Guidelines for the Implementation of the National GI Endoscopy Quality Improvement Programme

Version 6.0

Developed by

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Building a Better Health Service | Seirbhís Sláinte Níos Fearr á Forbairt
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RCSI

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GLOSSARY OF TERMS

QI Data	Refers to the data that is recorded in the Endoscopy Recording System and uploaded to NQAIS.
NQAIS	The National Quality Assurance and Improvement System (NQAIS) for GI Endoscopy is the central national repository for QI data.
Quality Improvement Activity	An activity that should be performed by those participating in the Programme to create the QI data necessary to generate KQD reports.
Key Quality Indicator	Refers to a metric for which there is a sufficient evidence base to recommend a standard e.g. caecal intubation rate.
Key Quality Target	Refers to the standard to be reached associated with Key Quality Indicators.
Key Recommendation	Refers to a proposed course of action that should be implemented in each endoscopy unit to support quality improvement activities.
Endoscopist 1	The clinician who performs the majority of the procedure.
Endoscopist 2	A clinician present in the procedure room during the course of the procedure and who also provides support to the primary endoscopist (verbal or physical).
KQD Report	Key Quality Data (KQD) Reports are reports created on QI data at individual, hospital, and national level.
BSG	British Society of Gastroenterology
JAG	Joint Advisory Group on GI Endoscopy
ACPGBI	Association Of Coloproctology Of Great Britain And Ireland
EMR	Endoscopic Mucosal Resection
ESD	Endoscopic Submucosal Dissection (ESD)
PPB	Post Polypectomy Bleeding
PCCRC	Post Colonoscopy Colorectal Cancer
ADR	Adenoma Detection Rate
Colonoscopy (Col)	A procedure that allows the Endoscopist to look directly at the lining of the large bowel or colon.
Oesophagogastroduo-denoscopy (OGD)	A procedure during which a small flexible endoscope is introduced through the mouth and advanced through the pharynx, oesophagus, stomach, and duodenum.
Flexible Sigmoidoscopy (FSIG)	A procedure used to evaluate the lower part of the large intestine.
CI Rate (CIR)	Refers to Caecal Intubation Rate. This is number of colonoscopies where the terminal ileum / caecum / anastomosis has been reached, expressed as a percentage of total colonoscopies performed.

1. Introduction

The objective of the National GI Endoscopy Quality Improvement (NEQI) Programme is to provide a framework which enables those providing endoscopic services in Ireland to drive continuous quality improvement and enhance patient care.

This document provides guidance on the implementation of the National GI Endoscopy Quality Improvement Progamme.

1.1 PROGRAMME BACKGROUND

The Conjoint Board of the Royal College of Physicians of Ireland (RCPI) and the Royal College of Surgeons in Ireland (RCSI) launched the National GI Endoscopy Quality Improvement (NEQI) Programme in October 2011 in collaboration with the National Cancer Control Programme and the National Cancer Screening Service. As of 2014, this programme has been funded by the HSE National Quality Improvement Team. The Programme enables endoscopy departments to compare their data against national aggregate QI data and targets set in the programme guidelines. They can use this information to identify areas for quality improvement, enhancing patient safety and minimising the potential for error.

The development of a National Quality Assurance Intelligence System (NQAIS) in collaboration with the HSE's Health Intelligence Unit allows users to store, analyse, report, and review QI data and results. NQAIS has greatly benefited hospitals participating in the National QI Programmes in Histopathology, Radiology and GI Endoscopy. By comparing the QI data and statistics available locally on the NQAIS-Endoscopy against the Key Quality Indicators (KQI) and associated guidelines developed by the programme's Working Group, participating endoscopy departments can drive quality improvement activities locally.

The fundamental aim of the NEQI Programme is to establish a quality improvement framework in each participating endoscopy department unit that ensures the provision of a high quality, consistent and accurate service with an associated quality patient experience.

1.2 PURPOSE OF THE QI GUIDELINES

This document will define key areas of quality improvement (QI) in the delivery of endoscopic procedures. QI data is collected and analysed locally and relates to predefined Key Quality Indicators (KQI's) collected in each endoscopy unit. This QI data is presented annually in a National Data Report (NDR), which is published and disseminated to participating sites and other key stakeholders and is also available to download on the RCPI website.

The QI Guidelines enable each Endoscopist and endoscopy unit to use these indicators to monitor the achievement of the key quality targets in their own hospitals when compared to the national aggregate, and where possible, to facilitate quality improvement in line with local hospital policy.

1.3 WHAT THE QI GUIDELINES ARE NOT

The QI Guidelines are not intended to be a replacement for clinical guidelines. They refer exclusively to quality improvement activities.

1.4 TIME AND RESOURCES

The NEQI Programme strongly recommends that adequate resourcing be made available by hospital management to ensure successful implementation of this QI programme at the local level. Each endoscopy unit should have an established Endoscopy User Group as per JAG recommendations, a designated Endoscopy QI Clinical Lead consultant, a Local Operating Manager and an Endoscopy Reporting System (ERS). The Endoscopy User Group should be multidisciplinary and meet regularly.

2. Guidelines on Using NQAIS-Endoscopy

2.1 REVIEW OF SIGNED-OFF QI DATA

Any clinical quality issues relating to the QI data noted during the review and sign-off by the Clinical Lead should be dealt with locally, in line with appropriate HSE policies. Statistics in NQAIS-Endoscopy can be affected by factors such as case mix, demographics, clinical specialisation, and data entry errors. As such, where issues are identified in NQAIS-Endoscopy, they should be confirmed against information collected in Endoscopy Reporting Systems and other appropriate hospital data sources. Data collection methods should always be considered when evaluating statistics in NQAIS-Endoscopy

2.2 REVIEW OF REPORTS FROM NQAIS-ENDOSCOPY

The reports run in NQAIS-Endoscopy are called Key Quality Data (KQD) reports, and should be reviewed by the QI Clinical Lead quarterly, at a minimum, to ensure areas of concern and/or best practice are identified and acted on. To facilitate communication and highlight learning opportunities, KQD reports should be discussed with Quality and Patient Safety (QPS) Committee (or equivalent) and senior management in each hospital. The quarterly KQD reports may provide a streamlined method of delivering this information to senior management and the QPS Committee. (See Memorandum of Understanding)

3. Maintaining Competencies

3.1 NUMBERS OF PROCEDURES

There is some historic evidence that suggests that endoscopic proficiency (with respect to occurrence of complications) increases with the number of procedures performed [1]. In a population-based study of outpatient colonoscopy carried out in Canada the lowest complication rate, was associated with the highest number of procedures, i.e. >200 per Endoscopist per year [2] [3]. Notably, however, completion rates in these cohorts were at 72%. Experience but not volume appears to show some correlation with caecal intubation rates [4]. Similarly, Adenoma Detection Rate (ADR) does not appear to correlate with overall endoscopy numbers [5]. It is important to note that:

1) Low numbers of procedures *may* be associated with poor performance.

2) Low numbers may mean the sample size for key quality indicators (KQIs) is low and the confidence intervals around the observed performance will be wide.

Adequate numbers of procedures are required to provide accurate estimates of performance, particularly if procedures are performed infrequently e.g. when the 95% confidence interval for a completion rate of 90% for 150 colonoscopy procedures per year is 85%-95% [6].

Endoscopists who are technically proficient will likely find it easier to maintain competency with lower numbers. It may not be possible to maintain adequate performance with low numbers, although there may be exceptions to this whereby lifelong experience may obviate the requirement for high numbers. Similarly, Endoscopists who routinely receive referrals for difficult procedures may have lower numbers.

Endoscopy numbers in isolation may not be indicative of poor performance but should be interpreted in conjunction with other KQIs.

Key Quality Data:

- Number of Oesophago-Gastroduodenoscopy (OGD) procedures performed by each Endoscopist
- Number of Flexible Sigmoidoscopy (FSIG) procedures performed by each Endoscopist
- Number of Colonoscopy procedures performed by each Endoscopist

Key Recommendations:

1 Endoscopists should endeavour to keep their number of procedures high in order to maintain proficiency at adequate levels

- Colonoscopies: A minimum of 100 per year should be encouraged but must be interpreted in conjunction with other KQIs
- OGDs: A minimum of 100 per year should be encouraged but must be interpreted in conjunction with other KQIs

2 The annual number of procedures performed by each Endoscopist should be reviewed collectively in the endoscopy unit with the designated clinical lead for the service

4. Upper GI Endoscopy

4.1 SUCCESS OF INTUBATION

An Oesophago-Gastroduodenoscopy (OGD) requires successful intubation of the oesophagus.

Key Quality Data:

- Number of successful intubations

Key Quality Indicator:

- Number of successful intubations expressed as a % of all 'intend to' OGD cases per Endoscopist

Key Quality Target:

- Successful Intubation in greater than or equal to 95% in all OGD cases

4.2 RETROFLEXION (J MANOEUVRE)

Retroflexion, also known as the J manoeuvre, allows for a full view and inspection of the cardia and fundus of the stomach. It is an important quality measure of the completeness of the procedure.

Key Quality Data:

- Number of cases in which retroflexion was performed

Key Quality Indicator:

- Number of cases in which retroflexion was performed expressed as a % of all OGD cases per Endoscopist

Key Quality Target:

- Retroflexion (J manoeuvre) in stomach should visualise fundus in greater than or equal to 95% of cases

4.3 DUODENAL SECOND PART INTUBATION

The endoscope should be passed through the pylorus to examine the first and second parts of the duodenum. It is an important quality measure of the completeness of the procedure.

Key Quality Data:

- Number of cases in which Duodenal second part intubation was achieved

Key Quality Indicator:

- Number of cases in which Duodenal second part intubation was achieved expressed as a % of total OGD cases per endoscopist

Key Quality Target:

- Intubation of Duodenum Second Part in greater than or equal to 95% of cases

5. Colonoscopy

5.1 COMFORT LEVELS

While the principle indicator for assessing competence in colonoscopy is caecal intubation rate, patient comfort during endoscopy is also considered to be another measure of the quality of the endoscopic procedure. It is therefore proposed to measure a comfort score for each procedure using the modified Gloucester Scale below.

Gloucester Scale

1 - No discomfort - resting comfortably throughout.
2 - Minimal - One or two episodes of mild discomfort, well tolerated.
3 - Mild - More than two episodes of discomfort, adequately tolerated.
4 - Moderate - Significant discomfort, experienced several times during the procedure.
5 - Severe - Extreme discomfort, experience frequently during the procedure.

Key Quality Data:

- Comfort score per colonoscopy per Endoscopist

Key Quality Indicator:

- Number of colonoscopies with a comfort score of 1 to 3 expressed as a % of total colonoscopies per Endoscopist

Key Quality Target:

- Greater than or equal to 90% of colonoscopy cases should have a comfort score of between 1 and 3

Key Recommendation:

- Use the modified Gloucester scale above
- Patient comfort should be assessed by the Endoscopist and the endoscopy nurses present during the procedure. The comfort score should be agreed on by those present before it is recorded in the ERS

5.2 CAECAL INTUBATION

Caecal Intubation Rate (CIR) is one of the key quality indicators of colonoscopy. Caecal intubation rates are affected by a number of factors including age, sex, low BMI, bowel cleansing, sedation, diverticular disease and general health status [7] [8] [9].

Adjusted completion rates (for factors such as bowel prep or obstruction) are open to diverse interpretation and it is recommended to use unadjusted rates for this standard.

Key Quality Data:

- Number of colonoscopies where the terminal ileum / caecum / anastomosis has been reached

Key Quality Indicator:

- Number of colonoscopies where the terminal ileum / caecum / [10] anastomosis have been reached expressed as a % of total colonoscopies per endoscopist

Key Quality Target:

- **Minimum Target:** Greater than or equal to 90% of colonoscopy cases should reach the terminal ileum/caecum or anastomosis
- **Achievable Target:** Greater than or equal to 95% of colonoscopy cases should reach the terminal ileum/caecum or anastomosis

Recommendations:

- The CIR standard should be an unadjusted (intention to scope) figure of 90%
- Clear photographic evidence of the terminal ileum / caecum / anastomosis should be recorded for all patients

5.3 CAECAL INTUBATION PHOTOGRAPHIC EVIDENCE

Photographic evidence of the appendiceal orifice, ileocaecal valve, terminal ileum or anastomosis (if applicable) should be recorded for all patients. At present this cannot be audited via NQAIS-Endoscopy and so it is expected that every service has a policy of everyone in the room (Endoscopists and Endoscopy Nurses) agreeing that one of these landmarks has been reached to record a complete procedure, in addition to the photo-documentation of these 'landmarks'. If there are any concerns raised by KQI data, then a separate audit can be carried out to ensure these are being recorded correctly for specific operators.

5.4 POLYP DETECTION RATES

Polyp detection rate is calculated as the number of colonoscopies with polyps detected as a % of total colonoscopies.

Due to the inability to link endoscopy and histology reporting systems at this time, the NEQI Programme measures Polyp Detection Rates rather than measuring direct adenoma detection rates.

The minimum Adenoma Detection Rate (ADR) should be 15%. The achievable detection rate should be 20% [10]. Where polyp detection rate can be shown to be accurate it may be used as a marker of ADR.

Thorough examination of the colonic mucosa (CM) is crucial to maximise the effectiveness of colonoscopy as a diagnostic test. The ADR is the marker most commonly used for this purpose. Lower ADRs are associated with higher rates of interval cancers [11] [12].

Measuring ADR currently requires interrogation of pathology databases to obtain polyp histology. The Polyp Detection Rate (PDR) is often much simpler to obtain.

Key Quality Data:

- Colonoscopies with polyps detected

Key Quality Indicator:

- Colonoscopies with at least one polyp detected expressed as a % of total colonoscopies per Endoscopist

Key Quality Target:

- Greater than or equal to 20% of all colonoscopies should have a polyp(s) detected

5.5 BOWEL PREPARATION

Effective bowel preparation is critical to ensure a detailed visual examination of the bowel. To date no single bowel preparation for colonoscopy has emerged as consistently superior over another [13]. Good bowel preparation supports improved polyp detection and caecal intubation. Poor bowel preparation is associated with failure to reach the caecum and hinders the detection of lesions [14].

Validated scoring systems exist, such as the Boston, Ottawa [15] and Aronchick [16] scales. The following scale is recommended for use:

- **Excellent**
  No or minimal solid stool and only clear fluid requiring suction
- **Adequate**
  Collections of semi-solid debris that are cleared with washing/suction
- **Poor**
  Solid or semi-solid debris that cannot be cleared

Key Quality Data:

- Bowel Preparation score per colonoscopy

Key Quality Indicator:

- Express the total number of colonoscopies with Adequate and Excellent scores (using scale above) as a % of all colonoscopies

Key Quality Target:

- **Minimum Target:** Bowel preparation described as excellent or adequate in greater than or equal to 90% of procedures
- **Achievable Target:** Bowel preparation described as excellent or adequate in greater than or equal to 95% of procedures

Key Recommendation:

- Use the above scale to record the quality of bowel preparation for each procedure
- Colonic cleansing protocols should be in place and the effectiveness of these should be monitored continuously by the Endoscopy User Group

5.6 DIAGNOSTIC COLO-RECTAL BIOPSIES FOR PERSISTENT DIARRHOEA

Mucosal biopsies should be obtained in all patients presenting with chronic diarrhoea. Samples should be obtained from healthy colon tissue. Ileal intubation and biopsy are strongly recommended for this group.

Key Quality Data:

- Number of colonoscopies with mucosal biopsies taken

Key Quality Indicator:

- Number of colonoscopies with mucosal biopsies taken expressed as a % of cases which present with persistent diarrhoea per Endoscopist

Key Quality Target:

- Diagnostic mucosal biopsies for persistent diarrhoea in greater than or equal to 95% of cases

Key Quality Recommendation:

- Ileal intubation and biopsy are strongly recommended for this group

6. Sedation

The discomfort experienced by patients during endoscopy can be reduced by careful patient preparation and sedation. Sedation improves patient tolerance of endoscopy. However, excessive sedation is considered to be a leading contributor to cardio-respiratory deaths following endoscopy in high-risk patients. This is particularly relevant for older patients (greater or equal to 70 years of age) where the median level of sedation should be approximately half that of patients under that age.

Pain control requires the administration of specific analgesic agents; most commonly fentanyl or pethidine.

A 2004 report by the National Confidential Enquiry into Patient Outcome and Death (NCEPOD), *Scoping our Practice* found that there were 1,818 deaths after therapeutic GI endoscopic procedures. NCEPOD advisors judged that the sedation given was inappropriate in 14% of cases, usually because an overdose of benzodiazepine had been administered [17]. The use of specific reversal agents - flumazenil, a benzodiazepine antagonist, or naloxone, an opiate antagonist - usually indicates that the patient has been given a relative overdose of benzodiazepine or opiate. Cardio-respiratory complications are infrequent for patients without known heart or lung disease but monitoring of oxygenation and blood pressure should be performed for all sedated patients. While hypoventilation, cardio-pulmonary events and vasovagal reactions may be related to pain and distension caused by the endoscopic procedure, in most cases they are more closely associated with the use of sedatives and opioids. Reduction in risk for these reactions has been observed when sedation is given only as required [18].

Sedative and analgesic medications should be used to achieve conscious sedation; where the patient displays purposeful response to verbal or light tactile stimulation [19].

6.1 SEDATION IN COLONOSCOPY AND UPPER GI ENDOSCOPY

In cases where a patient has multiple endoscopy procedures in one patient visit, the following recording practices should be employed:

1. Procedure A's record should have the type and quantity of sedation that was administered at the time of the Procedure A.
2. Procedure B's record should have the type of sedation administered for Procedure A **and** the type and quantity of sedation that was administered for Procedure B.

Key Quality Data:

- Sedative type and quantity used for patients under 70 years of age per procedure type
- Sedative type and quantity used for patients 70 years of age and older per procedure type
- Number of times a reversal agent is used per procedure type

Key Quality Indicator:

- Sedative and analgesia type and quantity used for patients under 70 years of age expressed as a **median** figure per Endoscopist
- Sedative and analgesia type and quantity used for patients 70 years of age and older expressed as a **median** figure per Endoscopist
- Number of times a reversal agent is used expressed as a percentage of the total of each procedure performed per Endoscopist.

Key Quality Targets:

SEDATION TYPE	COLONOSCOPY TARGET	UPPER GI ENDOSCOPY TARGET
Midazolam	**Median** quantity of Midazolam used in Colonoscopies: • Less than or equal to 5mg for patients below 70 years of age • Less than or equal to 3mg for patients 70 years of age and over	**Median** quantity of Midazolam used in OGDs: • Less than or equal to 5mg for patients below 70 years of age • Less than or equal to 3mg for patients 70 years of age and over
Fentanyl	**Median** quantity of Fentanyl used in Colonoscopies: • Less than or equal to 100mg for patients below 70 years of age • Less than or equal to 50mg for patients 70 years of age and over	**Median** quantity of Fentanyl used in OGDs: • Less than or equal to 100mg for patients below 70 years of age • Less than or equal to 50mg for patients 70 years of age and over
Pethidine	**Median** quantity of Pethidine used in Colonoscopies: • Less than or equal to 50mg for patients below 70 years of age • Less than or equal to 25mg for patients 70 years of age and over	**Median** quantity of Pethidine used in OGDs: • Less than or equal to 50mg for patients below 70 years of age • Less than or equal to 25mg for patients 70 years of age and over
Reversal Agent*	Reversal Agent Usage in colonoscopies should take place in less than or equal to 1% of all cases	Reversal Agent usage in OGDs should take place in less than or equal to 1% of all cases

* *The use of reversal agents should be recorded as a patient safety incident and should trigger review of the case locally.*

Key Recommendations:

- Sedative and analgesic medications should be used to achieve conscious sedation, where the patient displays purposeful response to verbal or light tactile stimulation [19].
- If deeper levels of sedation are required, for example with the use of propofol, an anaesthetist or relevant trained clinician should be present.
- Opioids should be given before benzodiazepines and their effect observed before proceeding.
- The use of reversal agents should be recorded as a patient safety incident and should trigger review of the case in line with local hospital escalation policy.

7. Recommendations and Best Practice

This section contains recommendations for quality improvement in GI Endoscopy in areas where accurate data collection is not currently possible. The following are recommended as good practice in endoscopy units, but the National GI Endoscopy QI Programme will not be reporting on this data until systems are in place that allow the relevant data to be collected accurately.

7.1 UPPER GI RECOMMENDATIONS

7.1.1 Repeat Endoscopy for Gastric Ulcers

Gastric ulcers (mucosal break >5mm in diameter) should be biopsied and re-evaluated, where clinically indicated, after appropriate treatment within 8-12 weeks [20] [21] .

Key Quality Data:

- Number of repeat endoscopies requested to be performed within 12 weeks

Key Quality Indicator:

- Number of repeat endoscopies requested to be performed within 12 weeks due to the presence of gastric ulcer expressed as a % of total OGD cases with gastric ulcer detected per endoscopist

Key Quality Target:

- Greater than or equal to 80% of cases in which a gastric ulcer is found should have a repeat endoscopy requested within 12 weeks.

Key Recommendations:

- If a repeat endoscopy is not indicated due to a specific reason, this should be recorded in the Endoscopy Reporting System.

7.2 COLONOSCOPY RECOMMENDATIONS

7.2.1 Endoscopic Mucosal Resection (EMR) and Endoscopic Submucosal Dissection (ESD)

EMR and ESD procedures should only be carried out by appropriately trained and experienced Endoscopists with access to appropriate surgical backup.

7.2.2 Tattooing

Tattooing is an important technique for lesion localisation at surgery, localisation of colonic lesions or identification of resection sites at future colonoscopy (repeat therapeutic colonoscopy or incomplete/suspected incomplete removal of lesions).

Tattooing of all lesions >20 mm and/or suspicious of cancer outside of the rectum and caecum, in line with local policy, is recommended. [22] [23]

Key Quality Data:

- Number of colonoscopies with tattooing of suspected malignant tumours outside the rectum or caecum

Key Quality Indicator:

- Number of colonoscopies with tattooing of suspected malignant tumours outside the rectum or caecum expressed as a % of all colonoscopies with suspected malignant tumours outside the rectum or caecum detected per Endoscopist

Key Recommendation:

- Endoscopy units should have an agreed and documented Endoscopy Users Group policy on tattooing
- The endoscopy report should clearly describe the position of tattoos and, in particular, the relationship with any previous colonic tattoo sites.
- Tattooing should be performed in 100% of colonoscopies with suspected malignant tumours outside the rectum or caecum.

7.2.3 Polyp Recovery

Polyps should be retrieved for histological assessment in 90% of cases. Following successful polyp removal, it is important to retrieve it for histological assessment. This is important to establish the histological nature of the polyp to determine surveillance intervals and to establish the presence of advanced features such as high-grade dysplasia, villous components or cancer. Polyps with a diameter that is <1cm are less likely to contain these features; however, retrieval is still important to determine whether there are adenomatous features that determine the need for surveillance.

Key Quality Data:

- Number of polyps retrieved

Key Quality Indicator:

- Number of polyps with histology requested expressed as a % of all polyps excised per Endoscopist

Key Recommendation:

- Greater than or equal to 90% of all polyps excised should have histology requested

7.2.4 Colonic Perforation

Perforation is defined as evidence of air, luminal contents or instrumentation outside the GI tract. It may result from direct mechanical trauma to the bowel wall during insertion, over-insufflation of the colon (barotrauma) or from therapeutic procedures (hot biopsy, polypectomy, dilatation). Several large series have reported overall perforation rates of 0.03% to 0.085% [24] [2] [25] [26]. A recent review of population-level studies, comprising 10 million colonoscopies, revealed a pooled rate of 5.8 perforations per 10,000 colonoscopies performed (0.58%) [27].

The risk of perforation is higher with therapeutic procedures. Perforation rates of 0.1% have been reported for therapeutic procedures, predominantly related to polypectomy [28] [29]. A meta-analysis of 29 studies, including 8,237 procedures, and reporting complications of Endoscopic Mucosal Resection of polyps >20 mm and ESD revealed pooled perforation rates of 1.1% and 7.2% respectively [27].

The BSG, JAG and ACPGBI proposed the following quality indicators for colonoscopic perforation, overall rate of <0.1%, with a rate of <0.05% for diagnostic procedures, 0.2% post polypectomy, <3% post dilation and <10% post stenting [10].

Key Quality Data:

- Number of incidents of colonic perforation
- Number of incidents of post polypectomy perforation

Key Quality Indicator:

- Number of incidents of colonic perforation expressed as a % of all colonoscopies
- Number of incidents of post polypectomy perforation expressed as a % of colonoscopies where polypectomy is performed

Key Recommendation:

- All incidence of perforation should be recorded in the adverse events log and reviewed in line with local policy and protocol
- The following outcomes are put forward as guidelines on expected incidence of colonic perforation although current hospital systems may not allow for capture of all necessary data to reflect these targets:
  - Colonoscopy perforation rates less than 1 per 1000 colonoscopies performed
  - Post polypectomy perforation rate less than 2 per 1000 colonoscopies performed

7.2.5 Post-polypectomy bleeding (PPB)

Bleeding is the most frequent adverse event following polypectomy. Post-polypectomy bleeding rates of between 0.3% and 6.1% have been reported [27] [30] [31] [2]. The risk of bleeding increases with the size of polyp and location, in particular polyps larger than 2cm and located in the right colon [32] [33] [34]. Rates of post-polypectomy bleeding are higher for ESD and EMR [27]. Other reported risk factors include cardiovascular disease, chronic kidney impairment and the use of antiplatelet and anticoagulant agents [27] [30] [33] [34]. The majority of post-polypectomy bleeding should be amenable to conservative management without the need for surgical intervention.

The BSG, JAG and ACPGBI has proposed a rate of intermediate or greater (Table 1) post-polypectomy bleeding of <1:200 [10].

Criteria	Severity
Procedure aborted	Minor
Unplanned post-procedure medical consultation	
Unplanned hospital admission, or prolongation of hospital stay, for 3 nights	
Haemoglobin drop of >2g	Intermediate
Transfusion	
Unplanned admission or prolongation for 4–10 nights	
ITU admission for 1 night	
Interventional procedure (endoscopic or radiological)	
Surgery	Severe
Unplanned admission or prolongation for >10 nights	
ITU admission >1 night	
Death	Fatal

Table 1: Post-polypectomy bleeding severity. Modified from Rees et al. Gut 2016 [10]

Key Quality Data:

- Number of incidents of intermediate or major post-polypectomy bleeding.

Key Quality Indicator:

- Number of incidents of intermediate or major post-polypectomy bleeding expressed as a % of colonoscopies where polypectomy is performed

Key Quality Target:

- Less than 0.5% of colonoscopies where polypectomy is performed per Endoscopist

Key Recommendations:

- All incidences of post polypectomy bleeding requiring transfusion should be recorded in the adverse events log and acted on in line with appropriate local hospital policy
- The following outcome is put forward as a guideline on expected incidence of post polypectomy bleeding requiring transfusion although current hospital systems may not allow for capture of all necessary data to reflect this target
  - Post polypectomy bleeding requiring transfusion <1:100 (for >1cm polyps)
- The following outcome is put forward as a guideline on expected incidence of intermediate or major severity post-polypectomy bleeding, although current hospital systems may not allow for capture of all necessary data to reflect this target:
  - Non-minor post-polypectomy bleeding - <1:200

7.2.6 Post Colonoscopy Colorectal Cancer (PCCRC)

A Post Colonoscopy Colorectal Cancer (PCCRC) is defined as a tumour diagnosed between 6 to 36 months of a negative colonoscopy.

A PCCRC may occur due to a number of contributing factors. It may be a new aggressive and rapidly growing tumour. It may result as a consequence of inadequate removal of a precancerous lesion or it may have been missed at the initial colonoscopy.

PCCRC rate is a key quality measure of colonoscopy. Within the context of the NEQI Programme and the Bowel Screen Programme, it is likely to be a number of years before the PCCRC can be calculated. Evidence from a retrospective study in the UK, involving both screening and non-screening colonoscopies, indicated PCCRC rates of 8.6% [35].

7.2.7 Withdrawal time

A median withdrawal time of > 6 minutes for negative procedures has been proposed to indicate adequate examination of the colon and to increase ADR. [22] [23]

8. Summary QI Targets and Recommendations Tables

Key Quality Indicator	QI Target	Reason/Evidence for Target
COLONOSCOPY		
Caecal Intubation Rate	**Minimum Target: ≥90%** **Achievable Target: ≥95%**	International Standards
Percentage of colonoscopies where polyp(s) are detected	**≥20%**	Working Group Opinion and National Data from NQAIS-Endoscopy
Percentage of colonoscopies where the comfort score is 1, 2, or 3 per Endoscopist	**≥90%** (of colonoscopies with a Comfort Score of 1 to 3)	Working Group Opinion, NQAIS-Endoscopy and International Standard
Percentage of colonoscopies where bowel preparation is classified as excellent or adequate	**Minimum Target: ≥90%** **Achievable Target: ≥95%** (Of colonoscopies recorded as excellent or adequate)	International Standards
UPPER GI ENDOSCOPY		
Percentage of successful intubations per Endoscopist	**≥95%**	Working Group Opinion and NQAIS-Endoscopy Data
Percentage of cases in which Duodenal second part intubation was achieved per Endoscopist	**≥95%**	International Standards
Percentage of cases in which retroflexion was performed	**≥95%**	International Standards

Key Quality Indicator	QI Target			Reason/Evidence for Target
SEDATION				
Median sedative dose, per Endoscopist, based on sedative type and patient cohort (e.g. patients under 70 years of age, and patients 70 years of age and older)	**Type**	**Colonoscopy**	**Upper GI**	International Standards and NQAIS-Endoscopy Data and Working Group Opinion
	Midazolam	Median dose of less than or equal to **5mg for patients below 70 years of age** Median dose of less than or equal to **3mg for patients 70 years of age and over**	Median dose of less than or equal to **5mg for patients below 70 years of age** Median dose of less than or equal to **3mg for patients 70 years of age and over**	
	Fentanyl	Median dose of less than or equal to **100mg for patients below 70 years of age** Median of less than or equal to **50mg for patients 70 years of age and over**	Median dose of less than or equal to **100mg for patients below 70 years of age** Median of less than or equal to **50mg for patients 70 years of age and over**	
	Pethidine	Median dose of less than or equal to **50mg for patients below 70 years of age** Median dose of less than or equal to **25mg for patients 70 years of age and over**	Median dose of less than or equal to **50mg for patients below 70 years of age** Median dose of less than or equal to **25mg for patients 70 years of age and over**	
Number of times a reversal agent* is used *The use of reversal agents should be recorded as a patient safety incident and should trigger review of the case.	**Reversal Agent**	Reversal Agent usage in colonoscopies should take place in **less than or equal to 1% of all cases**	Reversal Agent usage in OGDs should take place in **less than or equal to 1% of all cases**	

Key Quality Indicator	QI Recommendation	Reason/Evidence for Target
Volume of Oesophagogastro-duodenoscopy procedures, Flexible Sigmoidoscopy and Colonoscopy procedures performed by each Endoscopist	Performing more procedures is a possible means to increase proficiency in meeting QI targets	International Standards
COLONOSCOPY		
Withdrawal time	Median withdrawal time of ≥6min for negative screening or diagnostic procedures	International Standards
Number of polyps with histology requested expressed as a % of all polyps excised per endoscopist	≥90%	International Standards
Percentage of colonoscopies where tattooing of suspected malignant tumours took place	≥60%	Working Group Opinion
Number of incidents of colonic perforation	<1 per 1,000 colonoscopies performed	International Standards
Number of incidents of post polypectomy perforation	<2 per 1,000 colonoscopies performed	International Standards
Number of incidents of post polypectomy bleeding requiring transfusion	<0.5% colonoscopies where polypectomy is performed	Number of incidents of post polypectomy bleeding requiring transfusion
UPPER GI ENDOSCOPY		
Percentage of repeat endoscopies requested in cases where gastric ulcer(s) is present. Repeat endoscopy to be completed within 12 weeks	≥80%	International Standards and Working Group opinion

9. References

[1] Lorenzo-Zúñiga, Moreno de Vega, Doménech, Manosa, Planas and Boix, "Endoscopist Experience as a Risk Factor for Colonoscopic Complications," *Colorectal Dis 12,* vol. 12, no. 10, pp. 273-7, 2010.

[2] L. Rabeneck, L. Paszat, R. Hilsden, R. Saskin , D. Leddin , E. Grunfeld and et al, "Bleeding and perforation after outpatient colonoscopy and their risk factors in usual clinical practice," *Gastroenterology,* vol. 135, no. 6, pp. 1899-1906, 2008.

[3] Singh, Penfold, DeCoster, Kaita, Proulx, Taylor and et al, "Colonoscopy and its complications across a Canadian regional health authority," *Gastrointestinal Endosc 69,* vol. 69, no. 3, pp. 665-671, 2009.

[4] G. Harewood, "Relationship of colonoscopy completion rates and endoscopist features," *Dig Dis Sci 50,* vol. 50, no. 1, pp. 47-51, 2005.

[5] Adler, Wesgscheider, Lieberman, Aminalai, Aschenbeck, Drossel and et al, "Factors Determining the Quality of Screening Colonoscopy: A Prospective Study on Adenoma Detection Rates," *Gut ,* vol. 62, no. 2, pp. 236-41, 2013.

[6] N. Segnan, J. Patnick and L. von Karsa, "Guidelines for quality assurance of endoscopy in colorectal cancer screening and diagnosis," Publications Office of the European Union, Luxembourg, 2010.

[7] M. Eloubeidi, M. Wallace, R. Desmond and F. Farraye, "Female gender and other factors predictive of a limited screening flexible sigmoidoscopy examination for colorectal cancer," *Am J Gastroenterol,* vol. 98, no. 7, pp. 1634-1639, 2003.

[8] J. Harris , J. Vader , V. Wietlisbach, B. Burnand, J. Gonvers and F. Froehlich, "Variations in colonoscopy practice in Europe: a multicentre descriptive study (EPAGE)," *Scan J Gastroenterol,* vol. 42, no. 1, pp. 126-134, 2007.

[9] S. Rathgaber and T. Wick, "Colonoscopy completion and complication rates in a community gastroenterology practice," *Gastrointestinal Endosc,* vol. 64, no. 4, pp. 556-562, 2006.

[10] C. Rees, S. Thomas Gibson, M. Rutter, P. Baragwanath, R. Pullan, M. Feeney and et al, "UK Key performance indicators and quality assurance standards for colonoscopy," *Gut,* vol. 65, no. 12, pp. 1923-1929, 2016.

[11] M. Kaminski, J. Regula , E. Kraszewska, M. Polkowski, U. Wojciechowska, J. Didkowska and et al, "Quality indicators for colonoscopy and the risk of interval cancer," *N Eng J Med,* vol. 362, no. 19, pp. 1795-803, 2010.

[12] D. Corley, C. Jensen, A. Marks, W. K. Zhao, J. K. Lee, C. A. Doubeni and et al, "Adenoma detection rate and risk of colorectal cancer and death," *N Eng J Med,* vol. 370, no. 14, pp. 1298-306, 2014.

[13] J. Besley, O. Epstein and D. Heresnbach, "Systematic review: oral bowel preparation for colonoscopy," *Aliment Pharmacol Ther,* vol. 25, no. 4, pp. 373-384, 2007.

[14] G. Harewood, V. Sharma and P. de Garmo, "Impact of colonoscopy preparation quality on detection of suspected colonic neoplasia," *Gastrointest Endosc,* vol. 58, no. 1, pp. 76-79, 2003.

[15] A. Rostom and E. Jolicoeur, "Validation of a new scale for the assessment of bowel preparation quality," *Gastrointest Endosc,* vol. 59, no. 4, pp. 482-486, 2004.

[16] C. Aronchik, W. Lipshutz and S. Wright , "Validation of an instrument to assess colon cleansing," *Gastreoenterol,* no. 94, p. 2667, 1999.

[17] NCEPOD, "Scoping our practice. The 2004 Report of the National Confidential Enquiry into Patient Outcome and Death," https://www.ncepod.org.uk/, 2004.

[18] V. Eckardt, G. Kanzler, T. Schmitt, A. Eckhardt and G. Bernard , "Complications and adverse effects of colonoscopy with selective sedation," *Gastrointest Endosc,* vol. 49, no. 5, pp. 560-565, 1999.

[19] D. Early, J. R. Lightdale, J. J. Vargo, R. D. Acosta, V. Chandrasekhara, K. V. Chathadi and et al, "Guidelines for sedation and anesthesia in GI Endoscopy," *Gastrointest Endosc,* vol. 87, no. 2, pp. 327-37, 2018 .

[20] S. Beg, K. Ragunath, A. Wyman, M. Banks , N. Trudgill, M. D. Pritchard and et al, "Quality standards in upper gastrointestinal endoscopy: a position statement of the British Society of Gastroenterology and Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland (AUGIS)," *Gut,* vol. 66, no. 11, pp. 1886-1899, 2017.

[21] R. C. o. P. Joint Advisory Group, "JAG accreditation programme: guide to meeting quality and safety standards, For UK Services," 2016.

[22] E. S. o. G. Endoscopy, "Performance measures for lower gastrointestinal endoscopy: a European Society of Gastrointestinal Endoscopy (ESGE) Quality Improvement Initiative," 2017.

[23] Rees, Gibson, Rutter, Baragwanath, Pullan, Feeney and et al, "UK Key Performance Indicators & Quality Assurance Standards for Colonoscopy," http://dx.doi.org.ucd.idm.oclc.org/10.1136/gutjnl-2016-312044, 2019.

[24] C. Iqbal, D. Cullinane, H. Schiller , M. Sawyer , S. Zietlow and D. Farley, "Surgical management and outcomes of 165 colonoscopic perforations from a single instiution," *Arch Sura,* vol. 143, no. 7, pp. 701-6, 2008.

[25] G. Arora , A. Mannalithara , G. Singh , L. B. Gerson and G. Triadafilopoulos, "Risk of perforation from a colonoscopy in adults: a large population-based study," *Gastrointest Endosc,* vol. 69, no. 3, pp. 654-64, 2009.

[26] D. Gavin, R. Valori and J. Anderson, "The National Colonoscopy Audit: a nationwide assesment of the quality and safety of colonoscopy in the UK," *Gut,* no. 62, pp. 242-9, 2013.

[27] S. Kothari, R. Huang , A. Shaukat, D. Agrawal, S. Abbas Fehmi, L. Jamil and et al, "ASGE Standards of Practice Committee Chair. ASGE Review of adverse events in colonoscopy," *Gastrintest Endosc,* vol. 90, no. 6, pp. 863-876, 2019.

[28] M. Rutter, C. Nickerson and C. Rees , "Risk factors for adverse events related to polypectomy in the English Bowel Cancer Screening Programme," *Endoscopy,* no. 46, pp. 90-7, 2014.

[29] A. Remkens, E. Rondagh , C. Bakker, B. Winkens, A. Masclee and S. Sanduleanu, "Post-Colonoscopy Complications: A Systematic Reviw, Time Trends, and Meta-Analysis of Population-Based Studies," *Am J Gastroenterol,* vol. 111, no. 8, pp. 1092-101, 2016.

[30] L. Rosen, D. Bub, J. Reed and S. Nastasee, "Hemorrhage following colonoscopic polypectomy," *Dis Colon Rectum,* vol. 36, no. 12, pp. 1126-31, 1993.

[31] D. Nelson , K. McQuaid , J. Bond, D. A. Lieberman, D. G. Weiss and T. K. Johnston, "Procedural success and complications of large-scale screening colonoscopy," *Gastrointest Endosc,* vol. 55, no. 3, p. 307:314, 2002.

[32] K. Buddingh, T. Herngreen, J. Haringsma, W. C. van der Zwet, F. P. Vleggaar, R. Breumelhof and et al, "Location in the right hemi-colon is an inprendent risk factor for delayed post-polypectomy hemorrhage: multi-centre case-control study," *Am J Gastroenterol,* vol. 106, no. 6, pp. 1119-24, 2011.

[33] H. Kim, T. Kim and W. Kim, "Risk factors for immediate postpolypectomy bleeding of the colon: a multicentre study," *Am J Gastroenterol,* vol. 101, no. 6, pp. 1333-41, 2006.

[34] R. Niikura, H. Yasunaga, A. Yamada, H. Matsui, K. Fushimi, Y. Hirata and et al, "Factors predicting adverse events associated with therapeutic colonoscopy for colorectal neoplasia: a retrospective nationwide study in Japan," *Gastrointest Endosc,* vol. 84, no. 6, pp. 971-982, 2016.

[35] E. Morris, M. Rutter, P. Finan, J. Thomas and R. Valori, "Post-colonoscopy colorectal cancer (PCCRC) rates vary considerably depending on the method used to calculate them: a retrospective observational population based study of PCCRC in the English National Health Service," *Gut,* no. 64, pp. 1248-1256, 2015.

10. Bibliography

B. Levin, D. Lieberman, B. McFarland, R.A Smith, D Brooks, K.S Andrews, et al, "Screening and surveillance for the early detection of colorectal cancer and adenomatous polyps: a joint guidelines from the American Cancer Society, the US Multi-Society Task Force on Colorectal Cancer and the American College of Radiology," *Gastroenterology,* vol. 134, no. 5, pp. 1570-1595, 2008.

D. Francis, D. Rodriguez-Correa, A. Buchner, G.C Harewood, M. Wallace, "Application of a conversion factor to estimate the adenoma detection rate from the polyp detection rate," *Gastrointest Endosc,* vol. 73, no. 3, pp. 493-7, 2011

N. Patel, R. Islam, Q. Wu, S. Gurudu, F.C. Ramirez, M.D. Cromwell, et al, "Measurement of polypectomt rate by using administrative claims data with validation against the adenoma detection rate," *Gastrointest Endosc,* vol. 77, no. 3, pp. 290-4, 2013.

P. Rajasekhar, T. Lee, M. Rutter, M.G. Bramble, D.W. Wilson, J.E. East, et al, "Using a 'conversion factor' to estimate adenoma detection rate," *Endoscopy,* vol. 61, no. 2, pp. 371, 2012.

K. McQuaid and L. Laine, "A systematic review and meta-analysus of randomized control trials of moderate sedation for routine endoscopic procedures," *Gastrointest Endosc,* vol. 67, no. 6, pp. 910-23, 2008.

M. Rutter, C. Nickerson, C. Rees, J. Patnick, R.G. Blanks, "Factors for adverse events related to polypectomy in the English Bowel Cancer Screening Programme," *Enodscopy,* vol. 46, no.2, pp. 90-7, 2014.

W. Heldwein, M. Dollhopf, T. Rosch, A. Meining, G. Schmidtsdorff, J. Hasford, et al, "The Munich Polypectomy Study (MUPS): prospective analysis of complications and risk factors in 4000 colonic snare polypectomies," *Endoscopy,* vol. 37, no. 11, pp. 1116-22, 2005.

T. Lee, M. Rutter, R. Blanks, S. Moss, A. Goddard, A. Chilton, et al, "Colonoscopy quality measures: experience from the NHS Bowel Cancer Screening Programme," *Gut,* vol. 61, no. 7, pp. 1050-7, 2012.

D. Rex, "Colonoscopy," *Gastroenterology Endosc Clin C Am,* no. 10, pp. 135-60, 2000.

11. Useful Resources

Post-polypectomy and post-colorectal cancer resection surveillance guidelines
https://www.bsg.org.uk/clinical-resource/bsg-acpgbi-phe-post-polypectomy-and-post-colorectal-cancer-resection-surveillance-guidelines/

Colitis Surveillance
https://fg.bmj.com/content/1/3/126

Barrett's Oesophagus Surveillance
https://www.esge.com/assets/downloads/pdfs/guidelines/2016_s_0042_122140.pdf

Guidelines for Antibiotic Prophylaxis in Gastrointestinal Endoscopy
https://gut.bmj.com/content/58/6/869

Guidelines relating to Anticoagulant and Antiplatelet Therapy
https://gut.bmj.com/content/65/3/374

Summary of recommendations for colorectal cancer screening and surveillance in moderate risk and high risk family groups
https://www.bsg.org.uk/wp-content/uploads/2019/12/BSG_ACPGBI-guidelines-for-colorectal-cancer-screening-and-surveillance-in-moderate-and-high-risk-groups-update-from-2002-.pdf

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