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INSIDE

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NIOSH: Healthcare Workers Still Face Surgical Smoke Hazards

Twenty years of toxic plume warnings yield little progress

By Gary Evans, AHC Media Senior Staff Writer

A study in press for publication by the National Institute of Occupational Safety and Health (NIOSH) will report that, despite longstanding hazard warnings, healthcare workers are still frequently exposed to toxic smoke and plumes created by burning tissue during laser surgery and electrosurgery, *Hospital Employee Health* has learned.

In a particularly disturbing finding, almost half of those surveyed said they never received any training about the potent mix of chemicals and biologicals found in the smoke created from burning tissue. The NIOSH study had not been published as this issue went to press, but one of the authors previewed some of the findings in Chicago at the November 3, 2015 meeting of the American Public Health Association (APHA).[1]

> OSHA TOLD *HEH* THAT SURGICAL SMOKE IS INDEED "HAZARDOUS," BUT IT HAS NO SPECIFIC STANDARD TO ENFORCE THE ISSUE.

"One of the main recommendations for working around surgical smoke is that the [plume] be evacuated using local exhaust ventilation [LEV]," said **Andrea Steege**, PhD, NIOSH epidemiologist and study author. "LEV is not widely used. This is especially true for electrosurgery procedures, where workers report more days, more hours, and more procedures exposed to surgical smoke. Our results indicate that workplaces do not prioritize control of surgical

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SENIOR STAFF WRITER: Gary Evans, (706) 424-3915, (gary.evans@ahcmedia.com).
MANAGING EDITOR: Jill Drachenberg
CONTINUING EDUCATION AND EDITORIAL DIRECTOR: Lee Landenberger

EDITORIAL QUESTIONS:
For questions or comments, call
Gary Evans at (706) 424-3915.

smoke. There is a lack of training that could facilitate procedures for preventing surgical smoke. Some of the reasons for not using local exhaust ventilation were that it wasn't part of their protocol, the exposure was not great enough to use it, and about a fourth said it was not provided by employers."

A situation that has been going on for some 20 years is marked by a seeming disconnect between NIOSH and OSHA.

OSHA told *HEH* that surgical smoke is indeed "hazardous," but it has no specific standard to enforce the issue. It can enforce worker protections from plumes with its General Duty clause, but its e-tool webpage on the issue refers to the issue as more of a potential problem and instills little sense of urgency. *(See related story, page 77.)*

The lack of a specific OSHA standard and insufficient enforcement is frequently cited by proponents of plume safety. Indeed, a telling moment came when Steege was asked at the end of her presentation at the APHA meeting by a member of audience: Who is going to enforce these recommendations to protect healthcare workers?

"I don't think — it's not going to be OSHA," Steege said.

A branch of the CDC, NIOSH warned of "toxic gases and vapors" and various biologic and mutagenic threats in surgical smoke — in 1998.[2] Still, skeptics[3] question whether there is sufficient evidence of surgical plume harms to warrant mandated smoke evacuation. Others say follow the money, whether it is held by tight-fisted hospitals unwilling to part with it for LEVs, or sought by manufacturers who are trying to make a profit by selling the devices.

A question

All this aside for a moment, consider this metaphorical question: If someone offered you a cigarette containing benzene, hydrogen cyanide, formaldehyde, and viral and bacterial particles, would you smoke it? You might at least read the NIOSH warning label: "Surgical smoke has been shown to be mutagenic, cytotoxic and genotoxic."[1]

That means essentially that exposure could mutate cellular DNA and kill both cells and genetic material. "No, thanks," would be your rational answer.

But what if the caveat was that you had to partake of these "Surgical Smokes" as a part of your job in an operating room — even in a hospital that is an otherwise smoke-free campus?

This is the situation many surgical healthcare workers face daily because their facility does not use smoke evacuation devices to protect them from plumes formed in laser surgery and electrosurgery. Voluntary guidelines to protect workers have been on the books for years, but surgical plume safety advocates say that regulatory enforcement is insufficient and hospitals — as underscored by the NIOSH study — continue to ignore the recommendations.

"[Employee health professionals] need to raise awareness and provide education — they need to discuss this [hazard] at their safety committee meetings because this is not going to go away," says **Kay Ball**, PhD, RN, CNOR, FAAN, an associate professor of nursing at Otterbein University in Westerville, OH.

"We are going to continue to produce smoke in surgery. All the research is out there and it shows that it is a hazard. There are toxic chemicals [produced] when we burn tissue, when we coagulate and cut through tissue with electrosurgery devices, lasers, or ultrasonic scalpels."

A member of the Association of periOperative Registered Nurses, Ball says AORN has started a "Go Clear" campaign that will recognize facilities that ensure their workers are protected from inhalation of surgical plumes. Having given her first lecture on the hazards of surgical smoke in 1985, Ball is neither surprised nor daunted by the NIOSH survey findings.

"We need to get rid of this [smoke] so we are not breathing it in," she says. "We are in a confined area and we have ventilation and air currents in the room that are taking these small particles and delivering it to everybody in the room. I could be scrubbed in at the surgery table and you would could be two yards away, but because of the ventilation in the room you are going to be exposed as much to the plume as I am."

Thus the need for one of the handheld LED devices, as workers donning masks and even respirators are not considered adequately protected.

"A mask is never — I want to stress never — to be used as the first line of defense to protect you against surgical smoke," Ball says. "It has to be local exhaust ventilation and that means the smoke evacuators being used. The regular room ventilation that moves the air [is not sufficient]. The toxic gases from the smoke and the small size of the particles — most of them in surgical smoke are less than 1.1 microns — go right through a regular surgical mask. If you wear an N95 respirator or a high filtration mask, are you wearing it right? Have the particles gone around the side if the mask is not adhered to the face?"

NIOSH findings

The surgical smoke data were drawn from the NIOSH Health and Safety Practices Survey of Healthcare Workers, an anonymous, multi-module, Web-based survey conducted in 2011. Respondents on the surgical smoke question were members of organizations representing anesthesiologists, nurse anesthetists, operating room nurses, and surgical technologists. Of 4,750 respondents reporting they worked within five feet of surgical plume within the week prior, 47% reported that LEV was always used when smoke was generated during laser surgery. Only 14% reported it was always used during electrosurgery.

In the survey results, LEV was used "sometimes" by 22% for lasers and 26% for electrosurgery. LEV was reported as "never" used by 31% for lasers and 59% for electrosurgery. Though LEV is the NIOSH-recommended method for removal plumes, the use of a "different system to remove smoke" was reported by 21% for lasers and 36% electrosurgery. In addition, 49% of those exposed to lasers and 44% of those exposed to electrosurgery had never received any training on the hazards of surgical smoke.

Though not considered adequate protection, one might assume masks and respirators were widely used in the absence of LEV for plume removal. However, that was not the case, as Steege reported that 90% of those working with lasers did not wear a respirator and 96% answered similarly for electrosurgery.

In addition to AORN, the use of LEV to prevent plume exposures is recommended by American National Standards Institute. NIOSH recommends a combination of general room ventilation and LEV.

Cases of HPV transmission

There are two commonly-cited cases suggestive of human papillomavirus (HPV) transmission via surgical smoke. The first involved a 44-year-old laser surgeon with laryngeal papillomatosis.[4] DNA hybridization of tissue from the tumors revealed HPV DNA. History revealed that the surgeon had given laser therapy to patients with anogenital condylomas, which are known to harbor the same viral types. "These findings suggest that the papillomas in [the surgeon] may have been caused by inhaled virus particles present in the laser plume," the authors concluded.

The other case[5] involved a 28-year-old gynecological operating room nurse, who assisted repeatedly in electrosurgical and laser surgical excisions of anogenital condylomas, and then developed recurrent laryngeal papillomatosis. "The expert opinion of a virological institute confirmed a high probability of correlation between the occupational [exposure] and the laryngeal papillomatosis," the researchers noted.

In addition, Ball's doctoral

dissertation found that perioperative nurses have twice the incidence of some respiratory problems compared with the general population.[6] Nurses' respiratory problems may be linked to the cumulative inhalation of surgical smoke contaminants, she notes. Results indicated that nurses who reported respiratory conditions were usually more alert to the need to evacuate surgical smoke and comply with smoke evacuation recommendations, she says. Of course, the accumulating anecdotal evidence does not carry the weight of clinical trials, though one could hardly be conducted with human subjects.

"It is not ethical to divide a group of practitioners and say you are going to use smoke evacuators and the other group will not," Ball says. "We can't do that to see if any disease forms in their airways. But we have a lot of anecdotal evidence where surgeons have acquired papilloma venereal warts in their throat by not evacuating smoke. They have gotten it in the conjunctiva of their eyes. Research has shown even cancer cells during laparoscopic procedure are floating around in the smoke from the belly of a laparoscopic patient. Benzene has been shown to be a trigger for leukemia."

While the long-term effects of surgical plume exposure may be more difficult to show in terms causality, the acute immediate effects of some exposed sufferers have been observed and documented.

"Surgical smoke can cause acute health effects — eye, ear, nose, and throat irritation, headaches, nasal congestion, nausea, dizziness, asthma, asthma-like symptoms," Steege said. "There are also animal studies that link it to inflammatory changes including emphysema, asthma, and chronic bronchitis. There have been health and safety guidelines dealing with surgical smoke for around 20 years, so this is not a new concern. These guidelines were developed by professional practice organizations as well as government agencies. There is no OSHA standard, but they do have an 'e-tool' site that talks about surgical smoke."

OSHA: 500,000 exposed

OSHA estimates that 500,000 healthcare workers are exposed to surgical smoke each year. Yet in the absence of routine inspections, the onus falls to healthcare workers to report facilities that have not adopted protection measures.

"Nurses have reported their institutions because they have not provided enough smoke evacuators for each surgical room," Ball says. "Nurses have been forced to report their own facility to OSHA, which has come in, inspected, and issued fines and said you need to have smoke evacuators in every room. You have to provide a safe workplace environment for your workers."

Though OSHA has whistleblower protections, there is certainly the perception that reporting the lack of surgical plume protections could put healthcare workers in some job jeopardy.

"Nurses are afraid that their anonymity will be breached and [administration] will find out who reported to OSHA that their own hospital does not have a safe work environment," Ball says. "You may have a couple of nurses verbalizing this [concern], and all of sudden OSHA shows up. So many nurses are afraid to report their facility even though this is definitely a workplace safety issue for staff members and nurses that are in surgery all of the time."

Industry sources that sell the plume evacuator equipment to hospitals say they are typically told it is too expensive and/or surgeons don't want them in the OR. This may be lingering perception from early models that were very loud, though new models are now much quieter, they say.

"The surgeon may say, 'You don't have to evacuate surgical smoke during my procedure,'" Ball says. "Well, that's all well and good for one or two procedures those surgeons are exposed to this particulate smoke. But the surgical team members like the surgical nurses or the techs, anesthesia providers, are in there much more often and are exposed to a greater amount of surgical smoke than individual surgeons are. Surgeons should not have any say in making decisions that will affect the health of the staff who are working with them. It should come from the occupational health and safety committee at the hospital."

In addition to the aforementioned issues that have contributed to slow uptake of smoke removers, Ball says a certain complacency has crept into the exposed workforce. "They say, 'I've been breathing it for so many years I am not going to bother with it now,'" she says. "Or, 'We have smoke evacuators, but I just don't want to pull them out to use them.' We are trying to address this complacency in staff [by emphasizing] what could happen if you continue to breathe in surgical

smoke. The research is there; we have already shown conclusively that this is a hazard. We have to get them educated."

Ball is chairing the clinical advisory committee of the newly formed International Council on Surgical Plume, Inc. (http://www.plumecouncil.com), which is becoming a sort of clearing house for all data and publications on the longstanding issue. Surgical plume safety advocates are also pushing for state laws requiring worker protections.

"It may happen state by state, but when it goes — when it is finally approved by the state legislatures — that is going to be big," Ball says. "One state is kind of leading the way, but we don't want to publicize it yet until everything is through the legislature and then hospitals will be forced to use smoke evacuation."

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OSHA: Surgical Smoke 'Hazardous,' but HCWs Must Report to Stir Action

Agency reports no data on inspections or citations on smoke

A common theme in the call to protect healthcare workers from surgical smoke is the lack of enforcement by OSHA. Given this apparently widespread perception, *Hospital Employee Health* submitted the following questions to OSHA and received these responses from the agency via email.

HEH: What are OSHA's regulations on worker exposure to surgical smoke, which NIOSH says can cause "both acute and chronic health effects ranging from eye, nose, and throat irritation to emphysema, asthma or chronic bronchitis?"

OSHA: OSHA does not have a specific standard that addresses hazards related to smoke from surgical procedures. However, there are other OSHA standards related to these hazards, including:

- **General Duty Clause.** (http://1.usa.gov/1EHfbpD) Employers can be cited for violation of the General Duty Clause if a recognized serious hazard exists in their workplace and the employer does not take reasonable steps to prevent or abate the hazard. The General Duty Clause is used only where there is no standard that applies to the particular hazard.
- **Personal Protective Equipment** (http://1.usa.gov/1Y0Wynf) worn to minimize exposure to chemical, radiological, and physical hazards during surgery.
- **Respiratory Protection** (http://1.usa.gov/1QodsXg) to control occupational diseases caused by inhaling air contaminated with harmful substances.
- **Air Contaminants** (http://1.usa.gov/1fO5bIb), which contains permissible exposure limits for chemicals typically found in surgical smoke.

OSHA's Laser/Electrosurgery Plume webpage (http://1.usa.gov/20Rqa5J) also provides a letter of interpretation on hazards of smoke generated from surgical procedures and national consensus standards related to laser hazards and non-beam hazards.

HEH: Just to clarify, does OSHA regard surgical smoke as a hazard and would the agency respond to a complaint by a healthcare worker on this?

OSHA: Yes, the agency does consider smoke from surgical procedures hazardous and would investigate if a worker filed a complaint.

HEH: Do you have any data on how often OSHA has inspected/cited healthcare employers on surgical

smoke issues?

OSHA: We have not found any such inspections or citations.

No sense of urgency

While this may be due in part to the challenge of retrieving records from the bureaucratic entanglement of a federal agency, it inspires little confidence in OSHA's commitment to protect workers from surgical smoke. Though OSHA confirmed it considers surgical smoke hazardous, its e-tool website is also surprisingly equivocating on the issue (http://1.usa.gov/1TKtL6y). Words like "may," "potential," and "possible" suggest why hospitals may not see surgical smoke evacuation as a compliance priority:

• Laser or electrosurgical units may be required during surgical procedures. Smoke byproduct or "plume" is created when tissue is thermally destroyed. Smoke plume may contain toxic gases and vapors such as benzene, hydrogen cyanide, and formaldehyde, bioaerosols, dead and live cellular material (including blood fragments), and viruses.

• The research is limited on transmission of disease through surgical smoke, but the potential for generating infectious viral fragments, particularly during treatment of venereal warts, may exist. Researchers have suggested that the smoke may act as a vector for cancerous cells which may be inhaled by the surgical team and other exposed individuals.

Potential Hazards: Exposure to high concentrations of smoke may cause ocular and upper respiratory tract irritation and create visual problems for the perioperative team. Smoke may contain toxic gases that could have the potential for adverse health impacts, such as mutagenic and carcinogenic impacts.

Possible Solutions:

• Use portable smoke evacuators and room suction systems with inline filters.

• Keep the smoke evacuator or room suction hose nozzle inlet within 2 inches of the surgical site to effectively capture airborne contaminants.

• Have a smoke evacuator available for every operating room where plume is generated.

• Evacuate all smoke, no matter how much is generated.

• Keep smoke evacuator "ON" (activated) at all times when airborne particles are produced during all surgical or other procedures.

• Consider all tubing, filters, and absorbers as infectious waste and dispose of them appropriately. Use universal precautions as required by the OSHA Bloodborne Pathogens Standard when contaminated with blood or other potentially infectious materials.

• Use new tubing before each procedure and replace the smoke evacuator filter as recommended by the manufacturer.

• Inspect smoke evacuator systems regularly to ensure proper functioning. ■

NIOSH Emphasizing Hazards of Oncology Drugs

'Highly toxic, can cause cancer — just really nasty drugs'

Despite longstanding guidelines on the hazards of antineoplastic drugs (ADs) used primarily in chemotherapy, public health officials are concerned that healthcare workers are still inadequately protected from these known or suspected carcinogens for which no safe exposure level exists.

"Chemotherapy drugs are wonder drugs, but they also pose a tremendous risk to healthcare workers," says **Jim Boiano**, MS, CIH, an industrial hygienist at the NIOSH division of surveillance, hazard evaluations, and field studies. "They are highly toxic, they can cause cancer — they are just really nasty drugs that are used in healthcare."

NIOSH studies[1] are finding that despite existing guidance and recommendations on how to use the drugs safely, "for whatever reason, there is not a universal adherence to these guidelines," he says.

Data from the studies have prompted discussions within NIOSH and OSHA about re-emphasizing the hazards of antineoplastic drugs, he says. In addition, the U.S. Pharmacopeial Convention (USP), a scientific nonprofit organization that sets various drug standards enforceable by the FDA, issued a new general chapter 800 "Hazardous Drugs — Handling in Healthcare Settings" in February of this year. To give healthcare facilities more time to comply, the standard does not become effective until July 1, 2018. *(See related story below.)*

For its part, NIOSH is updating a 2004 AD alert that will re-emphasize that the exposures to the drugs can cause fertility problems in women and men.

"If healthcare workers and oncology nurses [administering ADs] are considering getting pregnant they need to take precautions and possibly have alternate work duties during that period of time," Boiano says. "There are also some studies showing that the effects are aren't just limited to females; there can be reproductive effects in males as well."

The current OSHA guidance on ADs is in a chapter of a technical manual, but the agency appears to be moving to make the information more accessible, he notes.

"I was at a meeting last week and there was an OSHA representative there," Boiano tells *Hospital Employee Health*. "They are currently going to be updating that guidance … so I believe it is going to be more visible."

Little training, less time?

The need for raised awareness on ADs is underscored by a recently published study[1] by Boiano and fellow NIOSH investigators who looked at engineering controls, work practices, use of personal protective equipment, drug spills, and contamination. The data were from 1,094 hospital nurses who work with AD drugs and responded to the NIOSH 2011 Health and Safety Practices Survey of Healthcare Workers. In general, Boiano and colleagues found gaps and inconsistent use of safe methods in handling and administering ADs to patients. The following are among the findings:

- AD spills were reported by 9.5% of nurses during the week prior to the survey.
- Familiarity with safe handling guidelines and training in safe handling were associated with more reported PPE use.
- Nurse-perceived availability

USP Issues New Hazardous Drug Standard

Effective July 1, 2018

The United States Pharmacopeial Convention (USP) published a new standard on hazardous drugs in healthcare in February of this year, establishing a more than two-year moratorium to allow time for adoption by healthcare facilities.

The standard or "chapter" will become part of healthcare quality standards included in the United States Pharmacopeia-National Formulary (USP-NF), which is available by subscription. The USP posted the following frequently asked questions on the new chapter, including how to order the document, on its website at: http://bit.ly/1PCi6yY.

- **What is the purpose of General Chapter 800?** The purpose of the chapter is to describe practice and quality standards for handling hazardous drugs in healthcare settings and help promote patient safety, worker safety, and environmental protection. The new general chapter defines processes intended to minimize the exposure to hazardous drugs in healthcare settings.
- **Does General Chapter 800 apply to me?** The chapter applies to all healthcare personnel who handle hazardous drug preparations (e.g. pharmacists, pharmacy technicians, nurses, physicians, physician assistants, home healthcare workers, veterinarians, and veterinary technicians). The chapter also covers all healthcare entities that store, prepare, transport, or administer hazardous drugs (e.g., pharmacies, hospitals, other healthcare institutions, patient treatment clinics, physicians' practice facilities, and veterinarian offices).
- **What is a hazardous drug?** A hazardous drug is any drug identified as hazardous or potentially hazardous by the National Institute for Occupational Safety and Health (NIOSH) on the basis of at least one of the following six criteria: carcinogenicity, teratogenicity or developmental toxicity, reproductive toxicity in humans, organ toxicity at low doses in humans or animals, genotoxicity, and new drugs that mimic existing hazardous drugs in structure or toxicity. NIOSH maintains a list of antineoplastic and other hazardous drugs used in healthcare settings.
- **What is the status of the General Chapter 800 and when will it become official?** General Chapter 800 was published on February 1, 2016, in the First Supplement to USP 39–NF 34. The Expert Committee approved a delayed official implementation date of July 1, 2018 to allow entities additional time to implement the standard. With the delayed official date, entities have more than two years to implement this new standard. ■

of PPE was associated with more reported PPE use and lower odds of reported spills.

• Use of closed system drug-transfer devices and luer-lock fittings also decreased the odds of self-reported AD spills, while more frequent AD administration increased the risk.

• AD administration frequency was also associated with performing more activities with gloves previously worn to administer ADs, and nurse perception of having adequate time for taking safety precautions with fewer such activities.

"The results suggest that training and familiarity with guidelines for safe handling of ADs, adequate time to adhere to guidelines, and availability of PPE and certain engineering controls are key to ensuring adherence to safe handling practices," the authors concluded.

Previous studies have reported spills of ADs and skin contact with the drugs, resulting in contamination on hospital surfaces and presence in the urine of healthcare workers working with the ADs. In some cases, both training and resources were an issue as the researchers found safe handling guidelines were associated with consistent use of PPE, and availability of PPE was associated with fewer reported spills of ADs. For core PPE, including nonabsorbent gowns and chemotherapy gloves, institutional safe-handling procedures and employee familiarity with the procedures appeared to be key.

"We do think from other research that there are differences in [PPE] availability: Large hospitals have more resources than certainly ambulatory care facilities especially smaller ones," says lead author **Sharon Silver**, MS, an epidemiologist in the NIOSH division of surveillance, hazard evaluations, and field studies. "There are different levels of training and some of it is how frequent the training is. Most of them have had some training, but they are supposed to have an annual refresher at the least and not everybody had that."

Environmental contamination

Nurses who administered ADs more frequently reported more spills and performing more activities with potential for environmental contamination. The latter included touching bed controls, door knobs, and phones while still wearing gloves previously used to administer ADs. Given that the drugs are toxic and carcinogenic, *HEH* asked whether the environmental contamination of surfaces pose a risk to patients and other workers.

> THE FINDINGS CALL FOR A "COMMITMENT FROM ALL LEVELS OF HEALTHCARE ORGANIZATIONS TO PROTECT WORKERS FROM ADS."

"That's a good question, and yes, potentially," Silver says. "There have been other studies that have looked at contamination in hospitals and found it on the floors, elevator buttons, at the reception desk. So visitors, patients, or other healthcare workers can be exposed. It is far less than what healthcare workers working directly with these materials are exposed to, but these are hazardous drugs."

The findings call for a "commitment from all levels of healthcare organizations to protect workers from ADs," they concluded.

"The perception of having enough time to take safety precautions was associated with fewer environmental contamination activities," the authors noted. "Collectively, these results suggest that insufficient time to adhere to glove doffing and donning practices while performing core nursing functions in areas where ADs are administered may lead to greater potential for environmental contamination."

The study is one of the largest to assess adherence to safe-handling guidelines for administration of ADs as reported by hospital nurses. Adherence to best practices for safe administration of antineoplastic drugs requires the efforts of employers through engineering controls, training, provision of PPE, and adequate time for adherence to safety measures. Healthcare workers should seek out training, consistently follow facility procedures, and report any safety concerns.

"While providing optimal equipment and adjusting workflows to ensure adequate time to take safety precautions may be difficult in the current health-economic climate, the results of this study suggest potential benefits in terms of both reduced exposures and reduced downstream healthcare costs for hospital personnel," the NIOSH researchers concluded.

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More Than 40% of HCWs Report to Work with Flu-like Illness

Long-term care workers say work sick or no pay

In findings that further underscore the "presenteeism" phenomenon, investigators found that more than 40% of healthcare workers with influenza-like illness reported to work, putting patients and co-workers at risk of infection, an officer in the CDC Epidemic Intelligence Service (EIS) recently reported at the annual EIS meeting in Atlanta.

"Our results are consistent with studies that I have read in the literature based on certain occupation groups: physicians and nurse practitioners," says **Sophia K. Chiu**, MD, an EIS officer at the CDC.

Healthcare settings, where an estimated 14.6 million influenza cases received medical attention in 2013–14, are known sites for influenza transmission.[1] Healthcare workers with influenza-like illness (ILI) who continue working despite CDC's recommendation not to work until being afebrile for ≥24 hours, contribute to influenza transmission. Of course, not everyone who reports ILI has the actual flu, but the CDC recommendation is that ILI is defined as fever and cough or sore throat. "So the recommendations are not based on whether the person tests positive for influenza," she says.

Chiu and colleagues used a national internet survey of 1,914 healthcare workers during the 2014–15 influenza season to calculate the frequency of working with self-reported ILI. Of 414 (21.6% overall) healthcare workers reporting ILI during the 2014–15 season, 183 (41.4%) reported working with ILI (median: 3 days). Pharmacists (67.2%) and physicians (63.2%) had the highest frequency of working with ILI. By setting, hospital-based workers had the highest frequency of working with ILI (49.3%). The most common reasons for working while ill included the following

- still being able to perform job duties,
- not feeling bad enough to miss work,
- having a professional obligation to co-workers, and
- difficult to find coverage.

"We think these [reasons] are amenable to education and training of healthcare personnel with the goal of changing social or cultural norms; for example, about how sick one has to be to take sick leave and also reminding HCWs about how and when influenza can be transmitted," Chiu tells *HEH*. "Hospitals and other institutions can make arrangements so there is a pool of healthcare personnel that is scheduled to be on standby to fill in for ill colleagues. This can alleviate that feeling of burdening colleagues. There are some systems like this in place for some physicians and nurses, but it could be extended for all personnel."

PHARMACISTS (67.2%) AND PHYSICIANS (63.2%) HAD THE HIGHEST FREQUENCY OF WORKING WITH ILI. BY SETTING, HOSPITAL-BASED WORKERS HAD THE HIGHEST FREQUENCY OF WORKING WITH ILI (49.3%).

Among respondents working in long-term care facilities, the main reason for working ill was more disturbing, as most said they were not able to afford lost pay.

"However, that doesn't necessarily mean they don't have paid sick leave," she says. "It could be they used all of it up. We don't exactly know what the paid sick leave structure is to all the people that responded to the survey. We didn't directly ask about that, but it is an incentive to stay home while you're sick [if you have sick leave]. We asked institutions to consider implementing paid sick leave policies."

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Healthcare workers infected, transmit Group A Strep

Four long-term care residents die of infections

An unusually large and persistent outbreak of Group A *Streptococcus* (GAS) in a nursing home was spread in part by infected and colonized healthcare workers, underscoring the importance of reporting symptoms, seeking treatment, practicing rigorous infection control, and not working sick, an officer in the CDC Epidemic Intelligence Service recently reported at the annual EIS meeting in Atlanta.

GAS outbreaks can be difficult to control because those merely colonized and asymptomatic can still infect their contacts, says **Srinivas A. Nanduri**, MD, an EIS Officer at the CDC. A strep outbreak could hit a hospital if lapses of infection control occur, but the long-term care environment has characteristics that may enhance spread, he says.

"Clusters of Group A strep infections can also occur in hospitals," he tells *HEH*. "However, it is extremely unlikely that an outbreak of this magnitude would occur at an acute care hospital. In nursing homes, the population at risk, length of stay, staffing patterns, policies, and many other underlying factors are different from those found in acute care hospitals. Also, this particular outbreak is unique even among nursing home outbreaks in having affected a very large number of residents and staff."

In February 2015, the Illinois Department of Public Health (IDPH) identified a cluster of GAS infections at a nursing home. After multiple interventions, mass antibiotic prophylaxis was implemented from April 28–May 2, 2015. Infections re-emerged in late June. In November, the IDPH requested assistance to assess risk factors for infection and recommend control measures.[1]

Nanduri and EIS colleagues defined cases as GAS infection among residents or employees confirmed by culture or antigen detection. They surveyed employees and observed infection control practices. To identify disease risk factors, they conducted a case-control study comparing resident cases occurring from May 3 to November 10 to controls for the same time period. To identify asymptomatic colonization, they collected throat and wound cultures from residents receiving wound care and throat cultures from employees linked to cases.

A total of 57 cases and four deaths occurred in 2015. The total included 17 cases (10 residents and seven employees) that occurred after the mass antibiotic prophylaxis.

"All symptomatic employees in the outbreak had pharyngitis," he says. "Ill residents had a wide spectrum of presentations, with some having severe bloodstream infections and others having pharyngitis or wound infections."

All the deaths were in residents and the mortality in those four cases was attributable to GAS infection, he says.

"It is important to note that many of these residents had underlying illnesses which increase their risk of invasive GAS infection and worsen prognosis if they become ill," Nanduri says.

An employee survey identified seven self-reported, previously unrecorded workers with GAS illnesses since May 2015. "Employees should self-report if they have symptoms suggestive of infection with GAS," he says. Besides relying on self-reporting by employees, GAS prevention strategies include the following:

- education of staff about the symptoms suggestive of GAS infection,
- active surveillance for GAS symptoms suggestive of infection through reminders when employees present to work each day,
- employee health services should establish procedures for tracking absences, and
- develop sick leave policies that are non-punitive, flexible, and encourage sick employees to stay home.

Investigators observed multiple lapses in hand hygiene and wound care practices, which contributed to the spread of strep. All (8 of 8) case patients included in the case-control study received wound care versus 8 of 24 (33%) in the controls. One employee and four residents were colonized with GAS. The outbreak strain matched 96% of typed isolates (27 of 28).

"The healthcare workers were wearing gloves for wound care, illustrating the importance of always performing hand hygiene before and after using gloves," he says.

As per CDC guidelines for care of wounds infected with GAS, Nanduri cited the following precautions:

• Wounds with no dressings or with dressings that do not adequately contain drainage: contact and droplet precautions are advised.

• Wounds with dressing covers that adequately contain drainage: standard precautions are advised.

REFERENCE

1. Nanduri SA, Arwady MA, Edens C, et al. Prolonged Outbreak of Invasive Group A Streptococcus Among Nursing Home Residents — Illinois, 2015. Epidemic Intelligence Service Conference, Atlanta: May 2-5, 2016. ■

NIOSH warns of counterfeit N95s

There's no 'O' in 'NISH'

The National Institute of Occupational Safety and Health is alerting employee health professionals about a counterfeit N95 respirator on the market. The telltale sign is that the NIOSH abbreviation is misspelled as "NISH N95" on the front of the respirator.

"While the TC number and private label holder are valid, this unapproved unit can be identified by the misspelling of NIOSH on the front of the respirator," the institute states, posting a picture of the equipment on its website (1.usa.gov/1PHGkXU). "When NIOSH becomes aware of counterfeit respirators or those misrepresenting NIOSH approval on the market, we will post them here to alert users, purchasers, and manufacturers."

N95 respirators that are certified by NIOSH have demonstrated that they can filter out a minimum of 95% of airborne particles under worse-case test conditions.

The FDA also determines if the respirators demonstrate an acceptable level of fluid and flame resistance, which is particularly important in healthcare occupational settings like surgical suites. The FDA clearance process also requires that certified respirators have labeling that is relevant to healthcare personnel, such as information about the presence of natural rubber latex.

To make sure a respirator is NIOSH approved, check the Certified Equipment List at 1.usa.gov/1UF0zOn. Additional information is available on the NIOSH Trusted Source Page: 1.usa.gov/1RNmGeh. ■

NIOSH injury data will be unveiled at AOHP conference

NIOSH will hold a "town hall" meeting to answer questions about healthcare worker injuries as part of the annual meeting of the Association of Occupational Health Professionals in Healthcare (AOHP) in Myrtle Beach, SC, Sept. 7-10, 2016.

The September 8 NIOSH portion of the program will reveal data from 42,000 healthcare worker injuries that have been collected by the institute's Occupational Health Safety Network (OHSN). Some 120 hospitals have entered data into the modules of the NIOSH electronic surveillance system to track injuries and gain insights on prevention. Some of the details to be discussed include the following:

• the prevalence and type of injuries for healthcare job categories,

• a look at factors that cause or contribute to slips, trips, and falls, patient handling and movement injuries, and workplace violence among healthcare personnel,

• to what degree are the various types of injuries preventable? Workplace strategies that can be implemented at the local level, and

• information on how to join and optimize use of the OHSN surveillance.

For more information on the AOHP conference, visit: www.aohp.org. ■

COMING IN FUTURE MONTHS

- Employee health news updates from APIC in Charlotte
- Can resilience to job changes, challenges, be taught?
- Cleanliness is next to breathlessness: Working with powerful cleaners for *C. diff*
- Breaking down the EXPO-STOP needlestick data

CE INSTRUCTIONS

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

1. Read and study the activity, using the provided references for further research.
2. Scan the QR code to the right or log on to AHCMedia.com, then select "MyAHC" to take a post-test.
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4. After successfully completing the test, a credit letter will be emailed to you instantly.
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CE QUESTIONS

1. Though NIOSH found that many hospitals were not using smoke exhaust ventilation to remove surgical smoke, most workers in the OR wore fit-tested N95 respirators for procedures that generated plumes.

A. True
B. False

2. OSHA has no specific standard to protect healthcare workers from surgical smoke, but cited other OSHA standards related to this hazard including:

A. General Duty Clause
B. Personal Protective Equipment
C. Respiratory Protection
D. All of the above

3. In a NIOSH survey, nurses who administered antineoplastic drugs more frequently reported:

A. at least one miscarriage.
B. more spills.
C. damaged gloves from handling the drugs.
D. all of the above.

4. In a study of healthcare workers with influenza-like illness, how many continued working for a median of three days?

A. 18.5%
B. 27.3%
C. 33.6%
D. 41.4%

CE OBJECTIVES

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

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