

# Using Measurement to Guide Colonoscopy Quality Improvement

New York City Department of Health and Mental Hygiene  
New York Citywide Colon Cancer Control Coalition



New York Citywide  
Colon Cancer  
Control Coalition

**NYC**<sup>TM</sup>  
Health

# About This Presentation

- Audience
  - Gastroenterologists and trainees
  - Allied health professionals specializing in endoscopy
- Objective
  - Engage physicians and staff in a conversation about measuring colonoscopy quality improvement (QI)

# Why Measure?

- Identify gaps in care
- Set practice performance goals and track progress
- Track and inform improvements in practices, processes, outcomes, and the system as a whole
- Learn during Plan-Do-Study-Act (PDSA) cycles
- Participate in value-based incentive programs for quality of care (e.g., Merit-based Incentive Payment System [MIPS])

# Measures and Best Practices: Selecting Measures

- Select measures that are well-defined and linked to evidence-based practice
- Focus on measures that reveal gaps
  - Select a balanced set of measures to ensure the whole system is improved
- Define each of the measures:
  - Numerator and denominator; inclusions and exclusions; reporting frequency, reporting period
- Whenever possible, use data from the system to obtain measures:
  - Existing admin, clinical and patient experience data

# Measures and Best Practices: Data Quality

- Establish expectations for data quality (content and frequency) and ensure data collection is captured accordingly
- Perform routine quality assurance checks to identify any problems with data collection/entry and data upload/transfer
- Examine for completeness (e.g., track the amount of missing pathology)
- Ensure that documentation and other information systems collect accurate and complete information required for measures of interest

# Measures and Best Practices: Making Sense of the Data

- Begin reporting measures immediately
- Review data at least quarterly
- Examples of how to use data:
  - Display data over time using run charts rather than looking at a single point in time or a data table
  - Examine results to understand:
    - ❖ What is the practice and provider volume (sample size)?
    - ❖ What is the disease course?
    - ❖ What are the patient characteristics?
  - Run simple bivariate analyses to examine relationships between measures (e.g., ADR and adequate bowel preparation rate)

# Measures and Best Practices: Reporting

- Use measurement constructively
- Acknowledge context when interpreting data
- Provide comparison data within the practice as well as local and national data sets. Compare to both averages and the highest performing providers



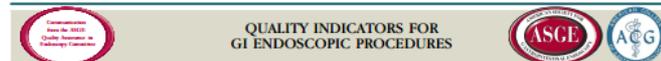
# Measures and Best Practices: Reporting

- Share measures with individual providers and present practice-wide findings at all-staff meetings
  - Identify and understand patterns of performance and reasons for variation
  - Set practice-wide goals for performance improvement
  - Engage providers and other team members in improvement plan development
- Provide one-on-one feedback when appropriate



# Indicators of a High Quality Screening Colonoscopy Program

- Preparation
  - Adequate bowel preparation rate  $\geq 85\%$
- Procedure
  - Adenoma Detection Rate (ADR)  $\geq 25\%$ 
    - ❖  $\geq 30\%$  in men
    - ❖  $\geq 20\%$  in women
  - Cecal intubation with photography rate  $\geq 95\%$
- Follow-up
  - Interval between screening colonoscopies is 10 years after a normal examination



## Quality indicators for colonoscopy

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

Optimal effectiveness of colonoscopy depends on patient acceptance of the procedure, which depends mostly on acceptance of the bowel preparation.<sup>3</sup> Preparation quality affects the completeness of examination, procedure duration, and the need to cancel or repeat procedures at earlier dates than would otherwise be needed.<sup>4,5</sup> Ineffective preparation is a major contributor to costs.<sup>6</sup> Meticulous inspection<sup>7,8</sup> and longer withdrawal times<sup>9-11</sup> are associated with higher adenoma detection rates (ADR). A high ADR is essential to rendering recommended intervals<sup>15</sup> between screening and surveillance examinations safe.<sup>16,17</sup> Optimal technique is needed to ensure a high probability of detecting dysplasia when present in inflammatory bowel disease.<sup>17,21</sup> Finally, technical expertise and experience will help prevent adverse events that might offset the benefits of removing neoplastic lesions.<sup>22</sup>

Recent studies report that colonoscopy is less effective in preventing proximal colon cancer and cancer deaths (ie, colon cancer proximal to the splenic flexure) compared with distal cancer (ie, colon cancer at or distal to the splenic flexure).<sup>23-28</sup> Decreased protection against right-sided CRC is likely due to multiple factors. These include missed adenomas or incompletely resected adenomas; suboptimal bowel preparation; precancerous

lesions that are endoscopically subtle or difficult to remove, such as sessile serrated polyps and flat and/or depressed adenomas; and differences in tumorigenesis between right-sided and left-sided cancers. Improving prevention of right-sided colon cancer is a major goal of colonoscopy quality programs.

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

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

## METHODOLOGY

In 2006, the American Society for Gastrointestinal Endoscopy (ASGE)/American College of Gastroenterology (ACG) Task Force on Quality in Endoscopy published their first version of quality indicators for colonoscopy.<sup>36</sup> The present update integrates new data pertaining to previously proposed quality indicators and new quality indicators for performing colonoscopy.<sup>36</sup> Indicators that had wide-ranging clinical application, were associated with

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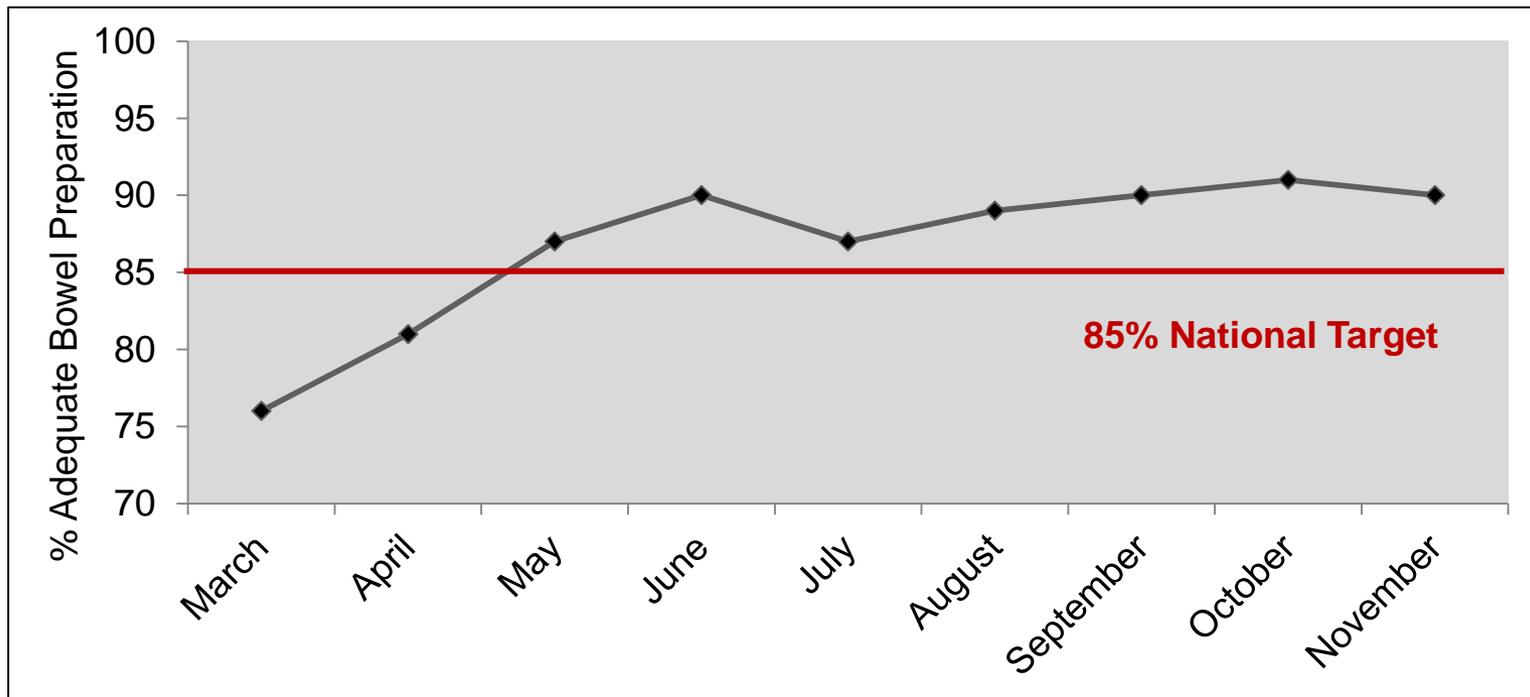
Rex DK, et al. *Gastrointestinal Endoscopy*. 81:31-53. 2015.

# Adequate Bowel Preparation

- **Definition:** Cleansing the colon judged either adequate or inadequate. Adequate bowel preparation is defined as a colon where the examiner is able to identify polyps of  $> 5$  mm.
- **Rationale:** Colon cleansing is critical for the efficacy of colonoscopy. Inadequate bowel preparation can prevent endoscopists from reaching the cecum and identifying adenomas. This can lead to repeat colonoscopy or a short follow-up interval.
- **Recommended by:** American Society for Gastrointestinal Endoscopy (ASGE) / American College of Gastroenterology (ACG) Task Force, 2015; U.S. Multi-Society Task Force, 2014
- **Target:** Bowel preparation should be deemed adequate in  $\geq 85\%$  of colonoscopies.
- **Suggested frequency:** Quarterly (or monthly if sufficient volume)
- **Minimum sample size:** 20
- **Data quality concerns:** Ambiguous reporting (e.g., “fair” preparation)

# Adequate Bowel Preparation: Practice-Level

- Chart your practice's percent adequate bowel prep over time
- Compare to the 85% national target



Data is for illustrative purposes only and does not represent actual patients or providers.

# Adequate Bowel Preparation Measurement

- Adequacy of bowel preparation and follow-up intervals
- Adequacy of bowel preparation and ADR



# Adenoma Detection Rates (ADR)

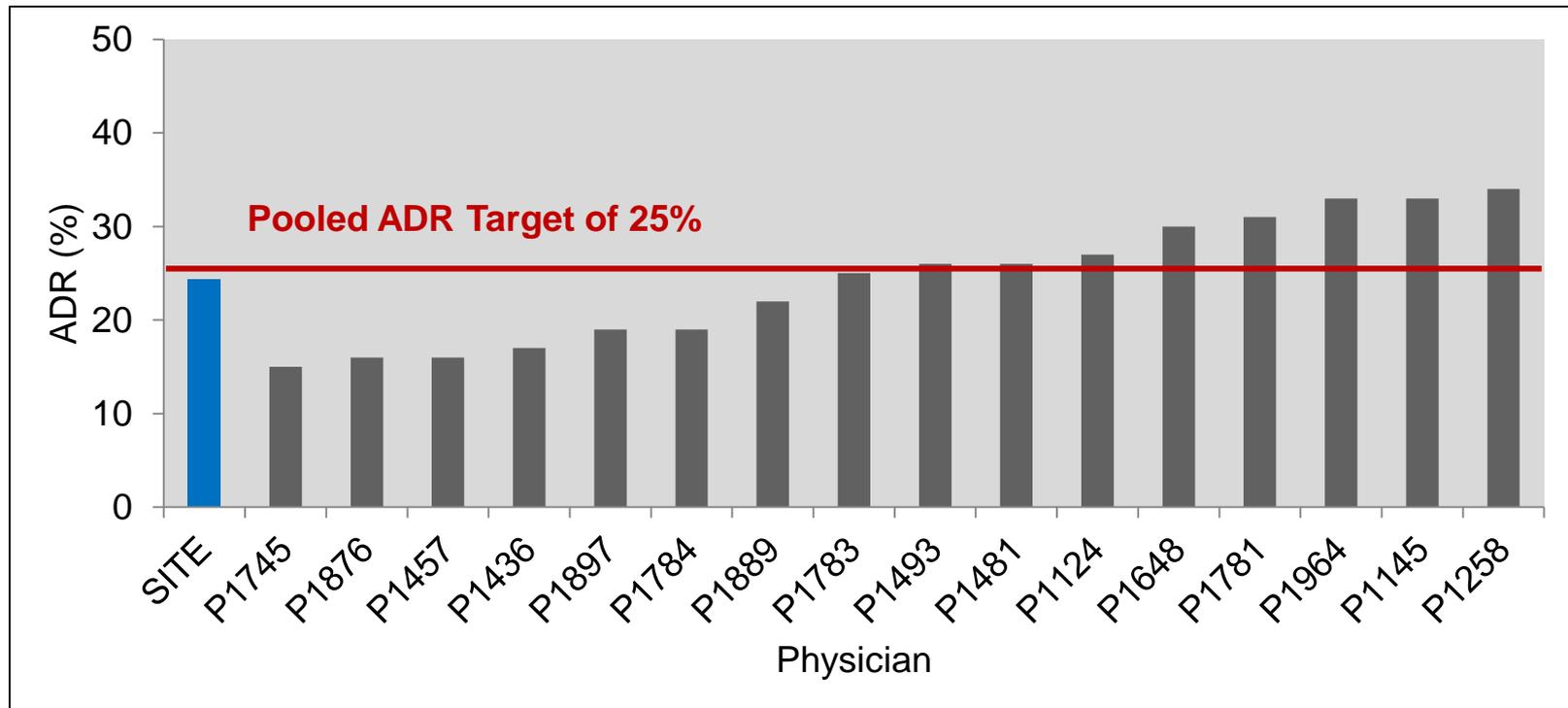
- **Definition:** The ADR is the proportion of patients aged  $\geq 50$  years undergoing a complete screening colonoscopy who have one or more adenomas detected.
- **Rationale:** ADR has emerged as a critical measure of a high-quality endoscopist. As ADR increases above 20%, the risk of subsequent CRC decreases.
- **Recommended by:** ACG/ASGE Quality Task Force 2014 Screening Colonoscopy
- **Target:**  $\geq 30\%$  ADR for all men,  $\geq 20\%$  ADR for all women
- **Suggested frequency:** Quarterly (or monthly if sufficient volume)
- **Minimum sample size:** Assessment of ADR improvement particularly at the endoscopist level depends on a large enough sample size to stabilize the volatility of the ADR point estimates. Recommend at least  $> 25$  charts.

# Adenoma Detection Rates: Data Quality Concerns

- “Missing” pathology results:
  - Complete pathology results are necessary to calculate accurate ADRs
- To ensure high data quality, design and implement systematic workflow for:
  - Collection of pathology report
  - Review and approval of reports by individual endoscopists
  - Entry of pathology results into an endowriter or electronic report writer

# Adenoma Detection Rates: Practice-Level Pooled Patient ADR

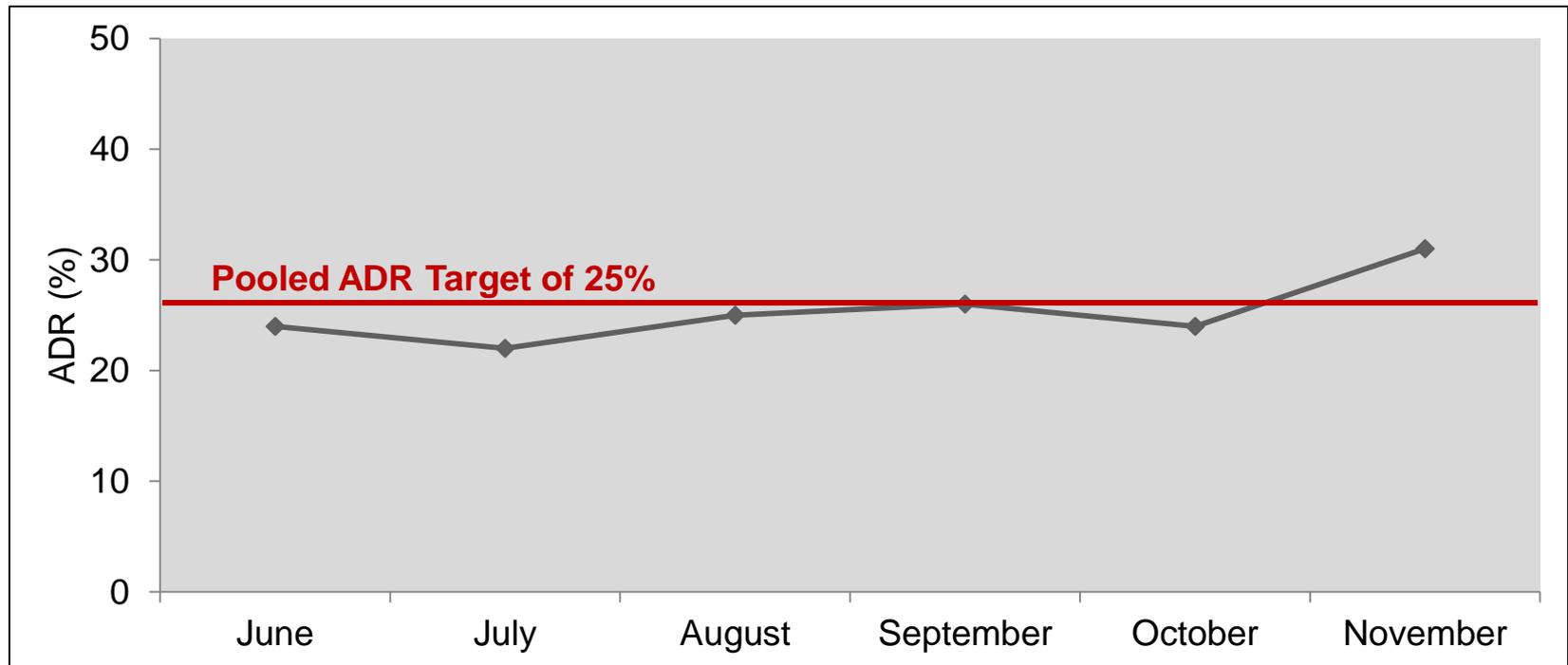
- Report individual physician's pooled ADR for all patients
- Compare to the ADR target of > 25%



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# Adenoma Detection Rates: Practice-Level Monthly ADR

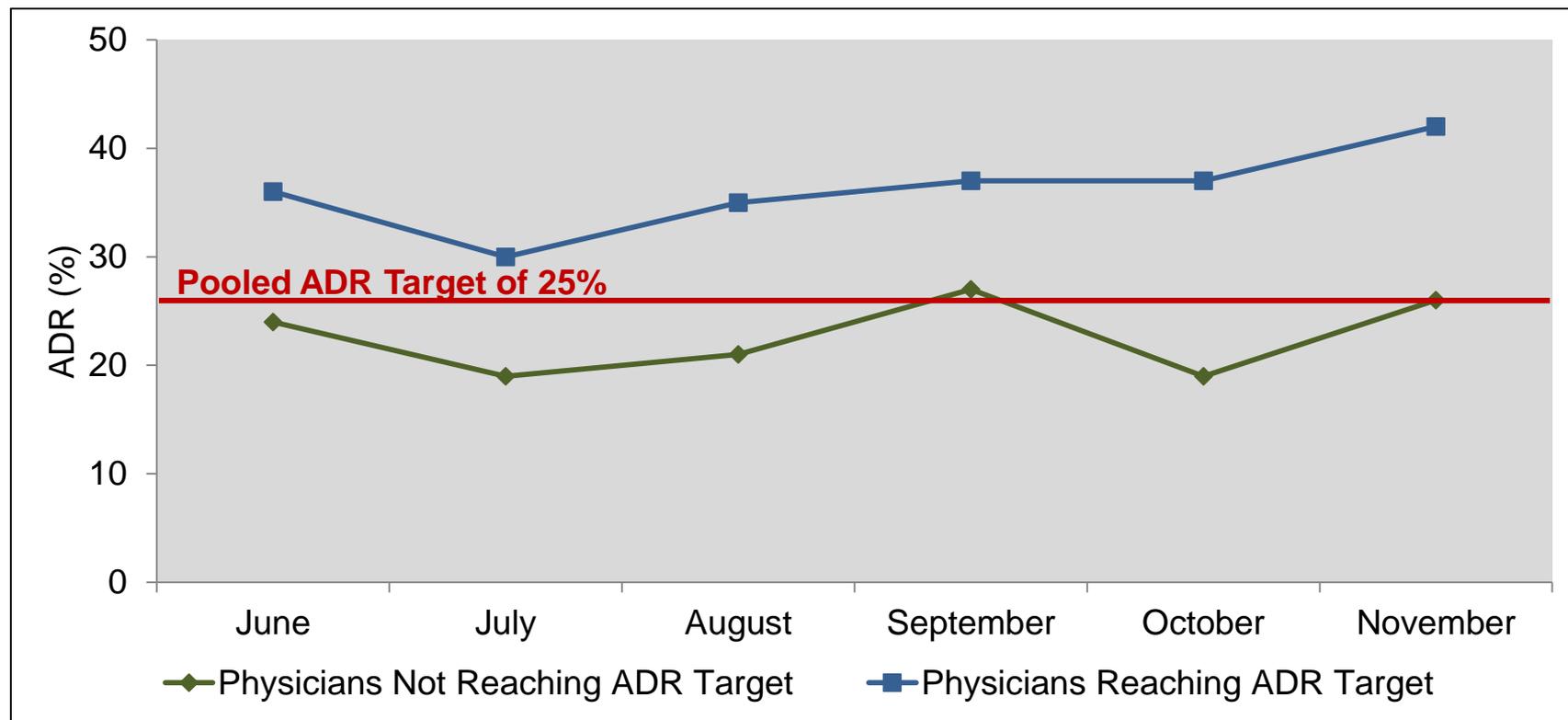
- Report pooled physician ADR data over time
- Compare your practice trend to the > 25% target



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# Adenoma Detection Rates: Practice-Level Monthly ADR

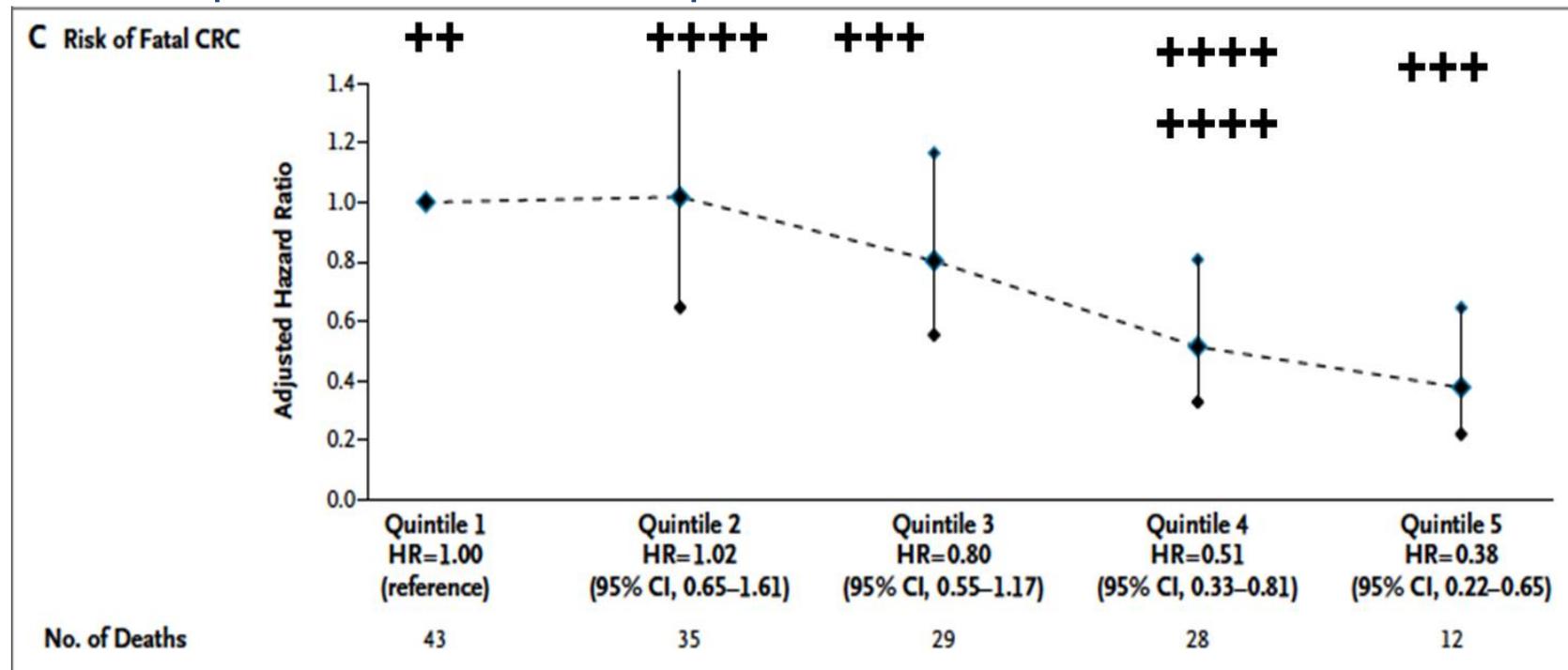
- Show physicians exceeding or not reaching ADR targets



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# Adenoma Detection Rates: Corley Quintiles

- Group providers into quintiles of ADR (“+” represents one provider)
- Inform providers into which quintile their ADR falls



Adopted from: Corley DA, et al. *New England Journal of Medicine*. 370:1298-1306. 2014. Data is for illustrative purposes only and does not represent actual patients or providers.

# Adenoma Detection Rates: Corley Quintiles

Physician Quintile	
P1745	5
P1876	5
P1457	5
P1436	4
P1897	4
P1784	4
P1889	4
P1783	4
P1493	3
P1481	3
P1124	2
P1648	2
P1781	2
P1964	2
P1145	1
P1258	1

**Highest**

**Overall ADR**

**Lowest**

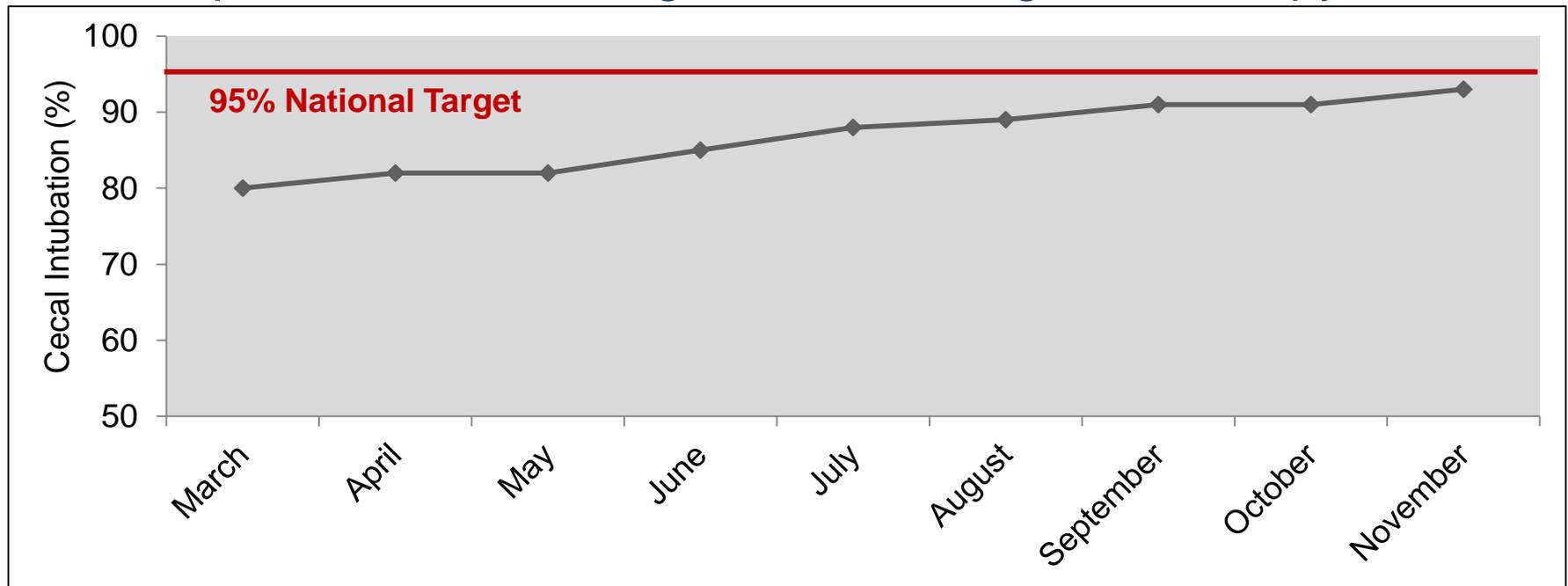
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# Cecal Intubation With Photo Documentation Rate

- **Definition:** 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.
- **Rationale:** Successful cecal intubation with photo documentation is critical to successful colonoscopy. Incomplete examination of the colon is significantly associated with missed adenoma.
- **Recommended by:** American Society for Gastrointestinal Endoscopy (ASGE)/American College of Gastroenterology (ACG) Task Force, 2015
- **Target:** Nationally, gastroenterologists are expected to reach the cecum in 95% of cases of screening colonoscopies and 90% of all colonoscopies.
- **Suggested frequency:** Quarterly (or monthly if sufficient volume)
- **Minimum sample size:** 20
- **Data quality concerns:** Examinations in which cecal intubation was not intended (e.g., therapeutic colonoscopy to remove a previously-identified polyp) should be excluded from the denominator.

# Cecal Intubation Rates: Practice-Level

- Chart your practice-level cecal intubation with photo documentation over time
- Compare to the 95% target for screening colonoscopy



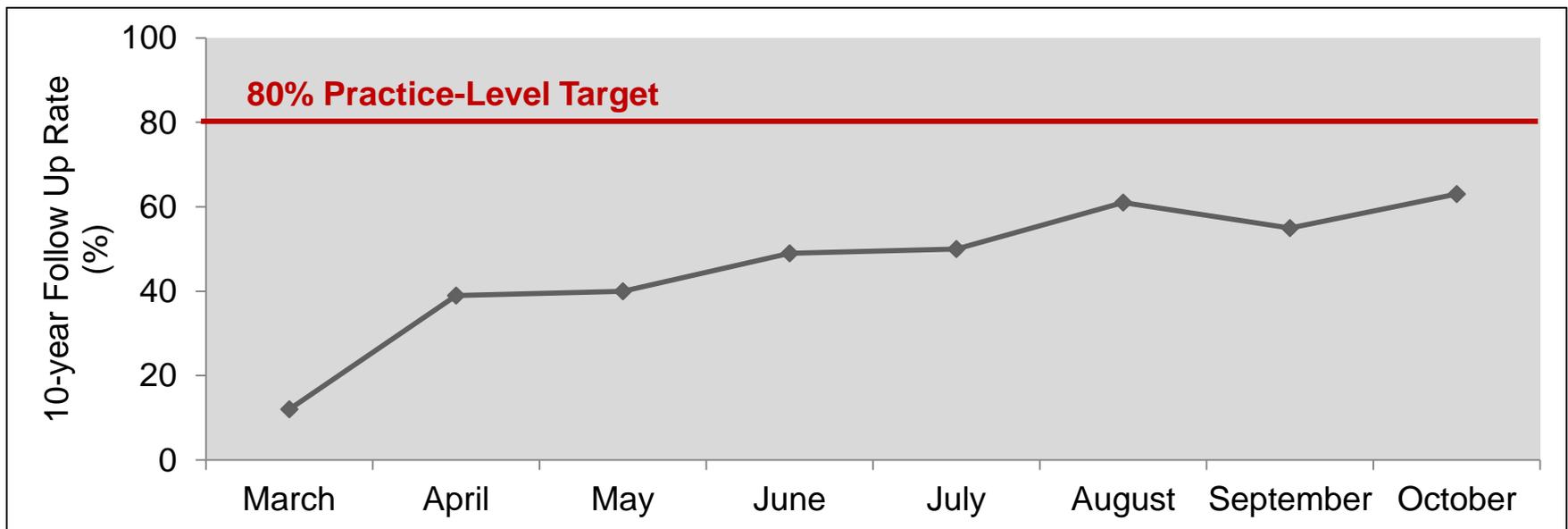
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# Colonoscopy Follow-up Intervals

- **Definition:** Recommended follow-up colonoscopy at 10-year intervals between screening colonoscopies in average-risk patients who have negative examination results and adequate bowel cleansing
- **Rationale:** Colonoscopic screening is recommended in all current guidelines at 10-year intervals, based on the adenoma-to-carcinoma progression and the established duration of the protective effect of colonoscopy
- **Recommended by:** American Society for Gastrointestinal Endoscopy (ASGE)/American College of Gastroenterology (ACG) Task Force, 2016
- **Target:** Following appropriate 10-year follow-up intervals is  $\geq 90\%$  for all screening negative colonoscopy
- **Suggested frequency:** Quarterly (or monthly if sufficient volume)
- **Minimum sample size:** 20
- **Data Quality Concerns:** Identifying examinations that should be excluded from the denominator (e.g., non-screening examinations, inadequate bowel preparation, high-risk patients)

# Follow-Up Interval: Practice-Level

- Chart your pooled practice level follow-up interval for screening colonoscopy over time
- Target is a 10-year follow-up interval
- Include only the interval for negative screening colonoscopies



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# Conclusions

- Measurement is essential to:
  - Identify gaps in care
  - Set practice performance goals
  - Guide improvement work
  - Track improvements in practices and outcomes
  - Participate in pay-for-reporting and -performance programs



# References

1. Rex DK, Schoenfeld PS, Cohen J, et al. Quality indicators for colonoscopy. *Gastrointestinal Endoscopy*. 2015;81(1):31-53.
2. Corley DA, Jensen CD, Marks AR, et al. Adenoma Detection Rate and Risk of Colorectal Cancer and Death. *New England Journal of Medicine*. 2014;370(14):1298-1306.