



SAF•T•GRAM

“A gram of safety is worth a pound of cure!”

Coats, Ties, Stethoscopes, Cell Phones, and ID Badges: Potential Sources of Healthcare-Associated Infections?

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Healthcare-associated infections (also called nosocomial infections) are infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting. Healthcare-associated infections are one of the top ten leading causes of death in the United States.¹ According to the Centers for Disease Control and Prevention (CDC), methicillin-resistant (MRSA) has become a prevalent nosocomial pathogen in the United States.² Healthcare personnel can come in contact with infectious diseases, such as MRSA, via direct hand contact with contaminated body fluids, or through contact with contaminated devices, items, or environmental surfaces.² The use of standard precautions and proper hand hygiene techniques should minimize the spread of infectious diseases in most cases.^{2,3} However, the potential transmission of diseases via contaminated devices or other items is often overlooked.

“Healthcare-associated infections are one of the top ten leading causes of death in the United States.” (CDC)

The white coat has historically been the universal symbol of the medical profession. However, it has been demonstrated to be a carrier of several strains of bacteria and, therefore, may itself be a potential source of disease transmission. In one study, *Staphylococcus aureus* was isolated from 29 out of 100 doctor’s white coats, mostly on the cuff and pocket areas.⁴ Forty-eight percent (48%) of the doctors from whose coats *S. aureus* was isolated were found to also carry the organism in their noses. Phage typing showed only 11 of 32 MRSA strains (34%) isolated from the coats were the same as those isolated from the corresponding physician’s nose.⁴ A similar study performed on 100 medical student white coats resulted in all coats having bacterial contamination to varying degrees, with the sites with the highest contamination found at the sleeve and the pocket.⁵ A third study of white coats of doctors, residents, and students revealed 95% of the coats tested

positive for one of several bacteria, including Gram-negative bacilli, *Coliforms*, *Pseudomonas aeruginosa*, *Citrobacter* sp., *Escherichia coli*, and *Staphylococcus* sp.⁶ This study also found that there was an increased count found on coats worn for longer durations without being laundered, and recommended that the coats be laundered at least once every three days.⁶

Neckties worn by doctors have also been shown to carry bacteria such as *S. aureus*, *Staphylococcus citreus*, and MRSA.^{7,8} Unrestrained neckties could potentially make contact with patients more easily than white coats. Ties are also not cleaned as often as white coats. When doctors in one study were asked when the tie had been cleaned, 70% indicated that they had never cleaned the tie, and for the remainder, it had been 20 weeks on average since the doctor’s tie had been cleaned.⁷

Stethoscopes have also been found to carry *Staphylococcus* sp. One study found that 89% of stethoscopes evaluated were found to be contaminated

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with staphylococcal species (19% yielded *S. aureus*).⁹ Only about half of those surveyed cleaned their stethoscopes daily or weekly and 7% indicated they had never cleaned their stethoscope.⁹ The study concluded that stethoscopes may be a potential vector of infection because they have been shown to carry bacteria and they are brought into contact with many patients, often without being cleaned between patients.⁹

Other items carried or used by healthcare professionals have been shown to carry bacteria. One-fifth of hospital personnel cellular telephones examined in one study were found to harbor pathogenic bacteria including MRSA and *Pseudomonas* species.¹⁰ Another study showed that identity badges and lanyards carried MRSA, methicillin-sensitive *S. aureus* (MSSA), enterococcus spp, and aerobic gram-negative bacilli.¹¹



It is important to note that, although these studies document microbial contamination of white coats, ties, and equipment, there is no clear correlation between the presence of bacterial contamination and an increased risk or rate of hospital-acquired infections.¹² Humans are a natural reservoir for bacteria such as *Staphylococcus aureus*.¹³ According to the United States Food and Drug Administration (FDA), “*Staphylococci* are present in the nasal passages and throats and on the hair and skin of 50 percent or more of healthy individuals. This incidence is even higher for those who associate with or who come in contact with sick individuals and hospital environments.”¹⁴ The mere presence of bacteria on surfaces and clothing does not automatically indicate that the bacteria will be transferred to the patient and cause disease. However, in a 1973 study, it was shown that *Staphylococcus aureus* transferred from patients to nurses’ clothing during treatment of burn patients.¹⁵ Tests revealed that airborne staphylococci subsequently dispersed from the nurses’ contaminated clothing.¹⁵ It was also possible to isolate staphylococci derived from the burn patient (through evaluation of phage type) on subsequent (volunteer) patient’s protective gown and bottom sheets¹⁵ thus showing that transference from one patient to another is possible.

So, what requirements are already in place? CDC’s “Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007” states that institutions should, “Establish policies and procedures for routine and targeted cleaning of environmental surfaces as indicated by the level of patient contact and degree of soiling,”³ and that institutions should, “Clean and disinfect surfaces that are likely to be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients’ rooms) on a more frequent schedule compared to that for other surfaces (e.g., horizontal surfaces in waiting rooms).”³

“White coats, neckties, stethoscopes, cell phones, and nurse’s clothing have been shown to carry bacteria”

White coats, neckties, stethoscopes, cell phones, and nurse’s clothing have been shown to carry bacteria, including MRSA and Gram-negative bacilli which can cause disease. These items are often not considered in routine cleaning schedules, but should be. In fact, because data shows that these items are likely be “contaminated with pathogens”, CDC says they should be cleaned on a more frequent schedule than other surfaces.

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Safety Training and Performance Evaluations

Annual employee performance evaluations must be performed by March 31 of each year. Completion of required safety training is one item that must be addressed for [The University of Oklahoma Staff Performance Evaluation Summary Report](#). Be sure you are current, and supervisors, be sure your employees are current. To see the status of your safety training, go to the following links:

Norman employees: <https://www.ouhsc.edu/ehso/training-norman/quiztakenemail3.asp>

HSC and Tulsa employees: <https://www.ouhsc.edu/ehso/training/quiztakenemail3.asp>

NIOSH Guidance on PPE for Healthcare Workers Who Work With Hazardous Drugs

Source: <http://www.cdc.gov/niosh/docs/wp-solutions/2009-106/pdfs/2009-106.pdf>

According to CDC's National Institute for Occupational Safety and Health (NIOSH), healthcare workers face serious health risks when exposed to hazardous drugs. This is a group of drugs that cause specific health effects such as cancer or birth defects, or are highly toxic at low doses. A list of known hazardous drugs may be found at <http://www.ouhsc.edu/ehso/labman/Appendix%20A%20-%20Hazardous%20Agents.pdf>. For patients, potential benefits of treatment outweigh the risks from adverse side effects. However, health care workers should minimize their exposure and health risks.

NIOSH has provided a guidance document found at <http://www.cdc.gov/niosh/docs/wp-solutions/2009-106/pdfs/2009-106.pdf>. Additional guidance for working with hazardous drugs may be found on the EHSO website at <http://www.ouhsc.edu/ehso/hazdrugproc.pdf>



UCLA Research Assistant Burned in Chemical Fire

Source: <http://www.dailybruin.ucla.edu/news/2009/jan/01/research-assistant-burned-chemical-fire/>
<http://newsroom.ucla.edu/portal/ucla/lab-assistant-dies-of-injuries-78543.aspx>

A research assistant at UCLA who was seriously burned in December, 2008 in a chemical fire involving t-butyl lithium (a pyrophoric compound) has died, according to the UCLA Newsroom website (see above sources). The chemical apparently caught on fire spontaneously when it was exposed to air. The events that lead to the ignition are still under investigation. The fire resulted in second- and third-degree burns on 40 percent of the research assistant's body.

It is important to use extra caution and understand the inherent properties of the material when working with alkali metals such as t-butyl lithium. Alkali metals can react vigorously with water to produce hydroxides and hydrogen gas (which is highly flammable), and can spontaneously ignite on exposure to air. Material Safety Data Sheets should be obtained and maintained that clearly outline the appropriate handling and storage requirements for the alkali metals that are used in the university work environment.

Compressed Gas Safety

The presence of compressed gases has the potential to create a hazardous environment because of the inherently unique properties of gases and the condition (under pressure) these gases are often stored under. It is important that certain guidelines are adhered to when storing, handling, and using compressed gas cylinders in an educational or research environment. The following information should provide an introduction to these guidelines.

Storage Requirements:

- Cylinders should be secured at all times, whether they are empty or full
- Cylinders should be stored away from heat and ignition sources
- Cylinders should be stored in an upright position
- Cylinders should be capped when not in use
- Cylinders should be stored so that full cylinders are isolated from empty cylinders
- Cylinders should be stored in environments that mimic room temperature

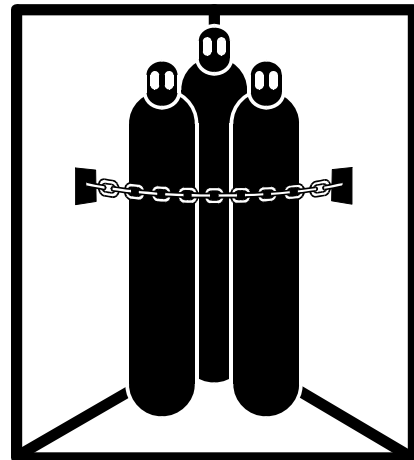
Handling and Use:

- Large cylinders should only be transported using a wheeled cylinder cart and not rolled or slid as a means of moving them
- Small cylinders should be protected from damage or falling during transport
- Cylinders should be stored at least 20 ft. away from all flammable, combustible, or incompatible material
- Cylinders should always be used with a regulator
- Cylinder valves should be closed when not in use, if practical
- Cylinders discharging gas into a liquid should be fitted with a check valve
- Cylinders containing asphyxiants should be used in a location that provides adequate ventilation
- Cylinders that are empty should be labeled as empty
- Cylinders should be labeled so its contents are easily identified and hazards recognized

Disposal:

- Cylinders are never truly “empty” and should always be handled as though they are full
- Whenever possible, cylinders should be purchased (or leased) from manufacturers that will service or take back the empty cylinders
- The campus representative Environmental Health & Safety Office (EHSO) will dispose of lecture-size cylinders and other cylinders that are unable to be returned to the manufacturer
- Disposal fees for cylinder(s) may be passed onto the generating department, particularly if the contents of the cylinder(s) are unknown

An individual who uses compressed gases should familiarize themselves with the specific chemical properties of these gases, which may be obtained from the Material Safety Data Sheet (MSDS) maintained by the gas manufacturer or distributor. Additional information on compressed gases can be obtained by reviewing the *OU Laboratory Safety Manual*-Section IX. This is available at <http://www.ouhsc.edu/ehso/Normanlabman/Normanlabman9-05.pdf> (Norman campus) or <http://www.ouhsc.edu/ehso/labman/Section%209%20-%20Compressed%20Gases.pdf> (HSC and Tulsa campuses).



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