LEARNING OBJECTIVES

1. Provide background information about hospital-acquired infections in healthcare facilities
2. Emphasize the importance of using gloves and proper hand washing procedures to reduce hospital-acquired infections
3. Answer common questions about the role of Certified Instrument Specialist technicians in preventing hospital-acquired infections

BACKGROUND

Concerns about the potential for transmitting hospital-acquired infections are an ongoing issue in all healthcare facilities and all Central Service (CS) departments. These infections are those that are not present when a patient is admitted to the facility, but which then occur within 48 hours after admission.

Hospital-acquired infections affect approximately 10% of all patients admitted and about 20% of those are in intensive care units (ICUs). It has been noted that, on average, patients with hospital-acquired infections spend 2.5 times longer in the hospital than their peers who do not.1

A patient with a hospital-acquired infection may require intravenous antibiotic therapy and prolonged hospitalization, both of which increase healthcare costs. In some cases, such as when an abscess develops or an implanted device such as an artificial hip or shunt become infected, additional surgeries might be required.

One-third of the American population carries some type of potentially pathogenic (disease-causing) bacteria. These infections are a common cause of sepsis, which occurs in approximately two million patients per year in the United States leading to about 90,000 deaths.2 Note: As defined by the IAHCSMM CSSD Dictionary and Reference Guide, sepsis is the condition, usually with fever, that results from the presence of microorganisms or their by-products in the bloodstream or other tissues.

The frequent use of antibiotics has led to the emergence of resistant bacteria. For example, the rate of reported Methicillin-Resistant Staphylococcus Aureus (MRSA) infections is increasing in the United States, and about 3% of the population is colonized with this bacteria strain every year. Approximately one-third of the US population has been exposed to MRSA. In an effort to prevent the spread of these infections, the Centers for Disease Control and Prevention is tracking them and is promoting wiser use of existing antibiotics and the development of new ones.3
HAND WASHING AND GLOVES
The use of proper hand washing procedures and gloves can help reduce the incidence of hospital-acquired infections.

Hand hygiene (washing hands with soap and water or using an alcohol-based hand rub) is the most important procedure to prevent and control the transmission of microorganisms from one person to another or from one site to another. CIS technicians should wash their hands upon entering and leaving their work area, and whenever their hands become soiled or contaminated. Infection control experts recommend that hands be washed immediately and thoroughly if they become soiled with blood, body fluids, secretion, or excretions. In the absence of visible soil following contact of bare hands with contaminated items, an alcohol-based hand rub should be used following the manufacturer's recommendations (see below).

Effective hand washing consists of wetting, soaping, lathering, and vigorously rubbing one's hands together (making sure to lather between fingers and around nails) for at least 15 seconds. Washing should be followed by rinsing with running water and thorough drying with a disposable towel. It is also helpful to use approved lotions after hand washing to keep the skin healthy and to minimize skin irritation and excessive drying. Note: some hand lotions may promote bacterial growth so lotions designed to work with other hand hygiene products must be used. Fingernails of personnel working in high-risk areas should be maintained at a length of ¼ inch or less to minimize passing along carried microorganisms. Also, long nails increase the risk of tearing gloves. Note: fingernail polish and artificial nails should not be worn in the CS department.8

Personnel with open or weeping wounds or excessive skin irritations should refrain from handling any patient care equipment until medically evaluated and the condition is resolved.

Every CIS technician must consistently follow dress codes and hand washing protocols to help prevent hospital-acquired infections.

Disinfection gels provide fast disinfection of hands that are visibly clean and dry. The gel must cover all areas of the hands including fingernails. Note: gels are alcohol-based and have little to no effect on hands contaminated with
protein soils or potentially contaminated with *Clostridium difficile*, a bacterium that causes gastrointestinal symptoms and commonly affects older adults in hospitals and long-term care facilities, and children at daycare. *Clostridium difficile* infection typically occurs after treatment with antibiotic medications.

**HOSPITAL-ACQUIRED INFECTIONS: QUESTIONS AND ANSWERS**

The control of hospital-acquired infections can be reviewed from several different perspectives.

What are standard precautions and how do they help reduce hospital-acquired infections? The concept of standard precautions involves the use of appropriate barriers to prevent transmission of infectious organisms from contact with blood and all other bodily fluids, non-intact skin, and mucous membranes; it applies to all patients, regardless of diagnosis or presumed infectious status. Its history can be traced to the mid-1850s when an Austrian surgeon and obstetrician, Dr. Semmelweis, observed that the after-delivery survival rate of women whose child was delivered by physicians and medical students was much lower than that of women attended by midwives or their trainees. He implemented a required hand washing policy and other practices for medical students and physicians which resulted in a reduced mortality rate for their patients.

CIS technicians take precautions for themselves and for the patients whom they serve. They do so as they frequently wash their hands and as they wear full personal protective equipment (PPE) when handling bio-burden in decontamination. In addition, numerous other factors impact infection rates, including proper storage conditions and transport methods to prevent contamination of the exterior of sterile items. Those who open sterile products must be trained to inspect packages for integrity prior to use. They must also know how to identify contamination, including the presence of soils, moisture, and wrapper abrasions. Transport vehicles also must be cleaned after each use. Even “minor” precautions, such as the proper disinfection of high transit surfaces (i.e., computer keyboards) are very important.

Which microorganisms need to be monitored by CIS technicians when performing their work responsibilities? Many types of organisms can cause patient infections, and some of the most common are listed in Figure One.

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**Figure 1: Common Causes of Patient Infections**

<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>Comment</th>
<th>Source (Reference)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Clostridium difficile</em></td>
<td>CDC Urgent Threat</td>
<td>3</td>
</tr>
<tr>
<td>Carbapenem-resistant <em>Enterobacteriaceae</em> (CRE)</td>
<td>CDC Urgent Threat</td>
<td>3</td>
</tr>
<tr>
<td>Drug-resistant <em>Neisseria gonorrhoeae</em></td>
<td>CDC Urgent Threat</td>
<td>3</td>
</tr>
<tr>
<td>Influenza virus</td>
<td>Germs enter eyes, nose, or mouth</td>
<td>2</td>
</tr>
<tr>
<td>Legionnaires’ disease</td>
<td>Water</td>
<td>2</td>
</tr>
<tr>
<td>Bacterial meningitis</td>
<td>Germs enter eyes, nose, or mouth</td>
<td>2</td>
</tr>
<tr>
<td>Measles</td>
<td>Persons coughs, sneezes, or shares food or drinks</td>
<td>2</td>
</tr>
<tr>
<td>West Nile virus</td>
<td>Infected mosquitoes</td>
<td>2</td>
</tr>
<tr>
<td>Tularemia</td>
<td>Insect bite</td>
<td>2</td>
</tr>
<tr>
<td>Hepatitis <em>A</em></td>
<td>Shared food or drink</td>
<td>2</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>Infected person’s stools</td>
<td>2</td>
</tr>
<tr>
<td>Norwalk virus</td>
<td>Infected person’s stools</td>
<td>2</td>
</tr>
<tr>
<td>Multidrug resistant <em>Pseudomonas</em></td>
<td>Causes pneumonia</td>
<td>2</td>
</tr>
<tr>
<td>Super-resistant <em>Klebsiella</em></td>
<td>Causes pneumonia</td>
<td>2</td>
</tr>
<tr>
<td>Methicillin Resistant <em>Staphylococcus Aureus</em> (MRSA)</td>
<td>Increases risk of lethal infections</td>
<td>2</td>
</tr>
<tr>
<td>Vancomycin Resistant <em>Enterococcus</em></td>
<td>Increases risk of lethal infections</td>
<td>8</td>
</tr>
<tr>
<td>Gram-negative <em>bacilli</em> (GNB)</td>
<td>Causes bloodstream infection</td>
<td>7</td>
</tr>
</tbody>
</table>

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CIS technicians may spread hospital-acquired bacteria in several ways. Patients may become contaminated if a CIS technician with contaminated hands takes a package out of the sterilizer and the contaminants come in contact with the hands of the circulating or scrub nurse in the OR. Cross-contamination can also occur between the decontamination area and the clean side. For example, cross-contamination would happen if a technician conducting inventory in the decontami-
nation area – without wearing appropriate PPE – were to become contaminated and spread contaminants to the clean side. This emphasizes the need to wash hands and follow standard precautions, including hand washing, and wearing gloves.

Another potential contamination hazard occurs when soap injectors on cart washers are not properly operating, and dirty carts are then sent to the clean side. Similarly, if washer disinfectant (non-sterilizing) machines are not properly functioning and not being monitored, dirty trays may move from decontamination into the tray preparation area.

How does a person know if they are a potential carrier? Most persons are unaware of their carrier status. However, some may know based on their previous medical histories. More rarely, a carrier may have a MRSA skin infection which looks and feels like spider bites. Those who know they are carriers should be vigilant around those with weakened immune systems.

What is the role of a facility’s Infection Control Committee in preventing hospital-acquired infections? A multidisciplinary team comprised of medical and nursing staff, the Infection Prevention and Control Professionals, and the CS manager should meet regularly. The team’s role should include the examination of errors in the application of principles that could cause hospital-acquired infections and to implement cleaning and other improvements that could prevent them.

What is the best strategy to prevent hospital-acquired infections? Healthcare personnel must ensure that they properly and frequently wash their hands.

IN CONCLUSION
Readers should recall three basic principles from this lesson. First, proper hand washing and the use of PPE are critical to prevent the transmission of hospital-acquired infections including MRSA. Second, CIS technicians can prevent the spread of hospital-acquired bacteria when they use proper PPE when working in the decontamination, staging, and sterilization areas. Third, since current antibiotics may not be effective in the face of emerging infectious bacterial diseases, special attention to the prevention of hospital-acquired infection is critical.

REFERENCES
CIS Self-Study Lesson Plan Quiz - Hospital-Acquired Infections

Lesson No. CIS 242 (Instrument Continuing Education - ICE) • Lesson expires March 2017

1. Hospital-acquired infections can be spread by:
   a. Visitors
   b. Employees
   c. Patients
   d. A and B above
   e. All the above

2. Hospital-acquired infections are those that are not present when a patient is admitted, but which then occur within ______ hours after admission to the facility.
   a. 24
   b. 48
   c. 72
   d. 96

3. Hospital-acquired infections affect approximately ______ percent of all patients admitted.
   a. 5
   b. 10
   c. 15
   d. 20

4. The frequent use of antibiotics has led to the emergence of resistant bacteria that, when they cause hospital-acquired infections, can be very difficult to treat.
   a. True
   b. False

5. What is the most important procedure to prevent and control transmission of microorganisms from one person to another?
   a. Wearing gloves
   b. Wearing PPE
   c. Washing hands with soap and water
   d. Checking patients for contagious infections

6. CIS technicians should wash their hands when leaving their work area.
   a. True
   b. False

7. For how long should one’s hands be rubbed together for effective hand washing?
   a. 1 minute
   b. 45 seconds
   c. 30 seconds
   d. 15 seconds

8. Which should not be worn or used in the CS department?
   a. Fingernail polish
   b. Artificial nails
   c. Lotions after hand washing
   d. All of the above
   e. A and B above

9. Disinfection gels are effective when used on hands contaminated with:
   a. Protein soils
   b. Clostridium difficile
   c. Both of the above
   d. Neither of the above

10. Standard precautions involve using barriers to prevent transmission of infectious organisms from contact with:
    a. Blood
    b. Non-intact skin
    c. Mucus membranes
    d. All of the above

11. Use of standard precautions is only necessary for patients who are presumed to be infectious to others.
    a. True
    b. False

12. How frequently should instrument transport vehicles be cleaned?
    a. Once time each month
    b. After each use
    c. Weekly
    d. Daily

13. Factors that impact infection rates include:
    a. Storage conditions
    b. Transport conditions
    c. Not checking sterile trays for integrity prior to opening
    d. All the above

14. Most people are aware if they are a carrier of an infectious organism.
    a. True
    b. False

15. Current antibiotics may not be effective in the face of emerging infectious bacterial diseases.
    a. True
    b. False

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