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SHEA: To protect patients, test viral load of infected health care workers

Circulating viral burden linked to risk of transmission of HIV, HBV, HCV

Do some health care workers infected with HIV or hepatitis B or C pose a risk to their patients? Should they be restricted from performing exposure-prone procedures? A new guideline from the Society for Healthcare Epidemiology of America (SHEA) seeks to answer these longstanding and controversial questions by specifically targeting health care workers with a high viral load of circulating virus.

The SHEA guideline identifies the most exposure-prone procedures and specifies how and why some health care workers should face restrictions. The precautions range from double-gloving and other safety measures to an outright restriction on performing certain exposure-prone procedures if they have a high viral load – defined as equal to or greater than 104 genome equivalents per milliliter of blood for HBV and HCV and equal to or greater than 5x102 genome equivalents per milliliter of blood for HIV.[1]

In a precedent-setting position, the SHEA guideline also suggests that health care workers infected with hepatitis B or C or HIV should be tested at least every six months to determine their viral load. All infected health care workers would consult an Expert Review Panel, comply with infection control precautions, and follow up regularly with occupational medicine staff or public health clinicians, the guideline states.

However, in what some say is a glaring omission, the guideline does not

SPECIAL REPORT ON HEALTH CARE-ASSOCIATED INFECTIONS

In this issue of *HEH*, we highlight current and controversial issues related to health care workers and health care-associated infections. A new guideline on health care workers infected with HIV or hepatitis B or C calls for a major new role for employee health in testing and monitoring those individuals involved in exposure-prone procedures. Upcoming tuberculosis screening guidelines acknowledge challenges with some interpretations of the blood tests.

address routine testing of surgeons and other OR personnel, except to say that testing should not be mandatory and that health care workers performing invasive, exposure-prone procedures are "ethically obligated" to know their status.

The guideline represents an update of the 1997 SHEA guideline, "Management of Healthcare Workers Infected with Hepatitis B Virus, Hepatitis C Virus, Human Immunodeficiency Virus and Other Bloodborne Pathogens." The Centers for Disease Control and Prevention guideline dates from 1991 and covers only HBV and HIV. However, the scientific understanding and treatment of HIV and hepatitis B and C have advanced considerably in the past two decades.

"We felt the science had progressed to the point where we really could define [these] issues – define the points where there was minimal risk to the patient while still allowing infected providers to pursue their livelihood," says **Neil Fishman**, MD, director of health care epidemiology, infection prevention and control at the University of Pennsylvania Health System in Philadelphia, an author of the guideline and president of SHEA. "The primary viewpoint was [the dictum of patient safety], 'Above all, do no harm.'"

In that regard, SHEA urges healthcare providers to comply with institutional policies and procedures designed to protect patients. Healthcare providers have an ethical responsibility to promote their own health and well-being, and a responsibility to remove themselves from care situations if it is clear that there is a significant risk to patients despite appropriate preventive measures, the guideline states.

However, infection with a bloodborne pathogen does not itself justify restriction on the practice of an otherwise competent healthcare provider, SHEA notes in the guideline. Healthcare providers infected with bloodborne pathogens should seek ongoing care and treatment. Restrictions may be justifiably imposed when a healthcare provider has a physical or mental impairment that affects his or her judgment and/or jeopardizes patient safety. Examples might include exudative lesions or weeping dermatitis; a history of poor infection-control technique or adherence to proper technique; mental confusion; or a prior incident of transmitting a bloodborne pathogen to a patient, the guideline states.

Janine Jagger, PhD, MPH, director of the International Health Care Worker Safety Center at the University of Virginia in Charlottesville, affirms that it is not necessary to sacrifice patient health and safety to spare healthcare workers' practice rights. With advances in the treatment and prophylaxis of HBV, HCV and HIV, there are new opportunities for policies that protect both patient and healthcare worker, she notes. It is essential for surgeons to be fully engaged with the policy process, she says. *(For Jagger's full response to the guideline, see related story, p. 53.)*

HCV viral levels 'arbitrary'

The guideline drew criticism both for what it contains and what it does not. Its authors read-

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SHEA identifies invasive, exposure-prone procedures

New Society for Healthcare Epidemiology of America (SHEA) guidelines for health care workers infected with bloodborne viruses include the following procedures at greatest risk of transmission to patients.[1]

Category III: Procedures for which there is definite risk of bloodborne virus transmission or that have been classified previously as "exposure-prone"

- General surgery, including nephrectomy, small bowel resection, cholecystectomy, subtotal thyroidectomy other elective open abdominal surgery
- General oral surgery, including surgical extractions, hard and soft tissue biopsy (if more extensive and/or having difficult access for suturing), apicoectomy, root amputation, gingivectomy, periodontal curettage, mucogingival and osseous surgery, alveoplasty or alveoectomy, and endosseous implant surgery guideline on HCWs infected with HBV, HCV, and/or HIV
- Cardiothoracic surgery, including valve replacement, coronary artery bypass grafting, other bypass surgery, heart transplantation, repair of congenital heart defects, thymectomy, and open-lung biopsy
- Open extensive head and neck surgery involving bones, including oncological procedures
- Neurosurgery, including craniotomy, other intracranial procedures, and open-spine surgery
- Non-elective procedures performed in the emergency department, including open resuscitation efforts, deep suturing to arrest hemorrhage, and internal cardiac massage
- Obstetrical/gynecological surgery, including cesarean delivery, hysterectomy, forceps delivery, episiotomy, cone biopsy, and ovarian cyst removal, and other transvaginal obstetrical and gynecological procedures involving hand-guided sharps
- Orthopedic procedures, including total knee arthroplasty, total hip arthroplasty, major joint replacement surgery, open spine surgery, and open pelvic surgery
- Extensive plastic surgery, including extensive cosmetic procedures (eg, abdominoplasty and thoracoplasty)
- Transplantation surgery (except skin and corneal transplantation)
- Trauma surgery, including open head injuries, facial and jaw fracture reductions, extensive soft-tissue trauma, and ophthalmic trauma
- Interactions with patients in situations during which the risk of the patient biting the physician is significant; for example, interactions with violent patients or patients experiencing an epileptic seizure
- Any open surgical procedure with a duration of more than 3 hours, probably necessitating glove change.

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1. Henderson DK, Dembry L, Fishman NO, et al. SHEA guideline for management of health care workers who are infected with hepatitis B virus, hepatitis C virus, and/or human immunodeficiency virus. *Infect Control Hosp Epidemiol* 2010; 31:203-232. ■

ily acknowledge that it does not follow the usual rigorous standards of scientific evidence. In fact, the authors note that the cut-off levels of viral load are "arbitrary." HCV research and experience, in particular, provides little basis for a specific value, they say: "This level was chosen in the absence of data that definitively associate a given level with either a clear risk for transmission or, more importantly, an absence of risk."

"There will never be a randomized control study of the risk of transmission of hepatitis B, hepatitis C or HIV. For ethical reasons, that could never happen," explains Fishman, who is also associate professor of medicine in the Division of Infectious Diseases at the University of Pennsylvania. However, there is evidence of a relationship between greater "circulating viral burden" and a higher risk of transmission, the guideline states.

In the United States, HBV transmission has been associated with e antigen-positive status. However, the SHEA guideline notes a report from the United Kingdom in which health care providers were infected with a "pre-core" mutant of HBV that caused them to be e antigen negative but to have a high viral load.[2]

The authors note that the restrictions in Europe are greater for HBV and HIV than those recommended in the SHEA guideline. (The European Consortium could not reach consensus on HCV-infected providers.) The United Kingdom guideline states that HCV-infected providers with circulating RNA should not conduct exposure-prone procedures.

In contrast, the current CDC guideline states that health care workers who are HIV-positive or HBV-positive with the e antigen (HBeAg) "should not perform exposure-prone procedures unless they have sought counsel from an expert review panel and been advised under what circumstances, if any, they may continue to perform these procedures." It does not cite specific procedures as exposure-prone or recommend any specific action on the part of the expert review panels.[3]

"We did review all of the European guidelines. But we felt that the evidence that was available did not support the European recommendations, that they were a little out of date," Fishman says.

Yet without data to support a cut-off level – in which transmission occurs more frequently above the cutoff than below it – the recommendation for viral load status for hepatitis C is problematic, says **Miriam J. Alter**, PhD, an HCV expert and

director of the Infectious Disease Epidemiology Program at the Institute for Human Infections and Immunity at the University of Texas Medical Branch at Galveston.

"It's very hard to defend a policy in which the data are so lacking unless you're choosing zero risk, and this is not what this [guideline] is choosing," says Alter, who is also the Robert E. Shope Professor in Infectious Disease Epidemiology.

Most cases of HCV transmission in the United States have been linked to contamination of multi-dose vials, reuse of syringes, or medication abuse (and needle-sharing) on the part of the health care worker. In one case, a Long Island, NY, surgeon infected 14 of 937 patients over a 10-year period. Investigations of five HCV-infected providers in the United Kingdom found 15 probable cases of transmission to patients among 5,868 patients tested, or a transmission rate of about .26%.4

Transmission risk is higher from HBV-positive individuals who are also e-antigen positive – which corresponds to a higher viral load. Alter cautions that the viral load can vary, and that facilities need to consistently use the same test for viral load because of possible variations among those of different manufacturers.

And what about patients? Should they be informed of their surgeon's HBV, HCV or HIV status? SHEA states that infected health care workers should not be required to inform patients of their infection status.

Fishman notes that the SHEA panel included an ethicist. "We did consider the ethics of the recommendations and situations," he says. The guideline also was reviewed by representatives of the American College of Surgeons and the American College of Occupational and Environmental Medicine, he says.

No mandate for HCW testing?

The guideline relies on health care workers to report their status. Yet if health care workers don't know their HIV, HBV or HCV status, there is no opportunity to consider restrictions. The guideline states that health care providers performing the most exposure-prone procedures are "ethically obligated" to know their status, and that any provider who inadvertently exposes a patient to his or her blood or body fluid should notify the patient and undergo testing.

Still, in the absence of specific recommendations for testing – either at hire or periodically – the health care provider may avoid the issue altogether. Both SHEA and CDC recommend against mandatory testing of health care providers. This position hasn't changed, although in 2006, CDC recommended that all HIV testing should be routine for patients "in all health care settings."[5]

The guideline advocates strict adherence to infection control practices. Yet there has been relatively low compliance with sharps safety practices and devices in U.S. operating rooms, says **Jane Perry**, MA, associate director of the International Healthcare Worker Safety Center at the University of Virginia. According to 2007 data from the EPINet (Exposure Prevention Information Network) surveillance, more sharps injuries occur in the OR than any other hospital locale and 24% of all injuries are from suture needles. (www.healthsystem.virginia.edu/internet/epinet/SOI/2007-NSI.pdf.)

Perry also notes that surgeons have the highest under-reporting rate of sharps injuries and blood exposures in most studies.

Promoting safe practices and encouraging reporting of bloodborne pathogen exposures is important for institutions and all health care workers involved in exposure-prone procedures, says Fishman. "It's critical that the various institutions have mechanisms in place to survey adherence to safe practices by all providers," he says.

Jagger favors a proactive approach: "It all hinges on accurate reporting of percutaneous injuries during surgical procedures. Institutions need to develop mandatory reporting policies specifically for the OR with rigorous administrative checks. Only then will patients benefit from the same post-exposure protocol that is offered by law to blood-exposed healthcare workers."

(The SHEA guideline is available at: www.shea-online.org/Assets/files/guidelines/BBPathogen_GL.pdf.)

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Infected HCWs should agree to IC training, twice-yearly tests

According to a new guideline from the Society for Healthcare Epidemiology of America, the following recommendations apply to health care workers infected with HIV or hepatitis B or C.

Responsibilities of the healthcare provider

1. Agrees to twice yearly follow-up by Occupational Medicine, including measurement of viral burden using tests specified by the panel.
2. Agrees to twice yearly evaluations by a private physician who has expertise in the provider's specific bloodborne pathogen infection and agrees to have this physician discuss the results of these evaluations with the provider's Expert Review Panel.
3. Agrees to formal training in infection control via a course identified by the infection control expert, or, alternatively agrees to counseling by the infection control professional concerning the use of appropriate infection control procedures, safety devices and work practice controls.
4. Agrees to follow the recommended procedures and practices identified in the previous item (responsibility 3).
5. Agrees to notify the occupational medicine or the public health authority participating in the panel regarding any change in provider status that may increase risk to the patient (eg, new neurological findings, development of another contagious disease [eg, tuberculosis]).
6. Acknowledges the ethical obligation to do so, and agrees to report instances immediately in which a patient exposure may have occurred to the hospital epidemiologist or to appropriate institutional/public health authorities identified in the contract, so that the potentially exposed patient may receive appropriate post-exposure management and counseling.
7. If receiving treatment, agrees to continue treatment as prescribed and agrees to notify occupational medicine if the treatment regimen is modified for any reason.
8. Agrees to re-evaluation by expert panel and revision of contract should clinical status or viral burden change.

Responsibilities of the institution and/or public health authorities

1. Agrees to convene Expert Review Panel at least twice annually (see text) to assess provider's clinical and virologic status as well as the provider's ongoing performance and her or his ability to continue to perform requested procedures.
2. Agrees to maintain provider's medical privacy and confidentiality.
3. Agrees to develop and follow institutional or provider-based follow-up procedure for potential patient exposure that makes every effort to ensure practitioner confidentiality.
4. Panel participants should have no liability.
5. Develops process for notifying hospital Risk Management. ■

Engage surgeons to protect selves, patients

Janine Jagger, PhD, MPH, director of the International Health Care Worker Safety Center at the University of Virginia in Charlottesville, offered this perspective on the new guideline from the Society for Healthcare Epidemiology of America:

"The new SHEA guideline is embedded in a very long, detailed, and heavily referenced document. Without going into excruciating detail, the main difference between the previous guideline and this one is that the number of cases in which patients have been infected by providers has grown. Boiling the document down to its essentials reveals the same basic philosophy as the previous guideline. There is one paragraph embedded in the 29-page document that sums this up neatly:

"The accumulated experience and data provide reassuring evidence that the magnitude of risk for provider-to-patient transmission of HIV, HCV and HBV, although not zero, is exceedingly small. At the same time, the burdens of certain restrictions that have been placed on healthcare providers out of concern for patient safety have been disproportionately high. . .These burdens, associated with highly personal and stigmatizing diagnoses, seem

unjustified in the face of an extremely low risk . . ."

"In other words it is better to sacrifice the patient's health (possibly life) in order to protect healthcare providers from discriminatory restrictions than to protect the patient's health at the expense of the healthcare worker's right to practice his or her profession. The guideline comes down squarely on the side of the healthcare worker, as if we had to make a choice. Although the philosophy underpinning the new guideline remains unchanged, we are in a very different situation today than when the guidelines were first introduced almost twenty years ago. We have an effective vaccine for hepatitis B, effective treatments for hepatitis C, and effective treatments and post-exposure prophylaxis for HIV.

"Healthcare provider-to-patient transmission of bloodborne pathogens is limited to a very narrow scope of healthcare. This is an issue affecting surgeons - and only those performing procedures that involve hands in a body cavity in proximity to sharp objects. We do not need a scattershot policy encompassing all healthcare workers. This issue needs to be worked out with surgeons.

"Today, it is no longer in the interest of surgeons not to know their bloodborne pathogen status — although some may still need to be convinced of that. Scientifically and medically we have made great advances that have yet to be fully incorporated into our policies. We have the knowledge and resources to create new policies that are not based on a choice of whom to sacrifice, whom to protect. There is no time like the present for surgeons to engage in this discussion and put forward some enlightened policy proposals that protect their patients as well as their own interests. I believe they are up to the challenge and the goal is within reach." ■

Hospitals must decide which workers to test

HIV, HBV, HCV policies may vary

At the Infected Health Care Worker Program in the Minnesota Department of Health, nurse specialist **Stephen Moore**, RN, MPH, has a case load of 150 health care workers who have HIV, hepatitis B or C. Some are administrators not involved in patient care. Only about 20 are nurses, doctors, or dentists who perform invasive procedures that are considered exposure-prone according to a 1991 guideline from the Centers for Disease Control and Prevention.

The new guideline of the Society for Healthcare Epidemiology of America (SHEA) provides some updated approaches to monitoring but also presents challenges, says Moore. Since the guideline was released in March, hospitals around the country have been reviewing the recommendations and determining how or whether they will adapt their policies. Many states have laws relating to health care workers infected with HIV or HBV, and hospitals must adapt any changes to those statutes.

"For the 15% of the licensed health care workers I deal with who have some chance of transmitting [a bloodborne pathogen], it probably has some benefits to raise awareness and send a message to the public that we do look out for this," Moore says. A Minnesota statute, dating from 1992, requires licensed health care workers who are infected with HIV, HBV or HCV to report their status to the commissioner of health or their licensing governing boards. Depending on the complexity of the health care worker's practice, the commissioner of health might refer the case to an expert review panel.

"We work hard with health care workers in modifying their practices to make sure people don't lose their careers," he says. "When we work with people, we treat them as if they have honor and ethics and they're good at what they do — they just happen to have this disease."

Bi-annual testing of viral load would add a new wrinkle to the monitoring. It also will raise the question of cost — who pays for the testing? Physicians and even some surgical techs may be independent contractors and may perform procedures at more than one hospital. Moore says he plans to meet with infection diseases experts and the state attorney general to consider policy changes. "I plan to seek input on the SHEA guidelines from infection preventionists, governing boards, and other state agencies," he says.

The Joint Commission accrediting body, based in Oakbrook Terrace, IL, expects hospitals to consider national guidelines related to health care workers infected with a bloodborne pathogen. But they don't necessarily have to adopt the monitoring protocol recommended by SHEA, says **Robert Wise**, MD, vice president of the Joint Commission's Division of Standards.

"We would expect the organization to have thought through how to handle a situation," he says. "We don't demand that they use the SHEA guideline, but we would expect some sort of

national guideline be used to direct their policy."

A recent review of state laws and guidelines found that only one addressed hepatitis C and 15 required notification of patients before an invasive, exposure-prone procedure if the health care worker was infected with a bloodborne pathogen. None of them addressed the issue of viral burden, said **Sarah Turkel**, MPH, an investigator with the National Institutes of Health Clinical Center in Bethesda, MD, who presented the findings recently in Atlanta at Fifth Decennial International Conference on Healthcare-Associated Infections. In 19 states, the issues of possible practice restrictions are handled at the hospital level, her review found.

How often should you test HCWs?

A recent HBV transmission from an HBV-positive orthopedic surgeon to patients forced the University of Virginia Health System in Charlottesville to reconsider issues of testing and restrictions. The surgeon had been a non-responder to HBV vaccination. He discovered that he had hepatitis B infection — with a viral load of 17 million international units per ml of blood — in baseline testing after a reported sharps injury.

The health system then tested patients in 237 procedures and discovered two HBV-positive cases that were linked to the surgeon and four that were likely cases of transmission, says **Kyle Enfield**, MD, MS, assistant hospital epidemiologist, who presented the findings recently in Atlanta at the Fifth Decennial International Conference on Healthcare-Associated Infections.

After treatment, the surgeon was allowed to resume performing procedures, with restrictions, says Enfield. He must double-glove and must report any potential exposures. He must have a non-HBV-infected surgeon with him in the operating room. He is also restricted from performing the most exposure-prone procedures, such as total hip or total knee replacement.

The health system does not require him to reveal his HBV status to patients prior to surgery. "The risk of transmission with a low viral load is infinitesimally small," says Enfield.

UVA now conducts further testing of non-responders to the HBV vaccine to determine if they are HBV-infected, says Enfield. The health system does not require routine testing of surgeons who perform invasive, exposure-prone procedures. That is in keeping with the new SHEA guideline, which calls for "voluntary confidential testing" but not mandatory testing of health care providers.

Hospitals will need to make a determination about testing of providers, says **Neil Fishman**, MD, director of health care epidemiology, infection prevention and control at the University of Pennsylvania Health System in Philadelphia, an author of the guideline and president of SHEA.

"At the least, every institution should offer confidential and readily available testing to providers," he says. "Then it's up to each institution to decide whether that should be mandatory if someone is going to perform these exposure-prone procedures.

At the University of Pennsylvania, for example, Fishman says, "we make testing readily available and strongly recommended. We're considering whether to make it mandatory.

"It is mandated that people get skin tested for tuberculosis annually. In that regard a similar recommended for bloodborne pathogen testing is reasonable, particularly for individuals whose career is centered on... performing high risk procedures," he says.

For physicians, testing could take place when their credentials are periodically renewed, he says. ■

Questions raised about TB blood tests

Expert judgment needed in some cases

Nine years after the Food and Drug Administration approved the first blood test to detect latent tuberculosis infection, hospitals are still struggling to determine how to use the tests — or whether to use them at all.

At presstime for *HEH*, the Centers for Disease Control and Prevention was poised to release a new guideline for assessing the results of the interferon-gamma release assay (blood test). The agency is likely to acknowledge some difficulties in interpreting the test, particularly among low-risk individuals who are near the cut-off for a positive blood test.

The Food and Drug Administration has approved three TB blood tests that are currently available: QuantiFERON-TB Gold and QuantiFERON-TB Gold In-Tube by Cellestis of Valencia, CA, and T-SPOT TB by Oxford Immunotec of Marlborough, MA.

In the QuantiFERON tests, whole blood is mixed with antigens — synthetic peptides that represent specific M. tuberculosis proteins that are not in any BCG vaccine strain and are not in most non-tuberculous mycobacteria. The test measures the release of interferon-gamma, a protein pro-

duced by white blood cells in response to the antigens. The T-SPOT test measures the number of white blood cells that produced interferon-gamma.

"Most people who are sensitized to these antigens due to prior Mtb infection will produce interferon-gamma and be positive, but those without prior infection will not be sensitized and will be negative by these tests," explains **Gerald Mazurek**, MD, medical officer and epidemiologist in CDC's Division of TB Elimination.

"In certain populations, there's clear evidence that there's improved specificity for IGRAs, but there's some lingering questions about sensitivity compared to the tuberculin skin test," he says.

Many hospitals have used the blood test to confirm a positive skin test, although previous CDC guidelines did not recommend using both tests. When an individual who is low-risk for tuberculosis has a positive skin test, many experts now believe "it's reasonable to confirm or refute it with another test," says Mazurek.

"If [the blood test] is negative, it doesn't mean you can completely discount the positive skin test, but it makes it less likely that the person is infected with tuberculosis," he says. "If you have a positive skin test and a negative IGRA, one might consider following [the employee] and repeating the test to see if they become consistently positive."

One caveat: "Extremely immune-compromised" individuals should be considered infected if they are positive by either test, says Mazurek. Further evaluation is necessary to determine if treatment is appropriate, he says.

The blood test is most compelling when used with employees who have been vaccinated with BCG. Because the blood test is more specific, BCG will not trigger a positive result. Employees with a history of BCG may have more faith in the blood test and may be more likely to initiate treatment for latent tuberculosis infection, Mazurek says.

Concern about false positives

Hospitals have had variable experiences with the new blood tests. The OSF Saint Francis Medical Center in Peoria, IL, wanted to move away from tuberculin skin test screening, which requires two visits for placement and reading of the results. Yet the first screening of about 6,500 employees produced 287 positives. Of those, 123 had previously been TST-positive, but that still left 164 new positives.

"That's quite a high number for us. We would never expect to see that many new TST responders," says **William S. Scott**, MD, MPH, medical director of the hospital's Center for Occupational Health and clinical assistant professor at the University of Illinois College of Medicine-Peoria.

The hospital retested the positive employees, and 66 of them reverted to normal. "That's a reversion rate of almost 50%. That's very concerning," says Scott. "It's the flip of a coin."

Scott suspects that the problem occurs with low-risk individuals whose results are near the cut-off. If the cut-off were raised from .35 to 1 international units per milliliter of blood, the conversion rate would be within an expected range, he says.

In fact, Mazurek says it's reasonable to consider risk or potential TB exposure when interpreting blood test results, just as the evaluation of induration in a skin test may include risk factors.

Despite the investment in the QuantiFERON test, Saint Francis Medical Center returned to skin testing and now uses the blood test as a confirmatory test or with BCG-vaccinated individuals. "It makes sense to use it in a targeted fashion rather than as a massive screening tool," Scott says.

At the Cleveland (OH) Clinic, a switch to QuantiFERON-TB Gold In-Tube initially was plagued with a high number of indeterminate results. The problem was with lab technique, says infectious disease physician **Cyndee Miranda**, MD. With help from the manufacturer and an internal review and training, the lab process improved and indeterminate rate is now low, she says.

There is still a concern about new converters who are near the cut-off and don't have a known exposure or risk factors, she says. "We're not sure they're really positive," she says. Some tests will be repeated or the individuals may be monitored rather than treated, she says.

The Marshfield (WI) Clinic now uses QuantiFERON-TB Gold In-Tube and finds fewer false positives than with the skin test, says **Bruce Cunha**, RN, MS, COHN-S, manager of employee health and safety. Per CDC recommendations, the clinic limits its annual screening program because it is in a community that is low-risk for TB.

Still, in some cases, infectious disease physicians make a judgment call, he says. "The closer you are to the cutoff value, the greater the potential that an employee with have an odd reading," he says. "But we see odd readings with the skin test, too."

The bottom line, says Mazurek: "It's not a perfect test. It took 100 years to refine the skin test and it's still not perfect. I think we've accomplished a lot with the blood tests. At some point we'll have a better understanding of the tests and how and when to use them." ■

Vigilant IC stops spread norovirus 'stomach flu'

New guideline will stress hand-washing

A wave of the "stomach flu" can be like a tsunami of gastrointestinal illness, affecting patients and health care workers alike. It takes vigilant hand hygiene, cleaning, and use of personal protective equipment to control and prevent hospital outbreaks, says **Tara MacCannell**, PhD, a health care epidemiologist with the Centers for Disease Control and Prevention's Division of Healthcare Quality Promotion.

"When norovirus is introduced in health care facilities, it tends to blitz through clinical areas," she says. "By the time [hospitals begin] more stringent infection control, it has already affected many of the staff and patients."

A health care-specific CDC guideline on managing a norovirus outbreak is expected later this year to underscore the important infection control measures, says MacCannell.

Even when an outbreak is resolved, it can recur if the virus is still circulating in the community, she says. "Studies show that even if you have exposure to norovirus and recover, re-infection even within a year can occur quite quickly," she says. "It is a community-based disease. It can have a seed in the community and make its way into the health care setting."

It can take as few as 100 viral particles to start an infection, she says. Here are some recommended measures for control of a norovirus outbreak, MacCannell says:

• Ill employees should stay home from work for a minimum of 48 hours after their symptoms resolve. (Local and regional health departments may have their own policies on this issue.)

• Chlorine bleach performs well against norovirus, but the fumes can be an irritant to the eyes, skin, and mucous membranes. The U.S. Occupational Safety and Health Administration (OSHA) has a permissible exposure limit for chlorine of 1 part per million (3 milligrams per cubic meter) as a ceiling limit — or a limit that should not be exceeded at any time. The National Institute for Occupational Safety and Health has a recommended exposure limit of 0.5 ppm (1.45 mg/m3) for a 15-minute sampling period. Neohydrogen peroxide products are also effective, she says.

• Employees who may come into contact with bodily fluids or contaminated surfaces should wear gloves and a gown. If there's a potential for contact with sprays, such as from vomiting patients, employees should also wear procedure masks and eye protection, she says.

• Cohort staff in units that are experiencing an outbreak and exclude non-essential staff, volunteers, and students from that area.

• Hand-washing is preferred to alcohol-based gels because the mechanical action removes the virus, she says. Alcohol-based sanitizers can be an adjunct method of hand hygiene, but MacCannell notes, "Norovirus is an extremely hardy virus and can be considered still infective even after exposures to high concentrations of alcohol."

• Although food-handling is not a common route of transmission in hospitals, it is a source of transmission in the community. Food service workers should never report to work when they are sick. The use of disposable dishes or utensils is not necessary, she says. ■

PAPRs end frustration of fit-test failures

Hospital diverts funds to reusables

At DuBois (PA) Regional Medical Center, employees were failing N95 fit tests in alarming numbers. In the cardiology department, about 46% of employees failed fit-tests — even after trying a variety of models and sizes. Things weren't much better in anesthesia (35%), cardiovascular ICU (34%), or the emergency department (26%).

The most important number — the one that prompted the hospital to switch to powered air-purifying respirators (PAPRs) — was the cost: about $37,000, mostly in loss of productivity of clinicians who had to spend an average of 35 minutes to complete a fit-test. By comparison, the investment in PAPRs and education cost about $38,000, including about $5,000 for education — the only annual cost.

"We were investing a significant time commitment and money every year, and the [fit-test] failure rates were higher than we were comfortable with," says **Sue Miller**, RN, COHN-S/CM, director of employee health.

Fortuitously, DuBois made the transition to PAPRs in 2008, a year before hospitals were faced with the novel H1N1 strain of influenza. That reinforced the benefits of reusable respirators, as

the hospital avoided the scramble for supplies and massive fit-testing efforts.

"For us, it was a good return on investment. It made our life so much easier during the crisis," says Miller. "I'm definitely very happy we went with this solution."

The switch to PAPRs began with the simple conviction that there had to be a better way to provide respiratory protection. Miller researched the use of PAPRs, particularly by John Hopkins Medical Center in Baltimore, MD, where PAPRs are the mainstay of respiratory protection. *(For more information, see HEH, September 2007, p. 100.)*

She drafted a proposal that outlined the problems with the N95 fit-testing, the benefits of PAPRs and the cost comparison.

Hospital leadership agreed with the plan to use the money that was usually budgeted for annual fit-testing toward the purchase of 50 PAPRs — enough for five per patient care unit with negative pressure rooms, including the Emergency Department. Five were maintained for regular use in the ED, three in bronchoscopy and two in pediatrics. Others were stored or kept on carts used in isolation rooms. There also is one for each of the primary care physician offices.

PAPRs require training, maintenance

Switching to PAPRs did present some logistical challenges. Employees in various roles and departments needed to learn how to use the PAPRs, from environmental services and maintenance to radiology and physical therapy. A train-the-trainer program made that process manageable. Each year, 660 employees complete respirator fit questionnaires on the system's intranet.

Central processing takes charge of maintaining the PAPRs — charging the units and cleaning the hoods, when necessary. Employees wear disposable OR bonnets for enhanced infection control. The hoods can then be wiped down and used by another employee, if necessary, says Miller. The cuffs are also wiped down between uses and replaced when soiled, she says. DuBois also chose the MaxAir because it was designed for health care and could accommodate a stethoscope.

Health care workers are concerned about how the PAPRs will affect patient care. Pediatric clinicians were especially worried that children might be frightened of them if they can in with a hooded respirator. Miller shared an article that refuted that concern. Meanwhile, the hospital's public

CNE QUESTIONS

17. According to a new guideline from the Society for Healthcare Epidemiology of America (SHEA), health care workers who perform invasive, exposure-prone procedures and are infected with hepatitis B or C or HIV:
    A. Should be prohibited from performing the riskiest procedures.
    B. Should inform patients of their infection status before procedures.
    C. Should undergo testing at least every six months to determine their viral load.
    D. Do not need any restrictions.

18. According to a review by a National Institutes of Health investigator, how many states have laws or policies that cover hepatitis C?
    A. None
    B. One
    C. Five
    D. 14

19. According to Gerald Mazurek, MD, medical officer and epidemiologist in CDC's Division of TB Elimination, what should you do if an employee has a positive skin test but a negative TB blood test?
    A. Consider the employee to be positive and treat for latent TB infection.
    B. Consider the employee to be negative.
    C. Consider following the employee over time and repeating the test to see if they become consistently positive.
    D. Monitor the employee with a symptom questionnaire.

20. When combating a norovirus outbreak, what does the Centers for Disease Control and Prevention recommend regarding hand hygiene?
    A. Hand-washing is preferable to alcohol-based gels.
    B. Alcohol-based gels are preferable to hand-washing.
    C. Chlorhexidine is the preferred cleansing agent.
    D. All methods of hand hygiene are equally effective.

Answer Key: 17. C; 18. B; 19. C; 20. A.

relations department contacted the local newspaper and was able to arrange an article on the new respirators so the public would know what to expect.

Noise was not a problem, either, says Miller. The PAPRs produce 62 decibels, which is about the level of background conversation, she says. "I'm very soft spoken. If they could hear me when they were wearing their PAPRs, they could definitely hear their patients," she says.

Meanwhile, unlike with masks, patients could see their caregivers facial expressions, or even read lips if they were hard of hearing. And in an unexpected benefit, the cadre of aging nurses appreciated the blast of cool air, particularly in contrast to the heat that builds with long-term use of N95s.

"One nurse said we should buy one for every peri-menopausal female," Miller quips. "The comfort level was huge."

Then, of course, came the surge of patients with suspected H1N1. Emergency room triage nurses still wore N95s, based on their preference. But that required only a limited supply as other departments relied on the reusable respirators.

By preventing exposures, the hospital may have also reduced its absenteeism, Miller says. At the peak, only six health care workers out of 1,800 employees were out sick on the same day, she says.

"It enabled us to provide the protection to our employees and our patients that we needed to during this crisis," she says.

REFERENCE

1. Forgie, S., et. al. (2009) The "fear factor" for surgical masks and face shields, as perceived by children and their parents. *Pediatrics* 2009; 124; 3777-3781. ■

CDC director: Hospital infections 'unacceptable'

The staggering burden of heath care associated infections (HAIs) in lives and dollars is "unacceptable," but changing the status quo is difficult because the health care system is woefully skewed toward treatment rather than prevention, **Thomas Frieden**, MD, MPH, director of the Centers for Disease Control and Prevention, said recently in Atlanta at the opening of the Fifth Decennial International Conference on HAIs.

"The toll of HAIs is unacceptable," he said. "One in 20 patients in U.S. hospitals each year becomes infected. There are an estimated 100,000 deaths annually, $33 billion dollars in medical costs, longer hospitalizations and we don't [even] know what the burden is outside of hospitals.

Addressing some 3,000 attendees from 74 nations, Frieden said sharply reducing HAIs could be a critical benefit of health care reform efforts in the United States.

"We know that reducing health care infections is going to require political will and sufficient funding," he said. "Prevention is a 'best buy' in the health sector. HAI prevention is particularly a best buy because the cheapest ICU admission is the ICU admission that didn't happen. As health reform moves forward, one of the important early wins will be a substantial reduction in HAIs."

Massive federal initiatives to reduce HAIs in recent years — including slashed reimbursements for preventable infections — are making slow but promising progress, Frieden said. ■

CNE INSTRUCTIONS

Nurses participate in this continuing nursing education program by reading the issue, using the provided references for further research, and studying the questions at the end of the issue. Participants should select what they believe to be the correct answers, then refer to the list of correct answers to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material. After completing this semester's activity with the **June** issue, you must complete the evaluation form provided in that issue and return it in the reply envelope provided to receive a credit letter.

COMING IN FUTURE MONTHS

- Pushing for progress in OR sharps safety
- MDR-TB and HCWs: An argument against complacency on TB
- H1N1 vaccination: How well did we do?
- Comparison of butterfly devices shows disparity in safety
- Working wounded: When HCWs work with MSDs

CNE OBJECTIVES

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

- identify particular clinical, administrative, or regulatory issues related to the care of hospital employees;
- describe how the clinical, administrative and regulatory issues particular to the care of hospital employees affect health care workers, hospitals, or the health care industry at large;
- 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.

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Hospital Employee Health

2010 Reader Survey

In an effort to learn more about the professionals who read *HEH*, we are conducting this reader survey. The results will be used to enhance the content and format of *HEH*.

Instructions: Fill in the appropriate answers. Please write in answers to the open-ended questions in the space provided. Return the questionnaire in the enclosed postage-paid envelope by **July 1, 2010.**

In future issues of *HEH*, would you like to see more or less coverage of the following topics?

A. more coverage B. less coverage C. about the same amount

1. Joint Commission requirements	O A	O B	O C
2. OSHA requirements	O A	O B	O C
3. CDC guidelines	O A	O B	O C
4. Occupational exposures	O A	O B	O C
5. Ergonomic issues	O A	O B	O C
6. Immunization programs	O A	O B	O C
7. Record-keeping compliance	O A	O B	O C
8. Workers' compensation	O A	O B	O C
9. Latex allergies	O A	O B	O C
10. TB compliance regulations	O A	O B	O C

Please rate your level of satisfaction with the following items.
A. excellent B. good C. fair D. poor

11. quality of newsletter	O A	O B	O C	O D
12. article selections	O A	O B	O C	O D
13. timeliness	O A	O B	O C	O D
14. length of newsletter	O A	O B	O C	O D
15. overall value	O A	O B	O C	O D
16. customer service	O A	O B	O C	O D

17. On average, how many people read your copy of *HEH*?

O A. 1-3
O B. 4-6
O C. 7-9
O D. 10-15
O E. 16 or more

18. How would you rate your overall satisfaction with your job?

O A. very satisfied
O B. somewhat satisfied
O C. somewhat dissatisfied
O D. very dissatisfied

19. How would you describe your satisfaction with your subscription to *HEH*?

O A. very satisfied
O B. somewhat satisfied
O C. somewhat dissatisfied
O D. very dissatisfied

20. What is your title?

O A. employee health director/manager/coordinator
O B. employee health nurse
O C. occupational health director/manager
O D. employee health/infection control manager
O E. other_____

21. How large is your hospital?

O A. fewer than 100 beds
O B. 100-200 beds
O C. 201-300 beds
O D. 301-500 beds
O E. more than 500 beds

22. *Hospital Employee Health* has been approved for 15 nursing contact hours using a 60-minute contact hour by the American Nurses Credentialing Center's Commission on Accreditation. If you participate in this CNE activity, how many hours do you spend in the activity each year? _____

23. Do you plan to renew your subscription to *HEH*?

O A. yes
O B. no If no, why not? _____

_____

24. What department do you report to?

- ○ A. Chief Financial Officer
- ○ B. Chief Medical Officer
- ○ C. Chief Operating Officer
- ○ D. Nursing

25. What is the highest degree that you hold?

- ○ A. ADN (2-year)
- ○ B. diploma (3-year)
- ○ C. bachelor's degree
- ○ D. master's degree
- ○ E. other_____

26. To what other publications or information sources about employee health do you subscribe?

_____

_____

27. Including *HEH*, which publication or information source do you find most useful, and why?

_____

_____

28. Which web site related to your position do you use most often?

_____

_____

29. Please list the top three challenges you face in your job today.

_____

_____

30. What do you like most about *HEH*?

_____

_____

31. What do you like least about *HEH*?

_____

_____

32. What are the top three things you would add to *HEH* to make it more valuable for your money?

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