Australian Government

Department of Health

Application Form

(New and Amended

Requests for Public Funding)

(Version 2.4)

This application form is to be completed for new and amended requests for public funding (including but not limited to the Medicare Benefits Schedule (MBS)). It describes the detailed information that the Australian Government Department of Health requires in order to determine whether a proposed medical service is suitable.

Please use this template, along with the associated Application Form Guidelines to prepare your application. Please complete all questions that are applicable to the proposed service, providing relevant information only. Applications not completed in full will not be accepted.

Should you require any further assistance, departmental staff are available through the Health Technology Assessment Team (HTA Team) on the contact numbers and email below to discuss the application form, or any other component of the Medical Services Advisory Committee process.

Phone: +61 2 6289 7550
Fax: +61 2 6289 5540
Email: hta@health.gov.au
Website: www.msac.gov.au

PART 1 – APPLICANT DETAILS

1. **Applicant details (primary and alternative contacts)**

Corporation / partnership details (where relevant): Dr Fergus W Gardiner
Corporation name: Gastroenterological Society of Australia
ABN: 44 001 171 115
Business trading name: Gastroenterological Society of Australia

Primary contact name: Dr Fergus W Gardiner

Primary contact numbers
Business: REDACTED
Mobile: REDACTED
Email: REDACTED

Alternative contact name: Dr Fiona Bailey

Alternative contact numbers
Business: Gastroenterological Society of Australia
Mobile: REDACTED
Email: REDACTED

2. **(a) Are you a lobbyist acting on behalf of an Applicant?**

☐ Yes
☒ No

(b) If yes, are you listed on the Register of Lobbyists?

☐ Yes
☒ No

PART 2 – INFORMATION ABOUT THE PROPOSED MEDICAL SERVICE

3. **Application title**

Endoscopic mucosal resection (EMR) to differentiate colon polyps from colorectal cancer.

4. **Provide a succinct description of the medical condition relevant to the proposed service (no more than 150 words – further information will be requested at Part F of the Application Form)**

Colorectal cancer (CRC), also known as large bowel cancer, is when malignant cancer cells grow in the wall of the large bowel. This includes the large intestine, and rectum, which are all part of the lower digestive tract. Cancers that affect the small bowel (or small intestine) are very rare.

CRC occurs when the cells of the large bowel lining begin to grow uncontrollably and turn into a collection of cells called a polyp or an adenoma. Most polyps are benign and are not malignant or cancerous. However, when polyps with pre-cancerous potential are undetected (and not removed early) they can become cancerous. Most bowel cancers originate from cancerous polyps that spread to other organs.

The most common type of bowel cancer is called an adenocarcinoma, named after the glandular cells in the lining of the bowel where the cancer first develops.

5. **Provide a succinct description of the proposed medical service (no more than 150 words – further information will be requested at Part 6 of the Application Form)**

EMR involves injection of a solution into the submucosal space to separate a mucosal lesion from the underlying muscularis propria. The lesion can then be resected by snare electrosurgery. The submucosal cushion theoretically reduces the risk of thermal or mechanical injury to the underlying muscularis propria.

Sessile and flat colorectal laterally spreading lesions (LSLs) (or laterally spreading tumors [LSTs])≥20 mm in size require advanced techniques for resection. Large prospective studies have demonstrated that EMR is safe and efficacious.[1] There is now an established evidence base for several key technical aspects of the procedure, aimed at improving complete resection rates, reducing recurrence, and lowering rates of complications including perforation, bleeding, and post-procedural pain. Advanced endoscopic resection requires a patient- and lesion-centered approach, where the endoscopist must carefully appraise the risks of submucosal invasive cancer, the risks and benefits of resection techniques, and the co-morbidities of the patient.

6. **(a) Is this a request for MBS funding?**

☒ Yes
☐ No

(b) If yes, is the medical service(s) proposed to be covered under an existing MBS item number(s) or is a new MBS item(s) being sought altogether?

☐ Amendment to existing MBS item(s)
☒ New MBS item(s)

(c) If an amendment to an existing item(s) is being sought, please list the relevant MBS item number(s) that are to be amended to include the proposed medical service:

N/A

(d) If an amendment to an existing item(s) is being sought, what is the nature of the amendment(s)?

i. ☐ An amendment to the way the service is clinically delivered under the existing item(s)
ii. ☐ An amendment to the patient population under the existing item(s)
iii. ☐ An amendment to the schedule fee of the existing item(s)
iv. ☐ An amendment to the time and complexity of an existing item(s)
v. ☐ Access to an existing item(s) by a different health practitioner group
vi. ☐ Minor amendments to the item descriptor that does not affect how the service is delivered
vii. ☐ An amendment to an existing specific single consultation item
viii. ☐ An amendment to an existing global consultation item(s)
ix. ☐ Other (please describe below):

Insert description of 'other' amendment here

(e) If a new item(s) is being requested, what is the nature of the change to the MBS being sought?

i. ☐ A new item which also seeks to allow access to the MBS for a specific health practitioner group
ii. ☒ A new item that is proposing a way of clinically delivering a service that is new to the MBS (in terms of new technology and / or population)
iii. ☐ A new item for a specific single consultation item
iv. ☐ A new item for a global consultation item(s)

(f) Is the proposed service seeking public funding other than the MBS?

☐ Yes
☒ No

(g) If yes, please advise:

Insert description of other public funding mechanism here

7. **What is the type of service:**

☒ Therapeutic medical service
☐ Investigative medical service
☐ Single consultation medical service
☐ Global consultation medical service
☐ Allied health service
☐ Co-dependent technology
☐ Hybrid health technology

8. **For investigative services, advise the specific purpose of performing the service *(which could be one or more of the following)*:**

i. ☐ To be used as a screening tool in asymptomatic populations
ii. ☐ Assists in establishing a diagnosis in symptomatic patients
iii. ☒ Provides information about prognosis
iv. ☐ Identifies a patient as suitable for therapy by predicting a variation in the effect of the therapy
v. ☐ Monitors a patient over time to assess treatment response and guide subsequent treatment decisions

9. **Does your service rely on another medical product to achieve or to enhance its intended effect?**

☐ Pharmaceutical / Biological
☐ Prosthesis or device
☒ No

10. **(a) If the proposed service has a pharmaceutical component to it, is it already covered under an existing Pharmaceutical Benefits Scheme (PBS) listing?**

☐ Yes
☐ No

(b) If yes, please list the relevant PBS item code(s):

Insert PBS item code(s) here

(c) If no, is an application (submission) in the process of being considered by the Pharmaceutical Benefits Advisory Committee (PBAC)?

☐ Yes (please provide PBAC submission item number below)
☐ No

Insert PBAC submission item number here

(d) If you are seeking both MBS and PBS listing, what is the trade name and generic name of the pharmaceutical?

Trade name: Insert trade name here
Generic name: Insert generic name here

11. **(a) If the proposed service is dependent on the use of a prosthesis, is it already included on the Prostheses List?**

☐ Yes
☐ No

(b) If yes, please provide the following information (where relevant):

Billing code(s): Insert billing code(s) here
Trade name of prostheses: Insert trade name here
Clinical name of prostheses: Insert clinical name here
Other device components delivered as part of the service: Insert description of device components here

(c) If no, is an application in the process of being considered by a Clinical Advisory Group or the Prostheses List Advisory Committee (PLAC)?

☐ Yes
☐ No

(d) Are there any other sponsor(s) and / or manufacturer(s) that have a similar prosthesis or device component in the Australian market place which this application is relevant to?

☐ Yes
☐ No

(e) If yes, please provide the name(s) of the sponsor(s) and / or manufacturer(s):

Insert sponsor and/or manufacturer name(s) here

12. **Please identify any single and / or multi-use consumables delivered as part of the service?**

Single use consumables: Injection needle, Gelofusine, Indigo carmine dye, snare, and retrieval basket.
Multi-use consumables: Diathermy unit

PART 3 – INFORMATION ABOUT REGULATORY REQUIREMENTS

13. **(a) If the proposed medical service involves the use of a medical device, in-vitro diagnostic test, pharmaceutical product, radioactive tracer or any other type of therapeutic good, please provide the following details:**

Type of therapeutic good: Insert description of single use consumables here
Manufacturer's name: Insert description of single use consumables here
Sponsor's name: Insert description of single use consumables here

(b) Is the medical device classified by the TGA as either a Class III or Active Implantable Medical Device (AIMD) against the TGA regulatory scheme for devices?

☐ Class III
☐ AIMD
☒ N/A

14. **(a) Is the therapeutic good to be used in the service exempt from the regulatory requirements of the *Therapeutic Goods Act 1989*?**

☐ Yes (If yes, please provide supporting documentation as an attachment to this application form)
☐ No

(b) If no, has it been listed or registered or included in the Australian Register of Therapeutic Goods (ARTG) by the Therapeutic Goods Administration (TGA)?

☐ Yes (if yes, please provide details below)
☐ No

ARTG listing, registration or inclusion number: Insert ARTG number here
TGA approved indication(s), if applicable: Insert approved indication(s) here
TGA approved purpose(s), if applicable: Insert approved purpose(s) here

15. **If the therapeutic good has not been listed, registered or included in the ARTG, is the therapeutic good in the process of being considered for inclusion by the TGA?**

☐ Yes (please provide details below)
☐ No

Date of submission to TGA: Insert date of submission here
Estimated date by which TGA approval can be expected: Insert estimated date here
TGA Application ID: Insert TGA Application ID here
TGA approved indication(s), if applicable: If applicable, insert description of TGA approved indication(s) here
TGA approved purpose(s), if applicable: If applicable, insert description of TGA approved purpose(s) here

16. **If the therapeutic good is not in the process of being considered for listing, registration or inclusion by the TGA, is an application to the TGA being prepared?**

☐ Yes (please provide details below)
☐ No

Estimated date of submission to TGA: Insert date of submission here
Proposed indication(s), if applicable: If applicable, insert description of proposed indication(s)
Proposed purpose(s), if applicable: If applicable, insert description of proposed purpose(s) here

PART 4 – SUMMARY OF EVIDENCE

17. **Provide an overview of all key journal articles or research published in the public domain related to the proposed service that is for your application (limiting these to the English language only).** ***Please do not attach full text articles, this is just intended to be a summary.***

Please refer to Appendix 1: Evidence tables used in the development of the European Society of Gastrointestinal Endoscopy (ESGE) Guideline on colorectal polypectomy and endoscopic mucosal resection (EMR).

Please note we have included all the evidence, although Table 6 provides EMR literature pertaining to this population setting.

	Type of study design*	Title of journal article or research project (including any trial identifier or study lead if relevant)	Short description of research (max 50 words)**	Website link to journal article or research (if available)	Date of publication***
1.	Prospective intention-to-treat analysis.	Large refractory colonic polyps: is it time to change our practice? A prospective study of the clinical and economic impact of a tertiary referral colonic mucosal resection and polypectomy service (with videos).	This study included 174 patients (mean age 68 years) who were referred with 193 difficult polyps (186 laterally spreading, mean size 30 mm [range 10-80 mm]). They totally excised 173 laterally spreading lesions by EMR (115 piecemeal, 58 en bloc). Invasive adenocarcinoma was found in 6 lesions-5 treated successfully with EMR. Eleven patients were referred directly to surgery without an endoscopic attempt due to suspected invasive carcinoma. Seven >30-mm, pedunculated polyps were removed. There were no perforations. A total of 20 bed days was used because of endoscopic complications. Among all patients referred, 90% avoided the need for surgery. Excluding patients who were treated surgically for invasive cancer, the procedural success was 95% (157 of 168). By using Australian cost estimates applied to the entire group and compared with cost estimates assuming all patients had undergone surgery, we calculated the total medical cost savings was $6990 (U.S.) per patient, or a total savings of $1,216,231 (U.S.).	https://www.giejournal.org/article/S0016-5107(09)02065-3/fulltext	2009

	Type of study design*	Title of journal article or research project (including any trial identifier or study lead if relevant)	Short description of research (max 50 words)**	Website link to journal article or research (if available)	Date of publication***
2.	Observational: Cost-analysis	Cost Analysis of Endoscopic Mucosal Resection vs Surgery for Large Laterally Spreading Colorectal Lesions.	EMR was performed on 1489 lesions (mean size, 36 mm) in 1353 patients (mean age, 67 years; 52.1% male). Total costs involved in the endoscopic management of large LSL were US $6,316,593 and total inpatient hospitalization length of stay was 1180 days. The total cost predicted for the surgical management group was US $16,601,502, with a total inpatient hospitalization length of stay of 4986 days. Endoscopic management produced a potential total cost saving of US $10,284,909; the mean cost difference per patient was US $7602 (95% confidence interval, $8458–$9220; P < .001). Inpatient hospitalization length of stay was reduced by 2.81 nights per patient (95% confidence interval, 2.69–2.94; P < .001).	https://www.cghjournal.org/article/S1542-3565(15)01201-X/fulltext	2016

	Type of study design*	Title of journal article or research project (including any trial identifier or study lead if relevant)	Short description of research (max 50 words)**	Website link to journal article or research (if available)	Date of publication***
3.	Prospective, observational, multicentre cohort study.	Actual endoscopic versus predicted surgical mortality for treatment of advanced mucosal neoplasia of the colon	Among 1050 patients with advanced mucosal neoplasia (AMN) treated by EMR, including patients with a predicted mortality rate of greater than 5% (13.8% of cohort), no deaths occurred within 30 days after the procedure. The predicted surgical mortality rate was 3.3% with the Association of Coloproctology of Great Britain and Ireland score (P < .0001). This suggests a significant advantage of EMR over surgery. The results were validated by using the Colorectal Physiologic and Operative Severity Score for Enumeration of Mortality and Morbidity in 390 patients predicting a surgical mortality rate of 3.2% (P = .0003).	https://www.giejournal.org/article/S0016-5107(14)01350-9/fulltext	2014

4.	Observational	Endoscopic submucosal dissection for early gastric cancer – applying the expanded resection criteria in a western tertiary center	Over 60 months to October 2015 69 patients with EGCs (mean age 73, 73% male) were referred for endoscopic submucosal dissection (ESD). Lesions underwent pre-resection evaluation by high definition white light endoscopy, narrow band imaging and endoscopic ultrasound. One lesion was referred directly for surgery and one procedure was abandoned midway due to significant fibrosis and vasculature raising concern for invasive disease. ESD was performed on 67 lesions (median lesion size 20 mm (IQR 15-30)). Lesions satisfying the expanded criteria were larger (mean 38 mm versus 13 mm, p=0.001) and contained more invasive cancer (26% versus 0%, p=0.01). Complete endoscopic resection was achieved in 97% at the index procedure and was similar between the two groups (median procedure time 123.5 minutes). En-bloc resection rate was 91% for the entire cohort but was significantly higher in the lesions satisfying the original criteria (100% versus 84%, p=0.03). Perforation occurred in 1 case and was successfully managed endoscopically with clips. Delayed bleeding occurred in 3 (4.5%) patients. Complete pathological resection (R0) was achieved in 92% and was not significantly different between lesions satisfying the original versus the expanded criteria (100% versus 86%, P=0.06). Four patients (6%) were referred for surgery following ESD due to invasive disease beyond sm1 in the resected specimen or incomplete resection. Recurrence was encountered and treated endoscopically in one patient on second surveillance endoscopy	https://www.giejournal.org/article/S0016-5107(16)00792-6/fulltext	2016

	Type of study design*	Title of journal article or research project (including any trial identifier or study lead if relevant)	Short description of research (max 50 words)**	Website link to journal article or research (if available)	Date of publication***
			(median follow-up duration 6.7 months, (IQR 4-11)). For patients without invasive disease, who completed ≥1 surveillance endoscopy (n=32), 97% were free of disease and considered cured.		
5.	Retrospective review	Outcomes of repeat colonoscopy in patients with polyps referred for surgery without biopsy-proven cancer	Outcomes of repeat colonoscopy in patients with polyps referred for surgery without biopsy-proven cancer. Intervention consisted of repeat colonscopy. There were 38 lesions in 36 patients; 71% of the lesions were noncancerous and were successfully treated endoscopically. In 26% of the lesions, previous removal was attempted by the referring physician but was unsuccessful. The adenoma recurrence rate was 50%, but all recurrences were treated endoscopically and none were cancerous. Two patients were admitted for overnight observation. There were no major adverse events.	https://www.giejournal.org/article/S0016-5107(13)02099-3/fulltext	2014

	Type of study design*	Title of journal article or research project (including any trial identifier or study lead if relevant)	Short description of research (max 50 words)**	Website link to journal article or research (if available)	Date of publication***
6.	Observational	Outcome of Endoscopic Mucosal Resection As an Alternative to Surgery in Patients with Complex Colon Polyps	EMR was performed in 155 patients and was deferred in 48 patients who were referred to surgery. EMR specimens revealed benign polyps in 149 and cancer in 6 patients. EMR adverse events occurred in seven patients, requiring hospitalization in five of them. None of the patients died of their adverse events. Surveillance colonoscopy at 4-6 months after resection of a benign lesion in 137 patients revealed residual adenoma at the scar site in 6 patients and additional synchronous precancerous lesions in 117 patients that were not removed by the referring endoscopist. None underwent surgery for failure of EMR. The overall precancerous lesion burden was 2.83 per patient, the adenoma burden was 2.13 per patient, and the serrated polyp burden was 0.69 per patient.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4949087/	2017

	Type of study design*	Title of journal article or research project (including any trial identifier or study lead if relevant)	Short description of research (max 50 words)**	Website link to journal article or research (if available)	Date of publication***
7.	Observational	Adverse events after surgery for nonmalignant colon polyps are common and associated with increased length of stay and costs	Over the 11-year period, 359 underwent Surgical Resection (SR) (58% laparoscopic) for complex polyps. In total, 17% experienced an AE, and 3% required additional surgery; 12-month mortality was 1%. Including readmissions, median LOS was 5 days (IQR 4-7 days), and costs were $14,528. When an AE occurred, costs ($25,557 vs $14,029; P < .0001) and LOS (11 vs 5 days; P < .0001) significantly increased. From 2011 to 2013, 198 patients were referred for ER, and 73 underwent primary SR (70% laparoscopic). There was a lower AE rate for ER versus primary SR (10% vs 18%; P Z .09). ER costs (including rescue SR, when required) were lower than those of primary SR ($2152 vs $15,264; P < .0001).	https://www.giejournal.org/article/S0016-5107(16)00108-5/fulltext	2016

	Type of study design*	Title of journal article or research project (including any trial identifier or study lead if relevant)	Short description of research (max 50 words)**	Website link to journal article or research (if available)	Date of publication***
8.	Editorial	EMR should be the first-line treatment for large laterally spreading colorectal lesions	Compelling evidence has been amassed for EMR to be embraced as the universal first-line treatment for large colorectal LSLs, and this should be reflected in society practice guidelines accordingly. It should be borne in mind that the excellent outcomes in efficacy, safety, and cost-effectiveness of colorectal EMR in the literature have been largely derived from specialist academic centers where high-volume expertise exists. Developing tertiary-level EMR referral pathways in each city involving all stakeholders (endoscopists, gastroenterologists, surgeons, pathologists, primary care physicians, health plan organizations, and governments) should therefore underpin the efficient, successful, safe, and cost-effective management of patients with large colorectal LSLs.	https://www.giejournal.org/article/S0016-5107(16)30024-4/fulltext	2016

** Categorise study design, for example meta-analysis, randomised trials, non-randomised trial or observational study, study of diagnostic accuracy, etc.*

***Provide high level information including population numbers and whether patients are being recruited or in post-recruitment, including providing the trial registration number to allow for tracking purposes.*

**** If the publication is a follow-up to an initial publication, please advise.*

18. **Identify yet to be published research that may have results available in the near future that could be relevant in the consideration of your application by MSAC (limiting these to the English language only).** ***Please do not attach full text articles, this is just intended to be a summary.***

	Type of study design*	**Title of research (including any trial identifier if relevant)**	**Short description of research (max 50 words)****	**Website link to research (if available)**	**Date*****
1.	For yet to be published research that may have results relevant to your application, insert the type of study design in this column and columns below	For yet to be published research that may have results relevant to your application, insert the title of research (including any trial identifier if relevant) in this column and columns below	For yet to be published research that may have results relevant to your application, insert a short description of research (max 50 words) in this column and columns below	For yet to be published research that may have results relevant to your application, insert a website link to this research (if available) in this column and columns below	For yet to be published research that may have results relevant to your application, insert date in this column and columns below
2.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
3.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
4.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
5.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
6.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
7.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
8.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date

	Type of study design*	Title of research (including any trial identifier if relevant)	Short description of research (max 50 words)**	Website link to research (if available)	Date***
9.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
10.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
11.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
12.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
13.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
14.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date
15.	Insert study design	Insert title of research	Insert description	Insert website link	Insert date

** Categorise study design, for example meta-analysis, randomised trials, non-randomised trial or observational study, study of diagnostic accuracy, etc.*

***Provide high level information including population numbers and whether patients are being recruited or in post-recruitment.*

****Date of when results will be made available (to the best of your knowledge).*

PART 5 – CLINICAL ENDORSEMENT AND CONSUMER INFORMATION

19. **List all appropriate professional bodies / organisations representing the group(s) of health professionals who provide the service (please attach a statement of clinical relevance from each group nominated):**

The following groups have been consulted and have provided clinical support:

1. The Royal College of Pathologists Australasia; and
2. The Royal Australasian College of Surgeons

20. **List any professional bodies / organisations that may be impacted by this medical service (i.e. those who provide the comparator service):**

It is not envisioned specific groups will be impacted as EMR is in wide use, and is considered superior as compared to invasive surgery.

21. **List the relevant consumer organisations relevant to the proposed medical service (please attach a letter of support for each consumer organisation nominated):**

List relevant consumer organisations here

22. **List the relevant sponsor(s) and / or manufacturer(s) who produce similar products relevant to the proposed medical service:**

N/A

23. **Nominate two experts who could be approached about the proposed medical service and the current clinical management of the service(s):**

Name of expert 1: REDACTED

Telephone number(s): REDACTED

Email address: REDACTED

Justification of expertise:

REDACTED

Name of expert 2: REDACTED

Telephone number(s): REDACTED

Email address: REDACTED

Justification of expertise:

REDACTED

Please note that the Department may also consult with other referrers, proceduralists and disease specialists to obtain their insight.

PART 6 – POPULATION (AND PRIOR TESTS), INDICATION, COMPARATOR, OUTCOME (PICO)

PART 6a – INFORMATION ABOUT THE PROPOSED POPULATION

24. **Define the medical condition, including providing information on the natural history of the condition and a high level summary of associated burden of disease in terms of both morbidity and mortality:**

CRC is the development of cancer from the colon or rectum. A cancer is the abnormal growth of cells that possess the ability to invade or spread to other parts of the body.[2] CRC arises from a precursor, adenomatous polyp; and formed in a field of epithelial cell hyperproliferation and crypt dysplasia. With time, this precursor lesion progresses to colorectal cancer; involving a multistep process.[3] This is accompanied by alterations of several numerous suppressor genes that gives rise to abnormalities of cell regulation. It is known that environmental factors and inherited susceptibility are actively involved in the series of events.[4]

However, CRC is a major public health concern, and it is the third most commonly diagnosed cancer; and fourth cause of oncological death globally.[5] It is known that there less variability in mortality rate of the disease worldwide. CRC accounts for 13% of the causes of all tumours, but similar to many cancers; there are major variabilities between the less and more developed countries. Increasing trend of the disease has been observed in developed countries, including Australia.[2] In Australia, CRC is a major cause of mortality and morbidity, and it has one of the highest rates of CRC in the world. The risk of being diagnosed with the disease by the age of 85 years is one in 11 males, and one in 16 females. A recent estimate of CRC showed that the number of deaths from the disease at the age of 85 years will be 1 in 54 (1 in 47 males and 1 in 63 females).[6]

25. **Specify any characteristics of patients with the medical condition, or suspected of, who are proposed to be eligible for the proposed medical service, including any details of how a patient would be investigated, managed and referred within the Australian health care system in the lead up to being considered eligible for the service:**

Gastrointestinal EMR is a procedure to remove early-stage cancer and precancerous growths from the lining of the digestive tract. EMR is usually performed by a specialist in digestive system disorders (gastroenterologist) who has expertise in the technique.

EMR is performed with a long, narrow tube equipped with a light and video camera. During EMR of the upper digestive tract, the doctor passes this tube (endoscope) down the patients throat into the esophagus, stomach or upper part of the small intestine (duodenum). To reach the colon, the Gastroenterologist guides the tube up through the anus. The Gastroenterologist then inserts instruments through the tube to perform the procedure.

EMR is usually done to treat a health condition. However, the Gastroenterologist may also collect samples of tissue during the procedure. Examination of this tissue can help make a diagnosis of cancer. Specifically, EMR can help determine if the cancer has spread to tissues beneath the digestive tract lining.

EMR is a less invasive alternative to surgery for removing abnormal tissues from the lining of the digestive tract. Depending on clinical symptoms the procedure may be recommend to remove certain early-stage cancers or precancerous growths.

Some of the conditions that EMR has been used to treat include:

- Barrett's esophagus
- Cancer of the small intestine (duodenum)
- Colon polyps
- Colorectal cancer
- Esophageal cancer
- Noncancerous growths of the uterus (leiomyomas)
- Stomach (gastric) cancer

The Medicare Benefits Schedule Review Taskforce,[7] recommended the following:

- *The Committee proposes that consideration be given to adding a new MBS item for the removal of very large polyps by Endoscopic Mucosal Resection (EMR). The Committee noted that if surgery is currently the only approach for the removal of very large polyps then EMR would need to meet an evidence threshold for clinical safety. If a fee greater than colonoscopy is envisaged then cost effectiveness must also be considered.*
- *The Committee considered research evidence on the safety, clinical effectiveness and cost-effectiveness of this procedure and noted the widespread use in public hospitals. The Committee noted the range of EMR complexity, time and expertise required to perform the procedure and considered if the service should be restricted to specialist to specialist referrals and or if specifying the size of the resected specimen is required.*
- *The Committee agreed that it should not be restricted to tertiary referral as this would prevent experienced specialists from completing the procedure if found during a normal colonoscopy. It would also mean that the patient would undergo an unnecessary second sedation for the removal at a later date.*

The Committee recommended an assessment by the Medical Services Advisory Committee (MSAC) of EMR to enable consideration of public funding for this procedure. The Committee recommends that the Gastroenterological Society of Australia (GESA) submit an application to MSAC and request an expedited assessment.

The Committee recommends GESA sponsor an MSAC application for public funding of EMR for the removal of very large polyps. This would be an alternative to surgery and would benefit the patient as it would be less invasive and recovery time would be reduced.

<u>This application is focusing on the use of EMR for CRC, although MSAC may wish considering it to other cancer types.</u>

26. **Define and summarise the current clinical management pathway *before* patients would be eligible for the proposed medical service (supplement this summary with an easy to follow flowchart [as an attachment to the Application Form] depicting the current clinical management pathway up to this point):**

The type of tests for CRC will vary depending on the symptoms. Early diagnosis of CRC is possible through a screening test called the faecal occult blood test (FOBT). The FOBT looks for blood in stool samples, possibly caused by polyps and early symptoms of colorectal cancer. This is free and available for individuals over 50.

When there is suspicion of a possible CRC diagnosis, the medical practitioner will first conduct a physical examination to check the abdomen for swelling. A digital rectal exam may also be done where the doctor checks for swelling in the anus and rectum. Examinations also include blood tests to check for anaemia.

A colonoscopy also allows the medical practitioner to examine the entire length of the large bowel. This can help detect polyps and any abnormal body tissue. This is done using a thin flexible tube with a camera, called a colonoscope, inserted into the anus, rectum and colon. During the procedure, the doctor may also take a small sample of tissue, called a biopsy, for examination under a microscope to see if there are any cancer cells.

Other imaging technology may be used to get a clearer picture for doctors to see if there is any evidence of cancer. This may include computed tomography/positron emission tomography (CT/PET scans) or Magnetic Resonance Imaging (MRI).

PART 6b – INFORMATION ABOUT THE INTERVENTION

27. **Describe the key components and clinical steps involved in delivering the proposed medical service:**

EMR involves injection of a solution into the submucosal space to separate a mucosal lesion from the underlying muscularis propria. The lesion can then be resected by snare electrosurgery. The submucosal cushion theoretically reduces the risk of thermal or mechanical injury to the underlying muscularis propria.

Sessile and flat colorectal laterally spreading lesions (LSLs) (or laterally spreading tumors [LSTs])≥20 mm in size require advanced techniques for resection. Large prospective studies have demonstrated that EMR is safe and efficacious.[1, 8, 9] There is now an established evidence base for several key technical aspects of the procedure, aimed at improving complete resection rates, reducing recurrence, and lowering rates of complications including perforation, bleeding, and post-procedural pain. Advanced endoscopic resection requires a patient- and lesion-centered approach, where the endoscopist must carefully appraise the risks of submucosal invasive cancer, the risks and benefits of resection techniques, and the co-morbidities of the patient. Although EMR is effective and safe for the vast majority of sessile flat colorectal LSLs without imaging features suggestive of invasive disease, surgical resection or endoscopic submucosal dissection (ESD) may be appropriate alternatives for higher risk lesions.

Effective resection technique relies on multiple interdependent factors, but is difficult to study objectively as it requires the intersection of a number of endoscopic skills, including optical diagnosis, endoscope shaft and tip

control, injection technique, snare selection and manipulation, visual and haptic feedback, and judgment. Several sources including technical reviews and expert opinion are available to guide technique.[10, 11] Complete and safe excision often requires an adaptable approach to the lesion and the techniques employed may vary slightly between operators. Factors associated with the lowest recurrence risk are complete snare resection, en bloc or oligo-piecemeal excision, and the absence of adjunctive thermal ablative techniques. The ideal submucosal injectate should provide a sustained lift, facilitate en bloc or oligo-piecemeal resection, be inexpensive, widely available, and have few adverse effects.[12] The traditional EMR submucosal injectate is normal saline; however several other solutions have been investigated.[13]

En bloc resection by EMR for lesions ≥20 mm is reported in 16%–48% of lesions.[14, 15] It is associated with lower recurrence rates than piecemeal resection in both EMR and ESD studies.[16] No studies have defined a cutoff point for size where en bloc resection is unsafe, so it remains a decision that is based on lesion morphology and location. The factors that limit en bloc resection by EMR are polyp size, location, EMR technique, and the experience of the endoscopist.[17] Finally however the primary driver must be consideration of safety. For flat and sessile colonic lesions the maximum size that can be reliably excised en bloc by EMR is 15–20 mm proximal to the splenic flexure where the risk of perforation is higher, and 20–25 mm in the sigmoid and rectum. If en bloc resection is not possible, the lesion should be removed in as few pieces as possible.[18]

Circumferential incision of lesions using ESD techniques (c-EMR, CSI-EMR, or EMR-precut) may allow extension of the size limits while mitigating perforation risk.[19] Use of special devices such as dual-loop snares may also increase the rate of en bloc resection for lesions ≥20 mm to 64%.[20]

28. **Does the proposed medical service include a registered trademark component with characteristics that distinguishes it from other similar health components?**

N/A

29. **If the proposed medical service has a prosthesis or device component to it, does it involve a new approach towards managing a particular sub-group of the population with the specific medical condition?**

No, although the Cook Endoscopy Duette Multi-Band Mucosectomy device is used for endoscopic mucosal resection in the upper GI tract.

30. **If applicable, are there any limitations on the provision of the proposed medical service delivered to the patient (i.e. accessibility, dosage, quantity, duration or frequency):**

A large (>25mm) non-invasive lesion (sessile or flat superficial colorectal neoplasia) that requires En bloc EMR by a suitabily qualified surgical endocrinologist, endoscopist specialist.

Frequency, once per calendar year.

31. **If applicable, identify any healthcare resources or other medical services that would need to be delivered <u>at the same time</u> as the proposed medical service:**

Endoscopy/ colonoscopy

32. **If applicable, advise which health professionals will primarily deliver the proposed service:**

Surgical endoscopist, and gastroenterologist specialists.

33. **If applicable, advise whether the proposed medical service could be delegated or referred to another professional for delivery:**

N/A

34. **If applicable, specify any proposed limitations on who might deliver the proposed medical service, or who might provide a referral for it:**

This would be limited to surgical endoscopists and gastroenterologist specialists.

35. **If applicable, advise what type of training or qualifications would be required to perform the proposed service as well as any accreditation requirements to support service delivery:**

Training as a consultant Endoscopist/ Gastroenterologist.

If applicable, insert advice regarding training or qualifications

36. **(a) Indicate the proposed setting(s) in which the proposed medical service will be delivered (select all relevant settings):**

☐ Inpatient private hospital
☐ Inpatient public hospital
☐ Outpatient clinic
☐ Emergency Department
☐ Consulting rooms
☒ Day surgery centre
☐ Residential aged care facility
☐ Patient's home
☐ Laboratory
☐ Other – please specify below

The above applies to public and private hospital day procedural centres

(b) Where the proposed medical service is provided in more than one setting, please describe the rationale related to each:

Describe rationale here

37. **Is the proposed medical service intended to be entirely rendered in Australia?**

☒ Yes
☐ No – please specify below

Specify further details here

PART 6c – INFORMATION ABOUT THE COMPARATOR(S)

38. **Nominate the appropriate comparator(s) for the proposed medical service, i.e. how is the proposed population currently managed in the absence of the proposed medical service being available in the Australian health care system (including identifying health care resources that are needed to be delivered at the same time as the comparator service):**

The comparator for lesions ≥ 25 mm is surgery.

39. **Does the medical service that has been nominated as the comparator have an existing MBS item number(s)?**

☐ Yes (please provide all relevant MBS item numbers below)
☒ No

Specify item number/s here

40. **Define and summarise the current clinical management pathways that patients may follow *after* they receive the medical service that has been nominated as the comparator (supplement this summary with an easy to follow flowchart [as an attachment to the Application Form] depicting the current clinical management pathway that patients may follow from the point of receiving the comparator onwards including health care resources):**

Comparator pathway

The comparator in the past was surgical intervention regardless of the size and location of the CR polyps. First-line surgical intervention is no longer recommended, with EMR the current standard in the removal of non-invasive large CR polyps. Prior to EMR and other methods, such as hot snare polypectomy and endoscopic submucosal dissection, sessile or flat CR polyps would have received surgical resection.

Please refer to Figure 1 below, for the EMR intervention pathway.

41. **(a) Will the proposed medical service be used in addition to, or instead of, the nominated comparator(s)?**

☐ Yes
☒ No

(b) If yes, please outline the extent of which the current service/comparator is expected to be substituted:

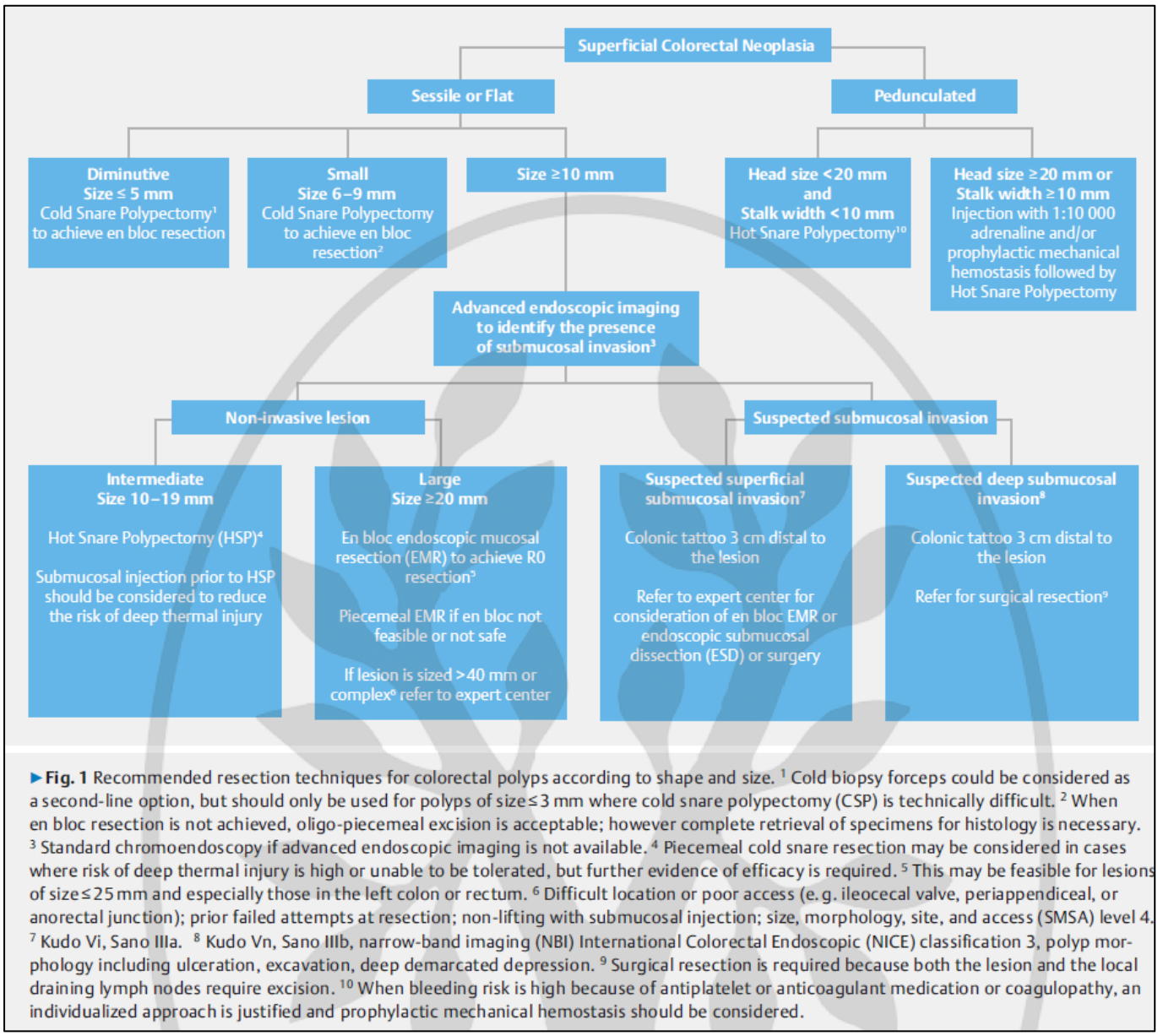
Outline service/comparator substitution here

42. **Define and summarise how current clinical management pathways (from the point of service delivery onwards) are expected to change as a consequence of introducing the proposed medical service including variation in health care resources (Refer to Question 39 as baseline):**

Intervention pathway:

The endoscopic removal of CR polyps reduces the incidence and mortality of CRC and is considered an essential skill for all endoscopists who perform colonoscopy. The below evidence-based guideline was commissioned by the European Society of Gastrointestinal Endoscopy (ESGE),[21] and addresses all the major issues concerning the practical use of polypectomy and EMR to inform and underpin this fundamental technique in coloscopy and CRC prevention.

Figure 1: EMR intervention pathway



▶ **Fig. 1** Recommended resection techniques for colorectal polyps according to shape and size. [1] Cold biopsy forceps could be considered as a second-line option, but should only be used for polyps of size ≤ 3 mm where cold snare polypectomy (CSP) is technically difficult. [2] When en bloc resection is not achieved, oligo-piecemeal excision is acceptable; however complete retrieval of specimens for histology is necessary. [3] Standard chromoendoscopy if advanced endoscopic imaging is not available. [4] Piecemeal cold snare resection may be considered in cases where risk of deep thermal injury is high or unable to be tolerated, but further evidence of efficacy is required. [5] This may be feasible for lesions of size ≤ 25 mm and especially those in the left colon or rectum. [6] Difficult location or poor access (e.g. ileocecal valve, periappendiceal, or anorectal junction); prior failed attempts at resection; non-lifting with submucosal injection; size, morphology, site, and access (SMSA) level 4. [7] Kudo Vi, Sano IIIa. [8] Kudo Vn, Sano IIIb, narrow-band imaging (NBI) International Colorectal Endoscopic (NICE) classification 3, polyp morphology including ulceration, excavation, deep demarcated depression. [9] Surgical resection is required because both the lesion and the local draining lymph nodes require excision. [10] When bleeding risk is high because of antiplatelet or anticoagulant medication or coagulopathy, an individualized approach is justified and prophylactic mechanical hemostasis should be considered.

Source: Ferlitsch, M., et al. (2017). "Colorectal polypectomy and endoscopic mucosal resection (EMR): European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline." Endoscopy 49(3): 270-297.

PART 6d – INFORMATION ABOUT THE CLINICAL OUTCOME

43. **Summarise the clinical claims for the proposed medical service against the appropriate comparator(s), in terms of consequences for health outcomes (comparative benefits and harms):**

We propose that EMR is superior in both patient safety and clinical effectiveness outcomes. EMR is a safe and effective treatment for colorectal polyps, however surgical resection (SR) remains prevalent despite the evidence indicating its inferiority.[22] We propose this is due to a lack of MBS funding. Based on evidence-based literature we propose that EMR rather than SR has significantly lower total costs[23-25], length of stay[23], and significantly lower AE rates.[26-28] EMR for complex polyps is effective when performed by experienced endoscopists.[1, 14, 29]

44. **Please advise if the overall clinical claim is for:**

☒ Superiority
☐ Non-inferiority

45. **Below, list the key health outcomes (major and minor – prioritising major key health outcomes first) that will need to be specifically measured in assessing the clinical claim of the proposed medical service versus the comparator:**

Safety Outcomes:

The main safety outcomes as it pertains to the comparator include: procedural success and adverse event frequencies, with adverse events including bleeding requiring therapy, perforations, pain, or late stricture formation

Clinical Effectiveness Outcomes:

The comparable outcome includes: EMR success rates, and early and late recurrence rates. With comparable or reduced adverse events; comparable 12-month mortality; reduced hospital length of stay; reduced total hospital costs.

PART 7 – INFORMATION ABOUT ESTIMATED UTILISATION

46. **Estimate the prevalence and/or incidence of the proposed population:**

CRC was the third most commonly diagnosed cancer in Australia in 2014. It is estimated that it will become the third most commonly diagnosed cancer in 2018 (Table 1).

In 2014, there were 15,253 new cases of CRC diagnosed in Australia (8,368 males and 6,886 females). In 2018, it is estimated that 17,004 new cases of CRC will be diagnosed in Australia (9,294 males and 7,709 females). In 2014, the age–standardised incidence rate was 57 cases per 100,000 persons (67 for males and 49 for females). In 2018, it is estimated that the age–standardised incidence rate will remain at 58 cases per 100,000 persons (67 for males and 49 for females. The incidence rate of colorectal cancer is expected to generally increase with age for both males and females.[30][31]

Table 1: Prevalence of CRC in the proposed population

Cancer type	2017 (% cancer incidence)[30]	2018 (% cancer incidence)[31]
Colorectal	16 682 (12.4)	17 004 (12.3)

47. **Estimate the number of times the proposed medical service(s) would be delivered to a patient per year:**

A maximum of 1 Endoscopic Mucosal Resection for a large (>25mm) laterally spreading Colorectal Lesion.

48. **How many years would the proposed medical service(s) be required for the patient?**

Until death.

49. **Estimate the projected number of patients who will utilise the proposed medical service(s) for the first full year:**

It is envisioned that if the service was established in 2017, 45,000 EMR procedures would have been conducted.

50. **Estimate the anticipated uptake of the proposed medical service over the next three years factoring in any constraints in the health system in meeting the needs of the proposed population (such as supply and demand factors) as well as provide commentary on risk of 'leakage' to populations not targeted by the service:**

There are an estimated 900,000 colonoscopies performed nationally in a year. It is envisioned that 5% (1/20) would need an EMR. In three years, the number would remain the same. In other words, the proportion (i.e. %) of patients needing EMR would not change, rather the raw number would increase in line with population growth.

Table 2: Expected utilisation

Procedure	Anticipated uptake >2017
EMR	45,000

PART 8 – COST INFORMATION

51. **Indicate the likely cost of providing the proposed medical service. Where possible, please provide overall cost and breakdown:**

The following costs are based on a recently published Australian analysis by Jayanna et al.,[25] who estimated the following costs per- patient:

- EMR: $ 7,344,877 (AUD); and its comparator
- Surgery without complications: $19,304,072 (AUD).

Cost analysis methods:

Jayanna et al.,[25] performed a prospective, observational, multicenter study of consecutive patients referred to 1 of 7 academic hospitals in Australia for the management of large LSL (≥20 mm) from January 2010 to December 2013. They collected data on numbers of patients undergoing EMR, actual endoscopic management costs (index colonoscopy, hospital stay, adverse events, and first surveillance colonoscopy), characteristics of patients and lesions, outcomes, and adverse events, and findings from follow-up examinations 14 days, 4–6 months, and 16–18 months after treatment. They compared data from patients who underwent EMR with those from a model in which all patients underwent surgery without any complications. Event-specific costs, based on Australian refined diagnosis-related group codes, were used to estimate average cost per patient.

Actual endoscopic management costs (index colonoscopy, hospital stay, adverse events, and first surveillance colonoscopy [SC1] at 4–6 months) were compared with the hypothetical situation where all patients underwent surgery for benign lesions without complications.

Event-specific costs, based on 2013–2014 Australian Refined Diagnosis Related Group (AR-DRG) codes (Version 7.0 2013) were incorporated and used to estimate average cost per patient for the procedure. The actual endoscopic costs were applied post hoc. AR-DRG classifications are based on the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification, and the Australian Classification of Health Interventions. AR-DRGs classify units of hospital output. The classification groups inpatient stays into categories of similar levels of complexity that consume similar amounts of resources.

Costs are the direct costs incurred by the hospital in the treating of the patient and so are distinct from billing costs paid by the patient or insurer. Because currency exchange rates may be volatile, costs were reported in Australian dollars. At the time of article submission 1 AUD ¼ 0.86 USD. Analysis of endoscopic management included average cost of service, cost of sedation, and consumables. No analysis was made of patient- or community-related financial or social costs, such as sick leave. Direct admission was defined as immediate postprocedure admission and delayed admission as hospital readmission within a fortnight postprocedure. Two specialist colorectal surgeons independently assigned the surgical approach and inpatient LOS (ILOS) according to the location of the polyp and on the assumption that all polyps were benign.

Current guidelines advise postoperative colonoscopy at 12 months, so ongoing healthcare costs between the 2 arms were assumed to equilibrate at this point. Where data were not available for patient follow-up in the actual endoscopic arm, the intended treatment plan at 2 weeks, where endoscopic and histology findings were available, was adhered to. If surgery was planned, this was matched to the surgical arm. Patients who were unable to undergo further follow-up because of comorbidities, or who declined further follow-up were treated according to the intended treatment plan at 2 weeks.

Index colonoscopy costs were $1459.69 (US $1255) for a day stay colonoscopy without complication, $4783.74 (US $4114) for a colonoscopy resulting in admission of 1–3 nights primarily for observation, and $13,093.17 (US $11,260.13) for a colonoscopy resulting in admission >3 nights or with investigations or interventions for any adverse event (pain, bleeding, or perforation). Where patients underwent emergency surgery, the additional cost of this surgery was incorporated ($31,152.48 [US $26,791.13]). Readmission events were reviewed and their DRG codes examined. Patients fell into 1 of 2 groups: admission of 1–3 nights primarily for observation ($2938 [US $2527]) or admission of any duration with investigations or interventions for any adverse event (eg, pain, bleeding, or perforation) ($8207 [US$7058]).

Any patient undergoing surgery had the costs of the surgical event added to the total cost. Surgical costs were assumed to be for uncomplicated surgery, because data were not collected on patient outcomes postsurgery and polyp factors other than location were unlikely to influence surgical outcome. Costs for major colorectal surgery are grouped by rectal or colonic location in the current AR-DRG system. Rectal surgery cost was $20,342.10 (US $17,494), which includes abdominoperineal resection and low anterior resection. Transanal endoscopic microsurgery was substantially lower cost than other rectal surgery at $4933.15 (US $4242). Colonic surgery cost was $16,063.87 (US $13,815). Open or laparoscopic surgery costs are not differentiated in current AR-DRG codes. Total costs are known to be similar. Costs were also calculated for surgery with major adverse events. Major adverse events were defined as anastomotic breakdown, sepsis, cardiopulmonary events, or death based on established studies. These adverse events increased rectal surgery costs to $34,879.75 (US $29,996.59) and colonic surgery to $31,152.48 (US $26,791.13).

52. **Specify how long the proposed medical service typically takes to perform:**

Depends on the size of the polyp location, and patient complexity.

53. **If public funding is sought through the MBS, please draft a proposed MBS item descriptor to define the population and medical service usage characteristics that would define eligibility for MBS funding.**

Category 3 – Therapeutic procedure
Proposed item descriptor: A large (>25mm) non-invasive lesion (sessile or flat superficial colorectal neoplasia) that requires En bloc EMR by a suitably qualified specialist gastroenterologist or surgical endoscopist. Fee: $1750.0

PART 9 – FEEDBACK

The Department is interested in your feedback.

54. **How long did it take to complete the Application Form?**

24 hours

55. **(a) Was the Application Form clear and easy to complete?**

☒ Yes
☐ No

(b) If no, provide areas of concern:

Describe areas of concern here

56. **(a) Are the associated Guidelines to the Application Form useful?**

☒ Yes
☐ No

(b) If no, what areas did you find not to be useful?

Insert feedback here

57. **(a) Is there any information that the Department should consider in the future relating to the questions within the Application Form that is not contained in the Application Form?**

☐ Yes
☒ No

(b) If yes, please advise:

Insert feedback here

References

1. Moss A, Bourke MJ, Williams SJ. Endoscopic mucosal resection outcomes and prediction of submucosal cancer from advanced colonic mucosal neoplasia. Gastroenterology. 2011;140:1909-18.

2. Arvelo F, Sojo F, Cotte C. Biology of colorectal cancer. Ecancermedicalscience. 2015;9.

3. Testa U, Pelosi E, Castelli G. Colorectal cancer: genetic abnormalities, tumor progression, tumor heterogeneity, clonal evolution and tumor-initiating cells. Medical Sciences. 2018;6(2):31.

4. Sack J, Rothman JM. Colorectal cancer: natural history and management. Hospital Physician. 2000;36:64-73.

5. Favoriti P, Carbone G, Greco M, Pirozzi F, Pirozzi REM, Corcione F. Worldwide burden of colorectal cancer: a review. Updates in Surgery. 2016;68(1):7-11.

6. AIHW. Cancer compendium: information and trends by cancer type: Australian Institute of Health and Welfare; 2017 [updated 30 March 2017; cited 2018. Available from: https://www.aihw.gov.au/reports/cancer/cancer-compendium-information-and-trends-by-cancer-type/report-contents/colorectal-cancer-in-australia.

7. Department of Health. Report from the Gastroenterology Clinical Committee. Canberra, Australia: Medicare Benefits Schedule Review Taskforce; 2016.

8. Conio M, Repici A, Demarquay JF. EMR of large sessile colorectal polyps. Gastrointest Endosc. 2004;60:234-41.

9. Ferrara F, Luigiano C, Ghersi S. Efficacy, safety and outcomes of “inject and cut” endoscopic mucosal resection for large sessile and flat colorectal polyps. Digestion. 2010;82:213-20.

10. Shinji T, Shiro O, Kazuaki C, Koichi K. KNACK AND PRACTICAL TECHNIQUE OF COLONOSCOPIC TREATMENT FOCUSED ON ENDOSCOPIC MUCOSAL RESECTION USING SNARE. Digestive Endoscopy. 2009;21(s1):S38-S42.

11. Klein A, Bourke MJ. Advanced polypectomy and resection techniques. Gastrointest Endosc Clin N Am. 2015;25:303-33.

12. Hwang JH, Konda V, Abu Dayyeh BK. Endoscopic mucosal resection. Gastrointest Endosc. 2015;82:215-26.

13. Ferreira AO, Moleiro J, Torres J. Solutions for submucosal injection in endoscopic resection: a systematic review and meta-analysis. Endosc Int Open. 2016;4:E1-E16.

14. Moss A, Williams SJ, Hourigan LF, Brown G, Tam W, Singh R, et al. Long-term adenoma recurrence following wide-field endoscopic mucosal resection (WF-EMR) for advanced colonic mucosal neoplasia is infrequent: results and risk factors in 1000 cases from the Australian Colonic EMR (ACE) study. Gut. 2015;64(1):57-65.

15. Buchner AM, Guarner-Argente C, Ginsberg GG. Outcomes of EMR of defiant colorectal lesions directed to an endoscopy referral center. Gastrointestinal Endoscopy. 2012;76(2):255-63.

16. Oka S, Tanaka S, Saito Y, Iishi H, Kudo S-e, Ikematsu H, et al. Local Recurrence After Endoscopic Resection for Large Colorectal Neoplasia: A Multicenter Prospective Study in Japan. The American Journal Of Gastroenterology. 2015;110:697.

17. Puli SR, Kakugawa Y, Gotoda T, Antillon D, Saito Y, Antillon MR. Meta-analysis and systematic review of colorectal endoscopic mucosal resection. World Journal of Gastroenterology : WJG. 2009;15(34):4273-7.

18. Bourke M. Current status of colonic endoscopic mucosal resection in the west and the interface with endoscopic submucosal dissection. Digestive endoscopy : official journal of the Japan Gastroenterological Endoscopy Society. 2009;21 Suppl 1:S22-7.

19. Sakamoto T, Matsuda T, Nakajima T, Saito Y. Efficacy of endoscopic mucosal resection with circumferential incision for patients with large colorectal tumors. Clinical gastroenterology and hepatology : the official clinical practice journal of the American Gastroenterological Association. 2012;10(1):22-6.

20. Yoshida N, Saito Y, Hirose R, Ogiso K, Inada Y, Yagi N, et al. Endoscopic mucosal resection for middle and large colorectal polyps with a double-loop snare. Digestion. 2014;90(4):232-9.

21. Ferlitsch M, Moss A, Hassan C, Bhandari P, Dumonceau JM, Paspatis G, et al. Colorectal polypectomy and endoscopic mucosal resection (EMR): European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. Endoscopy. 2017;49(3):270-97.

22. Keswani RN, Law R, Ciolino JD, Lo AA, Gluskin AB, Bentrem DJ, et al. Adverse events after surgery for nonmalignant colon polyps are common and associated with increased length of stay and costs. Gastrointestinal Endoscopy. 2016;84(2):296-303.e1.

23. Swan MP, Bourke MJ, Alexander S, Moss A, Williams SJ. Large refractory colonic polyps: is it time to change our practice? A prospective study of the clinical and economic impact of a tertiary referral colonic mucosal resection and polypectomy service (with videos). Gastrointestinal Endoscopy. 2009;70(6):1128-36.

24. Law R, Das A, Gregory D, Komanduri S, Muthusamy R, Rastogi A, et al. Endoscopic resection is cost-effective compared with laparoscopic resection in the management of complex colon polyps: an economic analysis. Gastrointest Endosc. 2016;83(6):1248-57.

25. Jayanna M, Burgess NG, Singh R, Hourigan LF, Brown GJ, Zanati SA, et al. Cost analysis of endoscopic mucosal resection vs surgery for large laterally spreading colorectal lesions. Clinical Gastroenterology and Hepatology. 2016;14(2):271-8. e2.

26. Ikard RW, Snyder RA, Roumie CL. Postoperative Morbidity and Mortality among Veterans Health Administration Patients Undergoing Surgical Resection for Large Bowel Polyps (Bowel Resection for Polyps). Digestive Surgery. 2013;30(4-6):394-400.

27. Ahlenstiel G, Hourigan LF, Brown G, Zanati S, Williams SJ, Singh R, et al. Actual endoscopic versus predicted surgical mortality for treatment of advanced mucosal neoplasia of the colon. Gastrointestinal Endoscopy. 2014;80(4):668-76.

28. Billeter AT, Polk HC, Hohmann SF, Qadan M, Fry DE, Jorden JR, et al. Mortality after Elective Colon Resection: The Search for Outcomes that Define Quality in Surgical Practice. Journal of the American College of Surgeons. 2012;214(4):436-43.

29. Hassan C, Repici A, Sharma P, Correale L, Zullo A, Bretthauer M, et al. Efficacy and safety of endoscopic resection of large colorectal polyps: a systematic review and meta-analysis. Gut. 2016;65(5):806-20.

30. Australian Institute of Health and Welfare. Cancer compendium: information and trends by cancer type. Canberra, Asutralia; 2017.

31. Australian Government. Bowel cancer statistics. Canberra, Australia: Department of Health; 2018.