### Takeaway

Manual cleaning of flexible endoscopes should be verified using cleaning verification tests when new endoscopes are purchased and at established intervals (e.g., after each use, daily).

### Explanation

- **Efficacy of cleaning has traditionally been evaluated visually; however, visual inspection alone, even with magnification, is not sufficient to determine cleanliness of complex devices such as flexible endoscopes.**

- **Infectious microorganisms are not visible to the naked eye. It is also not possible to visually inspect the lumens of flexible endoscopes. Residual soil may remain and prevent effective subsequent high-level disinfection (HLD) or sterilization.**

- **There is a need for rapid testing methods to detect residual soil and verify the adequacy of manual cleaning. Cleaning verification tests include adenosine triphosphate (ATP) and chemical reagent tests for detecting clinically relevant soils (e.g., protein, carbohydrate).**

- **Periodic verification of cleaning effectiveness may help reduce errors in manual cleaning and improve effectiveness.**

- **Auditing the manual cleaning of flexible endoscopes provides an objective method for verifying cleanliness and helps ensure that insufficiently cleaned flexible endoscopes are re-cleaned before HLD or sterilization.**

**Recommendation XIII.f.**

### After manual cleaning and when compatible with the endoscope manufacturer's instructions for use, flexible endoscopes and accessories should be either mechanically cleaned and mechanically processed by exposure to a high-level disinfectant or a liquid chemical sterilant or should be mechanically cleaned and sterilized.

- **Mechanical processing includes mechanical cleaning, mechanical HLD or sterilization, and mechanical rinsing.**

- **The collective evidence shows that mechanical processing improves cleaning effectiveness, increases efficiency, minimizes personnel exposure to biohazardous materials, and can be more successfully monitored for quality and consistency.**

**Recommendation VIII.b.**
The collective evidence shows that optimal storage of flexible endoscopes facilitates drying, decreases the potential for contamination, and provides protection from environmental contaminants.

Drying cabinets include a drying system that circulates HEPA-filtered air through the cabinet while filtered air under pressure is forced through the endoscope channels. The internal and external surfaces of the endoscope are continuously dried, suppressing bacterial growth. Studies related to the efficacy of drying cabinets compared with other methods of storage showed that drying cabinets effectively limited bacterial proliferation during storage.

Recommendation IX.b.

A multidisciplinary team that includes infection preventionists, endoscopy and perioperative RNs, endoscopy processing personnel, endoscopists, and other involved personnel should establish a policy to determine the maximum storage time that processed flexible endoscopes are considered safe to use without reprocessing.

The collective evidence regarding the maximum safe storage time for processed endoscopes is inconclusive. Recommendations from professional organizations for maximum storage times for flexible endoscopes are not in agreement. Studies are also not in agreement and have shown that when correctly processed, flexible endoscopes may be safe to use for 48 hours to 56 days after processing.

Benefits to reducing unnecessary processing include reduced processing costs (eg, personnel, processing supplies), reduced wear and tear on the endoscope and processing equipment, and lower replacement and repair costs.

Safe storage times may be affected by factors unique to the facility, including the type of endoscopes processed and stored, processing effectiveness (eg, level of residual contamination), storage conditions (eg, restricted access, drying cabinet, HEPA-filtered air), compliance with manufacturers’ instructions for use (ie, endoscope, mechanical processor, storage cabinet), frequency of use, and patient population.

Recommendation IX.h.
A multidisciplinary team that includes infection preventionists, endoscopists, endoscopy processing personnel, microbiologists, laboratory personnel, risk managers, and other involved personnel should evaluate the need to implement a program for regular microbiologic surveillance culturing of flexible endoscopes and mechanical processors.

• A program of regular microbiological surveillance culturing of flexible endoscopes and mechanical processors is advised in the processing guidelines of several international organizations; however, there are variances among the recommendations.

• Routine surveillance microbiological culturing is supported in the literature as an effective method for monitoring the effectiveness and quality of processing, reinforcing best practices, evaluating the effectiveness of corrective interventions, and detecting endoscopes requiring service. Routine microbiological surveillance may also help to identify the source of contamination and rectify processing methods to prevent transmission of infection.

• The sensitivity of routine cultures may be unreliable for detecting the organisms associated with outbreaks. The use of surveillance cultures is confounded by the delay in feedback and the frequent isolation of nonpathogenic organisms resulting from environmental contamination. The need to quarantine flexible endoscopes until the culture results have been obtained may not allow for rapid reuse of the tested endoscope and could also lead to delays in patient care. Microbiological culturing is resource-intensive, and requires additional expenditures for microbiological testing and time for personnel to collect and process samples.

Recommendation XIII.g.

This tool is intended to be an adjunct to the complete guideline document on which it is based and is not intended to be a replacement for that document. Individuals who are developing and updating organizational policies and procedures should review and cite the full guideline document.