

# Quality of Colonoscopy Reporting: A Process of Care Study

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**OBJECTIVE:** Several groups have developed guidelines for specific content necessary in endoscopic procedure reports. Little information is available assessing adherence to reporting recommendations, and little is known about common reporting errors. The aim of this study was to assess the quality of colonoscopy reporting and to identify possible areas of improvement.

**METHODS:** Using the 1997 American Society for GI Endoscopy guidelines for endoscopy reporting, we created operational definitions for adherence to each guideline. We then created 31 specific process of care criteria to assess adherence to each of these operational definitions. We subdivided the 31 specific process of care criteria into six domains: demographic information, patient history, sedation procedure, adequacy of preparation/visibility, lesion identification/removal, and procedure interpretation. Reports obtained from 122 separate endoscopy centers were reviewed for adherence to the guidelines. Adequate performance for any criterion was defined as 70% or better compliance.

**RESULTS:** Performance varied widely across the domains. Clinicians demonstrated adequate performance on sedation procedure (75%) and lesion identification/removal (84%). Clinicians scored poorly on demographic data (69%), patient history (57%), procedure quality (40%), and procedure interpretation (58%).

**CONCLUSIONS:** Clinicians' colonoscopy reporting practices are widely variable and often suboptimal. There is an opportunity to improve the quality of care in colonoscopy reporting by improving physicians' adherence to established standards. (*Am J Gastroenterol* 2002;97:2651-2656. © 2002 by Am. Coll. of Gastroenterology)

## INTRODUCTION

The quality of health care may be assessed using three domains: 1) the structure of health care delivery; 2) the process of health care delivery; and 3) the outcome of health care delivery (1). Studies of structure assess the adequacy of facilities or the presence of appropriate personnel to provide care. Studies of outcome assess actual changes in the health status of the patient after some intervention. In contrast, process studies do not focus on patient outcome, but rather assess the adequacy with which particular components of care are completed. In theory, the appropriate completion of many individual processes ultimately improves the outcome of patient care. Adequacy of collecting clinical data is a well-recognized process measure (2).

Appropriate documentation of endoscopic procedures is important for optimizing patient care and providing medico-legal documentation. The endoscopy report is the vehicle that communicates the endoscopic findings to the referring physician and other clinicians. Moreover, the report becomes a permanent part of the patient's medical record and provides a frame of reference for subsequent endoscopic examinations and medical care.

Despite the importance of endoscopic documentation, there are limited data evaluating the process of generating the report or its effectiveness in serving the above-mentioned purposes. The specific aim of this study was to determine the quality of colonoscopy reporting by assessing how well reports adhered to published standards for endoscopy recording.

## MATERIALS AND METHODS

### *Data Source*

This study assessed colonoscopy reports obtained during the Colorectal Adenoma Prevention Study (CALGB 9270). This was a randomized, double-blind, placebo-controlled

**Table 1.** Elements to Be Contained in an Endoscopy Report as Recommended by the ASGE\*



\* From reference 4.

trial designed to determine whether the daily use of aspirin (325 mg/day) decreases the development of new colorectal adenomas among individuals who have already developed colorectal cancer. Eligible subjects were between age 40 and 80 and had undergone curative resection for their malignancy. Those with early stage disease (Dukes A and B1) were immediately eligible; patients with more advanced disease were required to be without evidence of recurrent cancer for at least 5 yr before study entry. Subjects remain on treatment for at least 3 yr. The study has completed accrual, but no primary outcome data are yet available.

As part of the parent study, coordinators submitted copies of the colonoscopy report relating to the examination that qualified subjects for the study and all colonoscopies after enrollment. For this analysis, we reviewed a single colonoscopy report from 122 independent endoscopy centers in the United States. The reports were selected at random from colonoscopy examinations submitted by the coordinators.

Institutional review board approval was obtained for the parent study at the center in which the subject was enrolled. As part of the consent for the parent study, subjects agreed to release reports for research purposes.

### Measured Outcomes

To perform a process of care study, some benchmark for quality care in a given area must be established (3). With regard to colonoscopy reporting, The American Society for GI Endoscopy (ASGE) has published guidelines delineating the essential elements of an endoscopic procedure (4). We used these guidelines to develop quality indicators (Table 1). Operational definitions, which are specific rules for assessing whether the guideline was met, were created for each of the 19 elements in the ASGE guidelines. Using these operational definitions, 31 specific process of care criteria were developed. These process of care criteria were divided into six content domains: demographic information, patient history, sedation procedure, procedure quality, lesion identification/removal, and procedure interpretation (Table 2). Based on a consensus rating of their importance by the authors, six process of care criteria were chosen *a priori* as *primary outcome variables*. These variables were: procedure indication, medication name and dose, preparation adequacy, extent of examination, and polyp size.

A standardized data collection form was created to assess compliance with each of the 31 criteria. The data extraction was performed by three of the authors (D.J.R., L.B.L., N.J.S.). Questions arising during the extraction process (*i.e.*, whether or not the documentation met the operational definition) were resolved by consensus of these three investigators.

### Statistical Analysis

Using SAS statistical software (SAS Institute, Cary, NC), summary statistics were generated to determine overall compliance with the ASGE guidelines. Performance was considered poor for a particular item if less than 70% of the reports were compliant with the process of care measure.

**Table 2.** Process of Care Criteria Divided Into Six Domains

Demographic Information	Patient History	Sedation Information	Procedure Quality	Lesion Identification and Removal	Procedure Interpretation
Patient name	Patient history	<b>Medication name</b>	<b>Examination extent</b>	<b>Polyp size</b>	Impression
Patient identification number	Physical examination	<b>Medication dose</b>	Type of preparation	Polyp type	Disposition
Age	Informed consent		<b>Adequacy of preparation</b>	Location	Recommendations for care
Sex	Procedure type		Visualization	Removal	
Race	<b>Indications</b>		Complications		
Date			Results		
Assistant					
Type of scope					
Scope identification					

The six primary outcome measures are in boldface text.

**Table 3.** Overall Compliance by Domain

Domain	Overall Compliance (%)
Demographic information	69.6
Patient name	97.5
Patient identification number	86.1
Age	48.4
Sex	95.1
Race	85.2
Date	98.3
Endoscopist	98.4
Assistant	8.2
Type of scope	52.4
Scope identification	26.3
Patient history	57.5
Patient history	50.0
Physical examination	21.3
Informed consent	32.0
Procedure type	95.1
<b>Indications</b>	<b>89.3</b>
Sedation information	75.8
<b>Medication name</b>	<b>78.7</b>
<b>Medication dose</b>	<b>72.9</b>
Procedure quality	40.0
<b>Examination extent</b>	<b>91.0</b>
Type of preparation	6.6
<b>Adequacy of preparation</b>	<b>29.5</b>
Visualization	17.2
Complications	58.2
Results	37.7
Lesion identification and removal	83.6
<b>Polyp size</b>	<b>73.8</b>
Polyp type	75.4
Location	98.4
Removal	90.2
Method of removal	80.3
Procedure interpretation	58.5
Impression	82.0
Disposition	24.6
Recommendations for care	68.9

The six primary outcome measures are in boldface text.

## RESULTS

The compliance rates for the various domains are shown in Table 3. Clinicians demonstrated adequate performance (>70%) on sedation procedure (75.8%) and lesion identification and removal (83.6%). Conversely, clinicians scored poorly on demographic information (69.6%), patient history (57.5%), procedure quality (40.0%), and procedure interpretation (58.5%).

Compliance with the recommended guidelines was quite variable within the various domains. For example, within the demographic information domain, physicians did well in documenting basic information such as the patient's name (97.5%), identification number (86.1%), and the date of the procedure (98.3%). However, specific information regarding which endoscopic instrument was used was often missing (scope identification, 26.3%). Greater than 90% of the reports had adequate documentation of the type of the procedure being performed and the indication for the procedure. However, supplementary information regarding pa-

tient history and physical examination was much less frequently documented in the report, being present in only 50% and 21.3% of the reports, respectively. A statement clearly indicating that informed consent was obtained before the procedure was noted in only 32.0% of the reports.

Performance was also variable on the six process of care elements that were established *a priori* as the main outcome measures. Over 20% of the reports suffered from inadequate documentation of the medications used during the procedure. Although 91.0% of the reports clearly documented the extent of the examination, documentation of preparation adequacy (another major outcome measure) was present in only 29.5% of reports. In contrast, documentation of polyps found during the examination was generally good. Sixty-one of the reports (50% of the total sample) documented the finding of polyps. In those reports, 98.4% of the reports noted the location of the polyp, and greater than 90% documented whether or not the polyp was removed. Physicians were less likely to document polyp size (73.8%) or polyp type (75.4%).

The majority of the reports (82%) gave a summary impression of the procedure. Only 68.9% of the clinicians used the endoscopy report to communicate specific postprocedure recommendations.

## DISCUSSION

There is considerable interest in improving the quality of health care delivery. One way to improve outcome is to guarantee that the series of processes that could influence outcome are completed appropriately. One might argue that a basic strategy to improve the quality of colonoscopy would be to carefully document essential elements of the procedure. Through such documentation, the endoscopist can provide detailed information that may improve outcome, should the patient require surgery, suffer a complication, develop a cancer, or return for a subsequent procedure. In fact, investigators have demonstrated that the appropriate completion of process measures does correlate with subsequent improvements in outcome (5, 6). Therefore, to improve the quality of endoscopic reporting, the ASGE has developed guidelines that describe the essential elements of a report. The present study was designed to evaluate how often these guidelines were followed using a large number of reports from a very diverse group of institutions.

To date, only two studies have directly evaluated the process of endoscopy reporting. Most recently, Ofman *et al.* (7) examined the process of care in reporting Barrett's esophagus. In that study, endoscopists generally did well identifying important landmarks that define a segment of Barrett's mucosa. However, gastroenterologists identified precise biopsy location and number of biopsies taken less than 50% of the time and quite frequently (35%) biopsied in the presence of esophagitis. The only study to systematically review colonoscopy reports was performed over a decade ago by Mai *et al.* (8). They found significant deficiencies in

documentation that improved when endoscopists were directly confronted about their omissions using a peer review process. However, that study was limited in that reports only came from a single institution, which limits the generalizability of the findings.

Our study suggests that there is significant potential for the improvement of colonoscopy reports; many of the standards endorsed by the ASGE were only inconsistently met. Of the six main outcome variables, physicians scored poorly on one (preparation adequacy) and less than 80% on three others (dose of medication, polyp size, and polyp type). As noted, only the Mai *et al.* study (8) directly assessed the quality of colonoscopy reporting. Both their study and ours found endoscopists deficient about 40% of the time in documenting a clear postprocedure plan. Our study differs from the previous work in that we found a much higher omission rate of medication documentation (only about 1% in the prior study). Likewise, we found a much lower compliance with documentation of examination limitations than was seen previously (only about 4% in the prior study). Presumably, our results are more generalizable given the greater number of endoscopists having evaluable reports in our study ( $n = 122$ ) compared with the prior work ( $n = 8$ ).

Strengths of our study include its size and breadth. We used colonoscopy reports that were generated for clinical (not research) purposes from 122 separate endoscopy units nationwide. Therefore, these reports do not reflect the customs of a single practice or institution. Because we purposely abstracted a single record from each institution, we cannot comment on variation among physicians within a given institution. We suspect that local customs and the use of various templates or computers may lead to less variation within an institution than between institutions, but we have no empiric data to test this hypothesis. The reports were submitted to document colonoscopy findings in a group of subjects who were participating in a chemoprevention trial. Although the reports were submitted from institutions (largely, but not exclusively, academic) that were participating in the trial, the colonoscopies were often performed by local physicians. To the extent that centers participating in research have more standardized endoscopic reporting procedures, the quality of colonoscopy reporting nationally may actually be worse than what was found here.

The use of a fair and objective benchmark of quality was a second strength of our study. The operational definitions were defined clearly before data abstraction. Additionally, only three investigators performed the abstraction, minimizing variability in data collection. Our study, then, fairly determined whether or not the required elements were contained in the reports.

Of course, the accuracy of the reported findings (*e.g.*, finding of a polyp) could not be assessed in this project, only their documentation. That the mere presence of a completed process may not imply good quality is a well-recognized weakness of process studies (9). For example, whether or not endoscopists accurately and reliably identified certain

landmarks or pathology that they documented is a separate issue not studied here.

One potential weakness of the study is that the reports were reviewed out of context from the remainder of the patient's medical record. It is possible that recommendations were made clearly elsewhere in the medical record but not specifically in the endoscopy report. However, effective communication to other providers is optimized if a single document conveys all essential information rather than if it is scattered in several progress notes and/or letters. It is also unlikely that some of the elements of the report would have been found even if the entire medical record were available. For example, it is improbable that the quality of the colon preparation was recorded in some other associated document aside from the endoscopy report. Lastly, for this study, we relied on published guidelines that suggest all the elements in Table 1 should be included in a *single* endoscopic report. It is possible that these guidelines are overly rigorous and thus an unfair measure of endoscopists' documentation skills. A second limitation is related to the absence of a true standard to assess degree of compliance. For this analysis, we chose 70% as a cutpoint to identify those criteria that were often unmet. Although this standard is arbitrary, it did allow us to highlight areas of especially poor performance.

The results of our study suggest the current colonoscopy reporting is suboptimal. Although it is hard to measure the precise impact of incomplete documentation of endoscopy, it may be large. For example, incomplete documentation of examination extent or preparation adequacy may lead to needlessly repeating the examination at some short interval in the future if symptoms persist. Infectious complications arising from colonoscopy may also require the identification of the instrument used for the procedure. In addition, incomplete documentation of indication may lead to unnecessary delays and expenditure of time and effort acquiring reimbursement from third-party payers.

Future work should focus on improving the thoroughness of endoscopic reports. One potential solution would be the use of computer programs that prompt the endoscopist for specific information. Such programs already exist (*e.g.*, the Clinical Outcomes Research Initiative, CORI, a standardized data collection format used to both generate clinical reports and provide data for clinical research). Of course, such programs still require physician compliance in providing the information requested by the computer program. Some reports in the radiology literature suggest that structured data entry is more complete than free text dictation (10). There are limited data in the English literature directly assessing the comparative quality of computer-generated reports. A single center in Lisbon, Portugal, reported their observations when a computer database system was instituted (SISCOPE) in place of traditional free text reporting (11, 12). They found that the computer-generated reports had an 18% missing data rate compared with a 48% missing data rate in the control free text dictation group. Although our general impression was that the free text reports were

the most incomplete, we did not have sufficient numbers of free text reports to test this hypothesis.

In conclusion, we have found that colonoscopy reports are deficient in important areas. Many endoscopists do not adhere to guidelines for colonoscopy documentation, and therefore the quality of colonoscopy reporting is diminished. Although the quality of the endoscopy reporting may not directly reflect the quality of the endoscopy procedure, it is important that physicians strive to prepare a report that fully documents the details of the examination. Based on these findings, endoscopists nationwide might consider implementing quality assurance projects to improve their compliance with the ASGE reporting guidelines.

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