

OVERVIEW

The panel had three main purposes which were:

1. To refine the inclusion and exclusion criteria for defining the study population
2. To refine the list of procedures within the definition of ‘emergency surgery’.
3. To define ‘the most appropriate’ time window that constitutes ‘emergency surgery’

The results from both rounds of this panel survey will be used to define the main (base case) analyses, with differences of opinion reflected in sensitivity analyses.

In the first round panelists were asked to indicate **which procedures** should be regarded as *emergency surgery* for patients admitted as an emergency, and under the care of a consultant surgeon with one of five primary diagnoses (appendicitis, cholecystitis, diverticulitis, intestinal obstruction and abdominal hernia). Panelists were asked to indicate the **time window** within which the surgery should occur to be defined as ‘emergency’.

The panel discussion for four conditions was held on 27th March 2020 although not all panelists were able to attend. Hernia was not covered at the meeting but panelists were asked to provide their reasons for their ratings by email.

The panel discussed diagnoses, procedures and timing of surgery. General points from the discussion were (i) to avoid ill-defined sub populations, with extensive heterogeneity; (ii) to recognise possible ‘crossover’: patients for whom there is an intention to manage primarily non-operatively who then end up having delayed surgery; (iii) to define in the comparator arm those procedures that are solely diagnostic even if they are ‘pre-surgery’.

In the second round of the survey the panelists were asked to indicate support for specific inclusion and exclusion criteria. Panelists were also asked to indicate their support for the procedures, and timing of procedures, that should define ‘emergency surgery’ in the light of the panel’s views from the first round of the survey.

This report presents a summary of findings for all conditions and separate sections for each of the five conditions:

- A summary of discussion about inclusion and exclusion criteria (for hernia the emailed comments are provided) and overall panel ratings for inclusion and exclusion criteria;
- Overall panel ratings for procedures that might be regarded as emergency surgery for the most frequent procedures;
- Procedures with the largest changes (>20%) in panel support between the first and second round of the survey;
- Overall panel ratings on the time window for emergency surgery in both rounds of the survey;
- A full list of panel ratings for all procedures for the five conditions is included in an appendix.

A full list of the panel members, including detail of their roles / specialisms, is set out in Appendix 7.

Inclusion and exclusion criteria

Table 1 shows a summary of the condition-specific inclusion and exclusion criteria based on a requirement that a minimum of 75% panel support is needed for inclusion. Approximate cohort sizes (using Hospital Episode Statistics from 2009-2016) ranged from 50k (hernia) to 200k (appendicitis) using these definitions.

Table 1: Summary of inclusion and exclusion criteria

	Hernia	Intestinal obstruction	Cholelithiasis	Appendicitis	Diverticulitis
Estimated cohort size (2009-2016)	50k	90k	145k	200k	170k
Included	Inguinal; Femoral; Umbilical; Ventral	Intestinal adhesions; Intussusception; Volvulus; Gallstone ileus; Other obstruction	Calculus of gall bladder	All included	Large intestine
Not included	Incisional; Parastomal	Paralytic ileus; Other impaction; Ileus, unspecified	Calculus of bile duct; Other cholelithiasis	None	Small intestine; Small and large intestine; Unspecified
Exclusions	Pregnancy; Ischaemia; Cancer.	Colorectal cancer with metastases; Gynaecological cancer; Ischaemia		Pregnancy; Appendiceal cancer	

If we require greater support of 90% rather than 75% panel support for the ‘included’ list, this would have major consequences on cohort size for the smaller cohorts. The hernia cohort would be around 25k or half the size; the intestinal obstruction cohort would be about 30k or one third of the size.

By contrast there if we apply a lower threshold of panel support for inclusion (50% rather than 75%), this has little impact on cohort size. The biggest impact of applying these weaker criteria (around 10k or 20% increase) would be the inclusion of incisional and parastomal hernias in the cohort definition for hernia.

Defining ‘emergency surgery’

Table 2 shows a summary of the panel’s views on which procedures should be regarded as ‘emergency surgery’ and the time limit within which a procedure must occur to be classified as ‘emergency surgery’. A procedure was defined as emergency surgery if at least half the panelists supported it. The time limits are based on the panel’s median duration.

A majority of procedures were defined as ‘emergency surgery’ for four of the conditions. The exception was cholelithiasis; less than a quarter of procedures were defined as

‘emergency surgery’. The estimated proportion of cohorts having emergency surgery ranged from 7.7% for diverticulitis to 73% for appendicitis. Key procedures and the approximate percentage of each cohort who have those procedures are also shown.

Hernia surgery had the strictest timing threshold of three days for both a procedure in the index admission or in a readmission. The threshold for intestinal obstruction, cholelithiasis and appendicitis was seven days in either an index or readmission. Surgery could be classified as ‘emergency surgery’ if it occurred at any time in an index admission or within 4 days in a readmission.

Table 2: Summary of procedures and timing of procedures defining ‘emergency surgery’

	Hernia	Intestinal obstruction	Cholelithiasis	Appendicitis	Diverticulitis
Procedures defined as ‘emergency surgery’	52 of 59	111 of 140	11 of 48	21 of 33	45 of 57
Estimated percentage of cohort having emergency surgery	55%	25%	14%	73%	7.7%
Key procedures defined as ‘emergency surgery’	Primary repair of inguinal hernia (23.6%)	Freeing of adhesions of peritoneum (7.7%)	Total cholecystectomy (11.7%)	Emergency excision of abnormal appendix (59.2%)	Rectosigmoidectomy (4.6%)
Key procedures NOT defined as ‘emergency surgery’	none	none	Endoscopic sphincterotomy (6.3%)	Unspecified other excision of appendix (15.6%)	Image controlled percutaneous drainage (0.6%)
Threshold for a procedure in the index admission to be ‘emergency surgery’	3 days	7 days	7 days	7 days	Any time
Threshold for a procedure in a readmission to be ‘emergency surgery’	3 days	7 days	7 days	7 days	14 days

Please note: for the purposes of defining emergency surgery, we do not differentiate between laparoscopic and open procedures, but these will be included in the study’s final analysis.

APPENDICITIS

Inclusion and exclusion criteria

In the discussion there were differing views about whether general peritonitis, cancers and abscesses should be excluded. For *generalised peritonitis* it was argued that few would treat non-operatively. *Pregnancy* as an exclusion criterion was discussed on the basis that there was a lack of equipoise and that non-operative management was favoured due to risks to the viability of the pregnancy.

Acute appendicitis without generalized peritonitis was supported by all panel members (Table 3). A majority of the panel supported the inclusion of acute appendicitis with generalized peritonitis and unspecified appendicitis.

Table 3: Inclusion criteria for appendicitis

Diagnosis (ICD-10 codes in brackets)	INCLUDE in study n/N (%)
Acute appendicitis (K35)	12/12 (100.0%)
Acute appendicitis with generalized peritonitis (K35.2)	10/12 (83.3%)
Acute appendicitis with localized peritonitis (K35.3)	12/12 (100.0%)
Acute appendicitis, other and unspecified (K35.8)	12/12 (100.0%)
Unspecified appendicitis (K37)	9/12 (75.0%)

A majority of the panel supported pregnancy and appendiceal cancer as exclusion criteria but did not support exclusion of patients with an appendiceal abscess (Table 4).

Table 4: Exclusion criteria for appendicitis

Criteria	EXCLUDE from study n/N (%)
Pregnancy	10/12 (83.3%)
Appendiceal cancer	11/12 (91.7%)
Appendiceal abscess	2/12 (16.7%)

Definition of emergency surgery

Table 5 shows the extent of panel support for the most frequently procedures inclusion within the definition of 'emergency surgery'. The most common procedure, emergency excision of an abnormal appendix, was supported by all panelists. Unspecified other excision of appendix, the second most frequent procedure, failed to achieve the support of at least half the panel. No panelists rated interval appendicectomy as emergency surgery.

Table 5: Panel support for procedures as ‘emergency surgery’ in appendicitis

OPCS code	Procedure	% Volume	Round 1	Round 2
H012	Emergency excision of abnormal appendix NEC	59.16%	11/11 (100.0%)	12/12 (100.0%)
H029	Unspecified other excision of appendix	15.59%	5/11 (45.5%)	5/12 (41.7%)
H011	Emergency excision of abnormal appendix and drainage HFQ	8.19%	11/11 (100.0%)	12/12 (100.0%)
H019	Unspecified emergency excision of appendix	3.14%	11/11 (100.0%)	12/12 (100.0%)
H013	Emergency excision of normal appendix	0.89%	8/11 (72.7%)	10/12 (83.3%)
H021	Interval appendicectomy	0.77%	0/11 (0.0%)	0/12 (0.0%)
H031	Drainage of abscess of appendix	0.46%	10/11 (90.9%)	12/12 (100.0%)
H028	Other specified other excision of appendix	0.25%	3/11 (27.3%)	1/12 (8.3%)
H072	Right hemicolectomy and side to side anastomosis of ileum to transverse colon	0.25%	9/11 (81.8%)	12/12 (100.0%)
H071	Right hemicolectomy and end to end anastomosis of ileum to colon	0.23%	10/11 (90.9%)	12/12 (100.0%)
H073	Right hemicolectomy and anastomosis NEC	0.19%	10/11 (90.9%)	12/12 (100.0%)

A complete list of responses for all procedures can be found in the Appendix.

Changes in panel ratings between the first and second round of the survey were generally small: four relatively infrequent procedures had shifts of 20% or more (Table 6) with three in favour of ‘emergency surgery’.

Table 6: Changes in ratings of procedures for appendicitis

OPCS code	Procedure	% Volume	Round 1	Round 2
H018	Other specified emergency excision of appendix	0.05%	8/11 (72.7%)	12/12 (100.0%)
H078	Other specified other excision of right hemicolon	0.01%	6/11 (54.5%)	9/12 (75.0%)
T468	Other specified other drainage of peritoneal cavity	0.01%	6/11 (54.5%)	9/12 (75.0%)
T309	Unspecified opening of abdomen	0.02%	4/11 (36.4%)	1/12 (8.3%)

Timing of Surgery

For appendicitis, the panellists time thresholds for emergency surgery ranged from 3 days to any time in the index admission (Table 7). The panel's round 2 median was within seven days and did not change from round 1.

A majority of panellists agreed that emergency surgery could occur in a readmission with a panel median of a limit of seven days.

Table 7: Timing of 'emergency' procedures for appendicitis

Procedure during the index admission	Round 1 n/N (%)	Round 2 n/N (%)
Within 1 day	0/11 (0.0%)	0/12 (0.0%)
Within 2 days	0/11 (0.0%)	0/12 (0.0%)
Within 3 days	3/11 (27.3%)	1/12 (8.3%)
Within 4 days	0/11 (0.0%)	0/12 (0.0%)
Within 7 days	3/11 (27.3%)	6/12 (50.0%)
Within 14 days	1/11 (9.1%)	0/12 (0.0%)
Any time	4/11 (36.4%)	5/12 (41.7%)
Procedure following a readmission		
N/A, not 'emergency surgery'	0/11 (0.0%)	3/12 (25.0%)
Within 2 days	1/11 (9.1%)	0/12 (0.0%)
Within 3 days	1/11 (9.1%)	0/12 (0.0%)
Within 4 days	0/11 (0.0%)	0/12 (0.0%)
Within 7 days	5/11 (45.5%)	7/12 (58.3%)
Within 14 days	4/11 (36.4%)	2/12 (16.7%)

CHOLELITHIASIS**Inclusion and exclusion criteria**

Need to be careful to ensure equipoise and clearly defined, homogenous populations. On balance, the panel supported inclusion of: calculus of gall bladder with or without cholecystitis (ICD10 codes K80.0, K80.1 and K80.2).

Table 8: Inclusion criteria for cholelithiasis

Diagnosis (ICD-10 code)	% voting to INCLUDE in study
Calculus of gallbladder with acute cholecystitis (K80.0)	12/12 (100.0%)
Calculus of gallbladder with other cholecystitis (K80.1)	12/12 (100.0%)
Calculus of gallbladder without cholecystitis (K80.2)	10/12 (83.3%)
Calculus of bile duct with cholangitis (K80.3)	5/12 (41.7%)
Calculus of bile duct with cholecystitis (K80.4)	7/12 (58.3%)
Calculus of bile duct without cholangitis or cholecystitis (K80.5)	5/12 (41.7%)
Other cholelithiasis (K80.8)	6/12 (50.0%)

Definition of emergency surgery

Cholecystectomy gained strong support for inclusion. A minority (up to 25%) of panelists supported the inclusion of the more common endoscopic procedures within the definition of emergency surgery. The panel was evenly split as to whether percutaneous drainage of the gall bladder, the third most common procedure, should be included within the definition of emergency surgery.

Table 9: Panel support for procedures as 'emergency surgery' in cholelithiasis

OPCS code	% Volume	Round 1 n/N (%)	Round 2 n/N (%)
J183: Total cholecystectomy NEC (11.69%)	11.69%	11/11 (100.0%)	12/12 (100.0%)
J381: Endoscopic sphincterotomy of sphincter of Oddi and removal of calculus HFQ (6.3%)	6.30%	3/12 (25.0%)	2/12 (16.7%)
J241: Percutaneous drainage of gall bladder (1.01%)	1.01%	6/12 (50.0%)	7/12 (58.3%)
J382: Endoscopic sphincterotomy of sphincter of Oddi and insertion of tubal prosthesis into bile duct (0.87%)	0.87%	3/12 (25.0%)	2/12 (16.7%)
J439: Unspecified diagnostic endoscopic retrograde examination of bile duct and pancreatic duct (0.56%)	0.56%	1/12 (8.3%)	0/12 (0.0%)

J212: Drainage of gall bladder (0.54%)	0.54%	10/12 (83.3%)	12/12 (100.0%)
J185: Partial cholecystectomy NEC (0.49%)	0.49%	12/12 (100.0%)	12/12 (100.0%)
J389: Unspecified endoscopic incision of sphincter of Oddi (0.37%)	0.37%	2/12 (16.7%)	1/12 (8.3%)
J182: Total cholecystectomy and exploration of common bile duct (0.36%)	0.36%	10/11 (90.9%)	12/12 (100.0%)
J402: Endoscopic retrograde insertion of tubal prosthesis into bile duct NEC (0.34%)	0.34%	2/12 (16.7%)	0/12 (0.0%)
J411: Endoscopic retrograde extraction of calculus from bile duct (0.34%)	0.34%	2/12 (16.7%)	1/12 (8.3%)
J388: Other specified endoscopic incision of sphincter of Oddi (0.18%)	0.18%	2/12 (16.7%)	1/12 (8.3%)

All other procedures that represented at least 0.1% of admissions received strong (>80%) support for inclusion or exclusion from the definition of emergency surgery. The complete list of responses for the panel can be found in the Appendix.

Table 10: Changes in ratings of procedures for cholelithiasis

OPCS code	% Volume	Round 1	Round 2
J332: Open removal of calculus from bile duct NEC (0.01%)	0.01%	4/12 (33.3%)	1/12 (8.3%)

Timing of surgery

For surgery occurring during the emergency admission a small majority (7 of 12, 58%) of panelists felt that it should be defined as 'emergency surgery' if it occurred within seven days of first being under the care of the surgeon. The remaining panelists felt it could at any time during the admission.

Table 11: Timing of 'emergency' procedures for cholelithiasis

Procedure during the index admission	Round 1 n/N (%)	Round 2 n/N (%)
Within 1 day	0/12 (0.0%)	0/12 (0.0%)
Within 2 days	0/12 (0.0%)	0/12 (0.0%)
Within 3 days	0/12 (27.3%)	0/12 (0.0%)
Within 4 days	0/12 (0.0%)	1/12 (8.3%)
Within 7 days	7/12 (58.3%)	6/12 (50.0%)
Within 14 days	0/12 (0.0%)	0/12 (0.0%)

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Any time	5/12 (41.7%)	5/12 (41.7%)
Procedure following a readmission		
N/A, not 'emergency surgery'	2/12 (16.7%)	6/12 (50.0%)
Within 2 days	0/12 (0.0%)	0/12 (0.0%)
Within 3 days	1/12 (8.3%)	0/12 (0.0%)
Within 4 days	0/12 (0.0%)	0/12 (0.0%)
Within 7 days	6/12 (50.0%)	3/12 (25.0%)
Within 14 days	3/12 (25.0%)	3/12 (25.0%)

A majority (10/12) of panelists felt that surgery in a patient discharged and readmitted could still be defined as 'emergency surgery' with a majority supporting a longer threshold of 7 days (6/12, 50%) or 14 days (3/12, 25%).

DIVERTICULITIS**Inclusion and exclusion criteria**

In the discussion the panel supported focusing on those subpopulations which definitely relate to the large intestine (ICD10 codes K57.2 & K57.3) and exclude diagnoses where large intestine involvement was unclear.

Table 12: Inclusion criteria for diverticulitis

Diagnosis (ICD-10 code)	INCLUDE in study n/N (%)
Diverticular disease of small intestine with perforation and abscess (K57.0)	2/12 (16.7%)
Diverticular disease of small intestine without perforation or abscess (K57.1)	1/12 (8.3%)
Diverticular disease of large intestine with perforation and abscess (K57.2)	12/12 (100.0%)
Diverticular disease of large intestine without perforation or abscess (K57.3)	12/12 (100.0%)
Diverticular disease of both small and large intestine with perforation and abscess (K57.4)	6/12 (50.0%)
Diverticular disease of both small and large intestine without perforation or abscess (K57.5)	6/12 (50.0%)
Diverticular disease of intestine, part unspecified, with perforation and abscess (K57.8)	4/12 (33.3%)
Diverticular disease of intestine, part unspecified, without perforation or abscess (K57.9)	4/12 (33.3%)

Definition of emergency surgery

In the discussion the general view was that radiological procedures should not be defined as emergency surgery. Rectosigmoidectomy, the most frequent procedure, was unanimously included in the definition of emergency surgery. The panel was more divided on irrigation of the peritoneal cavity and anterior resection (both receiving 75% support) and image controlled percutaneous drainage procedures (both supported by 33% of panelists).

Table 13: Panel support for procedures as 'emergency surgery' in diverticulitis

OPCS code	% Volume	Round 1	Round 2
H335: Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel (4.55%)	4.55%	12/12 (100.0%)	12/12 (100.0%)
T463: Irrigation of peritoneal cavity (0.5%)	0.50%	9/12 (75.0%)	11/12 (91.7%)

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H105: Sigmoid colectomy and exteriorisation of bowel NEC (0.45%)	0.45%	11/12 (91.7%)	12/12 (100.0%)
T453: Image controlled percutaneous drainage of abdominal abscess NEC (0.29%)	0.29%	4/12 (33.3%)	5/12 (41.7%)
T452: Image controlled percutaneous drainage of pelvic abscess (0.27%)	0.27%	4/12 (33.3%)	5/12 (41.7%)
H336: Anterior resection of rectum and exteriorisation of bowel (0.2%)	0.20%	9/12 (75.0%)	12/12 (100.0%)
H072: Right hemicolectomy and side to side anastomosis of ileum to transverse colon (0.16%)	0.16%	6/12 (50.0%)	9/12 (75.0%)
H151: Loop colostomy (0.14%)	0.14%	7/12 (58.3%)	10/12 (83.3%)
H333: Anterior resection of rectum and anastomosis of colon to rectum using staples (0.13%)	0.13%	11/12 (91.67%)	12/12 (100.0%)
H103: Sigmoid colectomy and anastomosis NEC (0.12%)	0.12%	11/12 (91.7%)	12/12 (100.0%)
H104: Sigmoid colectomy and ileostomy HFQ (0.11%)	0.11%	11/12 (91.7%)	12/12 (100.0%)
H071: Right hemicolectomy and end to end anastomosis of ileum to colon (0.1%)	0.10%	6/12 (50.0%)	9/12 (75.0%)
H161: Drainage of colon (0.1%)	0.10%	7/12 (58.3%)	8/12 (66.7%)
H013: Emergency excision of abnormal appendix NEC (0.1%)	0.10%	0/12 (0.0%)	0/12 (0.0%)
H071: Right hemicolectomy and end to end anastomosis of ileum to colon (0.1%)	0.10%	6/12 (50.0%)	9/12 (75.0%)
H072: Right hemicolectomy and side to side anastomosis of ileum to transverse colon (0.16%)	0.16%	6/12 (50.0%)	9/12 (75.0%)
H073: Right hemicolectomy and anastomosis NEC (0.09%)	0.09%	6/12 (50.0%)	9/12 (75.0%)
H074: Right hemicolectomy and ileostomy HFQ (0.06%)	0.06%	6/12 (50.0%)	9/12 (75.0%)
H108: Other specified excision of sigmoid colon (0.01%)	0.01%	7/12 (58.3%)	11/12 (91.7%)
H109: Unspecified excision of sigmoid colon (0.02%)	0.02%	7/12 (58.3%)	11/12 (91.7%)
H111: Colectomy and end to end anastomosis of colon to colon NEC (0.01%)	0.01%	7/12 (58.3%)	10/12 (83.3%)
H121: Excision of diverticulum of colon (0.03%)	0.03%	8/12 (66.7%)	11/12 (91.7%)
H151: Loop colostomy (0.14%)	0.14%	7/12 (58.3%)	10/12 (83.3%)

H198: Other specified other open operations on colon (0.02%)	0.02%	4/12 (33.3%)	0/12 (0.0%)
H336: Anterior resection of rectum and exteriorisation of bowel (0.2%)	0.20%	9/12 (75.0%)	12/12 (100.0%)
T309: Unspecified opening of abdomen (0.06%)	0.06%	3/12 (25.0%)	0/12 (0.0%)
T342: Open drainage of pelvic abscess (0.09%)	0.09%	9/12 (75.0%)	12/12 (100.0%)
T348: Other specified open drainage of peritoneum (0.01%)	0.01%	8/12 (66.7%)	12/12 (100.0%)
T349: Unspecified open drainage of peritoneum (0.01%)	0.01%	7/12 (58.3%)	10/12 (83.3%)

Timing of surgery

For surgery occurring during the emergency admission most panelists supported a threshold of at least 7 days of first being under the care of the surgeon although panelists were fairly evenly split between 7 days (33%), 14 days (25%) or at any time during the admission (33%).

Table 14: Timing of 'emergency' procedures for diverticulitis

Procedure during the index admission	Round 1 n/N (%)	Round 2 n/N (%)
Within 1 day	0/12 (0.0%)	0/12 (0.0%)
Within 2 days	0/12 (0.0%)	0/12 (0.0%)
Within 3 days	1/12 (8.3%)	0/12 (0.0%)
Within 4 days	0/12 (0.0%)	0/12 (0.0%)
Within 7 days	4/12 (33.3%)	3/12 (25.0%)
Within 14 days	3/12 (25.0%)	3/12 (25.0%)
Any time	4/12 (33.3%)	6/12 (50.0%)
Procedure following a readmission		
N/A, not 'emergency surgery'	0/12 (0.0%)	2/12 (16.7%)
Within 2 days	0/12 (0.0%)	0/12 (0.0%)
Within 3 days	0/12 (0.0%)	0/12 (0.0%)
Within 4 days	1/12 (8.3%)	0/12 (0.0%)
Within 7 days	2/12 (16.7%)	0/12 (0.0%)
Within 14 days	9/12 (75.0%)	10/12 (83.3%)

All panelists support a definition of emergency surgery that includes patients being discharged and readmitted. A majority (9/12, 75%) were in favour of the longest threshold of 14 days.

INTESTINAL OBSTRUCTION**Inclusion and exclusion criteria**

Key areas of discussion were identifying homogenous groups and dealing with cancer diagnoses.

There was support for restricting to a diagnosis of K56.5 (intestinal adhesional bands) as this is a fairly large, clearly defined group with equipoise.

There was support for including a colorectal cancer diagnosis without metastases, including where the main diagnosis was cancer and intestinal obstruction the second diagnosis. There appears to be equipoise in this subgroup with trials comparing surgery versus IR stenting.

Table 15: Inclusion criteria for intestinal obstruction

Diagnosis (ICD-10 code)	INCLUDE in study n/N (%)
Paralytic ileus (K56.0)	0/12 (0.00%)
Intussusception (K56.1)	9/12 (75.0%)
Volvulus (K56.2)	10/12 (83.3%)
Gallstone ileus (K56.3)	9/12 (75.0%)
Other impaction of intestine (K56.4)	7/12 (58.3%)
Intestinal adhesions [bands] with obstruction (K56.5)	12/12 (100.0%)
Other and unspecified intestinal obstruction (K56.6)	10/12 (83.3%)
Ileus, unspecified (K56.7)	0/12 (0.0%)

There was support to exclude admissions with gynaecological cancers.

Table 16: Exclusion criteria for intestinal obstruction

Criteria	EXCLUDE in study n/N (%)
Colorectal cancer with metastases	4/12 (33.3%)
Colorectal cancer without metastases	2/12 (16.7%)
Gynaecological cancer	7/12 (58.3%)
Ischaemia	8/12 (66.7%)

Definition of emergency surgery

For the most frequent procedures, at least three-quarters of panelists agreed they should be included within the definition of emergency surgery.

The more frequent procedures (>0.1% of admissions) with less consensus are shown in table 17 below. The complete list of responses for the panel is shown in the Appendix.

Table 17: Panel support for procedures as 'emergency surgery' for intestinal obstruction

OPCS code	% Volume	Round 1	Round 2
T413: Freeing of adhesions of peritoneum (7.7%)	7.70%	12/12 (100.0%)	12/12 (100.0%)
G693: Ileectomy and anastomosis of ileum to ileum (2.31%)	2.31%	11/12 (91.7%)	12/12 (100.0%)
T423: Endoscopic division of adhesions of peritoneum (1.32%)	1.32%	9/12 (75.0%)	11/12 (91.7%)
T412: Division of band of peritoneum (1.27%)	1.27%	12/12 (100.0%)	12/12 (100.0%)
H072: Right hemicolectomy and side to side anastomosis of ileum to transverse colon (0.98%)	0.98%	9/12 (75.0%)	11/12 (91.7%)
G699: Unspecified excision of ileum (0.97%)	0.97%	11/12 (91.7%)	12/12 (100.0%)
H151: Loop colostomy (0.97%)	0.97%	9/12 (75.0%)	11/12 (91.7%)
H335: Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel (0.97%)	0.97%	9/12 (75.0%)	11/12 (91.7%)
T415: Freeing of extensive adhesions of peritoneum (0.95%)	0.95%	12/12 (100.0%)	12/12 (100.0%)
H071: Right hemicolectomy and end to end anastomosis of ileum to colon (0.76%)	0.76%	9/12 (75.0%)	11/12 (91.7%)
G763: Open relief of obstruction of ileum NEC (0.61%)	0.61%	12/12 (100.0%)	12/12 (100.0%)
H073: Right hemicolectomy and anastomosis NEC (0.53%)	0.53%	9/12 (75.0%)	11/12 (91.7%)
G783: Removal of foreign body from ileum (0.48%)	0.48%	7/12 (58.3%)	9/12 (75.0%)
G694: Ileectomy and anastomosis of ileum to colon (0.39%)	0.39%	11/12 (91.7%)	12/12 (100.0%)
G698: Other specified excision of ileum (0.32%)	0.32%	9/12 (75.0%)	12/12 (100.0%)
H074: Right hemicolectomy and ileostomy HFQ (0.32%)	0.32%	9/12 (75.0%)	11/12 (91.7%)
G743: Creation of defunctioning ileostomy (0.29%)	0.29%	9/12 (75.0%)	10/12 (83.3%)
G788: Other specified other open operations on ileum (0.26%)	0.26%	5/12 (41.7%)	3/12 (25.0%)

Table 18: Changes in rating of procedures for intestinal obstruction

OPCS code	% Volume	Round 1	Round 2
G698: Other specified excision of ileum (0.32%)	0.32%	9/12 (75.0%)	12/12 (100.0%)
G711: Bypass of ileum by anastomosis of jejunum to ileum (0.01%)	0.01%	9/12 (75.0%)	12/12 (100.0%)
G712: Bypass of ileum by anastomosis of ileum to ileum (0.08%)	0.08%	9/12 (75.0%)	12/12 (100.0%)
G713: Bypass of ileum by anastomosis of ileum to caecum (0.02%)	0.02%	9/12 (75.0%)	12/12 (100.0%)
H051: Total colectomy and anastomosis of ileum to rectum (0.02%)	0.02%	8/12 (66.7%)	11/12 (91.7%)
H053: Total colectomy and ileostomy NEC (0.06%)	0.06%	7/12 (58.3%)	11/12 (91.7%)
H081: Transverse colectomy and end to end anastomosis (0.01%)	0.01%	8/12 (66.7%)	11/12 (91.7%)
H082: Transverse colectomy and anastomosis of ileum to colon (0.01%)	0.01%	9/12 (75.0%)	11/12 (91.7%)
H083: Transverse colectomy and anastomosis NEC (0.01%)	0.01%	8/12 (66.7%)	11/12 (91.7%)
H101: Sigmoid colectomy and end to end anastomosis of ileum to rectum (0.04%)	0.04%	8/12 (66.7%)	11/12 (91.7%)
H138: Other specified bypass of colon (0.01%)	0.01%	8/12 (66.7%)	11/12 (91.7%)
H176: Open relief of obstruction of colon NEC (0.1%)	0.10%	8/12 (66.7%)	11/12 (91.7%)
H298: Other specified subtotal excision of colon (0.11%)	0.11%	8/12 (66.7%)	11/12 (91.7%)
H333: Anterior resection of rectum and anastomosis of colon to rectum using staples (0.07%)	0.07%	7/12 (58.3%)	11/12 (91.7%)
H334: Anterior resection of rectum and anastomosis NEC (0.04%)	0.04%	7/12 (58.3%)	11/12 (91.7%)
H336: Anterior resection of rectum and exteriorisation of bowel (0.07%)	0.07%	8/12 (66.7%)	11/12 (91.7%)
G702: Excision of lesion of ileum NEC (0.08%)	0.08%	7/12 (58.3%)	10/12 (83.3%)
H158: Other specified other exteriorisation of colon (0.03%)	0.03%	7/12 (58.3%)	10/12 (83.3%)
H159: Unspecified other exteriorisation of colon (0.05%)	0.05%	7/12 (58.3%)	10/12 (83.3%)
H171: Open reduction of intussusception of colon (0.01%)	0.01%	7/12 (58.3%)	10/12 (83.3%)

H172: Open reduction of volvulus of caecum (0.08%)	0.08%	7/12 (58.3%)	10/12 (83.3%)
H173: Open reduction of volvulus of sigmoid colon (0.12%)	0.12%	7/12 (58.3%)	10/12 (83.3%)
H174: Open reduction of volvulus of colon NEC (0.06%)	0.06%	7/12 (58.3%)	10/12 (83.3%)
H198: Other specified other open operations on colon (0.02%)	0.02%	5/12 (41.7%)	2/12 (16.7%)
G749: Unspecified creation of artificial opening into ileum (0.03%)	0.03%	4/12 (33.3%)	1/12 (8.3%)
G633: Closure of perforation of jejunum (0.01%)	0.01%	3/12 (25.0%)	0/12 (0.0%)
G828: Other specified other operations on ileum (0.01%)	0.01%	3/12 (25.0%)	0/12 (0.0%)

Timing of surgery

For surgery occurring during the emergency admission a majority (8 of 12) of panelists felt that it should be defined as 'emergency surgery' if it occurred within seven days of first being under the care of the surgeon. The remaining panelists felt it could at any time during the admission.

Table 19: Timing of 'emergency' procedures for intestinal obstruction

Procedure during the index admission	Round 1 n/N (%)	Round 2 n/N (%)
Within 1 day	0/12 (0.0%)	0/12 (0.0%)
Within 2 days	0/12 (0.0%)	0/12 (0.0%)
Within 3 days	0/12 (0.0%)	0/12 (0.0%)
Within 4 days	0/12 (0.0%)	0/12 (0.0%)
Within 7 days	8/12 (66.7%)	7/12 (58.3%)
Within 14 days	0/12 (0.0%)	0/12 (0.0%)
Any time	4/12 (33.3%)	5/12 (41.7%)
Procedure following a readmission		
N/A, not 'emergency surgery'	2/12 (16.7%)	6/12 (50.0%)
Within 2 days	0/12 (0.0%)	0/12 (0.0%)
Within 3 days	0/12 (0.0%)	0/12 (0.0%)
Within 4 days	0/12 (0.0%)	0/12 (0.0%)
Within 7 days	5/12 (41.7%)	2/12 (16.7%)
Within 14 days	5/12 (41.7%)	4/12 (33.3%)

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A majority (10/12) of panelists felt that surgery in a patient discharged and readmitted could still be defined as 'emergency surgery'. Views were equally split between the timing: five panelists indicating within seven days of first being under the care of a surgeon and five panelists indicating within 14 days.

HERNIA

Inclusion and exclusion criteria

Ventral/umbilical hernias:

Comments generally favoured the inclusion of umbilical hernias. The one concern related to the potential for heterogeneity.

Include	Exclude or concerns
<p><i>"I suspect a lot of the patients coded as having ventral hernia will actually have an umbilical hernia and I'd therefore include them under an umbrella of umbilical / ventral."</i></p> <p><i>"umbilical are ok."</i></p> <p><i>"Umbilical hernias – yes, I would include. They are common and again the treatment should be black and white"</i></p> <p><i>"Yes I would include paraumbilical (umbilical usu relates to paediatrics so prob wont be high numbers)"</i></p> <p><i>"... I would be tempted to include para-umbilical and parastomal hernias in also as we do see them relatively frequently as emergencies and some of the management decisions (i.e. surgery or not) can be quite variable - so potentially would be interesting for the study."</i></p>	<p><i>"Umbilical?epigastric?spigelian etc add numbers but heterogeneity."</i></p>

Incisional hernias:

Most comments supported excluding incisional hernias.

Include	Exclude or concerns
<p><i>"yes both should be included"</i></p>	<p><i>"The other factor for this group of patients is that a number of the patients coded as "incisional" hernia may actually be parastomal hernias."</i></p> <p><i>"I would be really cautious about incisional hernia as these are much less standard than a groin hernia. In this case the counterfactual may not be as good a comparison as you get in other hernia."</i></p> <p><i>"I think incisional hernias will bring a lot of issues. Some of them are simply not operable in an emergency setting as they either can't be closed without some significant prep or would cause other problems like inability to breathe."</i></p>

	<p><i>"I agree incisional hernias should not be included. They are the classic 'hot potato' therefore there would be peculiar delays. While interest to a small group of surgeons, they may dilute your wider message in the hernia section"</i></p>
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Parastomal hernias:

Comments on parastomal hernias were more evenly balanced.

Include	Exclude or concerns
<p><i>"Yes I would add in parastomal hernia definitely"</i></p> <p><i>"... and would include parastomal hernias but will likely be low numbers - I do have a scientific interest in this, so may have more interest than others in the group."</i></p> <p><i>"yes both should be included"</i></p> <p><i>"but I would be tempted to include para-umbilical and parastomal hernias in also as we do see them relatively frequently as emergencies and some of the management decisions (i.e. surgery or not) can be quite variable - so potentially would be interesting for the study."</i></p>	<p><i>"Parastomal hernia are a relatively specialist (colorectal) problem. Many units don't have dedicated separate upper and lower Gi rotas and therefore inclusion may skew the results because they are the sort of patient likely to be not operated upon by a "general" surgeon with an upper GI sub-specialism and operated upon by a lower GI surgeon."</i></p> <p><i>"Parastomal hernias - definitely out - these are complex hernias and if you ask two surgeons when to operate you will get 5 answers..."</i></p>

Ischaemia:

Views on the exclusion of ischaemia were also mixed and the question of consistency across conditions was raised.

Include	Exclude or concerns
<p><i>"No, this may be put down as sometimes pts present with ischaemia."</i></p> <p><i>"Intestinal ischemia - no.... leave [include]"</i></p> <p><i>"Secondary ischaemia is fine to be included if the primary diagnosis is the hernia"</i></p>	<p><i>"My view is yes ischaemia should be excluded as in my book this should only be treated surgically (without surgery mortality is virtually guaranteed)."</i></p> <p><i>"I assume we just need to remain consistent across all facets - i.e. if we excluded ischaemia in the bowel obstruction section, should we do the same here too. Personally, bowel ischaemia is perhaps more of an interest in the context of hernias, as it is often the risk/presence of bowel ischaemia if the bowel is stuck in the hernia that necessitates the emergency surgery."</i></p>

Pregnancy:

All comments favoured the exclusion of pregnancy.

Include	Exclude or concerns
	<p><i>"I think pregnancy should be excluded, the number of patients presenting with an emergency hernia are likely to be very small."</i></p> <p><i>"Pregnancy – yes [exclude]"</i></p> <p><i>"Hernia and pregnancy are common, needing surgery/ presenting as emergencies low incidence so I would exclude."</i></p>

Table 20: Inclusion Criteria for hernia

Diagnosis (ICD-10 code)	INCLUDE in study n/N (%)
Bilateral inguinal hernia, with obstruction, without gangrene (K400)	11/12 (91.7%)
Bilateral inguinal hernia, with gangrene (K401)	10/12 (83.3%)
Bilateral inguinal hernia, without obstruction or gangrene (K402)	10/12 (83.3%)
Unilateral or unspecified inguinal hernia, with obstruction, without gangrene (K403)	11/12 (91.7%)
Unilateral or unspecified inguinal hernia, with gangrene (K404)	10/12 (83.3%)
Unilateral or unspecified inguinal hernia, without obstruction or gangrene (K409)	10/12 (83.3%)
Bilateral femoral hernia, with obstruction, without gangrene (K410)	11/12 (91.7%)
Bilateral femoral hernia, with gangrene (K411)	10/12 (83.3%)
Bilateral femoral hernia, without obstruction or gangrene (K412)	11/12 (91.7%)
Unilateral or unspecified femoral hernia, with obstruction, without gangrene (K413)	11/12 (91.7%)
Unilateral or unspecified femoral hernia, with gangrene (K414)	10/12 (83.3%)
Unilateral or unspecified femoral hernia, without obstruction or gangrene (K419)	11/12 (91.7%)
Umbilical hernia with obstruction, without gangrene (K420)	11/12 (91.7%)
Umbilical hernia with gangrene (K421)	10/12 (83.3%)
Umbilical hernia without obstruction or gangrene (K429)	10/12 (83.3%)

Incisional hernia with obstruction, without gangrene (K430)	8/12 (66.7%)
Incisional hernia with gangrene (K431)	8/12 (66.7%)
Incisional hernia without obstruction or gangrene (K432)	7/12 (58.3%)
Parastomal hernia with obstruction, without gangrene (K433)	8/12 (66.7%)
Parastomal hernia with gangrene (K434)	8/12 (66.7%)
Parastomal hernia without obstruction or gangrene (K435)	6/12 (50.0%)
Other and unspecified ventral hernia with obstruction, without gangrene (K436)	10/12 (83.3%)
Other and unspecified ventral hernia with gangrene (K437)	9/12 (75.0%)
Other and unspecified ventral hernia without obstruction or gangrene (K439)	8/12 (66.7%)

Comments on other potential exclusions:

Gangrene: *Any diagnosis with gangrene should be excluded. Surgery only chance to salvage these.*

Recurrent hernias: *I'd avoid recurrent hernias in general as different decision making processes and pathology.*

Traumatic hernias: *Maybe traumatic hernia after penetrating injuries, diaphragmatic hernia*

Table 21: Exclusion criteria for hernia

Criteria	EXCLUDE from study n/N (%)
Pregnancy	10/12 (83.3%)
Ischaemia	6/12 (50.0%)
Cancer	8/12 (66.7%)

Definition of Emergency Surgery

Most panelists were fairly inclusive in their selection of eligible procedures.

“The issue is that 'hernia' is neither an emergency or elective isolated term unlike 'bowel obstruction' which is clearly emergent. It is the consequences of the hernia that determine emergent: pain' irreducibility, obstruction, incarceration'. That is why almost all I have included as YES.”

A few panelists adopted a stricter approach that included primary repair but excluded other procedures including repair of recurrent hernias.

“I have included all the standard coding for inguinal, femoral and abdomen that include primary repair with sutures, natural material or prosthetic material as all can be used in the emergency setting. All of the recurrent hernias I've excluded as these all are things that would be done electively as well as removal of mesh. Adhesiolysis etc not appropriate for primary hernia issue.”

Table 22: Panel support for procedures as ‘emergency surgery’ in hernia

Main procedure	% Volume	Round 1	Round 2
T202: Primary repair of inguinal hernia using insert of prosthetic material	23.62%	11/11 (100.0%)	12/12 (100.0%)
T223: Primary repair of femoral hernia using sutures	8.20%	11/11 (100.0%)	12/12 (100.0%)
T222: Primary repair of femoral hernia using insert of prosthetic material	6.10%	11/11 (100.0%)	12/12 (100.0%)
T212: Repair of recurrent inguinal hernia using insert of prosthetic material	3.86%	10/11 (90.9%)	12/12 (100.0%)
T203: Primary repair of inguinal hernia using sutures	2.22%	11/11 (100.0%)	12/12 (100.0%)
T252: Primary repair of incisional hernia using insert of prosthetic material	1.86%	11/11 (100.0%)	10/12 (83.3%)
T253: Primary repair of incisional hernia using sutures	1.35%	11/11 (100.0%)	10/12 (83.3%)
T229: Unspecified primary repair of femoral hernia	1.16%	10/11 (90.9%)	12/12 (100.0%)
T272: Repair of ventral hernia using insert of prosthetic material	1.07%	11/11 (100.0%)	12/12 (100.0%)
T273: Repair of ventral hernia using sutures	0.95%	11/11 (100.0%)	12/12 (100.0%)
T209: Unspecified primary repair of inguinal hernia	0.85%	10/11 (90.9%)	12/12 (100.0%)
T213: Repair of recurrent inguinal hernia using sutures	0.67%	8/11 (72.7%)	12/12 (100.0%)
T262: Repair of recurrent incisional hernia using insert of prosthetic material	0.37%	9/11 (81.8%)	10/12 (83.3%)
T232: Repair of recurrent femoral hernia using insert of prosthetic material	0.25%	9/11 (81.8%)	12/12 (100.0%)
T259: Unspecified primary repair of incisional hernia	0.25%	10/11 (90.9%)	10/12 (83.3%)
T279: Unspecified repair of other hernia of abdominal wall	0.23%	10/11 (90.9%)	12/12 (100.0%)

Table 23: Changes in ratings of procedures for hernia

Main procedure	% Volume	Round 1	Round 2
T211: Repair of recurrent inguinal hernia using insert of natural material	0.03%	9/11 (81.8%)	12/12 (100.0%)
T213: Repair of recurrent inguinal hernia using sutures	0.67%	8/11 (72.7%)	12/12 (100.0%)
T218: Other specified repair of recurrent inguinal hernia	0.03%	9/11 (81.8%)	12/12 (100.0%)
T219: Unspecified repair of recurrent inguinal hernia	0.15%	9/11 (81.8%)	12/12 (100.0%)
T231: Repair of recurrent femoral hernia using insert of natural material	0.01%	8/11 (72.7%)	12/12 (100.0%)
T232: Repair of recurrent femoral hernia using insert of prosthetic material	0.25%	9/11 (81.8%)	12/12 (100.0%)
T233: Repair of recurrent femoral hernia using sutures	0.19%	9/11 (81.8%)	12/12 (100.0%)
T239: Unspecified repair of recurrent femoral hernia	0.02%	9/11 (81.8%)	12/12 (100.0%)
T288: Other specified other repair of anterior abdominal wall	0.01%	8/11 (72.7%)	12/12 (100.0%)
G762: Open relief of strangulation of ileum	0.02%	7/11 (63.6%)	11/12 (91.7%)
G763: Open relief of obstruction of ileum NEC	0.04%	7/11 (63.6%)	11/12 (91.7%)
H176: Open relief of obstruction of colon NEC	0.01%	6/11 (54.5%)	11/12 (91.7%)
T318: Other specified other operations on anterior abdominal wall	0.02%	6/11 (54.5%)	9/12 (75.0%)

For the most frequent procedures (>0.8% of admissions) over 90% of panelists supported their inclusion as constituting emergency surgery.

Other than T213 Repair of recurrent inguinal hernia using sutures, the procedures failing to achieve a three-quarters majority were infrequent (fewer than 1 in 2000 admissions):

The complete list of responses for the panel is shown in the Appendix.

Timing of surgery

For surgery occurring during the emergency admission there was a tendency to support a narrower definition for the timing of surgery: seven (64%) favoured a definition of no more than 2-4 days although two panelists supported a definition of surgery at any time during the admission.

Table 24: Timing of 'emergency' procedures for hernia

Procedure during the index admission	Round 1 n/N (%)	Round 2 n/N (%)
Within 1 day	0/11 (0.0%)	0/12 (0.0%)
Within 2 days	1/11 (9.1%)	0/12 (0.0%)
Within 3 days	4/11 (36.4%)	8/12 (66.7%)
Within 4 days	2/11 (18.2%)	0/12 (0.0%)
Within 7 days	1/11 (9.1%)	1/12 (8.3%)
Within 14 days	1/11 (9.1%)	0/12 (0.0%)
Any time	2/11 (18.2%)	3/12 (27.3%)
Procedure following a readmission		
N/A, not 'emergency surgery'	0/11 (0.0%)	5/12 (45.5%)
Within 2 days	1/11 (9.1%)	0/12 (0.0%)
Within 3 days	3/11 (27.3%)	2/12 (18.2%)
Within 4 days	0/11 (0.0%)	0/12(0.0%)
Within 7 days	3/11 (27.3%)	2/12 (18.2%)
Within 14 days	4/11 (36.4%)	3/12 (33.3%)

All panelists agreed that that surgery in a patient discharged and readmitted could still be defined as 'emergency surgery'. A small majority (64%) favoured a duration of 7-14 days.

Comments on timing of surgery

Below are comments on timing ordered by panelists' responses to the first timing question.

2-4 days

"48 hours because that encompasses acute emergency needs (so painful, obstructed, ischaemic should all have been operated on) leaving the only conservative management being small bowel (SB) obstruction where NASBO has shown max conservative management is 48hours.2

"Gone for 3 days, seems to marry up with the timing of surgery graph. 48 hours would also be reasonable. In reality we operate on obstructed, incarcerated hernias within 24hours often much sooner. But there are a cohort of incarcerated paraumbilical hernias with some omentum that can wait for several days. so I could be swayed to be more restrictive but less inclined to increase the amount of time."

"I have gone for small window = 3 days. Usually obvious if need operation for strangulated hernia contents. Any other hernia operation can wait days to weeks to indeed months if hernia reduced."

"Emergency in this scenario in my book would be any patient admitted and placed on the CEPOD operating list for surgery within the same admission. For hernias, less than other conditions I would be less inclined to include patients with a subsequent second admission beyond 24 hours after an initial admission. The 24 hours is quoted to allow for a patient seen in a hot clinic and advised to represent the next day for surgical intervention."

7-14 days

"To be honest I've tried to go for consistency across all the different areas that you're looking at, so I have again chosen seven days. This will make it much easier when you analyse and present the data in any manuscripts."

"Immediate: signs of intestinal ischaemia: pain, fever, high wcc. Early (24-48hrs): usually in those with renal injury but no evidence of ischaemia. Delayed (may be sent home): those that are reduced clinically and then an expedited repair is performed during same admission or on urgent elective basis."

Any time

"For me, there are 2 ways 'emergency surgery' can be categorised. The first is simply through NCEPOD classifications, and thus it can be argued that anything that is category 1 (immediate) or 2 (urgent - typically first 2-24 hours) would be a true emergency (3 = expedited, this may also count depending on the circumstances). This probably over simplifies it, however, as there is a group of patients that either get their operation delayed (thus moving beyond these time frames) or have their operation at some point on that index admission (prior to discharge) and as such I would include these also as 'emergency' (e.g. someone who had small bowel obstruction that failed a trial of conservative management at 72 hours and ended up with a laparotomy - I would call that an emergency, similarly, I suspect there is a significant cohort of patients with diverticulitis on a similar trajectory)."

Appendix 1: Appendicitis all procedures by OPCS code

OPCS code	Procedure	% Volume	Round 1	Round 2
G693	Ileectomy and anastomosis of ileum to ileum	0.01%	2/11 (18.2%)	0/12 (0.0%)
G694	Ileectomy and anastomosis of ileum to colon	0.01%	6/11 (54.5%)	6/12 (50.0%)
G699	Unspecified excision of ileum	0.01%	2/11 (18.2%)	0/12 (0.0%)
H011	Emergency excision of abnormal appendix and drainage HFQ	8.19%	11/11 (100.0%)	12/12 (100.0%)
H012	Emergency excision of abnormal appendix NEC	59.16%	11/11 (100.0%)	12/12 (100.0%)
H013	Emergency excision of normal appendix	0.89%	8/11 (72.7%)	10/12 (83.3%)
H018	Other specified emergency excision of appendix	0.05%	8/11 (72.7%)	12/12 (100.0%)
H019	Unspecified emergency excision of appendix	3.14%	11/11 (100.0%)	12/12 (100.0%)
H021	Interval appendicectomy	0.77%	0/11 (0.0%)	0/12 (0.0%)
H022	Planned delayed appendicectomy NEC	0.15%	0/11 (0.0%)	0/12 (0.0%)
H023	Prophylactic appendicectomy NEC	0.01%	0/11 (0.0%)	0/12 (0.0%)
H024	Incidental appendicectomy	0.02%	0/11 (0.0%)	0/12 (0.0%)
H028	Other specified other excision of appendix	0.25%	3/11 (27.3%)	1/12 (8.3%)
H029	Unspecified other excision of appendix	15.59%	5/11 (45.5%)	5/12 (41.7%)
H031	Drainage of abscess of appendix	0.46%	10/11 (90.9%)	12/12 (100.0%)
H032	Drainage of appendix NEC	0.01%	9/11 (81.8%)	12/12 (100.0%)
H033	Exteriorisation of appendix	0.01%	0/11 (0.0%)	0/12 (0.0%)
H038	Other specified other operations on appendix	0.01%	3/11 (27.3%)	1/12 (8.3%)
H062	Extended right hemicolectomy and anastomosis of ileum to colon	0.01%	8/11 (72.7%)	9/12 (75.0%)
H071	Right hemicolectomy and end to end anastomosis of ileum to colon	0.23%	10/11 (90.9%)	12/12 (100.0%)

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H072	Right hemicolectomy and side to side anastomosis of ileum to transverse colon	0.25%	9/11 (81.8%)	12/12 (100.0%)
H073	Right hemicolectomy and anastomosis NEC	0.19%	10/11 (90.9%)	12/12 (100.0%)
H074	Right hemicolectomy and ileostomy HFQ	0.04%	10/11 (90.9%)	12/12 (100.0%)
H078	Other specified other excision of right hemicolon	0.01%	6/11 (54.5%)	9/12 (75.0%)
H079	Unspecified other excision of right hemicolon	0.02%	6/11 (54.5%)	8/12 (66.7%)
T309	Unspecified opening of abdomen	0.02%	4/11 (36.4%)	1/12 (8.3%)
T342	Open drainage of pelvic abscess	0.02%	9/11 (81.8%)	12/12 (100.0%)
T343	Open drainage of abdominal abscess NEC	0.03%	9/11 (81.8%)	12/12 (100.0%)
T452	Image controlled percutaneous drainage of pelvic abscess	0.04%	6/11 (54.5%)	6/12 (50.0%)
T453	Image controlled percutaneous drainage of abdominal abscess NEC	0.10%	7/11 (63.6%)	6/12 (50.0%)
T454	Image controlled percutaneous drainage of lesion of abdominal cavity NEC	0.03%	6/11 (54.5%)	5/12 (41.7%)
T463	Irrigation of peritoneal cavity	0.03%	7/11 (63.6%)	10/12 (83.3%)
T468	Other specified other drainage of peritoneal cavity	0.01%	6/11 (54.5%)	9/12 (75.0%)

Appendix 2: Appendicitis all procedures by level of support

OPCS code	Procedure	% Volume	Round 1	Round 2
H011	Emergency excision of abnormal appendix and drainage HFQ	8.19%	11/11 (100.0%)	12/12 (100.0%)
H012	Emergency excision of abnormal appendix NEC	59.16%	11/11 (100.00%)	12/12 (100.0%)
H018	Other specified emergency excision of appendix	0.05%	8/11 (72.7%)	12/12 (100.0%)
H019	Unspecified emergency excision of appendix	3.14%	11/11 (100.0%)	12/12 (100.0%)
H031	Drainage of abscess of appendix	0.46%	10/11 (90.9%)	12/12 (100.0%)
H032	Drainage of appendix NEC	0.01%	9/11 (81.8%)	12/12 (100.0%)
H071	Right hemicolectomy and end to end anastomosis of ileum to colon	0.23%	10/11 (90.9%)	12/12 (100.0%)
H072	Right hemicolectomy and side to side anastomosis of ileum to transverse colon	0.25%	9/11 (81.8%)	12/12 (100.0%)
H073	Right hemicolectomy and anastomosis NEC	0.19%	10/11 (90.9%)	12/12 (100.0%)
H074	Right hemicolectomy and ileostomy HFQ	0.04%	10/11 (90.9%)	12/12 (100.0%)
T342	Open drainage of pelvic abscess	0.02%	9/11 (81.8%)	12/12 (100.0%)
T343	Open drainage of abdominal abscess NEC	0.03%	9/11 (81.8%)	12/12 (100.0%)
H013	Emergency excision of normal appendix	0.89%	8/11 (72.7%)	10/12 (83.3%)
T463	Irrigation of peritoneal cavity	0.03%	7/11 (63.6%)	10/12 (83.3%)
H062	Extended right hemicolectomy and anastomosis of ileum to colon	0.01%	8/11 (72.7%)	9/12 (75.0%)
H078	Other specified other excision of right hemicolon	0.01%	6/11 (54.5%)	9/12 (75.0%)
T468	Other specified other drainage of peritoneal cavity	0.01%	6/11 (54.5%)	9/12 (75.0%)
H079	Unspecified other excision of right hemicolon	0.02%	6/11 (54.5%)	8/12 (66.7%)
G694	Ileectomy and anastomosis of ileum to colon	0.01%	6/11 (54.5%)	6/12 (50.0%)

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T452	Image controlled percutaneous drainage of pelvic abscess	0.04%	6/11 (54.5%)	6/12 (50.0%)
T453	Image controlled percutaneous drainage of abdominal abscess NEC	0.10%	7/11 (63.6%)	6/12 (50.0%)
H029	Unspecified other excision of appendix	15.59%	5/11 (45.5%)	5/12 (41.7%)
T454	Image controlled percutaneous drainage of lesion of abdominal cavity NEC	0.03%	6/11 (54.5%)	5/12 (41.7%)
H028	Other specified other excision of appendix	0.25%	3/11 (27.3%)	1/12 (8.3%)
H038	Other specified other operations on appendix	0.01%	3/11 (27.3%)	1/12 (8.3%)
T309	Unspecified opening of abdomen	0.02%	4/11 (36.4%)	1/12 (8.3%)
G693	Ileectomy and anastomosis of ileum to ileum	0.01%	2/11 (18.2%)	0/12 (0.0%)
G699	Unspecified excision of ileum	0.01%	2/11 (18.2%)	0/12 (0.0%)
H021	Interval appendicectomy	0.77%	0/11 (0.0%)	0/12 (0.0%)
H022	Planned delayed appendicectomy NEC	0.15%	0/11 (0.0%)	0/12 (0.0%)
H023	Prophylactic appendicectomy NEC	0.01%	0/11 (0.0%)	0/12 (0.0%)
H024	Incidental appendicectomy	0.02%	0/11 (0.0%)	0/12 (0.0%)
H033	Exteriorisation of appendix	0.01%	0/11 (0.0%)	0/12 (0.0%)

Appendix 3: Cholelithiasis

OPCS code	% Volume	Round 1	Round 2
J181: Total cholecystectomy and excision of surrounding tissue (0.08%)	0.08%	11/12 (91.7%)	12/12 (100.0%)
J182: Total cholecystectomy and exploration of common bile duct (0.36%)	0.36%	10/11 (90.9%)	12/12 (100.0%)
J183: Total cholecystectomy NEC (11.69%)	11.69%	11/11 (100.0%)	12/12 (100.0%)
J184: Partial cholecystectomy and exploration of common bile duct (0.02%)	0.02%	11/12 (91.7%)	12/12 (100.0%)
J185: Partial cholecystectomy NEC (0.49%)	0.49%	12/12 (100.0%)	12/12 (100.0%)
J212: Drainage of gall bladder (0.54%)	0.54%	10/12 (83.3%)	12/12 (100.0%)
J188: Other specified excision of gall bladder (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
J189: Unspecified excision of gall bladder (0.09%)	0.09%	9/12 (75.0%)	11/12 (91.7%)
J211: Open removal of calculus from gall bladder (0.02%)	0.02%	7/12 (58.3%)	9/12 (75.0%)
J213: Drainage of tissue surrounding gall bladder (0.01%)	0.01%	7/12 (58.3%)	9/12 (75.0%)
J241: Percutaneous drainage of gall bladder (1.01%)	1.01%	6/12 (50.0%)	7/12 (58.3%)
J372: Operative cholangiography through cystic duct (0.01%)	0.01%	3/12 (25.0%)	2/12 (16.7%)
J381: Endoscopic sphincterotomy of sphincter of Oddi and removal of calculus HFQ (6.3%)	6.30%	3/12 (25.0%)	2/12 (16.67%)
J382: Endoscopic sphincterotomy of sphincter of Oddi and insertion of tubal prosthesis into bile duct (0.87%)	0.87%	3/12 (25.0%)	2/12 (16.7%)
J332: Open removal of calculus from bile duct NEC (0.01%)	0.01%	4/12 (33.3%)	1/12 (8.3%)
J333: Drainage of bile duct NEC (0.01%)	0.01%	2/12 (16.7%)	1/12 (8.3%)
J373: Direct puncture operative cholangiography (0.01%)	0.01%	2/12 (16.7%)	1/12 (8.33%)
J388: Other specified endoscopic incision of sphincter of Oddi (0.18%)	0.18%	2/12 (16.7%)	1/12 (8.3%)
J389: Unspecified endoscopic incision of sphincter of Oddi (0.37%)	0.37%	2/12 (16.7%)	1/12 (8.3%)
J411: Endoscopic retrograde extraction of calculus from bile duct (0.34%)	0.34%	2/12 (16.7%)	1/12 (8.3%)

J413: Endoscopic retrograde lithotripsy of calculus of bile duct (0.05%)	0.05%	2/12 (16.7%)	1/12 (8.3%)
J501: T tube cholangiography (0.01%)	0.01%	3/12 (25.0%)	1/12 (8.3%)
J342: Sphincteroplasty of bile duct using duodenal approach NEC (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J349: Unspecified plastic repair of sphincter of Oddi using duodenal approach (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J352: Sphincterotomy of bile duct using duodenal approach NEC (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J359: Unspecified incision of sphincter of Oddi using duodenal approach (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J391: Endoscopic sphincterotomy of accessory ampulla of Vater (0.03%)	0.03%	0/12 (0.0%)	0/12 (0.0%)
J401: Endoscopic retrograde insertion of tubal prosthesis into both hepatic ducts (0.01%)	0.01%	1/12 (8.3%)	0/12 (0.0%)
J402: Endoscopic retrograde insertion of tubal prosthesis into bile duct NEC (0.34%)	0.34%	2/12 (16.7%)	0/12 (0.0%)
J403: Endoscopic retrograde renewal of tubal prosthesis in bile duct NEC (0.03%)	0.03%	1/12 (8.3%)	0/12 (0.0%)
J404: Endoscopic retrograde removal of tubal prosthesis from bile duct (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J405: Endoscopic retrograde insertion of expanding covered metal stent into bile duct (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J406: Endoscopic retrograde insertion of expanding metal stent into bile duct NEC (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J412: Endoscopic dilation of bile duct NEC (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J418: Other specified other therapeutic endoscopic retrograde operations on bile duct (0.02%)	0.02%	1/12 (8.3%)	0/12 (0.0%)
J421: Endoscopic retrograde insertion of tubal prosthesis into pancreatic duct (0.03%)	0.03%	0/12 (0.0%)	0/12 (0.0%)
J431: Endoscopic retrograde cholangiopancreatography and biopsy of lesion of ampulla of Vater (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J438: Other specified diagnostic endoscopic retrograde examination of bile duct and pancreatic duct (0.01%)	0.01%	1/12 (8.3%)	0/12 (0.0%)
J439: Unspecified diagnostic endoscopic retrograde examination of bile duct and pancreatic duct (0.56%)	0.56%	1/12 (8.3%)	0/12 (0.0%)
J441: Endoscopic retrograde cholangiography and biopsy of lesion of bile duct (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
J449: Unspecified diagnostic endoscopic retrograde examination of bile duct (0.07%)	0.07%	2/12 (16.7%)	0/12 (0.0%)
J459: Unspecified diagnostic endoscopic retrograde examination of pancreatic duct (0.02%)	0.02%	1/12 (8.3%)	0/12 (0.0%)

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J475: Percutaneous insertion of tubal prosthesis into common bile duct (0.02%)	0.02%	1/12 (8.3%)	0/12 (0.0%)
J486: Percutaneous transhepatic biliary drainage single (0.05%)	0.05%	1/12 (8.3%)	0/12 (0.0%)
J502: Percutaneous cholangiography NEC (0.01%)	0.01%	2/12 (16.7%)	0/12 (0.0%)
J505: Percutaneous transhepatic cholangiography (0.01%)	0.01%	2/12 (16.7%)	0/12 (0.0%)
J539: Unspecified endoscopic ultrasound examination of bile duct (0.02%)	0.02%	1/12 (8.3%)	0/12 (0.0%)
T439: Unspecified diagnostic endoscopic examination of peritoneum (0.05%)	0.05%	1/12 (8.3%)	0/12 (0.0%)

Appendix 4: Diverticulitis

OPCS code	% Volume	Round 1 n/N (%)	Round 2 n/N (%)
H091: Left hemicolectomy and end to end anastomosis of colon to rectum (0.02%)	0.02%	11/12 (91.7%)	12/12 (100.0%)
H092: Left hemicolectomy and end to end anastomosis of colon to colon (0.01%)	0.01%	11/12 (91.7%)	12/12 (100.0%)
H093: Left hemicolectomy and anastomosis NEC (0.01%)	0.01%	11/12 (91.7%)	12/12 (100.0%)
H094: Left hemicolectomy and ileostomy HFQ (0.01%)	0.01%	9/12 (75.0%)	12/12 (100.0%)
H095: Left hemicolectomy and exteriorisation of bowel NEC (0.09%)	0.09%	11/12 (91.7%)	12/12 (100.0%)
H101: Sigmoid colectomy and end to end anastomosis of ileum to rectum (0.03%)	0.03%	10/12 (83.3%)	12/12 (100.0%)
H102: Sigmoid colectomy and anastomosis of colon to rectum (0.08%)	0.08%	11/12 (91.7%)	12/12 (100.0%)
H103: Sigmoid colectomy and anastomosis NEC (0.12%)	0.12%	11/12 (91.7%)	12/12 (100.0%)
H104: Sigmoid colectomy and ileostomy HFQ (0.11%)	0.11%	11/12 (91.7%)	12/12 (100.0%)
H105: Sigmoid colectomy and exteriorisation of bowel NEC (0.45%)	0.45%	11/12 (91.7%)	12/12 (100.0%)
H113: Colectomy and anastomosis NEC (0.01%)	0.01%	11/12 (91.7%)	12/12 (100.0%)
H114: Colectomy and ileostomy NEC (0.05%)	0.05%	10/12 (83.3%)	12/12 (100.0%)
H115: Colectomy and exteriorisation of bowel NEC (0.02%)	0.02%	11/12 (91.7%)	12/12 (100.0%)
H152: End colostomy (0.03%)	0.03%	11/12 (91.7%)	12/12 (100.0%)
H158: Other specified other exteriorisation of colon (0.01%)	0.01%	10/12 (83.3%)	12/12 (100.0%)
H333: Anterior resection of rectum and anastomosis of colon to rectum using staples (0.13%)	0.13%	11/12 (91.7%)	12/12 (100.0%)
H334: Anterior resection of rectum and anastomosis NEC (0.06%)	0.06%	11/12 (91.7%)	12/12 (100.0%)
H335: Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel (4.55%)	4.55%	12/12 (100.0%)	12/12 (100.0%)
H336: Anterior resection of rectum and exteriorisation of bowel (0.2%)	0.20%	9/12 (75.0%)	12/12 (100.0%)
T342: Open drainage of pelvic abscess (0.09%)	0.09%	9/12 (75.0%)	12/12 (100.0%)

T343: Open drainage of abdominal abscess NEC (0.08%)	0.08%	10/12 (83.3%)	12/12 (100.0%)
T348: Other specified open drainage of peritoneum (0.01%)	0.01%	8/12 (66.7%)	12/12 (100.0%)
H108: Other specified excision of sigmoid colon (0.01%)	0.01%	7/12 (58.3%)	11/12 (91.7%)
H109: Unspecified excision of sigmoid colon (0.02%)	0.02%	7/12 (58.3%)	11/12 (91.7%)
H121: Excision of diverticulum of colon (0.03%)	0.03%	8/12 (66.7%)	11/12 (91.7%)
H159: Unspecified other exteriorisation of colon (0.01%)	0.01%	9/12 (75.0%)	11/12 (91.7%)
T463: Irrigation of peritoneal cavity (0.5%)	0.50%	9/12 (75.0%)	11/12 (91.7%)
T468: Other specified other drainage of peritoneal cavity (0.04%)	0.04%	9/12 (75.0%)	11/12 (91.7%)
H111: Colectomy and end to end anastomosis of colon to colon NEC (0.01%)	0.01%	7/12 (58.3%)	10/12 (83.3%)
H112: Colectomy and side to side anastomosis of ileum to colon NEC (0.01%)	0.01%	8/12 (66.7%)	10/12 (83.3%)
H151: Loop colostomy (0.14%)	0.14%	7/12 (58.3%)	10/12 (83.3%)
T349: Unspecified open drainage of peritoneum (0.01%)	0.01%	7/12 (58.3%)	10/12 (83.3%)
T469: Unspecified other drainage of peritoneal cavity (0.01%)	0.01%	8/12 (66.7%)	10/12 (83.3%)
H053: Total colectomy and ileostomy NEC (0.08%)	0.08%	7/12 (58.3%)	9/12 (75.0%)
H062: Extended right hemicolectomy and anastomosis of ileum to colon (0.02%)	0.02%	7/12 (58.3%)	9/12 (75.0%)
H064: Extended right hemicolectomy and ileostomy HFQ (0.01%)	0.01%	7/12 (58.3%)	9/12 (75.0%)
H071: Right hemicolectomy and end to end anastomosis of ileum to colon (0.1%)	0.10%	6/12 (50.0%)	9/12 (75.0%)
H072: Right hemicolectomy and side to side anastomosis of ileum to transverse colon (0.16%)	0.16%	6/12 (50.0%)	9/12 (75.0%)
H073: Right hemicolectomy and anastomosis NEC (0.09%)	0.09%	6/12 (50.0%)	9/12 (75.0%)
H074: Right hemicolectomy and ileostomy HFQ (0.06%)	0.06%	6/12 (50.0%)	9/12 (75.0%)
H161: Drainage of colon (0.1%)	0.10%	7/12 (58.3%)	8/12 (66.7%)
H299: Unspecified subtotal excision of colon (0.03%)	0.03%	6/12 (50.0%)	8/12 (66.7%)

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H298: Other specified subtotal excision of colon (0.09%)	0.09%	7/12 (58.3%)	7/12 (58.3%)
G742: Creation of temporary ileostomy (0.02%)	0.02%	5/12 (41.7%)	6/12 (50.0%)
G743: Creation of defunctioning ileostomy (0.03%)	0.03%	5/12 (41.7%)	6/12 (50.0%)
T452: Image controlled percutaneous drainage of pelvic abscess (0.27%)	0.27%	4/12 (33.3%)	5/12 (41.7%)
T453: Image controlled percutaneous drainage of abdominal abscess NEC (0.29%)	0.29%	4/12 (33.3%)	5/12 (41.7%)
H079: Unspecified other excision of right hemicolon (0.01%)	0.01%	4/12 (33.3%)	4/12 (33.3%)
T454: Image controlled percutaneous drainage of lesion of abdominal cavity NEC (0.07%)	0.07%	4/12 (33.3%)	4/12 (33.3%)
T458: Other specified image controlled operations on abdominal cavity (0.02%)	0.02%	4/12 (33.3%)	2/12 (16.7%)
H011: Emergency excision of abnormal appendix and drainage HFQ (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
H012: Emergency excision of abnormal appendix NEC (0.02%)	0.02%	0/12 (0.0%)	0/12 (0.0%)
H013: Emergency excision of abnormal appendix NEC (0.1%)	0.10%	0/12 (0.0%)	0/12 (0.0%)
H019: Unspecified emergency excision of appendix (0.01%)	0.01%	0/12 (0.0%)	0/12 (0.0%)
H029: Unspecified other excision of appendix (0.03%)	0.03%	0/12 (0.0%)	0/12 (0.0%)
H198: Other specified other open operations on colon (0.02%)	0.02%	4/12 (33.3%)	0/12 (0.0%)
T309: Unspecified opening of abdomen (0.06%)	0.06%	3/12 (25.0%)	0/12 (0.0%)

Appendix 5: Intestinal obstruction

OPCS code	% Volume	Round 1	Round 2
G584: Partial jejunectomy and anastomosis of jejunum to ileum (0.19%)	0.19%	11/12 (91.7%)	12/12 (100.0%)
G588: Other specified excision of jejunum (0.02%)	0.02%	11/12 (91.7%)	12/12 (100.0%)
G611: Bypass of jejunum by anastomosis of jejunum to jejunum (0.03%)	0.03%	10/12 (83.3%)	12/12 (100.0%)
G612: Bypass of jejunum by anastomosis of jejunum to ileum (0.01%)	0.01%	10/12 (83.3%)	12/12 (100.0%)
G613: Bypass of jejunum by anastomosis of jejunum to colon (0.02%)	0.02%	10/12 (83.3%)	12/12 (100.0%)
G693: Ileectomy and anastomosis of ileum to ileum (2.31%)	2.31%	11/12 (91.7%)	12/12 (100.0%)
G694: Ileectomy and anastomosis of ileum to colon (0.39%)	0.39%	11/12 (91.7%)	12/12 (100.0%)
G698: Other specified excision of ileum (0.32%)	0.32%	9/12 (75.0%)	12/12 (100.0%)
G699: Unspecified excision of ileum (0.97%)	0.97%	11/12 (91.7%)	12/12 (100.0%)
G711: Bypass of ileum by anastomosis of jejunum to ileum (0.01%)	0.01%	9/12 (75.0%)	12/12 (100.0%)
G712: Bypass of ileum by anastomosis of ileum to ileum (0.08%)	0.08%	9/12 (75.0%)	12/12 (100.0%)
G713: Bypass of ileum by anastomosis of ileum to caecum (0.02%)	0.02%	9/12 (75.0%)	12/12 (100.0%)
G714: Bypass of ileum by anastomosis of ileum to transverse colon (0.07%)	0.07%	10/12 (83.3%)	12/12 (100.0%)
G715: Bypass of ileum by anastomosis of ileum to colon NEC (0.07%)	0.07%	10/12 (83.3%)	12/12 (100.0%)
G718: Other specified bypass of ileum (0.01%)	0.01%	10/12 (83.3%)	12/12 (100.0%)
G719: Unspecified bypass of ileum (0.01%)	0.01%	10/12 (83.3%)	12/12 (100.0%)
G722: Anastomosis of ileum to transverse colon (0.02%)	0.02%	10/12 (83.3%)	12/12 (100.0%)
G723: Anastomosis of ileum to colon NEC (0.02%)	0.02%	10/12 (83.3%)	12/12 (100.0%)
G762: Open relief of strangulation of ileum (0.1%)	0.10%	11/12 (91.7%)	12/12 (100.0%)
G763: Open relief of obstruction of ileum NEC (0.61%)	0.61%	12/12 (100.0%)	12/12 (100.0%)

T412: Division of band of peritoneum (1.27%)	1.27%	12/12 (100.0%)	12/12 (100.0%)
T413: Freeing of adhesions of peritoneum (7.7%)	7.70%	12/12 (100.0%)	12/12 (100.0%)
T415: Freeing of extensive adhesions of peritoneum (0.95%)	0.95%	12/12 (100.0%)	12/12 (100.0%)
G589: Unspecified excision of jejunum (0.04%)	0.04%	10/12 (83.3%)	11/12 (91.7%)
G601: Creation of jejunostomy (0.01%)	0.01%	9/12 (75.0%)	11/12 (91.7%)
G692: Ileectomy and anastomosis of duodenum to ileum (0.03%)	0.03%	9/12 (75.0%)	11/12 (91.7%)
H051: Total colectomy and anastomosis of ileum to rectum (0.02%)	0.02%	8/12 (66.7%)	11/12 (91.7%)
H053: Total colectomy and ileostomy NEC (0.06%)	0.06%	7/12 (58.3%)	11/12 (91.7%)
H061: Extended right hemicolectomy and end to end anastomosis (0.05%)	0.05%	9/12 (75.0%)	11/12 (91.7%)
H062: Extended right hemicolectomy and anastomosis of ileum to colon (0.16%)	0.16%	9/12 (75.0%)	11/12 (91.7%)
H063: Extended right hemicolectomy and anastomosis NEC (0.06%)	0.06%	9/12 (75.0%)	11/12 (91.7%)
H064: Extended right hemicolectomy and ileostomy HFQ (0.08%)	0.08%	9/12 (75.0%)	11/12 (91.7%)
H068: Other specified extended excision of right hemicolon (0.01%)	0.01%	9/12 (75.0%)	11/12 (91.7%)
H069: Unspecified extended excision of right hemicolon (0.01%)	0.01%	9/12 (75.0%)	11/12 (91.7%)
H071: Right hemicolectomy and end to end anastomosis of ileum to colon (0.76%)	0.76%	9/12 (75.0%)	11/12 (91.7%)
H072: Right hemicolectomy and side to side anastomosis of ileum to transverse colon (0.98%)	0.98%	9/12 (75.0%)	11/12 (91.7%)
H073: Right hemicolectomy and anastomosis NEC (0.53%)	0.53%	9/12 (75.0%)	11/12 (91.7%)
H074: Right hemicolectomy and ileostomy HFQ (0.32%)	0.32%	9/12 (75.0%)	11/12 (91.7%)
H075: Right hemicolectomy and end to side anastomosis (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
H078: Other specified other excision of right hemicolon (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
H079: Unspecified other excision of right hemicolon (0.07%)	0.07%	9/12 (75.0%)	11/12 (91.7%)
H081: Transverse colectomy and end to end anastomosis (0.01%)	0.01%	8/12 (66.7%)	11/12 (91.7%)

H082: Transverse colectomy and anastomosis of ileum to colon (0.01%)	0.01%	9/12 (75.0%)	11/12 (91.7%)
H083: Transverse colectomy and anastomosis NEC (0.01%)	0.01%	8/12 (66.7%)	11/12 (91.7%)
H085: Transverse colectomy and exteriorisation of bowel NEC (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
H091: Left hemicolectomy and end to end anastomosis of colon to rectum (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
H092: Left hemicolectomy and end to end anastomosis of colon to colon (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
H093: Left hemicolectomy and anastomosis NEC (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
H094: Left hemicolectomy and ileostomy HFQ (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
H095: Left hemicolectomy and exteriorisation of bowel NEC (0.06%)	0.06%	9/12 (75.0%)	11/12 (91.7%)
H101: Sigmoid colectomy and end to end anastomosis of ileum to rectum (0.04%)	0.04%	8/12 (66.7%)	11/12 (91.7%)
H102: Sigmoid colectomy and anastomosis of colon to rectum (0.06%)	0.06%	9/12 (75.0%)	11/12 (91.7%)
H103: Sigmoid colectomy and anastomosis NEC (0.1%)	0.10%	9/12 (75.0%)	11/12 (91.7%)
H104: Sigmoid colectomy and ileostomy HFQ (0.06%)	0.06%	9/12 (75.0%)	11/12 (91.7%)
H105: Sigmoid colectomy and exteriorisation of bowel NEC (0.19%)	0.19%	9/12 (75.0%)	11/12 (91.7%)
H109: Unspecified excision of sigmoid colon (0.02%)	0.02%	9/12 (75.0%)	11/12 (91.7%)
H111: Colectomy and end to end anastomosis of colon to colon NEC (0.04%)	0.04%	10/12 (83.3%)	11/12 (91.7%)
H112: Colectomy and side to side anastomosis of ileum to colon NEC (0.07%)	0.07%	9/12 (75.0%)	11/12 (91.7%)
H113: Colectomy and anastomosis NEC (0.03%)	0.03%	9/12 (75.0%)	11/12 (91.7%)
H114: Colectomy and ileostomy NEC (0.08%)	0.08%	10/12 (83.3%)	11/12 (91.7%)
H115: Colectomy and exteriorisation of bowel NEC (0.03%)	0.03%	9/12 (75.0%)	11/12 (91.7%)
H131: Bypass of colon by anastomosis of ileum to colon (0.05%)	0.05%	9/12 (75.0%)	11/12 (91.7%)
H138: Other specified bypass of colon (0.01%)	0.01%	8/12 (66.7%)	11/12 (91.7%)
H151: Loop colostomy (0.97%)	0.97%	9/12 (75.0%)	11/12 (91.7%)

H152: End colostomy (0.07%)	0.07%	9/12 (75.0%)	11/12 (91.7%)
H176: Open relief of obstruction of colon NEC (0.1%)	0.10%	8/12 (66.7%)	11/12 (91.7%)
H298: Other specified subtotal excision of colon (0.11%)	0.11%	8/12 (66.7%)	11/12 (91.7%)
H299: Unspecified subtotal excision of colon (0.05%)	0.05%	9/12 (75.0%)	11/12 (91.7%)
H333: Anterior resection of rectum and anastomosis of colon to rectum using staples (0.07%)	0.07%	7/12 (58.3%)	11/12 (91.7%)
H334: Anterior resection of rectum and anastomosis NEC (0.04%)	0.04%	7/12 (58.3%)	11/12 (91.7%)
H335: Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel (0.97%)	0.97%	9/12 (75.0%)	11/12 (91.7%)
H336: Anterior resection of rectum and exteriorisation of bowel (0.07%)	0.07%	8/12 (66.7%)	11/12 (91.7%)
T423: Endoscopic division of adhesions of peritoneum (1.32%)	1.32%	9/12 (75.0%)	11/12 (91.7%)
G702: Excision of lesion of ileum NEC (0.08%)	0.08%	7/12 (58.3%)	10/12 (83.3%)
G742: Creation of temporary ileostomy (0.19%)	0.19%	9/12 (75.0%)	10/12 (83.3%)
G743: Creation of defunctioning ileostomy (0.29%)	0.29%	9/12 (75.0%)	10/12 (83.3%)
H158: Other specified other exteriorisation of colon (0.03%)	0.03%	7/12 (58.3%)	10/12 (83.3%)
H159: Unspecified other exteriorisation of colon (0.05%)	0.05%	7/12 (58.3%)	10/12 (83.3%)
H171: Open reduction of intussusception of colon (0.01%)	0.01%	7/12 (58.3%)	10/12 (83.3%)
H172: Open reduction of volvulus of caecum (0.08%)	0.08%	7/12 (58.3%)	10/12 (83.3%)
H173: Open reduction of volvulus of sigmoid colon (0.12%)	0.12%	7/12 (58.3%)	10/12 (83.3%)
H174: Open reduction of volvulus of colon NEC (0.06%)	0.06%	7/12 (58.3%)	10/12 (83.3%)
G591: Excision of lesion of jejunum (0.02%)	0.02%	7/12 (58.3%)	9/12 (75.0%)
G691: Ileectomy and anastomosis of stomach to ileum (0.02%)	0.02%	7/12 (58.3%)	9/12 (75.0%)
G728: Other specified other connection of ileum (0.01%)	0.01%	7/12 (58.3%)	9/12 (75.0%)
G761: Open reduction of intussusception of ileum (0.05%)	0.05%	8/12 (66.7%)	9/12 (75.0%)

G782: Strictureplasty of ileum (0.07%)	0.07%	7/12 (58.3%)	9/12 (75.0%)
G783: Removal of foreign body from ileum (0.48%)	0.48%	7/12 (58.3%)	9/12 (75.0%)
H119: Unspecified other excision of colon (0.03%)	0.03%	8/12 (66.7%)	9/12 (75.0%)
H122: Excision of lesion of colon NEC (0.02%)	0.02%	7/12 (58.3%)	9/12 (75.0%)
H141: Tube caecostomy (0.01%)	0.01%	6/12 (50.0%)	8/12 (66.7%)
G734: Resection of ileocolic anastomosis (0.07%)	0.07%	6/12 (50.0%)	7/12 (58.3%)
H149: Unspecified exteriorisation of caecum (0.05%)	0.05%	6/12 (50.0%)	7/12 (58.3%)
T202: Primary repair of inguinal hernia using insert of prosthetic material (0.02%)	0.02%	6/12 (50.0%)	7/12 (58.3%)
T203: Primary repair of inguinal hernia using sutures (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
T209: Unspecified primary repair of inguinal hernia (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
T212: Repair of recurrent inguinal hernia using insert of prosthetic material (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
T222: Primary repair of femoral hernia using insert of prosthetic material (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
T223: Primary repair of femoral hernia using sutures (0.02%)	0.02%	6/12 (50.0%)	7/12 (58.3%)
T229: Unspecified primary repair of femoral hernia	0.01%	6/12 (50.0%)	7/12 (58.3%)
T242: Repair of umbilical hernia using insert of prosthetic material (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
T243: Repair of umbilical hernia using sutures (0.03%)	0.03%	6/12 (50.0%)	7/12 (58.3%)
T252: Primary repair of incisional hernia using insert of prosthetic material (0.03%)	0.03%	6/12 (50.0%)	7/12 (58.3%)
T253: Primary repair of incisional hernia using sutures (0.02%)	0.02%	6/12 (50.0%)	7/12 (58.3%)
T259: Unspecified primary repair of incisional hernia (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
T262: Repair of recurrent incisional hernia using insert of prosthetic material (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
T272: Repair of ventral hernia using insert of prosthetic material (0.03%)	0.03%	6/12 (50.0%)	7/12 (58.3%)
T273: Repair of ventral hernia using sutures (0.03%)	0.03%	6/12 (50.0%)	7/12 (58.3%)

T278: Other specified repair of other hernia of abdominal wall (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
T279: Unspecified repair of other hernia of abdominal wall (0.01%)	0.01%	6/12 (50.0%)	7/12 (58.3%)
H194: Open removal of foreign body from colon (0.02%)	0.02%	6/12 (50.0%)	6/12 (50.0%)
G598: Other specified extirpation of lesion of jejunum (0.01%)	0.01%	5/12 (41.7%)	4/12 (33.3%)
G678: Other specified other operations on jejunum (0.01%)	0.01%	5/12 (41.7%)	4/12 (33.3%)
G768: Other specified intra-abdominal manipulation of ileum (0.06%)	0.06%	4/12 (33.3%)	4/12 (33.3%)
G632: Incision of jejunum (0.03%)	0.03%	4/12 (33.3%)	3/12 (25.0%)
G638: Other specified other open operations on jejunum (0.08%)	0.08%	4/12 (33.3%)	3/12 (25.0%)
G748: Other specified creation of artificial opening into ileum (0.03%)	0.03%	5/12 (41.7%)	3/12 (25.0%)
G788: Other specified other open operations on ileum	0.26%	5/12 (41.7%)	3/12 (25.0%)
G701: Excision of Meckel's diverticulum	0.06%	3/12 (25.0%)	2/12 (16.7%)
H163: Colotomy	0.01%	3/12 (25.0%)	2/12 (16.7%)
H178: Other specified intra-abdominal manipulation of colon	0.01%	4/12 (33.3%)	2/12 (16.7%)
H198: Other specified other open operations on colon	0.02%	5/12 (41.7%)	2/12 (16.7%)
H331: Abdominoperineal excision of rectum and end colostomy	0.01%	3/12 (25.0%)	2/12 (16.7%)
T283: Resuture of previous incision of anterior abdominal wall	0.01%	3/12 (25.0%)	2/12 (16.7%)
G708: Other specified open extirpation of lesion of ileum	0.01%	3/12 (25.0%)	1/12 (8.3%)
G731: Revision of anastomosis of ileum	0.03%	3/12 (25.0%)	1/12 (8.3%)
G749: Unspecified creation of artificial opening into ileum	0.03%	4/12 (33.3%)	1/12 (8.3%)
G758: Other specified attention to artificial opening into ileum	0.02%	3/12 (25.0%)	1/12 (8.3%)
G784: Closure of perforation of ileum	0.05%	3/12 (25.0%)	1/12 (8.3%)
G822: Intubation of ileum for decompression of intestine	0.05%	3/12 (25.0%)	1/12 (8.3%)

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H192: Fixation of colon	0.05%	2/12 (16.7%)	1/12 (8.3%)
G633: Closure of perforation of jejunum	0.01%	3/12 (25.0%)	0/12 (0.0%)
G786: Open intubation of ileum	0.01%	1/12 (8.3%)	0/12 (0.0%)
G828: Other specified other operations on ileum	0.01%	3/12 (25.0%)	0/12 (0.0%)
H011: Emergency excision of abnormal appendix and drainage HFQ (0.01%)	0.01%	2/12 (16.7%)	0/12 (0.0%)
H012: Emergency excision of abnormal appendix NEC (0.06%)	0.06%	2/12 (16.7%)	0/12 (0.0%)
H013: Emergency excision of normal appendix (0.06%)	0.06%	1/12 (8.3%)	0/12 (0.0%)
H019: Unspecified emergency excision of appendix (0.01%)	0.01%	1/12 (8.3%)	0/12 (0.0%)
H029: Unspecified other excision of appendix (0.04%)	0.04%	1/12 (8.3%)	0/12 (0.0%)
H193: Enterorrhaphy of colon (0.01%)	0.01%	1/12 (8.3%)	0/12 (0.0%)

Appendix 6: Hernia

Main procedure	% Volume	Round 1	Round 2
T201: Primary repair of inguinal hernia using insert of natural material	0.10%	10/11 (90.9%)	12/12 (100.0%)
T202: Primary repair of inguinal hernia using insert of prosthetic material	23.62%	11/11 (100.0%)	12/12 (100.0%)
T203: Primary repair of inguinal hernia using sutures	2.22%	11/11 (100.0%)	12/12 (100.0%)
T204: Primary repair of inguinal hernia and reduction of sliding hernia	0.08%	10/11 (90.9%)	12/12 (100.0%)
T208: Other specified primary repair of inguinal hernia	0.09%	10/11 (90.9%)	12/12 (100.0%)
T209: Unspecified primary repair of inguinal hernia	0.85%	10/11 (90.9%)	12/12 (100.0%)
T211: Repair of recurrent inguinal hernia using insert of natural material	0.03%	9/11 (81.8%)	12/12 (100.0%)
T212: Repair of recurrent inguinal hernia using insert of prosthetic material	3.86%	10/11 (90.9%)	12/12 (100.0%)
T213: Repair of recurrent inguinal hernia using sutures	0.67%	8/11 (72.7%)	12/12 (100.0%)
T218: Other specified repair of recurrent inguinal hernia	0.03%	9/11 (81.8%)	12/12 (100.0%)
T219: Unspecified repair of recurrent inguinal hernia	0.15%	9/11 (81.8%)	12/12 (100.0%)
T221: Primary repair of femoral hernia using insert of natural material	0.10%	10/11 (90.9%)	12/12 (100.0%)
T222: Primary repair of femoral hernia using insert of prosthetic material	6.10%	11/11 (100.0%)	12/12 (100.0%)
T223: Primary repair of femoral hernia using sutures	8.20%	11/11 (100.0%)	12/12 (100.0%)
T228: Other specified primary repair of femoral hernia	0.12%	10/11 (90.9%)	12/12 (100.0%)
T229: Unspecified primary repair of femoral hernia	1.16%	10/11 (90.9%)	12/12 (100.0%)
T231: Repair of recurrent femoral hernia using insert of natural material	0.01%	8/11 (72.7%)	12/12 (100.0%)
T232: Repair of recurrent femoral hernia using insert of prosthetic material	0.25%	9/11 (81.8%)	12/12 (100.0%)
T233: Repair of recurrent femoral hernia using sutures	0.19%	9/11 (81.8%)	12/12 (100.0%)
T239: Unspecified repair of recurrent femoral hernia	0.02%	9/11 (81.8%)	12/12 (100.0%)

T242: Repair of umbilical hernia using insert of prosthetic material	0.09%	11/11 (100.0%)	12/12 (100.0%)
T243: Repair of umbilical hernia using sutures	0.08%	11/11 (100.0%)	12/12 (100.0%)
T249: Unspecified primary repair of umbilical hernia	0.01%	10/11 (90.9%)	12/12 (100.0%)
T271: Repair of ventral hernia using insert of natural material	0.02%	10/11 (90.9%)	12/12 (100.0%)
T272: Repair of ventral hernia using insert of prosthetic material	1.07%	11/11 (100.0%)	12/12 (100.0%)
T273: Repair of ventral hernia using sutures	0.95%	11/11 (100.0%)	12/12 (100.0%)
T278: Other specified repair of other hernia of abdominal wall	0.06%	10/11 (90.9%)	12/12 (100.0%)
T279: Unspecified repair of other hernia of abdominal wall	0.23%	10/11 (90.9%)	12/12 (100.0%)
T288: Other specified other repair of anterior abdominal wall	0.01%	8/11 (72.7%)	12/12 (100.0%)
G762: Open relief of strangulation of ileum	0.02%	7/11 (63.6%)	11/12 (91.7%)
G763: Open relief of obstruction of ileum NEC	0.04%	7/11 (63.6%)	11/12 (91.7%)
H176: Open relief of obstruction of colon NEC	0.01%	6/11 (54.5%)	11/12 (91.7%)
T251: Primary repair of incisional hernia using insert of natural material	0.06%	10/11 (90.9%)	11/12 (91.7%)
T972: Repair of recurrent umbilical hernia using insert of prosthetic material	0.01%	9/11 (81.8%)	11/12 (91.7%)
T981: Repair of recurrent ventral hernia using insert of natural material	0.01%	9/11 (81.8%)	11/12 (91.7%)
T982: Repair of recurrent ventral hernia using insert of prosthetic material	0.09%	9/11 (81.8%)	11/12 (91.7%)
T983: Repair of recurrent ventral hernia using sutures	0.06%	9/11 (81.8%)	11/12 (91.7%)
T989: Unspecified repair of recurrent other hernia of abdominal wall	0.01%	9/11 (81.8%)	11/12 (91.7%)
T252: Primary repair of incisional hernia using insert of prosthetic material	1.86%	11/11 (100.0%)	10/12 (83.3%)
T253: Primary repair of incisional hernia using sutures	1.35%	11/11 (100.0%)	10/12 (83.3%)
T258: Other specified primary repair of incisional hernia	0.05%	11/11 (100.0%)	10/12 (83.3%)
T259: Unspecified primary repair of incisional hernia	0.25%	10/11 (90.9%)	10/12 (83.3%)

T261: Repair of recurrent incisional hernia using insert of natural material	0.02%	9/11 (81.8%)	10/12 (83.3%)
T262: Repair of recurrent incisional hernia using insert of prosthetic material	0.37%	9/11 (81.8%)	10/12 (83.3%)
T263: Repair of recurrent incisional hernia using sutures	0.14%	9/11 (81.8%)	10/12 (83.3%)
T268: Other specified repair of recurrent incisional hernia	0.01%	9/11 (81.8%)	10/12 (83.3%)
T269: Unspecified repair of recurrent incisional hernia	0.02%	9/11 (81.8%)	10/12 (83.3%)
T318: Other specified other operations on anterior abdominal wall	0.02%	6/11 (54.5%)	9/12 (75.0%)
T199: Unspecified simple excision of inguinal hernial sac	0.01%	5/11 (45.5%)	7/12 (58.3%)
T283: Resuture of previous incision of anterior abdominal wall	0.01%	7/11 (63.6%)	7/12 (58.3%)
T192: Unilateral herniotomy	0.05%	5/11 (45.5%)	6/12 (50.0%)
T274: Removal of prosthetic material from previous repair of ventral hernia	0.01%	6/11 (54.5%)	6/12 (50.0%)
T214: Removal of prosthetic material from previous repair of inguinal hernia	0.01%	5/11 (45.5%)	5/12 (41.7%)
T234: Removal of prosthetic material from previous repair of femoral hernia	0.01%	5/11 (45.5%)	3/12 (25.0%)
T412: Division of band of peritoneum	0.01%	2/11 (18.2%)	1/12 (8.3%)
T413: Freeing of adhesions of peritoneum	0.15%	2/11 (18.2%)	1/12 (8.3%)
T415: Freeing of extensive adhesions of peritoneum	0.02%	2/11 (18.2%)	1/12 (8.3%)
T423: Endoscopic division of adhesions of peritoneum	0.01%	2/11 (18.2%)	1/12 (8.3%)
T439: Unspecified diagnostic endoscopic examination of peritoneum	0.02%	3/11 (27.3%)	1/12 (8.3%)

Appendix 7: Clinical Panel Members

Name	Location	Role / Specialism
Matthew Bedford	University Hospitals Birmingham NHS Foundation Trust	General & Colorectal Surgeon
Natalie Blencowe	University of Bristol	Upper Gastrointestinal Surgeon and MRC Clinician Scientist
Andrew de Beaux	Royal Infirmary of Edinburgh	Consultant General & Upper Gastrointestinal Surgeon and Honorary Clinical Senior Lecturer
Martyn Evans	Swansea University	Consultant General & Colorectal Surgeon and Honorary Professor of Surgery
Deepak Hariharan	Royal London Hospital	Consultant General & HPB Surgeon
Deena Harji	CHU de Bordeaux	Surgical Fellow in Robotics and Advanced Pelvic Malignancy
Matt Lee	University of Sheffield	NIHR Clinical Lecturer in General Surgery
Sonia Lockwood	Bradford Teaching Hospitals	Consultant Colorectal Surgeon
Frank McDermott	Royal Devon & Exeter NHS Foundation Trust	Consultant Colorectal Surgeon
Susan Moug	University of Glasgow	Consultant Colorectal Surgeon and Honorary Professor
Dale Vimalachandran	Countess of Chester Hospital	Consultant General & Colorectal Surgeon
Ravinder Vohra	University of Nottingham	Consultant General & Gastrointestinal Surgeon and Honorary Clinical Associate Professor