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Do PPE woes mean it's time to scale back contact precautions?

Some remove isolation measures for MRSA and VRE

By Gary Evans, Senior Staff Writer

As research spurred by the Ebola crisis continues to reveal that healthcare workers frequently contaminate themselves doffing personal protective equipment (PPE), there's increasing interest in scaling back contact precautions and treating more patients with standard measures and rigorous hand hygiene.

A recently published study[1] estimated that on any given day up to 25% of all hospitalized patients are on contact precautions, which typically means placing patients with *Clostridium difficile* or multidrug-resistant organisms (MDROs) in a private room and having caregivers don gloves and gowns to treat them. Some early adopters of a more "horizontal" strategy are no longer isolating patients with methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *enterococcus* (VRE) if they are an endemic presence in a non-outbreak setting. Instead, they may use standard precautions, ensure a high level of high hygiene compliance, and emphasize other measures like chlorhexidine bathing

> "SOME EARLY ADOPTERS OF A MORE 'HORIZONTAL' STRATEGY ARE NO LONGER ISOLATING PATIENTS WITH MRSA AND VRE IF THEY ARE AN ENDEMIC PRESENCE IN A NON-OUTBREAK SETTING."

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and cleaning and disinfection of environmental surfaces and fomites.

A survey conducted as part of the study found more than 90% of responding epidemiologists and infection preventionists currently use contact precautions for MRSA and VRE, but 62% expressed interest in possibly changing the practice. Contact precautions make "theoretical sense," but an exhaustive review of more than 90 studies yielded no "high-quality data" that "these practices have a measurable effect on reducing infection rates" of MRSA and VRE, says lead author **Daniel Morgan**, MD, MS, an associate professor of epidemiology and public health at the University of Maryland School of Medicine in Baltimore.

The study concluded that there are insufficient data to support or reject contact precautions for MRSA and VRE, thus local circumstances should guide the decision of epidemiologists and infection preventionists. For example, hospitals treating patients with high acuity — "the sickest of the sick" — may find that contact precautions for MRSA and VRE provide a small benefit, Morgan notes.

However, even that margin of benefit may be undermined unless healthcare workers are compliant and competent in PPE use. There is accumulating evidence in the wake of Ebola that healthcare workers frequently use PPE improperly and contaminate themselves when removing the gear. For example, a recently published simulation study[2] found that more than half of healthcare workers contaminated themselves while removing their gloves. *(See related story page 137.)*

That certainly highlights training needs but also suggests some unknown level of transmission may be occurring to subsequent patients after healthcare workers use PPE for contact precautions. There are also the negative aspects of being in contact precautions, as previous research indicates isolated patients may suffer from depression and anxiety and receive reduced care in the form of fewer visits from healthcare workers. The latter is likely due to healthcare workers' perception that the donning and doffing of gloves and gowns is too labor-intensive and time-consuming, Morgan notes. In light of these various factors, there is renewed interest in scaling back contact precautions. Epidemiologists and infection preventionists that adopted such strategies before Ebola have generally reported stable or declining infection rates.

"We are using less contact precautions then we were before for the simple reason that we think that they need to be used in a more judicious fashion," says **Gonzalo Bearman,** MD, MPH, FACP, FSHEA, hospital epidemiologist at Virginia Commonwealth University (VCU) in Richmond. "They need to be used for the right reasons, at the right time on the right [patients]. By making it less common we can drive up the compliance with appropriate use of contact precautions."

VCU dropped contact precautions for MRSA and VRE in 2013, though they did not make the move until they determined hand hygiene compliance rates exceeded 85% for four years. Now patients with MRSA or VRE are only placed in contact precautions if they have wound drainage not contained within a dressing or uncontained respiratory secretions.[3]

"We use contact precautions for *Clostridium difficile* and multidrug-resistant pathogens, which are fortunately uncommon," Bearman says. "[Infection rates] are not only stable — they have continued to go down."

Standardized training needed

In a commentary[4] accompanying the aforementioned simulation study on PPE contamination, Bearman and co-author **Michelle Doll**, MD, emphasize that a standardized PPE training protocol is long overdue and suggest use of standard precautions in some cases instead of contact precautions. The simulation study showed that an intervention and training program that gave one group of workers immediate visual feedback on their level of contamination after removing PPE reduced exposures significantly.

"What we argue in our commentary is that if this [frequent contamination related to PPE removal] is the key — if that is the case — then we really have to come up with ways to properly train and evaluate the donning and doffing of PPE," Bearman says.

The problem is ramping PPE training up to a large scale population of healthcare workers, particularly if you are going to use immediate visual feedback with fluorescent lotion as described in the simulation study.

"At VCU we have about 7,000 healthcare workers," he says. "You try to do training, retraining on a one-by-one basis for 7,000 people — it is virtually impossible. So the real question is, can we do simulations or training [with] virtual assessments using computer programs, videos, and interactive components to really teach the methodology for putting on and taking off personal protective equipment."

In any case, it appears that Ebola brought to light a long-standing problem with PPE use in U.S. hospitals.

"I think the issue of using PPE incorrectly has probably been going on for a long time, but what proportion it contributes to hospital infections is not known," Bearman says. "We have no idea — it would be very hard to measure."

Is the teachable moment fading?

Barring admission of another U.S. case, the intense, teachable moment Ebola brought to PPE use may fade back to a baseline complacency as the outbreak in West Africa burns out. The outbreak is almost over in a conventional sense, though recent reports that the virus could survive in semen for nine months may lead to sporadic cases if the viral RNA discovered in the study is capable of sexual transmission.[5] As of Nov. 1, 2015, the World Health Organization reported a total 28,571 Ebola cases with 11,299 deaths. A total of 881 healthcare workers have been infected and 513 of them died — a mortality rate of 58%. Contributing factors in the healthcare infections were a shortage of PPE and improper use of the equipment when it was available, the WHO said.

In the absence of the Ebola threat, new PPE training initiatives in the U.S. may lack a sense of urgency and face subsequent compliance problems. One barrier to PPE training programs "is the current healthcare worker attitude toward PPE for routine pathogens," says Doll, an infectious disease physician at VCU. "While PPE training for Ebola was well accepted as vitally important for healthcare workers, the more routine PPE use is generally not regarded as a complicated procedure that necessitates specific training. This is likely due to a perceived low risk. In fact, compliance with PPE at all can be problematic in hospitals."

Indeed, some research suggests that healthcare personnel wear PPE less than half the time when it is indicated and overall compliance is lower than that of historically difficult hand hygiene.[6] These concerns and conclusions echo those made in another recent PPE study[7] by **Nasia Safdar**, MD, PhD, infectious disease epidemiologist at William S. Middleton Veterans Hospital in Madison, WI.

"There's no national benchmark for PPE compliance and there's no requirement to routinely collect this sort of information," she noted. "It just never reached anyone's radar until Ebola."

A major factor in this trend appears to be the fundamental issue of PPE training — or lack thereof. An unpublished study recently presented in San Diego at the IDWeek conference found that many hospital workers were inadequately trained in the use of PPE and some reported no training at all.[8] How did we get to such a juncture?

Is OSHA mandate coming?

Before the current CDC transmission-based precautions were issued, there was the pioneering development of Body Substance

Isolation (BSI).[9] The basic concept was to regard all blood, body fluids, and substances as potentially infective and use PPE accordingly.

"I've always been a staunch believer in the original BSI published in 1990 by Pat Lynch and her team out of Seattle," says **Patti Grant**, RN, BSN, MS, CIC, director of infection prevention/quality at Methodist Hospital for Surgery (MHFS) in Addison, TX. "It is logical and uncomplicated. Being a new IP at the time, it was empowering to teach a 'process' and not 'diagnosis/identification of an organism.'"

The BSI concept was subsequently absorbed and superseded by a series of CDC patient isolation guidelines which are currently standard precautions augmented as warranted by contact, droplet, and airborne transmission measures. Some suggest a sense of isolation fatigue has set in with workers as so many patients are placed under contact precautions.

"[Contact precautions] remains a difficult concept for me to teach in general orientation because I feel there is an underlying 'mixed message' that for *these* people you must gown/glove to enter the patient room," Grant says. "Over the years I've learned to compromise. At MHFS we use contact isolation only for MDROs or *Clostridium difficile* if it is cultured from the current admission. The beauty is we also isolate for uncontrolled body substances, regardless of what is isolated. Common sense cannot be regulated."

Therein lies the rub, for just as the post-Ebola discussions in the infection control community are rethinking the use of PPE and patient isolation, the Occupational Safety and Health Administration(OSHA) has been slowly moving toward an infectious disease standard that could codify current CDC voluntary recommendations into a regulatory mandate.

That would likely stir the ire of many IPs, much as it did when OSHA proposed a TB standard in the 1990s. However, the truth is that it is hard to imagine a better time for OSHA to argue for an infectious disease rule to protect healthcare workers from occupational infections. The agency can cite the two nurses infected by Ebola last year as well as a succession of potentially pandemic pathogens that emerged in the last dozen years, including Severe Acute Respiratory Syndrome (SARS), H1N1 pandemic influenza A, Middle East Respiratory Syndrome (MERS), and Ebola. In addition, multidrug-resistant bacteria are increasing and a virulent strain of *Clostridium difficile* has reached epidemic levels. OSHA has a lot more ammunition than the agency did in its failed bid for a separate TB standard, which was being proposed when the disease was at record low levels in the U.S.

> "IN ADDITION, MULTIDRUG-RESISTANT BACTERIA ARE INCREASING AND A VIRULENT STRAIN OF *CLOSTRIDIUM DIFFICILE* HAS REACHED EPIDEMIC LEVELS."

OSHA has been considering regulating worker protection against infectious diseases in healthcare settings for several years. Thus the timing with Ebola was coincidental late last year when OSHA released details of a possible rule that would make infection control measures mandatory and add new requirements for hazard identification, exposure control, and documentation. *(See* Hospital Infection Control*, Dec. 2014.)*

No rule has been issued for comment, but the 38-page "regulatory framework" document released last year calls for "procedures to provide, make readily accessible, and ensure that each employee uses PPE (such as, but not limited to, gloves, gowns, laboratory coats, face shields, facemasks, and respirators) in accordance with recognized and generally accepted good infection control practices." Training on PPE would be required for new workers and annually thereafter for all workers who may be exposed to occupational infections.

The preliminary OSHA document specifies that MRSA and VRE patients are to be placed in contact precautions, but the agency concedes that "infection control practices normally rely upon a multi-layered and overlapping strategy of employing engineering, work practice, administrative controls, and PPE. Therefore, OSHA would permit [modifications to requirements] in accordance with recognized and generally accepted good infection control practices."

OSHA included "enhancements to current infectious disease protocols in healthcare and other high-risk environments" as a

regulatory priority for 2015 and the agency is projected by some insiders to issue proposed rulemaking on the infectious disease standard in 2016.

While small hospitals and business groups and other stakeholders said the standard would be redundant with existing requirements, the American Public Health Association (APHA) emphasized that the Ebola outbreak in Dallas underscored the "urgent need" for an OSHA infectious disease standard. "Had this been a widespread outbreak involving a pathogen easily transmitted between humans, the loss of life and the economic and social impacts would have been unimaginable," the APHA said.[10]

Other occupational health leaders and advocates have joined the chorus, saying "it is time for unanimous congressional support for promulgation of OSHA's long-awaited Infectious Disease Rule. … The rule narrows safety gaps by expanding the work that has already been done related to bloodborne pathogens such as HIV and hepatitis B and C."[6]

Despite such political momentum, there is still some question of if and when OSHA will proceed with an issue that is sure to be controversial.

"When I look at what the rest of the global population sometimes must manage with scarce resources and be creative with 'work-arounds,' I shudder to think of the wasted use of PPE that would result from a mandate of 'requisite PPE' under any circumstance in the U.S.," Grant says. "A mandate could never keep up with the science."

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Lack of PPE training leads to frequent contamination

Training using fluorescent lotion cut contamination rates

A major factor in contamination problems when removing personal protective equipment appears to be the fundamental issue of PPE training — or lack thereof. An unpublished study recently presented in San Diego at the IDWeek conference found that many hospital workers were inadequately trained in the use of PPE and some reported no training at all.[1]

"Among the physicians, 16%

denied ever receiving any sort of training," said lead researcher **Curtis Donskey**, MD, an infectious disease physician at Louis Stokes Cleveland VA Medical Center. "They were working with gloves and gowns and had never been told how to properly use them. Another thing that we assessed was how effective was the training? A lot of the training that nurses and others get is suboptimal. It primarily involves a demonstration but does not necessarily go beyond that to have them demonstrate that they are proficient in removing PPE quickly and following the recommendations."

The researchers say these findings could be generally extrapolated to indicate a similar lack of training in other hospitals.

"We focused on personnel in our facility but we have also discussed this with infection control and other people around the country and they describe similar deficiencies in training on PPE," Donskey says.

If contamination is occurring as frequently as it now appears, healthcare workers must redouble their hand hygiene practices after PPE use to protect themselves and their patients.

In the IDWeek study, the VA Medical Center personnel were surveyed to assess the type and frequency of PPE training they received and their confidence in avoiding contamination.

"We were looking at physicians, nurses, and ancillary staff, most of whom are regularly going in and out of isolation rooms," Donskey says.

Those three healthcare worker groups were equally represented in the survey participants, comprising about one-third each of the 222 respondents. Overall, 25% of personnel reported that they had received no PPE training in their current position, and 9% reported never receiving such training during their career. Only 1% of nurses had received no PPE training, as opposed to the aforementioned 16% of physicians. Of the physicians that reported prior training, only 13% said they received "formal training" that requires the trainee to demonstrate correct technique.

"These [physicians] were staff members at our hospital — residents or fellows," he says. "They weren't people who would have been trained somewhere outside our facility, but we were asking about training in our facility and outside as well."

Of overall respondents that had been trained, 46% received formal training, 42% reported informal on-the-job instruction, and 41% completed computer-based instruction. Of 222 personnel, 80 (36%) did not feel confident that they could avoid contamination with their PPE technique.

Visual feedback

"We implemented an intervention that was in part inspired by the Ebola crisis, which led us to think that we really need to do more to train personnel in the use of PPE," Donskey tells *Hospital Infection Control & Prevention*. "We are incorporating a lot of our training tools that we developed into our [routine] training. We would like to make this something done on an ongoing basis that includes [all] physicians and allied health personnel."

The new training initiative is based on an intervention Donskey and colleagues developed during a study that quantified the frequency of contamination of workers removing PPE, using surrogate markers to show where pathogens would be found on the skin. In that recently published study,[2] contamination of the skin and clothing of healthcare workers happened frequently during the removal of gloves or gowns as shown by fluorescent lotion under black light.

"Part of the problem is that if we asked healthcare personnel about this, I suspect most would be unaware of the significant risk of contamination during PPE removal," he says. "These deficiencies in our PPE practices create a potential recipe for disaster when we ask personnel with limited training in use of PPE to provide care for patients with Ebola and other highly transmissible pathogens."

Study participants included a convenience sample of healthcare personnel from four northeast Ohio hospitals who conducted simulations of contaminated PPE removal using the fluorescent lotion. An intervention was conducted in one medical center, where healthcare workers received education and practice in removal of the contaminated PPE. Importantly, they received immediate visual feedback showing the fluorescent lotion contamination of their skin and clothing.

"The sessions included a 10-minute educational video and 20 minutes of demonstrations with practice in PPE donning and doffing using the fluorescent lotion to identify sites of contamination," Donskey says.

The PPE donning and doffing technique was considered correct if the following four criteria were met:

- correct donning order, with gown first followed by gloves;
- gloves extended to cover the wrist of the isolation gown;
- gown doffed by pulling away

from the neck, shoulders, and body;

• gloves removed by peeling off the gloves at the same time as the gown or using a glove-in-glove technique wherein gloves are removed one at a time, making sure that bare skin does not touch the contaminated outside surface of the glove.

Contamination in 46% of PPE use

Overall, of the 435 glove and gown removal simulations, contamination of skin or clothing with fluorescent lotion occurred in 200 (46%), with a similar frequency of contamination among the four hospitals (range, 43%-50%). Contamination occurred more frequently during removal of contaminated gloves (53%) than gowns (38%) and when lapses in technique were observed (70%) than not (30%).

In the intervention group, skin and clothing contamination during glove and gown removal fell from 60% to 19%. This reduction fell further to 12% at one-month and three-month checkpoints after the initial training. These findings suggest that simulations using fluorescent lotions can improve techniques for standard glove and gown removal and for training in removal of full-body coverage PPE used in the care of patients infected with pathogens such as Ebola virus, the authors concluded.

In the overall study, a sobering detail is that even when no lapses in technique were observed, contamination occurred in approximately one-third of the simulations. Even the highly successful intervention could get no lower than a 12% contamination rate. Additional measures used for Ebola — disinfecting gloves during the removal process or having a partner observe doffing technique — would be difficult to implement in day-to-day patient care. A study in press by the same group of researchers found that glove disinfection with bleach wipes after care of *C. difficile* patients reduced the spore levels on worker hands, but gowns were still frequently a source of contamination.[3]

There may be a need for a PPE redesign to create products that are easy to remove while minimizing the risk for self-contamination. For example, Donskey and colleagues found that only one size of cover gown was available at each hospital in the contamination study, leaving small, large, and tall personnel in ill-fitting gowns.

Editor's note: The CDC last updated its guidelines for PPE use for Ebola on August 27, 2015. The updated guidance is for both confirmed Ebola patients and clinically stable persons under investigation. It includes a frequently asked questions section and is available at http://www.cdc.gov/vhf/ebola/healthcare-us/ppe/index.html.

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More than half of IPs given no additional resources

More than a year out from the emergence of Ebola, many infection preventionists report they received no additional resources to deal with the crisis, still lack adequate supplies of personal protective equipment (PPE), and remain uncertain about how frequently healthcare workers need to be trained to ensure they are donning and doffing PPE correctly.

The troubling trends appear in a national survey of 981 hospital-based IPs conducted by the Association for Professionals in Infection Control and Epidemiology (APIC). Ebola revealed that the nation's infection control programs are not adequately funded and have little surge capacity. Unfortunately, that still seems to be the case in many hospitals. Despite the most highly publicized and publicly feared infectious disease since the emergence of HIV in 1981, 55% of APIC survey respondents said they never received any additional resources from their hospitals to deal with the many issues raised by Ebola.

Ebola also exposed longstanding problems with PPE use that have

probably been contributing to infection transmission between hospital patients for some time. New studies continue to show workers lack training and frequently contaminate themselves removing the equipment.[1,2] The issue is the subject of ongoing confusion, as evidenced by 33% of the respondents in the APIC survey answering "we have not made that determination yet" when asked what frequency of retraining is needed to maintain PPE competency.

It is tempting to conclude that some hospitals simply gambled that they would not have to deal with a case of Ebola and avoided additional expenditures to prepare for an unlikely event. Those that did so may have dodged a deadly bug, but one could certainly argue they are less prepared for the next emerging infection. With global travel and continuing encroachment on animal habitats, we are in age of pandemics where zoonotic viruses can find a fast track into human populations.

In the recent APIC survey, 92% of respondents said their facility is more prepared for Ebola than it was a year ago. A positive response to be sure, but with the notable exception of highly-trained containment teams like those at Emory University Hospital and the University of Nebraska, it is questionable how many hospitals were really prepared in 2014 to deal with an emerging virus that had never been transmitted in the U.S. The CDC originally took the position that any hospital could handle an Ebola case, but dropped that assumption in favor of dispatching response teams after two nurses were infected by a dying patient in a Dallas hospital.

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Physicians work when ill, even with confirmed flu

Clear protocols, supportive work culture can lower risk to patients

Driven by a traditional work culture that underscores their responsibility to patients and commitment to coworkers, physicians will show up for work symptomatic and sick, even if they have laboratory-confirmed influenza, researchers reported recently in San Diego at the 2015 IDWeek conference.[1]

In an anonymous electronic survey of medical students, residents, fellows, and attending physicians, 96% said they would work despite cold symptoms; 78% would report despite diarrhea; 55% despite vomiting; and a surprising 36% despite test-confirmed influenza.

Among those with fever, 84% would work despite fever up to 100.9°F; 49% despite fever of 101-102.9°F; and 24% despite fever ≥103°F. The physicians' willingness to enter immunocompromised neutropenic patient rooms was 47% for cold symptoms; 29% for diarrhea; and 13% for fever ≥101°F.

The 474 physicians responding included 88 medical students, 193 residents, 40 fellows, and 153 attending doctors. Surgeons and emergency room physicians were the most likely to show up regardless of condition. While the interdepartmental findings may vary by institution, the overall finding of physicians willing to work while sick is probably similar in other facilities, says **Shruti K. Gohil**, MD, one of the authors of the study and associate medical director of Epidemiology & Infection Prevention at the University of California Irvine School of Medicine.

"We got a pretty good slice of the pie with a 61% response rate," she tells *Hospital Infection Control & Prevention*. "I do think in many different institutions that the general themes — not the interdepartmental parts — but the general themes of physicians coming to work [sick may be occurring]. Intuitively, that was not surprising to me."

Hospitals need to have clearly stated policies with the support of physician leaders outlining when sick doctors are expected to stay home. For example, the policy developed at Cal Irvine in light of the study calls for physicians to stay home if they have any of the following:

- fever >101;
- active diarrhea/vomiting;
- confirmed contagious illness (e.g. flu).

It goes without saying that physicians working with an infectious disease pose risks to patients and coworkers. Of course, as physicians,

the respondents were presumably well aware of this. Yet less tangible factors combine to coerce doctors — particularly those with less training — not to miss work even if sick. For example, there were significant differences in willingness to work despite confirmed influenza by training level, with residents most likely (36%) and attendings least likely (9.1%) to work if ill.

Reasons cited for working while ill included:

- symptoms not debilitating enough (89%);
- guilt for having colleagues cover for them (82%);
- believing transmission risk is low (75%).

'A macho young guy'

Distinguished epidemiologist **William Schaffner**, MD, who was not part of the study, gave a personal example of this phenomenon in Nashville this year at the annual conference of the Association for Professionals in Infection Control and Epidemiology.

"Before you get sick [with influenza] you are already transmitting infections to others," said Schaffner, professor of preventive medicine at Vanderbilt University. "The only way to prevent that is to be immunized on the front end. There's also this issue about 'when I'm sick I'll stay home.' Yeah, good luck with that. We all know that doesn't happen. People come to work while they are sick. I remember vividly when I was a resident I had influenza and I had a temperature of 103. I was a macho young guy and sure enough I showed up ready to go to work and do my shift. My chief resident took one look at me and wisely sent me home. Having done that, I know that others do that. Healthcare workers do come to work sick. It happens so frequently that they have a name for it — presenteeism."

In the physician survey, 70% of respondents identified the following key factors that would improve their willingness to stay home if ill:

- department chair/chief sets protocol for what to do if ill;
- seeing colleagues sent home if working ill;
- a lack of negative repercussions when physicians stay home if ill.

In the absence of such policies, infection preventionists should be aware that their physicians might be caring for patients despite having fever, diarrhea, vomiting, or flu-like illness. Again, fixed protocols and a supportive work culture are needed to lower the risk to the patients and co-workers of these presentee physicians. Gohil agreed to elaborate on the findings in an interview with *HIC*, which has been edited for length and clarity.

HIC: Was there a reason you focused on physicians rather than healthcare workers in general? Is there an indication in past research or anecdotally that physicians are more likely to work while ill?

Gohil: We knew that physicians have a strong work ethic and the culture of medicine is somewhat different than that of other professions. The consequences of absenteeism in our work can really have significant impact. If you think historically about the profession [including times when] both hospitals and physicians were few and far between, you can see that the culture is to work long hours regardless of our own personal needs. Sometimes our work necessitates absolute concentration on our patients and their needs, and this can be at the expense of us paying attention to our own needs.

HIC: The most surprising finding to me was that more than a third (36%) of physicians would work with test-confirmed influenza. That suggests that the infection control community has yet to make a convincing enough case that infected workers can transmit flu to vulnerable patients and supports the argument that mandatory vaccinations are necessary.

Gohil: Absolutely — getting the flu vaccine is important, as is keeping all of healthcare workers highly compliant for vaccines for preventable illness such as measles. Measles is the most contagious virus that we know of. Keeping you titers up and complying with all occupational health policies are critically important for this reason. This is not just related to willingness to work, but as a healthcare worker keeping yourself healthy is critical."

HIC: Those that would enter the room of a neutropenic patient included 29% with diarrhea and 13% with fever ≥101°F. Given that those symptoms could reflect transmissible infections, should hospitals have policies specifying that symptomatic healthcare workers should not enter neutropenic rooms?

Gohil: "In our hospital, [our policy is] you don't go into the room of a neutropenic patient if you are actively symptomatic. We found there were a few too many that would still go in and see their patients. This means we have to do a better job of educating our doctors and letting them know under what circumstances is it allowable to go into patients rooms. What patient-related factors and what sickness-related factors are involved in making that determination?

Suppose you happen to be the

only physician who can take care of a patient. Maybe you are in a rural part of the country, you happen to be sick, but you are the one that can help someone. There are things you can do by taking precautions. We need to identify what precautions you need to safely manage care, assuming you are not so ill that you have heavy secretions and you are highly infectious to others. If you are just getting over a cold, could you wear a mask and wash your hands a lot? We don't talk about this much, but as a profession we can begin a dialogue. We need to educate our doctors and give them more guidance.

HIC: The willingness to work with flu seemed to decrease with more training. Was that trend reflected in the other symptoms?

Gohil: The same groups, such as fellows, residents and students, reported more of a willingness to work while they were sick versus the attendings — the attendees being the ones highest in rank. Those three groups tended to be more concerned about their superiors thinking less of them if they called in sick. They reported a sense of duty and of guilt if they didn't come in. They thought that their patients might suffer if they didn't come in, and importantly, they thought that they would burden their coworkers if they didn't come in. They thought there wouldn't be enough coverage if they were out and all of the work would go their colleagues.

HIC: Emergency medicine and surgical departments reported the highest willingness to work if ill. Is there a mindset or work culture in these two settings that could explain this?

Gohil: We wanted to know if there were interdepartmental variations and we found this. We didn't explore further as to why — that needs to be the next step in our work, to examine what departments' culture is contributing to working while they are sick. Each facility may have their own [variations] by department.

HIC: Can you provide an example of the supportive culture needed to influence physician willingness to stay home if ill?

Gohil: We have policies not to come into work in a general way, but we asked our physicians what would help them change their willingness to come into work even though they are actively ill. They believe that any supportive means is helpful. [This could] range from a simple email from leadership reminding staff that the hospital supports them staying home if they are sick, to a set protocol about what they are supposed to do when ill.

There are a whole range of illnesses out there that are problematic. For example, when you get a cold the first few days you are highly communicable, but if you develop a cough that lingers for couple weeks [it doesn't necessarily] mean you are infectious to another person. It gets really blurry as to when is it ok to come in, when is it not? While many if not all [hospitals] have policies that support healthcare workers staying home if they are ill with communicable diseases, as physicians we want to know exactly what symptoms should I be looking for to stay home versus going ahead and working. Clearly our trainees, our students, and our residents don't want to do anything wrong by showing up to work while they are sick. They just want to know what is the line? What is the threshold?

HIC: So for the younger doctors, is it a matter of education or fear of the consequences of missing work?

Gohil: That is a really important question. I think it is matter of education and I think it is a matter of them understanding that their leadership supports them. They want to look like they are working hard and are willing to do whatever they can for patients. Just letting them know that there are certain circumstances in which you are doing more harm than good by coming in. This kind of messaging is really simple and helpful. Something we have done at California Irvine is show our interns and medical students the results of this study. And the leadership of the housewide residency programs and their program directors publicly stated during those presentations that they support the residents and interns staying home if they are sick. If they have a question about this, if they have a concern that they can be infectious to other people, we tell them to call your attending before you show up at work and review your symptoms. Or go to occupational health or your primary care doctor before you come to work. We will support you doing that, and that simple statement said so much. We have also had housewide communications that let all of our staff know that we support them if they are sick. Before the flu season starts, we wanted them to be [aware] of this. I think it will have an impact.

REFERENCE

1. Trunong KK, Huang, SA, Dickey Linda, et al. Do no Harm: Attitudes among Physicians and Trainees about Working when Ill. IDWeek. Session 53. HAI: Occupational Health. San Diego, CA. Oct.7-11, 2015. ■

CDC, FDA warn of surgical infections caused by heater-cooler units

Review cleaning and disinfection protocols for devices

An increase in nontuberculous mycobacteria (NTM) infections in post-surgical patients has been linked to contaminated water emitted from heater-cooler devices used in surgery. Infection preventionists and their clinical colleagues should immediately review cleaning and disinfection procedures for the devices and ensure only sterile water is used in them, public health agencies advise.

"The most important action to protect patients will be to remove contaminated heater-coolers from operating rooms, and ensure that those in service are correctly maintained," the CDC advises.

The FDA warns against using tap water to rinse, fill, refill or top-off the device water tanks since this may introduce NTM organisms. Use only sterile water or water that has been passed through a filter of less than or equal to 0.22 microns, the FDA notes. In addition, clinicians should direct the heater-cooler's vent exhaust away from the surgical field to reduce the risk of aerosolizing tank water into the sterile field and exposing the patient.

Heater-cooler devices are often used during cardiac surgical procedures to warm and cool a patient's blood during cardiopulmonary bypass. Commonly found in soil and water, NTM usually only threatens immune-compromised patients and is not transmitted from person to person. Bacterial growth is so slow that the patient may not become symptomatic until months or even years after the procedure. The CDC cited several recent reports of NTM infections[1-3] in making the following recommendations:

• Patients who have recently had cardiac or thoracic surgery should contact their healthcare provider if they have questions about possible exposure to a heater-cooler device. They should be aware that symptoms of NTM infection may include a combination of any of the following: fever, pain, redness, heat, pus around a surgical incision, night sweats, joint pain, muscle pain, and fatigue.

• Healthcare facilities must ensure they are following the most current manufacturer's instructions and FDA recommendations for maintenance, cleaning, disinfection, and monitoring of heater-cooler devices. If a heater-cooler device tests positive for NTM or if there is concern for patient infections related to the heater-cooler device, review microbiological database and records of surgical procedures to identify any patients that have had NTM-positive cultures within four years following a cardiac surgery procedure. If a heater-cooler device is suspected to have led to patient infections or cultures positive for NTM, promptly notify your local health department, submit a report to FDA via MedWatch, and assess the need for notifying exposed patients in coordination with public health authorities.

Healthcare providers should have increased suspicion for NTM infections among patients who have signs of infection and a history of cardiac surgery. When seeing patients, actions that providers should consider include:

• Assessment for NTM infection for patients who report signs or symptoms of infection and who have had undergone cardiac surgery within the previous four years.

•Patients suspected to have an NTM infection should also be assessed for a history of cardiac surgery or exposure to a heater-cooler device. Note that other healthcare exposures such as injections, plastic surgery, and dialysis may also be associated with NTM infections and warrant consultation with public health authorities or reporting to FDA.

REFERENCES

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2. Sax H, Bloemberg G, Hasse B, et al. Prolonged Outbreak of *Mycobacterium chimaera* infection after open-chest heart surgery. *CID* 2015;61(1):67-75.
3. Mycobacterial infections associated with heater-cooler units used in cardiac surgery: advice for providers of cardiac surgery. London: Public Health England; 2015. ■

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CNE/CME QUESTIONS

1. Some early adopters of a more "horizontal" strategy are no longer using contact isolation for patients with MRSA and VRE if they are an endemic presence in a non-outbreak setting. Instead, they may use and emphasize which of the following?

A. Standard precautions
B. High level of hygiene compliance
C. Cleaning and disinfection of environmental surfaces and fomites
D. All of the above

2. What percentage of current users of contact precautions are interested in possibly changing the practice?

A. 90%
B. 62%
C. 51%
D. 40%

3. A PPE training initiative using fluorescent lotion to show where pathogens would be found on the skin and clothing after doffing reduced contamination dramatically, but could not eliminate it. What was the lowest level of contamination the program achieved?

A. 6%
B. 8%
C. 12%
D. 19%

4. In a study revealing that physicians would report to work despite being ill, a surprising 36% of respondents said they would work even with a test-confirmed case of:

A. *Clostridium difficile*
B. Tuberculosis
C. Pneumonia
D. Influenza

CNE/CME 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.

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