Communication from the ASGE Standards of Practice Committee

GUIDELINE

# Infection control during GI endoscopy

*This is one of a series of statements discussing the use of GI endoscopy in common clinical situations. The Standards of Practice Committee of the American Society for Gastrointestinal Endoscopy (ASGE) prepared this text. In preparing this guideline, a search of the medical literature was performed by using PubMed, supplemented by accessing the "related articles" feature of PubMed. Additional references were obtained from the bibliographies of the identified articles and from recommendations of expert consultants. When little or no data exist from well-designed prospective trials, emphasis is given to results from large series and reports from recognized experts. Guidelines for appropriate use of endoscopy are based on a critical review of the available data and expert consensus at the time the guidelines are drafted. Further controlled clinical studies may be needed to clarify aspects of this guideline. This guideline may be revised as necessary to account for changes in technology, new data, or other aspects of clinical practice. The recommendations were based on reviewed studies and were graded on the strength of the supporting evidence (Table 1).*

*This guideline is intended to be an educational device to provide information that may assist endoscopists in providing care to patients. This guideline is not a rule and should not be construed as establishing a legal standard of care or as encouraging, advocating, requiring, or discouraging any particular treatment. Clinical decisions in any particular case involve a complex analysis of the patient's condition and available courses of action. Therefore, clinical considerations may lead an endoscopist to take a course of action that varies from these guidelines.*

## BACKGROUND

Despite the large number and variety of GI endoscopic procedures performed, documented instances of infectious complications remain rare, with an estimated frequency of 1 in 1.8 million procedures.[1] Endoscopy-related infection may occur under the following circumstances: (1) microorganisms may be spread from patient to patient by contaminated equipment (exogenous infections), (2) microorganisms may spread from the GI tract through the bloodstream during an endoscopy to susceptible organs or prostheses, or may spread to adjacent tissues that are breached as a result of the endoscopic procedure (endogenous infections), or (3) microorganisms may be transmitted from patients to endoscopy personnel and perhaps from endoscopy personnel to patients.

The purpose of this document is to disseminate information and promote understanding, which leads to the prevention of infection as a result of a GI endoscopy. Circumstances in which an endoscopy-related infection might occur are discussed, as are measures to prevent such infection, including endoscope reprocessing, antibiotic prophylaxis, and protection of endoscopy personnel.

## PATIENT TO PATIENT TRANSMISSION OF MICROORGANISMS (EXOGENOUS INFECTIONS)

Over the course of an endoscopic examination, the external surface and internal channels of flexible endoscopes are exposed to body fluids and contaminants. Disinfection of these reusable instruments poses special problems. Given their relatively delicate structure, these instruments cannot be autoclaved. Therefore, processing is achieved by mechanical cleaning, followed by high-level disinfection (HLD), rinsing, and drying. Stringent guidelines for the reprocessing of flexible endoscopes were developed by the ASGE and the Society for Healthcare Epidemiology of America, who convened with representatives from physician, nursing, and infection control organizations, industry leaders, and federal and state agencies. This conference resulted in the publication, in 2003, of the multisociety guideline for reprocessing of flexible GI endoscopes.[2] Since that time, there have been no reported cases of transmission of infection when these HLD guidelines were followed. In the absence of defective equipment, all subsequent reported cases of transmission of infection resulted from failure to adhere to these guidelines.

## TRANSMISSION OF MICROORGANISMS BY ENDOSCOPY

The potential for transmission of infection during a GI endoscopy is a matter of concern to both physicians and patients. Fortunately, such transmission is very rare.


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**TABLE 1. Grades of recommendation***

| Grade of recommendation | Clarity of benefit | Methodologic strength/supporting evidence | Implications |
|---|---|---|---|
| 1A | Clear | Randomized trials without important limitations | Strong recommendation; can be applied to most clinical settings |
| 1B | Clear | Randomized trials with important limitations (inconsistent results, nonfatal methodologic flaws) | Strong recommendation; likely to apply to most practice settings |
| 1C+ | Clear | Overwhelming evidence from observational studies | Strong recommendation; can apply to most practice settings in most situations |
| 1C | Clear | Observational studies | Intermediate-strength recommendation; may change when stronger evidence is available |
| 2A | Unclear | Randomized trials without important limitations | Intermediate-strength recommendation; best action may differ depending on circumstances or patient or societal values |
| 2B | Unclear | Randomized trials with important limitations (inconsistent results, nonfatal methodologic flaws) | Weak recommendation; alternative approaches may be better under some circumstances |
| 2C | Unclear | Observational studies | Very weak recommendation; alternative approaches likely to be better under some circumstances |
| 3 | Unclear | Expert opinion only | Weak recommendation; likely to change as data become available |

**Adapted from* Guyatt G, Sinclair J, Cook D, et al. Moving from evidence to action: grading recommendations—a qualitative approach. In: Guyatt G, Rennie D, editors. Users' guides to the medical literature. Chicago: AMA Press; 2002. pp. 599-608.

Spach et al[3] reviewed the literature between 1966 and 1992 and were able to document 281 reported cases of transmission of microorganisms by GI endoscopy.

The vast majority of these cases occurred before the adoption of the initial 1988 guidelines, which stressed the need for thorough manual cleaning of endoscopes before disinfection.[4] Only 28 cases of endoscopic transmission of infection were reported between 1988 and 1992, with an estimated 40 million GI endoscopies performed over the same period. The transmission rate of infection by a GI endoscopy, therefore, was estimated to be 1 in 1.8 million.[1] It has been argued that this figure may be an underestimate, because of a combination of underreporting, unrecognized asymptomatic infections, or an unrecognized association of infections with prior endoscopy, where the incubation period of the infecting organism is very long. Equally, it has been argued that, with the adoption of the stringent 2003 multisociety guidelines,[2] the transmission rate of infection by an endoscopy may now be considerably lower.[5] Nevertheless, it is evident that transmission of infection because of a GI endoscopy is a very rare event, and, when the multisociety guidelines were followed, no cases of transmission of infection were reported.

## Bacterial infections

When significant bacterial infections are transmitted, they are usually recognized, because their incubation periods are often short, and patients usually develop overt clinical symptoms. Transmission of bacterial infection from endoscopes has been rare after the adoption of the current reprocessing guidelines, which were shown to effectively eliminate microorganisms.[6] Most reported cases predate these guidelines.

A total of 84 cases of endoscopy-related transmission of *Salmonella* species between patients was reported between 1974 and 1987[7-15] but none since that time. Forty-five cases of endoscopic transmission of *Pseudomonas* species were reported between 1974 and 1993.[16,17] In addition to inadequate reprocessing of the endoscope itself, the bacterium's propensity for growth in moisture-rich conditions has frequently been a factor that has facilitated transmission. In some instances, an unsterilized irrigation water bottle attached to the endoscope was identified as a source of infection.[18,19] A lack of cleaning and drying of the air-water and/or the elevator channels of duodenoscopes was also implicated in some cases of transmission of *Pseudomonas* infection.[20,21] Also, several cases were related to flawed automated endoscope washer-dryers.[21,22]

A few reports of endoscopic transmission of *Helicobacter pylori* were related to inadequate reprocessing of endoscopes and biopsy forceps.[23,24] Up to 61% of endoscopes became contaminated after use in patients infected with *H pylori*,[25] but conventional cleaning and