

# The Q-Net™ Monthly

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## In the News ...

The topic addressed this month discusses measures to prevent transmission of environmental microorganisms to patients during endoscopy. This is an important topic as a state radio report (Monday, 30 Nov 1998) indicates:

*"Three people, each with a weakened immune system, have recently died from Legionnaire's disease in a hospital in Zaragoza, Spain. The hospital is disinfecting the water and air conditioning systems to prevent further infection."*

## Database Update

If your postal (or E-mail) address has changed, or if you are receiving duplicate mailings of this newsletter, please contact me so that I can update Q-Net's database.

## What is 'Q-Net'?

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

Q-Net's main goal is to encourage the infection control and endoscopy communities not only to ask good questions but also to demand succinct and 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.

## Reprocessing bronchoscopes in the A.M.

*~ The clinical benefits of reprocessing endoscopes before use on the first patient of the day have not been documented. ~*

## Background

Liquid chemical sterilants are routinely used to disinfect instruments. In order to minimize the likelihood of recontaminating the endoscope with environmental bacteria during storage, terminally rinsing the endoscope's internal channels with 70% alcohol, followed by forced air drying, is essential.<sup>1</sup>

*☞ Is it really that important to ensure the endoscope is dry before storage?*

Many types of microorganisms, including *Pseudomonas*, atypical mycobacteria, and *Legionella* (see *In the News*, above, left), have been identified in tap water used by hospitals to rinse endoscopes.<sup>2</sup>

Reports of endoscopes transmitting these and other potentially pathogenic bacteria to patients have been documented.<sup>3-6</sup> Rinsing the endoscope's internal channels with 70% (isopropyl) alcohol prior to storage accelerates drying, depriving these waterborne

microorganisms of the moist environment they require to proliferate during overnight storage.

But determining whether the endoscope is completely dry prior to storage is difficult. So is ensuring that the rinse (tap) water is free of bacteria. Some health care professionals therefore wonder whether cleaning and disinfecting the endoscope *before* its use on the first patient of the day might be clinically meritorious.

## 2 standards of care?

Several arguments favoring this preemptive practice have been posed. In addition to improving overall quality assurance, reprocessing an endoscope in the morning before use on the first patient increases the likelihood that the instrument will be safe and effective.

Further, because documentation that an endoscope removed from storage was properly reprocessed prior to its storage the previous day is not always available, this preemptive practice provides greater assurance that the endoscope will be of the same 'quality' (e.g., clean and disinfected) as the endoscopes used on other patients later in the day. Consequently, this practice allays concern that the first patient is being treated differently than subsequent patients, which would represent two standards of care.

To be sure, this practice is not without its critics, as it may increase reprocessing costs, can be time-

*(Continued on page 20)*

consuming, and data demonstrating its clinical benefit to the patient have not been documented. Cleaning and disinfecting endoscopes before the first patient is therefore generally not recommended, provided published standards and well-established reprocessing guidelines, which include proper instrument storage procedures, are exercised.<sup>1</sup>

Proponents, on the other hand, contend that this practice is requisite, since the possibility that the endoscope was not thoroughly dried prior to storage, and may therefore be contaminated with waterborne bacteria, exists. Not reprocessing the endoscope in the morning, they add, places the first patient of the day unnecessarily at risk of environmental contamination.

### Bronchoscopes vs. GI endoscopes

Published reprocessing guidelines do not generally discriminate between the infection risks associated with bronchoscopes and gastrointestinal (GI) endoscopes. Both are classified as semicritical devices that require thorough cleaning, high-level disinfection, and drying before storage.

The reported similar infection rates of these two types of endoscopes notwithstanding, some hospital staff perceive patients undergoing bronchoscopy to be

at greater risk of infection than GI endoscopy.<sup>7</sup> This may be for several reasons, including:

- (1) the public's increased sensitization to frequent and well-publicized reports of recent increases in the number of patients infected with *Mycobacterium tuberculosis*, which has been reported following bronchoscopy<sup>8</sup> but rarely GI endoscopy;<sup>9</sup>
- (2) treating mycobacterial infections can be costly, is difficult to monitor, and may require prolonged chemotherapy;
- (3) save for bacterial endospores, mycobacteria are the most resistant microorganisms to 2% glutaraldehyde and many other liquid chemical sterilants; and
- (4) tap water used by hospitals to rinse endoscopes after chemical immersion has been found to contain atypical mycobacteria and other opportunistic microorganisms<sup>2</sup> (see Box articles 1 and 2, below).

Because of the perception that bronchoscopy may pose more of an infection risk than GI endoscopy, some hospitals reprocess bronchoscopes more rigorously than GI endoscopes<sup>7</sup> (with the possible exception of side-viewing duodenoscopes used during ERCP procedures.) (Note: Modifying an instrument reprocessing procedure because of fears that it may be ineffective against, for example, HIV or *M. tuberculosis* is not consistent with Standard/Universal Precautions and therefore is not recommended.)

Reported modifications in the hospital's standard reprocessing practices include:

- (1) using ethylene oxide (EtO) gas to 'sterilize' bronchoscopes (while using 2% glutaraldehyde to disinfect all of its other endoscopes);
- (2) increasing the bronchoscope's exposure time (e.g., increasing the immersion time in 2% glutaraldehyde from 20 to 60 minutes<sup>10</sup>); and

(Continued on page 21, column 2)

**BOX Article 1:** The following appeared in the Centers for Disease Control's *Recommendations and Reports*, December 07, 1990; 39(RR-17);1-29 *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings, with Special Focus on HIV-Related Issues: Where should bronchoscopy be performed?*

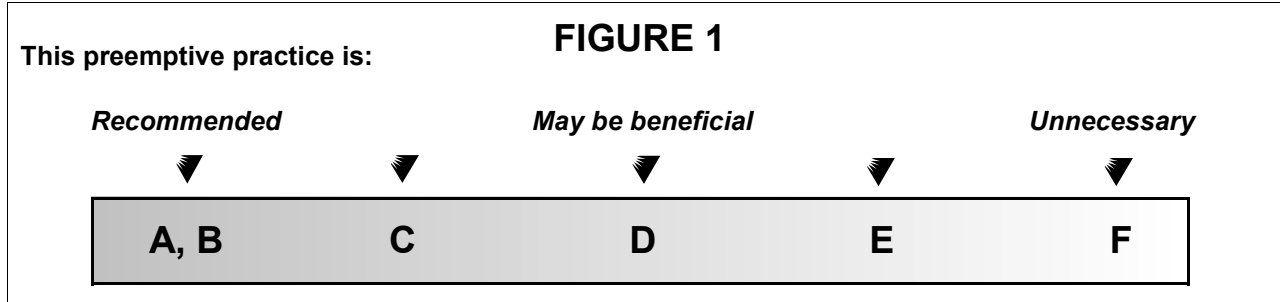
"Bronchoscopy should be performed in rooms that have adequate ventilation, good distribution of air flow, and air exhausted directly to the outside--in accordance with federal, state, and local regulations for environmental discharges--or recirculated through HEPA filters. Ideally, bronchoscopy should be performed in rooms with negative pressure relative to adjacent areas. If bronchoscopy must be performed in positive-pressure rooms (such as operating rooms), the risk of infectious tuberculosis should be ruled out beforehand. Additional protection may be afforded by local exhaust ventilation employed near the patient's head to exhaust most organisms near their source (see section II.C.1.) or by the use of UV lamps in treatment areas where bronchoscopies are performed (see section II.D.2.b.). Persons who must be in the room with the patient during bronchoscopy should wear PRs (see section II.D.2.c.)."

**BOX Article 2:** Several types of nontuberculous mycobacteria that have been isolated from hospital water systems. They include:<sup>2</sup>

☞ *Mycobacterium gordonae*, *M. chelonae*, *M. xenopi*, *M. avium* complex, *M. terrae*, and *M. fortuitum*.

Each of these microorganisms is potentially pathogenic. And several nosocomial outbreaks of nontuberculous mycobacterial disease, attributed to colonized water supplies, have been documented.<sup>2</sup>

TABLE 1	"A"	"B"	"C"	"D"	"E"	"F"
<b>Does the rinse water contain bacteria?</b>	YES	UNKNOWN	YES	YES	NO	NO
<b>Were the endoscope's channels flushed with 70% alcohol before storage?</b>	NO	UNKNOWN	YES	YES	NO	YES
<b>Were the endoscope's channels dried with forced air before storage?</b>	NO	UNKNOWN	NO	YES	NO	YES
<b>Relative risk to the patient:</b>	Greater risk	⇒	⇒	Less risk	⇒	Little risk, if any



**FIGURE 1:** Six unique scenarios, labeled "A" through "F", display the relative need to reprocess endoscopes *before* use on the first patient of the day. Depending on the facility's practices and the quality of its water supply, this practice may be recommended or deemed unnecessary.

- ☞ How to use **Table 1, Figure 1:**
- Answer each of the 3 questions displayed in the first column of **Table 1**, and determine which label (**A** through **F**) displayed in columns 2 through 7 best describes your facility.
  - Next, for this label, determine from the last row in **Table 1** the relative risk that processing endoscopes in your facility may pose to the patient.
  - Last, identify in **Figure 1** the location of this same label to determine whether this preemptive practice is *recommended* or *unnecessary* for your facility.

*(Continued from page 20)*

(3) reprocessing bronchoscopes before use on the first patient of the day.<sup>7</sup>

Unlike most GI endoscopes, which usually have several complex internal surfaces that do not facilitate cleaning, bronchoscopes have only one channel (the instrument channel) that can be cleaned with a brush, making their internal surfaces easier to disinfect. The number of infections transmitted by bronchoscopes is reported to be significantly *lower* than GI endoscopes.<sup>9</sup>

**What do published guidelines recommend?**

In general, most infection control organizations do not recommend reprocessing endoscopes before the first patient of the day. The *Working Party of the British Thoracic Society*, however, recommends this preemptive practice for bronchoscopes.<sup>10,11</sup> The *Working Party of the British Society of Gastroenterology* similarly recommends this practice for all endoscopic

*(Continued on page 22)*

equipment.<sup>12</sup>

☞ *Might there be an occasion when reprocessing bronchoscopes and GI endoscopes before use on the first patient is warranted?*

**Table 1** and **Figure 1** (page 21) display the relative need to reprocess endoscopes before use on the first patient of the day. Infection risks of varying degree to the patient are depicted by labels **A** through **F**.

While this practice may be unnecessary for facilities depicted by label **F**, it is recommended for facilities depicted by labels **A** and **B**, whose endoscopes are at greatest risk of contaminating patients with environmental bacteria. Differences in the relative infection risks of **A** and **B** are considered insignificant. (Refer to **Figure 1**'s legend on page 21, column 1.)

### Conclusions

Provided the endoscope has been thoroughly cleaned and disinfected using a standardized and validated process - which includes flushing its channels with 70% alcohol and drying them with forced air before storage - reprocessing endoscopes before use on the first patient of the day appears to be unnecessary. This is particularly true of hospitals whose tap water has been microbiologically sampled and demonstrated to be free of bacteria (refer to label **F** in **Table 1**) and who store their endoscopes in well-ventilated, clean areas.

To facilitate drying and further minimize the risk of contaminating patients with environmental mycobacteria, the following measures are recommended:

- ✓ Flush the endoscope's internal channels with 70% alcohol, followed by forced air;<sup>13</sup>
- ✓ Before storing the endoscope, remove its control valves, distal hood (if present), biopsy inlet cap and all other attachments, in accordance with the instructions in the endoscope's user manual;<sup>14</sup> and
- ✓ Store the endoscope in an area that is well-ventilated and prevents moisture accumulation.<sup>14</sup> Moreover, storing the endoscope in a hanging position,<sup>9</sup> rather than coiling it in a closed and poorly ventilated case, is recommended.

Even though data that demonstrate the effectiveness of reprocessing endoscopes before the first patient of the day have not been published, performing this preemptive practice may be prudent whenever:

- (a) the endoscope's channels are not routinely flushed with 70% alcohol followed by forced air before storage; or it is unknown whether these two steps may have been performed before storage (refer to labels **A** and **B** in **Figure 1, Table 1**);
- (b) the endoscope is observed to be moist when removed from storage; or
- (c) potentially pathogenic bacteria have been identified in the tap water used to rinse the endoscopes (refer to labels **A** through **D, Table 1**). *The End*

### References

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**LAWRENCE F MUSCARELLA, PHD**  
Director, Research and Development  
Chief, Infection Control

**CUSTOM ULTRASONICS, INC.**  
144 Railroad Drive  
Ivyland, PA 18974  
Tele: 215.364.1477; Fax: 215.364.7674  
E-mail: [q-net@msn.com](mailto:q-net@msn.com)  
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