

The Q-Net™ Monthly

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What's News

● The October and November, 2007, issues of *Materials Management in Health Care* provide my answers to six important instrument reprocessing questions. ● **Metricide OPA Plus**—a new high-level disinfectant the active ingredient of which, like Cidex OPA, is *ortho-phthalaldehyde*—is reportedly now available for sale. A review of this newsletter's *November-December, 2006*, issue is recommended to learn how to use both of these *ortho-phthalaldehyde* products safely.

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.

C. difficile, Biofilms

Has this spore-former been transmitted during GI endoscopy?

"Discussions about biofilms and the slow sporicidal rates of some high-level disinfectants as risk factors for transmission of C. difficile during GI endoscopy appear to 'much ado about nothing.'"

BACKGROUND: The last two issues of this newsletter provide recommendations to prevent transmission of *Serratia. Clostridium difficile* is another important nosocomial pathogen that also typically requires *Contact Precautions*, diligent hand washing (with soap and water), and cleaning of environmental surfaces to control and prevent its transmission.¹⁻⁶

C. difficile is responsible for a number of diseases of the intestines, including *Clostridium difficile*-associated disease (CDAD).^{1,6} This opportunistic, spore-forming, gram-positive, anaerobic bacillus is transmitted from one patient to another through direct or indirect contact—namely, through the oral ingestion of its vegetative cells or endospores (i.e., the fecal-oral route).¹ The primary reservoirs of *C. difficile* are infected (and colonized) patients in hospitals and long-term care facilities.^{2,3}

The hands of healthcare workers, which may become transiently colonized with this spore-former, are the primary sources of *C. difficile*, although to a less

and more controversial extent environmental surfaces, on which endospores of *C. difficile* can survive for weeks or months, also appear to play a role in the nosocomial transmission of *C. difficile*.¹⁻⁶

INTRODUCTION: Several company-sponsored lectures, seminars, and symposiums recently presented at infection control and gastrointestinal (GI) endoscopy conferences have focused on *C. difficile* and whether current practices for reprocessing GI endoscopes are adequate to prevent its transmission. Viewing these presentations with circumspect attention, the GI community has understandably questioned whether a contaminated GI endoscope could transmit *C. difficile*.

In addition to these presentations, a few recently published studies have similarly suggested that some high-level disinfectants may be potential risk factors for the transmission of *C. difficile*.⁷⁻⁹ According to a study promoting the use of an automated endoscope reprocessor (AER) and its accompanying high-level disinfectant, "improperly decontaminated colonoscopes and duodenoscopes have the potential to spread" endospores of

(Continued on page 22)

Keywords: *Clostridium difficile, biofilms, disease transmission, nosocomial infection and GI endoscopy*

C. difficile from one patient to another.⁸

Another recently published study promoting the use of a different high-level disinfectant concludes that: “colonoscopes, sigmoidoscopes, and gastroscopes could be expected to be contaminated with spore-forming bacteria” (such as *C. difficile*), which “could contribute to the formation of a biofilm if not killed.”⁹ (Biofilms are complexes of microorganisms and their secretions.⁹) This study sampled four GI endoscopes and found some to be contaminated with both spore-forming and non-spore-forming bacteria, although none of these bacteria were identified by name. (Neither of these two studies references any cases of the transmission of *C. difficile* or another spore-forming bacterium during GI endoscopy.^{8,9})

According to this latter study,⁹ once a biofilm has formed and adhered to the internal channels of a GI endoscope, infectious agents such as *C. difficile* could “take refuge” in the biofilm and be protected during chemical immersion. This study further suggests that reprocessing GI endoscopes using high-level disinfectants that require prolonged exposure times to destroy *Bacillus subtilis* and *C. sporogenes*—two spore-forming bacteria that are used to evaluate the sporicidal properties of a germicide—may pose an increased risk of the formation of biofilms and the transmission of infectious agents including spore-forming bacteria.⁹

Capitalizing on concerns in the GI community about the potential for patient-to-patient transmission of *C. difficile* during GI endoscopy, some of these presentations and published studies have (erroneously) suggested (or intimated) that: (a) high-level disinfection is an unrealized risk factor for disease transmission; (b) some marketed high-level disinfectants are inferior to others and may be responsible for the formation of biofilms and an increased risk of transmission of different types of infectious agents including *C. difficile* during GI endoscopy; and/or (c) “sterilization” of GI endoscopes or the use of a non-aldehyde high-level disinfectant is necessary to prevent the transmission of *C. difficile*.^{8,9}

THE FACTS ABOUT C. DIFFICILE: While it is true that some high-level disinfectants may require a longer exposure time than others to destroy *B. subtilis* and *C. sporogenes*, these two spore-forming bacteria are neither pathogenic nor encountered in the endoscopic setting. Further, not all types of spore-forming bacteria are alike or require either prolonged immersion in a high-level disinfectant or sterilization for their destruction. ➔ *Not only does high-level disinfection completely destroy vegetative cells and endospores of C. difficile, but 2% (alkaline) glutaraldehyde has been documented to destroy C. difficile in less than 10 minutes (at 20° C).*¹⁰⁻¹⁹

Although outbreaks of *C. difficile* have been reported in hospitals and long-term care facilities, none has been reported in the GI endoscopic setting.^{2,3} ➔ *In fact, there are no reports of a GI endoscope transmitting C. difficile or another type of*

There are no reports of a GI endoscope transmitting *C. difficile* or another type of pathogenic spore-forming bacterium.

pathogenic spore-forming bacterium. Nor have any published studies demonstrated that one type of high-level disinfectant is associated with a higher risk of disease transmission than other high-level disinfectants or sterilants.

These findings are significant, because not only are almost all GI endoscopes high-level disinfected between uses, but more than ten million GI endoscopic procedures are performed each year in the U.S.⁹ ➔ *Discussions and presentations about biofilms, the slow sporicidal rates of some high-level disinfectants, or glutaraldehyde-resistant mycobacteria as risk factors for nosocomial transmission of C. difficile or another type of*

pathogenic spore-forming (or non-spore-forming) bacterium during GI endoscopy appear to be sensationalistic and “much ado about nothing.”¹⁰

Biofilms have been linked to nosocomial infections following flexible endoscopy, but these biofilms were produced by non-spore-forming bacteria, such as *Pseudomonas aeruginosa*—not by *C. difficile* or another spore-forming bacterium. And, the causes of these biofilms and infections were atypical and due to, for example, a manufacturing defect of a recalled bronchoscope model, the flawed design of an AER, or the damaged channel of an endoscope.²⁰⁻²⁵ High-level disinfection of GI endoscopes—whether achieved using an aldehyde-based or other type of germicide—prevents transmission of all types of pathogenic microorganisms encountered in the GI endoscopic setting, including *C. difficile*. ● LFM

The REFERENCES for this article are available at:

www.myendosite.com/refs1107.pdf

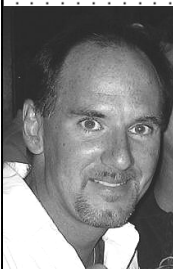
Thank you for your interest in this newsletter. I have addressed each issue and topic to the best of my ability. Respectfully, *Lawrence F. Muscarella, Ph.D.*
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