

Differences Between Generalists and Specialists in Characteristics of Patients Receiving Gastrointestinal Procedures

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BACKGROUND: As a result of market forces and maturing technology, generalists are currently providing services, such as colonoscopy, that in the past were deemed the realm of specialists.

OBJECTIVE: To determine whether there were differences in patient characteristics, procedure complexity, and clinical indications when gastrointestinal endoscopic procedures were provided by generalists versus specialists.

DESIGN: Retrospective cohort study.

PATIENTS: A random 5% sample of aged Medicare beneficiaries who underwent rigid and flexible sigmoidoscopy, colonoscopy, and esophagogastroduodenoscopy (EGD) performed by specialists (gastroenterologists, general surgeons, and colorectal surgeons) or generalists (general practitioners, family practitioners, and general internists).

MEASUREMENTS: Characteristics of patients, indications for the procedure, procedural complexity, and place of service were compared between generalists and specialists using descriptive statistics and logistic regression.

MAIN RESULTS: Our sample population had 167,347 gastrointestinal endoscopies. Generalists performed 7.7% of the 57,221 colonoscopies, 8.7% of the 62,469 EGDs, 42.7% of the 38,261 flexible sigmoidoscopies, and 35.2% of the 9,396 rigid sigmoidoscopies. Age and gender of patients were similar between generalists and specialists, but white patients were more likely to receive complex endoscopy from specialists. After adjusting for patient differences in age, race, and gender, generalists were more likely to have provided a simple diagnostic procedure (odds ratio [OR] 4.2; 95% confidence interval [95% CI] 4.0, 4.4), perform the procedure for examination and screening purposes (OR 4.9; 95% CI, 4.3 to 5.6), and provide these procedures in rural areas (OR 1.5; 95% CI 1.4 to 1.6).

CONCLUSIONS: Although generalists perform the full spectrum of gastrointestinal endoscopies, their procedures are of-

ten of lower complexity and less likely to have been performed for investigating severe morbidities.

KEY WORDS: colonoscopy; esophagogastroduodenoscopy; sigmoidoscopy; generalist physician; specialist; physician practice patterns.

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Generalists are currently providing services that in the past were deemed the realm of specialists, particularly in the rural, fee-for-service environment. Gastrointestinal procedures are particularly noteworthy because of significant advances in technology and the incorporation of instruction on gastrointestinal endoscopy into generalist training programs and continuing medical education courses.¹⁻³ The first procedures to be adopted by generalists were rigid and flexible sigmoidoscopies, but more complex and technically demanding endoscopic procedures such as esophagogastroduodenoscopy (EGD) and colonoscopy are now being performed by generalists.^{4,5} In a study of procedures performed by general internists, 74% performed rigid sigmoidoscopies, 42% performed flexible sigmoidoscopies, 7% performed EGDs, and 3% performed colonoscopies.⁶ A Washington State survey of family practitioners found that over 50% performed flexible sigmoidoscopies, and many of those not performing them planned to integrate them into future practice.⁷ The trend toward integrating increasingly complex procedures into generalist practice (e.g., offering full colonoscopy in addition to flexible sigmoidoscopy) is expected to continue.³

The safety and efficacy of rigid and flexible sigmoidoscopy performed by generalist physicians is now well established and has been included in many comprehensive cancer screening programs for over a decade.⁸ Studies of EGD use by generalists from the Military Health Services System,⁹ rural practice groups,¹⁰ and university-based clinics¹¹ suggest that EGDs can be performed by well-trained generalists with low complication rates and good diagnostic efficacy.^{12,13} Case series suggest that family practitioners can perform colonoscopy safely¹⁴ and usually can visualize the full colon without significant complications.¹⁵⁻¹⁸ Gastroenterological specialty societies, however, have questioned whether it is wise to expand the performance of gastrointestinal procedures by generalists, particularly in the cases of colonoscopy and EGD.¹⁸ In 1992, two prominent gastroenterological societies sent letters to hospital administrators suggesting that their institutions were at considerable risk if they granted endoscopy privileges to generalist physicians.¹⁹

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The resolution of the controversy surrounding the diffusion of "specialist" procedures into the generalist domain requires a thorough understanding of the characteristics of the services delivered, the population that received them, and the outcomes achieved by the two provider groups. Previous studies have failed to investigate whether there may be important differences in the types of patients, health of the patients, diagnostic indications for the procedures, or complexity of the procedures performed by generalist and specialist providers. We examined the characteristics of the gastrointestinal endoscopies and the patients who received them to identify differences between the practices of generalists and specialists that should be taken into account in future outcomes studies.

METHODS

We analyzed a random 5% sample of Medicare beneficiaries listed in the 1993 Medicare National Claims History File. Patients under the age of 65 years, patients whose claims were disallowed, and patients whose claims were for services provided outside the continental United States, Alaska, and Hawaii were excluded. In addition, patients who were enrolled in a Medicare health maintenance organization at any time during 1993 were excluded because of incomplete claims reporting under that program.²⁰ This resulted in a final sample of 1,369,179 Medicare beneficiaries.

Claims Data

We selected claims for gastrointestinal endoscopies using the *Physicians' Current Procedural Terminology-4* (CPT) codes: esophagogastroduodenoscopy (EGD) (43200–43272), rigid sigmoidoscopy (45300–45321), flexible sigmoidoscopy (45330–45337), and colonoscopy (45355–45385).²¹ The abstracted Medicare claims included demographic data on the patients, diagnostic codes in the *International Classification of Diseases, Ninth Revision Clinical Modification (ICD-9-CM)*,²² a self-designated physician specialty code, and the physician's unique provider identification number (UPIN).²³ Each of the procedures was further classified as to whether it was performed as a diagnostic procedure alone or accompanied by another service such as biopsy, polypectomy, or other therapeutic intervention (e.g., removal of a foreign body). Diagnostic indications for the procedure were grouped into a limited number of categories by using a modification of the Agency for Health Care Policy and Research's Clinical Classifications for Health Policy Research.²⁴ Specialties providing less than 1% of these procedures were excluded, leaving three specialist groups (gastroenterology, general surgery, and colorectal surgery) and three generalist groups (general internal medicine, family practice, and general practice) in our sample. For some analyses, the groups were collapsed into 4 specialty groups (gastroenterologists, surgeons,

general internists, and family/general practitioners). Medicare data were merged with county-level health care resource and population information from the 1993 Area Resource File (ARF) to place the provision of services in a geographic and demographic context.^{25,26}

Physician Specialty Designation

Because accurate specialty designation was essential to our analyses, we used 2 complementary data sources to designate physician specialty: (1) the self-designated physician specialty code in the Medicare data and (2) information on self-designated primary and secondary specialties, training histories, and board certification from the American Medical Association (AMA) Physician Masterfile.²⁷ The latter was linked to the Medicare data via the UPIN. This comprehensive approach to specialty classification avoided mislabeling of physicians and ensured that generalists performing gastrointestinal endoscopy did not differ in training or board certification from other generalists.

Analyses

Descriptive statistics of patient and provider characteristics, the distribution of these procedures, and diagnostic indications were generated. Logistic regression was performed to examine the independent differences in characteristics of patients and procedures controlling for the effects of age, gender, and race. All statistical analyses were performed using the Stata statistical package.²⁸

RESULTS

Physician Specialty Designation

A total of 44,031 physicians performed 167,347 gastrointestinal endoscopies on our sample population. There was some discordance in specialty self-designation between the Medicare data and the AMA Physician Masterfile. The agreement of the 2 sources for provider specialty codes was 31% for general practice, 87% for family practice, 62% for general internal medicine, 95% for gastroenterology, 85% for general surgery, and 94% for colorectal surgery. In most discordant cases, the specialty designation reported to the AMA was more specialized than that reported to Medicare. For example, of the 29% of Medicare-designated general internists who reported another specialty to the AMA, 86% were gastroenterologists.

Because of the disagreements on self-designated physician specialty codes, we created a composite specialty designation based on a hierarchical synthesis of information from the AMA Physician Masterfile and Medicare data. The highest level of evidence for specialty designation was board status. Of the 44,031 physicians, 20.4% were board certified in general surgery, 3.9% in colorectal

surgery, 8.6% in family practice, 54.1% in internal medicine, and 36.2% in gastroenterology, with 40.0% having board certification in more than one specialty. In all instances, the most specialized designation superseded any general designation (e.g., a physician who is board certified in both internal medicine and gastroenterology would be classified as a gastroenterologist). Using board designation, we were able to classify 36,653 (83.2%) of the physicians in the sample into one of our 6 specialties. For those without board certification, we relied on training histories (the most specialized training received in a program of at least 1 year's duration) to classify 5,430 (12.3%) of the physicians. For the remaining 1,948 physicians, we relied on their self-designated specialty codes to classify specialty. Of these, 1,009 (2.3%) had agreement between the AMA Physician Masterfile and Medicare self-designated specialty codes, and for the remaining 939 physicians (2.1%), the more specialized of the self-designated codes was used. This exhaustive effort to correctly classify physicians was integral to our examination of practice patterns of generalists and specialists and consistent with the methods used by other investigators in this field.²⁹ An examination of the relation, or concordance rates, between the specialty self-designation codes of Medicare and the AMA Physician Masterfile and the composite codes is presented in Table 1. The composite codes for specialty designation were used in the remainder of our analyses.

Procedure Characteristics

Our sample population had 9,396 rigid sigmoidoscopies (35.2% by generalists), 38,261 flexible sigmoidoscopies (42.7% by generalists), 57,221 colonoscopies (7.7% by generalists), and 62,469 EGDs (8.7% by generalists) (Table 2). For all 4 procedures, while specialists were much more likely than generalists to have performed a procedure for biopsy, polypectomy, or treatment rather than for diagnostic purposes alone (odds ratio [OR] \pm 4.2; 95% confidence interval [95% CI] 4.0 to 4.4) (Fig. 1). The

indications for the procedures varied significantly between generalists and specialists, with specialists being more likely than generalists to perform the procedure to investigate cancer (Fig. 2). Specialists were more likely to have performed the procedures in the hospital or an ambulatory surgical center than in the office (OR 6.9; 95% CI, 6.7 to 7.1). Overall, specialists tended sicker or more complex patients as demonstrated by the more serious indications and higher complexity of the procedures performed (Figs. 1 and 2).

Patient Characteristics

The age distribution of patients receiving gastrointestinal endoscopies did not differ between generalists and specialists (Table 3). However, the gender distribution of patients receiving colonoscopy or flexible sigmoidoscopy (but not EGD or rigid sigmoidoscopy) did differ between generalists and specialists.

The patients receiving sigmoidoscopy and EGD from specialists had poorer overall health status than those receiving the procedures from generalists, as noted by their greater likelihood to die or be hospitalized within the calendar year. For all 4 procedures, patients receiving these services from generalists were more likely to face difficulty in accessing specialist care as noted by their residence in a federally designated Health Professions Shortage Area, absence of gastroenterologists in their county, a low physician-to-population ratio, and a high proportion of generalists among the physician provider pool. Across all 4 procedures, generalists were more likely to provide these services to patients residing in rural areas and in areas other than the Northeast.

DISCUSSION

The role that specialists play in the provision of generalist services has been well documented.^{30,31} We have found that the converse, the provision of speciality services by generalists, must also be considered in the evalu-

Table 1. Concordance Between Our Composite Coding of Physician Specialty and Coding in the American Medical Association (AMA) Physician Masterfile and the Medicare Database†

Composite Specialty Code*	Family Practice, % (n)	General Practice, % (n)	General Internal Medicine, % (n)	Gastroenterology, % (n)	General Surgery, % (n)	Colorectal Surgery, % (n)
Concordance with AMA Physician Masterfile Designation	95 (4,367)	79 (612)	91 (7,942)	95 (19,365)	98 (8,325)	88 (2,070)
Concordance with Medicare Self-Designated Specialty	92 (4,437)	58 (913)	71 (11,235)	99 (15,463)	93 (9,197)	97 (1,387)

*Concordance is defined as the correlation between specialty self-designation codes of Medicare and the AMA Physician Masterfile. There were 1,350 physicians from the AMA Masterfile who were categorized as either "unspecified" or "other." Similarly, there were 1,399 physicians whose Medicare self-designated code was "multispecialty clinic or group practice," which did not correspond to the 6 specialties of interest. After applying our specialty designation methodology, we were able to classify all but 74 (0.2%) of the physicians. Those 74 physicians and the procedures they provided were omitted from the analysis.

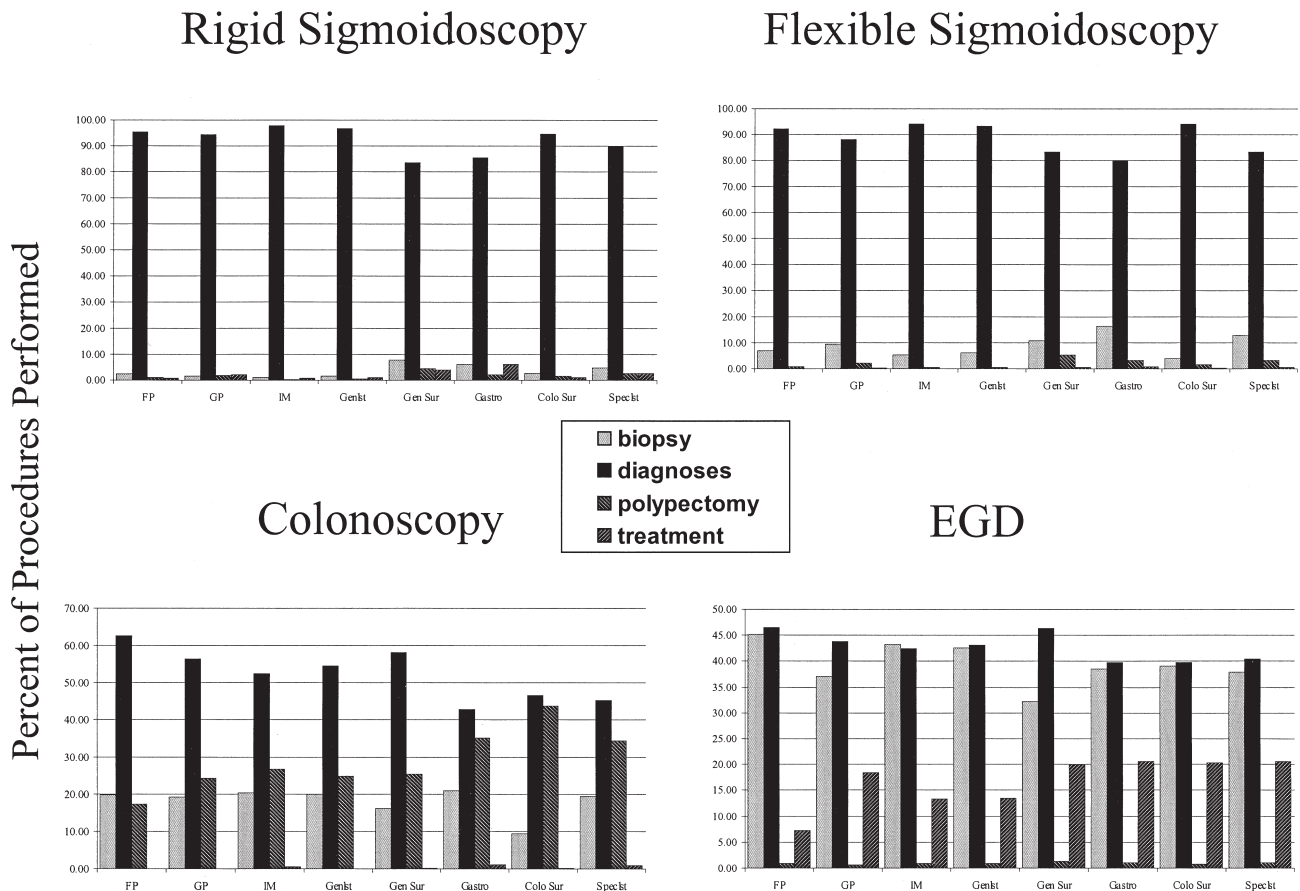
Table 2. Gastrointestinal Endoscopies Performed by Various Specialties in 5% Medicare Sample*

Procedure	Family Practice	General Practice	General Internal Medicine	Generalists	Gastroenterology	General Surgery	Colorectal Surgery	Specialists
Colonoscopy (n = 57,221)	655 1.1	737 1.3	3,019 5.3	4,411 7.7	41,758 73	7,434 13	3,618 6.3	52,810 92.3
EGD (n = 62,469)	520 0.8	764 1.2	4,128 6.6	5,412 8.7	50,962 81.6	5,967 9.6	128 0.2	57,057 91.3
Flexible sigmoidoscopy (n = 38,261)	4,886 12.8	892 2.3	10,566 27.6	16,344 42.7	14,177 37	3,311 8.6	4,429 11.6	21,917 57.3
Rigid sigmoidoscopy (n = 9,396)	696 7.4	375 4	2,236 23.8	3,307 35.2	755 8	2,008 21.4	3,326 35.4	6,089 64.8

*Top number in each cell represents the number of procedures performed. Bottom number represents the percentage of patients that had the procedure performed by that type of physician.

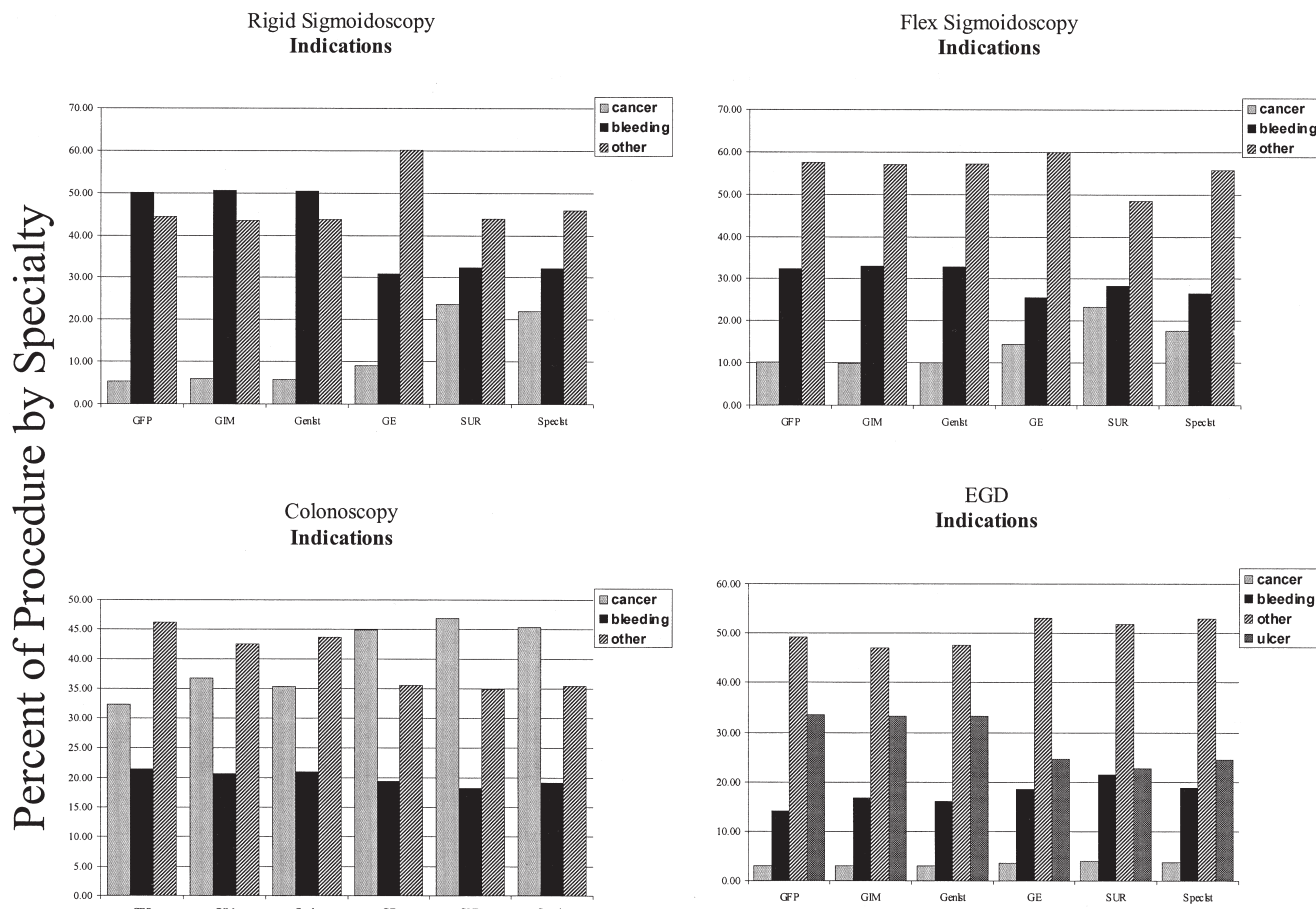
ation of the physician workforce structure and the quality of care it produces. In our analyses, 41% of sigmoidoscopies and 8% of more complex gastrointestinal endoscopic procedures were performed by generalists. The latter figure is below earlier assessments,⁵ which relied on a single indicator of physician specialty (the self-designated

code in the Medicare files). Our rigorous documentation of physician specialty from multiple sources makes it much more likely that those 8% of complex endoscopies were indeed performed by generalist physicians who did not differ significantly from their generalist colleagues in terms of training or board certification.



FP: family practitioner; GP: general practitioner; IM: internal medicine; Genlst: generalists; Gen Sur: general surgeons; Gastro: gastroenterologists; Colo Sur: colorectal surgeons; Speclst: specialists; EGD: esophagogastroduodenoscopy

FIGURE 1. Purpose of gastrointestinal endoscopies, by specialty.



GFP: family/general practitioner; GIM: general internal medicine; Genlt: generalists; GE: gastroenterologists; SUR: general/colorectal surgeons; Speclst: specialists; EGD: esophagogastroduodenoscopy

FIGURE 2. Indications for gastrointestinal endoscopies, by specialty.

We were able to document important differences between generalists and specialists in the patients who received these services. Those differences were particularly marked in comparisons between general/family practitioners and gastroenterologists. Although individual differences were often subtle, the aggregate effect leads to the conclusion that specialists were more likely to see patients who were less healthy (as noted by inpatient status at the time of the procedure and likelihood of dying within the calendar year), had more serious indications for the procedure (e.g., cancer as opposed to screening), and received more complex interventions (e.g., endoscopy with a polypectomy or other therapeutic intervention).

The proportion of complex procedures performed by generalists is likely to increase as maturing technology empowers generalists to integrate an expanding array of procedures into their routine practice.³² The specialists' willingness to teach generalists gastrointestinal procedures and techniques has been beneficial in terms of access, especially in rural areas, as 40% of U.S. health care service areas are without a gastroenterologist.⁵ Even in areas with many specialists, however, some patients receive complex endoscopic services from generalists.

The important contribution to access by the provision of some of these services by generalists demands careful attention to any disparity in outcome by provider group. Improved access does not imply improved quality because receiving a substandard examination may, in fact, be less desirable than not receiving any examination at all. Our analyses suggest that examinations of the gastrointestinal endoscopy outcomes produced by various provider types should take into account existing differences between generalists and specialists in patient characteristics and clinical indications for these procedures.

Limitations of our study are those of the databases we employed. Our linkage of procedures with the conditions for which they were performed provided an increased level of accuracy in the data. Systematic "over-coding" of procedures by generalists versus specialists introduces another potential bias. Oversight of procedural coding by the Medicare program, however, potentially mitigates biases that may exist. Because routine screening for colorectal cancer with flexible sigmoidoscopy was not covered by Medicare during 1993 (but is currently available through the Medicare reform implemented on January 1, 1998), it is likely that the number of screening

Table 3. Characteristics of Medicare Beneficiaries that Received Gastrointestinal Endoscopies*

Patient Characteristics	Colonoscopy					EGD					Flexible Sigmoidoscopy					Rigid Sigmoidoscopy				
	GFP	GIM	GE	SUR	OR (95% CI)	GFP	GIM	GE	SUR	OR (95% CI)	GFP	GIM	GE	SUR	OR (95% CI)	GFP	GIM	GE	SUR	OR (95% CI)
Mean age (± SD)	74.8 ±6.8	74.8 ±6.7	74.9 ±6.5	74.8 ±6.5		76.6 ±7.7	76.2 ±7.3	76.2 ±7.3	76.7 ±7.5		73.7 ±6.3	73.7 ±6.2	74.9 ±6.7	74.8 ±6.6		74.4 ±6.8	74.2 ±6.3	75.9 ±7.0	74.6 ±6.7	
% female	58.2	56.9	56.2	53.3	1.07 [†] (1.00, 1.14)	61.2	59.5	59.4	57.2	1.04 (0.97, 1.10)	55.0	55.6	59.8	54.0	0.93 [†] (0.89, 0.97)	53.0	53.0	61.0	53.8	0.94 (0.86, 1.03)
% white	88.2	82.7	87.9	89.6	1.40 [†] (1.28, 1.52)	85.8	79.8	85.5	85.6	1.39 [†] (1.28, 1.50)	90.6	88.9	88.9	90.4	0.98 (0.32, 1.05)	91.9	89.2	89.4	90.7	1.06 (0.92, 1.23)
% died within calendar year	6.4	6.2	6.5	5.2	1.01 (0.89, 1.16)	15.4	14.3	16.4	18.5	1.18 [†] (1.08, 1.29)	2.8	2.5	7.4	4.6	2.28 [†] (2.04, 2.55)	4.0	2.4	4.5	4.8	1.61 [†] (1.26, 2.06)
% admitted within calendar year	42.0	42.1	43.7	40.8	1.05 (0.98, 1.12)	64.8	61.4	65.0	69.6	1.16 [†] (1.09, 1.23)	25.0	22.3	39.1	34.1	1.87 [†] (1.78, 1.96)	22.9	21.8	37.4	36.4	2.00 [†] (1.81, 2.21)
% living in whole county health care provider shortage area	10.0	8.2	4.7	7.9	0.60 [†] (0.54, 0.68)	15.4	9.8	5.5	14.0	0.56 [†] (0.50-0.62)	5.6	4.1	4.2	5.2	0.98 (0.89-1.09)	5.6	3.0	3.3	4.4	1.13 (0.90, 1.42)
living in a county with any GE	52.5	66.1	85.7	65.8	2.76 [†] (2.58, 2.94)	45.3	63.5	84.2	47.9	2.83 [†] (2.65, 3.01)	69.0	81.4	87.7	78.8	1.66 [†] (1.57, 1.74)	73.0	88.6	90.4	81.9	0.97 (0.86, 1.09)
% in a high poverty county [‡]	4.6	5.3	2.8	4.0	0.62 [†] (0.54, 0.72)	8.2	6.2	3.4	7.2	0.58 [†] (0.51, 0.66)	2.4	1.8	2.5	2.8	1.26 [†] (1.10, 1.45)	2.5	4.0	2.7	1.8	0.54 [†] (0.41, 0.71)
% in a county with high HMO penetration	25.9	29.1	46.8	34.3	2.08 [†] (1.94, 2.23)	23.9	28.9	47.7	18.0	2.15 [†] (2.00, 2.30)	34.5	47.7	52.7	48.5	1.40 [†] (1.34, 1.46)	40.1	60.4	52.7	52.0	0.93 (0.85, 1.02)
% in a county with high proportion of generalists [§]	11.6	5.2	2.4	4.1	0.36 [†] (0.31, 0.41)	12.2	4.6	2.6	6.5	0.45 [†] (0.39, 0.51)	5.8	1.8	1.9	2.5	0.63 [†] (0.55, 0.72)	6.3	1.6	1.3	2.4	0.72 [†] (0.55, 0.95)
% in a county with high physician proportion	23.1	29.2	50.2	36.0	2.43 [†] (2.26, 2.61)	18.5	28.5	49.8	20.3	2.53 [†] (2.36, 2.72)	33.9	50.3	56.8	49.0	1.47 [†] (1.41, 1.54)	41.9	61.9	63.5	53.2	0.96 (0.88, 1.05)
% having procedure in hospital or ASC	76.0	81.9	92.8	93.2	3.28 [†] (3.02, 3.57)	88.5	86.8	94.4	95.6	2.53 [†] (2.30, 2.79)	23.0	15.2	41.6	25.6	2.47 [†] (2.35, 2.59)	15.6	6.4	21.7	17.4	2.06 [†] (1.80, 2.37)
% in rural county [¶]	9.2	5.6	2.4	5.2	0.42 [†] (0.37, 0.48)	9.8	4.7	2.6	7.9	0.53 [†] (0.46, 0.60)	5.7	2.7	2.2	3.0	0.65 [†] (0.58, 0.74)	4.9	1.7	1.8	2.4	0.87 (0.66, 1.15)

*Beneficiaries younger than 65 years, those enrolled in HMOs, and those living outside the 50 states and the District of Columbia were excluded from our sample. EGD indicates esophagogastroduodenoscopy; GFP, general/family practitioners; GIM, general internal medicine; GE, gastroenterologists; SUR, general and colorectal surgeons; OR, odds ratio; CI, confidence interval; ASC, ambulatory surgery center. All odds ratios were age- and gender-adjusted and were based on the differences between generalists and specialists, where generalists included general family practitioners and general internal medicine physicians and specialists included gastroenterologists, general surgeons, and colorectal surgeons.

[†]P < .05 for the comparison between generalists and specialists.

[‡]"High poverty" is defined as greater than 1 SD above the mean percentage of poverty.

[§]"High proportion of generalists" is defined as greater than 1 SD above the mean for presence of generalists.

^{||}"High physician proportion" is defined as greater than 1 SD above the physician-to-population mean.

[¶]"Rural" is defined by Medicare Area Resource File as a nonmetropolitan statistical area.

flexible sigmoidoscopies performed was underestimated.³³ Nevertheless, the data presented are representative of flexible sigmoidoscopy practices of the various specialties for all indications other than routine screening. Because

of incomplete claims reporting under Medicare managed care in 1993, we were unable to examine the effect of managed care on the provision of these procedures by generalists and specialists.

In conclusion, generalist physicians make a substantial contribution to patient access to gastrointestinal endoscopy, including more complex procedures such as colonoscopy and EGD. Although numerous benefits may be realized by expanding the procedural domain of generalists, our analyses indicate that performance of gastrointestinal endoscopy by generalists is currently focused on particular populations and procedures of relatively low complexity compared with procedures provided by specialists. Future work will need to critically examine the outcomes of gastrointestinal endoscopies performed by generalists and specialists accounting for these important differences.

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