This month’s newsletter provides Q-Net’s annual quiz, which focuses on all of the topics discussed in this newsletter during the previous year. After completing this self-study quiz, readers will have a better understanding of, among other topics, biofilms and transmission-based precautions. This quiz’s answers, which are provided on p. 12, can be used to update a facility’s policies and procedures and to assist in the development of a quality control program for gastrointestinal (GI) endoscopy.

Editor-in-Chief

All of the articles published in this newsletter are written by: Lawrence F. Muscarella, Ph.D., Chief, Infection Control at Custom Ultrasonics, Inc. Ivyland, PA.

What is ‘Q-Net’?

Q-Net is a technology-assessment, Internet-based network of questions and answers. Its newsletter is The Q-Net™ Monthly.

The main goal of Q-Net is to encourage the infection control, endoscopy, and OR communities not only to ask good questions but also to demand well referenced responses. Q-Net addresses the needs of both the health care provider whose goal is to provide the best care possible and the patient who deserves affordable quality health care.

Annual quiz, 2008

This annual quiz is provided to help readers review and learn about the topics discussed in this newsletter during 2007.

This annual quiz focuses on, among other topics: Clostridium difficile and biofilms; transmission-based precautions; potential conflicts of interest in infection-control; flash sterilization; Serratia infections; and the transmission of the hepatitis C virus during gastrointestinal (GI) endoscopy.

As part of an effective educational and quality assurance program, this quiz may be used for competency testing and for continuing education units, or CEUs.


1. Which one of the following measures does not apply to the care of hospitalized patients known to be infected with Clostridium difficile? (A) Standard Precautions (B) Proper hand hygiene (C) Contact Precautions (D) Use of an N95 or higher level respirator (E) Cleaning of environmental surfaces.

2. Which one of the following is false? (A) Although a spore-forming bacterium, C. difficile is readily destroyed by high-level disinfection. (B) C. difficile is not transmitted from patient-to-patient through direct or indirect contact. (C) The primary reservoir of C. difficile is infected (and colonized) patients in hospitals and long-term care facilities. (D) C. difficile is transmitted by way of oral ingestion (i.e., the fecal-oral route), not contaminated GI endoscopes.

3. Which one of the following statements is true? (A) Biofilms in the internal channels of GI endoscopes reprocessed in accordance with SGNA

(Continued on page 10)

Quiz Instructions

Write your answers on the lines provided in the Answer Box on page 12. The correct answers to this quiz are provided in the accompanying Key.

The PowerPoint lecture that the editor of this newsletter (LFM) presented at SGNA’s 2008 Annual Course in Salt Lake City, UT, is available on-line for review. Visit: http://www.myendosite.com/ This presentation focuses on the prevention of disease transmission during gastrointestinal (GI) endoscopy.
guidelines have not been causally linked to disease transmission. (B) Some high-level disinfectants are ineffective and have been linked to an increased risk of transmission of C. difficile during GI endoscopy. (C) Several reports document the transmission of C. difficile embedded in biofilms adhering to the walls of the internal channels of GI endoscopes. (D) Two percent (2%) glutaraldehyde does not destroy C. difficile, even during prolonged immersion times.

4. Which one of the following statements is false? (A) Biofilms are complexes of microorganisms and their secretions. (B) GI endoscopes contaminated with biofilms have been linked to infections of spore-forming bacteria. (C) High-level disinfectants that contain ortho-phthalaldehyde have not been shown to pose an increased risk of biofilm development, disease transmission, or C. difficile infection. (D) Not all types of spore-forming bacteria are alike, and some, like C. difficile, do not require sterilization for their destruction.


1. The 2007 report of the transmission of the hepatitis C virus (HCV) at a pain clinic in New York was attributed to each of the following except: (A) The reuse of contaminated multi-dose medicine vials (B) The re-injection of the same patient with additional medicine (C) The reuse of syringes on multiple patients (D) Horizontal transmission of HCV from the source patient to the index patient.

2. Each of the following practices pose an increased risk of transmission of HCV except: (A) The reuse of syringes (B) High-level disinfection of a GI endoscope (C) The sharing of single-dose medicine vials among different patients (D) The use of multi-dose medicine vials (E) The pooling of medications from single- or multi-dose vials into one vial to be shared among different patients.

3. Which one of the following practices is not recommended to prevent transmission of HCV: (A) High-level disinfection of biopsy forceps and other GI endoscopic accessories. (B) Establishment of a quality assurance program that monitors healthcare staff to ensure compliance with endoscope-reprocessing guidelines. (C) Use of a new sterile syringe (and needle) to re-inject a patient with additional doses of an intravenous (IV) medication. (D) Use of aseptic technique during the administration of IV medications.

4. The transmission of HCV reported in 2008 at a GI endoscopy clinic in Nevada was due to which of the following? (A) The sharing of single-dose medicine vials among different patients. (B) The improper cleaning of a colonoscope’s air and water channels. (C) Inadequate disinfection of a gastroscope. (D) The reuse of syringes to re-inject patients with additional medication. (E) A and D. (F) B and C.


1. Which one of following is not an “epidemiologically important” infectious agent? (A) methicillin-resistant Staphylococcus aureus (MRSA) (B) multidrug-resistant gram-negative bacilli (C) vancomycin-resistant enterococci (VRE) (D) Mycobacterium gordonae (E) C. difficile.

2. Which one of the following is not a transmission-based precaution? (A) Standard Precautions (B) Droplet Precautions (C) Contact Precautions (D) Airborne Infection Isolation Precautions (E) All of the above.

3. Which one of the following statements is false? (A) Standard Precautions are used to prevent transmission of blood-borne pathogens including the hepatitis C virus (HCV). (B) Both Droplet Precautions and Airborne Infection Isolation Precautions are recommended to prevent patient-to-patient transmission of non-tuberculous (atypical) mycobacteria, such as Mycobacterium avium-intracellulare (MAI). (C) Standard Precautions may be insufficient to prevent person-to-person transmission of some types of infectious agents that use the contact, droplet, or airborne route to infect patients. (D) Airborne Precautions may be necessary to prevent transmission of respiratory tuberculosis.

Topics discussed in this newsletter in 2007

- Risk factors for Toxic Anterior Segment Syndrome: Jan-Feb 2007
- A proposal to reduce the risk of healthcare-acquired infections: Mar-Apr 2007
- Annual quiz, 2007: May-Jun 2007
- Serratia infections in NICUs: Jul-Aug 2007
- Transmission-based Precautions: Jul-Aug 2007
- Flash sterilization: Sept-Oct 2007
- Clostridium difficile, biofilms: Nov 2007
- HCV transmission in New York: Dec 2007

4. Which one of the following is not recommended as part of an effective quality assurance and educational program developed to prevent nosocomial transmission of Serratia spp.? (A) Education of nursing staff about the principles of and rationale for Contact Precautions. (B) Surveillance of patients for the prompt identification of Serratia infections (and colonizations). (C) Supervision of nursing staff. (Continued on page 11)
(D) Education of nursing staff about the epidemiology and modes of transmission of *Serratia* spp. (E) Sterilization of non-critical items used on or in contact with infected patients.

5. Which one of the following measures does not prevent the transmission of *S. marcescens* in a neonatal intensive care unit (NICU)? (A) Contact Precautions (B) Droplet Precautions (C) Standard Precautions (D) Use of personal protective equipment (PPE) (E) Cleaning and disinfection of environmental surfaces (F) Cohorting of infected neonates.

**PART 3B. *Serratia* infections in NICUs, flash sterilization.** Discussed in the September-October, 2007, issue of this newsletter.

1. Which one of the following poses an increased risk of transmission of *Serratia* spp. in a NICU? (A) Designing the NICU to include single rooms for infected (and colonized) patients. (B) Temporarily closing the NICU, or stopping new admissions. (C) Judicious use of antibiotics (D) Using tap water in the neonates’ nebulizers and humidifiers.

2. Which one of the following measures is not recommended to prevent transmission of *S. marcescens* in a NICU? (A) Sterilization of all reusable semi-critical instruments used on infected (or colonized) neonates. (B) Cohorting infected (and colonized) neonates. (C) Proper hand washing by staff members. (D) Prompt identification and isolation of infected (or colonized) neonates.

3. Which one of the following about *S. marcescens* is false? (A) Like *C. difficile, S. marcescens* is transmitted by direct or indirect contact, and *Standard Precautions* may be insufficient to prevent its spread. (B) Most healthcare infections of *Serratia* spp. are caused by *S. marcescens*. (C) Bronchoscopes and GI endoscopes have been linked to infections of *S. marcescens*. (D) The transiently contaminated hands of healthcare workers may be responsible for nosocomial transmission of *S. marcescens* in a NICU. (E) Overcrowding, understaffing, and an inadequate supply of reusable instruments are risk factors for transmission of *S. marcescens* in a NICU. (F) All of the above are true.

4. Each one of these has been reported to be potential reservoir or source of *S. marcescens* in a NICU except: (A) The hands of healthcare workers (B) The gastrointestinal tracts of infected infants (C) Contaminated laryngoscopes and incubators (D) Contaminated sinks, water faucets, and other wet environmental surfaces (E) All of the above.

5. Which one the following about flash sterilization is false? (A) It may encourage the preoperative administration of prophylactic antibiotics. (B) It is safe, effective, and recommended for implants. (C) It can introduce two standards of care into the operating room setting. (D) It is associated with an inherently narrower margin of safety compared to traditional (wrapped) steam sterilization. (E) JCAHO recommends its use only when absolutely necessary or in an “emergency situation” - not on a routine basis (e.g., daily).

6. Which one of the following about flash sterilization is true? (A) It is recommended for routine use. (B) Flashed instruments are wrapped and dry at the time of use. (C) Its use may reduce the number of instruments required in inventory to meet patient demand. (D) The documentation associated with flashing is more detailed than that associated with traditional steam sterilization processes.

7. Which one of the following would not explain or justify the overuse of flash sterilization in a healthcare facility? (A) JCAHO recommends its routine use to establish one consistent standard of care. (B) Flashing may be completed in as few as 3 minutes (at 134°C, with no drying time). (C) Flashing decreases instrument turnaround time. (D) Flashing is convenient and may reduces costs.


1. Which one of the following statements is false? (A) As many as 2 million healthcare-acquired infections, with 90,000 associated deaths, are reported each year in the U.S. (B) The recommendations of infection-control guidelines can be subtly manipulated to become “ingenious marketing tools.” (C) Virtually every infection-control guideline discloses in its text all of the financial associations that exist between the guideline’s sponsoring organization and companies marketing infection-control products. (D) Financial associations between organizations that publish infection-control guidelines and manufacturers of infection-control products may inadvertently introduce bias into the guideline.

2. For which one of the following reasons would it be inappropriate for an organization to write or revise an infection-control guideline? (A) To minimize confusion and to clarify for its membership the organization’s position and recommended practices. (B) To promote the sale of an infection-control product marketed by a company that, through “educational” grants, funds the guideline’s sponsoring organization. (C) To improve public health. (D) To establish a consistent and safe standard of patient care.

(Continued on page 12)

1. Toxic Anterior Segment Syndrome (TASS) is a term used to describe injury to which of the following organs? (A) urinary tract (B) esophagus (C) pulmonary tract (D) eyes (E) colon (F) None of the above.

2. Which one of the following factors associated with instrument reprocessing is not a reported risk factor for TASS? (A) Flash sterilization of ophthalmic instruments. (B) The reuse of single-use cleaning brushes. (C) Improper maintenance of steam autoclave generators. (D) Bacterial contamination of ultrasounds baths. (E) Residues of enzymatic detergents that remain on ophthalmic instruments after cleaning and water rinsing. (F) Low temperature sterilization of ophthalmic instruments. (G) All of the above.

3. Which one of the following about TASS is false? (A) TASS has been linked to infections of gram-negative bacteria including Serratia marcescens and Pseudomonas aeruginosa. (B) TASS is caused by contact of the eye with toxic, non-infectious substances during ophthalmic surgery. (C) The cleaning and sterilization of ophthalmic instruments may be responsible for some cases of TASS. (D) The onset of inflammation associated with TASS is usually sudden and within 12 to 24 hours after surgery. • The End LFM

Thank you for your interest in this newsletter. I have addressed each issue and topic to the best of my ability. Respectfully, Lawrence F. Muscarella, Ph.D.

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~ Answer Box and Key ~

Instructions: (1) Before beginning this quiz, cover the inverted right-hand column (which provides the correct answers). (2) Next, write your answers on the lines provided in the left-hand column. A review of all of this newsletter’s issues published in 2007 is recommended.

Part 1.
• Question 1: ________  • Question 2: ________  • Question 3: ________  • Question 4: ________

Part 2.
• Question 1: ________  • Question 2: ________  • Question 3: ________  • Question 4: ________

Part 3A.
• Question 1: ________  • Question 2: ________  • Question 3: ________  • Question 4: ________  • Question 5: ________

Part 3B.
• Question 1: ________  • Question 2: ________  • Question 3: ________  • Question 4: ________  • Question 5: ________  • Question 6: ________  • Question 7: ________

Part 4.
• Question 1: ________  • Question 2: ________  • Question 3: ________

Part 5.
• Question 1: ________  • Question 2: ________  • Question 3: ________