those who acquired flu in the hospital had underlying medical conditions, principally cardiovascular, neurologic, immunological, and renal problems.

"The median length of stay after influenza diagnosis was six days," the researchers reported. "Of 463 HA cases, 126 (27%) were in the intensive care unit before HA influenza diagnosis, 22 (5%) were admitted to the ICU on or after the date of HA influenza diagnosis, and 36 (8%) died."

"Among cases with complete ICU admission and discharge dates, 30% developed hospital-acquired influenza during ICU stay," Cummings said. "In addition, [another] 30% who tested positive one to seven days after ICU discharge, may have been exposed to influenza during their ICU stay. The length of stay was considerably longer for hospital-acquired influenza compared to community-acquired influenza." ■

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Universal Masking Protects Stem Cell Patients

Year-round policy stops parainfluenza virus infections

A universal masking policy for healthcare providers and home care workers dramatically reduced respiratory viral infections in hematopoietic stem cell transplant (HSCT) patients, researchers report.[1]

In particular, parainfluenza virus 3 (PIV3) — the primary threat to this particular patient group — was reduced sharply from an infection rate of 8.3% to 2.2% following the mask intervention.

"That really is the virus that was most prevalent in our population and causing the most symptoms," says **Mitchell E. Horwitz**, MD, associate professor of medicine and director of the Clinical Research Adult Blood and Marrow Transplant Program at Duke University Medical Center in Durham, NC. "Influenza and respiratory syncytial virus are much more serious, but fortunately, not as common. Whether [this intervention] would help reduce those viruses is not clear because of the relatively low numbers, but the parainfluenza was the biggest [factor] and was really the impetus for the study."

The surgical mask policy requires all individuals in inpatient and outpatient HSCT facilities with direct patient contact to wear surgical masks regardless of symptoms or season. While standard infection control procedures are effective against respiratory infections, they may be insufficient to prevent the spread of PIV3. That is because providers and others with PIV3 may shed virus while asymptomatic, Horwitz explains. Thus, standard droplet precautions that focus on symptomatic patients may not be protective. Similarly, strategies that increase infection control measures during the winter influenza and respiratory syncytial virus (RSV) seasons neglect PIV3, which peaks in the summer months, he notes.

The Duke stem cell unit was hit hard with respiratory infections in 2009, leading to the creation of the new policy: All healthcare workers and caregivers of HSCT must wear a surgical mask around the patients. The masking policy was in effect all year, regardless of season or symptoms.

The researchers compared the infection rate from the period of 2003-2009 to the post-intervention time frame of 2010–2014. Overall, respiratory infections dropped from a rate of 10.3% in the no-mask period to 4.4% after the policy. Significant decreases were seen for both allogeneic and autologous transplants. Again, infections due to PIV3 comprised the majority of the reduced infections.

We asked Horwitz to comment further on the study, which certainly suggests other centers may want to consider such a policy in the face of recurrent parainfluenza viruses in this patient population.

HIC: You found that universal masking dramatically decreased respiratory viral infections in this patient group. What do you think was happening there? Is it possible asymptomatic workers were spreading viral infections to patients prior to the masking policy?

Horowitz: Yes, that is certainly true, and it also was true of the caregivers that were involved with the patient management. When someone is going through a bone marrow transplant, at least in our program, they spend a lot of time out of the hospital. So, by instituting this not only by healthcare providers, but by caregivers at home, I think that is how we were able to have this impact.

Often, patients are coming from out of town, so they are housed in an apartment. There is not as many of the typical family members or friends, although we do have some patients who come from the local area. The instructions are for anybody who gets near the patient during this period of time should be wearing a mask.

HIC: What was the reaction of the healthcare workers? Showing them such results would certainly be a validation of the policy, but did you get any pushback on masking and any signs of lack of compliance?

Horowitz: None at all. Everyone was very compliant and they realized the importance of the issue. These are not N95 [respirators] and uncomfortable. They are surgical masks and much easier to tolerate. Anecdotally, the head nurse believes there were fewer respiratory infections among nurse staff because they were wearing masks more frequently and there were less infections being passed from nurse to nurse.

HIC: Could there be implications for using universal surgical masking with other immune compromised patient groups, or perhaps ICUs in general?

Horowitz: I think so. I don't know if the non-influenza respiratory viruses are quite as significant as they are in bone marrow transplant patients. I'm sure there are occasions when patients get sick, but I think that our population is unique in the degree of lymphocyte depletion in the immune system. With standard solid tumor chemotherapy or even leukemia, the neutropenia is profound and prolonged, but the lymphopenia is not quite as pronounced — and that is where you are getting the major holes in the immune system and the susceptibility to severe viral infections. I think there would be an impact [in other populations], but I don't think it would be quite as clinically significant. ■

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Cures Act Includes Antibiotic Provisions for CDC, FDA

Editor's note: As this issue went to press, the 21st Century Cures Act was finalized by Congress and signed into law.

Infectious disease groups have successfully lobbied Congress to pass legislation that would fast track development of new antibiotics, improve tracking of drug resistant bacteria and support the national push for antibiotic stewardship.

The sweeping 21st Century Cures Act includes "antimicrobial innovation and stewardship" provisions that were welcomed by groups like the Society for Healthcare Epidemiology of America (SHEA.)

"There is agreement now that we are at a crisis level with the problem of antibiotic resistance," **Lynne Batshon**, SHEA director of policy and practice, says in comments before the bill was finalized. "We believe this bill represents another layer of commitment from the United States. Policy drives change. We think this will help provide additional foundations to ensure that antibiotic

stewardship programs and other forces that are needed in order to drive changes in prescribing practices [are in place] to stem the tide of resistance."

The antibiotic provisions in the Cures Act, which bundles numerous healthcare improvements in a single bill, had passed the House as this issue went to press. It is a separate action than the ongoing discussions by CMS to require antibiotic stewardship programs as a condition of participation. A final ruling on that is expected to be issued in the near future.

"We are hopeful that CMS is able to finalize that rule as quickly as possible," Batshon tells *Hospital Infection Control & Prevention*. "In SHEA's comments in the docket, we urge CMS right up front to finalize the rule by the end of the year."

The antibiotic provisions in the Cures Act include requirements for the CDC and the FDA to collect and report information on antimicrobial resistance.

"We are hopeful that this might incentivize healthcare IT vendors to make their software more compatible with CDC's National Healthcare Safety Network (NHSN) [module for] collecting and reporting antibiotic use data," she says. "Right now, hospitals are fairly limited within that module and it is my understanding that it is due to limitations on many of the software packages. I know those improvements are being made now even as we speak, but I feel that this type of legislation might further incentivize those vendors and better position the CDC to create the demand, so to speak, through NHSN."

The bill would also require the CDC to distribute educational materials on antibiotic stewardship programs and practices to healthcare facilities, Batshon says.

"The CDC and FDA are already engaging in this and I know that CDC has been distributing materials and has started making data publicly available," she says. "We believe that this line item in the bill will strengthen this ability."

A more controversial aspect of the bill would allow the FDA to fast-track new antibiotics under development, and some advocacy groups have cautioned against any efforts to speed up clinical trials. Thus far, the Cures Act has enjoyed bipartisan support and has not been enveloped in the political acrimony of the recent election. However, it is no secret that the incoming administration is generally less likely to view federal regulations favorably than the outgoing one.

"We are hopeful and optimistic that this will remain a bipartisan issue." Batshon says. "The goal is to get this bill signed within the current administration." ■

Reach Out to the Addicted Before Outbreaks

Drug diverters were once HCWs trying to help others

Focused on their high calling to protect patients from cross-transmission and full-blown outbreaks, infection preventionists may find it difficult to muster compassion for those who willfully endanger their frail charges by stealing the very medicine needed to comfort them.

Healthcare workers who divert drugs are understandably reviled for potentially harming patients by depriving them of pain relief and putting them at risk of infections from tampered medications. A seemingly endless series of outbreaks of blood-borne infections bear start witness to this all-too-common trend in healthcare. But somewhere beneath the distortions of addiction and denial, shame and stigma, is a person who once sought to care for others.

People like **John Furman**, PhD, MSN, CIC, COHN-S, director of Washington Health Professional Services (WHPS) in Olympia, are now trying to care for them, and if possible, restore them as healthcare workers empowered again to help others.

"I don't want to make a direct analogy, but it can be said to some degree that Washington state looks at substance abuse disorder as chronic relapsing disorder, much the same as asthma and diabetes," Furman says. "Now, it's not exactly the same — I'm not trying to pull the wool over anybody's eyes — but the point is that all healthcare professionals should have the right to have their legitimate medical condition [treated]. And if it can be managed successfully, they should have the right to re-enter the workforce and continue their profession just as anyone else would."

That said, there are public safety issues to be strongly considered, and if a nurse referred to the WHPS cannot make the necessary changes, or further acts to endanger patients, the state nursing commission may revoke his or her license.

"In many cases they can return to practice, that can be accomplished, but in some cases it can't and they do end up losing their license," Furman says.

WHPS is the state alternative to a discipline substance abuse monitoring program for nurses with substance use disorders, again seen as medical conditions driven by biological traits that can change over time. Though opioids may certainly be the drug abused, the situation with nurses is not simply an extension of the national opioid epidemic that has become a public health crisis. Despite the recent focus on the opioid epidemic, the number of substance-abusing healthcare workers remains in the same general range as it has for years.

"I don't see a big difference with regard to the numbers and rates of HCWs with substance use disorders or the circumstances surrounding their initiation and continued use all the way up to diversion,' says Furman, a 35-year veteran in the field. "I think the numbers and research has stayed fairly steady over the years. Depending on the research, you look at about 10% to 15% of the general population with some level of substance abuse disorder and that's mirrored in the healthcare professional profession — with healthcare workers having a higher rate of prescription drug abuse than the general population. With the opioid epidemic, that gap may be narrowing a little bit."

As infection preventionists are well aware, nurses can suffer injuries moving patients and endure chronic pain thereafter.

"We have many nurses in our program — and it is my experience with other states' programs that are fairly similar — with chronic pain issues that have a great deal to do with their substance use disorders," he says. "[These include] nurses who have hurt themselves on the job and have been mismanaged by their healthcare provider with regard to their pain issues, or possibly by their employer with regard to bringing them back on duty prematurely and not providing appropriate oversight and support. That really contributes to their [drug] behavior if a nurse who doesn't have sufficient leave time because of that comes back prematurely from an injury."

The Malleable Brain

Thus, the occupational hazards of healthcare work can lead to substance use for pain, which may cross over into abuse if addiction sets in through a process called neuroplasticity.

"The brain is malleable and changes in response to different stimuli whether they are internal or external," he says. "It is also important to realize that at one point medical, science thought our brain was set in concrete by late adolescence or early adulthood. Now we know that our brain changes all the time throughout our lifespan. When an individual is exposed to something — drugs, alcohol, opioids, — the brain changes in response to that exposure and becomes an addicted or chemically dependent brain. By removing that exposure and also having psychotherapy as part of treatment, then the brain is able to change and reset back to its original state."

Common drugs used or diverted by healthcare workers include hydrocodone, morphine, oxycodone, fentanyl, Ambien, Xanax, Valium, and Ritalin, Furman says. Common diversion methods include medication substitution, removal of medication without orders, frequent medication overrides, giving less than high-end ordered and diverting the waste, signature/order falsification, and savaging from waste, he notes.

"In Washington state right now, the average age of nurses is about 48 years," he says. "So they are getting older and they are more prone to musculoskeletal injuries and other injuries that may result in chronic pain issues. It is a significant issue."

The majority of nurses come into the WHPS program after a complaint has been filed against their license for substance misuse. It may be personal misuse or it may involve drug diversion at their workplace, but the vast majority are referred by the state nurse commission, he says.

"However, we do have an alternative discipline track that most nurses take to enroll in the program," Furman says. "So even though a complaint's been filed — and the rule of thumb is that no patient harm has occurred as a result of the behavior — they are allowed the option to come into the program in lieu of discipline. That means there is no formal action taken against their license and the fact that they are in the program is non-public in nature. This is never reflected as part of a public document."

In Washington and many other states, you can look up a nurse's name and see if they have had any discipline taken against their license. If so, it will be noted in the public record and include some details of the incident. The alternative track at WHPS can spare a nurse this public disclosure and the attendant stigma.

"Our mandate from the legislature is two-fold," he says. "One is they have directed the state Department of Health, which licenses healthcare providers, to provide an alternative to the traditional disciplinary process for health professionals with substance abuse disorders. The second part of that mandate is that we are to make every effort to safely allow nurses to continue or return to practice. The legislature looks at healthcare workers in total as a state resource. If there

is something that can be done to retain that resource — something that can be reasonably and safely done — they want that to be explored."

Conditions vary from state to state, and in some cases relapse means automatic license revocation. In the WHPS program, nurses that do overcome their addictions and return to the workforce are subject to random drug tests, ordered to attend counseling or a support group, and have a series of work conditions that can include:

- worksite restrictions, e.g., no home health work,
- will not have multiple employers,
- limits on overtime and shift rotation,
- will not float from unit to unit, and
- no access to controlled substances for at least 12 months.

Returning to Work

"In Washington, our graduation rate – the number of nurses who graduate from our program – is about 65% to 70%," he says. "We feel pretty good about that and also the nurses are in the program for a minimum of five years. The standard throughout the nation is at least three to five years." Nurses in the program must call in or check in via a computer every work day.

"If they are selected to take a drug test that day they must submit a sample that calendar day," Furman says. "Test results may result in sanctions on their license."

Though admitting it sounds counterintuitive given medicine is their profession, Furman says the lack of education about drugs and addiction is still a major contributor to the problem.

"There is very little direct education in nursing schools with regard to substance abuse, especially addressing the risk to health professionals," he says. "Some states have enacted legislation that requires a certain number of hours or at least to some degree [education] as part of the nursing curriculum. But that is in very few states and it needs to be much broader. Then in the healthcare facility itself they should have clear policies and procedures on substance abuse. Those should not sit on a shelf. They need to be part of new orientation and revisited as part of mandatory ongoing training on a routine scheduled basis." ■

VRE and MRSA: Should We Stop Routine Contact Precautions?

By Stan Deresinski, MD, FACP, FIDSA

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

SYNOPSIS: The value of routine contact precautions for VRE and MRSA is strongly challenged.

SOURCES: Martin EM, Russell D, Rubin Z, et al. Elimination of routine contact precautions for endemic methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant *Enterococcus*: A retrospective quasi-experimental study. *Infect Control Hosp Epidemiol* 2016;37:1323-1330.

Lemieux C, Gardam M, Evans G, et al. Longitudinal multicenter analysis of outcomes after cessation of control measures for vancomycin-resistant Enterococci. *Infect Control Hosp Epidemiol* 2016:1-7. [Epub ahead of print] PubMed PMID: 27804901.

Making hospital infectious disease rounds has become a continual ballet of donning-doffing-donning gowns and gloves because of the enormous number of patients placed in contact isolation at many hospitals. The most frequent reasons for such precautions are patient infection and/or colonization with methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* (VRE), *Clostridium difficile*, and multidrug-resistant gram-negative bacilli. It has been pointed out recently, however, that high-quality evidence justifying the use of contact precautions for MRSA and VRE is lacking.

Martin and colleagues at the UCLA Medical Center and Santa Monica Hospital analyzed changes in the epidemiology of MRSA and VRE after their discontinuation of routine contact precautions for patients with these organisms as of July 1, 2014. At UCLA, all rooms were single-patient, while at the Santa Monica Hospital, most were. Prior to that date, all patients with active infection, a history of active infection, or of current or past positive surveillance cultures were placed under contact precautions consisting of the use of gowns and gloves in addition to standard precautions. After that date, contact isolation was required only if the patient had a draining wound. Another policy change, which likely acted as a confounder in interpreting the change in isolation policy, had been made in May 2004. Prior to that time, only intensive care patients

received daily chlorhexidine bathing, while thereafter this intervention was applied throughout both hospitals.

Analysis of the first year after discontinuation of routine contact precautions for MRSA and VRE found no evidence of increased rates of recovery of these organisms. Thus, the average positive culture rates of MRSA changed from 0.40 to 0.32 cultures/100 admissions ($P = 0.09$), while those of VRE changed from 0.48 to 0.40 cultures/100 admissions. Prior to the change, 28.5% of intensive care beds and 19% of medicine surgery beds were on contact isolation. The investigators estimated overall cost savings of $643,776 per year — savings of $729,572 resulting from reduced use of gowns for staff minus $85,796 per year for hospital-wide chlorhexidine bathing. Additional cost savings ($4.6 million) were calculated from an estimate that the total nursing time spent in donning gowns and gloves over one year exceeded 45,000 hours — although it was accepted that the actual dollar cost savings could not be realized but that the extra time would allow for greater focus on direct patient care.

Lemieux and colleagues reported outcomes after all VRE screening and isolation practices at four large academic hospitals in Ontario, Canada, were discontinued on July 1, 2012. Prior to that time, VRE surveillance of stool or rectal swabs was performed. Relative outcomes were expressed as the incidence rate ratio (IRR), with values < 1 indicating a decreased risk of a given outcome. Analysis found that the IRR for VRE infection (not simply colonization) was 0.59, while it was 0.54 for VRE bacteremia, and 0.54 for all-cause mortality — none of these values suggestive of improved outcomes were statistically significant. Thus, the authors concluded that cessation of VRE control measures had no significant negative effect. There appeared to be an increase in numbers of patients with hematological malignancy with VRE infection. This may have accounted, at least in part, for a significant increase in use of daptomycin (but not linezolid) — which, at least in the United States, is a potential cause of financial toxicity.

Although Lemieux et al observed an apparent increase in VRE infections in patients with hematologic malignancies, this result conflicts with that of Almyroudis et al.[1] That group of investigators, in examining two consecutive three-year periods, found no evidence of an increase in VRE bacteremia in such patients or in those who had undergone hematopoietic stem cell transplantation after discontinuation of active surveillance and contact precautions for VRE colonization.

COMMENTARY

It has been recommended widely that patients historically or currently colonized or infected with VRE or MRSA be maintained in isolation with use of contact precautions to reduce transmission of these organisms. However, patient isolation is not without its unfavorable consequences. Although not confirmed in all studies, these consequences have included fewer and shorter healthcare provider contact, increased medication errors, increased risk of pressure ulcers and falls, and, importantly, adverse psychological effects. Increased cost also has been added to the list. Thus, Tran and colleagues, in a multicenter, retrospective propensity score-matched cohort study, found that respiratory isolation was associated with a prolonged length of stay and of cost.[2] These also were true for patients with MRSA placed in isolation with contact precautions, but this group also had a greater 30-day readmission rate. The results reviewed here were confirmed by at least two studies presented at IDWeek (see abstracts 275 and 277 available at https://idsa.confex.com/idsa/2016/webprogram/Session8193.html).

Overall, a reasonably firm conclusion can be reached that routine contact isolation for endemic MRSA and VRE is unnecessary (and may be harmful) when there is active maintenance of hand hygiene, environmental cleaning, and chlorhexidine bathing. ■

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HOSPITAL INFECTION
CONTROL & PREVENTION

CME/CE INSTRUCTIONS

To earn credit for this activity, please follow these instructions:

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CME/CE QUESTIONS

1. The CDC projected if CRE entered 10 facilities that were sharing patients, and they made no effort to go beyond the status quo in terms of improving infection control and collaborating, the CRE level would increase by what percentage in five years?

a. 12%
b. 18%
c. 25%
d. 40%

2. Tom Frieden, MD, compared the protective effect of the human microbiome of commensal bacteria to a:

a. vaccine.
b. monoclonal antibody.
c. separate organ.
d. white cell army.

3. A condition called subacute sclerosing panencephalitis (SSPE) is a fatal complication of which viral infection?

a. Zika
b. Varicella
c. Mumps
d. Measles

4. A universal masking policy for healthcare providers and home care workers dramatically reduced respiratory viral parainfluenza virus 3 (PIV3) infections in leukemia patients.

a. True
b. False

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.