## ORIGINAL ARTICLE

## Colonoscopic Withdrawal Times and Adenoma Detection during Screening Colonoscopy

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## ABSTRACT

## BACKGROUND

Colonoscopy is commonly used to screen for neoplasia. To assess the performance of screening colonoscopy in everyday practice, we conducted a study of the rates of detection of adenomas and the amount of time taken to withdraw the colonoscope among endoscopists in a large community-based practice.

## METHODS

During a 15-month period, 12 experienced gastroenterologists performed 7882 colonoscopies, of which 2053 were screening examinations in subjects who had not previously undergone colonoscopy. We recorded the numbers, sizes, and histologic features of the neoplastic lesions detected during screening, as well as the duration of insertion and of withdrawal of the colonoscope during the procedure. We compared rates of detection of neoplastic lesions among gastroenterologists who had mean colonoscopic withdrawal times of less than 6 minutes with the rates of those who had mean withdrawal times of 6 minutes or more. According to experts, 6 minutes is the minimum length of time to allow adequate inspection during instrument withdrawal.

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N Engl J Med 2006;355:2533-41. Copyright © 2006 Massachusetts Medical Society.

#### RESULTS

Neoplastic lesions (mostly adenomatous polyps) were detected in 23.5% of screened subjects. There were large differences among gastroenterologists in the rates of detection of adenomas (range of the mean number of lesions per subject screened, 0.10 to 1.05; range of the percentage of subjects with adenomas, 9.4 to 32.7%) and in their times of withdrawal of the colonoscope from the cecum to the anus (range, 3.1 to 16.8 minutes for procedures during which no polyps were removed). As compared with colonoscopists with mean withdrawal times of less than 6 minutes, those with mean withdrawal times of a minutes of 6 minutes or more had higher rates of detection of any neoplasia (28.3% vs. 11.8%, P<0.001) and of advanced neoplasia (6.4% vs. 2.6%, P=0.005).

## CONCLUSIONS

In this large community-based gastroenterology practice, we observed greater rates of detection of adenomas among endoscopists who had longer mean times for withdrawal of the colonoscope. The effect of variation in withdrawal times on lesion detection and the prevention of colorectal cancer in the context of widespread colonoscopic screening is not known. Ours was a preliminary study, so the generalizability and implications for clinical practice need to be determined by future studies.

More than 10 fold difference > 1000% in adenomas/patient. ADR 9.4-> 32.7 for 6 min withdrawal <11.8 >28.3 Shouldn't goal be maximal clearing of all adenomas?

N ENGLJ MED 355;24 WWW.NEJM.ORG DECEMBER 14, 2006





The values are for procedures in which no polyps were removed. The significant correlation between rates of detection of adenomas and withdrawal times was calculated with the use of the Spearman rank-correlation coefficient.

may increase further if the period of withdrawal is more than 6 to 10 minutes. Regardless, acceptance of the usefulness of a minimum colonoscopic withdrawal time — whether 6 minutes or longer — would require validation in a prospective study. Variability among observers has been reported with other screening tests for neoplasia, with superior results observed in centers that perform a relatively large number of tests with a relatively high degree of expertise.<sup>18-20</sup>

The goal of screening colonoscopy is to prevent colorectal cancer. The influence that divergent rates of adenoma detection might have on this goal is unclear. On the one hand, detection of diminutive adenomas may have little effect on the risk of colon cancer, since the majority of these lesions do not progress to cancer.<sup>21</sup> Also, persons found to have a single diminutive adenoma are believed to be at no greater risk for the development of colorectal cancer than are those without adenomas.<sup>22</sup>

On the other hand, enhanced detection of adenomas could provide long-term benefits for patients. First, support for the protective effect of colonoscopy against colorectal cancer derives from studies in which all identified adenomatous polyps, regardless of size, were removed.<sup>3,4</sup> Even small polyps can occasionally contain cancer,<sup>23</sup> a fact underlined in the present study by the discovery of a 7-mm malignant adenoma. Second, our data highlight differences among endoscopists not only in detection of neoplasia overall but also in detection of advanced neoplasia, both of which correlated with colonoscopic withdrawal times. Advanced adenomas are considered important because of their greater propensity for progression to a malignant condition.<sup>24</sup> Third, by definition, tubular adenomas are neoplastic lesions with the potential to progress to cancer. Patients who have adenomatous polyps that were overlooked during a screening colonoscopy may be at risk for progression to cancer, either because of a longer interval between colonic examinations than is appropriate or because of the patient's own decision to forgo colorectal cancer screening in the future. Fourth, the finding of adenomatous polyps may affect the recommendations for colorectal neoplasia screening for relatives of the index patient.<sup>25</sup> Therefore, although these points support the practice of carefully scrutinizing the colorectal mucosa and removing all identified adenomatous polyps during screening colonoscopy, it should be acknowledged that there is a relatively small clinical benefit of detecting and removing very small polyps.

Successful efforts to reduce the disease burden from colorectal cancer depend on implementation of effective screening practices in community settings. Our study showed wide variation in the duration of withdrawal of the colonoscope and higher rates of adenoma detection among endoscopists with longer withdrawal times. However, because of the relatively small number of endoscopists in this study, the generalizability and implications for clinical practice are uncertain and need to be determined by future studies. Furthermore, this study did not address the appropriateness or cost-effectiveness of systematically increasing colonoscopic withdrawal time. Although the findings of this preliminary observational study should be interpreted cautiously, they may inform future efforts to improve strategies for the prevention of colorectal cancer.

No potential conflict of interest relevant to this article was reported.

We thank Brenda Paulson, Evon Dowd, and Kathy Geissler for invaluable assistance with patient care, data collection, and manuscript preparation.

, CCC - smallest is <sup>1</sup> 3mm

## AMERICAN COLLEGE OF GASTROENTEROLOGY Questions and Answers about Quality in Colonoscopy

## 1. Why is quality important in colonoscopy?

Although colonoscopy has been available in clinical practice for more than 40 years, only in the past 15 years has awareness developed that the success of colonoscopy in preventing colorectal cancer and minimizing complications is very dependent on the skill and competence of the colonoscopist. Colonoscopists differ substantially in the number of precancerous polyps they detect during colonoscopy and in how often they perform colonoscopy in response to both normal and abnormal findings. Awareness of these differences led the U.S. Multisociety Task Force on Colorectal Cancer in 2002, as well as a joint task force of experts from the American College of Gastroenterology and American Society of Gastrointestinal Endoscopy in 2006, to propose quality indicators that colonoscopists can use to measure how effectively and safely they perform colonoscopy. Obviously, patients have an interest in undergoing the most effective and safe colonoscopy possible, and achieving these goals requires a colonoscopist who is committed to high quality.

# 2. Does the quality of examination differ among colonoscopists from different specialties?

Studies have shown average performance of colonoscopy by gastroenterologists to be superior to that of primary care physicians in three different areas of colonoscopy performance. First, three population-based studies have found that gastroenterologists performing colonoscopy are less likely to miss colorectal cancer than are primary care physicians who perform colonoscopy. This may reflect the more extensive training that gastroenterologists receive in this procedure and their higher volumes of colonoscopy in practice. Second, gastroenterologists' patients are less likely to incur serious complications during colonoscopy, such as perforation or making a hole in the colon, compared to primary care physicians. Third, gastroenterologists are less likely than both primary care physicians and general surgeons to perform colonoscopy at intervals that are considered too short according to current guidelines. Whether this difference reflects a lack of confidence among primary care physicians and general surgeons in the quality of their colonoscopy or lack of awareness of current guidelines is unknown.

# 3. Is there variation in quality of performance among members of the same specialty?

Even though gastroenterologists have on average the highest level of training and their examinations have been shown on average to be superior to primary care physicians, there is considerable variation among gastroenterologists in their detection rates of precancerous polyps. Therefore, it is essential that every colonoscopist, regardless of specialty, makes measurements to establish that their examinations are effective. It is very reasonable and appropriate for patients to ask questions of their colonoscopist about whether quality measurements are being made and their results.

# 4. How can I be sure that I will receive a careful examination of my colon?

The measurement that best reflects how carefully colonoscopy is performed is a doctor's "adenoma detection rate." This rate is defined as the percentage of patients age 50 and older undergoing screening colonoscopy, who have one or more precancerous polyps detected. This rate should be at least 25% in men and 15% in women. A secondary measure of careful examination is that doctors should have an average withdrawal time of at least six minutes. The withdrawal time is the time it takes to remove the scope from the colon. This interval is important because this is the phase of colonoscopy when most doctors actually examine the colon systematically for polyps. It is perfectly reasonable to expect doctors to have measured their adenoma detection rate and to record their withdrawal time. It is also reasonable to ask for a copy of the colonoscopy report that documents that the colonoscope was advanced to the very beginning of the colon and that the landmarks of that portion of the colon (called the "cecum") have been documented by notation in the report and by photography.

# 5. Why is bowel preparation for colonoscopy important, and what can I do to make sure my colon is thoroughly cleansed for the procedure?

Colonoscopy is a video examination of the colon. The video camera and the colonoscope, like any other video camera, cannot see through solids. Therefore, the colon must be thoroughly cleansed to provide the doctor the best opportunity possible for a thorough and detailed examination.

Be sure to pick up and read your written bowel preparation instructions at least several days before your colonoscopy. Go over the instructions and make sure you have all of the materials needed to complete the preparation.

The most effective bowel preparations involve "split" dosing of the laxatives, in which half of the preparation is taken on the morning of the examination, usually 4 to 5 hours before the time of the scheduled colonoscopy, and completed at least 2 to 3 hours before that time. If you are scheduled at 7 or 8 in the morning, this will mean getting up very early to take the second half of the preparation. If the instructions call for split dosing, do not alter the timing of the doses. It is worth the inconvenience of getting up in the middle of the night to make sure that you have a very effective preparation. The timing of the second dose in relationship to the colonoscopy is critical. If too long an interval is allowed between the end of the second half of the preparation and the timing of the colonoscopy, mucus and secretions will come out of the small intestine and stick to the cecum and right colon.

## Summary:

To ensure an effective and safe colonoscopic examination, find a well-trained colonoscopist who is committed to making quality measurements. It is fair to ask the colonoscopist to be sure to do a slow and careful examination and to provide a copy of the report that documents and photographs the complete extent of examination. Take the bowel preparation instructions seriously. Pick up the written instructions early, read them early, and follow them carefully. When colonoscopy is done carefully and with an effective preparation, it is a very powerful cancer prevention technique.

## ORIGINAL ARTICLE

## Quality Indicators for Colonoscopy and the Risk of Interval Cancer

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## ABSTRACT

### BACKGROUND

Although rates of detection of adenomatous lesions (tumors or polyps) and cecal intubation are recommended for use as quality indicators for screening colonoscopy, these measurements have not been validated, and their importance remains uncertain.

### METHODS

We used a multivariate Cox proportional-hazards regression model to evaluate the influence of quality indicators for colonoscopy on the risk of interval cancer. Data were collected from 186 endoscopists who were involved in a colonoscopy-based colorectal-cancer screening program involving 45,026 subjects. Interval cancer was defined as colorectal adenocarcinoma that was diagnosed between the time of screening colonoscopy and the scheduled time of surveillance colonoscopy. We derived data on quality indicators for colonoscopy from the screening program's database and data on interval cancers from cancer registries. The primary aim of the study was to assess the association between quality indicators for colonoscopy and the risk of interval cancer.

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N Engl J Med 2010;362:1795-803. Copyright © 2010 Massachusetts Medical Society.

#### RESULTS

A total of 42 interval colorectal cancers were identified during a period of 188,788 person-years. The endoscopist's rate of detection of adenomas was significantly associated with the risk of interval colorectal cancer (P=0.008), whereas the rate of cecal intubation was not significantly associated with this risk (P=0.50). The hazard ratios for adenoma detection rates of less than 11.0%, 11.0 to 14.9%, and 15.0 to 19.9%, as compared with a rate of 20.0% or higher, were 10.94 (95% confidence interval [CI], 1.37 to 87.01), 10.75 (95% CI, 1.36 to 85.06), and 12.50 (95% CI, 1.51 to 103.43), respectively (P=0.02 for all comparisons).

## ADR > or equal to 20 confers 10x the protection. ONLY 18% of all GIs had an ADR > or equal to 20.

## CONCLUSIONS

The adenoma detection rate is an independent predictor of the risk of interval colorectal cancer after screening colonoscopy.

N ENGLJ MED 362;19 NEJM.ORG MAY 13, 2010

ADR <11-cancer within 5 mos of colonoscopy ADR 11-14.9-cancer within 7 mos of colonoscopy





**Figure 2. Cumulative Hazard Rates for Interval Colorectal Cancer, According to the Endoscopist's Adenoma Detection Rate (ADR).** The graph shows cumulative hazard rates for interval colorectal cancer among subjects who underwent screening colonoscopy that was performed by an endoscopist with an ADR in one of the following categories: less than 11.0%, 11.0 to 14.9%, 15.0 to 19.9%, and 20.0% or more.

> pectomy may account for 25% of interval cancers,<sup>5,20</sup> these studies were limited in terms of assessing both the quality of the baseline colonoscopy and the adequacy of efforts to clear all neoplasia. Similarly, there is a lack of firm evidence for an increased proportion of poorly differentiated tumors among interval cancers, as compared with noninterval cancers.<sup>21,22</sup> However, in one study, there was an increased likelihood that such tumors were associated with mismatch-repair gene dysfunction.<sup>22</sup> There are no data linking the occurrence of interval cancers to serrated-pathway colorectal cancer. Unfortunately, we could not assess the biologic aggressiveness and genetic characteristics of interval cancers from the data available in the cancer registries.

> On the basis of the prevalence of adenomas and cecal intubation rates in studies of screening colonoscopy in the United States, threshold values for rates of adenoma detection (15% among women and 25% among men ≥50 years old) and cecal intubation (95% for both sexes) have been proposed.<sup>7-9</sup> There is no proof that these values apply to large-scale screening programs involving a high proportion of nonexpert centers, located in countries with different epidemiologic features of colorectal cancer and lower adenoma detection rates. Although our study was not designed to

determine the threshold for the adenoma detection rate, the 20% value that emerged from the analysis (for both sexes combined) is close to these recommendations. Nonetheless, it may not be possible to establish a universal threshold for the rate of adenoma detection because of geographic differences in the epidemiology of colorectal cancer and its precursors.<sup>11,18,23,24</sup>

Surprisingly, our study showed that the cecal intubation rate, when used as a quality measurement, was not associated with the risk of interval cancer. One can speculate that the rate of adenoma detection is a risk factor for interval cancer in the entire colon, whereas the importance of the cecal intubation rate is limited to the right colon; thus, it is difficult to evaluate the importance of cecal intubation because of the small number of interval cancers in the right colon. Our findings do not argue against the need for a complete examination but rather highlight the primary role of the adenoma detection rate. We did not find a significant association between individual characteristics of endoscopists (including age, sex, and specialty) and the risk of interval cancer. (In one previous study, the endoscopist's specialty was associated with the rate of detection of new or missed colorectal cancers.<sup>25</sup>)

In our study, another factor that was independently associated with the risk of interval colorectal cancer was the subject's age. The risk was particularly high for subjects who were 60 years of age or older, a finding that is consistent with the results of previous studies.<sup>5,25,26</sup>

Our study has several notable features. The incidence of colorectal cancer and the rate of death are the most appropriate end points for validating quality indicators for screening colonoscopy. However, the use of these end points requires a long-term observation period and a large number of subjects to achieve adequate statistical power. For that reason, we chose the occurrence of interval cancer as a surrogate end point, since it is closely related to the incidence of colorectal cancer and has been used previously in case-control studies to estimate a reduction in incidence.1,5,27 Furthermore, in screening programs for breast cancer, interval cancers have been inversely associated with a reduction in mortality, and surveillance for interval cancers is widely used to monitor the performance of such programs.<sup>28,29</sup>

In addition, there is no universally accepted definition of interval cancer. In colonoscopy stud-

Table 2. Characteristics of 186 Endoscopists, According to the Adenoma Detection Rate.*						
Characteristic	Adenoma Detection Rate					
	<11.0%	11.0 to 14.9%	15.0 to 19.9%	≥20.0%	Total	
Colonoscopists — no. (%)	80 (43.0)	46 (24.7)	34 (18.3)	26 (14.0)	186 (100.0)	
No. of colonoscopies included in study						
Median (interquartile range)	130 (54–230)	161 (98–304)	125 (98–194)	178 (112–654)	145 (80–262)	
Range	30–1824	34–1848	35-1589	32-1737	30–1848	
Person-years of follow-up — no.	65,528	54,339	27,490	41,431	188,788	
Mean age in 2000 (±SD) — yr	43.8±7.6	41.0±6.0	40.8±5.9	40.3±5.0	42.1±6.7	
Male sex — no. (%)	65 (81.2)	38 (82.6)	27 (79.4)	19 (73.1)	149 (80.1)	
Screening centers — no.†	35	28	18	12	45	
Rate of cecal intubation — %						
Median (interquartile range)	91 (84–95)	94 (88–96)	94 (91–96)	95 (92–98)	94 (88–96)	
Range	55–100	52–100	60–98	85–100	52-100	
Complete colonoscopies — no./total no. (%)	14,273/15,883 (89.9)	12,129/13,281 (91.3)	6,249/6,607 (94.6)	8,901/9,255 (96.2)	41,552/45,026 (92.3)	
Colonoscopic experience — no. (%)‡						
<5 yr	18 (22.5)	13 (28.3)	16 (47.1)	12 (46.2)	59 (31.7)	
5–10 yr	20 (25.0)	17 (37.0)	7 (20.6)	6 (23.1)	50 (26.9)	
>10 yr	30 (37.5)	14 (30.4)	8 (23.5)	5 (19.2)	57 (30.6)	
Unknown	12 (15.0)	2 (4.3)	3 (8.8)	3 (11.5)	20 (10.8)	
Specialty — no. (%)						
Gastroenterology	22 (27.5)	17 (37.0)	14 (41.2)	14 (53.8)	67 (36.0)	
Internal medicine or no specialty	24 (30.0)	14 (30.4)	8 (23.5)	6 (23.1)	52 (28.0)	
Surgery	34 (42.5)	15 (32.6)	12 (35.3)	6 (23.1)	67 (36.0)	
(No. of interval cancers/100,000 person-yr) (of follow-up)	33.6	22.1	25.5	2.4	22.3	

\* Plus-minus values are means ±SD. Because of rounding, percentages may not total 100.

† The numbers of centers do not total 45 because endoscopists at each center had multiple rates of adenoma detection.

The years of colonoscopic experience for endoscopists were not included in the multivariate analysis because of the lack of prospectively collected complete data.

presented in Table 2 in the Supplementary Appendix.

## DISCUSSION

In our study, a widely recommended quality indicator for screening colonoscopy (the endoscopist's rate of adenoma detection) was significantly associated with the risk of interval cancer among 45,026 subjects who underwent such screening. The risk was significantly higher among subjects who underwent colonoscopies that were performed by endoscopists with an adenoma detection rate of less than 20% than among subjects examined by endoscopists with a detection rate of 20% or more. A second widely recommended quality indicator, the cecal intubation rate, was not associated with the risk of interval cancer. These results, obtained in a large cohort, underscore the crucial role of meticulous inspection of the colorectal mucosa at the baseline examination and indicate that such inspection is a very important factor in the efficacy of screening.<sup>18,19</sup>

Other factors — such as an ineffective polypectomy, alternative pathways to colorectal cancer (e.g., the *BRAF*–CpG island methylation pathway), and biologic aggressiveness of selected tumors — may also be associated with the risk of interval colorectal cancer. However, in our study, only one interval cancer (2.4%) was attributed to an ineffective polypectomy. Although two previous studies have suggested that ineffective poly-

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# Average cost per case, per year to treat advanced colorectal cancer

# \$14 billion

Spent yearly to treat colorectal cancer in the United States

## Focused Legislative Efforts

As budgets have been shrinking, our legislative priorities this year focused sharply on maintaining funds for:

- Centers for Disease Control and Prevention's screening of low-income and high-risk populations
- Department of Defense's unique new streamlined, multidisciplinary cancer research
- National Cancer Institute funding for critical colorectal cancer research by national cancer center consortiums on vital topics (prevention, recurrence) not undertaken by pharmaceutical companies

We're not just supporting one bill's passage; we spend months and even years in the committee process, having complex conversations and working with legislative staffers to monitor funding bills. Medicare Rule Hits Seniors

One of our major efforts this year is a good example of paying close attention, then working persistently with politicians and other advocates to change a law or rule. Medicare-and all insurers-have confusing policies and highly varying interpretations about charging copayments for colonoscopies. Under the new health law, neither Medicare nor insurances can charge a copayment for a screening colonoscopy. But if a polyp is detected and removed, the colonoscopy can be re-defined as a "therapeutic" procedure-resulting in a surprise bill to patients of \$200 or more. We met with the Department of Health and Human Services, worked with Medicare to untangle the coding and billing issues, and cosponsored a Kaiser Foundation study to gather data for Congress about how often this happens in different states. Our advocates then headed to Congress to enlist lawmakers' support.

"For a Medicare beneficiary on a fixed income, the cost of coinsurance could be the deciding factor of whether to pursue a potentially life-saving screening colonoscopy. Congress must correct current law..." —U.S. Rep. Charlie Dent (R-PA)



After hearing the personal stories of Call-on Congress advocates and constituents. Pennsylvania Rep. Charlie Dent introduced H.R. 4120 to waive Medicare copayments when a screening colonoscopy includes polyp removal. These days, when politicians stick their necks out and push for funding new laws, or to fix existing law, they deserve—and need—vocal and visible support. We applaud Congressman Dent while we continue to urge our advocates to push for co-sponsorship from their own legislators.

In deep appreciation of his efforts, Fight Colorectal Cancer awarded U.S. Rep. Chartle Dent with its 2012 Congressional Champion Award for his commitment to improve prevention and detection of this disease.



## Colorectal cancer prevention by an optimized colonoscopy protocol in routine practice

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We conducted a retrospective cohort study to investigate the colorectal cancer (CRC) incidence and mortality prevention achievable in clinical practice with an optimized colonoscopy protocol targeting near-complete polyp clearance. The protocol consisted of: (*i*) telephonic reinforcement of bowel preparation instructions; (*ii*) active inspection for polyps throughout insertion and circumferential withdrawal; and (*iii*) timely updating of the protocol and documentation to incorporate the latest guidelines. Of 17,312 patients provided screening colonoscopies by 59 endoscopists in South Carolina, USA from September 2001 through December 2008, 997 were excluded using accepted exclusion criteria. Data on 16,315 patients were merged with the South Carolina Central Cancer Registry and Vital Records Registry data from January 1996 to December 2009 to identify incident CRC cases and deaths, incident lung cancers and brain cancer deaths (comparison control cancers). The standardized incidence ratios (SIR) and standardized mortality ratios (SMR) relative to South Carolina and US SEER-18 population rates were calculated. Over 78,375 person-years of observation, 18 patients developed CRC *versus* 104.11 expected for an SIR of 0.17, or 83% CRC protection, the rates being 68% and 91%, respectively among the adenoma- and adenoma-free subgroups (all p < 0.001). Restricting the cohort to ensure minimum 5-year follow-up (mean follow-up 6.58 years) did not change the results. The CRC mortality reduction was 89% (p < 0.001; four CRC deaths *vs.* 35.95 expected). The lung cancer SIR was 0.96 (p = 0.67), and brain cancer SMR was 0.92 (p = 0.35). Over 80% reduction in CRC incidence and mortality is achievable in routine practice by implementing key colonoscopy principles targeting near-complete polyp clearance.

#### What's new?

Colonoscopy screening is a promising preventative tool for colorectal cancer, but its success may be determined by how extensively precancerous polyps are cleared from the colon. Previous studies explored relative cancer hazard risks according to endoscopists' adenoma detection rates. This retrospective investigation expands on that work by quantifying the population-based cancer protection rate achieved through the use of an optimized colonoscopy protocol targeting near-complete polyp clearance. Use of the protocol was associated with reductions of more than 80% in colorectal cancer incidence and mortality, suggesting that high rates of protection from the disease are achievable in routine practice.

The lifetime risk of colorectal cancer (CRC) in Western populations is about 5 to 6%, with annual incidence rates of 48 to 50 per 100,000 population.<sup>1</sup> Screening colonoscopy holds great promise for primary prevention of CRC by enabling

**Key words:** colorectal cancer screening, screening colonoscopy effectiveness, colonoscopy protocol, colorectal cancer protection, retrospective cohort study

Additional Supporting Information may be found in the online version of this article.

Grant sponsor: National Cancer Institute; Grant number: 1R15 CA156098-01; Grant sponsor: Mayo Clinic College of Medicine, Rochester, Minnesota and NCI Established Investigator award; Grant number: K05 CA136975; Grant sponsor: NCI's Center to Reduce Cancer Health Disparities; Grant number: U54 CA153461 DOI: 10.1002/ijc.29228

History: Received 2 June 2014; Accepted 12 Sep 2014; Online 20 Sep 2014

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direct visualization and removal of precancerous polyps. The National Polyp Study (NPS), a prospective clinical trial documented 76% CRC incidence reduction among 1,418 patients provided colonoscopic polypectomy over 5.9 years of mean follow-up, and a CRC mortality reduction of 53% over 15.8 years of follow-up relative to the general population.<sup>2,3</sup> One academic medical center reported zero CRC incidence among persons without adenomas at initial colonoscopy over 5.34 years of mean follow-up.<sup>4</sup>

The outcomes of community-based colonoscopy programs have shown much lower cancer protection rates. The most recent study using pooled data from the Nurses Health Study and Health Professionals Follow-up Study reported CRC risk reductions of 43% and 56%, respectively, among persons with and without adenomas at baseline.<sup>5</sup> Claims-based studies from Canada reported CRC incidence reductions of 41% and 29%, respectively among males and females following a negative colonoscopy, and a 37% CRC mortality reduction among all colonoscopy recipients relative to those without a colonoscopy.<sup>6,7</sup> The latter study noted that low CRC protection rates were partly accounted for by nongastroenterologist endoscopists, which was attributed to potentially higher neoplasm miss rates by this group relative to gastroenterologist

## CORRESPONDENCE



## Long-Term Colorectal-Cancer Mortality after Adenoma Removal

TO THE EDITOR: The study of colorectal-cancer mortality by Løberg et al. (Aug. 28 issue)1 provides no data on the quality of the colonoscopies performed. This limitation outweighs the merits of the large population size and prolonged follow-up in this study, and it precludes meaningful inferences regarding the protective effect of colonoscopy against colorectal cancer. We think the results are best explained by polyps left behind or incompletely removed because of the use of a suboptimal technique.<sup>2,3</sup> The timing of colonoscopy may explain the modest mortality benefit among patients with low-risk adenomas versus no benefit among patients with multiple polyps, since younger patients have fewer and less advanced polyps. Our recent study involving patients who received treatment from an endoscopy group with an extraordinary, continuous, and prolonged focus on optimal mucosal inspection and complete polypectomy, as compared with the general population, showed an 83% reduction in the incidence of colorectal cancer and an 89% reduction in mortality.<sup>4</sup> The incidence of lung cancer in our study population was identical to that of the general population; this validated the substantial protective effect of high-quality colonoscopy against colorectal cancer. In our opinion, details about the quality of colonoscopy are more important than population size or follow-up in studies of methods to lower colorectalcancer mortality.5

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Dr. de Groen reports receiving royalties from a patent and owning potential stock options (in trust at the Mayo Clinic) in EndoMetric, a company that measures the quality of colonoscopies by analyzing streaming videos of endoscopies. No other potential conflict of interest relevant to this letter was reported.

**1.** Løberg M, Kalager M, Holme O, Hoff G, Adami HO, Bretthauer M. Long-term colorectal-cancer mortality after adenoma removal. N Engl J Med 2014;371:799-807.

**2.** Rex DK, Cutler CS, Lemmel GT, et al. Colonoscopic miss rates of adenomas determined by back-to-back colonoscopies. Gastroenterology 1997;112:24-8.

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**4.** Xirasagar S, Li Y-J, Hurley TG, et al. Colorectal cancer prevention by an optimized colonoscopy protocol in routine practice. Int J Cancer 2014 September 20 (Epub ahead of print).

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DOI: 10.1056/NEJMc1411954

**involving 25,000 cases over 12 yrs at CCC TO THE EDITOR:** Løberg et al. state that their study "extends recent findings from the National Polyp Study. We confirm that the risk of death from colorectal cancer after adenoma removal is

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## Quality Indicators for Colonoscopy

Quality Metrics: See # 8 on P79 which calls for intraprocedure ADR of 25 Mixed or 20 for woman and 30 for men!

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Am J Gastroenterol 2015; 110:72-90; doi:10.1038/ajg.2014.385; published online 2 December 2014

Colonoscopy is widely used for the diagnosis and treatment of colon disorders. Properly performed, colonoscopy is generally safe, accurate, and well-tolerated. Visualization of the mucosa of the entire large intestine and distal terminal ileum usually is possible during colonoscopy. Polyps can be removed during colonoscopy, thereby reducing the risk of colon cancer. Colonoscopy is the preferred method to evaluate the colon in most adult patients with large-bowel symptoms, iron deficiency anemia, abnormal results on radiographic studies of the colon, positive results on colorectal cancer (CRC) screening tests, postpolypectomy and post-cancer resection surveillance, and diagnosis and surveillance in inflammatory bowel disease. In addition, colonoscopy is the most commonly used CRC screening test in the United States (1). Based on 2010 data, over 3.3 million outpatient colonoscopies are performed annually in the United States, with screening and polyp surveillance accounting for half of indications (2).

Optimal effectiveness of colonoscopy depends on patient acceptance of the procedure, which depends mostly on acceptance of the bowel preparation (3). Preparation quality affects the completeness of examination, procedure duration, and the need to cancel or repeat procedures at earlier dates than would otherwise be needed (4,5). Ineffective preparation is a major contributor to costs (6). Meticulous inspection (7,8) and longer withdrawal times (9–14) are associated with higher adenoma detection rates (ADR). A high ADR is essential to rendering recommended intervals (15) between screening and surveillance examinations safe (16,17). Optimal technique is needed to ensure a high probability of detecting dysplasia when present in inflammatory bowel disease (17–21). Finally, technical expertise and experience will help prevent adverse events that might offset the benefits of removing neoplastic lesions (22).

Recent studies report that colonoscopy is less effective in preventing proximal colon cancer and cancer deaths (ie, colon cancer proximal to the splenic flexure) compared with distal cancer (ie, colon cancer at or distal to the splenic flexure) (23–28). Decreased protection against right-sided CRC is likely due to multiple factors. These include missed adenomas or incompletely resected adenomas; suboptimal bowel preparation; precancerous lesions that are endoscopically subtle or difficult to remove, such as sessile serrated polyps and flat and/or depressed adenomas, and differences in tumorigenesis between right-sided and left-sided cancers. Improving prevention of right-sided colon cancer is a major goal of colonoscopy quality programs.

Five studies have established that gastroenterologists are more effective than surgeons or primary care physicians at preventing CRC by colonoscopy (27,29–32). This most likely reflects higher rates of complete examinations (ie, cecal intubation) (30) and higher rates of adenoma detection among gastroenterologists (33,34). All endoscopists performing colonoscopy should measure the quality of their colonoscopy. Institutions where endoscopists from multiple specialties are practicing should reasonably expect all endoscopists to participate in the program and achieve recommended quality benchmarks.

The quality of health care can be measured by comparing the performance of an individual or a group of individuals with an ideal or benchmark (35). The particular parameter that is being used for comparison is termed a quality indicator. A quality indicator often is reported as a ratio between the incidence of correct performance and the opportunity for correct performance (4) or as the proportion of interventions that achieve a predefined goal (35). Quality indicators can be divided into 3 categories: (1) structural measures-these assess characteristics of the entire health care environment (eg, participation by a physician or other clinician in systematic clinical database registry that includes consensus endorsed quality measures), (2) process measures-these assess performance during the delivery of care (eg, ADR and adequate biopsy sampling during colonoscopy for chronic ulcerative colitis), (3) outcome measures—these assess the results of the care that was provided (eg, the prevention of cancer by colonoscopy and reduction in the incidence of colonoscopic perforation).

This document is a product of the ASGE/ACG Task Force on Quality in Endoscopy. This document was reviewed and approved by the Governing Boards of the American Society for Gastrointestinal Endoscopy and the American College of Gastroenterology. It appears simultaneously in *Gastrointestinal Endoscopy and the American Journal of Gastroenterology*. This document was reviewed and endorsed by the American Gastroenterological Association Institute.

# Colonoscopy Screening Rates Among Patients of Colonoscopy-Trained African American Primary Care Physicians

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BACKGROUND: When performed competently, colonoscopy screening can reduce colorectal cancer rates, especially in high-risk groups such as African Americans. Training primary care physicians (PCPs) to perform colonoscopy may improve screening rates among underserved high-risk populations. METHODS: The authors compared colonoscopy screening rates and computed adjusted odds ratios for colonoscopy-eligible patients of trained African American PCPs (study group) versus untrained PCPs (comparison group), before and after initiating colonoscopy training. All colonoscopies were performed at a licensed ambulatory surgery center with specialist standby support. Retrospective chart review was conducted on 200 consecutive, established outpatients aged ≥50 years at each of 12 PCP offices (7 trained African American PCPs and 5 untrained PCPs, practicing in the same geographic region). There were a total of 1244 study group and 923 comparison group patients. RESULTS: Post-training colonoscopy rates in both groups were higher than pretraining rates: 48.3% versus 9.3% in the study group, 29.6% versus 9.8% in the comparison group (both P < .001). African American patients in the study group showed a >5-fold increase (8.9% pretraining vs 52.8% post-training), with no change among whites (18.2% vs 25.0%). Corresponding pretraining and post-training rates among comparison patients were 10.4%% and 38.7%, respectively, among African Americans (P < .001), and 13.3% versus 13.2%, respectively, among whites. After adjusting for demographics, duration since becoming the PCP's patient, and health insurance, the study group had a 66% higher likelihood of colonoscopy in the post-training period (odds ratio, 1.66; 95% confidence interval, 1.30-2.13), and African Americans had a 5-fold increased likelihood of colonoscopy relative to whites. CONCLUSIONS: Colonoscopy-trained PCPs may help reduce colorectal cancer disparities. Cancer 2011;117:5151-60. © 2011 American Cancer Society.

**KEYWORDS:** screening colonoscopy, colorectal cancer screening, African American screening rate, colonoscopytrained primary care physicians.

**Colorectal** cancer (CRC) is a public health priority well suited to large-scale intervention. It is the second leading cause of cancer deaths, and has a relatively long latency of 10 to 15 years during which incipient, clinically accessible polyps progress to cancer.<sup>1</sup> Colonoscopy is a cost-effective<sup>2-6</sup> and safe outpatient procedure for polyp detection and removal, with proven efficacy for primary prevention.<sup>7,8</sup> The at-risk age group is well defined, because 90% of patients with CRC are >50 years old.<sup>9</sup> Despite declining CRC mortality among whites since 1973, the US Healthy People 2010 goal<sup>10</sup> (CRC mortality  $\leq 13.9$  of 100,000) remains elusive because of continuing high CRC incidence and mortality among African Americans, particularly in the southeastern United States.<sup>11</sup>

Nationally, African Americans have 12.3% higher CRC incidence than whites.<sup>12</sup> In South Carolina, the disparity is worse, with 33% and 30% higher incidence among African American men and women, respectively, and 57% and 40% higher mortality rates, respectively.<sup>13</sup> Consistent with the low sensitivity and specificity of the other major CRC screening

DOI: 10.1002/cncr.26142, Received: September 14, 2010; Revised: December 3, 2010; Accepted: February 25, 2011, Published online April 26, 2011 in Wiley Online Library (wileyonlinelibrary.com)

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We thank the 12 primary care physicians for providing access to patient charts for record review, and graduate research assistants Lekhena Sros, Kathy Dhotre, and Philip Cavicchia for data collection and data entry assistance.

# <sup>80%</sup>by2018



## **Effective Messaging** to Reach the Unscreened



## 2015 COMMUNICATIONS **GUIDEBOOK**









THE OFFICIAL SPONSOR OF BIRTHDAYS."

#### Dear 80% by 2018 Colleagues:

Thank you for being a part of the incredible effort to achieve an 80% colorectal cancer screening rate by 2018. As you know, many of us in public health have been working at this for a long time, and we have seen real progress with screening. Over the last ten years, colorectal cancer incidence rates have dropped 30% in the U.S. among adults 50 and older, almost entirely thanks to screening. Yet, despite the good news, colorectal cancer remains the second-leading cause of cancer death in the United States when men and women are combined. 23 million Americans between the ages of 50 and 75 are not being regularly screened, even though general awareness of colorectal cancer screening is high. The challenge is that those who are still unscreened will be the most difficult to reach. We now need a final push to the finish line to substantially reduce colorectal cancer screening as a major public health problem and make sure that all Americans are benefitting equally from this life-saving technology.

So, how can we reach the unscreened in a more strategic way? The American Cancer Society, the Centers for Disease Control and Prevention and the members of the National Colorectal Cancer Roundtable have been working to answer that question.

We are pleased to offer this Colorectal Cancer Screening 80% by 2018 Communications Guidebook designed to assist all of us in effectively talking to the unscreened with messages that are based on market research. With these messages, we intend to help educate, empower and mobilize three key unscreened audiences

- The Newly Insured
- The Insured, Procrastinator/Rationalizer
- The Financially Challenged

This guidebook is not intended to replace any partner's outreach effort, campaign or media blitz around colorectal cancer screening. Rather, we hope the information will supplement your current efforts and magnify our collective voice with these critical audiences.

We gratefully thank all of you for your partnership in working to make the goal of 80% by 2018 a reality. Special thanks to the members of the NCCRT Public Awareness Task Group for their advice and strategic thinking on how to best reach our target audiences. Together, we can save lives and eliminate colorectal cancer as a major public health problem.

Ruhard L. Wender

Richard C. Wender, MD Chair, National Colorectal Cancer Roundtable Chief Cancer Control Officer American Cancer Society, Inc.

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#### **Building on Screening Successes**

Colorectal cancer incidence rates have dropped 30% in the U.S. over the last 10 years among adults 50 and older.1

The percentage of the population up-to-date with recommended colorectal cancer screening increased from 56% in 2002 to 65% in 2010.2 In addition, the healthcare landscape is changing and barriers to colorectal cancer screening are breaking down. More people now have insurance coverage for colorectal cancer screening than ever before. Top health systems are already achieving 80% screening rates. For example, Massachusetts is already screening over 76%3 of their eligible population, the highest screening rate in the nation. These factors help to validate that an average national screening rate of 80% is indeed achievable

The members of the National Colorectal Cancer Roundtable (NCCRT) conducted extensive strategic planning this past summer to determine how to get to an 80% screening rate.

In order to get to 80%, the NCCRT's Public Awareness Task Group targeted three key unscreened audiences: The Newly Insured; the Insured, Procrastinators/Rationalizers; and the Financially Challenged.

Additionally, Hispanics and African Americans were identified as key subpopulations within each of these three target audiences.

http://nccrt.org/tools/80-percent-by-2018/80-by-2018-communications-guidebook/

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