

Quality in Colonoscopy

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Disclosures

I have no financial interests or relationships to disclose

Objectives

- Discuss significance of quality in colonoscopy
- Define quality metrics we measure
- Review best practice by AGA clinical guidelines
- Discuss adequate documentation and follow-up

What is Quality?

Merriam-Webster:

- Degree of excellence
- Superiority in kind

Agency for Healthcare Research and Quality (AHRQ)

- Quality Indicators (QIs) are standardized, evidence-based measures of health care quality that can be used to measure and track clinical performance and outcomes

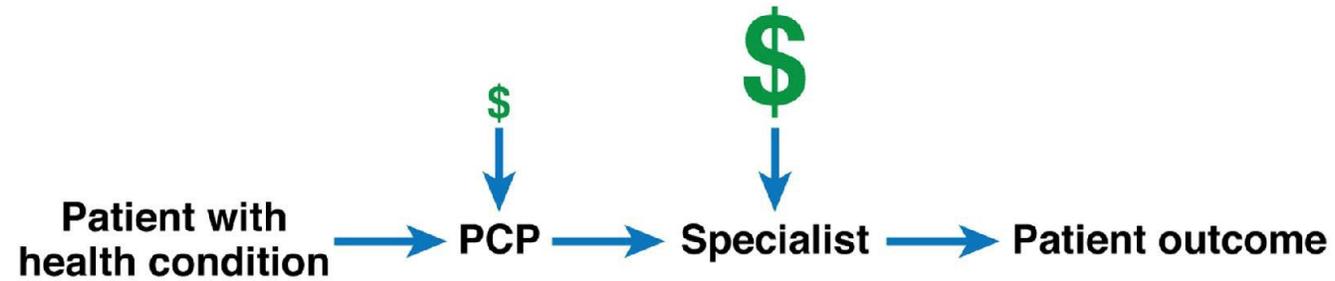
The Institute of Medicine (IOM)

- The degree to which health care services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge

Impact

- Pay for Performance
 - Providers are rewarded for quality of healthcare services
 - "P4P" or "value-based purchasing"- payment model rewards physicians, hospitals, medical groups, and other healthcare providers for meeting certain performance measures for quality and efficiency

Fee for service



Value-based purchasing



Significance

- Colonoscopy is an effective and widely used screening modality for reducing colorectal cancer (CRC) incidence and mortality
- Efficacy of colonoscopy varies widely among endoscopists
- Lower-quality colonoscopies are associated with higher interval CRC incidence and mortality
- Improving quality colonoscopy should reduce interval CRC development

High-Quality Colonoscopy

- Effective- detecting CRC and its precursors
- Safety- minimizing adverse events
- Value- avoiding unnecessary costs

Colonoscopy Quality Indicators

- **Bowel prep adequacy**
- **Adenoma detection rate (ADR)**
- **Cecal intubation rate**
- **Withdrawal time**
- Left and right colon ADR
- Mean ADR per procedure
- Sessile serrated polyp detection in right colon
- Endoscopist patient load
- Complication rate
- Timeliness of recognition of complication
- Patient safety and comfort during the procedure
- Patient satisfaction

Pre-Procedure

- Appropriate indication
- Informed consent on same day
- ASA Classification
- Discuss the risks, benefits
- Risks:
 - Bleeding
 - Perforation
 - Infection
 - Sedation adverse events
 - Missed diagnosis

Compliance

Population adheres to colonoscopy

Efficacy

High detection rates for adenomas and cancer

Colonoscopy screening Effectiveness

Reduction of colorectal cancer incidence and mortality

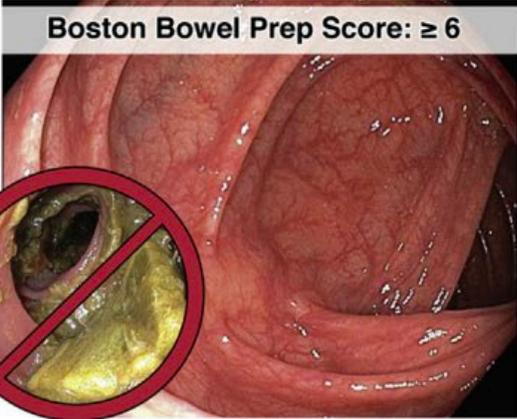
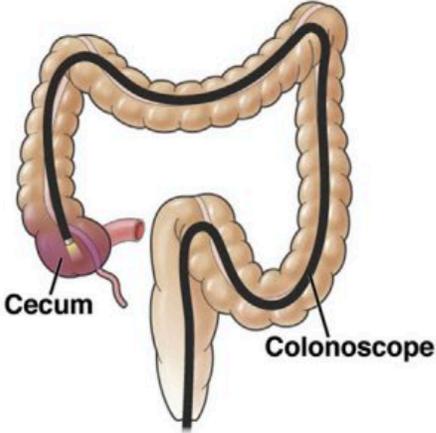
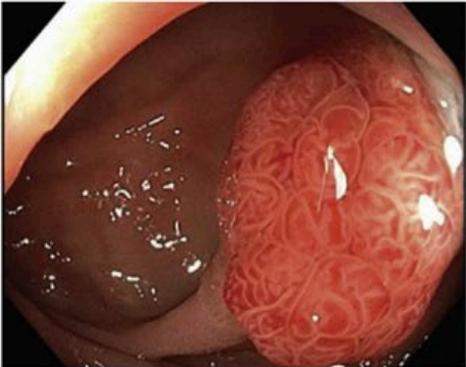
Quality

High endoscopist performance, low complication rate

Treatment

Early stage treatment more beneficial than late stage treatment

A**Measure, track, and provide feedback**

<p>Bowel prep adequacy rate Goal: $\geq 90\%$, aspirational $\geq 95\%$</p> <p>Boston Bowel Prep Score: ≥ 6</p> 	<p>Cecal intubation rate Goal: $\geq 90\%$, aspirational $\geq 95\%$</p> 	<p>Withdrawal time Goal: ≥ 6 min, aspirational ≥ 9 min</p> 
<p>Adenoma detection rate Goal: $\geq 30\%$, aspirational $\geq 35\%$</p> 	<p>Serrated lesion detection rate Goal: $\geq 7\%$, aspirational $\geq 10\%$</p> 	<p>Adverse events Measure unit-level colonoscopy adverse events</p> 

Best Practice #1: Measure Bowel Prep

- Endoscopy units should measure bowel preparation quality routinely
- Annually at a minimum
- Goal: Adequate bowel preparation in $\geq 90\%$ of screening and surveillance colonoscopies
- Aspirational target: $\geq 95\%$

Bowel Prep Adequacy

- High-quality bowel prep → improved detection of colorectal polyps
- Suboptimal cleansing → failed detection of flat/subtle polyps
- Impact of inadequate bowel prep more pronounced in the proximal colon
- Reduces detection of both adenomas and sessile serrated lesions (SSLs)
- Preparation quality varies based on patient, endoscopist, and system factors

Bowel Preparation Quality

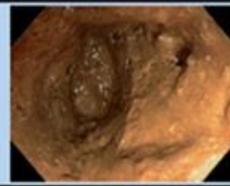
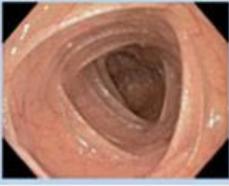
Poor or incomplete visualization of the colon reduces the yield of screening colonoscopies and increases health care costs, due to longer procedure times and aborted procedures.



Bowel Prep Scoring Systems

- Modified Aronchick score: a single score reflecting the overall quality of the bowel preparation (**excellent, good**, fair, poor, or inadequate)
- Boston Bowel Preparation Scale (BBPS): scores ranging from 0 (unprepared colon) to 3 (entire segment of colon well seen) for each colon segment (right, transverse, and left colon)
- Adequate definition: Boston Bowel Preparation Scale score (BPSS) ≥ 6
- Each segment score ≥ 2
- BPSS is preferred because it is applied after cleaning and has been rigorously validated

Boston Bowel Preparation Scale (BBPS,2010)

BBPS		3	2	1	0
3=Excellent					
2=Good					
1=Poor					
0=Inadequate					
LC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 0 points: Segment unprepared colon with mucosa not visualized by the presence of solid stool.
- 1 point: Areas colon segment seen by the presence of fecal liquid and semisolid.
- 2 points: Low fecal fluid content allows good visualization of the mucosa.
- 3 points: Excellent visualization of the mucosa without the presence of liquid remains.

Best Practice #2: Use Split-Prep

- Endoscopy units should use a split-dose bowel preparation as the standard preparation strategy in patients undergoing colonoscopy
- Reduces lag time from completion of the bowel prep to start of the colonoscopy
- Half of prep is taken the evening before; half taken 4–6hrs before the start of colonoscopy
- Superiority in adenoma detection has been repeatedly validated
- Patient tolerability is superior

El Sayed et al, Gastrointest Endosc 2013

Martel et al, Gastroenterology, 2015

Enestvedt et al, Clin Gastroenterol Hepatol, 2012

Horton et al, Am J Gastroenterol, 2016

Best Practice #3- Give Clear Instructions

- Bowel preparation instructions should be written at a sixth-grade reading level in the patient's native language
- Units with suboptimal bowel preparation quality should augment pre-procedure instructions with additional patient education and support

Utilizing Technology

- In addition to written instructions, also use instructional videos and patient navigation
- Use trained staff to help patients overcome barriers to care
- Can improve colonoscopy completion rates and bowel preparation adequacy, particularly in low literacy populations
- Smartphone applications and text messaging have been successfully implemented to improve bowel preparation quality

Best Practice #4: Measure Cecal Intubation Rate

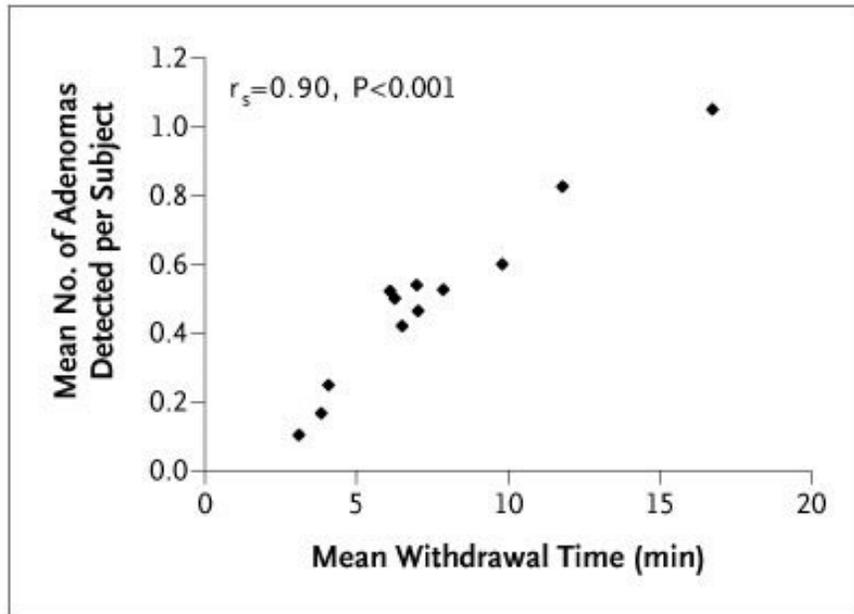
- Endoscopy units should measure cecal intubation rates on an endoscopist level
- Cecal intubation rates should be $\geq 90\%$ (aspirational $\geq 95\%$)
- Cecal landmarks (appendiceal orifice and ileocecal valve) should be photo-documented
- Lower CIR \rightarrow diminished detection of neoplasia, higher incidence of interval CRC
- Adds cost due to need for repeat colonoscopy or alternative testing
- The denominator of cecal intubation rate should include all colonoscopies

Best Practice #5: Measure Withdrawal Time

- Endoscopy units should measure withdrawal times (WT) on an endoscopist level
- Mean WT (time between cecal intubation and procedure completion) of an endoscopist's normal cases (no biopsies or polypectomy) is linked to adenoma detection
- Mean WT among normal colonoscopies should be ≥ 6 minutes (aspirational target ≥ 9 minutes)
- The merit of a colonoscopy occurs during withdrawal phase
- A threshold value of 6 minutes differentiates endoscopists with higher detection of both adenomas and advanced neoplasia

Quality Indicators for Colonoscopy

Withdrawal Times



Increased detection of significant neoplastic lesions in colonoscopic examinations where the withdrawal time is ≥ 6 minutes

Mean withdrawal time should be ≥ 6 minutes in colonoscopies with normal results performed in patients with intact colons

Benefit of Increasing Withdrawal Time

- Incremental gains in detection of both adenomas and SSLs are seen among endoscopists with WT of ≥ 9 mins
- WT is a surrogate for the quality of inspection
- Most valuable when monitored along with ADR

Best Practice #6: Do Second Look

- Endoscopists should perform a second look of the right colon
- Either retroflexed or forward view- reintubate the cecum
- Improves the detection of polyps
- Right colon is the most frequent location for missed CRCs and polyps
- Due to prevalence of flat and serrated polyps in the proximal colon that are difficult to visualize
- A second look of the right colon can increase ADR by 5–20%

Best Practice #7: Measure ADR

- Endoscopy units should measure and provide feedback on adenoma detection rate (ADR) at both the endoscopist and unit level on a routine basis
- Annually at a minimum or when endoscopists have accrued 250 screening colonoscopies
- Denominator for ADR is all screening colonoscopies performed in patients aged 45–75 years
- Surveillance and diagnostic colonoscopies are excluded
- Numerator is colonoscopies with confirmed adenomas; serrated polyps are excluded

Best Practice #8: ADR Goal $\geq 30\%$

- The goal ADR for an individual endoscopist should be $\geq 30\%$ (aspirational target $\geq 35\%$)
- Prior guidelines suggested that an ADR of at least 25% was adequate
- Recent data suggest that the risk of interval CRC is further reduced when the ADR is $\geq 35\%$
- Improvements in ADR are associated with a reduced interval CRC risk

Methods to Increase ADR

- Endoscopists not meeting these thresholds should have an intervention
- Educational interventions- understand importance of adequate WT, looking behind folds, adequate cleaning of colon, how to recognize subtle lesions
- Hands-on training with local leaders improve ADR significantly compared to quality feedback alone

Best Practice #9: Select Appropriate Polypectomy Device

- Effective and safe polyp removal requires appropriate device selection
- Requires proper technique and adequate skill of endoscopist
- Polypectomy quality is variable
- Residual neoplasia found in approximately 14% of post-polypectomy sites
- Cold snare polypectomy should be used for nonpedunculated polyps 3–9mm in size
- Forceps should be avoided for polyps >2mm in size
- Aim for a small rim of normal tissue around the polyp

Selecting Best Tool

- Based on size and morphology of the polyp
- Need to ensure adequate resection and avoiding post-polypectomy adverse events
- Use of standard cold forceps is discouraged due to the high risk of residual neoplasia
- Hot biopsy forceps should not be used due to potential for deep thermal injury
- Larger “jumbo” forceps can be useful for removal of diminutive polyps 2mm in size or polyps <5mm that are in challenging locations that preclude use of a snare
- Forceps should not be used as a primary modality for removal of polyps >5mm

Cold vs. Hot Snare

- Equally efficacious
- Cold snare reduces the risk of delayed post-polypectomy bleeding
- Cold snare avoids risk of thermal injury and reduces risk of perforation

B

Best practices

Use split prep

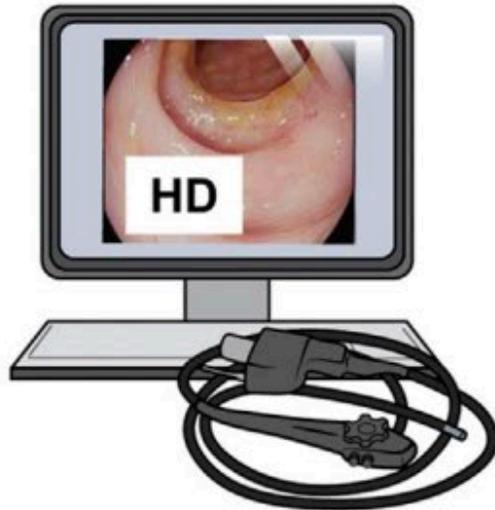


**1st half:
night before
procedure**

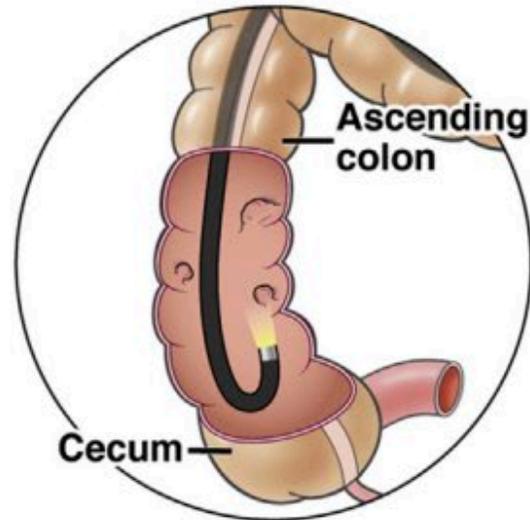


**2nd half:
morning of
procedure**

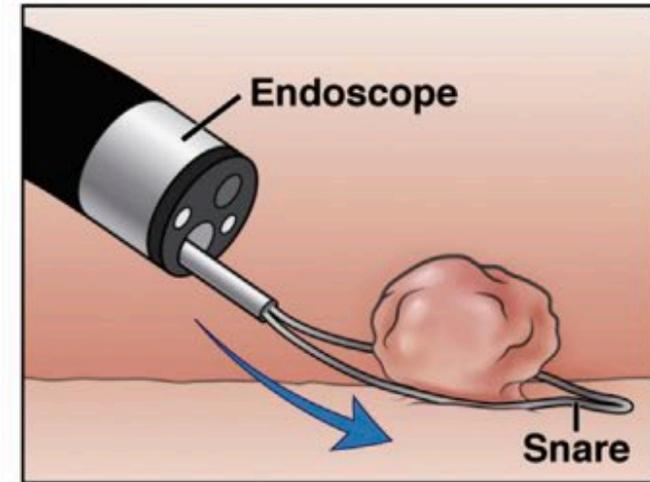
Use high-definition colonoscopes



Perform 2nd look in right colon



Use cold snares for all sessile polyps 3–9 mm



Refer patients with benign complex polyps for endoscopic resection not surgery



Provide clear and detailed post-procedure documentation

Quality Endo Unit			
Patient Name:	Your Patient	Procedure Date:	11/22/2018 2:00 PM
DOB:	11/11/1958	Sex of Study:	M
Admit Type:	Outpatient	Age:	60
Referral:	GI &	Referral:	Right
Referral Source:	Physician	Referral Source:	100-Coronary 41
Procedure:	Colonoscopy		
Indication:	Digital application surveillance. Personal history of colon adenomatous polyps. Last colonoscopy December 2016.		
Procedure:	DIGITAL COLONOSCOPY AND ENDOSCOPIC COLON POLYPECTOMY. See Endoscopy at		
Patient Position:	Right to left in patient chair for documentation of video and photos.		
Reference ICD:	Digestive Care Center 402		
Medication:	Propofol per Anesthesia		
Complications:	No immediate complications.		
Reporting Physician:			
Remarks:	<p>Pre-Procedure Assessment: None in the pre-procedure. A history and physical was performed, and patient vital signs and oxygen were checked. The patient's tolerance of conscious sedation was also assessed. The risks and benefits of the procedure and the possible options and risks were discussed with the patient. All questions were answered, and informed consent was obtained. Prior colonoscopies: The patient has had no previous colonoscopies or polypectomies. Age-appropriate surveillance is a patient with a positive adenoma history. After reviewing the risks and benefits, the patient was deemed to be a suitable candidate to undergo the procedure.</p> <p>Procedure: Patient identification and pre-procedure assessment were performed in the procedure room. The patient was positioned on the left side of the table. The colonoscope was inserted into the cecum. The cecum was inspected, and the ascending colon was inspected. The patient's blood pressure, pulse, and oxygen saturation were monitored continuously. The procedure was completed through the cecum and ascending colon. The patient was instructed to breathe normally through the nasal cannula and to remain in the left lateral decubitus position. The procedure was completed at the cecum. The patient was instructed to breathe normally through the nasal cannula and to remain in the left lateral decubitus position. The procedure was completed at the cecum. The patient was instructed to breathe normally through the nasal cannula and to remain in the left lateral decubitus position. The procedure was completed at the cecum.</p>		

Follow guidelines when assigning screening or surveillance intervals

- Normal colonoscopy → 10 years
- Small HP only → 10 years
- 1–2 small adenomas → 7–10 years
- 1–2 small SSLs → 5–10 years
- 3–4 small adenomas/SSLs → 3–5 years

Association between Endoscopist Specialty and Colonoscopy Quality

- Systematic review- EMBASE, MEDLINE, etc.
- 36 studies representing 3,500,832 colonoscopies included
- Colonoscopies performed by other endoscopists vs. gastroenterologists were associated with:
 - Lower ADRs (OR, 0.91; 95% CI, 0.87-0.96)
 - Higher perforation rates (OR, 3.02; 95% CI, 1.65-5.51)
 - Higher post-colonoscopy colorectal cancer rates (OR, 1.23; 95% CI, 1.14-1.33)
- Conclusion: Colonoscopies performed by non-GI endoscopists were associated with poorer quality metrics and outcomes
- Targeted quality improvement efforts may be warranted

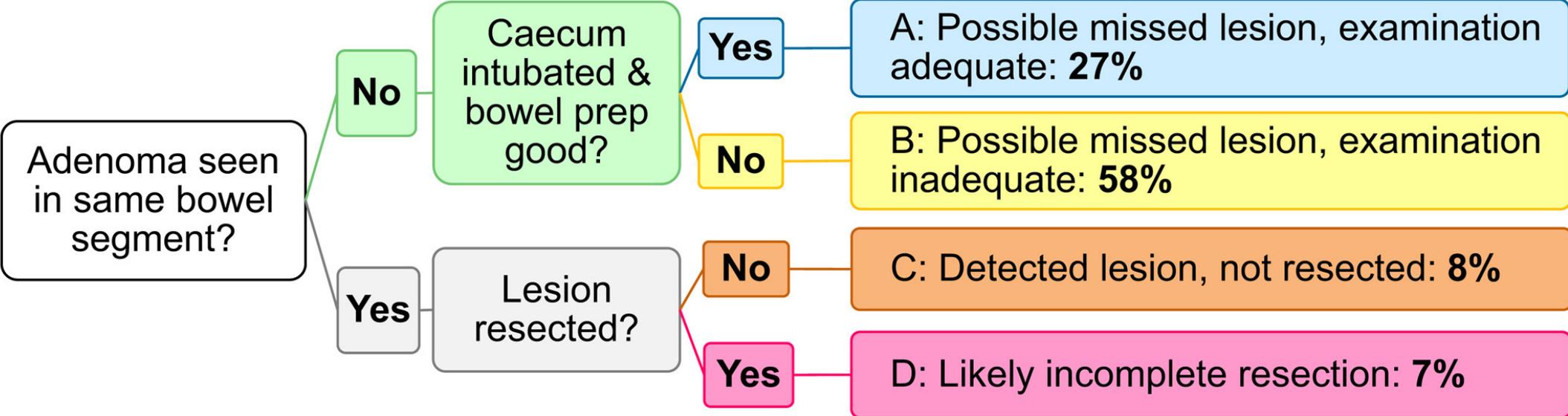
Association Between Endoscopist Annual Procedure Volume and Colonoscopy Quality

- Systematic comprising 11,276,244 colonoscopies
- No association between procedural volume and ADR (OR, 1.00; 95% CI, 0.98-1.02 per additional 100 annual procedures)
- Cecal intubation rate (CIR) improved with each additional 100 annual procedures (OR, 1.17; 95% CI, 1.08-1.28)
- Non-significant trend toward decreased overall AEs per additional 100 annual procedures (OR, 0.95; 95% CI, 0.90-1.00)
- Conclusion: Higher annual colonoscopy volumes correlate with higher CIR, but not with ADR or PCCRC. Trends toward fewer AEs were associated with higher annual colonoscopy volumes
- Very little data available from endoscopists who perform fewer than 100 annual colonoscopies
- Studies are needed on extremes in performance volumes to more clearly evaluate associations between colonoscopy volumes and outcomes

Impact of Good Quality

- Retrospective analysis of 107 PCCRCs identified at a single medical center in England from 1/1/2010 through 12/31/2017 using coding and endoscopy data
- PCCRC: Post-colonoscopy colorectal cancer (PCCRC)- CRC diagnosed after a colonoscopy in which no cancer was found
- For each case, reviewed clinical, pathology, radiology, and endoscopy findings
- Performed a root-cause analysis of each case, categorizing lesions : possible missed lesion, prior examination adequate; possible missed lesion, prior examination inadequate; detected lesion, not resected; or likely incomplete resection of previously identified lesion
- Determined whether PCCRCs could be attributed to the endoscopist for technical or decision-making reasons, whether the PCCRC was avoidable or unavoidable
- Conclusion: 89% of PCCRCs may be avoidable

Causes of Post-colonoscopy Colorectal Cancers Based on World Endoscopy Organization System of Analysis



Gastroenterology

Procedure Documentation

- Assessment of procedure results
- Documentation of unplanned interventions during colonoscopy
- Record any intra- or post-procedural complications
- Document that patients received instruction on how to manage adverse events after discharge
- Plan for follow-up
- Documentation of the communication of colonoscopy results and recommendations with the patient and referring clinician
- Systematic review of the pathology report with documentation of results and a subsequent follow-up plan

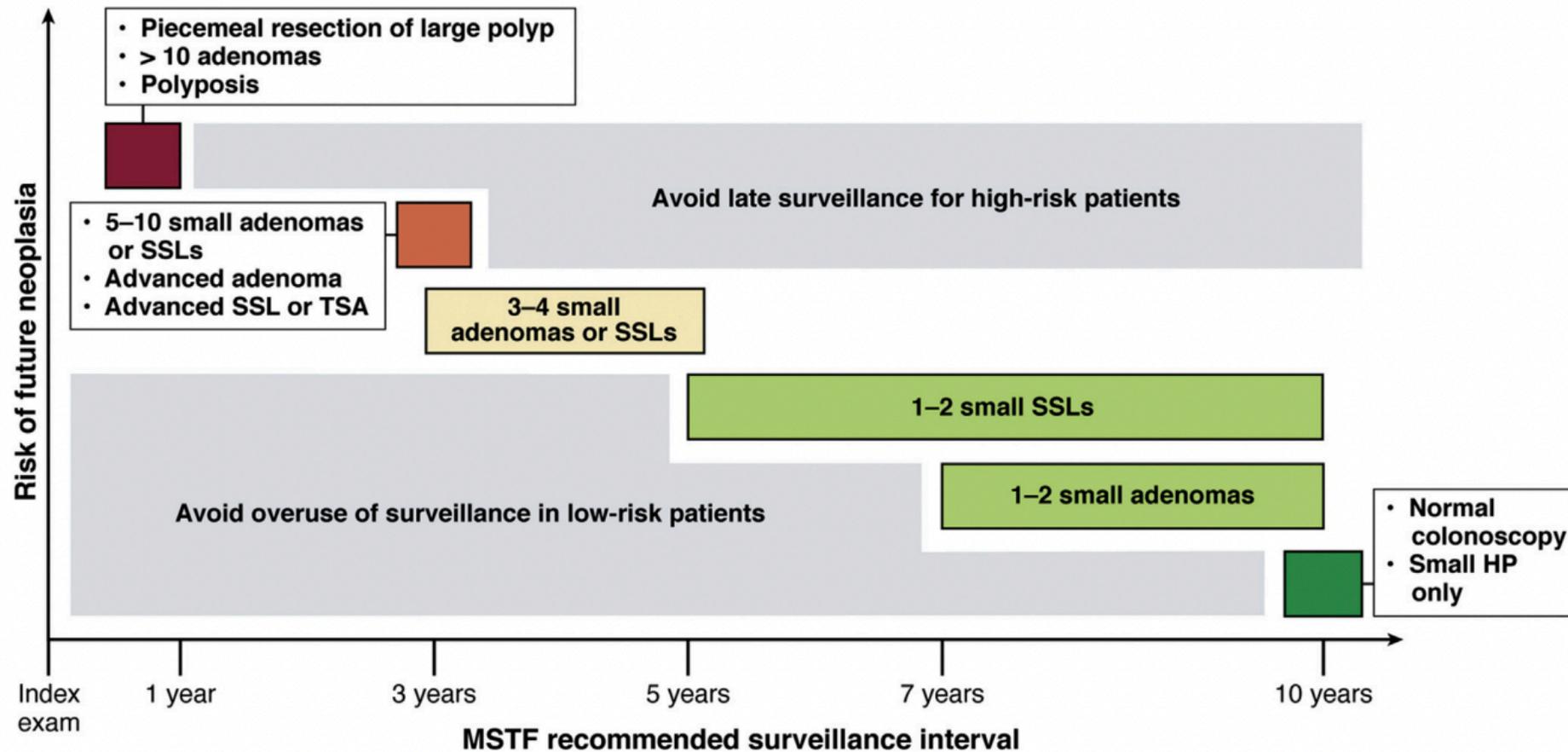


Figure 2. Key points for appropriate utilization of colonoscopy surveillance based on index examination findings. Avoiding late surveillance in high-risk patients (such as those with advanced lesions or many adenomas) can help prevent interval development of metachronous advanced lesions or CRC. Conversely, avoiding overuse of surveillance in low-risk patients (such as those with negative examinations, hyperplastic polyps (HPs) only, or 1–2 small adenomas or serrated polyps) can help avoid unnecessary cost and risk associated with low-yield colonoscopies. MSTF, Multi-Society Task Force; TSA, traditional serrated adenoma.

Summary

- Assessment of quality metrics improve performance
- Measurement and improvement can be done on both an endoscopist level and unit level
- Equally important to monitor adverse events to improve patient safety and satisfaction
- Continuous monitoring and optimization of colonoscopy quality to provide best patient is optimal
- Goal is to perform high-quality colonoscopy and deliver high-value care
- Procedure documentation and follow-up plan equally important

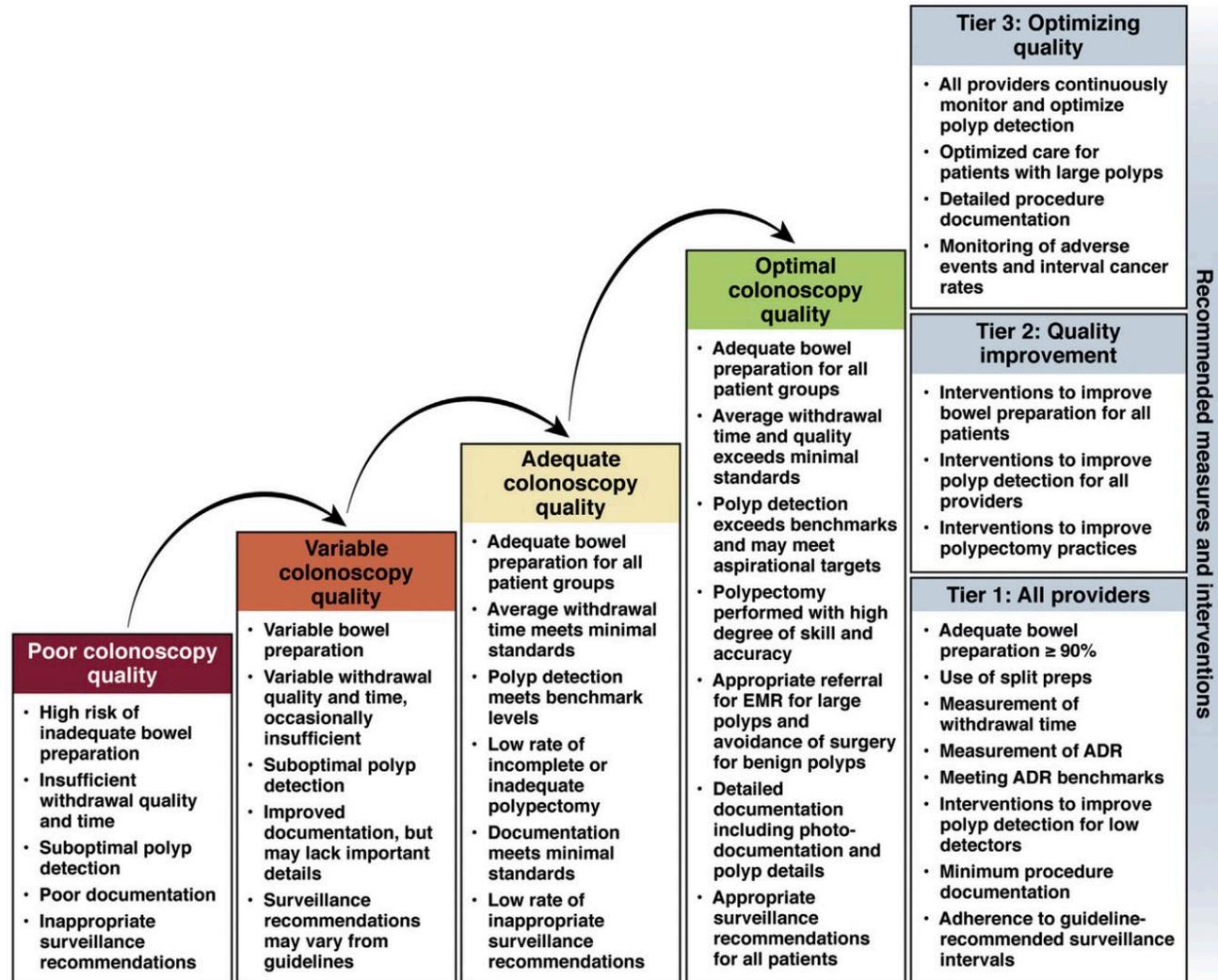


Figure 3. Tiers of colonoscopy quality and features of endoscopists and practices that provide optimal care for patients undergoing endoscopic CRC screening and surveillance.

THANK YOU