

Special REPORT

The GI Quality Improvement Consortium:

Helping Practices Improve Quality and Outcomes in Endoscopy

The gastroenterology practice is increasingly focused on the documentation of quality. Accreditation of endoscopy centers and Medicare reimbursements depend on evidence of high-quality gastrointestinal (GI) care. Referring physicians and patients seek quality data, such as a physician's adenoma detection rate (ADR) on colonoscopy. Above all, gastroenterologists continually strive to improve efficiency and outcomes, especially in their use of endoscopic technologies.

The measurement and documentation of quality, once a time-consuming process, has been streamlined by the GI Quality Improvement Consortium (GIQuIC), a quality benchmarking registry that enables practices to

track their performance on quality indicators for colonoscopy and esophagogastroduodenoscopy (EGD), and compare it within the practice for individual physician performance and with other practices in a national database. The registry is a nonprofit collaboration of the American College of Gastroenterology (ACG) and the American Society for Gastrointestinal Endoscopy (ASGE), and is designed to offer GI practices distinct clinical, organizational, and economic benefits. These benefits include improvements in care, ease of quality reporting to Medicare, an enhanced ability to negotiate with payors and to market endoscopy services, and opportunities to use the database for research.

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Overview of GIQuIC

GIQuIC is the result of a 3-year collaboration of clinicians, endowriter software developers, and Sentara Healthcare, a Virginia-based health system. From 2006 to 2009, the partnership, spearheaded by Irving M. Pike, MD, FACG, FASGE, completed a pilot project in which physicians from across the country submitted colonoscopy quality-indicator data to a central repository using diverse methods of submission.^{1,2}

In 2009, ACG and ASGE adopted the project and rolled it out nationally as GIQuIC.¹ In 2014, GIQuIC achieved 2 milestones: the national database surpassed 1 million colonoscopy cases and the Centers for Medicare & Medicaid Services (CMS) approved the GIQuIC registry as a Qualified Clinical Data Registry (QCDR), a new reporting mechanism for the Physician Quality Reporting System (PQRS).^{3,4} More than 335 practices, representing in excess of 2,800 physicians, have enrolled in GIQuIC.⁵

Membership in GIQuIC is open to GI offices, endoscopy units, ambulatory surgery centers, and hospitals of all sizes.⁶ Registration for GIQuIC can be accomplished via a form available at the website, www.giquic.org.

The GIQuIC registry is based on an electronic exchange of information between member facilities and the central registry. Participating facilities submit data fields from endoscopic procedure reports or manually into the registry. In turn, the GIQuIC registry provides the participating facility real-time, on-demand reports that show each physician's performance and overall practice performance across multiple quality indicators (Table 1).⁶ Additionally, performance data from the entire database also is reported, allowing facilities to compare their performance to that of nationwide peers.

Uploading procedure records to the registry is simplified by a built-in interface between GIQuIC and 10 electronic endowriters (Table 2).⁶ Physicians conduct and report each endoscopy as they normally would on their endowriter system, and data from the report can be automatically populated into a GIQuIC data set during the upload process. A nurse or allied professional who serves as a data manager for the practice can check the data set and upload it to GIQuIC according to the practice's time settings (eg, weekly, monthly). For those practices that do not use an endowriter, endoscopy data can be entered manually on the GIQuIC website.

Quality measure reports are then generated in a real-time manner by the participating facility. These reports allow each physician and the practice as a whole to compare performance with results from the entire GIQuIC registry. Figure 1 shows a summary chart for an endoscopy site as a whole compared with all data in the registry for the quality indicator of ADR. GIQuIC allows members to select time frames for reporting (eg, quarterly) and apply filters and display options to the data set (eg, display 95% confidence intervals with data).⁵

Derivation and Evolution of Quality Indicators

The GIQuIC quality measures were derived from the quality indicators for GI endoscopy established by the ACG and ASGE Task Force on Quality in Endoscopy in 2006.^{2,7-11} These quality measures had a transformative effect on endoscopic practice, training, and documentation, and have raised the bar for endoscopic competency across the specialty.¹²

Table 1. GIQuIC Current Quality Indicators

14 Colonoscopy Measures	12 EGD Measures
1. Adenoma detection rate—screening A. Female B. Male	1. Adverse events—immediate
2. Adequacy of bowel prep	2. Appropriate antibiotic prophylaxis
3. Adverse events—immediate	3. Appropriate anticoagulation management
4. Age-appropriate screening colonoscopy	4. Appropriate endoscopic therapy for stigmata of peptic ulcer disease bleeding
5. Appropriate follow-up interval for normal colonoscopy in average-risk patients	5. Appropriate management of new diagnoses of bleeding esophageal varices
6. ASA category documentation	6. Appropriate specimen acquisition in Barrett's esophagus
7. Cecal intubation rate with photo documentation A. All colonoscopies—screening, surveillance, and diagnostic B. Screening	7. ASA category documentation
8. Colonoscopy interval for patients with a history of adenomatous polyps - avoidance of inappropriate use	8. <i>Helicobacter pylori</i> status
9. History and physical documentation	9. History and physical documentation
10. Indication documentation	10. Indication documentation
11. Informed consent documentation	11. Informed consent documentation
12. Repeat colonoscopy recommended due to poor bowel preparation	12. Written discharge instructions—outpatient
13. Withdrawal time	
14. Written discharge instructions—outpatient	

ASA, American Society of Anesthesiologists; **EGD**, esophagogastroduodenoscopy
Based on reference 6.

The central goal of the Task Force was to improve endoscopic care by promulgating quality indicators backed by clinical evidence and expert consensus.⁷ A procedural goal was to adopt quality indicators that, in the majority of cases, could be extracted from the endoscopy report or documentation⁷; this goal ensured the utility of indicators in clinical practice, and paved the way for GIQuIC's streamlined interface with endoscopy reporting.

The Task Force developed quality indicators for the 4 major GI endoscopic procedures: colonoscopy, EGD, endoscopic retrograde cholangiopancreatography (ERCP), and endoscopic ultrasonography (EUS).^{2,7-12} Although GIQuIC currently includes quality measures only for colonoscopy and EGD, the registry is in the process of considering measures for other procedures.¹² GIQuIC working groups also are exploring unit-based quality measures,¹² which address the organized delivery of care in the endoscopy unit, and disease management-related quality measures in inflammatory bowel disease and hepatitis C.

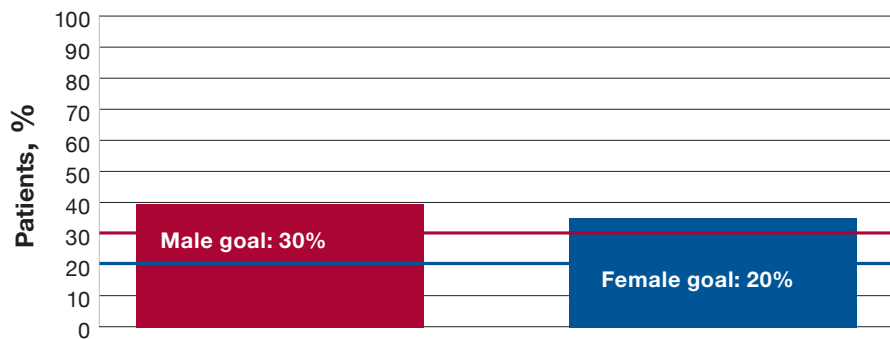
Quality indicators created by the Task Force fall into 3 groups: pre-procedure, intra-procedure, and post-procedure.^{7,11} For example, a pre-procedural quality indicator in colonoscopy mandates that, in every case, quality of bowel preparation should be noted in the report.² This indicator is backed by evidence that inadequate preparation unnecessarily extends cecal intubation and withdrawal time and reduces detection of polyps,^{13,14} increasing the likelihood that the colonoscopy will need to be repeated with a shorter interval than normally recommended.² A decade ago, about one-fourth of colonoscopies performed had inadequate bowel prep,¹³ indicating a significant need for quality improvement in this area.

Table 2. Endowriters Certified for Use With GIQuIC

Amkai
CORI
eMerge Health Solutions
EndoSoft
gMed
MD-Reports
Olympus (version 7.4)
Pentax (endoPRO iQ 7.5)
ProVation (version 5.0)
Summit Imaging
Based on reference 6.

This quality indicator is reflected in the quality metric of adequate bowel prep in GIQuIC (Table 1).⁶

Examples of intra-procedural quality indicators include cecal intubation rates of at least 90% in all cases (≥95% in screening of a healthy adult); an ADR of at least 25% in men and at least 15% in women over age 50 years in screening colonoscopy, and an average withdrawal time of at least 6 minutes in colonoscopies with normal results performed in patients with



Adenoma Detection					
Male goal: 30%, Female goal: 20%					
Benchmark Group	Numerator	Denominator	Patients, %	95% Confidence Interval, low	95% Confidence Interval, high
Endoscopy Site	1,442	3,690	39.1	37.5	40.7
Entire Registry	162,104	474,013	34.2	34.1	34.4

Figure 1. GIQuIC quality indicator sample report.

Percentage of patients age 50 years or over undergoing screening colonoscopy with a finding of at least 1 adenomatous polyp from June 1, 2011 through February 10, 2015.

ADR, males and females combined, for an endoscopy site (red) compared with all of the data in the entire registry at the time of the report (blue). Horizontal lines show the goal ADR rates for males and females.

ADR, adenoma detection rate

intact colons.^{2,15} Intubating the cecum is important because a substantial proportion of colorectal cancers are located in the proximal colon, including the cecum.^{2,16} During screening colonoscopy, ADR has historically been variable among endoscopists, increasing the risk that a missed adenoma will develop into an interval cancer between screenings.² Longer withdrawal times (≥ 6 minutes) have been associated with increased detection of adenomas.²

Post-procedural quality indicators include documentation and management of perforation and post-polypectomy bleeding.⁸ GIQuIC covers these quality indicators under the broader metric of adverse events.

Endoscopy quality indicators continue to be refined. In December 2014, the ASGE/ACG Task Force published updated quality indicators for colonoscopy, EGD, ERCP, and EUS.^{12,17-21} These updated indicators reflect data accrued on the factors that most affect outcomes since 2006.¹² Some measure targets or goals within GIQuIC will be updated to reflect the changes in these revision documents.

For example, updated colonoscopy indicators include additional data in support of the metric of at least 90% compliance with recommended post-polypectomy and post-cancer resection surveillance intervals and 10-year intervals between screening colonoscopies in average-risk patients who have negative examination results and adequate bowel cleansing.¹⁸ These newer data include a 2011 study showing that patients with a previously negative colonoscopy have a low risk for colorectal cancer 10 years after screening and beyond.²² Another update in colonoscopy is an elevation in ADR performance targets for men and women from 25% and 15% (2006) to 30% and 20% (2014), respectively.^{2,18} The evidence in ADR

has expanded with new data, notably a 2014 publication demonstrating an inverse correlation between ADR and the risk for interval cancers, including advanced and fatal interval cancers, based on more than 314,872 colonoscopies performed by 136 endoscopists (Figure 2).²³

GIQuIC in Practice

GIQuIC has an ever-evolving range of applications that include facility-wide quality improvement; simplification of quality reporting to Medicare; novel opportunities to negotiate favorably with third-party payors; enhanced ability to market the practice; performance of quality assurance projects for units; completion of a Practice Improvement Module (PIM) for Maintenance of Certification (MOC); and utility of the GIQuIC database for research (see *The User Experience*).

Facility-Wide Quality Improvement

Before GIQuIC, gastroenterologists had no objective measure of their performance. Using GIQuIC data, they are able to obtain quality benchmarks relative to their in-practice and national peers for an accurate assessment.

Clinicians who meet benchmarks work to surpass them, whereas clinicians who fall short of benchmarks strive to equal or outdo their peers. Throughout this process, medical executive committees and individual physicians often seek the advice of those endoscopists in the facility who consistently exceed expectations on GIQuIC metrics.

For example, a clinician who wants to boost his or her percentage of patients with adequate bowel prep may ask another clinician with very high compliance on this measure for advice on patient counseling and information on pre-procedures. In

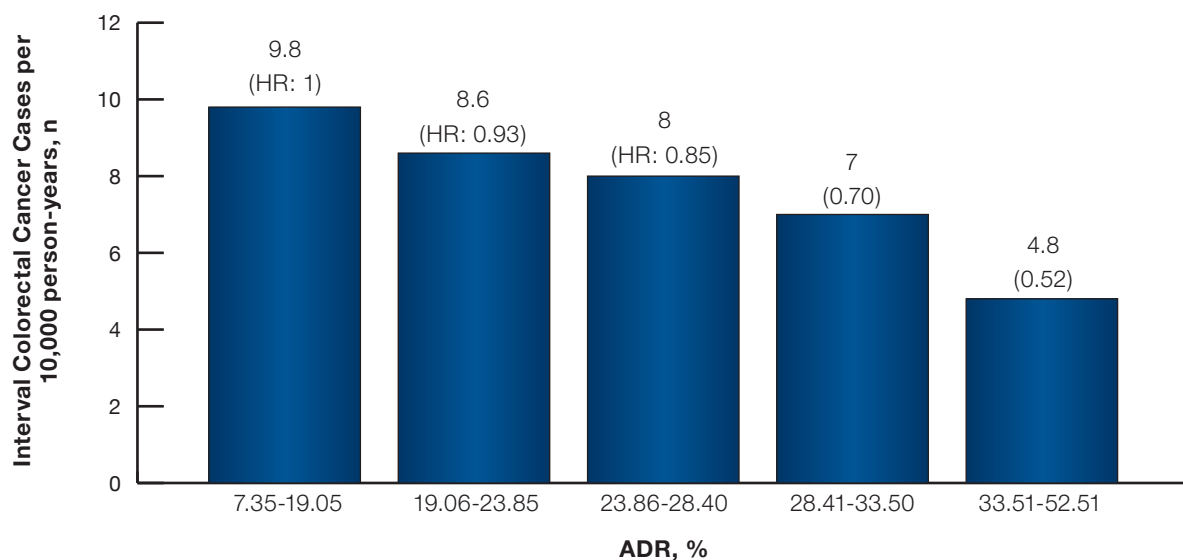


Figure 2. Unadjusted risk for interval colorectal cancers as a function of ADR in a study of 314,872 colonoscopies.

ADR, adenoma detection rate; HR, hazard ratio
Based on reference 23.

some facilities, physicians and data managers organize specific quality initiatives that are monitored and validated using GIQuIC data (see *Case Study*).

Physicians are able to employ GIQuIC data to complete the American Board of Internal Medicine's (ABIM's) Self-Directed PIM by demonstrating personal quality improvement. In doing so, they will earn points in the MOC program.

Medicare Quality Reporting

Under the Affordable Care Act, Medicare payments are tied to PQRS quality reporting. Physicians and groups that successfully report data on PQRS quality measures may qualify to receive upward payment adjustments.^{24,25}

However, there are penalties for not reporting to PQRS, and these penalties increase over time depending on the practice size. Physicians and groups that do not successfully report are subject to a cut by PQRS that is compounded by downward payment adjustments through the Value-Based Payment Modifier program that is tied to PQRS reporting.

For example, for the 2017 payment year, physician groups and solo practitioners who do not report PQRS quality measures in 2015 will receive a negative payment adjustment of 2%, which will be compounded with a downward payment adjustment via the value modifier. Physician groups of 2 to 9 as well as solo practitioners who do not successfully report PQRS quality measures in 2015 will be subjected to an automatic downward adjustment of -2% value modifier adjustment, while groups of 10 or more physicians will incur a -4% value modifier adjustment in 2017.²⁶

Enrollment in GIQuIC enables practices to address these federal mandates more easily. In May 2014, GIQuIC became a QCDR, allowing eligible professionals to use the registry for reporting quality measures to CMS in order to participate in PQRS.^{27,28} A webinar on GIQuIC as a QCDR for PQRS is available on the GIQuIC website, www.giquic.org.

Negotiating With Private Payors

Evidence of practice quality in GIQuIC may facilitate

favorable reimbursement negotiations with insurers. For example, a facility that consistently surpasses benchmarks on key quality indicators may negotiate incentive reimbursement within a framework of value-based benefit design.

GIQuIC also can be used for documentation of high-quality, affordable care within a commercial or Medicare-based accountable care organization (ACO); in the case of ACOs organized under the Medicare Shared Savings Program,^{29,30} demonstration of good-quality, appropriate care can result in reimbursement of cost savings attributed to quality.

Marketing of the Facility/Practice

GIQuIC can be a tool for Web-based and in-person marketing to referring physicians and the larger community. Tangible proof of quality, supplied by GIQuIC data, encourages clinicians to refer their patients for endoscopy. Patients with high health literacy may ask about ADRs; GIQuIC provides an unequivocal answer to such questions. Once a facility registers for GIQuIC, it receives marketing materials that explain the meaning of participation in GIQuIC and a public relations/media toolkit to help publicize the facility's involvement with the registry.⁶

Research

Given its vast database, GIQuIC can be employed for clinical research. The number of procedures and data fields in the registry can be analyzed to identify which behaviors are associated with an outcome indicator such as high ADR in colonoscopy. Practice-level, case-based research also can be facilitated by GIQuIC data.

Conclusion

Endoscopy quality is the focus of professional associations, government agencies, private payors, referring physicians, and patients. Moreover, procedure quality is the chief concern of every endoscopist. GIQuIC provides a comprehensive program to meet the continuing demand for quality improvement and reporting. The result is improved quality, greater practice efficiency, and better outcomes for patients.

The User Experience

The following Q & A provides insight on the utility of GIQuIC from registered users.

Q. Has GIQuIC improved endoscopy quality for you and your colleagues?

Dr. Deas: GIQuIC can have an amazing effect on your practice. Without it, you're like a guy who runs track, but doesn't measure his times. He thinks he's good, but he really doesn't know. Likewise, we think we're good endoscopists, but without GIQuIC, we have no objective data on whether we're worse than, equal to, or better than our colleagues or *quality benchmarks*. We all strive to improve, and GIQuIC is the tool we need to continue to get better.

Dr. Overholt: Previously, our practice did not do the best job on endoscopic quality measurements and reporting. Our

measures were self-reported and not validated. With GIQuIC, validation is national and the performance data are shifted back to the practice to use. When you show physicians their performance measured against their peers nationally, they will improve their performance.

Physicians are competitive people, and they will try to beat averages. This was true for our practice. Since implementing GIQuIC, we've seen improvements across the board. Physicians who were already better than their peers wanted to stay there. Those with lower numbers worked to surpass the benchmarks.

Dr. Pike: One way GIQuIC works is via the Hawthorne effect: People improve what is measured. Knowing that your performance is being measured and routinely checking your results motivates improvement.

Q. Is GIQuIC easy to use?

Dr. Overholt: One of the great things about GIQuIC is that the format is fully compatible with the endowriters we all use to create our endoscopy reports (Table 2). At the end of your report, you click on a drop-down menu for GIQuIC. A lot of the GIQuIC information is already populated from the report you've just completed—you only have to enter a little additional information. Then, you just click to upload to the GIQuIC database.

Ms. West: The interface between GIQuIC and our endowriter is seamless. Physicians need some training on the program, but the learning curve is very short. Training mainly involves how best to enter data in the endoscopy report so that it is picked up by GIQuIC. A lot of that depends on the endowriter you use, but typically it involves entering less in free text and more on specific menus. For instance, in our practice, some physicians used to input the time since last colonoscopy in free text; we've shown them how to input that information on a specific menu item so that it shows up readily in GIQuIC.

Q. Does GIQuIC change practice management?

Dr. Overholt: We have used GIQuIC in negotiations with a large third-party insurance carrier: We get incentive reimbursement if we perform above the national level on 4 benchmarks measured by GIQuIC—ADR, cecal intubation rate, recommended 10-year follow-up for normal-risk colonoscopy, and recommended 5-year follow-up for prior screenings with less than 3 non-high-risk adenomas. Part of the negotiation was to show that extra reimbursement, to help defray the cost of GIQuIC, would result in overall better value for the payor.

Dr. Deas: Before GIQuIC, our 17-physician practice tried to track quality. It was laborious, and as a result we would look at a quality indicator for a few months, then stop. GIQuIC lets us accomplish the same goal with less work and more consistency. For about 5 years now, we've gotten quality reports every quarter that are shared with our medical executive committee and each physician.

Ms. Reynolds: There's an aspect of day-to-day practice that GIQuIC makes much easier: handling controversial issues. GIQuIC reports have a lot of credibility with physicians and nurses. There are times when clinicians use a method or approach to endoscopy that isn't helping them do their best work. If you say this without tangible support, it can cause conflict. But when you have the support of a credible data registry like GIQuIC, you're just presenting facts, not criticizing. It's a really good way to enhance accountability.

Q. Is GIQuIC assisting you with reporting to CMS and other health agencies?

Dr. Pike: I'm happy to say that, in May 2014, Medicare, via CMS, began accepting our quality indicators. GIQuIC is now a QCDR, a qualified clinical data registry, which means that practices can use it to participate in the PQRS. CMS uses GIQuIC as a source of 13 GI-centered quality metrics.

Before this, gastroenterologists were reporting to PQRS—and so gaining eligibility for incentive payments and protection from losing reimbursement—based on a set of PQRS metrics that were not GI-specific. You could get credit for being a quality GI provider if you provided smoking cessation, diabetes care, and other non-GI services. By accepting quality reporting from GIQuIC, CMS is looking at measures relevant to the work we're actually doing.

Dr. Overholt: In 2014, Medicare required practices to input a minimum of 3 and as many as 9 approved quality measures. GIQuIC serves as an intermediary to PQRS. By using it, our providers will report 9 quality metrics to PQRS. So we can expect to obtain the 0.5% bonus Medicare reimbursement in 2014, and we will also prevent the Medicare payment reductions slated for 2016.

Ms. West: Reporting of all kinds is very difficult and labor-intensive when you have to do it all yourself. With GIQuIC, I can complete in 30 minutes what would take days without the program.

Q. What advice would you give to practices that are considering membership in GIQuIC?

Dr. Overholt: Do it yesterday! There is simply no way we can keep up with the demands and requirements of federal agencies and private insurers, unless we have this kind of electronic reporting. GIQuIC is also a great marketing tool for your practice; we provide our GIQuIC data under a "Quality" button on the website, so that patients and referring physicians can see our performance.

Ms. West: Think about what a GI practice is all about. We are all in the business of saving lives by early detection of precancerous polyps. That's what we do. We all really want to reduce the incidence of colon cancers. Tracking our ADR rate through GIQuIC is a very efficient tool to help us do just that.

Ms. Reynolds: There is a lot to be said for the timely reports we get from GIQuIC. If needed, you can get a report the next day on procedures done as late as the day before. It's nearly live data. That's become very important to our physicians, who are always asking to see their GIQuIC numbers. With GIQuIC, our endoscopists have been pleased to find out that they are very good relative to their peers.

Dr. Deas: My advice is this: We have an obligation to our patients to be sure we provide high-quality care; but to know whether you are actually meeting that obligation, you need data. I would hate to see that my colonoscopy ADR rate was only 12% and that, as a result, my patients were at greater risk for getting colon cancer. I would want to know that, so I could improve.

Dr. Pike: GIQuIC has helped gastroenterologists achieve multiple goals over time. It started out as a grassroots effort. Then, once the program rolled out, it began to help the membership of ACG and ASGE improve the quality of their work. In 2014, the registry became a QCDR, making it easier for the GI practice to report quality measures to Medicare. GIQuIC can also be used to apply for points in maintenance of certification. The GIQuIC database is now large enough to be a clinical research tool, and the program has continued to offer more and more to its members.

Getting Started With GIQuIC

The GIQuIC website (<http://giquic.gi.org>) provides extensive additional text materials and webinars. A drop-down menu allows access to the “Register” page to obtain a registration form. For more information, contact the GIQuIC staff at (301) 263-9000 or info@giquic.org.

To participate in GIQuIC, facilities pay an annual site license fee^a per the number of physicians at the site:

- 1-5 physicians: \$4,000
- 6-10 physicians: \$5,400
- 11-15 physicians: \$9,400
- 16-20 physicians: \$10,800

For facilities with more than 20 physicians, please contact GIQuIC.

^aParticipants in ASGE’s Endoscopy Unit Recognition Program qualify for discounted GIQuIC rates.

Case Study

Fort Worth and Southwest Fort Worth Endoscopy Centers

Fort Worth Endoscopy wanted to improve ADR to reduce the risk for interval cancers.²³ GIQuIC reports indicated that 3 physicians were not consistently meeting the 25% benchmark for ADR. Based on research published in 2005 linking higher ADR with longer (≥ 6 minutes) scope withdrawal times (Figure 3),^{8,31} the practice embarked on a quality improvement initiative: Increase withdrawal times to increase ADR. “We used our GIQuIC data to start tracking whether if physicians increased their withdrawal times, would their ADRs go up as well,” said Ms. West.

That hypothesis proved correct. In response to the initiative—which included regular comparative charts created from GIQuIC—physicians as a group increased average withdrawal times from a minimum of 6 minutes to 8 minutes or greater over 6 months. During the same period, 17 of 18 physicians attained a consistent ADR of 25%.

“It’s simple, when you see the data, it changes your behavior—that’s how GIQuIC works in a very tangible way,” said Dr. Deas.

Fort Worth Endoscopy Center will be presenting its data at the 2015 Annual Course of the Society of Gastroenterology Nurses and Associates (SGNA).

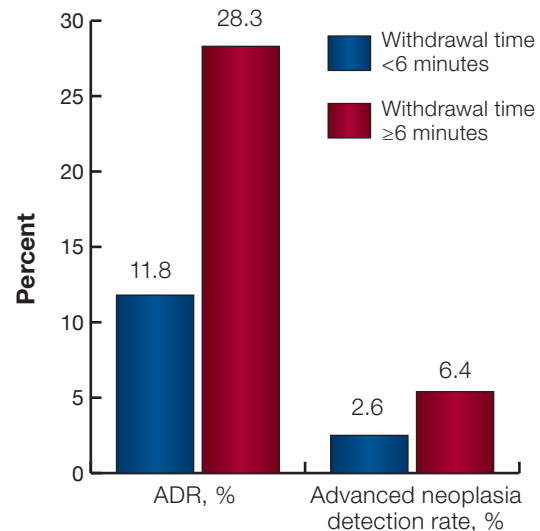


Figure 3. ADR and advanced neoplasia detection rate as a function of withdrawal time in colonoscopy.

ADR, adenoma detection rate
Based on reference 31.

References

1. GIQuIC: History. <http://giquic.gi.org/what-is-giquic.asp#history>. Accessed January 8, 2015.
2. Rex DK, Petrini JL, Baron TH, et al. Quality indicators for colonoscopy. *Am J Gastroenterol*. 2006;101(1):873-885.
3. GIQuIC colonoscopy quality registry surpasses 1 million colonoscopy cases milestone underscores value of clinical benchmarking tool for gastroenterology practices. Bethesda, MD: GIQuIC. November 5, 2014. http://giquic.gi.org/docs/GIQuIC_one_million_colonoscopies_FINAL_110514.pdf. Accessed January 8, 2015.
4. CMS approves GIQuIC as a PQRS Qualified Clinical Data Registry. Bethesda, MD: GIQuIC. June 2, 2014. http://giquic.gi.org/docs/GIQuIC_QCDR_Media_Advisory_6-2-14.pdf. Accessed January 8, 2015.
5. Pike IM. GIQuIC: A powerful tool for benchmarking GI endoscopy, June 22, 2010. <http://giquic.gi.org/benchmarking.asp>. Accessed January 8, 2015.
6. GI Quality Improvement Consortium, Ltd. *GIQuIC*. Bethesda, MD: American College of Gastroenterology/American Society for Gastrointestinal Endoscopy. 2014.
7. Faigel DO, Pike IM, Baron TH, et al. Quality indicators for gastrointestinal endoscopic procedures: an introduction. *Am J Gastroenterol*. 2006;101(4):866-872.
8. Cohen J, Safdi MA, Deal SE, et al. Quality indicators for esophago-gastroduodenoscopy. *Am J Gastroenterol*. 2006;101(4):886-891.
9. Baron TH, Petersen BT, Mergener K, et al; ASGE/ACG Taskforce on Quality in Endoscopy. Quality indicators for endoscopic retrograde cholangiopancreatography. *Am J Gastroenterol*. 2006;101(4):892-897.
10. Jacobsen BC, Chak A, Hoffman B, et al; ASGE/ACG Taskforce on Quality in Endoscopy. Quality indicators for endoscopic ultrasonography. *Am J Gastroenterol*. 2006;101(4):898-901.
11. Faigel DO, Pike IM, Baron TH, et al. Quality indicators for gastrointestinal endoscopic procedures: an introduction. *Gastrointest Endosc*. 2006;63(4 suppl):S3-S9.
12. Cohen J, Pike IM. Defining and measuring quality in endoscopy. *Am J Gastroenterol*. 2015;81(1):1-2.
13. Harewood GC, Sharma VK, de Garmo P. Impact of colonoscopy preparation quality of detection of suspected colonic neoplasia. *Gastrointest Endosc*. 2003;58(1):76-79.
14. Froelich 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(3):378-384.
15. Calderwood AH, Jacobson BC. Colonoscopy quality: metrics and implementation. *Gastroenterol Clin North Am*. 2013;42(3):599-618.
16. Rabeneck L, Soucek J, El-Serag HB. Survival of colorectal cancer patients hospitalized in the Veterans Affairs Health Care System. *Am J Gastroenterol*. 2003;98(5):1186-1192.
17. Rizk MK, Sawhney MS, Cohen J, et al. Quality indicators common to all GI endoscopic procedures. *Am J Gastroenterol*. 2015;81(1):3-16.
18. Rex DK, Schoenfeld PS, Cohen J, et al. Quality indicators for colonoscopy. *Am J Gastroenterol*. 2015;81(1):31-53.
19. Park WG, Shaheen NJ, Cohen J, et al. Quality indicators for EGD. *Am J Gastroenterol*. 2015;81(1):17-30.
20. Adler DG, Lieb JG, Cohen J, et al. Quality indicators for ERCP. *Am J Gastroenterol*. 2015;110(1):91-101.
21. Wani S, Wallace MB, Cohen J, et al. Quality indicators for EUS. *Am J Gastroenterol*. 2015;110(1):102-113.
22. Brenner H, Chang-Claude J, Seiler CM, et al. Long-term risk of colorectal cancer after negative colonoscopy. *J Clin Oncol*. 2011;29(28):3761-3767.
23. Corley DA, Jensen CD, Marks AR, et al. Adenoma detection rate and risk of colorectal cancer and death. *N Engl J Med*. 2014;370(26):1298-1306.
24. Centers for Medicare & Medicaid Services. PQRS—Analysis and Payment. <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/PQRS/AnalysisAndPayment.html>. Accessed January 8, 2015.
25. Centers for Medicare & Medicaid Services. Physician Quality Reporting System. <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/PQRS/index.html?redirect=/PQRS>. Accessed January 8, 2015.
26. Medicare Learning Network. 2015 Medicare Physician Fee Schedule Final Rule. December 2, 2014.
27. GIQuIC. PQRS/QCDR/Meaningful use. Report on file, 2014.
28. Centers for Medicare & Medicaid Services. Qualified Clinical Data Registry reporting. <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/PQRS/Qualified-Clinical-Data-Registry-Reporting.html>. Accessed January 8, 2015.
29. Centers for Medicare & Medicaid Services. Accountable Care Organization 2014 program analysis quality performance standards narrative measure specifications. <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/ACO-NarrativeMeasures-Specs.pdf>. Accessed January 8, 2015.
30. Centers for Medicare & Medicaid Services. Methodology for Determining Shared Savings and Losses under the Medicare Shared Savings Program. http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/ACO_Methodology_Factsheet_ICN907405.pdf. Accessed January 8, 2015.
31. Barclay RL, Vicari JJ, Doughty AS, et al. Colonoscopic withdrawal times and adenoma detection during screening colonoscopy. *N Engl J Med*. 2006;355(24):2533-2541.

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