

Factors that Contribute to Nonadherence with Endoscope Reprocessing Guidelines: A Prospective Study

Overview of Findings from the CLEANR Study

(Clinical Evaluation and Assessment of Endoscope Reprocessing)

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ABSTRACT

Background and Significance

To develop interventions that will improve adherence with disinfection guidelines, more information is needed about factors affecting compliance.

Purpose

To evaluate employee perceptions, occupational health, and reprocessing practices in diverse settings.

Methodology

Prospective, multi-site, observational study utilizing interviews, surveys, and direct observation of reprocessing procedures.

Results

Endoscope reprocessing guidelines were in place at five sites, and >90% of reprocessing employees affirmed the importance of several critical steps. Many employees disliked some reprocessing tasks, including leak testing (31%), performing bedside wipe down (36%), alcohol flush (37%), and brushing (50%). Employees also felt pressure to work quickly (75%), and 37% observed procedural delays due to a lack of clean endoscopes. Leak tests, cleaning, disinfection, and alcohol flushes were consistently done when an automated endoscope cleaner and reprocessor (ECR) was used to reprocess 114 gastrointestinal endoscopes. With manual cleaning and high-level disinfection (MHL), one of 69 gastrointestinal endoscopes were reprocessed according to guidelines. Symptoms attributed to reprocessing were reported by 53% of employees. Physical discomfort occurred more frequently with MHL (90%) than ECR (25%; $P < 0.001$).

Conclusions and Implications

This study identified several factors that may contribute to nonadherence with reprocessing guidelines. Strategies for educating employees, monitoring compliance, and alleviating time pressures and symptoms associated with reprocessing may improve employee satisfaction and health while ensuring patient safety.

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STUDY PURPOSE AND RESEARCH METHODS

The purpose of the study was to evaluate employee perceptions, occupational health, reprocessing practices, and the time required to reprocess endoscopes. The study was conducted from October 2008 to April 2009 at five institutions (Table 1).

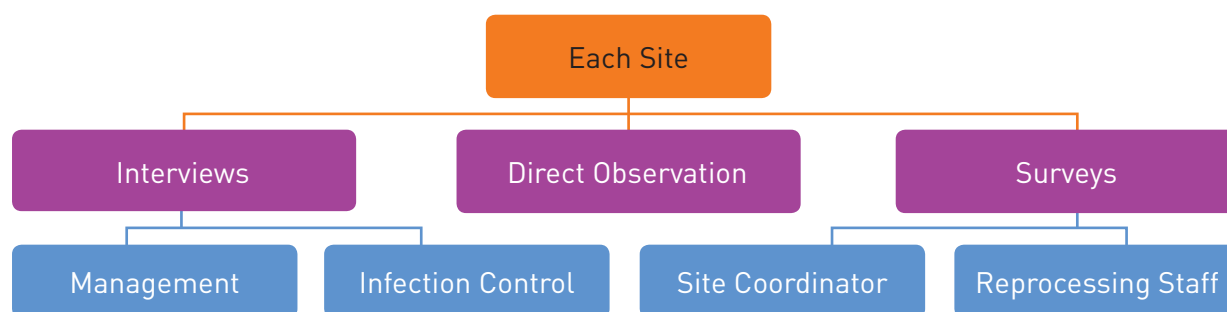
Participating sites used an automated system (ASP's EVOTECH® Endoscope Cleaner and Reprocessor (ECR)) or manual cleaning followed by automated High-Level Disinfection (MHL). For MHL, automated HLD was achieved using ASP's Automated Endoscope Reprocessor or STERIS® System 1® Sterile Processing System. Some MHL sites performed irrigation using MEDIVATORS® Scope Buddy™.

Table 1: Characteristics of Study Sites

Site	Procedures/Week	Facility Type	Scope Brands	Methods Used
A	45	Hospital	OLYMPUS® PENTAX™	ECR and MHL
B	35	GI Center	OLYMPUS®	ECR and MHL
C	10	Outpatient Surgery	FUJINON®	ECR
D	50	Hospital	OLYMPUS® PENTAX™	ECR and MHL
E	250	GI Center	OLYMPUS®	MHL

Data were collected via interviews, surveys, and direct observation during normal clinic operations (Figure 1).

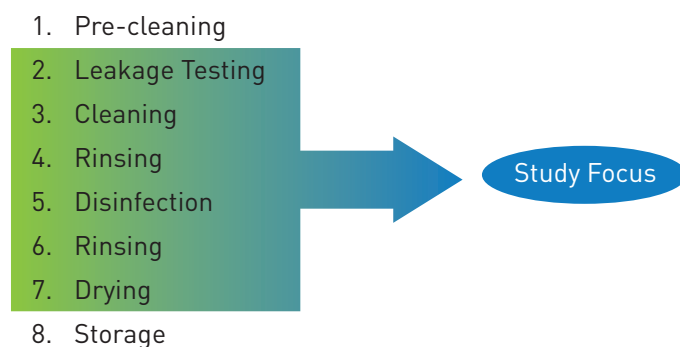
Figure 1: Data Collection Diagram



Trained observers used a structured log sheet and a stopwatch to document the steps taken and the time required to reprocess endoscopes. The observer began documenting reprocessing procedures and time upon the arrival of the endoscope in the reprocessing area. The observer remained in the room until reprocessing was completed for each scope. Reprocessors were aware they were being observed.

The data were used to evaluate adherence with six of the main steps covered in the 2009 SGNA guidelines (Figure 2).

Figure 2: 2009 SGNA Guidelines and Study Focus



RESULTS

Employee Satisfaction with Reprocessing Methods

Ninety-three employee surveys were completed. Over 90% of respondents affirmed the importance of several reprocessing steps recommended in the guidelines. They almost uniformly liked providing patient care, setting up endoscopes, and loading and unloading scopes from the automated HLD systems. However, fewer employees liked performing some of the tasks that are critical to effective reprocessing.

Percentage of employees who **liked** the task

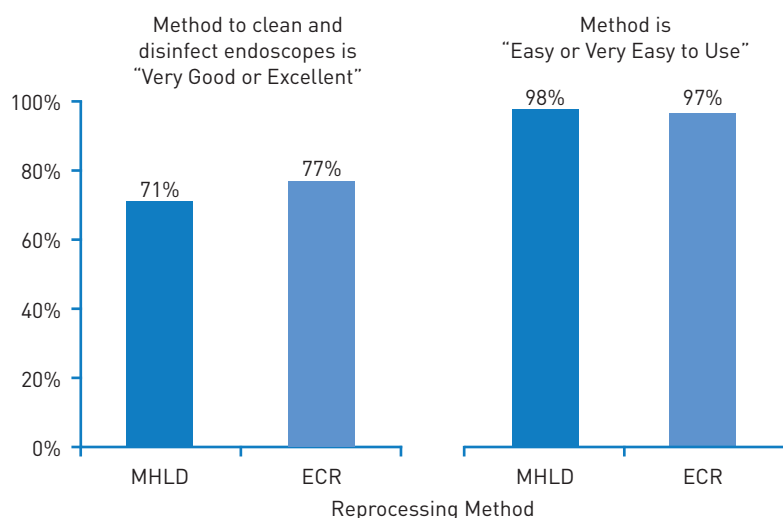
- 69% Leak testing
- 64% Performing wipe down/flush at bedside
- 63% Flushing with alcohol after HLD
- 50% Cleaning manually (brushing)

Employee perceptions on clinic efficiency:

- 75% felt pressure to work quickly when reprocessing endoscopes
- 37% observed procedural delays in the last month due to a lack of clean endoscopes

Employees described both MHL and ECR as effective and easy to use (Figure 3).

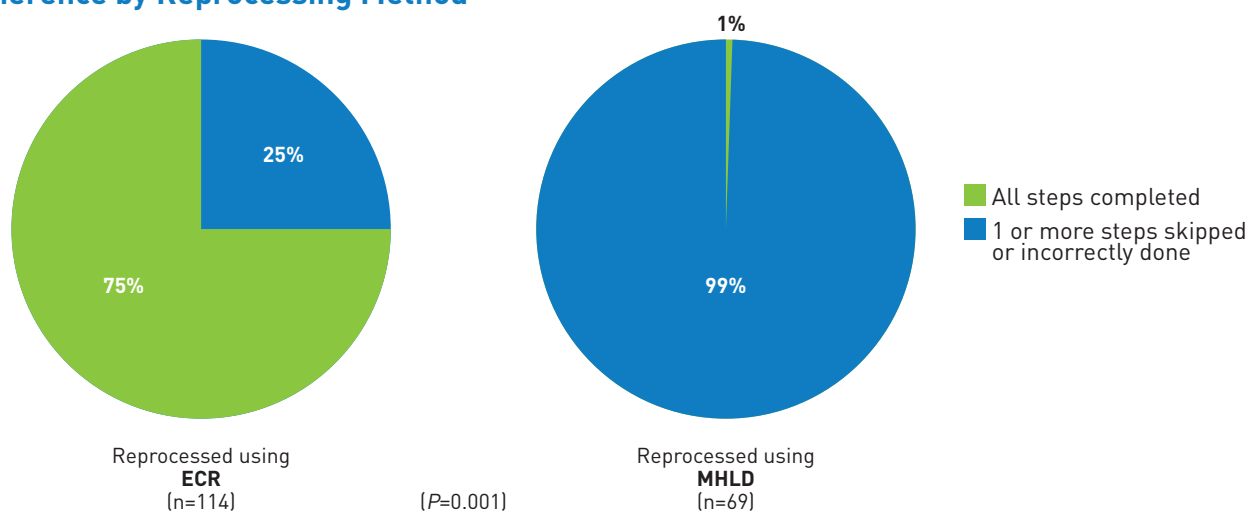
Figure 3: Satisfaction with Reprocessing Methods



Endoscope Reprocessing Adherence

Observers documented the reprocessing of 183 gastrointestinal endoscopes (114 with ECR; 69 with MHL). All of the steps were completed in accordance with guidelines for 47.5% of the observed endoscopes (including both ECR and MHL). Adherence differed by method used. Three-quarters of endoscopes reprocessed using ECRs were completed in accordance with guidelines. Only one of 69 endoscopes reprocessed using manual methods was completed in accordance with guidelines (Figure 4).

Figure 4: Adherence by Reprocessing Method



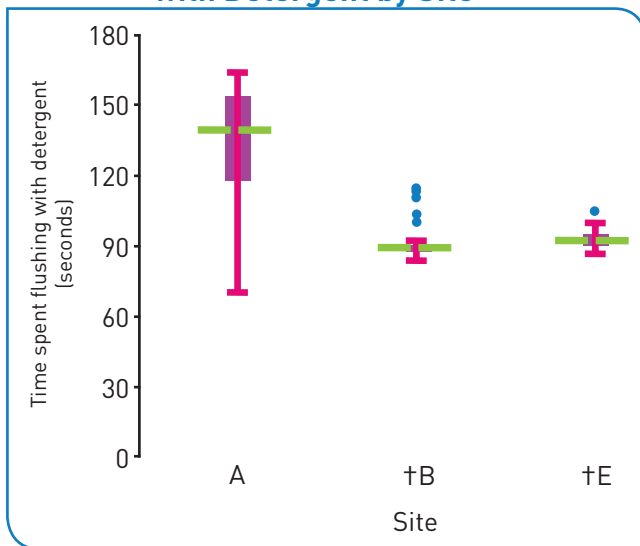
For ECR, the only reprocessing step skipped was the final wipe down, and there were no recorded instances where multiple steps were skipped. Multiple steps were skipped or done incorrectly for 45% of endoscopes reprocessed using MHLD. The errors included the following:

- 57% Did not brush all channels & components
- 55% Did not dry with forced air
- 22% Tested for leaks using sudsy water
- 16% Skipped air purge after detergent flush
- 14% Did not flush with alcohol
- 10% Skipped final wipe down

The observed time spent reprocessing was similar for ECR (39 minutes 20 seconds) and MHLD (38 minutes 35 seconds). There was a great deal of variation in flushing times (Figure 5) and brushing times (Figure 6) within and between MHLD sites. Flushing times were more consistent at sites that performed automated irrigation using the Scope Buddy™ with a timer (Figure 5, Sites B and E).



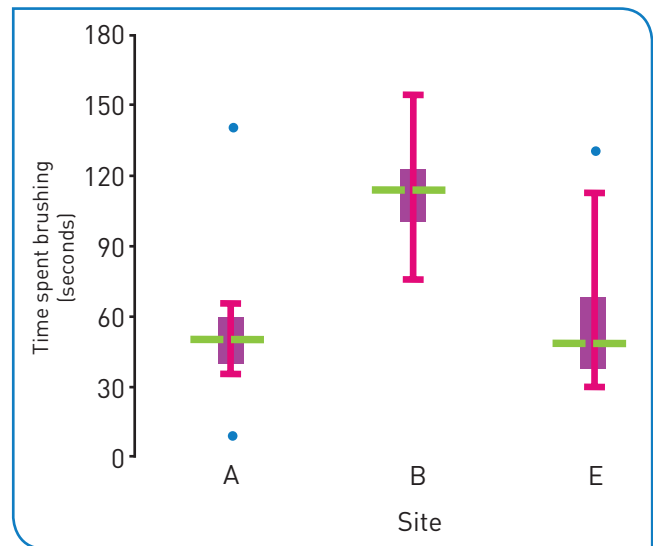
Figure 5: Observed Time Spent Flushing with Detergent by Site



*Range signifies 10th percentile to 90th percentile, with dots indicating outliers.

†Sites B and E used Scope Buddy™ on a timer

Figure 6: Observed Time Spent Brushing by Site



*Range signifies 10th percentile to 90th percentile, with dots indicating outliers.

Impact of Reprocessing on Occupational Health

More than half of all employees (53%) reported discomfort they attributed to reprocessing endoscopes. Nearly half of employees who had discomfort reported symptoms involving their lower extremities, backs, or necks. Discomfort occurred in the following areas:

- 47% Hands, wrists, elbows, arms, or shoulders
- 76% Hips, legs, or feet
- 91% Back or neck

Pain was the most common symptom, but many employees also experienced numbness and decreased flexibility (Figure 7). The presence of physical symptoms was strongly associated with the reprocessing method, and employees who used ECRs were far less likely to report symptoms (Figure 8).

Figure 7: Occupational Health Symptoms Reported

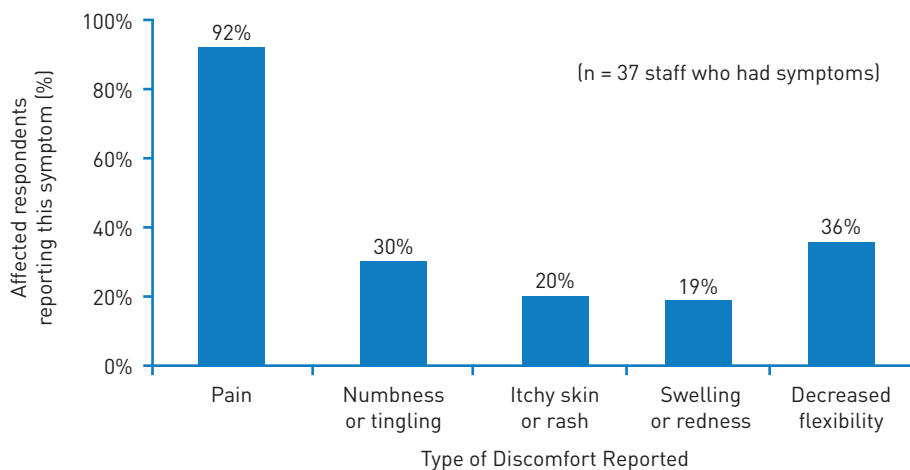
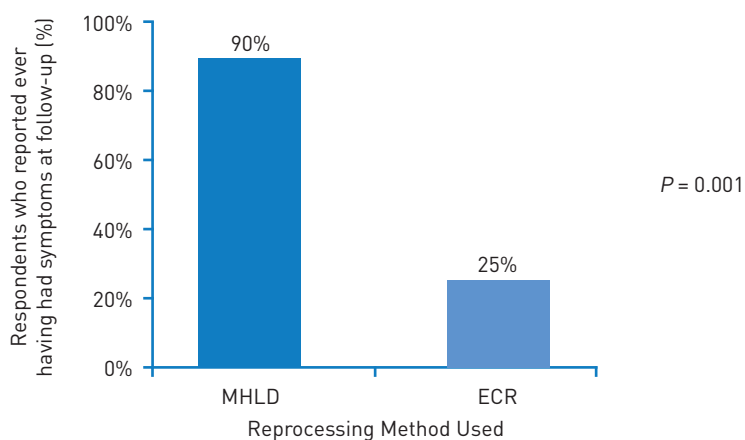
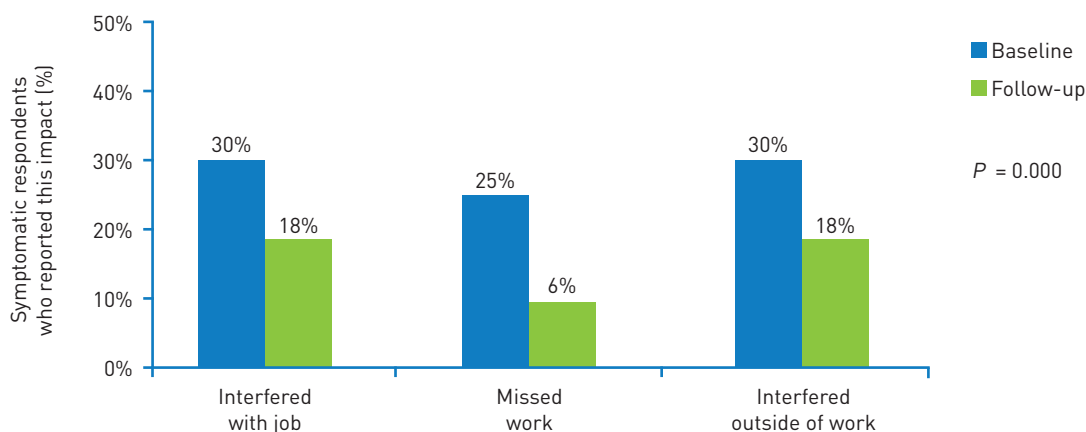


Figure 8: Symptoms Reported by Reprocessing Method



At baseline, many employees reported that their symptoms impacted their ability to function on the job and outside of work (Figure 9). In a follow-up survey completed six weeks after the ECR was installed, the impact of these symptoms on function was significantly reduced.

Figure 9: Impact of Occupational Health Problems on Functional Status



SUMMARY AND CONCLUSIONS

The researchers found great variability in reprocessing methods within and between sites. Guideline adherence was worse when manual methods were used. The use of automation improved consistency. Total reprocessing times were similar for both MHL and ECR, and employees stated both methods were effective and easy to use.

Employees affirmed the importance of steps, but there were several barriers to adherence including:

- Not liking some tasks
- Feeling pressure to work quickly
- Occupational health problems they attribute to reprocessing endoscopes

The researchers recommended strategies to improve adherence with guidelines, such as:

- Developing new educational programs that implement mastery-based training and target additional audiences, such as physicians and administrators
- Increasing specificity of guidelines and policies
- Utilizing automation to:
 - Ensure consistency
 - Alleviate symptoms and time pressures associated with reprocessing endoscopes
 - Improve accountability
 - Prepare documentation
- Monitoring compliance and providing feedback

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REFERENCES

1. ADVANCED STERILIZATION PRODUCTS (2008). EVOTECH® Endoscope Cleaner and Reprocessor User's Guide.
2. Duncan, W. E. (2009). Endoscopy Procedures at the U.S. Department of Veterans Affairs: What Happened, What Has Changed? In U.S. Department of Veterans Affairs, *House Committee on Veterans' Affairs. Washington, DC.*
3. Nelson, D. B., Jarvis, W. R., Rutala, W. A., Foxx-Orenstein, A. E., Isenberg, G., Dash, G. R., et al. (2003). Multi-society guideline for reprocessing flexible gastrointestinal endoscopes. Society for Healthcare Epidemiology of America. *Infect Control Hosp Epidemiol*, 24(7), 532-537.
4. Roe, D. P. (2009). Endoscopy Procedures at the U.S. Department of Veterans Affairs: Opening Statement. In U.S. Department of Veterans Affairs, *House Committee on Veterans' Affairs. Washington, DC.*
5. Rutala, W. A., & Weber, D. J. (2008). Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008 Available from http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Disinfection_Nov_2008.pdf.
6. Society of Gastroenterology Nurses and Associates (2009). *Standards of Infection Control in Reprocessing of Flexible Gastrointestinal Endoscopes*. Chicago, IL: Society of Gastroenterology Nurses and Associates, Inc.

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