

Following is an overview of the clinical quality measures available for 2016 PQRS reporting via the GIQuIC Qualified Clinical Data Registry (QCDR). Additional detail for each measure follows on the subsequent pages.

GIQIC #	Title	Type	Standard/Inverse	Domain
2	Adequacy of bowel preparation	Process	Standard	Effective Clinical Care
3	Photodocumentation of the cecum (also known as cecal intubation rate) – All Colonoscopies	Process	Standard	Effective Clinical Care
4	Photodocumentation of the cecum (also known as cecal intubation rate) – Screening Colonoscopies	Process	Standard	Effective Clinical Care
5	Incidence of perforation	Outcome	Inverse	Patient Safety
6	Appropriate follow-up interval for normal colonoscopy in average risk patients	Process	Standard	Communication and Care Coordination
8	Age appropriate screening	Outcome	Inverse	Efficiency and Cost Reduction
9	Documentation of history and physical rate - Colonoscopy	Process	Standard	Patient Safety
10	Appropriate management of anticoagulation in the peri-procedural period rate – EGD	Process	Standard	Communication and Care Coordination
11	<i>Helicobacter pylori</i> (<i>H. pylori</i>) status rate	Process	Standard	Communication and Care Coordination
12	Appropriate indication for colonoscopy	Process	Standard	Effective Clinical Care
14	Repeat screening colonoscopy recommended within one year due to inadequate bowel preparation	Outcome	Standard	Efficiency and Cost Reduction
15	Appropriate follow-up interval of 3 years recommended based on pathology findings from screening colonoscopy in average-risk patients	Process	Standard	Communication and Care Coordination
16	Adenoma Detection Rate	Outcome	Standard	Effective Clinical Care

Standard measure: A higher performance rate (closer to 100, not zero) is the goal.

Inverse measure: A lower performance rate (closer to zero, not 100) is the goal.

GIQIC Measure 2: Adequacy of bowel preparation**Measure Title:** Adequacy of bowel preparation**Description:** Percentage of colonoscopies with a bowel preparation documented as adequate or better**Denominator:** All colonoscopies**Denominator Exceptions/Exclusions:** N/A**Numerator:** Number of patients for whom bowel preparation was assessed and documented as adequate**Measure Type:** Process, standard measure **Measure Domain:** Effective Clinical Care**Rationale and Supported Evidence:**

Adenoma miss rates in the context of suboptimal bowel preparation are high; of all of the adenomas identified, 42% were discovered only during the repeat colonoscopy. The miss rate for advanced adenomas, although comparatively less, also remained high at 27%. This proportion remained similar after redefining an early repeat colonoscopy as occurring within 1 year of the index examination, suggesting a true miss rate rather than subsequent neoplasia. The miss rate was particularly high for those colonoscopies done with suboptimal bowel preparation in which any adenoma was found on the initial examination compared with none detected. Given the increased premalignant potential of advanced adenomas, suboptimal bowel preparation may cause an unacceptably high failure rate at identifying these important lesions, thereby compromising the effectiveness of the colonoscopy. While there is relative uniformity in surveillance intervals when bowel preparation is optimal, there is considerable variability when bowel preparation is suboptimal.^{1,2}

¹ Ben-Horin S, Bar-Meir S, Avidan B. The impact of colon cleanliness assessment on endoscopists' recommendations for follow-up colonoscopy. *Am J Gastroenterol* 2007;102:2680-5.

² Lebwohl B, Kastrinos F, Glick M, et al. The impact of suboptimal bowel preparation on adenoma miss rates and the factors associated with early repeat colonoscopy. *Gastrointest Endosc* 2011;73:1207-14.

GIQIC Measure 3: Photodocumentation of the cecum (also known as cecal intubation rate) – All Colonoscopies

Measure Title: Photodocumentation of the cecum (also known as cecal intubation rate) – All Colonoscopies

Description: Percentage of colonoscopies into the cecum including photodocumentation of one or more of the cecal landmarks (ileocecal valve, appendiceal orifice, or terminal ileum)

Denominator: All (i.e., screening, surveillance, diagnostic/therapeutic) colonoscopies

Denominator Exceptions/Exclusions: Patient has no cecum or hemicolectomy

Numerator: Number of patients for whom photodocumentation of one or more cecal landmarks was recorded

Measure Type: Process, standard measure **Measure Domain:** Effective Clinical Care

Rationale and Supported Evidence:

In the United States, colonoscopy is almost always undertaken with the intent to intubate the cecum. Cecal intubation is defined as passage of the colonoscope tip to a point proximal to the ileocecal valve, so that the entire cecal caput, including the medial wall of the cecum between the ileocecal valve and appendiceal orifice, is visible. The need for cecal intubation is based on the persistent finding that a substantial fraction of colorectal neoplasms are located in the proximal colon, including the cecum. Low cecal intubation rates have been associated with higher rates of interval proximal colon cancer.³ Effective colonoscopists should be able to intubate the cecum in $\geq 90\%$ of all cases.⁴

³ Baxter N, Sutradhar R, Forbes DD, Paszat LF, Saskin R, Rabeneck L. Analysis of administrative data finds endoscopist quality measures associated with post-colonoscopy colorectal cancer. *Gastroenterology* 2011;140:65-72.

⁴ Marshall JB, Barthel JS. The frequency of total colonoscopy and terminal ileal intubation in the 1990s. *Gastrointestinal Endoscopy* 1993;39:518-20.

GIQIC Measure 4: Photodocumentation of the cecum (also known as cecal intubation rate) – Screening Colonoscopies

Measure Title: Photodocumentation of the cecum (also known as cecal intubation rate) – Screening Colonoscopies

Description: Percentage of screening colonoscopies into the cecum including photodocumentation of one or more of the cecal landmarks (ileocecal valve, appendiceal orifice, or terminal ileum)

Denominator: All screening colonoscopies

Denominator Exceptions/Exclusions: Patient has no cecum or hemicolectomy

Numerator: Number of patients for whom photodocumentation of one or more cecal landmarks was recorded

Measure Type: Process, standard measure **Measure Domain:** Effective Clinical Care

Rationale and Supported Evidence:

A high-quality evaluation of the colon consists of examination of the entire colon – from the rectum to the cecum. This is especially important for colorectal cancer screening and surveillance colonoscopy examinations. A significant fraction of colonic neoplasms are located in the right colon,⁵ hence effective colonoscopists should be able to intubate the cecum in $\geq 95\%$ of cases when the indication is screening in a healthy adult.^{6,7,8} Knowing the completeness of the examination can inform physicians whether an imaging procedure or repeat colonoscopy is necessary, and influences the timing of follow-up examination.

⁵ Imperiale TF, Wagner DR, et al. Risk of advanced proximal neoplasms in asymptomatic adults according to the distal colorectal findings. *N Engl J Med* 2000; 343(3): 169-74.

⁶ Rathgaber SW, Wick TM. Colonoscopy completion and complication rates in a community gastroenterology practice. *Gastrointest Endosc* 2006;64:556-62.

⁷ Kim DH, Lee SY, Choi KS, et al. The usefulness of colonoscopy as a screening test for detecting colorectal polyps. *Hepatogastroenterology* 2007;54:2240-2.

⁸ Niv Y, Hazazi R, Levi Z, et al. Screening colonoscopy for colorectal cancer in asymptomatic people: a meta-analysis. *Dig Dis Sci* 2008;53:3049-54.

GIQIC Measure 5: Incidence of perforation**Measure Title:** Incidence of perforation**Description:** Percentage of total patients experiencing a perforation during colonoscopy, recognized immediately (before the patient leaves the facility)**Denominator:** All colonoscopies**Denominator Exceptions/Exclusions:** N/A**Numerator:** Number of patients experiencing a perforation during colonoscopy, recognized immediately (before the patient leaves the facility)**Measure Type:** Outcome, inverse measure **Measure Domain:** Patient Safety**Rationale and Supported Evidence:**

Perforation is generally considered the most serious adverse event presenting in the short-term during or after colonoscopy. About 5% of colonoscopic perforations are fatal.^{9,10,11} Published rates of colonoscopic perforation vary widely.¹⁰⁻¹²

⁹ Fruhmorgen P, Demling L. Complications of diagnostic and therapeutic colonoscopy in the Federal-Republic-of-Germany - results of an inquiry. *Endoscopy* 1979;11:146-150.

¹⁰ Nivatvongs S. Complications in Colonoscopic Polypectomy - an Experience with 1555 Polypectomies. *Diseases of the Colon & Rectum* 1986;29:825-830.

¹¹ Silvis SE, Nebel O, Rogers G, et al. Endoscopic complications. Results of the 1974 American Society for Gastrointestinal Endoscopy Survey. *Jama* 1976;235:928-30.

GIQIC Measure 6: Appropriate follow-up interval for normal colonoscopy in average risk patients**Measure Title:** Appropriate follow-up interval for normal colonoscopy in average risk patients**Description:** Percentage of average-risk patients aged 50 to 75 years receiving a screening colonoscopy without biopsy or polypectomy who had a recommended follow-up interval of at least 10 years for repeat colonoscopy documented in their colonoscopy report**Denominator:** All average-risk patients aged 50 to 75 years receiving screening colonoscopy without biopsy or polypectomy**Denominator Exceptions/Exclusions:** N/A**Numerator:** Number of average-risk patients aged 50 to 75 years receiving a screening colonoscopy without biopsy or polypectomy who had a recommended follow-up interval of at least 10 years for repeat colonoscopy documented in their colonoscopy report**Measure Type:** Process, standard measure**Measure Domain:** Communication and Care Coordination**Rationale and Supported Evidence:**

In the average-risk population (persons age 50 years and older without other risk factors for colorectal cancer, or who have only one first degree relative with colorectal cancer and that cancer was diagnosed at age >60 years), colonoscopic screening is recommended in all past and current guidelines at 10-year intervals.^{12, 13, 14} Inappropriate interval recommendations can result in overuse of resources and can lead to significant patient harm. Performing colonoscopy too often not only increases patients' exposure to procedural harm, but also drains resources that could be more effectively used to adequately screen those in need.¹⁵

¹² Lieberman DA, Rex DK, Winawer SJ, et al. Guidelines for colonoscopy surveillance after screening and polypectomy: a consensus update by the US Multi-Society Task Force on Colorectal Cancer. *Gastroenterology* 2012;143:844-57.

¹³ Rex DK, Johnson DA, Anderson JC, et al. American College of Gastroenterology guidelines for colorectal cancer screening 2008. *Am J Gastroenterol* 2009;104:739-50.

¹⁴ Levin B, Lieberman DA, McFarland B, et al. Screening and surveillance for the early detection of colorectal cancer and adenomatous polyps, 2008: a joint guideline from the American Cancer Society, the US Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology. *Gastroenterology* 2008;134:1570-95.

¹⁵ Lieberman, DA, Faigel, DO, Logan, J, Mattek, N, Holub, J, Eisen, G, Morris, C, Smith, R, Nadel, M. Assessment of Colonoscopy Quality: Results from a multi-center consortium. *Gastrointest Endosc*, 2009 Mar;69(3 Pt 2):645-53. doi: 10.1016/j.gie.2008.08.034.

GIQIC Measure 8: Age appropriate screening colonoscopy**Measure Title:** Age appropriate screening colonoscopy**Description:** Percentage of patients age 85 years or older undergoing screening colonoscopy**Denominator:** Patients age 50 years or older undergoing a screening colonoscopy**Denominator Exceptions/Exclusions:** N/A**Numerator:** Number of patients age 85 years or older undergoing a screening colonoscopy**Measure Type:** Outcome, inverse measure **Measure Domain:** Efficiency and Cost Reduction**Rationale and Supported Evidence:**

The U.S. Preventive Services Task Force (USPSTF) recommends screening for colorectal cancer in adults using fecal occult blood test, sigmoidoscopy, or colonoscopy, beginning at 50 years of age and continuing until 75 years of age. The risks and benefits of these screening methods vary. However, the USPSTF recommends against screening for colorectal cancer in adults older than 85 years as there is moderate certainty that the benefits of screening do not outweigh the harms.¹⁶

¹⁶ <http://www.uspreventiveservicestaskforce.org/uspstf08/colocancer/colors.htm>.

GIQIC Measure 9: Documentation of history and physical rate - Colonoscopy**Measure Title:** Documentation of history and physical rate - Colonoscopy**Description:** Percentage of colonoscopies with history and physical documented**Denominator:** All colonoscopies**Denominator Exceptions/Exclusions:** N/A**Numerator:** Number of patients for which history and physical are documented**Measure Type:** Process, standard measure **Measure Domain:** Effective Clinical Care**Rationale and Supported Evidence:**

When performing colonoscopy for colorectal cancer (CRC) screening, endoscopists should document if the patient previously had a colonoscopy, date of the last colonoscopy, and any histologic findings from polyps removed during that colonoscopy under "Indication" for procedure if that information is available. This documentation should demonstrate that colonoscopy for CRC screening or colon polyp surveillance is being performed at an appropriate interval. Evidence from surveys indicates that post-polypectomy surveillance colonoscopy in the United States is frequently performed at intervals that are shorter than those recommended in guidelines.^{17, 18, 19, 20, 21, 22}

GIQuIC's supporting societies agree lack of documentation of history and physical should be considered essentially a "never event" and have recommended a performance target of > 98%. Data in the GIQuIC registry shows in 2012 not quite 90% of colonoscopies cases included in the registry had history and physical documented. That number improved to approximately 93% in 2013; however, improvement is still needed.

¹⁷ Mysliwiec PA, Brown ML, Klabunde CN, et al. Are physicians doing too much colonoscopy? A national survey of colorectal surveillance after polypectomy. *Ann Intern Med* 2004;141:264-71.

¹⁸ Saini SD, Nayak RS, Kuhn L, et al. Why don't gastroenterologists follow colon polyp surveillance guidelines?: results of a national survey. *J Clin Gastroenterol* 2009;43:554-8.

¹⁹ Burke C, Issa M, Church J. A nationwide survey of post-polypectomy surveillance colonoscopy: too many too soon! *Gastroenterology* 2005;128:A566.

²⁰ Boolchand V, Singh J, Olds, G, Singh, P, Chak A, Cooper, GS. Colonoscopy surveillance after polypectomy: a national survey study of primary care physicians. *American Journal of Gastroenterology* 2005;100:S384-5.

²¹ Kim ER, Sinn DH, Kim JY, et al. Factors associated with adherence to the recommended postpolypectomy surveillance interval. *Surg Endosc* 2012;26:1690-5.

²² Shah TU, Voils CI, McNeil R, et al. Understanding gastroenterologist adherence to polyp surveillance guidelines. *Am J Gastroenterol* 2012;107:1283-7.

GIQIC Measure 10: Appropriate management of anticoagulation in the peri-procedural period rate – EGD

Measure Title: Appropriate management of anticoagulation in the peri-procedural period rate – EGD

Description: Percentage of patients undergoing an EGD on an anti-platelet agent or an anticoagulant who leave the endoscopy unit with instructions for management of this medication

Denominator: All patients undergoing an EGD on an anti-platelet agent or an anticoagulant

Denominator Exceptions/Exclusions: N/A

Numerator: Number of patients on an anti-platelet agent or an anticoagulant who leave the endoscopy unit with instructions for management of this medication

Measure Type: Process, standard measure **Measure Domain:** Communication and Care Coordination

Rationale and Supported Evidence:

Given bleeding is an adverse event associated with EGD,^{23, 24, 25} adherence to this quality measure is supported by GIQuIC for this population of patients.

²³ Ginzburg L, Greenwald D, Cohen J. Complications of endoscopy. *Gastrointest Endosc Clin N Am* 2007;17:405-32.

²⁴ Ben-Menachem T, Decker GA, Early DS, et al. Adverse events of upper GI endoscopy. *Gastrointest Endosc* 2012;76:707-18.

²⁵ Eisen GM, Baron TH, Dominitz JA, et al. Complications of upper GI endoscopy. *Gastrointest Endosc* 2002;55:784-93.

GIQIC Measure 11: *Helicobacter pylori* (*H. pylori*) status rate**Measure Title:** *Helicobacter pylori* (*H. pylori*) status rate**Description:** Percentage of patients undergoing an EGD with a duodenal or gastric ulcer whose *H. pylori* status is unknown who have a plan documented for assessing *H. pylori* status**Denominator:** All patients undergoing an EGD with a duodenal or gastric ulcer whose *H. pylori* status is unknown**Denominator Exceptions/Exclusions:** N/A**Numerator:** Number of patients undergoing an EGD with a duodenal or gastric ulcer whose *H. pylori* status is unknown and for whom a plan for assessing *H. pylori* status has been documented**Measure Type:** Process, standard measure **Measure Domain:** Communication and Care Coordination**Rationale and Supported Evidence:**

H. pylori is a common cause of gastric and duodenal ulcer disease. Successful eradication of this organism results in dramatically reduced rates of ulcer recurrence.²⁶ ASGE guidelines pertaining to the role of endoscopy for peptic ulcer disease recommends that all patients with gastric or duodenal ulcers should be assessed for this infection.²⁷

²⁶ Ford AC, Delaney BC, Forman D, et al. Eradication therapy for peptic ulcer disease in *Helicobacter pylori* positive patients. Cochrane Database Syst Rev 2006:CD003840.

²⁷ Banerjee S, Cash BD, Dominitz JA, et al. The role of endoscopy in the management of patients with peptic ulcer disease. *Gastrointest Endosc* 2010;71:663-8.

GIQIC Measure 12: Appropriate indication for colonoscopy**Measure Title:** Appropriate indication for colonoscopy**Description:** Percentage of colonoscopy procedures performed for an indication that is included in a published standard list of appropriate indications and the indication is documented**Denominator:** All colonoscopies**Denominator Exceptions/Exclusions:** N/A**Numerator:** Number of colonoscopies performed for an indication that is included in a published standard list of appropriate indications**Measure Type:** Process, standard measure **Measure Domain:** Effective Clinical Care**Rationale and Supporting Evidence:**

In 2012, ASGE updated its indications for endoscopic procedures, Appropriate Use of Gastrointestinal Endoscopy.²⁸ This list was determined by a review of published literature and expert consensus. Studies have shown that when colonoscopy is done for appropriate reasons, significantly more clinically relevant diagnoses are made.^{29, 30, 31}

Based on the evidence GIQuIC's supporting societies agree the performance target for an appropriate indication measure should be > 80%.

²⁸ ASGE Standards of Practice Committee, Early DS, Ben-Menachem T *et al.* Appropriate use of GI endoscopy. *Gastrointest Endosc* 2012;75:1127-31.

²⁹ Balaguer F, Llach J, Castells A, *et al.* The European panel on the appropriateness of gastrointestinal endoscopy guidelines colonoscopy in an open-access endoscopy unit: a prospective study. *Aliment Pharmacol Ther* 2005;21:609-13.

³⁰ Vader JP, Pache I, Froehlich F, *et al.* Overuse and underuse of colonoscopy in a European primary care setting. *Gastrointest Endosc* 2000;52:593-99.

³¹ de Bosset V, Froehlich F, Rey JP, *et al.* Do explicit appropriateness criteria enhance the diagnostic yield of colonoscopy? *Endoscopy* 2002;34:360-8.

GIQIC Measure 14: Repeat screening colonoscopy recommended within one year due to inadequate bowel preparation

Measure Title: Repeat screening colonoscopy recommended within one year due to inadequate bowel preparation

Description: Percentage of patients with an inadequate bowel preparation who received a recommendation for a repeat screening colonoscopy of one year or less

Denominator: Screening colonoscopies with an inadequate bowel preparation

Denominator Exceptions/Exclusions: N/A

Numerator: Number of patients for whom bowel preparation was assessed and documented as inadequate whose recommended follow up interval was one year or less

Measure Type: Outcome, standard measure **Measure Domain:** Efficiency and Cost Reduction

Rationale and Supported Evidence:

The economic burden of repeating examinations because of inadequate bowel preparation is substantial. The Clinical Outcomes Research Initiative (CORI) on Colonoscopy Quality Indicators Study of 53 gastroenterology practice sites in 24 states looked at all patients undergoing colonoscopy (n=438,521); in this study, quality of bowel prep recorded was assessed. Findings indicated that 13.9% of reports did not have bowel prep quality reported and in 14 of 53 practices, over 20% did not have bowel prep quality.³² A study conducted in a public hospital and university hospital setting concluded that inadequate bowel preparation increased costs by 12% in the university hospital and 22% in the public hospital.³³ The percentage of outpatient examinations with inadequate bowel preparation that require repeat colonoscopy in 1 year should not exceed 15%.³⁴

If bowel cleansing is inadequate to identify polyps > 5 mm in size, and the procedure is being performed for colorectal cancer screening or colon polyp surveillance, then the procedure should be repeated in 1 year or less.¹⁸ All patients for whom bowel preparation was assessed and documented as inadequate should receive a recommended follow up interval of one year or less.

³² Lieberman, D. et al. Standardized colonoscopy reporting and data system: report of the Quality Assurance Task Group of the National Colorectal Cancer Roundtable. *Gastrointestinal Endoscopy* 2007; 65(6): 757-766.

³³ Rex DK, Bond JH, Winawer S, et al. Quality in the technical performance of colonoscopy and the continuous quality improvement process for colonoscopy: recommendations of the U.S. Multi-Society Task Force on Colorectal Cancer. *Am J Gastroenterol*. 2002 Jun;97(6):1296-308.

³⁴ Froehlich F, Wietlisbach V, Gonvers JJ, et al. Impact of colonic cleansing on quality and diagnostic yield of colonoscopy: the European Panel of Appropriateness of Gastrointestinal Endoscopy European multicenter study. *Gastrointest Endosc* 2005;61:378-84.

GIQIC Measure 15: Appropriate follow-up interval of 3 years recommended based on pathology findings from screening colonoscopy in average-risk patients

Measure Title: Appropriate follow-up interval of 3 years recommended based on pathology findings from screening colonoscopy in average-risk patients

Description: Percentage of average-risk patients aged 50 years and older receiving a screening colonoscopy with biopsy or polypectomy and pathology findings of 3-10 adenomas, Advanced Neoplasm (≥ 10 mm, high grade dysplasia, villous component), Sessile serrated polyp ≥ 10 mm OR sessile serrate polyp with dysplasia OR traditional serrated adenoma who had a recommended follow-up interval of 3 years for repeat colonoscopy

Denominator: All complete and adequate screening colonoscopies of average-risk patients aged 50 years and older with biopsy or polypectomy and pathology finds of 3-10 adenomas, OR Advanced Neoplasm (≥ 10 mm, high grade dysplasia, villous component) OR Sessile serrated polyp ≥ 10 mm OR sessile serrated polyp with dysplasia OR traditional serrated adenoma

Denominator Exceptions/Exclusions: N/A

Numerator: Number of average-risk patients aged 50 years and older receiving a complete and adequate screening colonoscopy with biopsy or polypectomy and pathology finds of 3-10 adenomas OR Advanced Neoplasm (≥ 10 mm, high grade dysplasia, villous component) OR Sessile serrated polyp ≥ 10 mm OR sessile serrated polyp with dysplasia OR traditional serrated adenoma who had a recommended follow-up interval of 3 years for repeat colonoscopy

Measure Type: Process, standard measure

Measure Domain: Communication and Care Coordination

Rationale and Supported Evidence:

The *Guidelines for Colonoscopy Surveillance After Screening and Polypectomy: Consensus Update by the US Multi-society Task Force on Colorectal Cancer*¹⁵ presents recommendations for surveillance intervals in individuals with baseline average risk. Colonoscopies should follow recommended post-polypectomy surveillance intervals to be clinically effective and to minimize risk and further to be cost-effective. Average-risk patients aged 50 years and older receiving a screening colonoscopy with biopsy or polypectomy and pathology findings of 3-10 adenomas, advanced neoplasm (≥ 10 mm, high grade dysplasia, villous component), sessile serrated polyp ≥ 10 mm OR sessile serrate polyp with dysplasia or traditional serrated adenoma should receive a recommended follow-up interval of 3 years for repeat colonoscopy.

GIQIC Measure 16: Adenoma detection rate**Measure Title:** Adenoma detection rate**Description:** Percentage of patients age 50 and over undergoing screening colonoscopy with a finding of at least one conventional adenoma or colorectal cancer detected during screening colonoscopy**Denominator:** Patients age 50 years or older undergoing a screening colonoscopy**Denominator Exceptions/Exclusions:** Neoplasm detected is only diagnosed as traditional serrated adenoma, sessile serrated polyp, or sessile serrated adenoma**Numerator:** Number of patients age 50 years or older with at least one conventional adenoma or colorectal cancer detected during screening colonoscopy**Measure Type:** Outcome, standard measure **Measure Domain:** Effective Clinical Care**Rationale and Supported Evidence:**

The adenoma detection rate is the best-established colorectal neoplasia-related quality indicator, and is defined as the proportion of patients undergoing colonoscopy in whom an adenoma or colorectal cancer is found.³⁵ Studies show that high adenoma detection rates are associated with a significant reduction in colorectal cancer risk.³⁶ Yet, virtually all studies on this subject have found marked variation in adenoma detection rates among physicians.^{37, 38, 39, 40}

³⁵ Church J. Adenoma detection rate and the quality of colonoscopy: the sword has two edges. *Dis Colon Rectum* 2008;51:520-3.

³⁶ Kaminski, M F., Regula J, et al. Quality indicators for colonoscopy and the risk of interval cancer. *N Engl J Med* 2010; 362(19): 1795-803

³⁷ Imperiale TF, Glowinski EA, Juliar BE, et al. Variation in polyp detection rates at screening colonoscopy. *Gastrointest Endosc.* 2009 Jun;69(7):1288–95.

³⁸ Barclay RL, Vicari JJ, Doughty AS, et al. Colonoscopic withdrawal times and adenoma detection during screening colonoscopy. *N Engl J Med* 2006;355: 2533-41.

³⁹ Van Rijn JC, Reitsma JB, Stoker J, et al. Polyp miss rate determined by tandem colonoscopy: a systematic review. *Am J Gastroenterol* 2006; 101: 343-50.

⁴⁰ Cooper GS, Chak A, Koroukian S. The polyp detection rate of colonoscopy: A national study of Medicare beneficiaries. *American Journal of Medicine* 2005; 118, 1413.e11-1413.