

**Digestive Health Network, Inc.**

**List of Tables**

Table 1	Top 10 Physician Specialties Performing Colonoscopies, Medicare Fee-for-Service, 2015
Table 2	Colonoscopy-related Costs, Medicare Fee-for-Service Beneficiaries who Received a Screening or Diagnostic Colonoscopy, 2015
Table 3	Colonoscopy-related Costs, Medicare Fee-for-Service Beneficiaries who Received a Colonoscopy in an Ambulatory Surgical Center (ASC), Hospital Outpatient Department, or Physician Office, 2015
Table 4	Proportion of Medicare Fee-for-Service Medicare Beneficiaries who Received a Colonoscopy and were Treated in the Emergency Department within 7 Days of the procedure, 2015

## Digestive Health Network, Inc.

### Responses to Questions

**Q1 Among Medicare beneficiaries, how many colonoscopies are performed in the US, by type of physician?**

Nearly 2 million screening and diagnostic colonoscopies were performed in 2015. Of these, over 78% were performed by a gastroenterologist. Nearly 10% were performed by a general surgeon and about 6% were performed by an internal medicine specialist. These results are shown in Table 1.

**Q2 What proportion of spending on colonoscopies is accounted for by physician services?**

In 2015, Medicare expenditures associated with colonoscopies totaled over \$1.3 billion. (This excludes anesthesiology, pathology, radiology, and other costs identified in Table 2.) Approximately 31% of this amount, or \$416 million was associated with professional fees.

**Q3 What share of Part B Medicare spending is accounted for by colonoscopies?**

Medicare Part B expenditures in 2015 totaled over \$131 billion (data not shown). Colonoscopy costs accounted for approximately 1.03% of this total.

**Q4 What are the costs associated with colonoscopies for the different settings of care?**

Costs associated with colonoscopies in ambulatory surgical centers (ASC), hospital outpatient departments (HOPD), and physician offices are shown in Table 3. Compared to colonoscopies performed in a hospital outpatient department, average costs of colonoscopies performed in an ASC are 32% lower and those performed in a physician's office are 52% lower.

**Q5 What proportion of Medicare patients who receive a colonoscopy are treated in the ED, within 7 days of the procedure?**

Approximately 1.4% of Medicare patients who received a colonoscopy were treated in the emergency department within 7 days of the procedure. Estimates are shown separately in Table 4 for screening and diagnostic colonoscopies.

<b>Table 1: Top 10 Physician Specialties Performing Colonoscopies, Medicare Fee-for-Service, 2015</b>		
<b>Specialty</b>	<b>Number of colonoscopies</b>	<b>Percent of all colonoscopies</b>
Gastroenterology	1,473,257	78.32%
General surgery	184,419	9.80%
Internal medicine	103,996	5.53%
Colorectal surgery (formerly proctology)	74,342	3.95%
Family practice	20,317	1.08%
Emergency medicine	2,558	0.14%
General practice	2,480	0.13%
Vascular surgery	1,341	0.07%
Critical care (intensivists)	534	0.03%
Osteopathic manipulative therapy	506	0.03%
Other specialties	17,478	0.92%
Total	1,881,228	100.00%

Source: Medicare 100% Carrier File, 2015.

Colonoscopies were identified using the HCPCS included in the Comprehensive Colonoscopy Advanced Alternative Payment Model Proposal; these consist of HCPCS/CPT 44388, 44389, 44391, 44392, 44394, 44403, 44404, 45378, 45380, 45381, 45382, 45384, 45385, 45390, G0105, and G0121. Only colonoscopies rendered in an outpatient hospital, ambulatory surgical center or a physician office are included.

**Table 2: Colonoscopy-related Costs, Medicare Fee-for-Service Beneficiaries who Received a Screening or Diagnostic Colonoscopy, 2015**

	All Colonoscopies		Screening		Diagnostic	
	Average Costs (\$) per Colonoscopy	Total	Average Costs (\$) per Colonoscopy	Total	Average Costs (\$) per Colonoscopy	Total
Number of unique beneficiaries*		1,930,232		393,211		1,542,610
Number of colonoscopies†		1,972,424		395,766		1,576,658
Number (%) of incomplete colonoscopies		34,449 (1.75%)		11,739 (2.97%)		22,710 (1.44%)
<b>Colonoscopy costs</b>						
Colonoscopy, total	\$ 681.18	\$ 1,343,572,440	\$ 635.60	\$ 251,548,303	\$ 692.62	\$ 1,092,024,137
Colonoscopy, professional	\$ 211.18	\$ 416,543,544	\$ 194.43	\$ 76,948,270	\$ 215.39	\$ 339,595,273
Colonoscopy, facility	\$ 469.99	\$ 927,028,897	\$ 441.17	\$ 174,600,033	\$ 477.23	\$ 752,428,863
Anesthesia/sedation (HCPCS 00810, 008X1, 008X2)	\$ 83.77	\$ 165,229,121	\$ 78.69	\$ 31,141,165	\$ 85.05	\$ 134,087,956
Pathology	\$ 75.01	\$ 147,958,131	\$ 12.44	\$ 4,922,169	\$ 90.72	\$ 143,035,962
Lab/tests/imaging	\$ 6.82	\$ 13,451,699	\$ 3.72	\$ 1,471,635	\$ 7.60	\$ 11,980,063
Radiology (HCPCS 74261, 74262, 74270, 74280)	\$ 0.32	\$ 623,831	\$ 0.59	\$ 233,046	\$ 0.25	\$ 390,785
Other Part B	\$ 103.21	\$ 203,582,151	\$ 84.02	\$ 33,253,223	\$ 108.03	\$ 170,328,928
Evaluation & Management	\$ 0.89	\$ 1,757,362	\$ 0.36	\$ 144,358	\$ 1.02	\$ 1,613,004
Other physician/practitioner	\$ 0.88	\$ 1,731,575	\$ 0.56	\$ 221,601	\$ 0.96	\$ 1,509,974
Emergency Department	\$ 1.16	\$ 2,284,273	\$ 0.65	\$ 258,690	\$ 1.28	\$ 2,025,583
Other procedures	\$ 33.87	\$ 66,800,837	\$ 30.89	\$ 12,225,485	\$ 34.61	\$ 54,575,352
Other anesthesia	\$ 5.56	\$ 10,964,947	\$ 3.34	\$ 1,321,134	\$ 6.12	\$ 9,643,813
Part B drugs	\$ 0.39	\$ 776,230	\$ 0.37	\$ 147,789	\$ 0.40	\$ 628,441
Other, not otherwise listed	\$ 60.47	\$ 119,266,927	\$ 47.84	\$ 18,934,166	\$ 63.64	\$ 100,332,761
<b>Total</b>	<b>\$ 950.31</b>	<b>\$ 1,874,417,373</b>	<b>\$ 815.05</b>	<b>\$ 322,569,541</b>	<b>\$ 984.26</b>	<b>\$ 1,551,847,831</b>

Source: Medicare 100 Percent Research Identifiable Outpatient and Carrier Files, 2015

\* The sum of beneficiaries who received a screening and diagnostic colonoscopy does not add to the total as beneficiaries may have received more than one type of colonoscopy in the year.

†Includes both complete and incomplete colonoscopies. Incomplete colonoscopies were identified using the following claims modifiers: 52 - Reduced service; 53 - Discontinued Procedure; 73 - Discontinued outpatient hospital/ambulatory surgery center procedure prior to administration of anesthesia; 74 - Discontinued outpatient hospital/ambulatory surgery center procedure after administration of anesthesia.

Population includes Medicare beneficiaries with full-year Part A & B coverage. Excluded from this population are those beneficiaries with any months of Medicare Advantage (Part C), patients with End Stage Renal Disease, and beneficiaries residing outside the United States. Population was further restricted to beneficiaries with ICD 9/10 code proposed for inclusion in the Comprehensive Colonoscopy Advanced Alternative Payment (CC AAPM) Proposal: ICD-9 V10.05, V10.06, V12.72, V16.0, V18.51, V76.41, V76.50, V76.51, V84.09, 211.3, 211.4, 555, 556, 558.2, 558.9 OR ICD-10 K50, K51, K52.1, K52.89, K52.9, Z85.038, Z85.048, D12.6, Z12.11, Z12.12, Z15.09, Z80.0, Z83.71, Z86.010.

Colonoscopies were identified using the HCPCS included in the Comprehensive Colonoscopy Advanced Alternative Payment Model Proposal: 44388, 44389, 44391, 44392, 44394, 44403, 44404, 45378, 45380, 45381, 45382, 45384, 45385, 45390, G0105, and G0121. Only includes colonoscopies rendered in an outpatient hospital, ambulatory surgical center or a physician office. Colonoscopies performed in an inpatient hospital were excluded.

Services were identified using the HCPCS included in the Comprehensive Colonoscopy Advance Alternative Payment Model Proposal, as follows: Anesthesia and sedation - 00810, 008X1, 008X2, 99152, 99153, 99156, 99157, G0500; Pathology - 88305, 88313, 88341, 88342; Radiology - 74261, 74262, 74270, 74280; Emergency Room - 99281-99285; Evaluation & Management - 99201-99205, 99211-99215, 99241-99245. Screening colonoscopies were classified as those with HCPCS G0105 and G0121. All other HCPCS were classified as diagnostic colonoscopies. Diagnostic colonoscopies that began as screening colonoscopies are classified as diagnostic colonoscopies. Diagnostic colonoscopies that began as screening colonoscopies are classified as diagnostic colonoscopies.

Table 3: Colonoscopy-related Costs, Medicare Fee-for-Service Beneficiaries who Received a Colonoscopy in an Ambulatory Surgical Center (ASC), Hospital Outpatient Department, or Physician Office, 2015								
	All Settings		ASC		Outpatient		Office	
	Average Costs (\$) per Colonoscopy	Total	Average Costs (\$) per Colonoscopy	Total	Average Costs (\$) per Colonoscopy	Total	Average Costs (\$) per Colonoscopy	Total
Number of unique beneficiaries*		1,930,232		919,266		952,263		64,755
Number of colonoscopies†		1,972,424		932,416		974,437		65,571
Number (%) of incomplete colonoscopies		34,449 (1.75%)		14,500 (1.56%)		19,131 (1.96%)		818 (1.25%)
<b>Colonoscopy costs</b>								
Colonoscopy, total	\$ 681.18	\$ 1,343,572,440	\$ 556.04	\$ 518,460,320	\$ 820.32	\$ 799,350,351	\$ 392.88	\$ 25,761,769
Colonoscopy, professional	\$ 211.18	\$ 416,543,544	\$ 213.72	\$ 199,271,585	\$ 196.53	\$ 191,510,190	\$ 392.88	\$ 25,761,769
Colonoscopy, facility	\$ 469.99	\$ 927,028,897	\$ 342.32	\$ 319,188,735	\$ 623.79	\$ 607,840,162	--	--
Anesthesia/sedation (HCPCS 00810, 008X1, 008X2)	\$ 83.77	\$ 165,229,121	\$ 90.40	\$ 84,294,965	\$ 76.33	\$ 74,377,057	\$ 100.00	\$ 6,557,099
Pathology	\$ 75.01	\$ 147,958,131	\$ 97.20	\$ 90,630,907	\$ 51.77	\$ 50,450,294	\$ 104.88	\$ 6,876,930
Lab/tests/imaging	\$ 6.82	\$ 13,451,699	\$ 10.95	\$ 10,213,636	\$ 2.60	\$ 2,529,704	\$ 10.80	\$ 708,358
Radiology (HCPCS 74261, 74262, 74270, 74280)	\$ 0.32	\$ 623,831	\$ 0.25	\$ 231,675	\$ 0.38	\$ 366,314	\$ 0.39	\$ 25,843
Evaluation & Management	\$ 0.89	\$ 1,757,362	\$ 0.38	\$ 350,877	\$ 1.39	\$ 1,351,991	\$ 0.83	\$ 54,493
Other physician/practitioner	\$ 0.88	\$ 1,731,575	\$ 0.63	\$ 591,051	\$ 0.78	\$ 757,127	\$ 5.85	\$ 383,397
Emergency Department	\$ 1.16	\$ 2,284,273	\$ 1.02	\$ 948,755	\$ 1.32	\$ 1,289,289	\$ 0.71	\$ 46,229
Other Part B	\$ 100.29	\$ 197,808,942	\$ 60.15	\$ 56,088,959	\$ 142.84	\$ 139,186,584	\$ 38.64	\$ 2,533,399
Other procedures	\$ 33.87	\$ 66,800,837	\$ 51.90	\$ 48,389,440	\$ 16.77	\$ 16,343,275	\$ 31.54	\$ 2,068,121
Other anesthesia	\$ 5.56	\$ 10,964,947	\$ 3.77	\$ 3,518,331	\$ 7.38	\$ 7,193,847	\$ 3.85	\$ 252,769
Part B drugs	\$ 0.39	\$ 776,230	\$ 0.36	\$ 333,401	\$ 0.38	\$ 371,183	\$ 1.09	\$ 71,647
Other, not otherwise listed	\$ 60.47	\$ 119,266,926	\$ 4.13	\$ 3,847,787	\$ 118.30	\$ 115,278,279	\$ 2.15	\$ 140,862
<b>Total</b>	<b>\$ 950.31</b>	<b>\$ 1,874,417,374</b>	<b>\$ 817.03</b>	<b>\$ 761,811,145</b>	<b>\$ 1,097.72</b>	<b>\$ 1,069,658,711</b>	<b>\$ 654.98</b>	<b>\$ 42,947,517</b>

Source: Medicare 100 Percent Research Identifiable Outpatient and Carrier Files, 2015

\* The sum of beneficiaries who received a colonoscopy in each setting does not add to the total as beneficiaries may have received more than one colonoscopy in different settings during the year.

†Includes both complete and incomplete colonoscopies. Incomplete colonoscopies were identified using the following claims modifiers: 52 - Reduced service; 53 - Discontinued Procedure; 73 - Discontinued outpatient hospital/ambulatory surgery center procedure prior to administration of anesthesia; 74 - Discontinued outpatient hospital/ambulatory surgery center procedure after administration of anesthesia.

Population includes Medicare beneficiaries with full-year Part A & B coverage. Excluded from this population are those beneficiaries with any months of Medicare Advantage (Part C), patients with End Stage Renal Disease, and beneficiaries residing outside the United States. Population was further restricted to beneficiaries with ICD 9/10 code proposed for inclusion in the Comprehensive Colonoscopy Advanced Alternative Payment (CC AAPM) Proposal: ICD-9 V10.05, V10.06, V12.72, V16.0, V18.51, V76.41, V76.50, V76.51, V84.09, 211.3, 211.4, 555, 556, 558.2, 558.9 OR ICD-10 K50, K51, K52.1, K52.89, K52.9, Z85.038, Z85.048, D12.6, Z12.11, Z12.12, Z15.09, Z80.0, Z83.71, Z86.010.

Colonoscopies were identified using the HCPCS included in the CC AAPM proposal: 44388, 44389, 44391, 44392, 44394, 44403, 44404, 45378, 45380, 45381, 45382, 45384, 45385, 45390, G0105, and G0121. Colonoscopies performed in an inpatient hospital were excluded.

Services were identified using the HCPCS included in the CC AAPM proposal, as follows: Anesthesia and sedation - 00810, 008X1, 008X2, 99152, 99153, 99156, 99517, G0500; Pathology - 88305, 88313, 88341, 88342; Radiology - 74261, 74262, 74270, 74280; Emergency Room - 99281-99285; Evaluation & Management - 99201-99205, 99211-99215, 99241-99245. Screening colonoscopies were classified as those with HCPCS G0105 and G0121. All other HCPCS were classified as diagnostic colonoscopies. Diagnostic colonoscopies that began as screening colonoscopies are classified as diagnostic colonoscopies.

<b>Table 4: Proportion of Medicare Fee-for-Service Medicare Beneficiaries who Received a Colonoscopy and were Treated in the Emergency Department within 7 Days of the Procedure, 2015</b>			
	<b>Type of Colonoscopy</b>		
	<b>All</b>	<b>Screening</b>	<b>Diagnostic</b>
Number of unique beneficiaries (N)*	1,930,232	392,845	1,542,965
Beneficiaries 7-day ED visits (N)	28,456	3,588	24,902
Beneficiaries with 7-day ED visit (%)	1.47	0.91	1.61

Source: Medicare 100 Percent Research Identifiable Outpatient, Carrier, and Inpatient Files, 2015

\* The sum of beneficiaries who received a colonoscopy in each setting does not add to the total as beneficiaries may have received more than one colonoscopy in different settings during the year.

Population includes Medicare beneficiaries with full-year Part A & B coverage. Excluded from this population are those beneficiaries with any months of Medicare Advantage (Part C), patients with End Stage Renal Disease, and beneficiaries residing outside the United States. Population was further restricted to beneficiaries with ICD 9/10 code proposed for inclusion in the Comprehensive Colonoscopy Advanced Alternative Payment (CC AAPM) Proposal: ICD-9 V10.05, V10.06, V12.72, V16.0, V18.51, V76.41, V76.50, V76.51, V84.09, 211.3, 211.4, 555, 556, 558.2, 558.9 OR ICD-10 K50, K51, K52.1, K52.89, K52.9, Z85.038, Z85.048, D12.6, Z12.11, Z12.12, Z15.09, Z80.0, Z83.71, Z86.010.

Colonoscopies were identified using the HCPCS included in the CC AAPM proposal : 44388, 44389, 44391, 44392, 44394, 44403, 44404, 45378, 45380, 45381, 45382, 45384, 45385, 45390, G0105, and G0121. Screening colonoscopies were classified as those with HCPCS G0105 and G0121. All other HCPCS were classified as diagnostic colonoscopies.

**Physician-Focused Payment Model Technical Advisory Committee**

**LOI: Environmental Scan & Relevant Literature**

**Digestive Health Network**

**Letter Dated: 11/17/2016**

**Letter Received: 11/17/2016**

The Digestive Health Network (DHN) is a consortium of 40 gastroenterology practices representing over 1,000 physicians across the United States. DHN proposes a Physician-Focused Prospective Payment Model for Screening, Surveillance, and Diagnostic Colonoscopy. The model is a comprehensive prospective dual risked bundled payment model aimed to more effectively manage patients who require colonoscopy for colorectal cancer (CRC) screening and surveillance. The model will demonstrate improved quality of care and increased cost savings relative to the current fee-for-service (FFS) model for performance of colonoscopy, whether through a stoma or the rectum. Increases in colorectal cancer screening have been associated with a decrease in colorectal cancer incidence, and there is a correlation between adenoma detection rate (ADR) and decreased CRC incidence.

Cost reduction can be achieved by ensuring appropriate bowel prep to reduce repeat procedures, ensuring appropriate use of pathology, shifting site-of-service for patients with ASA class I-III from hospital outpatient to ambulatory surgical settings, and ensuring appropriate interval for follow-up studies based on multi-society consensus guidelines. Key components of this model include: (1) attribution of patients based on ICD-10 codes for screening, surveillance, and diagnostic colonoscopy procedures; (2) initial clinical Biopsychosocial Risk assessment; (3) interactive linguistically sensitive, culturally specific bowel preparation tools for patients; (4) deployment of Clinical Decision Support tools in CEHRT EMRs to capture MIPS-derived measures, ASC and OPDS measures, and other specialty quality outcomes measures to support algorithm-driven follow-up; (5) identification and capture of Patient-Reported Outcomes Measures; (6) data reporting into a publicly accessible database; (7) incorporating stop-loss reinsurance for surgical care resulting from procedure complications; and (8) downside-risk based upon clinical and financial performance.

The goals of this model include the improved management of patients undergoing colonoscopy for colorectal cancer screening, surveillance, and diagnostic purposes would be measured by clinical quality measures and patient outcomes, reduction in potentially avoidable repeat procedures and post-procedure complications, adherence to follow-up surveillance intervals, and reduced healthcare spending.

Sheet	Table	Contents
Environmental Scan	<a href="#">Table 1</a>	Key documents include a review on bundled payments for Colorectal Cancer and a comment response to CMS from the American Gastroenterological Association Institute, a recommendation statement from the US Preventive Services Task Force, and a summary of evidence prepared for the US Preventive Services Task Force.
Relevant Literature	<a href="#">Table 2</a>	Relevant and related literature materials.

<b>Table 1. Environmental Scan</b>		
<i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment</i>		
<b>Organization</b>	<b>Title</b>	<b>Date</b>
American Gastroenterological Association (AGA)	AGA Public Comment: Medicare Program; Merit-Based Incentive Payment System (MIPS) and Alternative Payment Model (APM) Incentive Under the Physician Fee Schedule, and Criteria for Physician-Focused Payment Models	6/27/2016
<b>Purpose/Abstract</b>		
<p><b>Background:</b> AGA has worked to provide CMS with MACRA-related guidance over the last year by submitting formal comments on several occasions.</p> <p><b>Summary:</b> AGA outlines their general concerns as the following: (1) quality payment programs should be flexible and responsive to physician and patient concerns; (2) small practices should not be unfairly disadvantaged. AGA discusses a number of items and requests for CMS. They touch on seven objectives AGA previously expressed concerns with including protecting patient health information, clinical decision support (CDS), computerized provider order entry (CPOE), electronic prescribing (eRx), health information exchange, patient electronic access, and public health/clinical data registry. AGA also highlights existing gastroenterology efforts proving the value of specialty APMs and mention the following examples: AGA's Colonoscopy Bundled Payment, the Gastroesophageal Reflux Disease (GERD) Episode Payment, Obesity Bundled Payment, Project Sonar, and the Medical Home Neighbor. AGA reiterates that a concerted effort between CMS, physicians, and other stakeholders remain critical to ensuring the Quality Payment Program (QPP) is a success.</p>		
<b>Additional Notes/Comments</b>		
<p><a href="https://www.federalregister.gov/documents/2016/11/04/2016-25240/medicare-program-merit-based-incentive-payment-system-mips-and-alternative-payment-model-apm">Proposed rule: https://www.federalregister.gov/documents/2016/11/04/2016-25240/medicare-program-merit-based-incentive-payment-system-mips-and-alternative-payment-model-apm</a></p> <p><a href="#">Public Comment letter is not from the DHN but relevant in terms of medical specialty.</a></p>		

<b>Table 1. Environmental Scan</b>		
<i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment</i>		
<b>Organization</b>	<b>Title</b>	<b>Date</b>
American Gastroenterological Association Institute: Gastroenterology (journal)	A Bundled Payment Framework for Colonoscopy Performed for Colorectal Cancer Screening or Surveillance	2/19/2014
<b>Purpose/Abstract</b>		
<p><b>Background:</b> In 2009, the American Gastroenterological Association Institute (AGA) Governing Board anticipated migration to alternative payment models and committed resources to help educate members. Since then, the AGA has developed a portfolio of practice tools to help members thrive in the storm of health care reform. The “Roadmap to the Future of GI Practice” contains a number of tools to aid practices in adapting to the changing business</p> <p><b>Summary:</b> Recognizing the potential advantages of bundled payment models, the AGA convened a work group of practicing clinicians and content experts in 2012 to develop a framework that could define a bundle in a gastroenterology practice. The work group explored various gastrointestinal services and procedures, such as inflammatory bowel disease, gastroesophageal reflux disease, and services related to gastrointestinal cancers, and spoke with numerous stakeholders, including providers, purchasers, government representatives, and payers. Based on their research, the work group recommended that the AGA initially focus on developing a bundle for colorectal cancer (CRC) screening and surveillance. The decision to focus on this topic was based on several factors that include the following three: (1) CRC screening and surveillance lacking a well-standardized procedure; (2) significant regional variations regarding the site of service, preparation agent, and sedation methodology such as fees, pharmaceuticals, computer-assisted moderate sedation etc.; (3) and surveillance follow-up intervals show that opportunities to improve the quality and cost of care provided are both necessary and plentiful. In the framework discussed in this article, a practice can develop its own negotiation strategy with purchasers and payers with the assurance that the framework had expert input and real-world application. The article details a bundled payment framework in the Appendix for selected colonoscopy services.</p>		
<b>Additional Notes/Comments</b>		

<b>Table 2. Relevant Literature</b>		
<i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
Oncotarget	Expected long-term impact of screening endoscopy on colorectal cancer incidence: a modelling study	6/20/2016
<b>Purpose/Abstract</b>		
<p><b>Background &amp; Aims:</b> Screening endoscopy reduces colorectal cancer (CRC) incidence but the time course and magnitude of effects beyond 10 years after screening are unknown. We aimed to estimate the expected time course and magnitude of long-term impact of screening endoscopy on CRC incidence.</p> <p><b>Methods:</b> We used Markov models based on the natural history of the disease along with data from the German national screening colonoscopy registry to derive the expected impact of screening colonoscopy at age 55 or 60 on cumulative CRC incidence according to time of follow-up over a period of up to 25 years.</p> <p><b>Results:</b> After a single screening colonoscopy, cumulative CRC incidence is expected to be increased for approximately 4 to 5 years. This transient increase is expected to be followed by a steadily increasing reduction in cumulative CRC incidence for at least 25 years. Less than one third of this long-term reduction is expected to be seen within 10-12 years of follow-up, the length of follow-up reported on in RCTs on flexible sigmoidoscopy screening and in most cohort studies on both sigmoidoscopy and colonoscopy screening. In relative terms, risk reduction is expected to reach its maximum approximately 15 years after a single screening colonoscopy and 20-25 years after the initial screening colonoscopy in case of repeat screening colonoscopy after 10 years.</p> <p><b>Conclusions:</b> The long-term impact of screening endoscopy on CRC prevention is expected to be much stronger than suggested by currently available evidence from RCTs and cohort studies with limited length of follow-up.</p>		
<b>Additional Notes/Comments</b>		

<b>Table 2. Relevant Literature</b>		
<p><i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i></p>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
Digestive Diseases and Sciences	A Comparative Study of Treatment-Emergent Adverse Events Following Use of Common Bowel Preparations Among a Colonoscopy Screening Population: Results from a Post-Marketing Observational Study	6/9/2016
<b>Purpose/Abstract</b>		
<p><b>Background:</b> Colonoscopy may be one of the most frequent elective procedures in older adults and is associated with a low occurrence of complications. However, reduction of risks attributable to the bowel preparation may be achieved with the use of effective and safer products.</p> <p><b>Aim:</b> The aim of this study was to examine the incidence of treatment-emergent adverse events (TEAEs) associated with SUPREP® [oral sulfate solution (OSS)] and other common prescription bowel preparations (non-OSS).</p> <p><b>Methods:</b> This real-world, observational study used de-identified health insurance claims and laboratory results to identify TEAEs in the 3 months following screening colonoscopy in adults with a prescription for a bowel preparation in the prior 60 days. The unadjusted and adjusted (controlling for patient risk factors) cumulative incidences of TEAEs were estimated using Kaplan–Meier and Poisson regression, respectively.</p> <p><b>Results:</b> Among patients ≥45 years, the overall cumulative incidence was significantly lower (<math>p &lt; 0.001</math>) in the OSS cohort than in the non-OSS cohort (unadjusted: 2.31 vs. 2.89 %; adjusted: 1.61 vs. 1.95 %), with significantly lower acute cardiac conditions (1.56 vs. 1.90 %; <math>p &lt; 0.001</math>), renal failure/other serious renal diseases (OSS: 0.21 %, non-OSS: 0.32 %; <math>p &lt; 0.001</math>), and serum electrolyte abnormalities (OSS: 0.39 %, non-OSS: 0.49 %; <math>p = 0.017</math>). There were no significant differences between cohorts in death, seizure disorders, aggravation of gout, and ischemic colitis. Results were similar in the adjusted cumulative incidences.</p> <p><b>Conclusions:</b> In actual use, the overall cumulative incidence of TEAEs was significantly lower in the OSS cohort, demonstrating that OSS is as safe as, or possibly safer than, non-OSS prescription bowel preparations.</p>		
<b>Additional Notes/Comments</b>		

<b>Table 2. Relevant Literature</b>		
<p><i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i></p>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
BMC Health Services Research	Costs and repeat rates associated with colonoscopy observed in medical claims for commercial and Medicare populations	1/31/2014
<b>Purpose/Abstract</b>		
<p><b>Background:</b> Colorectal cancer is among the leading causes of cancer and cancer-related mortality in the United States. The incidence and mortality associated with CRC can be reduced with preventive screening. Inadequate bowel preparation has been associated with missed adenomas and the need for repeat colonoscopies.</p> <p><b>Methods:</b> Separate claims source databases were analyzed to determine the costs associated with colonoscopy in the commercial and Medicare populations. Observed repeat rates for colonoscopy within 4 years of initial screening were also examined.</p> <p><b>Results:</b> Among the 6 most commonly used billing codes, the average allowed cost for an episode of colonoscopy in 2010 was \$2,146 in the commercial population and \$1,071 in the Medicare population, with average cost sharing of \$334 and \$275, respectively. The portion of colonoscopies associated with a biopsy or polyp removal exceeded 50% in the commercial and Medicare populations. Approximately 57% of colonoscopies in the commercial population were associated with claims for a prescription bowel preparation product within 30 days prior to the procedure. Three branded and three generic bowel cleansing products accounted for approximately 75% of the total number of prescription claims for colonoscopy. Given literature reports that up to 25% of patients receive inadequate bowel preparation, the rate of repeat colonoscopy within 4 years of initial screening was lower than expected among patients who were not coded with common clinical reasons for early repeat: benign neoplasm, lesion, or polyp removed at initial screening colonoscopy.</p> <p><b>Conclusions:</b> The reported rates of inadequate bowel preparation are 15% to 25%, but the rates of repeat colonoscopy found in our analysis are much lower; this is a risk concern considering the reported, significant miss rate of adenomas secondary to inadequate bowel preparation.</p>		
<b>Additional Notes/Comments</b>		

<b>Table 2. Relevant Literature</b>		
<i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
BMC Health Services Research	Variation in use of surveillance colonoscopy among colorectal cancer survivors in the United States	3/19/2010
<b>Purpose/Abstract</b>		
<p><b>Background:</b> Clinical practice guidelines recommend colonoscopies at regular intervals for colorectal cancer (CRC) survivors. Using data from a large, multi-regional, population-based cohort, we describe the rate of surveillance colonoscopy and its association with geographic, sociodemographic, clinical, and health services characteristics.</p> <p><b>Methods:</b> Researchers studied CRC survivors enrolled in the Cancer Care Outcomes Research and Surveillance (CanCORS) study. Eligible survivors were diagnosed between 2003 and 2005, had curative surgery for CRC, and were alive without recurrences 14 months after surgery with curative intent. Data came from patient interviews and medical record abstraction. We used a multivariate logit model to identify predictors of colonoscopy use.</p> <p><b>Results:</b> Despite guidelines recommending surveillance, only 49% of the 1423 eligible survivors received a colonoscopy within 14 months after surgery. Authors observed large regional differences (38% to 57%) across regions. Survivors who received screening colonoscopy were more likely to: have colon cancer than rectal cancer (OR = 1.41, 95% CI: 1.05-1.90); have visited a primary care physician (OR = 1.44, 95% CI: 1.14-1.82); and received adjuvant chemotherapy (OR = 1.75, 95% CI: 1.27-2.41). Compared to survivors with no comorbidities, survivors with moderate or severe comorbidities were less likely to receive surveillance colonoscopy (OR = 0.69, 95% CI: 0.49-0.98 and OR = 0.44, 95% CI: 0.29-0.66, respectively).</p> <p><b>Conclusions:</b> Despite guidelines, more than half of CRC survivors did not receive surveillance colonoscopy within 14 months of surgery, with substantial variation by site of care. The association of primary care visits and adjuvant chemotherapy use suggests that access to care following surgery affects cancer surveillance.</p>		
<b>Additional Notes/Comments</b>		

## Table 2. Relevant Literature

*Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy*

Journal	Title	Date
Annals of Internal Medicine	Screening for Colorectal Cancer in Adults at Average Risk: A Summary of the Evidence for the U.S. Preventive Services Task Force	7/16/2002

### Purpose/Abstract

**Purpose:** To assess the effectiveness of different colorectal cancer screening tests for adults at average risk.

**Data Sources:** Recent systematic reviews; Guide to Clinical Preventive Services, 2nd edition; and focused searches of MEDLINE from 1966 through September 2001. The authors also conducted hand searches, reviewed bibliographies, and consulted context experts to ensure completeness.

**Study Selection:** When available, the most recent high-quality systematic review was used to identify relevant articles. This review was then supplemented with a MEDLINE search for more recent articles.

**Data Extraction:** One reviewer abstracted information from the final set of studies into evidence tables, and a second reviewer checked the tables for accuracy. Discrepancies were resolved by consensus.

**Data Synthesis:** For average-risk adults older than 50 years of age, evidence from multiple well-conducted randomized trials supported the effectiveness of fecal occult blood testing in reducing colorectal cancer incidence and mortality rates compared with no screening. Data from well-conducted case-control studies supported the effectiveness of sigmoidoscopy and possibly colonoscopy in reducing colon cancer incidence and mortality rates. A nonrandomized, controlled trial examining colorectal cancer mortality rates and randomized trials examining diagnostic yield supported the use of fecal occult blood testing plus sigmoidoscopy. The effectiveness of barium enema is unclear. Data are insufficient to support a definitive determination of the most effective screening strategy.

**Conclusions:** Colorectal cancer screening reduces death from colorectal cancer and can decrease the incidence of disease through removal of adenomatous polyps. Several available screening options seem to be effective, but the single best screening approach cannot be determined because data are insufficient.

### Additional Notes/Comments

## Table 2. Related Literature

*Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy*

Journal	Title	Date
Annals of Internal Medicine	Effectiveness of Screening Colonoscopy to Prevent Colorectal Cancer Among Medicare Beneficiaries Aged 70 to 79 Years: A Prospective Observational Study	9/27/2016

### Purpose/Abstract

**Background:** No randomized, controlled trials of screening colonoscopy have been completed, and ongoing trials exclude persons aged 75 years or older. The Medicare program, however, reimburses screening colonoscopy without an upper age limit.

**Objective:** To evaluate the effectiveness and safety of screening colonoscopy to prevent colorectal cancer (CRC) in persons aged 70 to 74 and those aged 75 to 79 years.

**Design:** Large-scale, population-based, prospective study. The observational data were used to emulate a target trial with 2 groups: colonoscopy screening and no screening.

**Setting:** United States.

**Participants:** 1,355,692 Medicare beneficiaries (2004 to 2012) aged 70 to 79 years at average risk for CRC who used Medicare preventive services and had no previous diagnostic or surveillance colonoscopies in the past 5 years.

**Measurements:** 8-year risk for CRC and 30-day risk for adverse events.

**Results:** In beneficiaries aged 70 to 74 years, the 8-year risk for CRC was 2.19% (95% CI, 2.00% to 2.37%) in the screening colonoscopy group and 2.62% (CI, 2.56% to 2.67%) in the no-screening group (absolute risk difference, -0.42% [CI, -0.24% to -0.63%]). Among those aged 75 to 79 years, the 8-year risk for CRC was 2.84% (CI, 2.54% to 3.13%) in the screening colonoscopy group and 2.97% (CI, 2.92% to 3.03%) in the no-screening group (risk difference, -0.14% [CI, -0.41 to 0.16]). The excess 30-day risk for any adverse event in the colonoscopy group was 5.6 events per 1000 individuals (CI, 4.4 to 6.8) in the 70- to 74-year age group and 10.3 per 1000 (CI, 8.6 to 11.1) in the 75- to 79-year age group.

**Limitation:** CRC-specific mortality was not available, but CRC incidence and stage were studied at diagnosis.

**Conclusion:** Screening colonoscopy may have had a modest benefit in preventing CRC in beneficiaries aged 70 to 74 years and a smaller benefit in older beneficiaries. The risk for adverse events was low but greater among older persons.

### Additional Notes/Comments

<b>Table 2. Related Literature</b>		
<i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
Journal of General Internal Medicine	Overuse of Colonoscopy for Colorectal Cancer Screening and Surveillance	9/30/2014
<b>Purpose/Abstract</b>		
<p><b>Background:</b> Ongoing efforts to increase colorectal cancer (CRC) screening rates have raised concerns that these exams may be overused, thereby subjecting patients to unnecessary risks and wasting healthcare resources.</p> <p><b>Objective:</b> The aim was to measure overuse of screening and surveillance colonoscopies among average-risk adults, and to identify correlates of overuse.</p> <p><b>Design, Setting, And Participants:</b> The researchers approach was a retrospective cohort study using electronic health record data for patients 50–65 years old with no personal history of CRC or colorectal adenomas with an incident CRC screening colonoscopy from 2001 to 2010 within a multispecialty physician group practice.</p> <p><b>Main Outcome Measures:</b> The researchers measured time to next screening or surveillance colonoscopy and predictors of overuse (exam performed more than one year earlier than guideline recommended intervals) of colonoscopies.</p> <p><b>Key Results:</b> 1,429 adults were identified who had an incident colonoscopy between 2001 and 2010, and they underwent an additional 871 screening or surveillance colonoscopies during a median follow-up of 6 years. Most follow-up screening colonoscopies (88 %) and many surveillance colonoscopies (49 %) repeated during the study represented overuse. Time to next colonoscopy after incident screening varied by exam findings (no polyp: median 6.9 years, interquartile range [IQR]: 5.1–10.0; hyperplastic polyp: 5.7 years, IQR: 4.9–9.7; low-risk adenoma: 5.1 years, IQR: 3.3–6.3; high-risk adenoma: 2.9 years, IQR: 2.0–3.4, <math>p &lt; 0.001</math>). In logistic regression models of colonoscopy overuse, an endoscopist recommendation for early follow-up was strongly associated with overuse of screening colonoscopy (OR 6.27, 95 % CI: 3.15–12.50) and surveillance colonoscopy (OR 13.47, 95 % CI 6.61-27.46). In a multilevel logistic regression model, variation in the overuse of screening colonoscopy was significantly associated with the endoscopist performing the previous exam.</p> <p><b>Conclusions:</b> Overuse of screening and surveillance exams are common and should be monitored by healthcare systems. Variations in endoscopist recommendations represent targets for interventions to reduce overuse.</p>		
<b>Additional Notes/Comments</b>		

<b>Table 2. Related Literature</b>		
<p><i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i></p>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
American Journal of Gastroenterology	Variation in the Detection of Serrated Polyps in an Average Risk Colorectal Cancer Screening Cohort	8/17/2012
<b>Purpose/Abstract</b>		
<p><b>Objectives:</b> Serrated polyps are precursors in an alternative pathway to colon cancer. These polyps are frequently sessile or flat, located in the proximal colon, and may be overlooked during colonoscopy. Histological criteria to classify these polyps have only recently been described. This study assessed the variation of serrated polyp detection among endoscopists and pathologists in an average risk-screening cohort and trends in detection over time.</p> <p><b>Methods:</b> Endoscopy and pathology reports were reviewed from all average risk-screening colonoscopies at an urban academic medical center from 2006 through 2008. Polyps were classified as adenoma (tubular, tubulovillous, or villous), serrated polyp (hyperplastic polyp (HP), sessile serrated adenoma (SSA), or dysplastic serrated polyp (DSP)), adenocarcinoma, or other. Differences in polyp detection among endoscopists and pathologists were tested with <math>\chi^2</math>-tests. Potential predictors of polyp detection were modeled with Poisson regression.</p> <p><b>Results:</b> Included in the study were 4,335 polyps from 7,192 colonoscopies. Detection prevalence (patients with at least one polyp per 100 colonoscopies) was 22.2 for adenomas, 11.7 for HP, 0.6 for SSA, and 0.2 for DSP. Detection prevalence of proximal SSAs increased from 0.2 in 2006 to 4.4 in 2008 (<math>P &lt; 0.001</math>). Detection prevalences among endoscopists differed significantly for adenomas, HP, and SSA. Classification rates among pathologists differed significantly for HP and SSA, but not for adenoma or DSP. On multivariate analysis, endoscopist was a significant predictor of adenoma, HP, and SSA. Pathologist was a significant predictor of HP, SSA, and DSP, but not adenoma.</p> <p><b>Conclusions:</b> This study describes the detection of colorectal polyps in an average risk-screening cohort at an urban academic medical center. Detection of proximal SSAs increased during the study period. Detection of adenoma, HP, and SSA differed significantly by endoscopist. Classification of HP and SSA differed significantly by pathologist. Endoscopy and pathology practices should consider educational interventions to improve serrated polyp detection and standardize classification.</p>		
<b>Additional Notes/Comments</b>		

<b>Table 2. Related Literature</b>		
<i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
British Medical Journal	Factors determining the quality of screening colonoscopy: a prospective study on adenoma detection rates, from 12,134 examinations (Berlin colonoscopy project 3, BECOP-3)	3/22/2012
<b>Purpose/Abstract</b>		
<p><b>Background:</b> Screening colonoscopy (SC) outcome quality is best determined by the adenoma detection rate (ADR). The substantial variability in the ADRs between endoscopists may reflect different skills, experience and/or equipment.</p> <p><b>Objective:</b> To analyze the potential factors that may influence ADR variance, including case volume.</p> <p><b>Design:</b> 12,134 consecutive SCs (mean age 64.5 years, 47% men) from 21 Berlin private-practice colonoscopists were prospectively studied during 18 months. The data were analysed using a two-level mixed linear model to adequately address the characteristics of patients and colonoscopists. The ADR was regressed after considering the following factors: sex, age, bowel cleanliness, NSAID intake, annual SC case volume, lifetime experience, instrument withdrawal times, instrument generations used, and the number of annual continuing medical education (CME) meetings attended by the physician. The case volume was also retrospectively analysed from the 2007 national SC registry data (312 903 colonoscopies and 1004 colonoscopists).</p> <p><b>Results:</b> The patient factors that correlated with the ADR were sex, age (<math>p &lt; 0.001</math>) and low quality of bowel preparation (<math>p = 0.005</math>). The factors that were related to the colonoscopists were the number of CME meetings attended (<math>p = 0.012</math>) and instrument generation (<math>p = 0.001</math>); these factors accounted for approximately 40% of the interphysician variability. Within a narrow range (6–11 min), the withdrawal time was not correlated with the ADR. Annual screening case volume did not correlate with the ADR, and this finding was confirmed by the German registry data.</p> <p><b>Conclusions:</b> The outcome quality of screening colonoscopies is mainly influenced by individual colonoscopist factors (ie, CME activities) and instrument quality</p>		
<b>Additional Notes/Comments</b>		

<b>Table 2. Related Literature</b>		
<i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
Gastrointestinal Endoscopy	Procedural success and complications of large-scale screening colonoscopy	3/1/2002
<b>Purpose/Abstract</b>		
<p><b>Background:</b> Indirect evidence and modeling analyses suggest that colonoscopy may be the most cost-effective way to screen the average-risk population for colorectal neoplasia. However, the success and safety of primary colonoscopic screening has not been prospectively evaluated in a multicenter trial.</p> <p><b>Methods:</b> Asymptomatic subjects age 50 to 75 years who had not undergone examination of the colon within 10 years were recruited from the general medicine clinics of 13 Department of Veterans Affairs Medical Centers. Eligible patients underwent colonoscopy by study coinvestigators, at which time all polyps were measured, photographed, and removed. Patients were contacted at 24 hours and 1 week to track procedure-related complications.</p> <p><b>Results:</b> Primary screening colonoscopy was performed in a cohort of 3196 asymptomatic subjects. A "good" preparation was reported in 81% of patients, and colonoscopy to the cecum was successful in 97.2% of cases. Mean insertion time to the cecum and total procedure times were 10.5 (8.7) and 30.6 (19.1) minutes, respectively. No preprocedural patient characteristics were identified that were predictive of an incomplete procedure. At least one polyp was resected in 1672 patients. There was no perforation and no death attributed to colonoscopy. Major morbidity considered to be definitely related to colonoscopy occurred in 9 of 3196 procedures (0.3%): lower GI bleeding requiring intervention (6), myocardial infarction and/or cerebrovascular accident (2), and thrombophlebitis (1). In subjects undergoing only diagnostic procedures, the major complication rate was 0.1%.</p> <p><b>Conclusions:</b> Screening colonoscopy can be performed in multiple centers with a high degree of success and safety in large numbers of asymptomatic, average-risk men.</p>		
<b>Additional Notes/Comments</b>		

<b>Table 2. Related Literature</b>		
<i>Key words: colorectal cancer screening; colorectal cancer screening guidelines; colorectal cancer screening savings; bundled payment colon cancer; colonoscopy overuse; colonoscopy repeat procedures; colorectal cancer screening variations; colonoscopy cost-effectiveness; colon cancer alternative payment; screening colonoscopy; gastroenterology alternative payment; bowel preparation colonoscopy</i>		
<b>Journal</b>	<b>Title</b>	<b>Date</b>
Annals of Internal Medicine	Cost-Effectiveness of Colonoscopy in Screening for Colorectal Cancer	10/17/2000
<b>Purpose/Abstract</b>		
<p><b>Background:</b> Fecal occult blood testing, flexible sigmoidoscopy, and colonoscopy are used to screen patients for colorectal cancer.</p> <p><b>Objective:</b> To compare the cost-effectiveness of fecal occult blood testing, flexible sigmoidoscopy, and colonoscopy.</p> <p><b>Design:</b> The cost-effectiveness of the three screening strategies was compared by using computer models of a Markov process. In the model, a hypothetical population of 100 000 persons 50 years of age undergoes annual fecal occult blood testing, sigmoidoscopy every 5 years, or colonoscopy every 10 years. Positive results on fecal occult blood testing or adenomatous polyps found during sigmoidoscopy are worked up by using colonoscopy. After polypectomy, colonoscopy is repeated every 3 years until no polyps are found.</p> <p><b>Data Sources:</b> Transition rates were estimated from U.S. vital statistics and cancer statistics and from published data on the sensitivity, specificity, and efficacy of various screening techniques. Costs of screening and cancer care were estimated from Medicare reimbursement data.</p> <p><b>Target Population:</b> Persons 50 years of age in the general population.</p> <p><b>Time Horizon:</b> The study population was followed annually until death.</p> <p><b>Perspective:</b> Third-party payer.</p> <p><b>Outcome Measure:</b> Incremental cost-effectiveness ratio.</p> <p><b>Results of Base-Case Analysis:</b> Compared with colonoscopy, annual screening with fecal occult blood testing costs less but saves fewer life-years. A screening strategy based on flexible sigmoidoscopy every 5 or 10 years is less cost-effective than the other two screening methods.</p> <p><b>Results of Sensitivity Analysis:</b> Screening with fecal occult blood testing is more sensitive to changes in compliance rates, and it becomes easily dominated by colonoscopy under most conditions assuming less than perfect compliance. Other assumptions about the sensitivity and specificity of fecal occult blood testing, screening frequency, efficacy of colonoscopy in preventing cancer, and polyp incidence have a lesser influence on the differences in cost-effectiveness between colonoscopy and fecal occult blood testing.</p> <p><b>Conclusions:</b> Colonoscopy represents a cost-effective means of screening for colorectal cancer because it reduces mortality at relatively low incremental costs. Low compliance rates render colonoscopy every 10 years the most cost-effective primary screening strategy for colorectal cancer.</p>		
<b>Additional Notes/Comments</b>		