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Systematic review

Evaluating administrative workflow efficiency, procedural scheduling, and patient preparation in endoscopic services: a systematic review of primary research involving endoscopy specialists and medical secretaries

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Abstract

Endoscopic service performance depends on coordinated administration, appropriate scheduling, and effective patient preparation. Disruptions in these stages waste capacity and delay completed examinations. This review evaluated primary research addressing workflow efficiency, procedural scheduling, and preparation, with attention to endoscopy specialists and administrative personnel. Ten original articles published through 31 May 2026 were included. Eligible interventions addressed booking, staff training, workflow redesign, appointment support, or preparation education. Outcomes included response times, facility duration, room turnover, attendance, colonoscopy completion, and bowel cleanliness. Cross-site scheduling reduced average telephone answer time from more than 100 to 38 seconds. Clerical training increased self-rated booking confidence from 8.11 to 8.71 out of ten in 43 delegates. Workflow redesign reduced facility duration from 196.1 to 172.5 minutes, and reassigned patient transport reduced turnover from 18.51 to 14.25 minutes. Text navigation reduced nonattendance from 14% to 8% in one randomized study; another trial found no improvement in attendance accompanied by good or excellent preparation. Telephone re-education increased adequate preparation from 70.3% to 81.6%. Coordinated workflow interventions and targeted patient support improved selected service outcomes. Digital reminder effects varied across settings and existing routine patient support. Data measuring medical secretaries' contributions remained limited, and uncontrolled operational evaluations restricted causal interpretation.

Keywords: Endoscopy; administrative workflow; medical secretaries; scheduling; patient navigation; bowel preparation.

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Introduction

Endoscopic services depend on coordinated processes extending from referral acceptance and appointment allocation to procedure completion, recovery, and communication of findings (1). European service standards identify leadership, workforce competence, patient experience, and performance monitoring as integral elements of effective endoscopy delivery (1). Procedure-level quality frameworks in routine practice show adequate bowel preparation, examination completion, complication monitoring, and appropriate surveillance, establishing a connection between organizational performance and the clinical value of completed investigations (2).

Patient preparation represents an important interface between administrative communication and specialist care, because instructions must translate prescribed regimens into actions completed at the correct times (3). Updated American recommendations define adequate preparation by its suitability for assigning standard screening or surveillance intervals and recommend routine monitoring at both practitioner and unit levels (4). European recommendations support enhanced instructions and split dosing, placing practical importance on coordination between procedure timing and preparation schedules (3). These recommendations frame booking accuracy and preparation communication as complementary components of service quality rather than independent administrative transactions (3,4).

Patient education research provides a database for improving this coordination, with a meta-analysis reporting better bowel cleanliness following

educational interventions (5). An updated synthesis of randomized trials also associated reinforced education with improved preparation and increased adenoma detection, linking communication processes with clinically relevant examination outcomes (6). The interventions included different delivery formats, demonstrating that educational support encompasses more than distributing a standard instruction sheet during appointment booking (5,6).

A systematic review of interventions in the United States identified patient navigation and fecal-test outreach as approaches associated with increased colorectal screening participation (7). Its findings support examining administrative coordination alongside patient education, while retaining separate outcomes for screening participation and the quality of an individual endoscopic examination (2,7).

An integrated service perspective requires assessment of access, workflow, preparation, and patient experience rather than reliance on procedure volume alone (1,2). Within this perspective, administrative personnel and endoscopy specialists occupy interconnected positions in pathways governed by shared processes and quality standards (1). This review evaluated primary research on administrative workflow efficiency, procedural scheduling, and patient preparation, distinguishing directly studied clerical functions from broader multidisciplinary interventions relevant to coordination of endoscopic care.

Methods

This review was structured according to PRISMA 2020 (Fig 1). The question addressed whether administrative coordination, scheduling interventions, workflow redesign, or preparation support improved endoscopic service performance relative to usual practice or an earlier service period. The publication eligibility period extended from database inception through 31 May 2026.

PubMed, Scopus, Web of Science Core Collection, and the Cochrane Central Register of Controlled Trials were searched using free-text terms. The core expression was: (endoscop* OR colonoscop*) AND (schedul* OR booking OR workflow OR efficiency OR administrat* OR secretar* OR clerical OR navigation OR reminder* OR education OR "bowel preparation"). Reference lists of relevant publications were examined for additional records, and duplicate citations were removed before screening.

Eligible studies reported original findings from gastrointestinal endoscopy services or pathways leading to an endoscopic appointment. Randomized trials, comparative observational studies, service-improvement evaluations, and empirical staff-training evaluations were eligible. Studies required involvement of endoscopy teams, administrative or clerical personnel, coordinators, or navigators and at least one relevant operational, attendance, preparation, or staff-competence outcome.

We exclude reviews, guidelines, editorials, protocols without results, simulation-only studies, and studies comparing preparation drugs without a service-delivery component. Non-English reports and abstracts without sufficient outcome

information were excluded. Reviews and guidelines informed the background and interpretation without contributing participants or effect estimates to the tables.

Two authors screened titles and abstracts, assessed eligible reports, and extracted data using a standardized form. Disagreements were resolved through discussion. Extracted fields data publication details, country, setting, design, sample denominator, professional roles, intervention, comparator, outcome definition, follow-up, numerical results, and study limitations.

Two authors independently appraised methodological limitations using Cochrane Risk of Bias 2 domains for randomized trials and Joanna Briggs Institute checklists for nonrandomized evaluations. Uncontrolled evaluations were examined for concurrent changes and dependence on self-reported outcomes. Appraisal informed interpretation without excluding studies solely on the basis of methodological weaknesses or assigning a single numerical quality score.

Studies were grouped into administrative coordination, operational workflow, and patient attendance or preparation. Narrative synthesis retained original denominators, measurement scales, and follow-up intervals, and separated observed findings from projected financial benefits. Pooling was not undertaken because interventions and outcome definitions differed. Completion rates, performed, and preparation adequacy were interpreted as distinct outcomes, and no common participant total was calculated across patient, procedure, and staff samples.

Results

Administrative studies examined booking coordination and clerical capability, providing evidence closest to the medical-secretary component of the review (8,9). Fairchild and colleagues introduced technology-supported cross-site scheduling, reducing average telephone answer time from more than 100 to 38 seconds and reporting 115 staff hours saved (8). Dawson and colleagues evaluated training among 43 administrative and clerical delegates, with booking confidence increasing from 8.11 to 8.71 out of ten (9). The administrative training assessment used short electronic questionnaires completed before and after the course, without a concurrent comparison group (9). These findings represented measured communication efficiency and self-perceived competence, respectively, rather than interchangeable indicators of patient outcomes (8,9).

Three operational evaluations examined bottlenecks, lean workflow redesign, and redistribution of transport responsibilities across specialist teams (10–12). Kaushal and colleagues studied 2,248 patients undergoing 2,713 procedures, reporting a 12.2% reduction in true completion time and annual savings calculated at US\$312,618 (10). Kidambi and colleagues compared 274 baseline procedures with 113 intervention procedures, observing shorter waiting-room time, recovery duration, and total facility time (11). Post and colleagues transferred patient transport responsibilities from anesthesia personnel to endoscopy nurses, reducing mean turnover from 18.51 to 14.25 minutes (12). These nonrandomized evaluations show operational changes within local systems, with simultaneous workflow modifications

limiting attribution to individual components (10–12).

Digital reminder trials produced different results despite supplementing preparation support (13,14). In Mahmud and colleagues' 753-patient trial, attendance accompanied by good or excellent preparation occurred in 53.1% of intervention patients and 54.4% of controls, without a significant difference (13). Solonowicz and colleagues randomized 1,625 patients and recorded lower nonattendance with text navigation, at 8% versus 14% under usual care. Preparation adequacy did not differ significantly in that study, although screening and surveillance procedures showed rates of 93% versus 88% (14). The positive subgroup finding therefore did not establish improved cleanliness across all scheduled indications (14).

Personalized telephone support improved selected preparation and completion outcomes in three additional randomized studies (15–17). Liu and colleagues randomized 605 patients, with adequate preparation increasing from 70.3% to 81.6% following re-education the day before colonoscopy (15). DeGroff and colleagues reported six-month colonoscopy completion of 61.1% with navigation versus 53.2% with usual care, without improved preparation adequacy (16). Coronado and colleagues analyzed 967 participants after abnormal stool testing and found one-year completion rates of 55.1% versus 42.1%, an adjusted difference of 13.0 percentage points (17).

The ten studies comprised five randomized evaluations and five nonrandomized operational or training evaluations, covering stages of the endoscopy pathway (8–17). Outcomes ranged from seconds per answered call to minutes in facilities,

self-rated confidence, and completed examinations over different follow-up periods (8–17). Operational improvements did not consistently include corresponding measures of clinical quality, and attendance benefits did not uniformly accompany better preparation (10–17). Direct clerical evidence remained concentrated in scheduling and training, while specialist, nursing, and navigation interventions supplied broader service evidence (8–17). Tables 1 and 2 summarize study characteristics and reported outcomes, preserving distinctions between administrative performance, pathway completion, and bowel cleanliness (8–17).

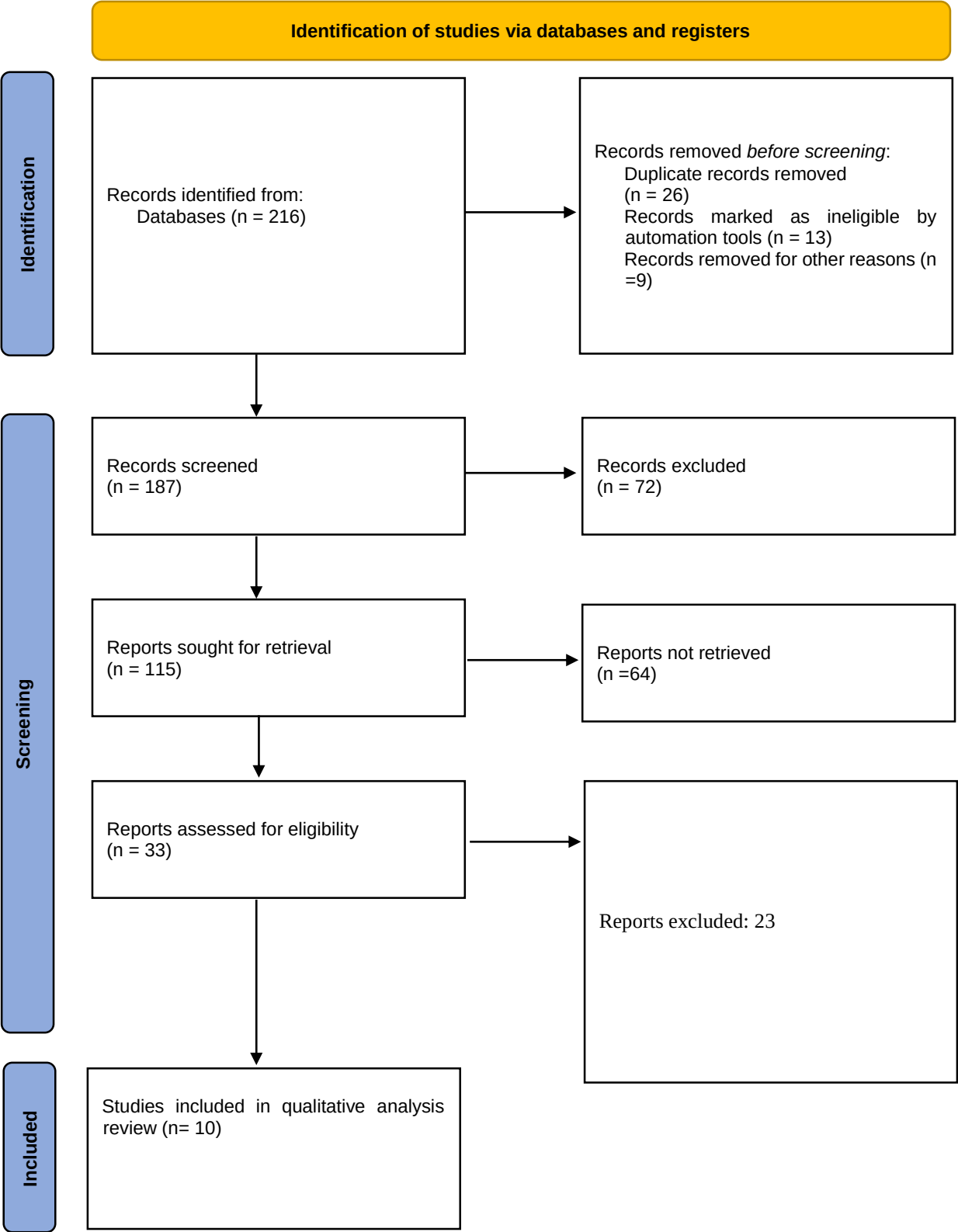


Figure 1: PRISMA flow chart

Table 1. Characteristics of the primary studies

Study	Setting and design	Sample	Staff and intervention
Fairchild, 2016 (8)	USA; multisite service evaluation	Service-level data	Scheduling coordinators and gastroenterology teams; technology-supported cross-site booking
Dawson, 2024 (9)	UK; uncontrolled training evaluation	43 delegates	Administrative and clerical staff; endoscopy-specific competency training
Kaushal, 2014 (10)	USA; prospective before–after	2,248 patients; 2,713 procedures	Specialist and nursing teams; bottleneck identification and targeted redesign
Kidambi, 2024 (11)	USA; before–after pilot	274 baseline; 113 intervention procedures	Endoscopist, anesthesiologist, nursing team; lean workflow changes
Post, 2025 (12)	USA; prospective cohort	Phase II: 2,192 baseline; 292 intervention cases	Endoscopy nurses and anesthesia team; reassigned patient transport
Mahmud, 2021 (13)	USA; RCT	753 analyzed	Endoscopy service; nine automated messages added to usual care
Solonowicz, 2022 (14)	USA; randomized quality improvement	1,625 randomized	Endoscopy service; timed preparation messages added to usual care
Liu, 2014 (15)	China; blinded-endoscopist RCT	605 randomized	Colonoscopy service; telephone re-education before the examination
DeGroff, 2017 (16)	USA; RCT	856 randomized*	Bilingual lay navigators and gastroenterology service; individualized appointment support
Coronado, 2025 (17)	USA; RCT across 32 clinics	967 in primary analysis	Bilingual clinical staff; telephone navigation after abnormal stool testing

Table 2. Reported service and patient outcomes

Study	Principal finding	Interpretation
Fairchild (8)	Answer time: >100→38 seconds; 115 staff hours saved	Administrative responsiveness; no common patient-level denominator
Dawson (9)	Booking confidence: 8.11→8.71/10	Self-reported confidence; no controlled evidence of reduced waiting times
Kaushal (10)	True completion time reduced 12.2%; calculated annual savings US\$312,618	Local operational improvement; nonrandomized comparison
Kidambi (11)	Facility time: 196.1→172.5 minutes; waiting-room time: 25.6→13.1 minutes	Several outcomes improved; turnover did not improve significantly
Post (12)	Turnover: 18.51→14.25 minutes; $P<0.0001$	Measured time benefit; additional revenue represented potential
Mahmud (13)	Attendance with good preparation: 53.1% versus 54.4%; $P=0.73$	No significant benefit from supplementary automated messages
Solonowicz (14)	Nonattendance: 8% versus 14%; $P<0.0001$; screening/surveillance adequate preparation: 93% versus 88%	Attendance benefit; preparation finding restricted to subgroup
Liu (15)	Adequate preparation: 81.6% versus 70.3%; $P=0.001$	Telephone reinforcement improved preparation in randomized comparison

Study	Principal finding	Interpretation
DeGroff (16)	Six-month completion: 61.1% versus 53.2%; $P=0.021$	Completion improved; preparation adequacy did not differ
Coronado (17)	One-year completion: 55.1% versus 42.1%; difference 13.0 percentage points, 95% CI 6.5–19.4	Navigation improved completion after abnormal stool testing

Discussion

The included studies support evaluating endoscopy efficiency as a connected pathway, with interventions targeting administrative contact, internal workflow, attendance, and preparation producing different kinds of benefit. Simulation research provides an explanation: procedure-room availability, endoscopist allocation, arrival schedules, and turnaround processes interact to determine throughput and patient waiting (18). The observed operational improvements support locating the relevant bottleneck before adopting a standard efficiency package across services (10–12,18). This interpretation favors coordinated measurement across several pathway stages, because a shorter interval in one location does not automatically establish improved performance throughout the entire service (11,18).

Scheduling interventions have implications beyond telephone responsiveness because unused appointments represent wasted capacity and delayed access to care (8,14). An endoscopy simulation study estimated financial losses from nonattendance and evaluated mitigation strategies, demonstrating the dependence of economic outcomes on attendance patterns and service configuration (19). The attendance improvement reported by Solonowicz and colleagues therefore represents a plausible route to better resource use, without establishing a transferable monetary saving

for other institutions (14,19). Financial estimates from operational studies require separate interpretation: Kaushal reported calculated annual cost savings, whereas Post described revenue potential from released room time (10,12). These quantities measure different economic consequences and are unsuitable for direct addition across studies (10,12,19).

Preparation support also requires coordination with procedure scheduling, rather than communication detached from the timing of purgative administration (3,4). A meta-analysis found split-dose regimens superior to day-before regimens, reinforcing the clinical importance of preparation timing when arranging colonoscopy appointments (20). Telephone re-education improved preparation in Liu's trial, while navigation trials primarily improved completion, indicating that attendance support and cleansing instruction address related, distinct barriers (15–17). The neutral result in Mahmud's randomized trial further argues against assuming that additional messages automatically improve either outcome (13). Differences in content, delivery schedule, usual care, and patient access to technology offer contextual explanations for variation, rather than evidence identifying a universally effective reminder format (13,14).

The clerical-training evaluation brings administrative personnel into the evidence base more explicitly than most patient-focused

interventions. Increased booking confidence supports the educational value of role-specific training, while its self-reported measurement and uncontrolled design limit inference about waiting times, cancellations, or sustained workforce retention (9). Cross-site scheduling provides stronger direct evidence for changed administrative performance through measured answer times and reported staff-hour savings (8). These studies justify distinguishing medical-secretary-specific findings from outcomes generated by multidisciplinary services, where professional contributions were not isolated experimentally (8–17).

Interpretation remains constrained by differing designs, settings, outcome definitions, and observation periods across the primary studies (8–17). The dominance of colonoscopy also restricts extrapolation to advanced therapeutic endoscopy pathways (13–17). PRISMA 2020 emphasizes transparent reporting of study selection, methods, findings, and limitations, making traceable evidence essential to judging review completeness (21). Guidance for synthesis without meta-analysis additionally supports explicit grouping and links between study-level results and narrative conclusions (22). Future evaluations require concurrent operational and clinical outcomes, documented staff responsibilities, and comparative designs that assess whether administrative improvements persist and translate into completed, adequately prepared examinations (8–17,21,22).

Conclusion

Coordinated scheduling, workflow redesign, and targeted patient support improved selected operational and patient outcomes across endoscopic services. Cross-site scheduling

enhanced telephone responsiveness, while clerical training increased perceived booking competence. Operational interventions shortened facility or turnover times, and navigation improved colonoscopy completion in several randomized comparisons. Preparation benefits were intervention-specific, and automated reminders produced inconsistent results. Evidence directly isolating medical secretaries’ contributions was limited. Endoscopy performance assessment requires separate measures of administrative efficiency, attendance, preparation, clinical quality, and resource use.

Abbreviations

Abbreviation Definition	
CI	Confidence interval
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomized controlled trial
UK	United Kingdom
USA	United States of America
US\$	United States dollars

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