OPTIMIZING CLINICAL WORKFLOWS WITH SINGLE-USE ENDOSCOPES: A SYSTEMATIC REVIEW

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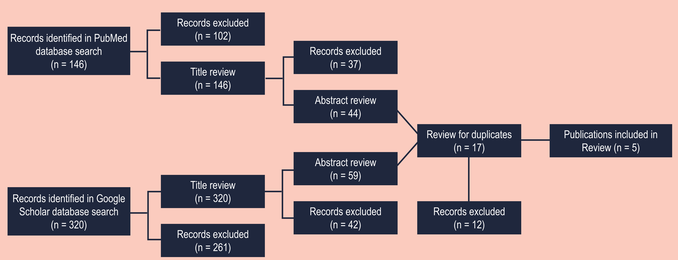
Introduction:

The first commercially available single-use endoscope in 2009 was the single-use (SU) bronchoscope. Since then, SU endoscopes have come on market in various specialties including urology, gastroenterology, and otolaryngology. Published literature showns SU endoscopes provide workflow efficiency benefits across clinical settings to improved scope availability and increased patient throughput. The goal of this systematic review was to understand the efficiency differences of implementing SU versus reusable (RU) endoscopes.

Methods:

- The authors searched PubMed and Google Scholar databases under these search terms: "(single-use endoscope OR disposable endoscope) AND (workflow efficiency OR clinical workflow OR operational efficiency OR turnaround time)".
- The publications returned were from January 2020 to June 2025. A title and abstract screen were performed and remaining articles reviewed for relevance.
- Times collected across publications include supply gathering, scope preparation and breakdown, procedure room turnover, and scope wipe down (full reprocessing not included).
- Simple averages were calculated (vs weighted averages) given volumes not available in all publications. See process map (figure 1) for inclusion and exclusion criteria.

Figure 1 Article Review Process Map



Results:

- The search yielded 320 publications on Google Scholar and 146 publications on PubMed; 103 articles were reviewed.
- 5 unique publications (4 specific to urology and 1 specific to pulmonology) were included in the analysis after title and text screening.
- Full results can be found in Table 1.

Figure 2 Average Hands-on Time by Endoscope in Seconds (Excluding AER)

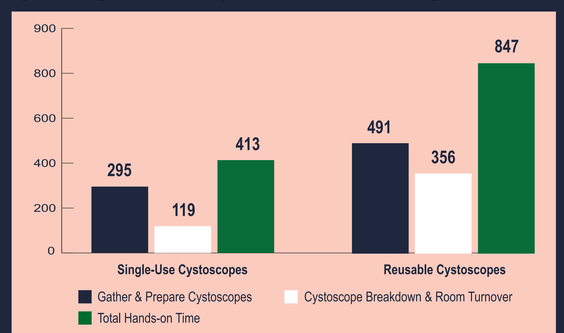


Table 1 Summary of Included Publications

Author/Study	Setting	Total Time SU	Total Time RU	Supply Gathering/ Set-up (SU)	Supply Gathering/ Set-up (RU)	Clean/Room Turnover (SU)	Clean/Room Turnover (RU)	Wipedown (RU)
Chen et al.	Inpatient	581 (9'41")	862 (14'22")	398 (6'38")	566 (9'26")	183 (3'03")	296 (4'56")	-
Haislip et al.	ASC	141.1 (2'22")	293.8 (4'53")	96.8 (1'36")	173.7 (2'53")	45.3 (0'45")	120.1 (2'00")	422 (7'02")
Medairos et al.	HOPD	540 (9'00")	1860 (31'00")	300 (5'00")	900 (15'00")	240 (4'00")	960 (16'00")	-
Johnson et al.	HOPD	390 (6'30")	372 (6'12")	384 (6'24")	324 (5'24")	6 (0'06")	48 (0'48")	-
Islam et al.	Inpatient	-	-	-	-	-	-	1144 (19'04")
Average time to complete	-	413 (6'53")	847 (14'07")	295 (4'55")	491 (8'11")	119 (1'59")	356 (5'56")	783 (13'03")

- Data collected from clinical settings include ambulatory surgery center (ASC), hospital outpatient departments (HOPD), and a hospital inpatient unit.
- Average hands-on time required for RU cystoscopes by facility:
  - 1,284s in the ASC
  - 333s in the HOPD
  - 862s in the inpatient setting
- Average hands-on time required for SU cystoscopes by facility:
  - 624s in the ASC
  - 266s in the HOPD
  - 581s in the inpatient setting
- Average time for wipedown of RU cystoscopes (n=1) was 422s and 1,144s for RU bronchoscopes (n=1). No SU comparator or procedural timestamp data was reported for bronchoscopes.

Discussion:

The evidence reviewed demonstrated SU endoscopes saved facilities time across clinical settings. Time required for reprocessing in an Automatic Endoscope Reprocessor (AER) and drying were not included, which would increase the time RU scopes are not available for patient care. While there is not yet the breadth of data in other areas of endoscopy, benefits may be generalizable – especially given the staffing burden on healthcare systems today. The adoption of single-use endoscopes has resulted in increased efficiencies and improved clinical workflows for patient care.