

Efficacy of the Colonoscopy Outsourcing Systems Used at a Large VA Medical Center

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This study assessed the overall efficacy of fee-basis and contract systems to support the effective allocation of VA resources in patients referred for colonoscopy.

Colonoscopy has 3 distinct uses as part of a colorectal cancer (CRC) control program: (1) as a primary CRC screening test; (2) as a test prompted by the positive result of another primary CRC screening test, including a fecal occult blood test (FOBT) or sigmoidoscopy; or (3) for surveillance of persons who are at increased risk for CRC.¹⁻³ Colonoscopy is also an important tool to evaluate patients with symptoms and signs that may indicate CRC or other intestinal conditions. As such, the increasing demand for colonoscopy for all these uses has led to concerns about whether there are sufficient colonoscopy resources in the U.S.⁴

Within the VA Health Care System, the demand for colonoscopy has exceeded the supply at many VA facilities.⁵ In addition, the VA has mandated that colonoscopies performed as follow-up from a positive

FOBT must be completed within 60 days, placing additional constraints on available colonoscopy capacity. Despite the mandates to ensure timely follow-up, the colonoscopy completion rates at several VA centers remain low. Subsequently, to

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help improve colonoscopy completion rates, several studies have analyzed interventions that target both the provider and the patient.⁶ Barriers to completing a colonoscopy include, but are not limited to, patient barriers (such as lack of understanding); physician barriers (such as lack of time); and systemwide barriers (such as lack of resources).⁷

At the Durham Veterans Affairs Medical Center (DVAMC), the num-

ber of requests for colonoscopies far outweighed the capacity. At the time of this study, the DVAMC received > 300 new colonoscopy requests per month (for all indications). About half the colonoscopy appointment times were already filled with exist-

ing patients (eg, adenoma follow-up and inflammatory bowel disease surveillance). To help meet colonoscopy demand while local capacity was increased, the DVAMC began to redirect patients to a fee-basis and contract list in January 2007.

The VA pays for approved colonoscopies obtained via fee basis or contract. Once the primary care physician (PCP) placed a colonoscopy request, it was reviewed by a member of the gastroenterology staff (usually the fellow), and if no colonoscopy appointments were available, veterans were approved for an outsourced colonoscopy. Initially, all outsourced colonoscopies were by fee basis. Patients assigned to the

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fee-basis list were instructed by a letter and mailed a packet to make arrangements to undergo a colonoscopy by a community (non-VA) practitioner. The fee-basis patients were instructed to find a physician in the community to perform the colonoscopy. By federal regulations, they could not be given a list of colonoscopy providers and were, instead, instructed to schedule the appointment themselves. Later, there were contracts in place to handle some of the colonoscopy demand. Patients assigned to the contract list had an appointment made with the closest contract provider. At the time of the study, the majority of the patients enrolled were on the fee-basis list, while a small percentage were placed on the contract list.⁸ By outsourcing a portion of colonoscopy requests to community providers, the VA had hoped to reduce the number of patients on the VA colonoscopy waiting list and ultimately improve the completion rate and timeliness of screening for VA veterans. However, quality control measures such as completion rate, timeliness, and allocation of resources of the fee-basis system had not been systematically monitored.

The purpose of this study was to provide a framework to assess the overall effectiveness of the fee-basis and contract systems in order to help the VA allocate its resources more appropriately. The primary aims of this study were to estimate the colonoscopy completion rate of the fee-basis and contract systems at the DVAMC and to examine the demographic and clinical predictors of completion of fee-basis or contract colonoscopy.

METHODS

Design, Setting, and Population

This analysis was part of a large

retrospective study examining the efficacy of the fee-basis and contract systems for colonoscopy at the DVAMC. The Durham VA Institutional Review Board approved the study on March 13, 2008, with waivers of informed consent and HIPAA authorization. All DVAMC veterans referred for a fee-basis or contract colonoscopy from January 2007 to May 2008 were included in the study. Follow-up through June 2010 was performed using the electronic medical record (EMR). There were no exclusion criteria to initial data collection for the veterans who met the aforementioned inclusion criterion. Patients who died prior to being mailed the letter with fee-basis instructions, or up to 2 weeks after the instructions were mailed, were excluded from analyses, because they had no opportunity to schedule and complete a colonoscopy. Other patients who died during the study period were included in the analyses.

Data Sources

All data abstraction was performed at DVAMC using the EMR system. Existing VA EMRs and non-VA colonoscopy reports sent from the fee-basis or contract sites were used to obtain information for the database. Colonoscopy reports from non-VA providers were scanned into the DVAMC EMR and were visible therein.

Data Abstraction and Collection

A Microsoft Excel spreadsheet was created by the study team. To standardize data collection, a data dictionary was also created. Data collected included demographic information, anticoagulant use, comorbidities, and colonoscopy status. The following demographics were collected: age at colonoscopy refer-

ral, race, ethnicity, sex, and county of residence. *Anticoagulant use* was defined as use of the following medications: aspirin, clopidogrel, warfarin, enoxaparin sodium injection, and aspirin/extended-release dipyridamole. In addition, comorbidities, including medical, psychological, and physical disabilities, were assessed. Other data abstracted included mortality (date and cause of death). Finally, colonoscopy data were gathered, including indication, completion status (yes/no), and location/provider performing the colonoscopy. Indications were defined as *screening* if it was a primary screening colonoscopy in an average-risk patient; *surveillance* if the colonoscopy was for follow-up of CRC, colorectal adenomas, or inflammatory bowel disease; *follow-up* for evaluation of another abnormal test, including a positive FOBT, abnormal serum iron studies, or abnormal imaging (eg, computed tomography); and *diagnostic* for evaluation of patient symptoms such as bleeding.

Statistical Considerations

Demographic and baseline clinical characteristics were summarized using frequency and percent for categorical characteristics and median and range for continuous descriptors. Logistic regression was used to estimate the odds ratios (ORs) describing the association between receipt of colonoscopy and demographic and clinical characteristics. A Wald 95% confidence interval [CI] was generated for each OR estimate. Adjusted estimates were generated using multivariable logistic regression models with age, gender, and race included as a priori covariates. When possible, logistic regression models were evaluated for lack of fit using the Hosmer-Lemeshow test. All analyses were

Table 1. Demographic and baseline clinical characteristics of 1,441 veterans listed for fee-basis or contract colonoscopy at the DVAMC from January 1, 2007, to May 19, 2008.

Characteristic	Frequency	Percentage (%)	Characteristic	Frequency	Percentage (%)
Age (y), median, and range	60	25-96	Comorbidities (continued)		
Gender			Cirrhosis	76	5.3
Male	1,337	92.8	Peptic ulcer disease	49	3.4
Female	103	7.2	End-stage renal disease	34	2.4
Race			Metastatic cancer	28	1.9
White	735	51.0	Dementia	19	1.3
Nonwhite	572	39.7	Other end-stage disease	19	1.3
Ethnicity			End-stage COPD	10	0.7
Non-Hispanic	1,395	96.8	Hemiplegia	6	0.4
Hispanic	6	0.4	Psychological conditions		
Anticoagulation			Depression	384	26.6
None	727	50.5	Posttraumatic stress disorder	312	21.7
Aspirin/clopidogrel, other	648	45.0	Generalized anxiety disorder	92	6.4
Enoxaparin or warfarin with or without additional anticoagulants	65	4.5	Schizophrenia	31	2.2
Comorbidities			Bipolar	28	1.9
Diabetes mellitus	446	31.0	Disabilities		
CAD	314	21.8	Wheelchair/walker use	76	5.3
Cancer	264	18.3	Limb amputation	11	0.8
COPD	163	11.3	Blindness	8	0.6
Renal disease	131	9.1	Spinal cord injury	5	0.3
Cerebrovascular accident	110	7.6	Other immobility	2	0.1
Myocardial infarction	95	6.6	Deafness	0	0

Missing data occurred as follows: gender (n = 1), race (n = 134), ethnicity (n = 40), anticoagulation (n = 1), cerebrovascular accident (n = 1), diabetes mellitus (n = 1), cancer (n = 2), bipolar (n = 2), generalized anxiety disorder (n = 1), limb amputation (n = 2), spinal cord injury (n = 1), deafness (n = 1), end-stage COPD (n = 3), and other end-stage disease (n = 1).

CAD = coronary artery disease; COPD = chronic obstructive pulmonary disease.

performed in SAS 9.2 (SAS Institute Inc., Cary, North Carolina).

RESULTS

A total of 1,452 veterans' records

were identified as electronically listed for fee-basis or contract colonoscopy between January 1, 2007, and May 19, 2008. Of these, 11 were excluded for the following reasons:

incomplete information on a large number of variables (n = 6), died prior to the letter being sent (n = 3), and died within 2 weeks after the letter was sent (n = 2). Thus,

the analytic sample consisted of 1,441 records.

Demographic and Clinical Characteristics

The demographic and clinical characteristics of the veterans studied are described in Table 1. As expected in this population of colonoscopy-eligible veterans, the majority were male (1,337/1,441; 92.8%), and the median age was 60 years (25-96 years). About 94% were aged \geq 50 years. Slightly less than half were non-white (572/1,441; 39.7%). Roughly half were receiving anticoagulant therapy (713/1,441; 49.5%), with 65 (9.1%) of the 713 receiving antiplatelet medication. The most common comorbidities were diabetes mellitus (446/1,441; 31%), coronary

41 received a colonoscopy prior to their death, while 33 did not. Of the 8 patients who received the colonoscopy prior to their death, the causes of death were not related to the colonoscopy (4 patients died from listed medical comorbidities, while the causes of death for the remaining 4 patients were not listed but were confirmed as not being periprocedural).

Table 2 contains estimated univariate (unadjusted) ORs and 95% CIs for the association between demographic and clinical characteristics and receipt of colonoscopy. None of the characteristics examined were significantly associated with colonoscopy receipt except for the use of aspirin/clopidogrel type anticoagulants (OR 1.33; 95% CI, 1.07-1.65). After controlling for the effects of age, gen-

the exclusion of these veterans could result in biased estimates of association if their deaths were associated with the predictors studied, these veterans were included under the classification of having not received a colonoscopy. However, it is possible that some of these veterans would have received a colonoscopy had they not died.

Therefore a sensitivity analysis was performed to evaluate the effects of the assumption. The results of this analysis are summarized in Table 2. The authors found that the deceased veterans were not similar to the living veterans with respect to demographic and clinical characteristics as follows: The living veterans had a higher percentage of psychological conditions (in particular, posttraumatic stress disorder 22.1% vs 3.0%), whereas the deceased had a higher percentage of comorbidities (cancer 66.7% vs 17.2%, diabetes mellitus 51.5% vs 30.5%, and CAD 39.4% vs 21.4%). Under the extreme assumption that all deceased veterans would have received a colonoscopy, the results of the analysis did not change with the exception of aspirin/clopidogrel shifting to being marginally not significant (OR 1.24; 95% CI, 0.98-1.56). In addition, repeating the analysis without these veterans found that there were no differences between the results. The authors concluded that the results of the analyses are not influenced by the inclusion of the deceased or their assumed colonoscopy status.

DISCUSSION

Various strategies, such as outsourcing and improved targeting of colonoscopy requests, have been assessed to accommodate the growing need for colonoscopies at the VA; however, one must routinely assess the outcome of such interventions.^{9,10}

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artery disease (CAD) (314/1,441; 21.8%), and cancer (264/1,441; 18.3%). The median number of comorbidities was 1; 13.3% had 3 or more comorbidities.

Receipt of Colonoscopy

A total of 535 of 1,441 (37.1%) listed veterans received a colonoscopy. Of those, 61.5% received the colonoscopy at a fee-basis or contract clinic, and 38.5% at the VA. The indications for colonoscopy were primary screening (692/1,441; 48.0%), surveillance (411/1,441; 28.5%), follow-up (166/1,441; 11.5%), and diagnostic (159/1,441; 11.0%). Forty-one veterans (2.8%) died during the study period. Eight of these

der, and race, aspirin/clopidogrel type anticoagulants remained the only significant correlate of colonoscopy receipt (OR 1.39; 95% CI, 1.10-1.76).

Secondary Analysis of Comorbidities

The authors hypothesized that the presence of end-stage illness would result in lower odds of receiving colonoscopy. Univariate and adjusted analysis demonstrated no association between end-stage comorbidity and colonoscopy receipt.

Sensitivity Analysis

As stated earlier, 33 veterans listed for contract or fee-basis colonoscopies died during the study period without receiving a colonoscopy. Because

Table 2. Estimated associations between demographic and clinical characteristics and the receipt of colonoscopy.

Characteristic	Colonoscopy (N = 535)	No colonoscopy (N = 906)	Unadjusted		Adjusted ^a	
			OR	95% CI	OR	95% CI
Age (10-year increase)			0.96	0.85-1.08	0.92	0.81-1.05
Gender						
Male, No. (%)	503 (94.0)	834 (92.1)	1.00 (ref)	--	1.00 (ref)	--
Female, No. (%)	32 (6.0)	71 (7.8)	0.75	0.49-1.15	0.64	0.41-1.02
Race (nonwhite)						
White, No. (%)	274 (51.2)	461 (50.9)	1.00 (ref)	--	1.00 (ref)	--
Nonwhite, No. (%)	212 (39.7)	360 (39.7)	0.99	0.79-1.24	0.98	0.78-1.24
Anticoagulation						
None, No. (%)	249 (46.5)	478 (52.8)	1.00 (ref)	--	1.00 (ref)	--
Aspirin/clopidogrel, other, No. (%)	265 (49.5)	383 (42.3)	1.33	1.07-1.65	1.39	1.10-1.76
Enoxaparin or warfarin, No. (%)	20 (3.7)	45 (5.0)	0.85	0.49-1.48	0.90	0.51-1.60
Total comorbidities (%)			1.00	0.91-1.09	0.99	0.89-1.09
0	192 (35.9)	314 (34.7)				
1	173 (32.3)	288 (31.8)				
2	93 (17.4)	189 (20.9)				
3	50 (9.3)	74 (8.2)				
4	19 (3.6)	30 (3.3)				
5	6 (1.1)	9 (1.0)				
6	2 (0.4)	2 (0.2)				
Presence of psychological condition						
No; No. (%)	295 (55.1)	528 (58.3)	1.00 (ref)	--	1.00 (ref)	--
Yes; No. (%)	239 (44.7)	376 (41.5)	1.14	0.92-1.41	1.02	0.81-1.29
Presence of disability						
No; No. (%)	506 (94.6)	837 (92.4)	1.00 (ref)	--	1.00 (ref)	--
Yes; No. (%)	28 (5.2)	66 (7.3)	0.70	0.45-1.11	0.66	0.41-1.06
Indication for colonoscopy						
Primary screening, No. (%)	262 (49.0)	430 (47.5)	1.00 (ref)	--	1.00 (ref)	--
Surveillance, No. (%)	154 (28.8)	257 (28.4)	0.98	0.76-1.27	0.94	0.72-1.23
Follow-up, No. (%)	63 (11.8)	103 (11.4)	1.00	0.71-1.42	0.93	0.64-1.35
Diagnostic, No. (%)	52 (9.7)	107 (11.8)	0.80	0.55-1.15	0.74	0.50-1.08

^aAdjusted ORs and CIs are the result of multivariable logistic regression models controlling for the effects of age, gender, and race.

CI = confidence interval; OR = odds ratio.

The objective of this study was to provide a framework to assess the overall efficacy of the fee-basis and contract systems to support the effective allocation of VA resources. The authors found that only a third of patients referred for colonoscopy using the fee-basis and contract systems were able to obtain a colonoscopy and that a substantial number ultimately underwent colonoscopy at the VA facility.

Interestingly, patients on antiplatelet (aspirin/clopidogrel) medications were found to have a significantly higher colonoscopy completion rate. Initially, the authors hypothesized that patients receiving anticoagulation therapy would be less likely to follow up with a colonoscopy given the added complexity of having to potentially stop the medication prior to receiving a colonoscopy. One would assume that this could have raised an additional barrier, therefore preventing the patients from receiving a colonoscopy. One potential explanation for the results is that patients on antiplatelet therapy may have closer follow-up with their PCP and thus would be more likely to receive appropriate age-adjusted screening. In addition, perhaps patients who are motivated enough to take their medications were more likely to be motivated to pursue a colonoscopy.

The authors were unable to identify patient characteristics associated with receipt of a colonoscopy. The original hypothesis was that younger, healthier patients would be more likely to receive a colonoscopy, because they would be more motivated or able to navigate the fee-basis and contract systems. Also, one could surmise that older patients with multiple comorbidities (especially end-stage disease) would be less likely to receive a colonoscopy, because they

may have more difficulty navigating the complex fee-basis system or because they may be less likely to be accepted by community physicians due to a concern over complications. However, based on the results of this study, the system seemed ineffective for all patient subgroups. Furthermore, the authors noted that patients with end-stage illnesses underwent a colonoscopy at the same rate as healthier patients, calling into question the appropriate use of colonoscopy. While the authors and others have previously demonstrated that comorbidity did not seem to impact FOBT use for screening in the VA, this study provided evidence that severe comorbidity may not be fully considered for colonoscopy use as well.^{6,11,12}

LIMITATIONS

There are limitations to this study. For instance, additional patient factors, such as geographic location and socioeconomic status, which may have been associated with colonoscopy completion, were not available. Also, there were no patient-reported data of their own perceived barriers to scheduling and completing a colonoscopy via this strategy. In addition, although a large population was sampled during the parent study, this study analyzed data from a single VA facility, which may limit its generalizability to other VA facilities. At the time of the study, the exact percentage of patients on the fee-basis list vs contract list was not obtained, although the authors do know that the majority of patients were placed on the fee-basis list. Had this additional data been gathered, the authors could have compared the colonoscopy completion rate between groups to better assess the efficacy of each system individually.

The results of this study suggest that a system that depended on VA patients to make their own colonoscopy arrangements was largely unsuccessful, even when the VA would pay for the procedure. A lack of patient factors associated with colonoscopy completion makes it difficult to propose applying this outsourcing system to any VA patient subgroup with the expectation of more success than that observed. Although the authors initially focused on patient factors that may have affected the colonoscopy completion rates, the fee-basis process may have posed a major barrier to successful colonoscopy completion. The patients on the fee-basis list were given a packet stating they should find an endoscopist in their community to perform the colonoscopy. Per federal regulations, they were not given the names or contact information for any providers and were not given any further direction on how to pursue a provider. In addition, they did not receive any follow-up information or correspondence regarding the fee-basis or contract process. Such a system puts the onus on the patient to obtain a colonoscopy and can prove particularly challenging for patients with multiple comorbidities, psychiatric disorders, or educational barriers.

CONCLUSION

Since the time of the study, the local capacity has dramatically increased with the hiring of additional endoscopists, additional staff (nurses and technologists), and a move to a larger endoscopy suite. In addition, educational outreach to referring physicians and additional training of the gastroenterology fellows were done to decrease the number of patients having potentially inappropriate colonoscopies requested and

scheduled. As such, the DVAMC has met its colonoscopy demands and no longer uses a fee-basis system or contract system for colonoscopies. However, if the DVAMC were to use such a system in the future, the outsourcing process would ideally be via contracts, in which case the patient would be provided the name and contact information for a specific community endoscopy group. A help line would also be useful for those with questions or difficulty navigating the system. These study results also imply that some patients referred for a colonoscopy may not have been suitable candidates because of severe comorbidities. Improvements in delivery of colonoscopy to appropriate VA patients may occur with increasing local capacity and better triage of colonoscopy consult requests. ●

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