What is a quality colonoscopy?

Gastro2019
Wellington, NZ

David G. Hewett
MBBS MSc PhD FRACP
The University of Queensland
Brisbane AUSTRALIA
Disclosures

• **Research support**
  - Olympus Corporation
  - Fujifilm Australia

• **Speaking fees**
  - Boston Scientific
Colonoscopy is not perfect

• Colonoscopy does not assure protection
  - “Interval” or “post-colonoscopy” cancers
  - Approximately 6% of CRC occur within 5 years of a colonoscopy.
  - Most interval cancers reflect missed rather than new lesions.
  - Less effective in the proximal colon

Samadder et al Gastro 2014
Jover et al Dig Endosc 2018
Colonoscopy is highly operator-dependent

- Strong association between individual endoscopist and the level of CRC protection

- Interval cancers occur more often in patients from endoscopists
  - With low adenoma detection rates
  - With low caecal intubation rates
  - Who are non-gastroenterologists

Kaminski et al N Engl J Med 2010
Interval cancer
Colonoscopy is highly operator-dependent

- **Variation in adenoma detection**
  - 2.5 fold difference in adenoma detection between highest/lowest detectors in same practice.
  - Can exceed x10 fold if expressed as adenomas per colonoscopy.

- **Who would do your colonoscopy?**

Kaminski et al NEJM 2010
Questions for referring clinicians

• Your 65 year old father/brother/uncle
  □ Positive FIT in national screening program
  □ No previous colonoscopy

• Colonoscopy – by whom? And where?
  □ How would you determine where he would get the best quality colonoscopy?
  □ What factors would you consider?
## Factors influencing colonoscopy quality

<table>
<thead>
<tr>
<th>• Patient</th>
<th>• Colonoscopist</th>
<th>• System</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Bowel preparation</td>
<td>□ Procedural/motor skills</td>
<td>□ Financial</td>
</tr>
<tr>
<td>□ Tumor biology</td>
<td>□ Visuoperceptual capacity</td>
<td>□ Organisational</td>
</tr>
<tr>
<td>□ Equipment</td>
<td>□ Personality characteristics</td>
<td></td>
</tr>
<tr>
<td>□ Technical limitations</td>
<td>□ Knowledge/attitude deficits</td>
<td></td>
</tr>
</tbody>
</table>
Quality indicators for colonoscopy

Douglas K. Rex, MD, John L. Petrini, MD, Todd H. Baron, MD, Amitabh Chak, MD, Jonathan Cohen, MD, Stephen E. Deal, MD, Brenda Hoffman, MD, Brian C. Jacobson, MD, MPH, Klaus Mergener, MD, PhD, Bret T. Petersen, MD, Michael A. Safdi, MD, Douglas O. Faigel, MD, ASGE Co-Chair, Irving M. Pike, MD, ACG Co-Chair

ASGE/ACG Taskforce on Quality in Endoscopy

Communication from the ASGE
Quality Assurance in Endoscopy Committee

QUALITY INDICATORS FOR
GI ENDOSCOPIC PROCEDURES

American Society for Gastrointestinal Endoscopy
American College of Gastroenterology

Quality indicators for colonoscopy

Rex et al Gastrointest Endosc 2006;63:S16-28
Rex et al ASGE Technology Committee 2015
Provider-level vs unit-level quality metrics

• Provider level
  - Caecal intubation rate
  - Adenoma detection rate
  - Recommended surveillance

• Unit-level
  - Bowel preparation
  - Patient experience

Hewett & Rex Am J Gastro 2010
Five tips for improving colonoscopy quality
Tips for high quality colonoscopy

1. Measure your performance
2. Pay attention to bowel preparation
3. Search for polyps (LOOK)
4. Recognise polyps (SEE)
5. Responsible surveillance practice
TIP 1: Measure and report your performance
Measure your own performance

• What is your adenoma detection rate?

• What is your withdrawal time?

• How long do your procedures take?
Measuring quality

• Quality measurement improves performance
  □ Motivational (Hawthorne effect): observation changes behavior

  □ Impact of quarterly report card
    ▪ 6 endoscopists, 928 patients
    ▪ Pre/post study design of quality assurance program over 3 years
    ▪ Significant improvements in adjusted adenoma detection (44.7% vs 53.9%) and caecal intubation rates (95.6% vs 98.1%)

Kahi et al GIE 2013
Provider-level quality metrics

- **Interval cancer rates**
  - The definitive outcome measure
  - True indicator of quality
  - Not feasible at individual level for regular monitoring
Adenoma detection rate

• **Intermediate outcome indicator**
  - Matches measure to purpose

• **Derived from screening colonoscopy studies**
  - Proportion of patients with one or more adenomas
  - Historical data: mean adenoma prevalence (25-37%)
  - True prevalence much higher (50%)
  - Did not include sessile serrated polyps
History of the ADR

2002  First proposed by the US MSTF
2006  Threshold of 20% recommended
2006  Association between ADR and withdrawal time
2010  Validation of ADR against interval cancer risk
      □ Poland 2010
      □ California 2014
2015  Thresholds increased to 25% (men 30%, women 20%)
2017  Validation of ADR against interval cancer risk
      □ 2017: ADR improvements lowers interval cancers

1 Barclay et al NEJM 2006
2 Kaminski et al NEJM 2010
3 Corley et al NEJM 2014
4 Rex et al GIE 2015;81:31-53
Key points about the ADR

• Validation was performed in **first time screening colonoscopy**.

  □ Second screening colonoscopy: 3% lower
  □ Surveillance: 7-12% higher
  □ Diagnostic: 5-10% lower
  □ FIT+: 15-16% higher

Rex et al GIE 2018;87:254-9
Anderson et al CGH 2013;11:1308-12
Rex et al Endoscopy 2017;49:1069-74
Robertson et al GIE 2017;85:2-21
Wong et al Gastrointest Endosc 2019;89:607-13
Key points about the ADR

- Detection targets were validated for **conventional adenomas** only
  - ADR should not include patients with only serrated lesions.

- **Serrated lesion** detection rate not feasible or necessary
  - Interobserver variation in pathology: SSP vs HP
  - Tight correlation between ADR and SSPDR

References:

- Rex et al GIE 2018;87:254-9
- Anderson et al CGH 2013;11:1308-12
- Rex et al Endoscopy 2017;49:1069-74
- Robertson et al GIE 2017;85:2-21
- Wong et al Gastrointest Endosc 2019;89:607-13
Limitations of the adenoma detection rate

• ADR is only a surrogate (intermediate outcome)
• ADR can be distorted/gaming
  - “One and done”
  - Indication gaming

• **ADR** is more difficult to measure than **PDR** (polyp detection rate)
  - Linkage with pathology
  - Need sufficient numbers for precision
The challenges of measurement

- **Need sufficient numbers**
  - At least 500 for sufficient precision (95% CI)

### Table 2
ADR and confidence intervals

<table>
<thead>
<tr>
<th># of Colonoscopies</th>
<th>15%</th>
<th>20%</th>
<th>25%</th>
<th>30%</th>
<th>35%</th>
<th>40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>8–22</td>
<td>12–28</td>
<td>17–33</td>
<td>21–39</td>
<td>26–44</td>
<td>30–50</td>
</tr>
</tbody>
</table>

Calderwood & Jacobsen GE Clin N Am 2013
What should the ADR target be?

![Graph showing the relationship between interval colorectal cancers per 1000 person-years and physician's annual adenoma detection rate (percentage). The Pearson correlation coefficient (r) is 0.294, and the P-value is 0.41. The graph suggests that as the physician's annual adenoma detection rate increases, the interval colorectal cancers per 1000 person-years decrease.]

Shaukat et al Gastroenterology 2015;149:952-7
ADR thresholds

• Minimum acceptable threshold 25%

• Aspirational threshold 50% (70% in FIT+)
Better than ADR?

- Adenomas per colonoscopy
  - Better separation between endoscopists than ADR
  - Better reflection of inspection quality over entire colon/rectum
  - Requires separate specimen containers
A focus on quality in Australia
Have you recertified yet?

What is your adenoma detection?
Have you recertified yet?

What is your adenoma detection?

Publically available: recert.gesa.org.au
Have you recertified yet?

- Improvements in data entry
- Integration with ProVation etc.
Future developments

• Publication of personal ADRs?
• Systematic video-recording
• AI assisted detection and diagnosis
In your own unit or practice...
Unit or practice-level reporting
Unit or practice-level reporting

Adenoma detection rates
Unit or practice-level reporting
Start/finish times
Unit or practice-level reporting

Turnover times (by day)
TIP 2: Pay attention to bowel preparation
Do your bowel preps look like this?
What do your bowel preps look like?
Do your bowel preps look like this?
Would you see this lesion?
Do your bowel preps look like this?
Do your bowel preps look like this?
What about your bowel preparation regimens?

- **Type of bowel preparation**
  - PEG-ELS vs other?
  - Standard or low volume?

- **Timing**
  - Split dose? Same day dosing?

- **Adjuncts**
  - Dietary modification?
Know your products
TIP #2: Wash and clean-up!

- Rate and report the preparation **AFTER** washing.

- Rating reflects the quality of exam (ability to inspect)

- Expect to spend time washing the colon (3-4 mins)
  - Wash debris  (with simethicone!)
  - Suction pools

ASGE quality indicators - Rex et al GIE 2015;81:31-53
TIPS 3-4: Review your detection technique
What about withdrawal time?

• Time is a key factor that correlates with high level detection?
But it is more than just time...

- But spending time is not the actual behaviour that detects polyps.
  - Withdrawal time interventions are general ineffective.

- Searching for polyps takes time...

- How long should this take?
  - On average, 6 minutes in normal screening colonoscopy (with excellent preparation).
  - You should report times (withdrawal + total procedure).
Improving mucosal inspection

• The problem with withdrawal time
  □ Surrogate measure of quality inspection
  □ Does not measure the key behaviours required for detection
  □ Use as quality measure problematic
  □ Does not motivate the actual behaviours required

• But how do you search for polyps?
• What are the behaviours required?
TIP 3: Review your detection techniques

- How do I inspect the colon for neoplasia?
- What is my mucosal inspection technique?
Improving adenoma detection

1. Exposing mucosa (LOOKING)

2. Recognising lesions (SEEING)
How can I detect more adenomas?

1. Mucosal inspection technique (LOOKING)

2. Lesion recognition skills (SEEING)
Not all colonoscopists are created equal

• The best colonoscopist is sufficiently slow, careful, and compulsive during withdrawal to expose and scrutinise the maximum amount of colonic mucosa possible.

• Must avoid the “straight pull-back” technique.
Tip #3: LOOKING

- **Proximal fold examination**
  - Pronounced, deliberate, systematic/repeated colonoscope tip deflection to expose hidden mucosa on the proximal sides of folds/flexures/valve
  - “Straight-pullback technique,” comprising no evidence of tip deflection to examine mucosa hidden by folds

- **Luminal distension**
  - Full colonic insufflation
  - Complete luminal collapse with sustained apposition of colonic walls

- **Clean-up**
  - Deliberate, meticulous washing of surface debris/mucus, dispersion of bubbles, and suctioning of fluid pools
  - Clean-up mucosal surfaces

Rex GIE 2000
Rex & Hewett Am J Gastro 2010
More about technique than time

• Inspection technique differentiates between endoscopists with varying ADRs

![Box plot showing withdrawal technique score with different ADR groups.](image)

Lee et al. GIE 2011;74:128-34
More about technique than time

- Inspection technique differentiates between endoscopists with varying ADRs

![Graph showing the relationship between withdrawal time and technique score with p-values](image)

Lee et al GIE 2011;74:128-34
Improving mucosal inspection: LOOKING

- Mucosal exposure
  - Systematic, deliberate inspection of the whole colon
  - Proximal surfaces of folds, flexures
Improving mucosal inspection

• Searching strategies
  □ Instrument/tip control
  □ Systematic, methodical approach to inspection

• Techniques
  □ Compulsive searching behind folds
  □ Examine the right colon twice
LOOKING: Mucosal exposure
Examine the right colon twice

- Consider doing the second exam in retroflexion
Tip #4: SEEING more at colonoscopy

- Requires lesion **recognition**
- Is an *active* behavior; recognition of:
  - **Disturbances in mucosal patterns**
    - Vascular
    - Fold contours
    - Pit pattern
    - Innominate grooves
- Requires
  - Calibration of what is normal
  - Skills in pattern recognition
How well do we train detection skills?

• We need know the component skills of detection...
SEEING: normal mucosal patterns

“Innominate grooves”
SEEING: Disruption to innominate grooves
SEEING: Disruption to innominate grooves
SEEING: normal mucosal patterns

Mucosal crypts/pits
SEEING: normal mucosal patterns

Mucosal crypts/pits
SEEING: Disrupted background pit pattern
SEEING: Disrupted background pit pattern
SEEING: Disrupted background pit pattern
SEEING: Normal mucosal patterns

Vascular patterns
SEEING: Disrupted vascular pattern
SEEING: Disrupted vascular pattern
SEEING: Disrupted vascular pattern
SEEING: Disruption to contour of folds
Can technologies help?

• Adjuvant technologies will improve low level detectors.

• Can address operator-dependence in detection.
TECHNOLOGIES: improving detection

- **Mucosal exposure (looking)**
  - Cap
  - Endocuff
  - Endorings
  - Wide angle

- **Recognition/highlighting (seeing)**
  - Electronic image enhancement
  - Chromocolonoscopy
TECHNOLOGIES: improving detection

- **Mucosal exposure**
  - **Cap**: multiple RCTs; incremental benefit
  - **EndoCuff**: average 7% gain in ADR
  - **Endorings**: single RCT - reduces adenoma miss rate
  - **Wide angle**: higher ADR compared with SD
TECHNOLOGIES: improving detection

- Mucosal exposure
  - Recent RCT:
    - EndoCuff: increased APC of 17-40% higher ADR than other 3 arms
    - However, the benefits were operator-dependent

Rex et al GIE 2018
TECHNOLOGIES: improving detection

- Highlighting
  - Early studies **generally ineffective** for improving adenoma detection (multiple studies)

Adler et al Gut 2008
TECHNOLOGIES: improving detection

• Highlighting

  □ More recent technologies promising
    ▪ Recent meta-analysis

  □ Methylene blue MMX capsule

Atkinson et al Gastroenterology 2019;157:462–471
Repici et al Gastroenterology 2019;156:2198–2207
TECHNOLOGIES: Artificial intelligence
TECHNOLOGIES:

• Computer-aided detection is here...
TIP 5: Responsible surveillance practice
Surveillance

• Detection must be matched with good surveillance practice.

• Implementation of surveillance guidelines.
What is the impact on surveillance?

- Impact of variable detection is magnified when the results of individual colonoscopies are subjected to postpolypectomy surveillance follow-up recommendations...

- Recommended surveillance intervals do not consider endoscopist factors...
  - Assume uniform performance of colonoscopy
  - Assume fixed performance characteristics
The surveillance paradox

• High ADR  DOUBLY PROTECTED
  □ Colons are better cleared
  □ Patients come back at earlier intervals

• Low ADR  DOUBLY UNPROTECTED
  □ Colons are poorly cleared
  □ Patients are reassured and return at longer and longer intervals (if at all)
Managing the surveillance paradox

- What do we do about surveillance done by somebody else?
- Surveillance intervals do NOT allow adjustment for ADR.
- Patients of low ADR doctors are doubly unprotected.
PROCEDURE: Colonoscopy with polypectomy

INDICATION: Surveillance – previous colorectal cancer (DH colonoscopy #1):

- Cumulative adenoma burden = 0 (post-carcinoma).
- Right hemicolectomy, July 2003 (Dr Stitz, laparotomy); Dukes B.
- Primary peritoneal serous carcinoma (Stage IIIC), March 2007: surgery, chemotherapy.
- Previous colonoscopies (Dr):
  - April 2016: right hemicolectomy, no polyps.
  - February 2014: right hemicolectomy, no polyps.
  - February 2012: right hemicolectomy, 5mm splenic flexure hyperplastic polyp.
  - September 2009: right hemicolectomy, no polyps.
  - March 2007: right hemicolectomy, no polyps.
  - October 2006: right hemicolectomy, no polyps.
  - June 2004: right hemicolectomy, no polyps.

- Asymptomatic.
- Family history of colorectal cancer: brother, aged 63.
**FINDINGS:**

*Colonoscopy* The Olympus CF-HQ190L cap-fitted colonoscope was inserted without difficulty to the ileo-colic anastomosis and into the neo-terminal ileum. The mucosa of the visualised terminal ileum and colon was carefully inspected after mucosal washing. Narrow band imaging was used for mucosal interrogation. Bowel preparation, after washing, was good.

There were several polyps removed throughout the colon using a cold snare:

- Proximal transverse 2mm, Paris II\(\text{a}\), NICE2
- Distal transverse 2mm, Paris II\(\text{a}\), NICE1
- Distal transverse 8mm, Paris II\(\text{a}\), NICE1
- Distal sigmoid 5mm, Paris II\(\text{a}\), NICE1

Otherwise, the mucosa of the visualised terminal ileum, proximal and distal colon was normal throughout, with no evidence of mucosal inflammation, ulceration or further neoplasia. Retroflexion in the proximal colon did not reveal any additional findings. Retroflexion in the rectum was normal.

**HISTOLOGY:**

*Biopsies:* nil.

*Envol Pathology* Polyp/s:

- Proximal transverse colon: Sessile serrated adenoma
- Distal transverse colon: Inflammatory pseudopolyp
- Distal transverse colon 8mm: Sessile serrated adenoma with cytological dysplasia
- Distal sigmoid colon 5mm: Hyperplastic polyp

**SUMMARY:**

1. Colonic polyps
   - x2 sessile serrated lesions.
   - Including advanced serrated lesion (small lesion with cytological dysplasia).
2. Previous right hemicolecction.
PROCEDURE: Colonoscopy with polypectomy

INDICATION: Surveillance – previous colorectal cancer (DH colonoscopy #1):
- Right hemicolectomy 1990 for cancer (Dr Barry Fryar, Holy Spirit).
- Recent dysplastic sessile serrated polyp with invasive adenocarcinoma (MLH1 deficient).
- Known pancolonic diverticulosis.
- Previous colonoscopies (Dr ):
  - August 2018: residual SSP at resection site (just distal to anastomosis).
  - July 2018: dysplastic SSP with focus of invasive cancer (1x1mm) + x2 tubular adenomas.
  - June 2015: sigmoid diverticulosis.
  - March 2012: sigmoid diverticulosis.
  - January 2009: sigmoid diverticulosis, diminutive transverse adenoma
  - November 2003: sigmoid diverticulosis, diminutive sigmoid polyp.

- Asymptomatic.
- Family history of colorectal cancer: brother, paternal aunt.
**FINDINGS:**

The Olympus CF-HQ190L cap-fitted colonoscope was inserted without difficulty to the ileocolic anastomosis; identified by visual landmarks. The mucosa of the neo-terminal ileum and colon was carefully inspected after mucosal washing. Narrow band imaging was used for mucosal interrogation. Bowel preparation, after washing, was excellent.

The scar from resection of the malignant SSP was identified; no evidence of residual neoplasia. There were many other, predominantly adenomas, removed from the remnant colon, using a cold snare:

- Scar (beyond anastomosis) 2mm, Paris IIa, NICE2
- Anastomosis (near scar) 15mm, Paris IIa, NICE1 (large, sessile serrated polyp – wide margin)
- Proximal transverse 2mm, Paris IIa, NICE2
- Mid transverse 4mm, Paris IIa, NICE2
- Mid transverse 3mm, Paris IIa, NICE2
- Mid transverse 6mm, Paris IIa, NICE2
- Mid transverse 2mm, Paris IIa, NICE2
- Distal transverse 2mm, Paris IIa, NICE2
- Splenic flexure 5mm, Paris IIa, NICE2
- Proximal descending 6mm, Paris IIa, NICE2
- Proximal descending 3mm, Paris IIa, NICE2

Throughout the colon, there were multiple small and large diverticulae; there was dense diverticulosis in the sigmoid with some angulation/fixation. Otherwise, the mucosa of the visualised terminal ileum, proximal and distal colon was normal throughout, with no evidence of mucosal inflammation, ulceration or further neoplasia. Retroflexion in the proximal colon did not reveal any additional findings. Retroflexion in the rectum was normal.

**HISTOLOGY:**

**Biopsies:**
- Polypectomy scar anastomosis: Scar; no residual polypl.
- Anastomosis polyp: Tubular adenoma
- Proximal transverse polyp: Sessile serrated adenoma
- Proximal transverse polyp: Prominent mucosal fold
- Mid transverse polyp: Tubular adenoma
- Mid transverse polyp: Tubular adenoma
- Mid transverse polyp: Tubular adenoma
- Mid transverse polyp: Tubular adenoma
- Distal transverse polyp: Tubular adenoma
- Splenic flexure polyp: Tubular adenoma
- Proximal descending polyp: Tubular adenoma
- Proximal descending polyp: Tubular adenoma

**Polyps:**

**SUMMARY:**

1. **Multiple colonic polyps:**
   - x9 small/diminutive adenomas.
   - Large sessile serrated lesion.
2. **Pancolonic diverticular disease.**
3. **Haemorrhoids.**
Tips for high quality colonoscopy

1. Measure your performance
2. Pay attention to bowel preparation
3. Search for polyps (LOOK)
4. Recognise polyps (SEE)
5. Responsible surveillance practice
What is a quality colonoscopy?

Gastro2019
Wellington, NZ

David G. Hewett
MBBS MSc PhD FRACP
The University of Queensland
Brisbane AUSTRALIA
Implications for quality colonoscopy practice

• Detection techniques

• Counting numbers of adenomas
  □ Retrieving polyps
  □ The mucosal prolapse polyp

• Polyp size measurement

• The problem of the surveillance paradox
Adenoma count

• The new guidelines and MBS item numbers require:
  □ Documentation of previous adenomas
  □ Specific numbers of adenomas
  □ Awareness of the cumulative adenoma burden
Polyp retrieval ...

- Will become even more important.
- High retrieval rates with cold snare resection are possible (100%)
- Failure to retrieve polyp post-resection is surprisingly common
  - Retrieval failure rates range between 2.5 - 16.2%
- ESGE recommends >90% retrieval rate

Rembacken et al Endoscopy 2012;44(10):957-68
Deenadayalu & Rex GIE 2005;62(2):253-6
Polyp retrieval ...

• TIPS
  □ Do not tent (lift up) the snare catheter during resection
  □ Suction specimen around the catheter (do not remove catheter)
  □ Guide the specimen into the channel using the snare catheter
  □ Use a high quality polyp trap
Adenoma counting

• How to accurately count individual adenomas?
  □ Requires separate specimen pots for each resected polyp.
  □ $$$Costs

• Alternative strategy is optical diagnosis for real-time histology prediction.
Documentation of previous adenoma

• It is not clear what evidence will be required to justify use of MBS item numbers.
  □ For documentation of a past history of adenomas.
  □ For documentation of multiple adenomas.
Pathology is not perfect.

• The prominent mucosal fold...
Pathologist vs endoscopist

• Ponugoti et al Endoscopy 2019;51:221–226
  □ Single endoscopist, 900 consecutive high confidence adenomas ≤3mm
  □ 644 high quality endoscopy images, histology predicted by 2 external experts
  □ 15.4 % were reported as normal mucosa by pathology

  □ “These findings suggest that pathology interpretation is not a gold standard for lesion management when this phenomenon is observed.”
Lesion diagnosis

• Can we use the endoscopic optical diagnosis for determining surveillance intervals and MBS item numbers?

• We could...
Accuracy of optical diagnosis for polyp histology

- ASGE Technology Review 2015
  - ASGE PIVI thresholds... with endoscopists who are expert in using this advanced imaging technology and when assessments are made with high confidence.

<table>
<thead>
<tr>
<th></th>
<th>Pooled NPV 91%</th>
<th>Abu Dayyeh et al Gastrointest Endosc 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic</strong></td>
<td>92% (95%CI 89-94)</td>
<td>88% (95%CI 82-94)</td>
</tr>
<tr>
<td><strong>Experienced</strong></td>
<td>93% (95%CI 91-96)</td>
<td>87% (95%CI 83-91)</td>
</tr>
<tr>
<td><strong>High confidence</strong></td>
<td>93% (95%CI 90-96)</td>
<td>88% (95%CI 84-92)</td>
</tr>
<tr>
<td><strong>Experienced + high confidence</strong></td>
<td>95% (95%CI 92-98)</td>
<td>90% (95%CI 86-94)</td>
</tr>
</tbody>
</table>
Accuracy of optical diagnosis for polyp histology

UK NICE guidelines

1 Recommendation

1.1 Virtual chromoendoscopy using NBI, FICE or i-scan is recommended to assess polyps of 5 mm or less during colonoscopy, instead of histopathology, to determine whether they are adenomatous or hyperplastic, only if:

- high-definition enabled virtual chromoendoscopy equipment is used
- the endoscopist has been trained to use virtual chromoendoscopy, and accredited to use the technique under a national accreditation scheme
- the endoscopy service includes systems to audit endoscopists and provide ongoing feedback on their performance (see section 6.1) and
- the assessment is made with high confidence.
Potential benefits of real-time diagnosis

• Cost savings
  □ Pathologic assessment
  □ Efficiency (time for retrieval/managing specimens)
  □ Avoid clinic follow-up

• Improved quality
  □ Improved guideline adherence
    (immediate specification of surveillance interval)
  □ More reliable (avoid retrieval, pathology interpretation)
  □ Quality indicators (adenomas per colonoscopy)

Requires high quality photo documentation.

Kessler et al Endoscopy 2011;43:683-91
Hassan et al CGH 2010;8:865-9
Lesion size measurement at colonoscopy

• The guidelines and item numbers also require accurate lesion size assessment.
Size

• Real-time size estimates are highly inaccurate
  - Tendency to overestimate and underestimate
  - “Terminal digit preference”
Lesion size: technology bias

Sakata et al Gut 2018
Lesion size: technology bias
Improving size measurement

• Be aware of **technology bias**
  - Use an accessory (snare catheter)
  - Standardise viewing distance important (touch the lesion)

• Endoscopic size not pathologist size.

6. Mid transverse polyp 6mm: Fragments 15mm diam, the largest 5mm. (6A)
7. Mid transverse polyp 3mm: Two fragments 5mm and 8mm diam. (7A)
8. Mid transverse polyp 2mm: Fragments 20mm diam, the largest 10mm. (8A)
9. Distal transverse polyp 2mm: One fragment 5mm diameter. (9A)
10. Splenic flexure polyp 5mm: Two fragments 5mm and 12mm diam. (10A)
Improving size measurement

• Be aware of **technology bias**
  - Use an accessory (snare catheter)
  - Standardise viewing distance important (touch the lesion)

• Endoscopic size not pathologist size.