HOSPITAL EMPLOYEE HEALTH

THE PRACTICAL GUIDE TO KEEPING HEALTH CARE WORKERS HEALTHY

SEPTEMBER 2016 Vol. 35, No. 9; p. 97-108

INSIDE

AHC Media

Overshadowed by Zika, MERS Still a Looming Threat to HCWs

Risk remains for travelers, 'super-spreaders'

By Gary Evans, Senior Staff Writer

Though Zika has eclipsed it as a national concern, another virus that has already caused many occupational infections and even deaths in healthcare workers is still emerging in hospital outbreaks a plane ride away: Middle East Respiratory Syndrome (MERS).

The World Health Organization recently reported an outbreak of the MERS coronavirus in a hospital in Riyadh, Saudi Arabia, where a single patient infected 24 contacts — 11 of them healthcare workers.[1] Similarly, researchers recently documented the explosive spread of MERS last year from a single patient in a Korean ED to eight healthcare workers and scores of patients.[2]

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). *(See related story, page 101.)*

> "IT'S TRUE IT AIN'T OVER TILL IT'S OVER — AND MERS AIN'T OVER YET. WE CAN ALL USE A REMINDER THAT IT IS NOT OVER AND TO STAY ALERT."

Still, there may be some sense of complacency in the U.S., 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 U.S. EDs could certainly be vulnerable to an

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Financial Disclosure: Senior Staff Writer **Gary Evans**, Managing Editor **Jill Drachenberg**, and Nurse Planner **Kay Ball** report no consultant, stockholder, speaker's bureau, research, or other financial relationships with companies having ties to this field of study.

HOSPITAL EMPLOYEE HEALTH

Hospital Employee Health®,
ISSN 0744-6470, is published monthly by
AHC Media, LLC
One Atlanta Plaza
950 East Paces Ferry Road NE, Suite 2850
Atlanta, GA 30326.
Periodicals Postage Paid at Atlanta, GA 30304 and at additional mailing offices.

POSTMASTER: Send address changes to:
Hospital Employee Health®
P.O. Box 550669
Atlanta, GA 30355.

SUBSCRIBER INFORMATION:
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Hours of operation: 8:30 a.m.- 6 p.m. Monday-Thursday; 8:30 a.m.-4:30 p.m. Friday, EST.

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Provider approved by the California Board of Registered Nursing, Provider #CEP14749, for 1.25 Contact Hours. This activity is intended for employee health nurse managers. It is in effect for 36 months from the date of publication.

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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 **William Schaffner**, MD, an epidemiologist in the department of preventive medicine at Vanderbilt University Medical Center in Nashville, TN. "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 often include transmission to healthcare workers.

"There is no question that primary cases are continuing to occur at a steady rate," says **Allison McGeer**, MD, a microbiologist and infectious disease consultant at Mount Sinai Hospital in Toronto. "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."

640 MERS deaths

As of July 30, 2016, WHO reported that MERS has caused 1,791 confirmed infections and 640 deaths since first emerging in Saudi Arabia in September 2012. It is still largely confined to the kingdom, 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.

Hospital Employee Health asked for more information on the number of infections and subsequent outcomes in healthcare workers, but neither WHO nor the CDC provided information as this issue went to press.

However, it is widely known that many healthcare workers have been infected with MERS in hospital outbreaks. Without citing a specific number, a recently published paper confirms fatal MERS infections have occurred among healthcare workers. In addition, the researchers cited the emotional toll on workers of seeing colleagues become very sick and end up hospitalized alongside patients during the outbreak. *(See related story, page 102.)*

MERS has caused severe infections and deaths in healthcare workers, says McGeer, who was on the frontlines of the SARS outbreak in Toronto that resulted in 400 infections and 41 deaths in patients and three healthcare workers. The SARS outbreak that began in China spread globally, eventually causing more than 8,000 infections and some 775 deaths. It is estimated that about 20% of the total SARS cases were healthcare workers. In a point particularly germane to the current situation with MERS, the Toronto outbreak began with a case of unrecognized SARS in an infected contact of a recent traveler to the Hong Kong epicenter.

"There are healthcare workers who have died of MERS, but the majority of healthcare workers' cases are either asymptomatic or minimally symptomatic" McGeer says. "The majority of healthcare workers with SARS had symptoms and the case fatality rate was higher."

In the Saudi hospital outbreak reported recently by WHO, most of the infected healthcare workers

were, indeed, asymptomatic or had mild symptoms and were confined to home isolation. However, one serious case developed in a 28-year-old male healthcare worker who was exposed to the index case, developed symptoms, and was admitted to the hospital. The worker, who has no comorbidities, was in stable condition after being admitted to a negative pressure isolation room, WHO reported.

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."

A 14-hour flight

Thus, a single undiagnosed case infected 11 healthcare workers and 13 other patients, visitors, and contacts in a country with a high suspicion for cases and experience with MERS outbreaks. That may not bode well for future introductions of a MERS case in a U.S. hospital — for example, one in Washington, DC, that is a 14-hour nonstop flight from Riyadh.

"I think even with a really good healthcare system, you will 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.[3] That said, U.S. hospitals may have to run that risk as long as they can at least pick up incoming symptomatic MERS cases.

> COMPLICATING THE SITUATION, A STUDY PUBLISHED LAST YEAR RAISED THE POSSIBILITY OF TRANSMISSION FROM THOSE WITH ASYMPTOMATIC MERS.

"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. None of the American healthcare workers exposed to the first two MERS cases were infected, but all were subject to rapid follow-up and home quarantine policies following the exposures. For example, in the hours before MERS was suspected in the second U.S. case in Orlando, several employees in a hospital ED had unprotected exposures. Two physicians and 14 other healthcare workers at Dr. P. Phillips Hospital were placed on home isolation for the 14-day MERS incubation period. Another seven healthcare workers at Orlando Regional Medical Center were furloughed after it was discovered they were exposed when the patient accompanied a friend to the radiology department there.

MERS vigilance

The 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 healthcare workers and patients may already be exposed by the time a MERS case is diagnosed. Even if precautions are indicated, surveillance data and exposure reports are a cause for concern. For example, the International Safety Center's Exposure Prevention Information Network (EPINet) 2012-2014 occupational incident surveillance data indicates that, during a mucotaneous blood or body fluid exposure, healthcare workers are only wearing face-appropriate barrier protection or PPE (mask, respirator, eye protection, face shield) 14% of the time.

"This leaves a gaping window of risk open for occupationally acquired respiratory threats," says **Amber Mitchell**, PhD, center director. "It creates an environment where the risk of transmission of occupational illness is extremely high, especially with MERS, which continues to be a public health threat in the Middle East and Asia. As the WHO indicates, it is not always possible to identify patients with MERS early, meaning that being diligent about access to and use of appropriate PPE and barrier garments becomes increasingly important to protect healthcare providers."

Preventing exposures

To prevent these exposures from the outset, the CDC recommends respiratory "etiquette" signs and posters reminding patients and healthcare workers to adhere to respiratory hygiene and cover coughs while practicing hand disinfection and following triage procedures.[4]

"Instructions should include how to use facemasks 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 facemask over the patient's nose and mouth) and isolate those at risk for MERS-CoV infection in an airborne infection isolation room."

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.

"Each of these infections — SARS, Ebola, Zika and MERS — are distinctive and there are still unknowns about all of them," Schaffner says. "The appearance of widespread SARS in Canada but not in the U.S. and not in Europe — and then the sudden disappearance of SARS — still has most of us perplexed. The epidemiology and reservoir of MERS in the Middle East has been somewhat elucidated but it is still, to some extent, a mystery. There are people infected who have no contact with camels and there is no big epidemic of MERS in the camel herders and owners, so what is going on there? It's really very puzzling to us." ■

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'Super-spreaders' Threaten Healthcare Workers

Frequent, close contact delivering care leads to infection

The quasi-medical term "super-spreader" was coined to describe a single person who infects an unusually large number of contacts, including healthcare workers and other patients.

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.

With SARS — and a similar, currently emerging coronavirus, MERS — healthcare workers seem to be particularly vulnerable to the super-spreader phenomenon. For example, a patient with undiagnosed SARS was admitted to one hospital and then transferred to another in Singapore in 2003. A total of 62 persons with probable SARS, including 25 healthcare workers, were ultimately linked to this single case.[1] Frequent close contact with patients infected with a respiratory virus like SARS or MERS increases the risk of transmission to healthcare workers.

"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."

In a current example, investigators of a 2015 outbreak of MERS in Samsung Medical Center in Seoul, South Korea, recently published a study that revealed one patient exposed 218 healthcare workers and hundreds of patients and visitors while in the ED between May 27 and May 29.[2]

> "WITH RESPIRATORY INFECTIONS, THE CONCEPT OF A SUPER-SPREADER BEING EXTREMELY DANGEROUS IN TERMS OF TRANSMISSION HAS SOME REAL CREDENCE."

MERS infection was confirmed in eight healthcare workers, 33 patients, and 41 visitors. Such situations are chaotic because even workers that do not develop infection may be subject to furlough for the 14-day MERS incubation period.

"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 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 patients visit 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." ■

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MERS Outbreak Takes Emotional Toll on HCWs

Seeing their co-workers become seriously ill disturbing

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.[1]

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, says in an email to *Hospital Employee Health*.

"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 says. "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. Eight patients infected with MERS developed pneumonia and died during the outbreak.

"Among the various stressors related to the MERS-CoV outbreak, safety was the main concern for the staff," Khalid and colleagues concluded in the study. "It was extremely stressful for them to see their colleagues getting intubated, patients dying in front of them from MERS, as well as the fear that they could transmit the disease to their families or friends."

Similar concerns were expressed by healthcare workers in Toronto during the 2003 outbreak of SARS coronavirus. There were reports of workers removing all work clothes before going into their homes, afraid they would infect their families. The toll was such that a veteran Toronto nurse, who survived a SARS infection, was planning to quit when pandemic H1N1 influenza A first emerged in 2009.

"I didn't really realize how much SARS affected me until H1N1 came out, and I thought, 'I cannot go through this again, I just can't,'" the nurse said.[2] "I was surprised at my reaction. I love nursing and my patients, but if it meant losing my job, that would be it for me."

H1N1 flu turned out to be milder than first feared, but at least one U.S. nurse died. Though it was not definitive whether infection was acquired in the community or the hospital, a previously healthy California nurse died of complications from H1N1 infection that included severe respiratory infection and pneumonia. *(For more information, see the October 2009 issue of* HEH*.)*

"There are still concerns regarding MERS, but they have eased as no more cases are reported in our locality," Khalid says. "Also, fears are less now, as no healthcare worker died in our hospital."

Khalid and colleagues surveyed 150 clinical staff who worked in high-risk

areas during the April–May 2014 MERS outbreak at the hospital. The results for the 117 (78%) respondents indicate a positive attitude and the sense of an "ethical obligation" to provide care drove workers onward. The improving condition of infected colleagues and adoption of rigorous infection control precautions were reassuring to the workers, who also cited positives such as recognition by hospital administration and replenished PPE supplies. Staff followed standard (a.k.a. "universal") precautions and wore scrubs that were disposed of at the end of the work day. They also avoided community contact in a kind of "semi-quarantine," the study found.

"The staff, however, did feel fearful during the outbreak," Khalid and colleagues noted. "They appreciated the extra financial compensation and recognition given to them by the hospital. They tried to limit their exposure to patients with MERS, and were reluctant to work overtime. … Seeing colleagues contracting the infection, getting sicker, and being intubated for respiratory failure was very distressing. Caring for these sick colleagues also put them under enormous emotional burden." ■

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Zika Riddle: Did Virus Spread to Caregiver?

Dying patient had 100k times more virus than normal

A dying patient in Utah with a staggering level of circulating Zika virus apparently infected a family caregiver in what may be the first case of non-sexual person-to-person transmission of the emerging virus.

The family member who cared for the patient completely recovered from the Zika infection, but the strange Utah case opens up a whole new area of concern for a virus that is proving highly unpredictable. In addition, as this issue went to press, the first 15 cases of mosquito transmission were reported in Miami. That was a feared, but expected, milestone, but the Utah case is yet another departure from the projected Zika characteristics.

The case began with the first reported Zika-related death of a person in the continental U.S., in late June near Salt Lake City.

"The deceased patient had traveled to an area with Zika and lab tests showed he had uniquely high amounts of virus — more than 100,000 times higher than seen in other samples of infected people — in his blood," the CDC reported.[1]

That certainly suggests how the patient was able to transmit the virus to a family contact who provided care, as any exposure to blood or body fluid could have contained high levels of virus. Zika virus has been recovered in a variety of bodily fluids in past research, including semen, vaginal fluid, urine, blood, and saliva. Transmission by one of these fluids is merely supposition at this point, but public health investigators are not ruling anything out. Asked about airborne transmission, a CDC epidemiologist said at a recent press conference that was "extremely unlikely," particularly in the absence of a medical procedure that could generate aerosols.

"In our line of work, nothing is truly off the table," said **Michael Bell**, MD, deputy director of CDC's Division of Healthcare Quality Promotion. "The table is vast. We never want to underestimate possibilities; however, it would be extremely unlikely for something like that to occur."

Here's what is known: The caregiver had not traveled to a Zika transmission area, had no sexual risk factors, and the *Aedes* mosquitoes that transmit the virus have not been seen in Utah. Culex mosquitoes that typically feed on birds in the state are being periodically tested for Zika virus, and thus far all are negative. The CDC and state health officials are testing other family members of the index case, and healthcare workers who may have provided care.

Again, the secondary case recovered and did not have the high viral titers of Zika like the index case. The question of why the first patient had such an off-the-charts viral load raises the issue of whether Zika proliferated due to the patient's reported underlying medical condition.

"From the infection control perspective, I think it is too early to make a clear statement about what we think could have happened," Bell said at the press conference. "Certainly

a high viral load is something we take very seriously, and as it is not something about which we have a very long experience [with Zika]. So you are asking sort of a chicken-or-the-egg question. Someone who is extremely ill and debilitated from another disease process could have a diminished immune system that does not fight the virus as well and that might allow more virus to proliferate in the bloodstream. On the other hand, someone with a high viral load could be sick with the viral infection. I personally cannot tell you which way that went."

Given the lack of information, the CDC is not changing any guidelines for PPE use by healthcare workers treating Zika patients.

"Make sure that healthcare personnel don't have any direct contact with blood or bodily fluid, through broken skin, needlesticks, or splashes to the mucous membranes," Bell said. "I think this highlights the fact that with an infection like Zika virus, a good percentage of patients don't have symptoms. It means that it is as important as ever to stick with good precautions. Just like we assume anybody might carry hepatitis or HIV, we don't wait for a positive diagnosis in order to prevent blood or bodily fluid exposure. The same thing is true with Zika virus, and this is a great example of why we should never take chances, but always adhere to standard precautions." ■

Mayo Clinic Reaching Out to Physicians in Peril

'Usually, it's an event — something happens and somebody's in trouble'

As an aging population of physicians approaches a demographic cliff that may cause a shortage of medical doctors, there is renewed interest in prolonging and safeguarding the careers of those in the healing profession.

In that regard, **William G. Buchta**, MD, MPH, medical director of the Employee Occupational Health Service at Mayo Clinic in Rochester, MN, is involved in reaching out to physicians having health concerns whether they be physical, mental, or linked to substance abuse.

Some 40% of physicians are older than 55 and another 20% are over 65, he notes. All the while, the demand for healthcare is increasing. Thus the need for a "physician care model" developed by Buchta and colleagues at Mayo Clinic to address acute health needs, return-to-work issues, impairment, and recovery. It is a customized version of the kind of programs recommended by the Federation of State Physician Health Programs, which provide care for physicians with substance abuse issues as well as mental and physical illness. *(For more information, visit: http://www.fsphp.org/.)*

Before we delve more in-depth into these less tangible aspects, it should be noted that physicians typically suffer occupational injuries distinctly different from their nursing counterparts.

"Physicians are more inclined to have repetitive strain type of issues like neuropathies," Buchta says. "I have [treated a] radiologist who works a computer mouse all day — 12 to 14 hours a day — and developed [a] compression syndrome. The surgeons that are doing hours-long procedures looking down a small deep hole tend to have more neck issues. It tends to be specific to the type of procedures they are doing, whereas the nurses are more likely to get neck, shoulder, and low-back strain from an acute exposure. You don't see that much in physicians. It's more the cumulative positioning issues that cause a new condition or aggravate an underlying condition."

A member of the *Hospital Employee Health* editorial board, Buchta told us more about the physician care program at Mayo Clinic in the following interview.

HEH: We hear a lot about burnout in physicians and other caregivers. Are you seeing a lot of that issue in this program?

Buchta: It is the mid-career physicians who are having problems with burnout. They have too much on their plate — clinical responsibilities, research, education — and they can't handle it all. So they go into a shell, become irritable — typical signs of burnout. Whereas with aging physicians, there are more problems with physical and cognitive decline. They are more susceptible to fatigue. It's kind of a terminal manifestation that a career of 40 years is coming to an end. Burnout is not so much an aging issue as an over-commitment issue.

HEH: How did you become interested in developing this program?

Buchta: We were seeing a lot of own colleagues. We have 3,000 physicians in our institution and some of them were clearly struggling at one point or another. Working in occupational health, a lot of them would come to see me — sometimes on their own, but often they were

directed by their administrator or colleagues saying, "Something's wrong here. You should start taking action." I realized that we were getting this pretty steady stream of these cases and figured that this wasn't unique to our institution, so we decided to open it up to outside areas.

We advertised that we were available to make these types of evaluations, and we got some pretty interesting takers on that. Some of the situations are just unbelievably complex, emotionally charged. But I think we have been able to help them get their lives back together. We have discovered some underlying medical conditions that could explain why they were declining in their performance. We decided to formalize this program as an entry point for physicians or physician organizations to send people for confidential evaluation and a full report at the end with recommendations for their healthcare.

HEH: Does this present more as an issue of impairment — a patient safety issue — rather than strictly occupational health?

Buchta: Unfortunately, it has been primarily reactive — reacting to things gone wrong. It is kind of secondary prevention, and that's not the best model for this. We would like to move to a primary prevention model if we can. That is what we are eventually advocating to have: to be the entry point for physicians who would then take care of themselves, to give them general preventive services before they start to decline, particularly focusing on the needs of their specialty and how that interacts with their own particular medical profile.

HEH: Are these physicians becoming aware of medical errors, say, an increase in infection rates for a surgeon?

Buchta: That's one of the ways, yes. Usually it's an event — something happens and somebody's in trouble. So it is an emotionally charged emergency. Also, looking at data and seeing that [a physician's] data doesn't look as good as [colleagues']. That's a more objective, less emotionally charged way of doing it, but it takes work. It takes a system and somebody has to be looking at that. But I think we are moving in that direction more in reporting an individual's statistics. I think that is probably a better model than the reactive: responding when something bad happens. We could offer this as a service to physicians, to enroll them to receive preventive services through this that would be over and above your general healthcare.

HEH: But you say healthcare reform legislation may not look favorably on this, as it may be viewed as a high-cost employer-sponsored health plan subject to the so-called "Cadillac tax?"

Buchta: That's been kicked down the road to 2020, or otherwise we would be looking at that next year. This is one of those services that would be considered taxable by 40% and that could discourage a lot of people from participating and a lot of employers from offering a program like this. We are trying to collect the data to show that this really makes a difference and helps salvage lives and careers. We are looking at a healthcare shortage in the future, so we want to take advantage of the resources that we have and maximize those in addition to generating new [physicians].

HEH: What other kind of obstacles are you facing in treating these physicians?

Buchta: The initial problem is overcoming the barrier of self-recognition. So many physicians tend to isolate themselves as far as their personal problems. They don't want to talk about them or think about them. It's kind of like, no data, no problem. They have to come to the realization that they do have a problem. We have found that if they get past that barrier, they finally admit they need to address something, they become some of the best patients you ever met. It's a complete 180. Suddenly, they realize this is an opportunity to get their act together and they become very compliant with our recommendations. It's like you're hitting this wall and suddenly the wall comes down. They get it, and this is particularly true with substance abuse. Most impaired physician programs are developed for substance abuse. But the recidivism rate is incredibly low in physicians because they get it. Once they acknowledge a problem and deal with it, they say, "Why would I let this get in the way of my career? It's illogical."

HEH: Do a lot of physicians come in with addiction problems?

Buchta: It's no more common or less common than it is in the general population. We are a slice of the American population, and no different than anyone else. It is suggested that about 10% of all physicians have some type of chemical dependency issue. That doesn't mean that they are all practicing it, but they need to admit that and deal with it. I think sometimes the public thinks that physicians are in a different category, they are superhuman. Physicians have to get past that [perception], too. We think we're superhuman."

HEH: Approximately how many physicians are you able to help a year?

Buchta: The program is pretty nascent — it is about 50-100 a year. That's not huge by any means, and we know that there are a lot more cases out there that we could be helping. But it is a start. ■

Colorado Drug Diversion Law Requires Fingerprints

Tough new state law targets traveling surgical techs

After a series of highly publicized drug diversion incidents by healthcare workers in Colorado in recent years, the state passed a law that requires surgical technologists to register and submit to a background check.

Effective Aug. 10, 2016, Colorado law (House Bill 16-1160) requires that surgical techs pass a criminal history record check and submit fingerprints to the state Bureau of Investigation. The law also stipulates that employers requiring surgical techs to take a drug test must forward any positive results for a non-prescribed controlled substance to state officials.

In the latest of a succession of incidents in Colorado, last year the state charged an HIV-positive surgical technician with stealing opioid drugs, leading to a recommendation that some 3,000 patients at Swedish Medical Center in Englewood be tested for bloodborne viruses.

Colorado may now have the strongest law in the land to address what is clearly a national problem. Addicted healthcare workers are another spectrum in a national opioid epidemic that has reached epic proportions. Surgical techs who are "travelers" or agency workers have been able to go from hospital to hospital, even in cases where they have been discovered diverting and fired.

Hospitals fearing liability in drug diversion incidents may be reluctant to report and prosecute diverters. In the most egregious case to date, an HCV-infected traveling radiology technician was linked to a cluster of HCV patient infections at a New Hampshire hospital in 2012. The subsequent investigation uncovered a large HCV outbreak spanning several years, involving more than a dozen hospitals and affecting thousands of patients in eight states. The technician was stealing syringes filled with narcotics, self-injecting, refilling them with saline, and placing them back into the procedure area, officials reported. He was sentenced to 39 years in prison.

According to the CDC, there have been an estimated 100 patient infections and 30,000 potentially exposed patients via drug diversion reported in U.S. healthcare facilities over the last decade.[1]

With a history of drug use, the diverter is often infected with HCV or other bloodborne pathogens. The addicted healthcare worker may contaminate syringes and solutions in diverting drugs, leading to an outbreak among patients. In the absence of an outbreak, other infections and patient harms are likely going undetected as sporadic bloodborne infections that may not be discovered for some time may not be traced back to a drug diversion incident. ■

REFERENCE

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Compressed Work Shifts Put Nurses at Risk

Lack of recovery time dulls reactions

Nurses appear to be at higher risk of injury as they suffer a kind of cumulative fatigue and diminishment in balance and reactions working "compressed" shifts, researchers report.[1]

Regardless of day or night shift, nurses working three 12-hours stints within a four-day period showed measurable diminishment in motor skills and increase in musculoskeletal disorders, the study found. The overall effect of this fatigue heightens risk for injury by slips and falls while putting patients at risk of medical errors.

"Evidence is mounting that the more rigorous work schedules yield unfavorable effects on the worker and on the quality of care," says lead author **Brennan J. Thompson**, PhD, assistant professor of kinesiology at Utah State University in Logan. "More effort is needed to regulate the volume of work performed within a given time period."

Some researchers argue that 12-hour shift schedules are a major part of the problem, suggesting that shorter work shifts would help resolve some of the poor health and work-related issues of nurses, he says.

"If the 12-hour shift schedule is

unable to be avoided, efforts should be made to spread the work shifts across a longer time period, allowing greater recovery between shifts," Thompson tells *Hospital Employee Health*.

For example, nurses could consider spreading their shifts across a greater number of days, such as working three shifts over a five-to-seven-day period.

"It may be prudent for nurses to work no more than two shifts in a row and to allow a minimum of two days of recovery days off following two work shifts," he says. "Fatigue, and ultimately burnout, occur when there is an imbalance of work volume performed relative to recovery."

For successive shifts — two or more — one day off for recovery is likely insufficient to restore performance. If recovery time is lacking, chronic fatigue may set in along with impaired mental and physical performance on a long-term basis, he warns.

Sticking strictly to the science, it is not possible to say exactly what is causing the problem or account for all variables between day and night shifts. Regardless of shift, nurses working three 12-hours stints within a four-day period showed measurable diminishment in motor skills and increase in musculoskeletal disorders. This corrected the original hypothesis to some degree, as researchers thought night shift workers would have increased musculoskeletal disorders or poorer response times than their day shift colleagues.

"Our study findings did not show differences in fatigue responses between day and night shift workers for a time-matched work intervention," Thompson says. "This may suggest that fatigue develops in nurses independent of the type of shift worked, when working long hours in a successive work shift pattern."

However, this does not pinpoint the exact sources of the fatigue, so "the possibility remains that unique characteristics to each shift type are contributing differently to the similarly observed performance declines," he says.

The prevailing but unproven theory is that workers on compressed shifts lack "recovery time," and thus suffer diminished abilities as they wear down, he says.

"The current body of research is not complete in this regard," Thompson says. "More work is needed to identify and characterize the root causes of worker fatigue as a result of demanding work schedules. An appealing hypothesis is the lack of opportunity for a full recovery of performance prior to the next successive shift."

It's certainly an area in need of some answers, as nurses are an unfortunate No. 1 annually when non-fatal occupational injuries are tallied. In addition, only workers in the warehouse and transportation sector have more musculoskeletal disorders than nurses.

"This alarming statistic is particularly impactful when considering that the healthcare industry comprises one of the largest portions of the labor force (12%, 17 million workers), and is projected to experience the highest growth of any other industry in the upcoming years — adding 5 million jobs through 2022," Thompson and co-authors reported in the paper.

The most commonly reported injuries in nurses are of the musculoskeletal variety, with leading causes including overexertion, slips, trips, and falls. Delayed response and fatigue impairments could hinder rapid responses needed to recover from a slip or a sudden patient movement that could result in a needlestick or other injury.

"[T]hese predominant causes of injury may be largely preventable, particularly because they are factors that are influenced by the individual-environment dynamic," the authors reported. "For example, improvements in individual health and performance abilities [through] reduced fatigue, improved body mass index, enhanced response time, muscular strength, [in addition to better] work scheduling patterns, availability of mechanical lifting aids, etc., would likely diminish risks."

The researchers used a questionnaire to find the prevalence of musculoskeletal disorders and fatigue effects. Nurses working three 12-hour work shifts in a four-day period were then tested for balance, reaction time, and other measures after the work period.

"A key feature of this study was that these changes were demonstrated objectively using physical performance-based measurements, and not solely based off of self-reported or perceived functional status," the authors concluded. ■

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COMING IN FUTURE MONTHS

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CE QUESTIONS

1. A patient recently admitted to a Saudi Arabian hospital in critical condition had other symptoms that delayed the diagnosis of MERS for 48 hours. How many healthcare workers were infected by this case?

A. 3
B. 7
C. 11
D. 16

2. Two people sought treatment for MERS in separate incidents in Florida and Indiana in 2014. Which of the following was their occupation?

A. Flight attendants
B. Healthcare workers
C. Diplomats
D. Pilgrims returning from Hajj

3. A dying patient in Utah, who apparently infected a family caregiver, had what multiple of circulating Zika virus in the blood above and beyond what would be expected for a typical infection?

A. 1,000 times more
B. 10,000 times more
C. 50,000 times more
D. 100,000 times more

4. According to William Buchta, MD, physicians at which career stage are suffering the greatest level of emotional "burnout?"

A. Physicians who leave patient care for administrative duties.
B. Late-career physicians experiencing more fatigue.
C. Mid-career physicians taking on too much.
D. Early-career physicians overwhelmed by patient care demands.

CE OBJECTIVES

After reading each issue of *Hospital Employee Health*, the nurse will be able to do the following:

1. Identify particular clinical, administrative, or regulatory issues related to the care of hospital employees;
2. Describe how the clinical, administrative and regulatory issues particular to the care of hospital employees affect health care workers, hospitals, or the healthcare industry at large;
3. Cite solutions to the problems faced in the care of hospital employees based on expert guidelines from relevant regulatory bodies, or the independent recommendations of other employee health professionals.