

# Benefits and Harms of Treatment Options for Esophageal Adenocarcinoma and Precancerous Conditions: An Overview of Systematic Reviews

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**Author Contribution**

NA, CH, AB, KP, and MT participated in screening, and data extraction/verification. NA, CH, AS, and AB drafted the report. BSk developed the search strategy and provided text for the review. All authors (NA, CH, MT, KP, AB, BSk, DM, AC, LF, BH, BS, JL, AS) critically reviewed the overview and provided methodological or clinical expertise.

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## Abstract

**Background:** Esophageal adenocarcinoma (EAC) is the most common type of esophageal cancer in Canada. It usually develops in the lower third of the esophagus, in the area where Barrett's esophagus (BE) occurs. Incidence rates of esophageal cancer has doubled in both men (1.8 to 3.5 per 100,000) and women (0.2 to 0.5 per 100,000) from 1986 to 2006 respectively, with an average annual increase of 3.9% and 3.6%, respectively. Five-year survival of EAC is low among both men and women, with a rate of 14%, mostly due to late-stage diagnosis, where cancer has metastasized or spread to other organs. Those diagnosed early with asymptomatic EAC have better survival than those diagnosed with symptomatic disease, over 50% of whom will require palliative measures at diagnosis. The prevention of EAC via screening, early diagnosis, and treatment of precancerous conditions such as BE, and low- and high-grade dysplasia, if effective, would offer a strategy for reducing mortality and improving long term survival and quality of life of those affected.

**Objective:** The aim of this project was to examine the evidence on the treatment options for stage 1 EAC and precancerous conditions (BE and/or dysplasia), using an overview of reviews approach. The results from this overview will be used to inform the Canadian Task Force on Preventive Health Care (CTFPHC) during their development of guideline recommendations on screening for EAC.

**Methods:** A protocol for this review was registered with PROSPERO (CRD42018084825). A detailed search of MEDLINE, Embase and the Cochrane Library from inception to October 2018 was carried out by an experienced information specialist and peer reviewed by another senior information specialist. Grey literature was also searched. Quality assessment was performed with AMSTAR, with additional guidance using AMSTAR 2. Full-text screening and quality assessment were carried out independently by two reviewers, and disagreements were resolved through discussion or third-party adjudication. Data extraction, risk of bias (using the Cochrane risk of bias tool), and evaluation of the certainty of the body of evidence (using the GRADE domains as a guide) was performed by one reviewer and verification was carried out by a second senior reviewer.

**Results:** After removing duplicates, 3,761 bibliographic records were screened on title and abstract. Of these, 2,754 were excluded. Among 1,007 articles screened based on full-text, 995 records were excluded, leaving eleven included systematic reviews (SRs). Of these, five were in adults with BE with or without dysplasia, three in BE patients with high-grade dysplasia and intramucosal cancer, and two in BE patients with low-grade dysplasia. The SRs were published between 2008 and 2018 and included 25 articles reporting results of randomized control trials published between 1996 and 2014. Trials included from nine to 208 participants and most included fewer than 100. There was overlap of primary studies across included reviews. The risk of bias of the primary trials were assessed with various tools (e.g., Cochrane risk of bias, Jadad, Downs and Black, Critical Appraisal Skills Programme checklist) and rated as unclear or high risk of bias. The AMSTAR rating was low for two reviews and critically low for the remaining nine SRs. The quality of evidence was low or very low for most outcomes. The findings were based on a few trials with small sample sizes, and most outcomes were based on a single study.

Survival, quality of life, psychological effects, and overtreatment were not reported in any of the SRs.

**Limitations:** There was no limitation on language in the search, however, only English and French language reviews were considered for inclusion. Few analyses were discordant within and across reviews. The methodological issues pertaining to the quality of the source reviews was another major limitation of this overview. Poor data presentation, and incomplete reporting and description of primary source data within and between the reviews was another limitation. Reduction and regression were reported differently, which made it difficult to combine and compare outcomes across studies and reviews.

**Conclusions:** Many treatment modalities for BE have been evaluated, but there are few small studies for each and most had low or very low quality of evidence. Due to several limitations, including the low or critically low quality of the reviews themselves there is uncertainty in understanding the effectiveness of these treatments. Large multicentre trials with longer follow-up are needed.



## Abbreviations/Glossary

AMSTAR	A MeaSurement Tool to Assess Systematic Reviews
APC	Argon Plasma Coagulation
ARD	Absolute Risk Difference
BE	Barrett's Esophagus
CI	Confidence Interval
COMET	Core Outcome Measures in Effectiveness Trials
CTFPHC	Canadian Task Force for Preventive Health Care
CADTH	Canadian Agency for Drugs and Technologies in Health
DSR	Distiller Systematic Review
EAC	Esophageal adenocarcinoma
EMR	Endoscopic mucosal resection
ESCC	Esophageal squamous cell carcinoma
GERD	Gastroesophageal reflux disease
GRADE	Grading of Recommendations, Assessment, Development and Evaluation
HGD	High-grade dysplasia
H2RA	Histamine Type 2 Receptor Antagonists
LGD	Low-grade dysplasia
MD	Mean Difference
MPEC	Multipolar Electrocoagulation
NR	Not Reported
OR	Odds Ratio
PICOS	Population, Interventions, Comparisons, Outcomes, Study design
PPI	Proton Pump Inhibitor
PRESS	Peer Review of Electronic Search Strategies
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PTD	Photodynamic Therapy
RCT	Randomized Controlled Trial
RFA	Radiofrequency Ablation
ROB	Risk of Bias
RR	Risk Ratio
SD	Standard Deviation
SR	Systematic Review

# 1 Introduction

## 1.1 Objective

The Canadian Task Force for Preventive Health Care (CTFPHC) is undertaking a series of systematic evaluations of the evidence to inform the development of a clinical practice guideline regarding the effectiveness of screening adults for esophageal adenocarcinoma (EAC) and associated precancerous lesions (Barrett's Esophagus (BE) and dysplasia).

Two systematic reviews (not yet published) (protocols<sup>1,2</sup> available at <https://osf.io/ty926> and <https://osf.io/pzyej>) were undertaken by the Ottawa Research and Synthesis Center. They have synthesized the evidence on the benefits and harms of screening, as well as the patient preferences and values in relation to screening. However, sufficient direct evidence on the effectiveness of screening was not identified. Consequently, the present project on treatment effectiveness will be used as linked evidence to inform the CTFPHC guideline recommendation on EAC screening.

The purpose of this project is to examine the evidence on the treatment options for stage 1 EAC and precancerous conditions (BE and/or dysplasia), using an overview of reviews approach.

## 1.2 Background

### Prevalence and burden

There are two main types of esophageal cancer, EAC where malignant cells form in the tissues of the lower third of the esophagus, primarily in glandular cells where BE also develops<sup>3</sup>, and esophageal squamous cell carcinoma (ESCC) where malignant cells form in the squamous cells of the esophagus. Globally, there were approximately 52,000 cases of EAC in 2012.<sup>4</sup> Nearly 50% of EAC cases occurred in North America and northwestern Europe.<sup>5</sup> From 1986-2006, EAC incidence in males increased by 3.9% (1.8 to 3.5 per 100,000) and 3.6% in females (0.2 to 0.5 per 100,000) per year in Canada.<sup>5</sup> About 20% of EAC cases are diagnosed at an early stage.<sup>6</sup> Treatment with surgery at early stage leads to a five-year survival rate of 90%.<sup>6</sup> The overall very low five-year survival rate of EAC (14%) maybe attributable to a higher late stage diagnosis (39.9% at stage IV).<sup>7</sup> Increases in incidence of EAC may be dependent on the increasing prevalence of related risk factors such as obesity and gastroesophageal reflux disease (GERD).<sup>5</sup> Other risk factors for the development of EAC are BE, male sex, age older than 50 years, white ethnicity, current or past smoking history, and a family history of BE or EAC.<sup>3,5,8,9</sup>

Although GERD and BE are two risk factors for EAC, not every person diagnosed with EAC will have experienced GERD or have been diagnosed with BE. Approximately 10% of people with GERD will develop BE<sup>10,11</sup> and there is some evidence of progression from GERD to BE, to low-/high-grade dysplasia, and to EAC. The annual incidence of EAC among BE patients has been reported to range between 0.3-0.6%.<sup>12</sup>

BE is the most critical precancerous condition for EAC. In BE, the tissue lining the esophagus transforms into tissue resembling the lining of the intestines. Generally, this transformation is called intestinal metaplasia, and in the esophagus, it is called BE. It is currently not known how the transformation occurs; however, it has been suggested that the acid regurgitation associated

with GERD may assist changes at the cellular level.<sup>13</sup> One Canadian study reported the prevalence of BE at 2.4% among primary care patients experiencing dyspepsia.<sup>14</sup> The prevalence of BE among those who undergo an esophagogastroduodenoscopy (EGD) (also known as upper GI endoscopy) for any reason is between 1% and 2%, and between 5% and 15% among those who receive an EGD for symptoms of GERD.<sup>15</sup> Most patients with non-dysplastic BE or only low-grade dysplasia (cellular change) will not develop cancer. However, incidence of carcinoma has been reported as high as 1 in 52 patient-years, corresponding to 1,920 carcinomas per 100,000 BE patients, compared to annual incidence of 15 esophageal cancers in the general population (whether dysplasia was present was not indicated).<sup>16,17</sup> It has also been found that the longer the length of BE (e.g., short segment vs. long segment) the higher the risk for EAC.<sup>18</sup>

## **Treatment**

The goal of treatment for BE and/or low- or high-grade dysplasia is to slow or halt GERD symptoms, reduce mucosal inflammation, control dysplasia, and prevent progression to adenocarcinoma.<sup>10</sup> The treatments for EAC depend on the stage of the disorder (0 to 4). For stage 0, the disease is considered precancerous and is synonymous with high-grade dysplasia. Endoscopic therapies [e.g., radiofrequency ablation (RFA) or endoscopic mucosal resection (EMR)] are typically performed, followed by endoscopic surveillance.<sup>19</sup> For stage 1, the disease is generally treated with mechanical methods to remove tissue (e.g., endoscopic mucosal resection) followed by an ablative technique to destroy any remaining abnormal areas in the esophagus lining.<sup>19</sup>

There are four main categories for managing and/or treating the conditions of interest (i.e., stage 1 EAC, BE, or dysplasia): (1) pharmacological therapies; (2) surveillance (endoscopic); (3) endoscopic or endoscopic-assisted therapies; and (4) surgery (see **Appendices 1 and 2**). These strategies may overlap with some of the conditions of interest. For example, proton pump inhibitor therapy (PPI) is not a treatment for EAC but may reduce the risk of developing dysplasia and EAC among people with BE. These therapies may also be used in combination (e.g., pharmacological therapy and surveillance procedures for BE) depending on the disease progression.

There are several types of pharmacological therapies used for treatment, such as PPIs and Histamine 2 receptor antagonists (H2RA). These therapies decrease the production of stomach acid, which helps reduce acid reflux-related symptoms, allows for healing, and improves GERD symptoms.<sup>20</sup>

Surveillance strategies, such as high-definition white light endoscopy and chromoendoscopy, are generally considered for patients with BE and are used to monitor progression and assist in the detection of dysplastic and malignant lesions. These strategies use various technologies that help visualize and detect lesions early.<sup>21,22</sup>

The endoscopic or endoscopic assisted therapies, such as endoscopic mucosal resection and radiofrequency ablation, intend to destroy affected tissue and encourage the growth of new healthy tissue in the esophagus.

About 20% of cases of EAC are diagnosed during an early stage where the cancer is limited to the mucosa or submucosa.<sup>6</sup> Treatment with surgery during this stage can be done with endoscopic eradication therapies or esophagectomy. An esophagectomy performed during the early stage of EAC leads to a five-year survival rate of 90%, but this procedure has a mortality rate of 2% and a major morbidity (e.g., unexpected return to operating room, anastomotic leak, reintubation, pneumonia, renal failure<sup>23</sup>) rate of up to 10%.<sup>6</sup>

The prevention of EAC via screening for Barrett's esophagus, surveillance of patients with known Barrett's esophagus for dysplasia, and the non-invasive eradication of high-risk lesions, if effective, could offer a strategy for reducing mortality and improving long term survival and quality of life of those affected.

### **Current recommendations**

Several international organizations such as the American College of Physicians,<sup>24</sup> the American Gastroenterological Association,<sup>25</sup> the American College of Gastroenterology,<sup>9</sup> the National Institute for Health and Care Excellence,<sup>26</sup> the Society for Thoracic Surgeons,<sup>27</sup> and the National Comprehensive Cancer Network<sup>28</sup> have guidelines addressing the management and treatment options for EAC, BE, and low- and high-grade dysplasia. The National Institute for Health and Care Excellence's guideline on endoscopy treatments for people aged 18 and over with BE and high-grade dysplasia or intramucosal cancer (T1A) includes recommendations on various types of endoscopic treatments. One of the recommendations is to consider endoscopic therapies (e.g., endoscopic mucosal resection or ablative therapies) as an alternative to esophagectomy, considering individual patient preferences and general health.<sup>29</sup> The American Gastroenterological Association's guideline issued a position statement on the management of BE. It recommends endoscopic mucosal resection for patients with dysplasia in BE associated with a visible mucosal irregularity to determine the T stage of the neoplasia.<sup>9</sup>

We are not aware of any national recommendations based on a SR of the evidence regarding treatment for EAC and precancerous conditions in Canada. A few provincial organizations<sup>10,30</sup> (e.g., Alberta Health Services and the British Columbia Provincial Health Authority) have published recommendations on treatment and management, but none are based on a SR of the evidence.

Several relevant clinical practice organizations<sup>9,25,27,31</sup> have also published recommendations or statements addressing the management and treatment options for EAC, BE, and low- and high-grade dysplasia, but none are based on a SR of the evidence.

## **2. Methods**

This overview was developed, conducted, and prepared according to the *Cochrane Handbook of Systematic Reviews of Interventions* chapter on overviews<sup>32</sup> and other overview methodology publications.<sup>33–37</sup>

The protocol for this overview was registered with PROSPERO (CRD42018084825) and is available on the CTFPHC website and Open Science Framework (<https://osf.io/mxceb/>).

Any amendments made to the protocol when conducting the overview have been outlined in this manuscript.

## **2.1 Key question**

Key Question 1: What is the effectiveness (benefits and harms) of treatment for stage 1 EAC and precancerous conditions (BE and low- and high-grade dysplasia) in adults?

## **2.2 Inclusion and exclusion criteria**

A narrative of the inclusion and exclusion criteria is provided below and the PICOS (Population, Interventions, Comparison, Outcomes, Study design) table can be found in **Appendix 1**.

### *Population*

The population of interest for this overview were adults ( $\geq 18$  years) with stage 1 EAC or precancerous condition (nondysplastic BE, BE with low- or high-grade dysplasia). We did not use a predefined method for diagnosis (e.g., histopathological exams, ICD code) and relied on how it was defined in the SRs. Similarly, the presence of chronic GERD was deemed as per the review authors' definitions, whether it was reported or not. SRs with participants diagnosed with other gastro-esophageal conditions (e.g., gastric cancer, esophageal atresia, and other life-threatening esophageal conditions) were excluded.

### *Interventions*

All management/treatment strategies for stage 1 EAC or precancerous conditions (BE, low- or high- grade dysplasia) were considered, including: 1) pharmacological therapies; 2) surveillance methods (endoscopic); 3) endoscopic or endoscopic assisted therapies; and 4) surgery (**Appendix 2**). We excluded follow-up diagnostic tests, such as 24-hour esophageal pH test or tests for staging purposes, such as computerized tomography and magnetic resonance imaging.

### *Comparisons*

We included SRs that compared treatment with no management/treatment, any other management/treatment strategies, or a combination of management/treatment strategies.

### *Outcomes*

To measure treatment effectiveness, the following outcomes were considered by the CTFPHC EAC working group as critical and important for decision making. These outcomes were drawn from the CTFPHC EAC working group outcome rating and validation with patients as part of the SR on the benefits and harms of screening for EAC. Additionally, other relevant outcomes were identified during the data extraction phase (e.g., eradication). This is further described in the amendments to the protocol section.

The screening outcomes of interest that are considered *critical* for decision-making are:

1. All-cause mortality and EAC-related mortality (1, 5, 10 years, or as available)
2. Survival (1, 5, 10 years, or as available)
3. Progression from non-dysplastic BE to BE with dysplasia, progression from low-grade to high-grade dysplasia, progression to EAC. The following outcomes were added post-hoc to include the reverse of progression: complete eradication of intestinal metaplasia/BE,

complete eradication of dysplasia, complete eradication of high-grade dysplasia, complete eradication of neoplasia, reduction/regression of BE in length (cm) and in area (%). Treatment failure (no ablation, no eradication) and EAC recurrence were also added.

4. Life threatening, severe, or medically significant consequences (e.g., requiring/prolonging hospitalization)

Outcomes considered *important* for decision-making are:

5. Quality of life (validated scales only)
6. Major or minor medical procedures
7. Psychological effects (e.g., anxiety, stress)
8. Overtreatment

### *Study design*

SRs of randomized controlled trials (RCTs) were included. To be defined as a SR, a review must have met all four of the following criteria: (1) searched at least one database; (2) reported its selection criteria; (3) conducted quality or risk of bias assessment on included studies; and (4) provided a list and synthesis of included studies. SRs that identified observational studies were included if results from RCTs were provided separately.

### *Settings*

Any setting was considered.

### *Timing*

There were no limitations set for publication dates.

### *Language*

There were no language restrictions in the electronic searches; however, only English articles were considered for inclusion at full-text.

## **2.4 Literature search**

The search strategy was developed and tested through an iterative process by an experienced medical information specialist in consultation with the review team. Another senior information specialist peer reviewed the strategy prior to execution according to the Peer Review of Electronic Search Strategies (PRESS) checklist (**Appendix 3**).<sup>38</sup> Using the OVID platform, we searched OVID MEDLINE Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE, and Embase Classic + Embase. We also searched the Cochrane Library on Wiley, including the Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, and Health Technology Assessment databases. All searches from inception were updated and run on October 29-30, 2018.

Strategies utilized a combination of controlled vocabulary (e.g., “Barrett Esophagus”, “Esophageal Neoplasms”, “Meta Analysis”) and keywords (e.g., Barrett’s dysplasia, esophageal cancer, systematic review). Vocabulary and syntax were adjusted across databases. There were no language or date restrictions but when possible, animal-only records and opinion pieces were removed from the results.

The completed peer-reviewed search strategy can be found in **Appendix 4**.

We performed a targeted grey literature search based on the Canadian Agency for Drugs and Technologies in Health (CADTH)'s Grey Matters Checklist ([https://www.cadth.ca/sites/default/files/pdf/Grey-Matters\\_A-Practical-Search-Tool-for-Evidence-Based-Medicine.doc](https://www.cadth.ca/sites/default/files/pdf/Grey-Matters_A-Practical-Search-Tool-for-Evidence-Based-Medicine.doc)). Additional references were sought through hand-searching the bibliographies of SRs and clinical practice guidelines.

## **2.5 Study selection**

Results from the search strategies were uploaded into Reference Manager<sup>39</sup> and duplicates across searches were identified and removed. The remaining citations were then uploaded into Distiller Systematic Review (DistillerSR) Software©<sup>40</sup> for the title and abstract screening and full-text screening (**Appendix 5**).

A screening pilot was performed prior to full screening of titles and abstracts (50 titles and abstracts) and full-text screening (25 reviews). Two reviewers independently assessed the titles and abstracts for eligible SR using the liberal accelerated method<sup>41</sup> where only one reviewer is required to include citations for further assessment at full-text screening and two reviewers are needed to exclude a citation. Citations were reviewed in random order and reviewers were unaware if a citation had already been assessed.

The full-text articles of potentially relevant citations were retrieved for full-text screening and two reviewers independently assessed the article for relevancy. Any disagreements were resolved through discussion and if needed, a third reviewer.

Full-text articles that were not available electronically were ordered through the University of Ottawa's interlibrary loan service. Articles that were not received within 30 days were excluded with the reason provided. For articles with abstracts only, a search was performed to locate any full-text publications. Those that were not available as full-texts were excluded.

## **2.6 Data extraction and management**

Data were extracted by one reviewer using a data extraction form developed *a priori* and verified by a second reviewer. Any discrepancies were resolved through discussion and if needed, a third reviewer. Data were extracted as they were synthesized and/or reported in the included reviews. No additional information from the primary studies was extracted or assessed and quality control was not performed to verify the accuracy of the reviews' data on the included studies.

Full data extraction included the general characteristics of the review (author, year, country, funding source, conflict of interest, and PICOS); characteristics of included studies (e.g., intervention, outcomes, and risk of bias); methodological features (e.g., study designs included, databases, last search date, methods for the quality assessment of primary studies); and results (e.g., number of included studies, total number of participants, and review findings).

## **2.7 Quality assessment of reviews**

The quality of the included SRs was assessed using the AMSTAR measurement tool<sup>42</sup> (**Appendix 6**). Two reviewers assessed the quality of each included SR independently. Any discrepancies were resolved through discussion and if needed, a third reviewer. We used the

AMSTAR 2<sup>43</sup> approach to come up with final assessments of quality of conduct, including consideration of four critical domains (i.e., 1. Was an a priori design provided? 2. Was a comprehensive literature search performed? 3. Was a list of studies provided? 4. Was the likelihood of publication bias assessed? see **Supplementary Table 1**). A senior reviewer categorized the quality as high, moderate, low, or critically low, using the criteria below, with another senior reviewer verifying these categorizations:

- High quality:  $\leq 1$  non-critical weakness
- Moderate quality:  $>1$  non-critical weakness and no critical flaw
- Low: one critical flaw
- Critically low:  $>1$  critical flaws

## **2.8 Analysis**

The characteristics of all included reviews are presented in tables and summarized narratively. The results presented in evidence sets 1-11 may omit some results due to overlap. In the case of overlap where outcome data was the same in multiple reviews, the review with the highest methodological quality or with the most complete outcome data was included; the additional reviews are listed in Table 2 and mentioned in the Notes column of the evidence sets.

Odds ratios (OR) were commonly used in SRs and absolute risk differences (ARDs) were calculated accordingly. Where SR authors did not provide an OR, a relative risk (RR) was calculated based on the results and the ARD was calculated based on the RR. In instances where the RR did not approximate the OR reported in the SR, we inserted the RR in the notes column in the evidence set; however, the ARDs were calculated based on the OR.

We determined the extent of overlap of evidence across reviews by outcome for each comparison using the corrected covered area (CCA) method.<sup>44</sup>

## **2.9 Rating the certainty of the evidence**

The CTFPHC endorses the use of GRADE methodology to provide a transparent assessment of the strength and quality (also known as ‘certainty’) of evidence from very low to high certainty. As there are no published methods for performing GRADE for overviews of reviews, we have used the five domains as a guide: 1) study limitations (i.e., risk of bias); 2) indirectness; 3) inconsistency; 4) imprecision; and 5) other considerations (i.e., publication bias and comprehensiveness of the search).<sup>45</sup> The certainty of the evidence for each outcome, in each review, was rated by one reviewer and verified by a second reviewer. Any discrepancies were resolved through consensus.

As none of the included reviews used GRADE to evaluate the body of evidence, we performed these assessments using the reported information in the reviews and did not access the primary studies for any additional information, as was pre-specified in the protocol.

When undertaking domain assessments, we considered an approach with sufficient face validity to align with GRADE guidance. We have elaborated on considerations and decisions, below. As with existing GRADE guidance, each GRADE domain was judged as possessing no serious



limitations (no rating down), serious limitations (rating down by one), or very serious limitations (rating down by two).

### *Study limitations domain*

The GRADE Handbook outlines several criteria that are likely to result in biased results in randomized trials: randomization/concealment; blinding; attrition; selective reporting; and other limitations, such as the use of unvalidated outcome measures for patient-reported outcomes.<sup>46</sup>

Different critical appraisal criteria were used across reviews, including the Cochrane ROB tool. Unlike other tools, the Cochrane ROB tool addresses the GRADE criteria directly. Since the Cochrane ROB criteria correspond perfectly to the GRADE criteria, we have elected to present all critical appraisal information across reviews according to those criteria, to facilitate judgements for the study limitations domain.

To optimize the use of relevant information for a given study, we considered available Cochrane ROB information, either as a primary source or together with assessments made with another tool, to inform a judgement. We regarded study-level Cochrane ROB assessments as relevant to any reporting of a study. Details on how this information was considered is provided by outcome in the footnotes of the GRADE evidence sets 1-11.

In cases where information relevant to the study limitations criteria was not available or not reported in a way to enable its use, the study limitations domain was labelled as ‘unclear’, and no judgement was made on whether to down-rate (see final GRADE rating for further details).

In a few cases where the body of evidence was a mix of abstract and full report information (e.g., Evidence Set 7.2), we provide a range of potential assessments, reflective of the uncertainty in the collective risk of bias information. Aligning with assessments made in an included Cochrane review, conference abstracts were deemed to possess very serious limitations due to their preliminary nature (also used for abstract data alone), and the ROB information for the full reports was provided in aggregate in these cases, making it uncertain to know the contribution of an individual study in the analysis.

### *Indirectness domain*

Evaluating directness was more difficult, owing to our reliance on review authors’ reporting of study information. When evaluating indirectness, two factors were considered:

- Country of conduct: Of particular importance, as the delivery of care in some jurisdictions may not be directly applicable to the Canadian context and, therefore, may impact the understanding of the applicability of treatment effectiveness. This could impact pharmacological treatment as it may impact accessibility to the regimens. It may also impact procedural and surgical treatment, as there may be differences in training or equipment used. Therefore, when the country of conduct was included it was assessed against the Canadian context to determine if down-rating was necessary. For example, if a trial was conducted in the USA, care delivery for these interventions was thought not to differ from the Canadian context, so down-rating did not occur. If information on the country of conduct was missing, indirectness was not rated, but labelled as ‘unclear’.

- Other gastroesophageal conditions (GE): None of the included SRs provided any information as to whether the participants had other GE conditions, an *a priori* determined exclusion criterion. Although important to note in the GRADE tables as having been considered, it was judged to have minimal effect, and indirectness was not down-rated.

### *Imprecision*

Imprecision was judged based on GRADE default thresholds for optimal information size (300 events for dichotomous outcomes and 400 patients for continuous outcomes) and interpretation of confidence intervals according to whether results include no effect, appreciable benefit, and/or appreciable harm (benefit/harm threshold  $RR < 0.75$  and  $RR > 1.25$ , along with consideration of the absolute confidence interval). Clinical significance of estimates was difficult to determine for many outcomes and addressed in the Discussion section.

### **Final GRADE rating**

As all primary studies in the reviews were RCTs, each outcome started with a high level of certainty. If there was sufficient down-rating to very low certainty (i.e., three levels of down-rating) among domains with sufficient information for assessment, any unclear domain(s) would be inconsequential as no further rating changes are possible. However, if the certainty of the evidence was low, moderate, or high after rating the domains with sufficient information, an unclear domain may impact the certainty of the evidence. For example, if the rating (based on GRADE domains with known evidence) was a low level of certainty, and there was one domain that was unclear, having sufficient information to rate the domain could result in one of two situations: 1. A rating of no serious limitations would result in a final level of certainty of low (no change); or 2. A rating of serious or very serious would result in a final level of certainty of very low (one additional down-rating). To reflect this uncertainty, we have provided the range of possible certainty rating (i.e., very low to low).

## ***2.10 Changes from the protocol***

As noted above in the outcomes section of 2.3, data for additional relevant outcomes were extracted and included in this overview. Outcomes defined a priori only included progression; however, as the review is on treatment, other outcomes such as eradication/regression, reduction, and recurrence were considered relevant as well. It was stated in the protocol that AMSTAR assessments would be done by one reviewer, with verification by a second reviewer. However, these assessments were done independently, in duplicate, with conflicts resolved through discussion or with a third reviewer. We used the AMSTAR 2 approach, relating to the four critical domains, to come up with final categorization of the quality of conduct as noted in section 2.7.

## **3 Results**

### ***3.1 Summary of the literature search***

The database search (from inception to October 2018) yielded 4,374 citations, and a grey literature search identified an additional 45 records. After 658 duplicates were removed, 3,761 unique records were screened based on the title and abstract. Of these, 2,754 studies were

excluded while 1,007 records passed to full-text screening. Among these, 996 publications were excluded based on full-text screening and eleven SRs met all eligibility criteria and were included in this overview (**Figure 1**).

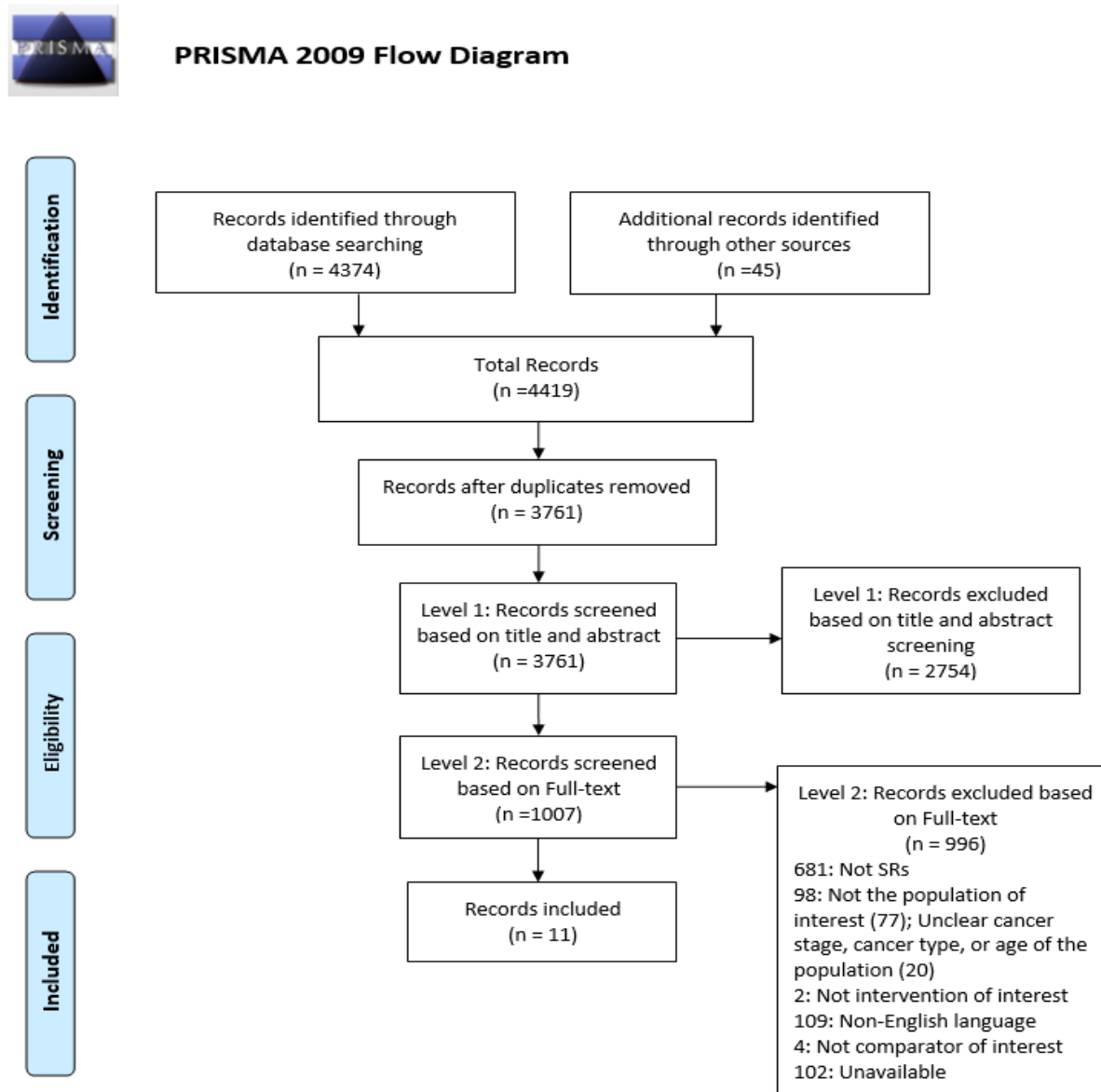


Figure 1 - PRISMA diagram for EAC Treatment Overview

**Appendix 7** provides a list of excluded reviews at full-text with reasons. We did not identify any ongoing SRs; however, a list of ongoing trials is provided in **Appendix 8**.

### 3.2 Results

Key Question 1: What is the effectiveness (benefits and harms) of treatment for stage 1 EAC and precancerous conditions (BE and low- and high-grade dysplasia) in adults?

### 3.2.1 Characteristics of included reviews

The review characteristics of the eleven included SRs are shown in **Table 1**,<sup>47–57</sup> Briefly, the populations included in these reviews were adults with BE with or without dysplasia in five SRs,<sup>47–50,57</sup> BE patients with low grade dysplasia (LGD) in three SRs,<sup>51,52,56</sup> and BE with high grade dysplasia (HGD), or intramucosal cancer in three SRs.<sup>50,53–55</sup> One review, Fayter et al.,<sup>50</sup> primarily reported results narratively.

SRs were published between 2008 and 2018. Five SRs included RCTs only,<sup>47–50</sup>, six included both observational and RCT study designs in patients with BE, dysplasia and/or stage 1 EAC. The sample size of included RCTs across the SRs ranged from nine to 208 participants, with most studies including fewer than 100. One included SR reported on an ongoing RCT with no results<sup>57</sup>, and should be tracked (**Appendix 8**).

A total of 25 articles reporting results of RCTs were included across the ten reviews with available data (**Appendix 9**). The number of included primary RCTs within a review ranged from one<sup>55</sup> to 16.<sup>49</sup> Some of the individual trials were represented in more than one review since the reviews did not have mutually exclusive eligibility criteria (**Figures 2 and 3**). The number of included RCTs in each SR is reported in **Table 1**.

### 3.2.2 AMSTAR rating

Two of the ten included SRs with available data were rated as low quality<sup>49,51</sup> and the remaining eight as critically low (**Supplementary Table 1**). All ten SRs had at least one of the four critical flaws stated in the method's section: only three SRs reported a priori design, four performed a comprehensive literature search, one provided a list of included and excluded studies, and four assessed the likelihood of publication bias.

### 3.2.3. Risk of bias assessment of primary RCTs:

Among the ten reviews, risk of bias of the primary RCTs was assessed by various tools including Cochrane risk of bias in one SR,<sup>49</sup> Jadad score in three SRs,<sup>47,48,52</sup> Newcastle-Ottawa scale in two SRs,<sup>53,55</sup> Downs and Black in two SRs,<sup>51,54</sup>, assessment guided by combination of Cochrane risk of bias tool and the Critical Appraisal Skills Programme (CASP) checklist in one SR,<sup>56</sup> and an unspecified checklist in one SR.<sup>50</sup> All SRs reported only study specific assessments across all outcomes, with only one review indicating that the assessments were the same across all outcomes.<sup>49</sup> The risk of bias assessment varied across primary studies with the majority of studies rated as unclear or high risk of bias. The most common reasons for overall assessments of unclear risk of bias in Rees 2010 were associated with the domains of selection bias, performance bias, and attrition bias; there was a lack of clarity as to whether the sequence generation and allocation concealment were carried out, if blinding was used, and if complete outcomes data were reported. Of the 16 RCTs included in Rees 2010,<sup>49</sup> only one was rated as low risk of bias,<sup>58</sup> Fayter 2010<sup>50</sup> did not report outcome and study specific assessments. Overall, most of trials in this review did not clearly report study methods. There was lack of clarity with regards to randomization in almost 80% of trials, allocation concealment in approximately 90% of studies, and use of blinding in about 62% of RCTs.<sup>50</sup> Of the two reviews using Downs and

Black tool based on sums, one<sup>54</sup> reported rating for individual items pertaining to risk of bias assessment (scored one for randomization and attrition bias, and zero for allocation concealment and blinding both primary trials<sup>59,60</sup>); and the other did not.<sup>51</sup> Rating for risk of bias items such as randomization, allocation concealment, blinding, attrition and selective outcome reporting were not distinguishable in two SRs using Newcastle-Ottawa scale,<sup>53,55</sup> Of the three SRs<sup>47,48,52</sup> using Jadad score, only one<sup>48</sup> reported item specific rating in which 69% of the trials had unclear randomization and allocation concealment, and 85% did not use blinding. Risk of bias assessment in Pandey 2018 was reported as being guided by the Cochrane risk of bias tool and CASP checklist, however, it was unclear if the actual tools were used.<sup>56</sup> Specifically, the SR reported a rating from one to four (one being the highest quality) and the two included RCTs were rated as one but there was no information on specific domains or how they reached such rating.<sup>56</sup> **Supplementary Table 2** provides detailed quality assessments of the included RCTs.

### 3.2.4. Certainty of the body of evidence

As none of the SRs reported a GRADE assessment, we assessed the certainty of the body of evidence based on the information reported in the reviews using the GRADE domains as a guide.

Briefly, evidence available for most outcomes was rated as very low certainty or ‘very low to low certainty’. The range in rating for some outcomes reflects our uncertainty in final rating of evidence due to lack of sufficient information in the SRs pertaining to primary studies to address GRADE domains as stated in the methods section (section 2.9). Detailed GRADE domain assessments are presented in Evidence Sets 1-11 (GRADE domains tables) and discussed later in the report.

### 3.2.5 Comparisons

The included SRs compared 11 different treatment group comparisons based on the four broad treatment group types (i.e., pharmacological therapies, surveillance, endoscopic or endoscopic assisted therapies, and surgery; **Appendix 2**). Detailed information on all comparisons, primary studies providing data, sample size for each arm, and outcomes are presented in Evidence sets 1-11 (results tables), and these comparisons include:

Evidence Set	Treatment group comparisons	Specific therapy comparisons
1	Pharmacological therapy vs Placebo	1.1 Celecoxib vs Placebo
2	Pharmacological therapy vs Pharmacological therapy	2.1 Omeprazole vs Histamine Type 2 Receptor Antagonists
3	Chemical ablative techniques combined with pharmacological therapy vs Pharmacological therapy	3.1 Photodynamic therapy + Omeprazole vs Omeprazole
4	Surgery combined with thermal ablative technique vs Surgery combined with surveillance	4.1 Anti-reflux surgery (Nissen fundoplication) +Argon plasma coagulation vs Anti-reflux surgery (Nissen fundoplication) +Surveillance (endoscopic)

Evidence Set	Treatment group comparisons	Specific therapy comparisons
5	Thermal ablative technique combined with pharmacological therapy vs Pharmacological therapy	5.1 Radiofrequency ablation + Proton pump inhibitor vs Proton pump inhibitor
6	Surgery vs Pharmacological therapy	6.1 Anti-reflux surgery (Nissen fundoplication) vs H2RA/Omeprazole
7	Chemical ablative technique vs Chemical ablative technique	7.1 Photodynamic therapy using 5-ALA vs Photodynamic therapy using Photofrin 7.2 Photodynamic therapy with different treatment parameters
8	Thermal ablative technique vs Surveillance	8.1 Radiofrequency ablation vs Surveillance (endoscopic)
9	Thermal ablative technique combined with Pharmacological therapy vs Thermal ablative technique combined with Pharmacological therapy	9.1 Argon plasma coagulation + Proton pump inhibitor vs Multipolar electrocoagulation + Proton pump inhibitor 9.2 evaluates 9.1 but reversed treatment and comparison groups
10	Thermal ablative technique vs Chemical ablative technique combined with Pharmacological therapy	10.1 Photodynamic therapy vs Argon plasma coagulation + Proton pump inhibitor
11	Mechanical ablative technique vs Thermal ablative technique	11.1 Endoscopic mucosal resection vs Radiofrequency ablation

Where possible, all treatment parameters were included in the comparison, but not all reviews described all facets of the treatment. For example, one review reported that both study groups received pharmacological therapy in addition to treatment,<sup>49</sup> while another review did not include this detail for the same primary study.<sup>51</sup>

**Tables 1 and 2** provide additional details of all primary studies included in each SR, and which treatment comparisons provided results in each SR. All primary studies within a review that provided outcome data but were not included in the evidence sets are displayed by italicized font in Table 2.

## Outcomes

Throughout the Evidence Sets 1-11, the word “significance” refers to statistical significance unless stated otherwise.

Twenty-two sets of comparisons had overlapping data across reviews (Appendix 10). In most cases, included studies overlapped completely, according to corrected covered area (CCA) calculations. In few cases was there discordance among reviews.

## 1 Pharmacological therapy vs Placebo

### 1.1 Celecoxib vs Placebo

One SR<sup>49</sup> with one included primary RCT<sup>61</sup> reported on the COX-2 inhibitor, Celecoxib (200 mg twice daily for up to two years) compared to placebo. **Evidence Set 1.1: Results table** provides details results for each outcome. Overall, there was no difference between the groups in the celecoxib and placebo arms.

Not presented in the results table but presented narratively in the SR, review authors stated that the primary trial authors did not report any statistical difference for the following outcomes: the area of Barrett's esophagus segment at 12 months, and in the reduction in the number of patients progressing from intestinal metaplasia to dysplasia between baseline and one-year. In addition, review authors reported "no statistical difference in the number of patients" with complete eradication of dysplasia at 12 months, and with bleeding in each group.

**All-cause mortality:** There is discordant reporting of this outcome within the review, where the text reports two deaths in the trial, but the forest plot reports three deaths in each group. Based on the information in the analysis, there was no difference in the number of deaths between the groups.

**Progression to adenocarcinoma at one-year:** There were three cases of EAC reported in each group, with no overall difference in treatment effects.

Overall, the certainty of the evidence for all-cause mortality was considered low due to serious concerns in the study limitations (risk of bias) and imprecision domains. Progression to EAC at one year was considered very low due to serious concerns in the study limitations (risk of bias) domain and very serious concern in the imprecision domain (**Evidence Set 1.1: GRADE domains table**).

## 2 Pharmacological Therapies vs Pharmacological Therapies

### 2.1 Omeprazole vs Histamine Type 2 Receptor Antagonists

One systematic review<sup>49</sup> reported data from three primary studies<sup>62-64</sup> on regression of BE (dysplasia status was not given) in terms of change in length and change in area. The table of results is provided in **Evidence Set 2.1: Results table** with results of the GRADE domains in **Evidence Set 2.1: GRADE domains table**.

One included primary study was an abstract, with no full publication.<sup>62</sup> The three studies had differences with regards to drug dosage and regimens. Weinstein 1996 and Peters 1999 compared slightly different treatment regimens of omeprazole to ranitidine (omeprazole 40mg twice daily for one year followed by omeprazole 40 mg one daily for a year compared to ranitidine 150 mg for two years in Weinstein 1996;<sup>64</sup> omeprazole 40 mg twice daily to ranitidine 150 mg twice daily for two years in Peters 1999<sup>63</sup> and Caldwell 1996 compared omeprazole (20 mg once daily) to Cimetidine (400 mg three times daily) for two years.<sup>62</sup>

**Reduction in length (cm) of BE at 12 months:** The meta-analysis of three studies demonstrated no difference between the compared groups, and the pooled effect estimate remained non-significant when the analysis was restricted to a subgroup who received a higher dose of omeprazole.<sup>63,64</sup> Both the overall and subgroup meta-analyses showed significant heterogeneity ( $I^2$  statistic = 62.6% and 60%, respectively) that might be due to differences in the drug dosage and regimens in at least one of the analyses.

**Reduction in area (%) of BE:** The meta-analysis of two studies showed a reduction with omeprazole that was statistically significant at 12 months; however, the change is small.<sup>63,64</sup>

The certainty of the evidence was very low in both main and subgroup analyses for reduction in length (cm) of BE based on serious concerns in the study limitations (risk of bias), imprecision, and inconsistency domains. There was insufficient information to judge indirectness (i.e., country of conduct) for these outcomes, however this domain would have no impact on the final level of certainty as it was already at very low.

The certainty of the evidence was initially considered low for reduction in area (%) of BE based on serious concerns in the study limitations (risk of bias) and imprecision domains. This level of certainty was changed to a range of ‘very low to low’, as there was insufficient information on indirectness (i.e., country of conduct). If sufficient information were available, the evidence may not have been rated down, in which case the final rating would be low. However, if there were serious or very serious concerns with indirectness, then the final rating would be very low (**Evidence Set 2.1. GRADE domains table**).

### **3 Chemical ablative technique combined with pharmacological therapy vs Pharmacological therapy alone**

#### ***3.1 Photodynamic Therapy (PDT) + Omeprazole vs Omeprazole alone***

Two unique<sup>65,66</sup> trials (from three studies)<sup>65–67</sup> reported across four SRs<sup>47–50</sup> compared combined photodynamic therapy and omeprazole to omeprazole alone in patients with BE. Overholt 2007<sup>65</sup> provided five-year follow-up data for progression to EAC, with Overholt 2005<sup>67</sup> providing two-year follow-up data for other outcomes for the same trial participants. **Evidence Set 3.1** provides details for each outcome and for GRADE domains. Most outcomes were reported by one study each with relatively small sample sizes.

**All-cause mortality:** Two studies reported on this outcome. One study<sup>67</sup> used PDT with 5-ALA and the other<sup>66</sup> used PDT with porfimer sodium; no follow-up time is reported. The study by Ackroyd et al.<sup>66</sup> observed no deaths, and Overholt et al.<sup>67</sup> reported no statistically significant difference between groups, but this was based on few observed events (n=3).

**Progression to EAC:** Two studies evaluated this outcome, with two<sup>67</sup> and five-year<sup>65</sup> follow-up data, respectively on the same population. At both two- (PDT + omeprazole: 18/138; omeprazole: 20/70; OR 0.38 (95%CI 0.18 to 0.77)) and five- (PDT + omeprazole: 21/138; omeprazole: 20/70; RR 0.53 (95%CI 0.31 to 0.91)) years, there was a statistically lower progression from BE to cancer with combined therapy than with omeprazole alone.



**Progression from non-dysplastic to dysplastic BE:** One RCT reported<sup>66</sup> that the progression to dysplastic BE was statistically lower with combined therapy, with no events observed in that group, and 12 events (of 18 participants) observed in the omeprazole group. Follow-up time was not reported.

**Eradication of dysplasia:** Data discrepancies observed between two reviews<sup>48,49</sup> were reported for both studies<sup>66,67</sup> that addressed this outcome. Based on the information presented, it is unclear why this discrepancy occurred but it could be due to how the outcome was defined and/or reporting error. However, both reviews show higher eradication with combined therapy.

**Eradication of high-grade dysplasia:** One review<sup>48</sup> provides data among those with HGD from the same studies as the eradication of dysplasia outcome. It is unclear why more participants experienced eradication of HGD than dysplasia in general, as the denominators are the same. There was higher eradication with PDT combined with Omeprazole.

**Eradication of BE:** One study reported that eradication of BE by five years was statistically greater with combined therapy (PDT + omeprazole: 72/138; omeprazole: 5/70; OR 14.18 (95%CI 5.38 to 37.37)).<sup>65</sup>

**Reduction/regression of BE:** One study with 36 participants reported this outcome in three reviews using four measures of reduction/regression.<sup>48-50</sup> Statistically significant reductions in both length and area were observed with combined therapy<sup>66</sup> in two reviews.<sup>48,49</sup> Fayter et al.<sup>50</sup> provided results of evidence of regression (not further described), with much higher percentage of those in the combined group experiencing regression (89% vs 11%).

**Treatment failure of BE:** A meta-analysis of two studies showed fewer absolute treatment failures with combined therapy.<sup>66,67</sup> No relative effect measure was reported for this meta-analysis.

**Stricture formation:** Statistically significantly more strictures formed with combined therapy (49/138) compared to the omeprazole treatment group (0/70) in one study.<sup>67</sup>

Seven outcomes (all-cause mortality, progression from IM to dysplasia, reduction in length (cm) of BE at 12 months, reduction in area (%) of BE at 12 months, area of regression of BE, evidence of regression, and treatment failure) were rated as very low certainty as there was serious or very serious concern in the study limitations (risk of bias) and imprecision domains. Area of regression of BE also had serious concern in the other considerations domain (i.e., publication bias and comprehensiveness of the search). Additionally, treatment failure had serious concerns in the imprecision and other considerations (i.e., comprehensiveness of the search) domains. For all seven outcomes, there was insufficient information to judge indirectness (i.e., country of conduct), however this would have no impact on the final level of certainty which was already at very low.

The certainty of the evidence for remaining seven outcomes (progression to cancer at the latest possible time point, progression to cancer at 5 years, complete eradication of dysplasia at 2 years,

dysplasia eradication, eradication of HGD, complete eradication of BE over the course of the study, and stricture formation) had serious concerns in the study limitations (risk of bias) and imprecision domains resulting in an initial rating of low certainty. This level of certainty was changed to a range of 'very low to low', as there was insufficient information on indirectness (i.e., country of conduct). If sufficient information were available, the evidence may not have been rated down, in which case the final rating would be low. However, if there were serious or very serious concerns with indirectness, then the final rating would be very low (**Evidence Set 3.1. GRADE domains table**).

## **4 Surgery combined with + thermal ablative techniques vs Surgery combined with surveillance**

### **4.1 Anti-reflux surgery (Nissen fundoplication) + Argon plasma coagulation (APC) vs Anti-reflux surgery (Nissen fundoplication) + Surveillance (endoscopic)**

Three systematic reviews<sup>47-49</sup> reported data from a single trial with two publications<sup>68,69</sup> on progression to EAC, progression to high grade dysplasia, progression from intestinal metaplasia to dysplasia, eradication of BE, ablation of BE and treatment failure. Ackroyd 2004<sup>69</sup> was a short-term follow up of the patients, with longer-term follow up presented in Bright 2007.<sup>68</sup> This trial compared APC ablation (at 60 W for a maximum of six sessions at four-weekly intervals) with standard surveillance consisting of a repeat upper GI endoscopy at one year of patients with BE after anti-reflux surgery (surgical fundoplication). A table of results and GRADE domains can be found in **Evidence Set 4.1**.

**Progression to EAC:** No patients progressed to cancer.

**Progression to HGD (from LGD):** Based on sparse events (only two instances in the surveillance group) in one RCT<sup>68</sup> from one SR<sup>48</sup>, no difference between the treatment effects was observed.

**Progression from intestinal metaplasia to dysplasia:** One trial<sup>68</sup> provided five-year follow -up data, and reported no difference between the two groups, although this was based on two cases of progression (both in the surveillance group).<sup>49,68</sup>

**Complete eradication of BE:** The effect estimate favoured APC<sup>68</sup> at 12 months. The data need to be interpreted with caution because of the very low quality of evidence due to imprecision and study limitations and uncertainty from authors' reporting whether the data represent one or five years of follow-up. Additionally, the data presented in the forest plot differed from the data in the text.<sup>49,68</sup>

**Complete ablation (among those with histological change):** No difference was observed between the treatment groups in one study<sup>46</sup> included in one review.<sup>67</sup>

**Treatment failure (no ablation of BE):** One RCT<sup>69</sup> included in one review<sup>47</sup> reported that no difference was observed between the compared groups and the quality of evidence was low due to imprecision.

The certainty of the evidence was very low for all outcomes. There were very serious concerns in the study limitations (risk of bias) domain, and serious or very serious concerns in the imprecision domain. For the progression to HDG and treatment failure at one year outcomes, there were serious concerns in the other considerations domain (i.e., comprehensiveness of the search). There was insufficient information to judge indirectness (i.e., country of conduct) for these outcomes, however this would have no impact on the final level of certainty as they were already rated as very low (**Evidence Set 4.1 GRADE domains table**).

## **5 Thermal Ablative Techniques combined with Pharmacological Therapy vs Pharmacological Therapy**

### ***5.1 Radiofrequency ablation (RFA) + Proton Pump Inhibitor (PPI) vs PPI alone***

Three systematic reviews<sup>49,51,56</sup> reported data from a single trial<sup>70</sup> on progression to EAC, progression to high grade dysplasia, complete clearance of dysplasia, complete eradication of BE, treatment failure and stricture formation. A table of results can be found in **Evidence Set 4.1**. Rees 2010 referred to a publication by Shaheen et al. 2009, with an incorrect publication year (2008). This SR included patients with both low- and high-grade dysplasia, labelled the comparison as RFA versus sham, and commented that all patients were followed by an extensive surveillance protocol and high dose proton pump inhibitor. However, Qumseya 2017, and Pandey 2018 included Shaheen 2009, but restricted their reporting to patients with low-grade dysplasia and the comparison was labelled as RFA vs surveillance.

**Progression to EAC:** Five participants progressed to EAC at five years or at the latest timepoint of follow-up, (RFA+PPI: 1/84; PPI: 4/43)<sup>49</sup> resulting in no difference between the compared treatments. Among those with LGD, none progressed to EAC over the follow-up period.<sup>49,51</sup>

**Progression to higher grades of dysplasia:** A reduction in progression to higher grades of dysplasia was reported with the RFA treatment.<sup>49</sup> However, when the outcome was restricted to progression to high grade dysplasia among patients with low grade dysplasia, no difference was observed.<sup>51,56</sup>

**Complete clearance of intestinal metaplasia:** One study reported a statistically significant difference favouring RFA was observed (RFA+PPI:34/42 PPI: 1/22; RR 17.81, 95%CI 2.61-121.54).<sup>56</sup>

**Complete clearance of dysplasia:** A favourable treatment effect with RFA was observed at 12 months (RFA+PPI: 72/84; PPI: 9/43; OR 22.67 (95%CI 8.72 to 58.94)).<sup>49</sup> The treatment effect was not lost when the outcome was restricted to patients with LGD comparing incomplete clearance between the groups (RFA+PPI:4/42; PPI: 17/22; OR 0.03, 95%CI 0.01-0.13).<sup>56</sup>

**Complete eradication of BE:** A statistically significant difference favouring RFA was observed at 12 months (RFA+PPI:65/84; PPI: 1/43; OR 143.53, 95%CI 18.53-1113.87).<sup>49</sup> The opposite of complete eradication, treatment failure, was reported by De Souza 2014 (see below).

**Treatment failure (no ablation of BE):** De Souza 2014<sup>47</sup> showed higher rate of treatment failure in the PPI treatment group compared to the RFA + PPI group (RFA+PPI: 19/84; PPI: 42/43).

**Stricture formation:** There was no difference between treatment effects.<sup>49</sup>

**Perforations:** There were no instances of perforation reported.<sup>56</sup>

**Bleeding:** One study participant developed bleeding, but data was not presented per arm.<sup>56</sup>

The certainty of the evidence was low for four outcomes (progression to EAC at five years, progression to higher grades of dysplasia, complete eradication of dysplasia at 12 months, and complete eradication of BE at 12 months) due to serious concerns in the study limitations (risk of bias) and imprecision domains. Stricture formation was rated as very low certainty due to serious concerns in study limitations (risk of bias) and very serious concerns in imprecision. The certainty of the evidence was very low for the remaining nine outcomes due to serious concerns in the study limitations (risk of bias) and other considerations (publication bias and/or comprehensiveness of the search) domains, with serious or very concerns the imprecision domain. (**Evidence Set 5.1 GRADE domains table**).

## 6 Surgery vs Pharmacological Therapies

### *6.1 Anti-reflux surgery (Nissen Fundoplication) vs H2 receptor agonist / Omeprazole*

Two systematic reviews<sup>48,49</sup> reported data from a single trial<sup>71</sup> on all-cause mortality, progression to EAC, progression to dysplasia, complete eradication of dysplasia, and complete eradication of BE. The primary study, Parrilla 2003, compared Nissen fundoplication (n=53) to H2 receptor antagonist which was then converted to the proton pump inhibitor Omeprazole (n=40) part way through the study. Although most outcomes report on all patients randomized to surgery, only 49 of the 58 patients were considered to have successful surgery.

**All-cause mortality:** No death was reported in either group.<sup>49</sup>

**Progression to EAC:** Few participants progressed to EAC, with two in each group (not statistically significant).<sup>49</sup>

**Progression to dysplasia from intestinal metaplasia:** Rees 2010<sup>49</sup> reported a significant difference in incidence of progression to dysplasia, with less progression in the surgical treatment group compared with the pharmacological treatment group. Although Li et al.<sup>48</sup> included the same primary study, the incidence in the surgery group differed from Rees et al, and demonstrated no significant difference between the groups.<sup>48,49</sup> Because different data were reported for the intervention groups, this led to discordant results between reviews.

**Complete eradication of dysplasia:** Although some participants experienced eradication of dysplasia (surgery: 5/58, H2 receptor antagonist/omeprazole: 3/43) at five-year follow-up, this was not statistically different between treatment groups.<sup>49</sup>

**Complete eradication of BE:** None of the participants experienced complete eradication at five years in either treatment group.<sup>49</sup>

The certainty of the evidence was very low for all outcomes based on very serious concerns in the study limitations (risk of bias) domain and serious or very serious concerns for the imprecision domain. Progression from non-dysplastic BE to BE with dysplasia also had serious concerns for the other considerations (i.e., publication bias and the comprehensiveness of the search) domain. There was insufficient information to judge indirectness (i.e., country of conduct), however this would have no impact on the final level of certainty as it was already at very low. (**Evidence Set 6.1 GRADE domains table**).

## 7 Chemical ablative techniques with different treatment parameters

### *7.1 PDT with 5-aminolevulinic acid (ALA-5) vs PDT with porfimer sodium*

One trial,<sup>72</sup> as reported in Rees et al. 2010,<sup>49</sup> comparing PDT using 5-ALA to porfimer sodium (Photofrin) was included, but preliminary data were available only in abstract form as shown in **Evidence Set 7.1**.

**Eradication of high-grade dysplasia:** The preliminary results based on an abstract showed no statistically significant difference between the treatment groups (preliminary results included 14 patients in each treatment group, with recruitment not yet complete).<sup>72</sup>

**Stricture formation:** These preliminary results showed no difference between treatment groups.

The certainty of the evidence for both outcomes was very low based on very serious concerns in the study limitations (risk of bias) domain and serious concerns in the imprecision domain. There was insufficient information to judge indirectness (i.e., country of conduct) for these outcomes, however, this would have no impact on the final level of certainty as it was already at very low. (**Evidence Set 7.1 GRADE domains table**). A caution in the understanding of the results of this study should be applied until a full report with complete patient recruitment is made available.

### *7.2 Photodynamic therapy with different treatment parameters*

A SR by Fayter et al.<sup>50</sup> compared three primary studies,<sup>73–75</sup> one of which was an abstract.<sup>73</sup> **Evidence Set 7.2** provides review results and GRADE domains descriptions.

These three primary studies compared different parameters in the PDT treatment. These parameters included ALA-PDT at 30 mg/kg or 60 mg/kg at 4- or 6-hour incubation times or with fractionated illumination, ALA-PDT with varying doses of light and comparing red or green light, and ALA-PDT with red light vs ALA-PDT with green light at 30 or 60 mg/kg. Results are provided narratively and can be found in **Evidence Set 7.2: Results table**. Generally, higher doses and red light had lower cancer risk and lower rates of adenocarcinoma.<sup>73</sup> These results were considered significant, but were taken from an abstract, so should be interpreted with caution.

The certainty of the evidence for cancer risk was rated as very low based on very serious concern in study limitations (risk of bias) domain as this rating was informed by a publication in abstract form, and serious concern in the imprecision domain.

The certainty of the evidence for reduction in BE and perforations was initially rated as low based on serious concerns in the study limitations (risk of bias) domain and imprecision domain. This level of certainty was changed to a range of ‘very low to low’, as there was insufficient information on indirectness (i.e., country of conduct). If sufficient information were available, the evidence may not have been rated down, in which case the final rating would be low. However, if there were serious or very serious concerns, then the final rating would be very low.

The certainty of the evidence for lower rates of adenocarcinoma and strictures was rated as very to low based on a range of serious to very serious risk in the study limitations (risk of bias) domain. This range was given as the information was based on an abstract report and because the information was provided in aggregate among all included studies. There was also serious concern in the imprecision domain. This level of certainty can be further affected as there was insufficient information on indirectness (i.e., country of conduct). If sufficient information were available, and the study limitation (risk of bias) domain was a serious concern, the evidence may not have been rated down, in which case the final rating would be low. However, if there was a combination of serious or very serious concern for study limitations (risk of bias) and/or serious or very serious concerns with indirectness, then the final rating would be very low (**Evidence Set 7.2 GRADE domains table**).

## 8 Thermal Ablative Technique vs Surveillance (endoscopic)

### 8.1 Radiofrequency ablation (RFA) vs surveillance (endoscopic)

One trial<sup>76</sup> reported in two systematic reviews<sup>51,56</sup> compared RFA to surveillance in patients with BE with low-grade dysplasia. These reviews also included another primary study by Shaheen et al.<sup>70</sup>; however, results from this study are presented in **Evidence Set 5.1** as another review<sup>49</sup> states that both treatment groups also received pharmacological therapy.

**Progression to EAC:** Data are reported as cumulative progression and progression per patient-year. Authors report data for each group but do not compare data between groups. Few events were observed.

**Progression from low-grade to high-grade dysplasia:** Qumseya 2017 reported data as cumulative progression and progression per patient-year. Few events were observed and none within the RFA group.<sup>51</sup> Authors reported within group comparison but did not compare the treatment effect between groups.<sup>51</sup> Pandey 2017 demonstrated a marginally statistically significant results favouring RFA (RFA:0/68, Surveillance: 18/68; RR 0.03, 95%CI 0.00-0.44).<sup>56</sup> Although Pandey and Qumseya reported discrepant data for the surveillance group in the number of patients with progression to HGD, 18 and 12, respectively, effect estimates are similar between reviews.

**Complete eradication of dysplasia:** RFA resulted in fewer patients with incomplete eradication (RFA+PPI:4/42; PPI: 17/22; OR 0.03, 95%CI 0.01-0.13).<sup>56</sup>

**Complete eradication of intestinal metaplasia:** A favourable treatment effect was observed with RFA (RFA:54/60, Surveillance: 0/68; RR 123.30, 95%CI 7.78-1954.10).<sup>56</sup>

**Stricture formation:** Eight strictures were formed among the study population; however, data was not reported per arm.<sup>56</sup>

**Perforations:** None of the study patients developed perforations.<sup>56</sup>

**Bleeding:** One study participant developed bleeding, but data was not reported per group.<sup>56</sup>

The certainty of evidence was rated as very low for progression to EAC: cumulative progression over the follow-up period due to very serious concerns in the imprecision domain and serious concern in the other considerations (i.e., publication bias was detected) domain. Progression to high-grade dysplasia was also rated as very low based on serious concerns in the inconsistency, imprecision, and other considerations (i.e., publication bias was detected) domains. There was insufficient information to judge the study limitations (risk of bias) domain, as the tools used did not map well to risk of bias criteria. However, this would have no impact on the final level of certainty as it was already at very low.

All remaining outcomes were initially rated as low certainty based on serious concerns in the imprecision domain and other considerations (i.e., publication bias and/or comprehensiveness of the search) domain. This level of certainty was changed to a range of ‘very low to low’, as there was insufficient information on the study limitations (risk of bias) domain, as the presentation of the Downs and Black did not map well to the risk of bias criteria or it was not clear what assessment tool was used and how scores were derived. If sufficient information were available, the evidence may not have been rated down, in which case the final rating would be low. However, if there were serious or very serious concerns, then the final rating would be very low (**Evidence Set 8.1 GRADE domains tables**).

## **9 Thermal Ablative Technique + Pharmacological Therapy vs Thermal Ablative Technique + Pharmacological Therapy**

Three systematic reviews<sup>47-49</sup> reported on two primary studies,<sup>58,77</sup> and four outcomes: all-cause mortality, complete ablation, treatment failure, and stricture formation. A table of results can be found in **Evidence Set 9.1** and **Evidence Set 9.2**. All reviews compare the same two interventions, but reversed the intervention and comparison group. As such they are presented as two sub-evidence sets.

### ***9.1 Argon Plasma Coagulation (APC) + Proton Pump Inhibitor (PPI) vs Multipolar Electrocoagulation (MPEC) + Proton Pump Inhibitor (PPI)***

One SR<sup>49</sup> reported on two primary studies,<sup>58,77</sup> with few events of all-cause mortality and stricture formation in either group.

**All-cause mortality:** There were no instances of mortality in either treatment group among the 48 participants.

**Stricture formation:** Only one participant, of the 19 in the APC treatment group experienced stricture formation.

The certainty of the evidence for all-cause mortality was initially rated as low based on serious concerns in the study limitations (risk of bias) and imprecision domains. This level of certainty was changed to a range of ‘very low to low’, as there was insufficient information on indirectness (i.e., country of conduct). If sufficient information were available, the evidence may not have been rated down, in which case the final rating would be low. However, if there were serious or very serious concerns with indirectness, then the final rating would be very low.

The certainty of the evidence was considered very low for stricture formation based on serious concerns in the study limitations (risk of bias) domain and very serious concerns in the imprecision domain. There was insufficient information to judge indirectness (i.e., country of conduct) for this outcome, however this would have no impact on the final level of certainty as it was already very low (**Evidence Set 9.1 GRADE domains table**).

## ***9.2 Multipolar Electrocoagulation (MPEC) vs Argon Plasma Coagulation (APC)***

Two SRs<sup>47,48</sup> report MPEC vs APC in two primary studies.<sup>58,77</sup> Outcomes reported are complete ablation of BE and the opposite of that, treatment failure. Both outcomes are presented as one review provided the pooled odds ratio (OR 2.01, 95%CI 0.77 to 5.23) for **histological complete ablation**<sup>48</sup> and the other provided the pooled risk difference (RD -0.14, 95%CI -0.33 to 0.05)<sup>47</sup> for **treatment failure**.

The certainty of the evidence for both outcomes were judged as very low based on serious concerns in the study limitation (risk of bias), imprecision, and other considerations (i.e., publication bias and/or the comprehensiveness of the search) domains. There was insufficient information to judge indirectness (i.e., country of conduct) for both outcomes, however this would have no impact on the final level of certainty as it was already very low (**Evidence Set 9.2 GRADE domains table**).

## **10 Thermal Ablative Technique vs Chemical Ablative Technique + Pharmacological Therapy**

### ***10.1 Photodynamic Therapy (PTD) vs Argon Plasma Coagulation (APC) + Proton Pump Inhibitor (PPI)***

Five systematic reviews<sup>47–50,52</sup> reported on six primary studies.<sup>78–83</sup> A table of results can be found in **Evidence Set 10.1**. Some reviews included primary studies that were abstracts only (e.g. Zoepf 2003<sup>82</sup>).



There were many differences between the SRs and the primary studies within the SRs. For example, Rees 2010<sup>49</sup> reported the comparison groups as PDT vs APC + PPI, while Li 2008<sup>48</sup> and De Souza 2014<sup>47</sup> reported the comparison groups as PTD vs APC. An assumption has been made that because these reviews referenced the same primary studies, the comparison groups are the same. There was also heterogeneity between therapy types. For example, Rees 2010<sup>49</sup> and Fayter 2010<sup>50</sup> reported that the primary studies of Hage 2004<sup>79</sup> and Kelty 2004<sup>80</sup> used 5-ALA with the PDT, whereas that of Ragunath 2005<sup>81</sup> used Porfimer sodium. In addition, review authors stated that these three studies each differed in their drug dosing and light delivery regimens.<sup>49</sup> Lastly, the participants who were included in the analyses also differed. For example, Rees et al. included all BE patients regardless of level of dysplasia, while Almond et al. only included those with low-grade dysplasia.

**All-cause mortality:** One SR<sup>49</sup> reported on three studies,<sup>79–81</sup> with a combined incidence of all-cause mortality of one in the PDT group and none in the APC + PPI group. The single death was reported in the Hage 2004<sup>79</sup> study.

**Progression to EAC:** One SR<sup>52</sup> reported on three studies<sup>79,81,83</sup> and reported one incident case of cancer by 12 months in the PDT group. Almond et al.<sup>52</sup> included only participants with low-grade dysplasia which reduced the sample size within some of the primary studies.

**Progression to high-grade dysplasia:** One SR<sup>52</sup> reported no events of progression to high-grade dysplasia among a small number of participants (n=17) in two primary studies.<sup>79,81</sup>

**Eradication of dysplasia:** Rees 2010<sup>49</sup> and Almond 2014<sup>52</sup> show discrepant data for the PDT group in Ragunath et al.<sup>81</sup> The number of patient experiencing complete eradication of dysplasia was reported as 10/13 in Rees 2010, and 8/11 in Almond 2014. As Almond et al. included only those with low-grade dysplasia, it might be that the two additional participants in Rees et al. had high-grade dysplasia, although this is not clearly reported. Both treatment regimens provided high levels of eradication.

**Eradication/regression/reduction of BE:** Five SRs reported on PDT vs APC+PPI and how it affected BE.<sup>47–50,52</sup> These reviews reported the outcomes in several ways: complete ablation of BE, eradication of BE, reduction of BE (length, surface reduction), and treatment failure (no ablation).

*Complete ablation of BE:* One SR<sup>48</sup> reported histologically complete ablation of BE in three primary studies.<sup>78–80</sup> Combined results show a statistically significant treatment effect for APC + PPI over PDT (OR 3.46, 95%CI 1.67-7.18).

*Eradication of BE:* Three systematic reviews<sup>49,50,52</sup> provided results on complete eradication of BE, with high level of heterogeneity among studies. Hage 2004<sup>79</sup> and Kelty 2004<sup>80</sup>, which compared PDT using ALA-5 reported high levels of eradication, whereas Ragunath 2005<sup>81</sup> reported no eradication in Rees 2008<sup>49</sup> and two instances of eradication in each treatment group in Almond 2010.<sup>52</sup> Determining concordance of results across reviews was difficult due to the differences in how information was reported.

*Reduction in BE:* There was little difference in the amount of reduction in the three reviews.<sup>48–50</sup> Only one review by Fayter 2010 described narratively that those receiving APC had statistically significantly better results for BE surface reduction than those who received single-dose PDT.<sup>79</sup>

*Treatment failure:* De Souza et al.<sup>47</sup> reported on treatment failure (the opposite of complete eradication) among three primary studies.<sup>79–81</sup> These are the same three studies Rees et al.<sup>49</sup> included in the complete eradication outcome. Although there was a higher level of treatment failure in the PDT treatment group, due to a high level of heterogeneity between studies and some discrepancy in the size of treatment groups with Rees 2010<sup>49</sup>, these results should be interpreted with caution.

**Eradication of intestinal metaplasia:** One review<sup>52</sup> reports on one study<sup>81</sup>, reporting no difference between treatments, with two participants experiencing eradication of IM in each group.

**Stricture:** Both Rees 2010<sup>49</sup> and Almond 2014<sup>52</sup> reported on stricture, with Rees 2010 including three primary studies and Almond et al. only including one. Ragunath 2005<sup>81</sup> was the primary study reported in both reviews, with discordance in the number of those experiencing stricture and those in each treatment group. This might be because Almond et al. only included those with low-grade dysplasia. Neither review reported any difference between treatment groups.

Overall, the certainty of the evidence for 14 of the 16 outcomes were considered very low. The concerns in domains were varied. For all-cause mortality, cancer incidence, progression to HGD, complete eradication of dysplasia at 12 months (Rees 2010), complete eradication of dysplasia at 12 months (both primary studies in Almond 2014 (Hage 2004 and Ragunath 2005)), histologically complete ablation of BE, complete eradication of BE at 12 months, complete eradication of intestinal metaplasia, BE surface reduction, length of regression (median), treatment failure, stricture formation (Rees 2010) and stricture formation (Almond 2014), this was due to serious or very serious concerns in the study limitations (risk of bias) and the imprecision domains. For some of these outcomes, the other considerations (i.e., publication bias and/or comprehensiveness of the search) domain was also a serious concern (cancer incidence, progression to HGD, complete eradication of dysplasia at 12 months (both primary studies in Almond 2014 (Hage 2004 and Ragunath 2005)), histologically complete ablation of BE, complete eradication of intestinal metaplasia, length of regression (median), treatment failure and stricture formation (Almond 2014)). For all-cause mortality, cancer incidence, progression to HGD, complete eradication of dysplasia at 12 months (Rees 2010), complete eradication of dysplasia at 12 months (both primary studies in Almond 2014 (Hage 2004 and Ragunath 2005)), histologically complete ablation of BE, complete eradication of BE at 12 months, BE surface reduction, reduction in length, treatment failure, and stricture formation (Rees 2010), there was insufficient information to judge indirectness (i.e., country of conduct), however this would have no impact on the final level of certainty as it was already very low. There was no concern in indirectness for complete eradication of intestinal metaplasia, reduction in length (cm) of BE at 12 months, length of regression (median), and stricture formation (Almond 2014).

The certainty of the evidence for reduction in length was very low to low. This was due to a range of very serious to serious concerns in the study limitations (risk of bias) domain, as the

information was based on an abstract report. Further, there was serious concern in the imprecision domain. There was insufficient information to judge indirectness (i.e., country of conduct). If sufficient information were available and there was only serious concern in the study limitations (risk of bias) domain, the evidence may not have been rated down, in which case the final rating would be low. However, if there were a combination of serious or very serious concerns in the study limitations (risk of bias) and/or serious or very serious concerns with indirectness, then the final rating would be very low.

The certainty of the evidence for reduction in length (cm) of BE at 12 months was considered low based on serious concerns in the study limitations (risk of bias) and imprecision domains (**Evidence Set 10.1 GRADE domains table**).

## **11 Mechanical ablative technique vs Thermal ablative technique**

### ***11.1 Endoscopic mucosal resection (EMR) vs Radiofrequency ablation (RFA)***

Three SRs included patients with BE and intramucosal neoplasia (i.e., early stage adenocarcinoma).<sup>53–55</sup> Although both Fujii-Lau et al.<sup>54</sup> and Chadwick et al.<sup>53</sup> include Shaheen 2011<sup>60</sup> as an included study, because only one of the treatment groups was considered relevant for those reviews, neither reported the results from the placebo group. Therefore, results from Shaheen 2011<sup>60</sup> are not presented in **Evidence Set 11.1**. All three reviews provided results for both treatment groups for the primary study of van Vilsteren 2011,<sup>59</sup> although all three reviews also label the treatment groups differently (e.g., stepwise EMR vs focal EMR + RFA, EMR vs RFA, complete EMR vs RFA).

Patients were given treatment for BE with dysplasia or early neoplasia and complete eradication was measured after treatment. In addition, a follow-up of these patients was done to measure recurrence rates of cancer, dysplasia and intestinal metaplasia.

**Eradication of cancer:** Both EMR and RFA eradicated neoplasia in most cases (EMR: 100%; RFA: 96%), with no difference between treatments.<sup>55</sup>

**Eradication of dysplasia:** Dysplasia was eradicated completely in almost all participants at the end of the treatment and at follow-up. Only one participant in the RFA group did not have complete eradication at the end of treatment and follow-up.<sup>53</sup>

**Eradication of intestinal metaplasia:** Almost all participants experienced complete eradication of intestinal metaplasia, although there was slight discordance among the percentages reported in the two reviews.<sup>53,55</sup>

**Recurrence of cancer:** Only one participant in the EMR treatment group experienced recurrence of cancer.<sup>54</sup>

**Recurrence of dysplasia:** No participant experienced recurrence of dysplasia.<sup>54</sup>

**Recurrence of intestinal metaplasia:** Two participants in each treatment group experience recurrence of intestinal metaplasia.<sup>54</sup> Desai 2017<sup>55</sup> reported that three participants in the EMR group experience a recurrence but did not provide any results for the RFA group.

**Bleeding:** Two SRs<sup>53,55</sup> reported on bleeding, with some data discrepancies, but overall concordant results. Desai 2017<sup>55</sup> compared to Chadwick et al.,<sup>53</sup> reported one additional participant who experienced bleeding in each treatment group.

**Perforations:** One SR<sup>53</sup> reported that among the 25 participants in the EMR group, only one participant experience perforations. No one in the RFA group experienced this outcome.

**Strictures:** Most participants receiving EMR treatment experienced strictures (22 of 25, 88%) compared to only three of 22 (14%) in the RFA group. Review authors did not provide effect estimates, but a risk ratio of 6.45 (95% CI 2.23 to 18.66) for EMR compared to RFA was calculated using these data.<sup>55</sup>

**Stenosis requiring treatment:** Almost all participants receiving EMR experienced stenosis requiring treatment (88%, 22/25), with only three of 21 (14%) experiencing stenosis in the RFA group.<sup>53</sup> This difference was statistically significant with a calculated risk ratio of 6.45 (95% CI 2.23-18.65) for EMR compared with RFA.

The certainty of the evidence was rated as very low among 14 of the 15 outcomes. For complete eradication of neoplasia, complete eradication of dysplasia (end of treatment), complete eradication of dysplasia with no recurrence at follow-up, complete eradication of intestinal metaplasia, complete eradication of intestinal metaplasia (end of treatment), complete eradication of intestinal metaplasia with no recurrence at follow-up, early neoplasia recurrence, recurrence of IM (follow-up), number of perforations, strictures and stenosis requiring treatment this was due to serious concerns in the study limitations (risk of bias), imprecision, and other considerations (publication bias and/or comprehensiveness of the search) domains. Acute bleeding endoscopically treated and bleeding had serious concerns in the study limitations (risk of bias) and other considerations (publication bias and/or comprehensiveness of the search) domains, with very serious concerns in the imprecision domain. Intestinal metaplasia recurrence was rated as very low due to serious concerns in the study limitations (risk of bias) domain and very serious concerns in the imprecision domain. The certainty of the evidence was rated as low for dysplasia recurrence after achieving complete eradication based on serious concerns in the study limitations (risk of bias) and imprecision domains (**Evidence Set 11.1 GRADE domains table**).

## 4. Discussion

### *Summary of Main Results and Quality of the Evidence Ratings*

Esophageal cancer, although lower in incidence relative to other cancers, has a higher mortality rate, partly due to a more advanced stage at diagnosis, when the cancer is widely spread to other vital organs and is incurable. This makes the consideration of whether to invest in screening services important. Because there was little direct evidence on the effectiveness of screening to

inform the CTFPHC guideline, an overview of SRs on treatment modalities for early stage EAC and precancerous lesions was undertaken to provide linked evidence.

Eleven systematic reviews addressed modalities for treating BE, with or without dysplasia, of which three reviews included data on participants with early-stage adenocarcinoma. Those modalities covered pharmacological therapy, various ablation techniques, surgery, and some combinations thereof, with a mix of statistically significant and non-significant results, meaning that treatment may show an effect on some outcomes and little to no effect on others. However, there were few studies, all with small sample sizes by outcome, and for many outcomes, only one study provided results, thereby providing little information with which to gauge the certainty of the evidence.

Accordingly, the quality of the evidence for treating BE, dysplasia, and early-stage cancer was low or very low across the comparisons and outcomes, indicating uncertainty that the observed effects would be representative of the true underlying effect. Poor reporting was a barrier in assessing all domains. Additionally, items within tools such as the Jadad score and Downs & Black do not directly translate to considerations that GRADE guidance suggests for assessing risk of bias.

### ***Evidence Considerations and Future Research***

The current limited evidence originated from small RCTs with unclear or high risk of bias with short follow-up times, comparing some of the pre-specified interventions in BE adults with only one small RCT in EAC patients. Where overlapping reviews addressed the same comparison and outcome, most reported the same studies and provided similar results.

Of the ten included reviews, only three were recently conducted, with search strategies being run between 2015 and 2017. As of the time of writing of this paper, most of the remaining reviews ran their most recent searches five to ten years ago. Trials were dated 1996 through 2011, except for one published in 2014. Depending on comparison, it is likely, that additional evidence has accumulated in those areas, even for the more recently conducted reviews.

Treatments have also changed over time. For instance, Photodynamic therapy, although assessed in **Evidence sets 7 and 10** by four SRs, is used less frequently, according to clinical expert experience. There were some treatment options listed in **Appendix 1** that were not evaluated (e.g., cryotherapy, endoscopic submucosal resection). This might be because they are considered newer techniques or less relevant options to include in a SR.

Most records (68%) were excluded during our screening phase due to not meeting the pre-defined SR definition.<sup>84</sup> Reason for exclusion were mainly lack of quality assessment of primary studies and not a study design of interest (either a narrative review or clinical practice guideline based on a non-systematic literature review). Consequently, there is a chance that our conclusions may not be reflective of the totality of relevant, existing evidence. Updating the evidence base is an important research agenda item. Among those that did meet the pre-defined definition, some were excluded because they only included observational studies, or did not separate results of RCTs from observational studies. Additionally, there were 102 records that

were not retrievable (i.e., not available through open access journals or through interlibrary loans). There is a chance that some of these records may have met the inclusion criteria and provided additional concordant or discordant results with those already included. Of those, it is unknown how many would have met our criteria, but likely few given the relative proportion of reviews that were included in this overview.

Although there were several results that were considered statistically significant, small sample sizes, few studies, and lack of clear outcome reporting may limit consideration of clinical significance. Discussions with clinical experts among the authorship team provided input on whether results (statistically significant or not) should be considered clinically significant and meaningful. Studies that provided results on all-cause mortality tended to report low incidence. Although there may have been few deaths and no difference between treatment groups, experts felt that informing patients of this finding is important. Experts also felt that a small reduction in area of BE at 12 months was clinically significant because there are not many helpful therapies (e.g., **Evidence Set 2.1**, Reduction in area (%) of BE). Other outcomes, such as progression from non-dysplastic to dysplastic BE (**Evidence Set 3.1**) was based on one study, and experts felt that there was a tendency toward clinical significance, but this was hard to determine based on a single study. Similarly, small study sizes may provide low precision (wide confidence intervals), which limits interpretation of clinical significance (e.g., **Evidence Set 4.1**, Complete eradication of BE). Lastly, experts were unable to determine the clinical significance for some outcomes due to insufficient or unclear information about how outcomes were measured (e.g. **Evidence Set 3.1**, Reduction/regression of BE).

The quality of conduct of the included reviews was poor. Two of the ten reviews were rated as low quality on AMSTAR; the other eight were considered critically low quality due to significant flaws in four critical domains. To be able to evaluate the validity of a given review, it is critical that a comprehensive literature search is performed, a list of studies is provided, and potential for publication bias is assessed.<sup>43</sup> If these three elements are not provided when updating the evidence, important improvements are needed to ensure that investment made to develop syntheses for decision-making and guideline development minimize review-level biases and are conducted to the highest of standards. As per our protocol, we used the AMSTAR tool to inform quality; we direct review authors to use the more recently published AMSTAR-2 to inform their systematic review conduct. None of the included reviews undertook GRADE assessments.

In conducting GRADE assessments, we used the available information as reported in the systematic reviews without seeking additional information from the primary studies (as per our protocol). We could not assess study limitations (risk of bias) or indirectness domains in some instances due to insufficiently reported relevant information in the reviews. Further, to validly evaluate the study limitations domain according to the criteria outlined by GRADE, we used information across reviews as best as possible, particularly that of Cochrane ROB study-level assessments, to inform our judgements. However, challenges exist when information by-study is not provided or when abstracts are included; in these cases, we reported a range of possible assessments for that domain. We encourage authors of future SRs to perform GRADE and transparently report information for each domain.

Further, researchers should be aware of and follow the PRISMA statement to ensure complete and transparent reporting of their systematic reviews. We encountered issues of incomplete reporting in relation to the reviews' account of their included studies. For example, reviews did not often report on the setting or geographic location of the studies they included; this is an important aspect of understanding whether the results are applicable to a given jurisdiction as per the availability of key aspects of implementing treatment modalities. As mentioned above, reviews were lacking in their description of the study populations, such as potential co-morbidities (i.e., other GE conditions). Treatment dosage and patient follow-up times were not adequately described across outcomes, which is important in understanding the similarity of comparisons across studies. Sufficient description of the study populations, interventions, comparators, outcome definitions, and other characteristics is necessary in understanding the applicability of the findings of studies. We encountered reporting issues in those domains that led to conflicting understanding of a given study's information, which necessitated us to make judgement decisions on what information we felt was the most representative, especially for outcomes data.

Most of the trials from the included reviews included a small number of participants and had short follow-up times. Without reviewing the primary studies, it is difficult to know whether study size is due to barriers to recruitment and/or retention issues. Multicenter trials are needed to increase the power of the evidence base. The lack of a longer patient follow-up time to inform outcomes may be explained by patient retention issues or the cost of following patients long-term.

Not all outcomes that were considered critical or important were considered. Only one review<sup>49</sup> reported on mortality, and five of ten reviews reported on progression to cancer, although at different time periods. Survival, quality of life, psychological effects, and overtreatment were not reported in any of the included reviews. Additional outcomes that were reported have been reported using several different methods. For example, BE was reported as complete eradication, regression or reduction (e.g., regression in cm, regression in area), making it difficult to combine and compare results across studies. One review<sup>47</sup> reported the outcome as "treatment failure" which is the opposite of eradication but provides another opportunity for reporting core outcomes across reviews. A quick search by our research team on the Core Outcome Measures in Effectiveness Trials (COMET) web-based repository of core outcome sets (<http://www.comet-initiative.org/studies/search>) revealed none for BE; the one available for esophageal cancer was in relation to chemotherapy, radiation therapy, and surgery, presumably for later-stage cancers. Although we developed our outcomes list *a priori* with review by various stakeholders, it would be a worthwhile endeavour to formally develop a core outcomes list to inform the conduct of future trials. The outcomes used in this review could be used to start discussions on developing core outcomes in this area. Due to the lack of a core outcome list, the pre-specified protocol missed some of the outcomes that were added post-hoc as we encountered them during screening and assessment of the reviews. Those core outcomes sets can help with consistency of outcome definition and terminology, an issue that was encountered in our review of the literature.

This overview was conducted specifically to inform a clinical practice guideline on screening of patients with chronic GERD for EAC. Given the poor reporting of trials in the identified reviews, it is unclear how many of those had a previous diagnosis of chronic GERD. We did not specify

this as a criterion in our eligibility criteria as we suspected this may not have been reported by review authors. It is therefore, unknown what proportion of study population patients had such a previous diagnosis, nor whether those with chronic GERD who then developed BE would be systematically different than patients in the studies included in the systematic reviews.

The strength of this overview lies in the development of a protocol before conducting the overview, use of comprehensive search strategies that were peer-reviewed before implementation, and conducting GRADE assessments where possible. Future SRs may consider conducting network meta-analyses of available treatment options, if there are additional primary studies in this area that have been conducted since the last search date of the included reviews.

### ***Conclusions***

To our knowledge, this is the first overview of treatment options for EAC and precancerous conditions. Many treatment modalities for BE have been evaluated in the SR literature, but available evidence is of low or very low quality for most outcomes. Due to several limitations (poorly reported low-quality SRs, unclear or high risk of bias trials with small sample sizes, few studies per treatment modality), there is uncertainty in the effectiveness of these treatments. Large multicentre trials with longer follow-up are needed.



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**Table 1. Characteristics of Included Systematic Reviews**

Author Year, Country Funding COI	Date of last search; Databases searched Included studies	Total population of SR	Primary Studies†	Comparisons (number of trials)	Outcomes	AMSTAR Rating
Pandey 2018 <sup>56</sup> , UK Funding: NR COI: None	May 2017; Ovid MEDLINE, EMBASE, and Web of Science  2 RCTs, 6 observational cohort studies (3 prospective design)	619 Adult patients diagnosed with low grade Dysplasia (Barrett's esophagus-associated low grade dysplasia receiving RFA)	<i>Phoa 2014, Shaheen 2009</i>	<ul style="list-style-type: none"> <li>• RFA vs surveillance (n=2)</li> </ul>	<ul style="list-style-type: none"> <li>• Progression to high grade dysplasia</li> <li>• Complete eradication of intestinal metaplasia</li> <li>• Complete eradication of dysplasia</li> <li>• Stricture formation</li> <li>• Perforation</li> </ul>	Critically Low
Codipilly 2018 <sup>57</sup> , USA  Funding: Public Health Service award, NIH award, and NIH grant  COI: Yes, Declared	September 2017; MEDLINE, Cochrane CENTRAL, SCOPUS, Web of Science, PubMed, and Ovid EMBASE  1 ongoing RCT, 1 Case- control, 17 cohort studies (included in the quantitative synthesis + additional 3 cohort excluded from the quantitative analysis)	3,400 BE patients (1700 in each group) in one ongoing RCT, the Barrett's Oesophagus Surveillance Study (BOSS), in BE patients	<i>BOSS trial</i>	<ul style="list-style-type: none"> <li>• Surveillance versus No Surveillance (n=1 ongoing RCT)</li> </ul>	Not applicable as it included an ongoing RCT with no results available	Critically Low
Almond 2014 <sup>52</sup> , UK  Funding: NR COI: None declared	January 2013; MEDLINE, Embase  6 RCTs (37* studies: cohort, case series): 3 RCTs providing data	90 patients with a diagnosis of low-grade dysplasia using any form of endoscopic therapy. Of these, 36 patients provided comparative data.	<i>Bright 2007, Dulai 2005, Hage 2004, Ragunath 2005, Shaheen 2011, Zopf 2001</i>	<ul style="list-style-type: none"> <li>• PDT vs APC (n=3)</li> <li>• MPEC vs NR (n=1)</li> <li>• APC vs NR (n=1)</li> <li>• RFA vs NR (n=1)</li> </ul>	<ul style="list-style-type: none"> <li>• Incident cancers</li> <li>• Progression to HGD</li> </ul>	Critically low
Chadwick 2014 <sup>53</sup> , UK  Funding: NR COI: None declared	January 2013; PubMed, Embase, Cochrane Library  3 RCTs (22 total studies: cohort)	47 adults with Barrett's esophagus with HGD or intramucosal cancer  n=42 in Shaheen 2009 and n=61 in Shaheen 2011 (update)	<i>Shaheen 2011 (follow- up of Shaheen 2009), van Vilsteren 2011</i>  Only RFA group data is presented in Shaheen 2009 and 2011	<ul style="list-style-type: none"> <li>• Complete EMR + Triple therapy vs RFA + Triple therapy (n=1)</li> <li>• RFA + PPI vs sham + PPI (n=2)</li> </ul>	<ul style="list-style-type: none"> <li>• Recurrence of intramucosal cancer</li> <li>• Complete eradication of: dysplasia, intestinal metaplasia with no recurrence</li> </ul>	Critically low
De Souza 2014 <sup>47</sup> , Brazil	NR; Pubmed, Embase, LILACS, Cochrane Library	649 adults with Barrett's esophagus comparing various modalities of	Ackroyd 2000, Ackroyd 2004, Dulai 2005, Hage 2004, Kelty 2004,	<ul style="list-style-type: none"> <li>• PDT vs APC (n=3)</li> <li>• MPEC vs APC (n=2)</li> <li>• PDT vs PPI (n=2)</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment failure</li> </ul>	Critically low

Author Year, Country Funding COI	Date of last search; Databases searched Included studies	Total population of SR	Primary Studies†	Comparisons (number of trials)	Outcomes	AMSTAR Rating
Funding: NR COI: NR	9 RCTs	endoscopic therapy for BE or endoscopic ablation treatment vs PPI.	Overholt 2005, Ragunath 2005, Shaheen 2009, Sharma 2006	<ul style="list-style-type: none"> <li>• APC vs PPI (n=1)</li> <li>• RFA vs PPI (n=1)</li> </ul>		
Desai 2017 <sup>55</sup> , USA  Funding: NR COI: None declared	June 2016; PubMed, Embase, Cochrane Library, Web of Science  1 RCT (20 studies: cohorts)	47 patients with Barrett's esophagus related neoplasia (HGD/EAC) who underwent either f-EMR + RFA or stepwise (or complete) EMR with intent of complete eradication of BE related neoplasia.	van Vilsteren 2011	<ul style="list-style-type: none"> <li>• Stepwise (complete) EMR vs focal-EMR + RFA (n=1)</li> </ul>	<ul style="list-style-type: none"> <li>• Recurrence of: EAC, dysplasia, intestinal metaplasia</li> <li>• Complete eradication of: neoplasia, intestinal metaplasia</li> </ul>	Critically low
Fayter 2010 <sup>50</sup> , UK  Funding: NIHR COI: NR	October 2008; MEDLINE, Embase, CINAHL, PASCAL, LILACS, Cochrane Library  11 RCTs	594 adults with Barrett's esophagus, adenocarcinoma (no data of interest on EAC population)	Ackroyd 1996, Ackroyd 2000, Hage 2004, Kelty 2004, Kelty 2004b, Mackenzie 2007, Mackenzie 2008, Mackenzie 2009, Overholt 2007, Ragunath 2005, Zoepf 2003	<ul style="list-style-type: none"> <li>• ALA-PDT vs placebo PDT (n=2)</li> <li>• ALA-PDT vs APC (n=3)</li> <li>• PDT with porfimer sodium vs APC (n=1)</li> <li>• PDT with porfimer sodium + PPI vs PPI alone (n=1)</li> <li>• PDT delivery comparisons (n=4)</li> </ul>	<ul style="list-style-type: none"> <li>• All-cause mortality</li> <li>• Eradication of dysplasia</li> <li>• Complete ablation/remission of: dysplasia, BE</li> <li>• Reduction/regression of: BE</li> <li>• Progression to cancer</li> <li>• Many outcomes were reported narratively</li> </ul>	Critically low
Fujii-Lau 2017 <sup>54</sup> , USA  Funding: NR COI: (1)	May 2016; PubMed, Embase, Web of Science  2 RCTs (39 studies: cohort, case series)	22 patients who achieved complete eradication of intestinal metaplasia after treatment with endoscopic eradication therapies (EMR, RFA or a combination of both)	Shaheen 2011, van Vilsteren 2011  Only RFA group data is presented in Shaheen 2011	<ul style="list-style-type: none"> <li>• Stepwise complete EMR vs RFA (n=1)</li> <li>• RFA vs sham (n=1)</li> </ul>	<ul style="list-style-type: none"> <li>• Recurrence of esophageal cancer</li> <li>• Complete eradication of: dysplasia, intestinal metaplasia with no recurrence</li> </ul>	Critically low
Li 2008 <sup>48</sup> , China  Funding: NR COI: NR	Date NR; Pubmed, Embase, Cochrane Library  13 RCTs; however: 12 of them are providing data	747 patients who had BE validated by pathology review who were treated with therapeutic treatment modalities.	Ackroyd 2000, Bright 2007 (update of Ackroyd 2004), Dulai 2005, Hage 2004, Hage 2005, Kelty 2004, Peters 1999, Overholt 2007 (update of Overholt 2005), Parrilla 2003, Ragunath 2005, Sharma 2006	<ul style="list-style-type: none"> <li>• Anti-reflux surgery vs Omeprazole (n=1)</li> <li>• PPI vs H2 Receptor Antagonists (n=1)</li> <li>• PDT vs PPI (n=3)</li> <li>• Anti-reflux surgery +APC vs Anti-reflux surgery + surveillance (n=2)</li> <li>• APC vs PDT (n=4)</li> </ul>	<ul style="list-style-type: none"> <li>• Progression to: cancer, dysplasia, HGD</li> <li>• Eradication of: dysplasia, HGD</li> <li>• Complete ablation of BE</li> <li>• Regression of BE (length, area)</li> </ul>	Critically low

Author Year, Country Funding COI	Date of last search; Databases searched Included studies	Total population of SR	Primary Studies†	Comparisons (number of trials)	Outcomes	AMSTAR Rating
				• APC vs MPEC (n=2)		
Qumseya 2017 <sup>51</sup> , USA  Funding: No financial support  COI: (2)	December 2015; Medline, Embase, Cochrane Library  2 RCTs (19 studies: prospective studies, four national registries, and retrospective analyses)	199 patients with Barrett's esophagus with LGD treated with RFA (with or without EMR) or surveillance.	Phoa 2014, Shaheen 2009	• RFA vs surveillance (n=2)	• Progression to cancer • Progression to HGD	Low
Rees 2010 <sup>49</sup> , UK  Medical Research Council  COI: (3)	June 2008; MEDLINE, Embase, Cochrane Library  16 RCTs: 15 providing data  Overholt 2007 was used to supplement Overholt 2005.	1074 adults whom the diagnosis of BE has been established both endoscopically and confirmed histologically, regardless of the status of dysplasia.	Ackroyd 2000, Bright 2007, Caldwell 1996, Dulai 2005, Hage 2004, Heath 2007, <i>Luman</i> 1996, Kelty 2004, Overholt 2005, Mackenzie 2008, Parrilla 2003, Peters 1999, Ragunath 2005, Shaheen 2008, Sharma 2006, Weinstein 1996	• PPI vs H2RA (n=3) • Celecoxib vs placebo (n=1) • Surgery vs PPI/ H2RA (n=1) • APC vs surveillance (n=1) • APC w/ PPI vs MPEC w/ PPI (n=2) • APC w/ PPI vs PDT (n=3) • PDT w/ PPI vs PPI (n=2) • PDT (5-ALA) vs PDT (Porfimer sodium) (n=1) • RFA w/PPI vs PPI (n=1)	• All-cause mortality • Progression to: cancer, dysplasia • Complete eradication of: dysplasia, BE • Reduction/regression of: BE (length, area)	Low

† italicized studies do not provide any data in the results of this overview of reviews.

(1) Authors have received funding from CSA Medical, Covidien, C2Therapeutic, CDx Medical, and Interpace Diagnostics

(2) Authors have received funding from Olympus, Ninepoint Medical, Medtronic, Cook Inc, Boston Scientific, Medtronic, C2Therapeutics, Erbe Medical

(3) Authors have received funding from Medical Research Council, Royal College of Surgeons of Edinburgh, Cancer Research UK, Astra Zeneca. Past collaborations with Merck and GlaxoSmithKline

\* SR authors state that four studies were identified from a single publication and the original references could not be obtained.

**Table 2. Outcomes and comparisons per systematic review (and primary study)**

	Evidence Set 1.1 Celecoxib vs placebo	Evidence Set 2.1 Omeprazole vs H2RA	Evidence Set 3.1 PDT + Omeprazole vs Omeprazole	Evidence Set 4.1 Anti-reflux surgery + APC vs Anti-reflux surgery + Surveillance	Evidence Set 5.1 RFA + PPI vs PPI	Evidence Set 6.1 Anti-reflux surgery vs Omeprazole / H2RA	Evidence Set 7.1 PDT (ALA-5) vs PDT (Photofrin)
All-cause mortality	Rees 2010 <sup>49</sup> (61)		Rees 2010 <sup>49</sup> (66,67)			Rees 2010 <sup>49</sup> (71)	
Progression to EAC	Rees 2010 <sup>49</sup> (61)		Rees 2010 <sup>49</sup> (67) Li 2008 <sup>48</sup> (65) Fayter 2010 <sup>50</sup> (65)	Rees 2010 <sup>49</sup> (68)	Rees 2010 <sup>49</sup> (70) Qumseya 2017 <sup>51</sup> (70)	Rees 2010 <sup>49</sup> (71) Li 2008 <sup>48</sup> (71)	
Progression to HGD				Li 2008 <sup>48</sup> (68)			
Progression to dysplasia			Rees 2010 <sup>49</sup> (66)	Li 2008 <sup>48</sup> (68)	Rees 2010 <sup>49</sup> (70) Qumseya 2017 <sup>51</sup> (70) Pandey 2018 <sup>56</sup> (70)	Rees 2010 <sup>49</sup> (71) Li 2008 <sup>48</sup> (71)	
Eradication of neoplasia							
Eradication of dysplasia			Rees 2010 <sup>49</sup> (66,67) Li 2008 <sup>48</sup> (66,67)			Rees 2010 <sup>49</sup> (71)	
Eradication of HGD			Li 2008 <sup>48</sup> (65) Fayter 2010 <sup>50</sup> (65) <sup>b</sup>				Rees 2010 <sup>49</sup> (71) Fayter 2010 <sup>50</sup> (72)
Complete clearance of dysplasia					Rees 2010 <sup>49</sup> (70) Pandey 2018 <sup>56</sup> (70) <sup>c</sup>		
Eradication of BE			Rees 2010 <sup>49</sup> (65) Li 2008 <sup>48</sup> (65)	Rees 2010 <sup>49</sup> (68) Li 2008 <sup>48</sup> (68)	Rees 2010 <sup>49</sup> (70)	Rees 2010 <sup>49</sup> (71)	
Reduction/ regression in BE <sup>a</sup>		Rees 2010 <sup>49</sup> (62-64) Li 2008 <sup>48</sup> (63)	Rees 2010 <sup>49</sup> (66) Li 2008 <sup>48</sup> (66) Fayter 2010 <sup>50</sup> (66)				
Complete clearance of intestinal metaplasia					Pandey 2018 <sup>56</sup> (70)		
Recurrence of EAC							
Recurrence of intestinal metaplasia							
Treatment failure (no ablation)			De Souza 2014 <sup>47</sup> (66,67)	De Souza 2014 <sup>47</sup> (69)	De Souza 2014 <sup>47</sup> (70)		
Serious adverse reaction							
Stricture formation			Rees 2010 <sup>49</sup> (67) Fayter 2010 <sup>50</sup> (65)		Rees 2010 <sup>49</sup> (70)		Rees 2010 <sup>47</sup> (68)
Bleeding					Pandey 2018 <sup>56</sup> (70)		
Perforations					Pandey 2018 <sup>56</sup> (70)		
Stenosis requiring treatment							

APC: Argon Plasma Coagulation; BE: Barrett's Esophagus; EAC: esophageal adenocarcinoma; H2RA: H2 Receptor Antagonists; PDT: Photodynamic Therapy; PPI: Proton Pump Inhibitor

a: could include reduction in length (cm), reduction in area (%) or regression; b: outcome evaluated was maintaining complete ablation; c: subset of patients

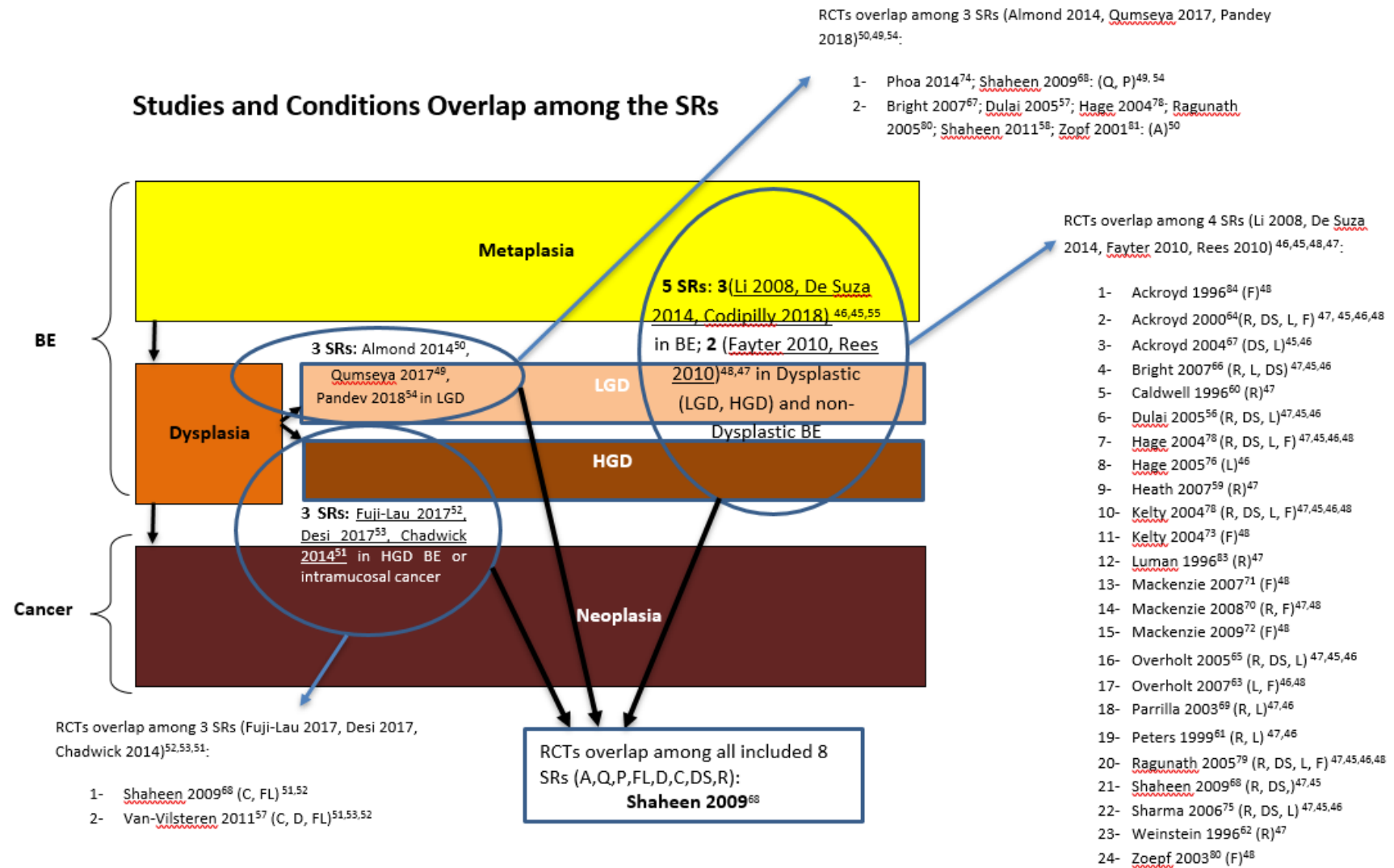
	Evidence Set 7.2	Evidence Set 8.1	Evidence Set 9.1	Evidence Set 9.2	Evidence Set 10.1	Evidence Set 11.1
	PDT w/ different treatment parameters	RFA vs Surveillance	APC + PPI vs MPEC + PPI	MPEC + PPI vs APC + PPI	PDT vs APC	EMR vs RFA
All-cause mortality			Rees 2010 <sup>49</sup> ( <sup>58</sup> )		Rees 2010 <sup>49</sup> ( <sup>79-81</sup> )	
Progression to EAC	Fayter 2010 <sup>50</sup> ( <sup>73,74</sup> )	Qumseya 2017 <sup>51</sup> ( <sup>76</sup> )			Almond 2014 <sup>52</sup> ( <sup>79,81,83</sup> )	
Progression to HGD		Qumseya 2017 <sup>51</sup> ( <sup>76</sup> ) Pandey 2018 <sup>56</sup> ( <sup>76</sup> )			Almond 2014 <sup>52</sup> ( <sup>79,81</sup> )	
Progression to dysplasia						
Eradication of neoplasia						Desai 2017 <sup>55</sup> ( <sup>59</sup> )
Eradication of dysplasia		Pandey 2018 <sup>56</sup> ( <sup>76</sup> )			Rees 2010 <sup>49</sup> ( <sup>81</sup> ) Almond 2014 <sup>52</sup> ( <sup>79,81</sup> ) Fayter 2010 <sup>50</sup> ( <sup>81</sup> ) Li 2008 <sup>48</sup> ( <sup>81</sup> )	Chadwick 2014 <sup>53</sup> ( <sup>59</sup> )
Eradication of BE <sup>†</sup>					Rees 2010 <sup>49</sup> ( <sup>79-81</sup> ) Fayter 2010 <sup>50</sup> ( <sup>80</sup> )	
Complete ablation of BE				Rees 2010 <sup>49</sup> ( <sup>58,77</sup> ) Li 2008 <sup>48</sup> ( <sup>58,77</sup> )	Li 2008 <sup>48</sup> ( <sup>78-80</sup> ) Fayter 2010 <sup>50</sup> ( <sup>79</sup> )	
Reduction/ regression in BE <sup>a</sup>	Fayter 2010 <sup>50</sup> ( <sup>75</sup> )				Rees 2010 <sup>49</sup> ( <sup>81</sup> ) Li 2008 <sup>48</sup> ( <sup>81</sup> ) Fayter 2010 <sup>50</sup> ( <sup>79,82</sup> )	
Eradication of intestinal metaplasia		Pandey 2018 <sup>56</sup> ( <sup>76</sup> )			Almond 2014 <sup>52</sup> ( <sup>81</sup> )	Desai 2017 <sup>55</sup> ( <sup>59</sup> ) Chadwick 2014 <sup>53</sup> ( <sup>59</sup> )
Recurrence of EAC						Fujii-Lau 2017 <sup>54</sup> ( <sup>59</sup> )
Recurrence of dysplasia						Fujii-Lau 2017 <sup>54</sup> ( <sup>59</sup> )
Recurrence of IM						Fujii-Lau 2017 <sup>54</sup> ( <sup>59</sup> ) Desai 2017 <sup>55</sup> ( <sup>59</sup> )
Treatment failure (no ablation)				De Souza 2014 <sup>47</sup> ( <sup>58,77</sup> )	De Souza 2014 <sup>47</sup> ( <sup>79-81</sup> )	
Stricture formation	Fayter 2010 <sup>50</sup> ( <sup>73,75</sup> )	Pandey 2018 <sup>56</sup> ( <sup>76</sup> )	Rees 2010 <sup>49</sup> ( <sup>77</sup> )		Rees 2010 <sup>49</sup> ( <sup>79-81</sup> ) Almond 2014 <sup>52</sup> ( <sup>81</sup> ) Fayter 2010 <sup>50</sup> ( <sup>80,81</sup> )	Desai 2017 <sup>55</sup> ( <sup>59</sup> )
Bleeding		Pandey 2018 <sup>56</sup> ( <sup>76</sup> )				Chadwick 2014 <sup>53</sup> ( <sup>59</sup> ) Desai 2017 <sup>55</sup> ( <sup>59</sup> )
Perforations	Fayter 2010 <sup>50</sup> ( <sup>75</sup> )	Pandey 2018 <sup>56</sup> ( <sup>76</sup> )				Chadwick 2014 <sup>53</sup> ( <sup>59</sup> ) Desai 2017 <sup>55</sup> ( <sup>59</sup> )
Stenosis requiring treatment						Chadwick 2014 <sup>53</sup> ( <sup>59</sup> )

APC: Argon Plasma Coagulation; BE: Barrett's Esophagus; EAC: esophageal adenocarcinoma; IM: Intestinal metaplasia; MPEC: Multipolar Electrocoagulation; PDT: Photodynamic Therapy; PPI: Proton Pump Inhibitor; RFA: Radiofrequency Ablation;

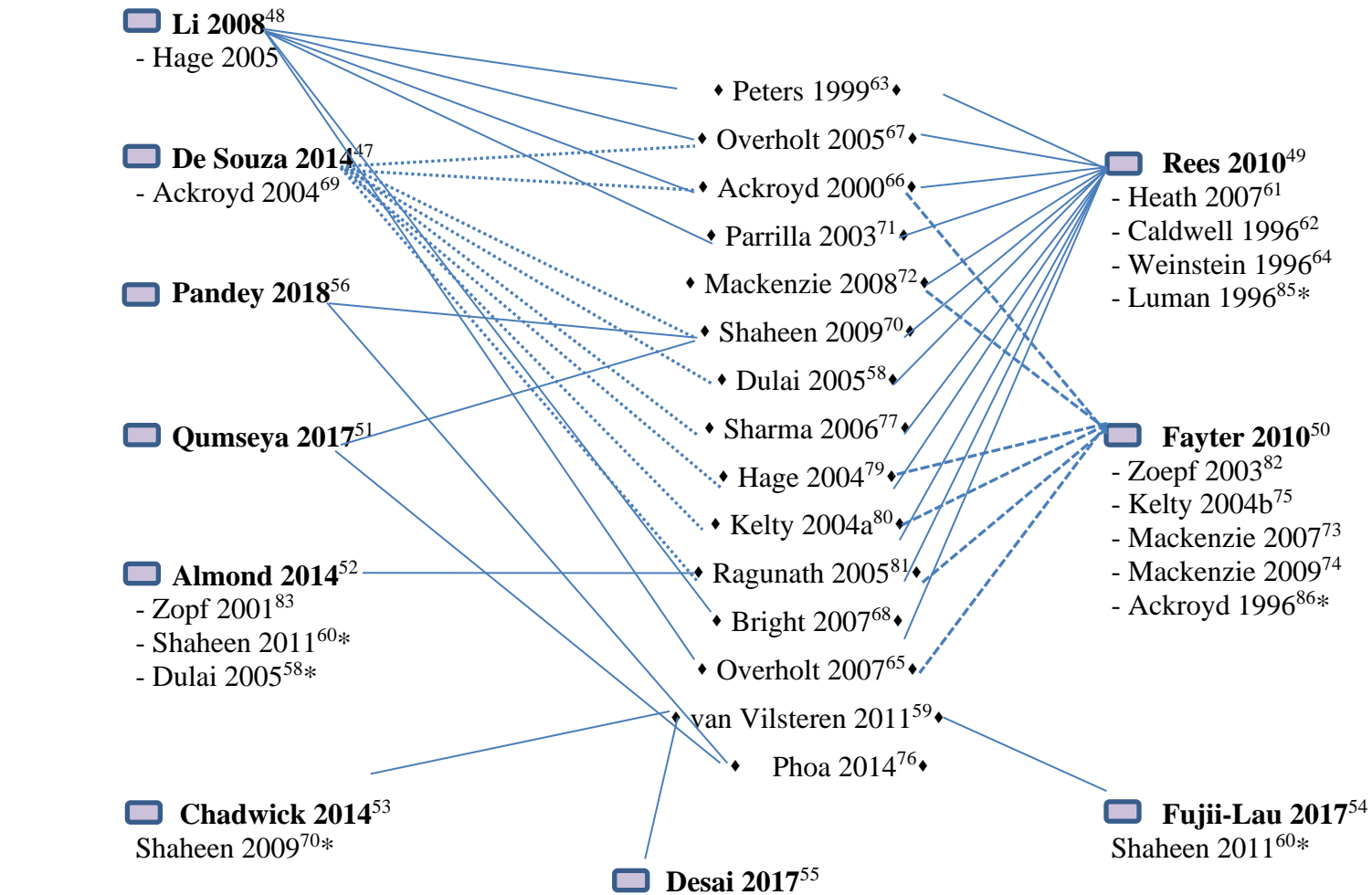
† eradication and complete ablation of BE are considered the same outcome, however a distinction has been made in Evidence Set 10.1 as the included studies and results differ between Rees 2010 and Li 2008



**Figure 2. Primary studies and conditions overlap among the systematic reviews**



**Figure 3. Map of Systematic Reviews and Primary RCTs**



## Evidence Set 1: Pharmacological therapy vs Placebo

### Evidence Set 1.1 Celecoxib vs Placebo: Results table

Based on one primary study: Heath 2007, USA<sup>61</sup>

Based on one primary study: Heath 2007, USA

1.1 Celecoxib vs Placebo								
Author Year	Outcome	Results: n/N			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	Celecoxib	Placebo				
All-cause mortality								
Rees 2010 <sup>49</sup>	All-cause mortality	Heath 2007 <sup>61</sup> , USA	3/49  See note	3/51  See note	See note	See note	<b>AMSTAR:</b> Low <b>Certainty:</b> Low	In the text two deaths are reported. We are unsure if the reported estimate from the forest plot belongs to Progression to EAC at one year (see next row).
Progression to EAC								
Rees 2010 <sup>49</sup>	Progression to EAC at one year	Heath 2007 <sup>61</sup> , USA	3/49 (6.1%)	3/51 (5.9%)	OR 1.04 (0.20, 5.44)	ARD with intervention: 2 more per 1,000 (from 46 fewer to 195 more);  Risk with control: 59 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	All six patients who progressed to EAC had a baseline diagnosis of HGD.

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 1: GRADE domains table for further details on GRADE domain ratings

## Evidence Set 1.1 Celecoxib vs Placebo: GRADE domains table

1.1 Celecoxib vs Placebo								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup> Heath 2007 <sup>61</sup>	All-cause mortality	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>2</sup>	No serious limitations • one study	Serious • small sample size (n=100) <sup>3</sup>	No serious limitations • SR did not assess for publication bias. Although small study, comprehensive search and included search for unpublished literature.	Low	Critical
Rees 2010 <sup>49</sup> Heath 2007 <sup>61</sup>	Progression to EAC at one-year	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>2</sup>	No serious limitations • one study	Very serious • small sample size (n=100), wide CI including only six events <sup>4</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical

1 Sequence generation, allocation concealment, and blinding all judged as unclear

2 The review does not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

3 Based on few events/small study sample (sample size < rule of thumb of n=300 events)

4 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm

## Evidence Set 2: Pharmacological therapy vs Pharmacological therapy

### Evidence Set 2.1 Omeprazole vs H2RA: Results table

Based on three primary studies: Caldwell 1996<sup>61</sup>; Peters 1999<sup>62</sup>; Weinstein 1996<sup>63</sup>

2.1 Omeprazole vs Histamine Type 2 Receptor Antagonists (H2RA)								
Review Author Year	Outcome	Results: Mean (SD)			Effect estimate (95% CI)	Absolute Risk Difference	AMSTAR† & GRADE‡	Notes
		Study, Country	Omeprazole	H2RA				
Reduction/regression of Barrett's Esophagus (BE) †								
Rees 2010 <sup>49</sup>	Reduction in length (cm) of BE at 12 months	Caldwell 1996 <sup>62</sup> , NR	0.7 (3.3) (n=10)	-1.7 (4.6) (n=10)	Pooled MD -0.42 (-1.65, 0.82)	Mean difference 0.42 lower (1.65 lower to 0.82 higher);  Risk with control: The mean reduction in length (cm) ranged from -1.7 to 0.53	AMSTAR: Low Certainty: Very low	Weinstein and Peters compare different treatment regimens of Omeprazole to Ranitidine and Caldwell compares Omeprazole 20 mg once/day to Cimetidine <sup>1</sup> 3x/day.
		Peters 1999 <sup>63</sup> , NR	-5.6 (10.86) (n=26)	0.53 (13.86) (n=27)				
		Weinstein 1996 <sup>64</sup> , NR	-0.4 (3.32) (n=50)	0.2 (3.16) (n=40)				
Rees 2010 <sup>49</sup>	Reduction in length (cm) of BE at 12 months (subgroup analysis including higher doses of omeprazole)	Peters 1999 <sup>63</sup> , NR	-5.6 (10.86) (n=26)	0.53 (13.86) (n=27)	Pooled MD -0.81 (-2.13, 0.50)	Mean difference 0.81 lower (2.13 lower to 0.5 higher);  Risk with control: The mean reduction in length (cm) ranged from 0.2 to 0.53	AMSTAR: Low Certainty: Very low	Weinstein: Omeprazole <sup>2</sup> 2x/day for one year followed by 40 mg 1/day for one year compared to Ranitidine 150 mg 2/day for two years. Peters: Omeprazole <sup>3</sup> 2x/day compared to Ranitidine 150 mg 2x/day for two years.
		Weinstein 1996 <sup>64</sup> , NR	-0.4 (3.32) (n=50)	0.2 (3.16) (n=40)				
Rees 2010 <sup>49</sup>	Reduction in area (%) of BE at 12 months	Peters 1999 <sup>63</sup> , NR	5.2 (11.22) (n=26)	0.8 (11.22) (n=27)	Pooled MD 4.06 (0.08, 8.04)	Mean difference 4.06% higher (0.08% higher to 8.04% higher);  Risk with control: The mean reduction in area (%) ranged from 0.5 to 0.8.	AMSTAR: Low Certainty: Very low to low	Li 2008 reports the area of regression for Peters 1999; concordance for these data.
		Weinstein 1996 <sup>64</sup> , NR	4.3 (12.02) (n=50)	0.5 (13.28) (n=40)				

Bolded effect estimates refer to statistically significant results. <sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings. <sup>‡</sup> see Evidence Set 2: GRADE domains table for further details on GRADE domain ratings. <sup>†</sup> post-hoc outcome

1 discrepant values reported: 400 mg in one instance and 300 mg in another

2 discrepant values reported: 40 mg in one instance and 80 mg in another

3 discrepant values reported: 40 mg in one instance and 20 mg in another

## Evidence Set 2.1 Omeprazole vs H2RA: GRADE domains table

2.1 Omeprazole vs Histamine Type 2 Receptor Antagonists (H2RA)									
Review / Studies	Comparison	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup>  Caldwell 1996 <sup>62</sup> (abstract) Peters 1999 <sup>63</sup> Weinstein 1996 <sup>64</sup>	Omeprazole vs histamine type 2 receptor antagonists (ranitidine or cimetidine)	Reduction in length (cm) of BE at 12 months	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	Serious • substantial heterogeneity ( $I^2=63\%$ , $p=0.07$ ) unaccounted for, little overlap of Cis, variation in direction of effect estimates	Serious • small sample size ( $n=143$ ) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very Low	Critical; identified post hoc
Rees 2010 <sup>49</sup>  Peters 1999 <sup>63</sup> Weinstein 1996 <sup>64</sup>	Omeprazole (40 mg) vs histamine type 2 receptor antagonists (ranitidine) Subgroup including only higher dose omeprazole	Reduction in length (cm) of BE at 12 months	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	Serious • moderate heterogeneity ( $I^2=60\%$ , $p=0.11$ ) unaccounted for, variations in magnitude of effect estimates	Serious • small sample size ( $n=143$ ) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very Low	Critical; identified post hoc
Rees 2010 <sup>49</sup>  Peters 1999 <sup>63</sup> Weinstein 1996 <sup>64</sup>	Omeprazole vs histamine type 2 receptor antagonists (ranitidine)	Reduction in area (%) of BE at 12 months	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations	Serious • small sample sizes ( $n=143$ ) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical; identified post hoc

1 Majority of evidence coming from 2/3 studies (85% of evidence), which were unclear for allocation concealment and whether attrition-related concerns exist; one of the studies (>50% of evidence) additionally unclear for randomization sequence, any differences in care provided or sought, and blinding of outcomes assessors. Assessments from remaining study was not included, as was published in abstract form and accounted for 15% of pooled evidence.

2 Unclear for allocation concealment and whether attrition-related concerns exist in both studies; one of the studies (>60% of evidence) additionally unclear for randomization sequence, any differences in care provided or sought, and blinding of outcomes assessors.

3 Country of conduct may affect the delivery of care in light of potential contextual influences such as a change in the accessibility to the regimens

4 The review does not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

5 Based on low study sample (sample size < rule of thumb of  $n=400$  people)

## Evidence Set 3: Chemical ablative technique combined with pharmacological therapy vs Pharmacological therapy alone

### Evidence Set 3.1 PDT + Omeprazole vs Omeprazole alone: Results table

Based on three primary studies (one an update of another): Ackroyd 2000<sup>66</sup>; Overholt 2005<sup>67</sup>; Overholt 2007 (update of 2005)<sup>65</sup>

3.1 Photodynamic therapy (PDT) + Omeprazole vs Omeprazole alone								
Author Year	Outcome	Results: n/N (%); Mean (SD)			Effect estimate (95%CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	PDT + Omepr.	Omepr.				
All-cause mortality								
Rees 2010 <sup>49</sup>	All-cause mortality	Overholt 2005 <sup>67</sup> , NR <sup>§</sup>	2/138 (1.4%)	1/70 (1.4%)	OR 1.01 (0.09, 11.39)	ARD with intervention: 0 fewer per 1,000 (from 13 fewer to 127 more);  Risk with control: 14 per 1,000	AMSTAR: Low Certainty: Very low	Overholt 2005 used PDT with 5-ALA and Ackroyd used PDT with porfimer sodium
		Ackroyd 2000 <sup>66</sup> , NR	0/18	0/18	OR not estimable	n/a		
Progression to EAC								
Rees 2010 <sup>49</sup>	Progression to cancer at latest possible time point (up to 2 years)	Overholt 2005 <sup>67</sup> , NR <sup>§</sup>	18/138 (13%)	20/70 (29%)	OR 0.38 (0.18, 0.77)	ARD with intervention: 154 fewer per 1,000 (from 50 fewer to 219 fewer);  Risk with control: 286 per 1,000	AMSTAR: Low Certainty: Very low to low	Li 2008 reports the same results at 2 years.
Li 2008 <sup>48</sup>	Progression to cancer (at 5 years)	Overholt 2007 <sup>65</sup> , NR <sup>§</sup>	21/138 (15%)	20/70 (29%)	NR  **RR 0.53 (0.31, 0.91)	ARD with intervention: 134 fewer per 1,000 (from 26 fewer to 197 fewer);  Risk with control: 286 per 1,000	AMSTAR: Critically low Certainty: Very low to low	Fayter 2010 reports that after 5 years of follow-up, the rate of patients who progressed to cancer in PDT+Omeprazole was significantly lower than in Omeprazole alone ( $p = 0.027$ ).
Progression from non-dysplastic BE to BE with dysplasia								
Rees 2010 <sup>49</sup>	Progression from intestinal metaplasia to dysplasia	Ackroyd 2000 <sup>66</sup> , NR	0/18	12/18 (67%)	OR 0.01 (0.00, 0.27)	ARD with intervention: 647 fewer per 1,000 (from --- to 316 fewer);  Risk with control: 667 per 1,000	AMSTAR: Low Certainty: Very low	Same results reported in Li 2008.
Eradication of dysplasia †								

3.1 Photodynamic therapy (PDT) + Omeprazole vs Omeprazole alone								
Author Year	Outcome	Results: n/N (%); Mean (SD)			Effect estimate (95%CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	PDT + Omepr.	Omepr.				
Rees 2010 <sup>49</sup>	Complete eradication of dysplasia at two-years	Ackroyd 2000 <sup>66</sup> , NR	*6/18 (33%)	*0/18	<b>Pooled OR 9.13 (4.42, 18.86)</b>	ARD with intervention: 426 more per 1,000 (from 248 more to 594 more);  Risk with control: 114 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low to low	Ackroyd used PDT with 5-ALA and Overholt 2005 used PDT with porfimer sodium.
		Overholt 2005 <sup>67</sup> , NR <sup>8</sup>	81/138 (59%)	10/70 (14%)				
Li 2008 <sup>48</sup>	Dysplasia eradication	Ackroyd 2000 <sup>66</sup> , NR	*18/18 (100%)	*6/18 (33.3%)	<b>**RR 2.85 (1.52, 5.33)</b>	ARD with intervention: 617 more per 1,000 (from 173 more to 1,000 more);  Risk with control: 333 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low to low	Although data differences with what was reported in Rees 2010 for Ackroyd 2000, overall concordance between reviews.
		Overholt 2005 <sup>67</sup> , NR <sup>8</sup>	81/138 (59%)	10/70 (14.3%)	<b>**RR 4.11 (2.28, 7.42)</b>	ARD with intervention: 444 more per 1,000 (from 183 more to 917 more);  Risk with control: 143 per 1,000		
Li 2008 <sup>48</sup>	Eradication of High Grade Dysplasia	Overholt 2005 <sup>67</sup> , NR <sup>8</sup>	106/138 (77%)	27/70 (39%)	<b>**RR 1.99 (1.46, 2.71)</b>	ARD with intervention: 382 more per 1,000 (from 177 more to 660 more);  Risk with control: 386 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low to low	Fayter 2010 reported that the probability of maintaining complete ablation of HGD was 48% in PDT + Omepr. compared to 4% in Omepr. alone (p<0.0001) at the end of 5-year follow up period. Same denominator as Li 2008 eradication of dysplasia, but unclear why there were more in the numerator.
<b>Eradication of Barrett's Esophagus (BE) †</b>								
Rees 2010 <sup>49</sup>	Complete eradication of BE over the course of the study (5 years)	Overholt 2007 <sup>65</sup> , Overholt 2005 <sup>67</sup> , NR <sup>8</sup>	72/138 (52%)	5/70 (7.1%)	<b>OR 14.18 (5.38, 37.37)</b>	ARD with intervention: 450 more per 1,000 (from 221 more to 670 more);  Risk with control: 71 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low to low	Reported as complete ablation in Li 2008 but as complete eradication in Rees 2010. Results are concordant.
<b>Reduction/regression of Barrett's Esophagus (BE) †</b>								
Rees 2010 <sup>49</sup>	Reduction in length (cm)	Ackroyd 2000 <sup>66</sup> , NR	1.11 (1.23) (n=18)	0.11 (0.32) (n=18)	<b>MD 1.00 (0.41, 1.59)</b>	MD 1 cm higher (0.41 cm higher to 1.59 cm higher);	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	



3.1 Photodynamic therapy (PDT) + Omeprazole vs Omeprazole alone								
Author Year	Outcome	Results: n/N (%); Mean (SD)			Effect estimate (95%CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	PDT + Omepr.	Omepr.				
	of BE at 12 months					Risk with control: mean was 0.11 cm		
Rees 2010 <sup>49</sup>	Reduction in area (%) of BE at 12 months	<u>Ackroyd 2000</u> <sup>66</sup> , NR	31.11 (20.25) (n=18)	1.11 (3.23) (n=18)	<b>MD 30.00 (20.53, 39.47)</b>	MD 30% higher (20.53% higher to 39.47% higher);  Risk with control: mean 1.11%	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	
Li 2008 <sup>48</sup>	Area of regression of BE	<u>Ackroyd 2000</u> <sup>66</sup> , NR	Median (range): 30% (0-60%)	Median (range): 0% (0-10%)	NR	Not estimable	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	SR did not refer what specific type of PPI was evaluated, however it includes the same primary studies as Rees 2010.
Fayter 2010 <sup>50</sup>	Evidence of regression	<u>Ackroyd 2000</u> <sup>66</sup> , NR	89%	11%	NR	Not estimable	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Reduction is reported as 30% vs 0%, which corroborates with the median reported in Li 2008.
Treatment failure †								
De Souza 2014 <sup>47</sup>	Treatment Failure (no ablation of BE)	<u>Ackroyd 2000</u> <sup>66</sup> , NR	4/18 (22%)	18/18 (100%)	<b>Pooled RD -0.49 (-0.58, -0.39), I<sup>2</sup> = 89%</b>  <b>**RR 0.49 (0.41 to 0.59)</b>	ARD with intervention: 487 fewer per 1,000 (391 fewer to 563 fewer)	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	SR did not refer what specific type of PPI was evaluated, however it includes the same primary studies as Rees 2010. Analysis uses fixed effects. Random effects would be RR 0.40 (0.17 to 0.92), I <sup>2</sup> =77%.
		<u>Overholt 2005</u> <sup>67</sup> , NR <sup>§</sup>	71/138 (51%)	66/70 (94%)		Risk with control: 955 per 1,000		
Stricture formation †								
Rees 2010 <sup>49</sup>	Stricture formation	<u>Overholt 2005</u> <sup>67</sup> , NR <sup>§</sup>	49/138 (36%)	0/70	<b>OR 77.98 (4.73, 1286.52)</b>	Not estimable	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low to low	Fayter 2010 reported (from Overholt 2007) that 36% of PDT patients developed oesophageal strictures, but that 94% of those with strictures were stricture free in the initial phase of the trial.

† see Supplementary table 1 for further details on AMSTAR domain ratings

‡ see Evidence Set 3: GRADE domains table below for further details on GRADE domain ratings

† post-hoc outcome

\*discrepant data

\*\*the effect estimate was not reported in the original SR but calculated by the overview team

§ Overholt 2005 has been an international trial but it is not known which countries were involved. Overholt 2007 was a 5 year follow up of the same patients.

Bolded effect estimates refer to statistically significant results.

Underlined first author name, publication year refers to a unique study included in more than one review.

## Evidence Set 3.1 PDT + Omeprazole vs Omeprazole alone: GRADE domains table

3.1 Photodynamic therapy (PDT) + Omeprazole vs Omeprazole alone								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup> Overholt 2005 <sup>67</sup> Ackroyd 2000 <sup>66</sup>	All-cause mortality	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • CI only 1 study; few events across studies	Very serious • small sample sizes (n=244), wide CI including only three events in total <sup>14</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Rees 2010 <sup>49</sup> Overholt 2005 <sup>67</sup>	Progression to cancer at latest possible time point (up to 2 years)	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study	Serious • small sample size (n=208) <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical
Li 2008 <sup>48</sup> Overholt 2007 <sup>65*</sup>	Progression to cancer (at 5 years)	Serious • some concerns due to assessments judged as unclear <sup>3</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study	Serious • small sample size (n=208) <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical
Rees 2010 <sup>49</sup> Ackroyd 2000 <sup>66</sup>	Progression from intestinal metaplasia to dysplasia	Very serious • some concerns due to assessments judged as unclear and high risk <sup>4</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study	Serious • small sample size (n=36) <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Rees 2010 <sup>49</sup> Ackroyd 2000 <sup>66</sup> Overholt 2005 <sup>67</sup>	Complete eradication of dysplasia at two-years	Serious • some concerns due to assessments judged as unclear <sup>5</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations	Serious • small sample size (n=244) <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical; identified post hoc

3.1 Photodynamic therapy (PDT) + Omeprazole vs Omeprazole alone								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Li 2008 <sup>48</sup> Overholt 2005 <sup>67</sup> Ackroyd 2000 <sup>66</sup>	Dysplasia eradication	Serious • some concerns due to assessments judged as unclear <sup>6</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations	Serious • small sample size (n=244) <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical; identified post hoc
Li 2008 <sup>48</sup> Overholt 2005 <sup>67</sup>	Eradication of high-grade dysplasia	Serious • some concerns due to assessments judged as unclear <sup>7</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study	Serious • small sample size (n=208) <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical; identified post hoc
Rees 2010 <sup>49</sup> Overholt 2007 <sup>65</sup> (update from Overholt 2005 <sup>67</sup> )	Complete eradication of BE over the course of the study (5 years)	Serious • some concerns due to assessments judged as unclear <sup>8</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study	Serious • small sample sizes (n=208) <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical; identified post hoc
Rees 2010 <sup>49</sup> Ackroyd 2000 <sup>66</sup>	Reduction in length (cm) of BE at 12 months	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>4</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study	Serious • small sample size (n=36) <sup>16</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Rees 2010 <sup>49</sup> Ackroyd 2000 <sup>66</sup>	Reduction in area (%) of BE at 12 months	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>4</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study	Serious • small sample size (n=36) <sup>16</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Li 2008 <sup>48</sup> Ackroyd 2000 <sup>66</sup>	Area of regression of BE	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>9</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup>	No serious limitations • one study	Serious • small sample size (n=36) <sup>17</sup>	Serious • SR did not assess for publication bias, and the review did not perform	Very low	Critical; identified post hoc

3.1 Photodynamic therapy (PDT) + Omeprazole vs Omeprazole alone								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
			• it is unknown if patients had other GE conditions <sup>13</sup>			comprehensive or grey lit searches		
Fayter 2010 <sup>50</sup> Ackroyd 2000 <sup>66</sup>	Evidence of regression	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>10</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study; no quantitative sufficient data	Serious • small sample size based on information from Rees 2010 (n=36) <sup>18</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
De Souza 2014 <sup>47</sup> Overholt 2005 <sup>67</sup> Ackroyd 2000 <sup>66</sup>	Treatment failure	Serious • some concerns due to assessments judged as unclear <sup>11</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	Serious • considerable heterogeneity (I <sup>2</sup> =89%, p=0.003)	Serious • small sample size (n=244) <sup>15</sup>	Serious • comprehensive search not undertaken and uncertain about grey literature search	Very low	Critical; identified post hoc
Rees 2010 <sup>49</sup> Overholt 2005 <sup>67</sup>	Stricture formation	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>12</sup> • it is unknown if patients had other GE conditions <sup>13</sup>	No serious limitations • one study	Serious • small sample size (n=208) <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical; identified post hoc

1 Both studies were unclear in relation to adequate sequence generation and attrition. One study (85% of evidence) was additionally unclear for allocation concealment and blinding in relation to care provided or sought. (Rees 2010 assessments)

2 Unclear in relation to whether adequate sequence generation, concealment used, systematic differences in the care provided (providers) or sought (patients), blinding of outcome assessors, and if attrition-related concerns. (Rees 2010 assessments)

3 Review authors (Li 2008) used Jadad tool indicating that randomization methods and allocation concealment unclear and no blinding took place, which is likely if the same and additional domains were assessed as unclear by the review authors (Rees 2010) of the 2005 version of this study. Authors did not make Jadad assessments specific to this outcome, but is reasonable to infer there may be concerns as per the assessments for the 2005 version.

4 Review authors state at unclear risk of bias in relation to sequence generation and attrition and at high risk from outcomes in this study not being clearly outlined. Given description of concealment, this is likely also unclear. Presumably, the latter refers to inadequate description or definition of outcomes. (Rees 2010 assessments)

5 Both studies were unclear in relation to adequate sequence generation and attrition. One study (85% of evidence) was additionally unclear for allocation concealment and blinding in relation to care provided or sought; the other study was deemed at high risk due to selective reporting (outcomes not clearly outlined) but contributed a minority of the evidence. (Rees 2010 assessments)

6 Assessments for both studies (Li 2008 review) made using Jadad tool, thus at least unclear from sequence generation and attrition. This information is corroborated by the assessments made in the Rees 2010 review, with an additional unclear assessment for allocation concealment. May be reasonable to assume that unclear judgements made for blinding (performance and detection bias) in the other review (Rees 2010) would have been deemed the same for this outcome.

7 Assessments (Li 2008 review) made using Jadad tool, thus at least unclear from sequence generation, concealment, and attrition. May be reasonable to assume that unclear judgements made for blinding (performance and detection bias) for other outcomes in the study (Rees 2010 review) would pertain to this outcome.

8 Using assessments reported in two reviews (Li 2008 and Rees 2010), the risk of bias related to sequence generation, concealment, care provided or sought, assessment of outcomes, and attrition is unclear.

- 9 Assessments (Li 2008 review) made using Jadad tool, thus at least unclear from sequence generation and concealment. May be reasonable to assume assessments made for other outcomes in the Rees 2010 review would pertain to this outcome: unclear attrition, high risk of selective reporting from outcomes not being clearly outlined in the study.
- 10 Review authors (Fayter 2010) provide information for all studies as an aggregate. From Rees 2010, the study is unclear for sequence generation and likely also for concealment as per description. It is likely that if unclear attrition and high risk for selective reporting for other outcomes, these would pertain to this outcome.
- 11 Assessments made in De Souza 2014 review not adequately detailed. Using assessments made in Rees 2010, both studies were unclear for sequence generation. One study (85% of evidence) was additionally unclear for allocation concealment; may be reasonable to assume that unclear judgements made for blinding (performance and detection bias) for other outcomes in the study would pertain to this outcome.
- 12 Country of conduct may affect the delivery of care in light of potential contextual influences such as a change in the accessibility to the regimens (for pharmacological treatment), and differences in training or equipment (procedural treatment).
- 13 The reviews do not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal
- 14 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm.
- 15 Based on few events/ small study sample (sample size < rule of thumb of n=300 events)
- 16 Based on small study sample (less than rule of thumb of n=400 people)
- 17 Likely low study sample based on other outcomes for same study (sample size < rule of thumb of 400 people). Ranges overlap between groups, but extent of dispersion difficult to compare.
- 18 As likely low study sample based on other outcomes for same study (sample size < rule of thumb of n=400 people).

\* Overholt 2005 is an international trial and Overholt 2007 presents the five-year follow up of the patients.

## Evidence Set 4: Surgery combined with thermal ablative technique vs Surgery combined with surveillance

### Evidence Set 4.1 Anti-reflux surgery (Nissen Fundoplication) + APC vs Anti-reflux surgery (Nissen Fundoplication) + Surveillance (endoscopic): Results table

Based on two primary studies: Bright 2007 (update of Ackroyd 2004)<sup>68</sup>; Ackroyd 2004<sup>69</sup>

4.1 Anti-reflux surgery (Nissen fundoplication) + Argon plasma coagulation (APC) vs Anti-reflux surgery (Nissen fundoplication) + Surveillance (endoscopic)								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	Anti- reflux surgery + APC	Anti- reflux surgery + Surv.				
Progression to EAC								
Rees 2010 <sup>49</sup>	Progression to EAC	Bright 2007 <sup>68</sup> , NR	NR	NR	NR	Not estimable	AMSTAR: Low Certainty: Very low	The review reports qualitatively that “none of the patients progressed to adenocarcinoma”.
Progression from low- to high-grade dysplasia								
Li 2008 <sup>48</sup>	Progression to HGD	Bright 2007 <sup>68</sup> , NR	0/20 (0%)	2/20 (10%)	NR  **RR 0.20 (0.01, 3.92)	ARD with intervention: 80 fewer per 1,000 (from 99 fewer to 292 more);  Risk with control: 100 per 1,000	AMSTAR: Critically low Certainty: Very low	
Progression from IM to dysplasia								
Rees 2010 <sup>49</sup>	Progression to dysplasia at 5 years	Bright 2007 <sup>68</sup> , NR	0/19	2/20 (10%)	**RR 0.21 (0.01, 4.11)	ARD with intervention: 79 fewer per 1,000 (from 99 fewer to 311 more);  Risk with control: 100 per 1,000	AMSTAR: Low Certainty: Very low	Bright 2007 is an update of Ackroyd 2004 (data not presented).
Eradication of Barrett's Esophagus (BE)								
Rees 2010 <sup>49</sup>	Complete eradication of BE at 12 months	Bright 2007 <sup>68</sup> , NR	14/20 (70%)	0/20	OR 91.46 (4.77, 1754.50)	Not estimable	AMSTAR: Low Certainty: Very low	The data presented in the forest plot differs from that in the text (APC: 11/19 vs Surv: 3/20). Although bannered as 12

4.1 Anti-reflux surgery (Nissen fundoplication) + Argon plasma coagulation (APC) vs Anti-reflux surgery (Nissen fundoplication) + Surveillance (endoscopic)								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	Anti- reflux surgery + APC	Anti- reflux surgery + Surv.				
								months follow-up in the forest plot, data may represent five years, based on study description.
Li 2008 <sup>48</sup>	Complete ablation (among those with histological change)	<u>Bright 2007</u> <sup>68</sup> , NR	8/20 (40%)	3/20 (15%)	<b>**RR 2.67</b> (0.82, 8.62)	ARD with intervention: 251 more per 1,000 (from 27 fewer to 1,000 more);  Risk with control: 150 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Bright 2007 is an update of Ackroyd 2004 (data not presented).
<b>Treatment failure †</b>								
De Souza 2014 <sup>47</sup>	Treatment failure (no ablation of BE) at one year	Ackroyd 2004 <sup>69</sup> , NR	6/19 (32%)	10/20 (50%)	ARR was not reported but only 95% CI (-0.119, 0.487), p>0.05  <b>** RR 0.63</b> (0.29,1.40)	ARD with intervention: 185 fewer per 1,000 (from 355 fewer to 200 more);  Risk with control:500 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	

† see Supplementary table 1 for further details on AMSTAR domain ratings

‡ see Evidence Set 4.1: GRADE domains table for further details on GRADE domain ratings

† post-hoc outcome

\*\*the effect estimate was not reported in the original SR but calculated by the overview team

Note: Comparison in Rees 2010 and Li 2008 is labelled as APC vs surveillance; however, in De Souza 2014 as APC vs PPI. The assumption has been made that as it refers to the same study and has the same study group sizes, that it is the same comparison.

It is assumed that surgery [(Anti-reflux surgery (Nissen Fundoplication))] was administered in the patients before randomization into APC vs. surveillance.

Bolded effect estimates refer to statistically significant results.

Underlined first author name, publication year refers to a unique study included in more than one review.

## Evidence Set 4.1 Anti-reflux surgery (Nissen Fundoplication) + APC vs Anti-reflux surgery (Nissen Fundoplication) + Surveillance (endoscopic): GRADE domains table

4.1 Anti-reflux surgery (Nissen Fundoplication) + Argon plasma coagulation (APC) vs Anti-reflux surgery (Nissen Fundoplication) + Surveillance (endoscopic)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup>  Bright 2007 <sup>68</sup>	Progression to EAC	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>4</sup> • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitation • one study	Serious • small sample size (n=40) <sup>6</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Li 2008 <sup>48</sup>  Bright 2007 <sup>68</sup>	Progression to HGD	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>4</sup> • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Very serious • few events, small sample size (n=40) <sup>7</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical
Rees 2010 <sup>49</sup>  Bright 2007 <sup>68</sup>	Progression from IM to dysplasia	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>4</sup> • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Very serious • sparse events, small sample size (n=40) <sup>7</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature	Very low	Critical
Rees 2010 <sup>49</sup>  Bright 2007 <sup>68</sup>	Complete eradication of BE at 12 months	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>4</sup> • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample sizes (n=40) <sup>8</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Li 2008 <sup>48</sup>  Bright 2007 <sup>68</sup>	Complete ablation (among those with histological change)	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>4</sup> • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=40) <sup>9</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
De Souza 2014 <sup>47</sup>	Treatment failure at one year	Very serious • some concerns due to assessments	Unclear • country of conduct not reported which may	No serious limitations • one study	Very serious • small sample size (n=40) <sup>10</sup>	Serious • comprehensive search not undertaken and uncertain about grey literature search	Very low	Critical; identified post hoc



4.1 Anti-reflux surgery (Nissen Fundoplication) + Argon plasma coagulation (APC) vs Anti-reflux surgery (Nissen Fundoplication) + Surveillance (endoscopic)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Ackroyd 2004 <sup>69</sup>		judged as unclear and high-risk <sup>3</sup>	affect the delivery of care <sup>4</sup> • it is unknown if patients had other GE conditions <sup>5</sup>					

1 High risk of bias for performance bias, detection bias, and selective reporting (outcomes not clearly outlined in methodology); unclear sequence generation and potentially allocation concealment as per authors' description. (Rees 2010 assessment).

2 Assessments (Li 2008) made using Jadad tool so at least unclear for randomization method and concealment; this information is corroborated by the assessments made in the Rees 2010 review. May be reasonable to assume that the high risk of performance and detection biases for the outcomes addressed in the Rees 2010 assessments would pertain here and corroborate the Jadad assessment of no blinding. Rees 2010 also identified selective reporting (see footnote 1) issues that could reasonably apply to this outcome.

3 Assessments in De Souza 2014 review not adequately detailed. Using assessments from Rees 2010 and Li 2008, sequence generation is unclear, likely also for concealment; high risk for performance and detection bias and selective reporting could apply to this outcome.

4 Country of conduct may affect the delivery of care in light of potential contextual influences such as differences in training or equipment.

5 The reviews do not report if the patients had other GE conditions, which were part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

6 Likely low study sample based on other outcomes for the same study (sample size < rule of thumb of n=300 events)

7 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm

8 Based on low study sample (sample size < rule of thumb of n=300 events)

9 Based on low study sample (sample size < rule of thumb of n=300 events) and including little to no absolute effect and appreciable benefit

10 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm

\*Bright 2007 is a follow-up to Ackroyd 2004

## Evidence Set 5: Thermal ablative techniques combined with pharmacological therapy vs Pharmacological therapy

### Evidence Set 5.1 RFA + PPI vs PPI: Results table

Based on one primary study: Shaheen 2009, USA<sup>70</sup>

5.1 Radiofrequency ablation (RFA) + Proton Pump Inhibitor (PPI) vs Proton Pump Inhibitor (PPI)								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	RFA + PPI	PPI				
Progression to EAC								
Rees 2010 <sup>49</sup>	Progression to cancer at five years or latest time point	Shaheen 2009 <sup>70</sup> , USA	1/84 (1.2%)	4/43 (9.3%)	OR 0.12 (0.01, 1.09)	ARD with intervention: 81 fewer per 1,000 (from 92 fewer to 8 more);  Risk with control: 93 per 1,000	AMSTAR: Low Certainty: Low	Includes both low- and high-grade dysplasia.
Qumseya 2017 <sup>51</sup>	Cumulative progression to EAC over follow up	Shaheen 2009 <sup>70</sup> , USA	0/42	0/21	Not reported <sup>¶</sup>	Not estimable	AMSTAR: Low Certainty: Very low	Comparison labelled as RFA vs surveillance in SR, but assumption that it is the same study, but only reporting on those with LGD, as stated in review.
Progression from non-dysplastic BE to BE with dysplasia								
Rees 2010 <sup>49</sup>	Progression to higher grades of dysplasia	Shaheen 2009 <sup>70</sup> , USA	3/84 (3.6%)	7/43 (16%)	OR 0.19 (0.05, 0.78)	ARD with intervention: 127 fewer per 1,000 (from 31 fewer to 153 fewer);  Risk with control: 163 per 1,000	AMSTAR: Low Certainty: Low	
Qumseya 2017 <sup>51</sup>	Progression to high-grade dysplasia	Shaheen 2009 <sup>70</sup> , USA	2/42 (4.8%)	3/21* (14.3%)	**RR 0.33 (0.06, 1.84)  Event rates <sup>¶¶</sup>	ARD with intervention: 91 fewer per 1,000 (from 133 fewer to 92 more);  Risk with control: 143 per 1,000	AMSTAR: Low Certainty: Very low	Comparison labelled as RFP vs surveillance in SR, but assumption that it is the same study, but only reporting on those with LGD, as stated in review.
Qumseya 2017 <sup>51</sup>	Progression to high-grade dysplasia (per patient-year) (among those with LGD)	Shaheen 2009 <sup>70</sup> , USA	0.0238	0.1429	Not reported <sup>¶¶¶</sup>	Not estimable	AMSTAR: Low Certainty: Very low	Comparison labelled as RFA vs surveillance in SR, but assumption that it is the same study, but only reporting on those with LGD, as stated in review.

5.1 Radiofrequency ablation (RFA) + Proton Pump Inhibitor (PPI) vs Proton Pump Inhibitor (PPI)								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR <sup>†</sup> & GRADE <sup>‡</sup>	Notes
		Study, Country	RFA + PPI	PPI				
Pandey 2018 <sup>56</sup>	Progression to high-grade dysplasia	<u>Shaheen 2009</u> <sup>70</sup> , USA	2/42 (4.8%)	3/22* (13.6%)	OR 0.32 (0.05, 2.06)	ARD with intervention: 93 fewer per 1,000 (from 130 fewer to 145 more);  Risk with control: 136 per 1,000	<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low	The forest plot (figure 5) of Pandey et al., 2018 refers to progression to high grade dysplasia (HGD) or cancer; however, the corresponding numbers in Table 2 of the review labelled as progression to HGD only. Discrepant denominator compared to Qumseya 2017.
<b>Complete clearance of dysplasia †</b>								
Rees 2010 <sup>49</sup>	Complete eradication of dysplasia at 12 months	<u>Shaheen 2009</u> <sup>70</sup> , USA	72/84 (86%)	9/43 (21%)	<b>OR 22.67 (8.72, 58.94)</b>	ARD with intervention: 648 more per 1,000 (from 488 more to 730 more);  Risk with control: 209 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Low	RR 4.10 (3.33, 4.49), calculated from the OR
Pandey 2018 <sup>56</sup>	Complete eradication of dysplasia	<u>Shaheen 2009</u> <sup>70</sup> , USA	38/42 (90%)	5/22 (23%)	<b>**RR 3.98 (1.83 to 8.66)</b>	ARD with intervention: 677 more per 1,000 (from 189 more to 1,000 more);  Risk with control: 227 per 1,000	<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low	Standardized Mean Difference=90.50; 95%CI=90.40, 90.60; SE=0.05  Evaluated only LGD patients.
<b>Complete eradication of BE at 12 months †</b>								
Rees 2010 <sup>49</sup>	Complete eradication of BE at 12 months	<u>Shaheen 2009</u> <sup>70</sup> , USA	65/84 (77%)	1/43 (2.3%)	<b>OR 143.68 (18.53, 1113.87)</b>	ARD with intervention: 751 more per 1,000 (from 283 more to 940 more);  Risk with control: 23 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Low	Result for PPI group in text differs from forest plot (0/43). RR 33.27 (13.16, 41.44), calculated from the OR
<b>Complete clearance of intestinal metaplasia</b>								
Pandey 2018 <sup>56</sup>	Complete eradication of	<u>Shaheen 2009</u> <sup>70</sup> , USA	34/42 (81.0%)	1/22 (4.6%)	<b>**RR 17.81 (2.61, 121.54)</b>	ARD with intervention: 764 more per 1,000	<b>AMSTAR:</b> Critically Low	Standardized Mean Difference=81.00;

5.1 Radiofrequency ablation (RFA) + Proton Pump Inhibitor (PPI) vs Proton Pump Inhibitor (PPI)								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	RFA + PPI	PPI				
	intestinal metaplasia					(from 73 more to 1,000 more);  Risk with control: 45 per 1,000	<b>Certainty:</b> Very low	95%CI=80.88, 81.12; SE=0.06
Treatment failure †								
De Souza 2014 <sup>47</sup>	Treatment Failure (no ablation of BE) at one year	<u>Shaheen 2009</u> <sup>70</sup> , USA	19/84 (23%)	42/43 (98%)	<b>ARI 0.751 (0.651, 0.851)</b>  <b>**RR 0.23 (0.16, 0.34)</b>	ARD with intervention: 752 fewer per 1,000 (645 fewer to 820 fewer)  Risk with control: 977 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Labelled as RFA vs PPI in review, but assumption has been made that it is the same comparator as in Rees 2010.
Stricture formation †								
Rees 2010 <sup>49</sup>	Stricture formation	<u>Shaheen 2009</u> <sup>70</sup> , USA	5/84 (6.0%)	0/43	OR 6.02 (0.33, 111.44)	Not estimable	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	
Perforations								
Pandey 2018 <sup>56</sup>	Perforations	<u>Shaheen 2009</u> <sup>70</sup> , USA	No instances of perforation were reported in total 84 patients.				<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low	
Bleeding								
Pandey 2018 <sup>56</sup>	Bleeding	<u>Shaheen 2009</u> <sup>70</sup> , USA	One event (1/84) was reported, but data was not presented per arm.				<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low	

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 4.2: GRADE domains table for further details on GRADE domain ratings

<sup>†</sup> post-hoc outcome

\*\*the effect estimate was not reported in the original SR, but calculated by the overview team

<sup>¥</sup> Between groups comparison was not reported but only event rate per arm was provided: RFA: 0.002, 95% CI -0.012, 0.017, p-value 0.752. Surveillance: 0.005, 95% CI -0.025, 0.034, p-value 0.752

<sup>¥¥</sup> Between groups comparison was not reported but only event rate per arm was provided: RFA: 0.048, 95% CI 0.012, 0.171, p-value 0.000 Surveillance: 0.143, 95% CI 0.047, 0.361, p-value 0.004

<sup>¥¥¥</sup> Between groups comparison was not reported but only event rate per arm was provided: RFA: 0.048, 95% CI -0.018, 0.114, p-value 0.157. Surveillance: 0.143, 95% CI -0.019, 0.305, p-value 0.083

*Note:* Shaheen 2009 is cited as Shaheen 2008 in Rees 2010, but refers to the same study as that in De Souza 2014. In Rees 2010, the comparison is labelled as RFA vs sham in the text description, but in the tables of included studies, it states that all participants were given PPI.

Bolded effect estimates refer to statistically significant results.

Underlined first author name, publication year refers to a unique study included in more than one review.

## Evidence Set 5.1 RFA + PPI vs PPI: GRADE domains table

5.1 Radiofrequency ablation (RFA) + Proton Pump Inhibitor (PPI) vs Proton Pump Inhibitor (PPI)								
Review Study (ies)	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup> Shaheen 2009 <sup>70</sup>	Progression to EAC at five years or latest time point	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=117) <sup>6</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Low	Critical
Qumseya 2017 <sup>51</sup> Shaheen 2009 <sup>70</sup>	Cumulative progression to EAC over follow up (among those with LGD)	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • sparse number of events, small sample size (n=63) <sup>7</sup>	Serious • publication bias detected	Very low	Critical
Rees 2010 <sup>49</sup> Shaheen 2009 <sup>70</sup>	Progression to higher grades of dysplasia	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=117) <sup>7</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature	Low	Critical
Qumseya 2017 <sup>51</sup> Shaheen 2009 <sup>70</sup>	Progression to high-grade dysplasia	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Very serious • small sample size (n=63) <sup>8</sup>	Serious • publication bias detected	Very low	Critical
Qumseya 2017 <sup>51</sup> Shaheen 2009 <sup>70</sup>	Progression to high-grade dysplasia (per person/year)	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=63), unclear number of events <sup>9</sup>	Serious • publication bias detected	Very low	Critical
Pandey 2018 <sup>56</sup> Shaheen 2009 <sup>70</sup>	Progression to high-grade dysplasia	Serious • some concerns due to assessments judged as unclear <sup>3</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Very serious • fewer events, small sample size (n=64) <sup>8</sup>	Serious • publication bias was assessed but for a composite outcome (progression to HGD or cancer) and included only two RCTs and one observational study not relevant to overview. Small studies; search for unpublished research was not reported in the review.	Very low	Critical

5.1 Radiofrequency ablation (RFA) + Proton Pump Inhibitor (PPI) vs Proton Pump Inhibitor (PPI)								
Review Study (ies)	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Pandey 2018 <sup>56</sup>  Shaheen 2009 <sup>70</sup>	Complete eradication of intestinal metaplasia	Serious • some concerns due to assessments judged as unclear <sup>3</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=64) <sup>7</sup>	Serious • publication bias was assessed but included only two RCTs and four observational studies not relevant to overview; Small studies; search for unpublished research was not reported in the review.	Very low	Critical
Rees 2010 <sup>49</sup>  Shaheen 2009 <sup>70</sup>	Complete eradication of dysplasia at 12 months	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=117) <sup>7</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Low	Critical; identified post hoc
Pandey 2018 <sup>56</sup>  Shaheen 2009 <sup>70</sup>	Complete eradication of dysplasia	Serious • some concerns due to assessments judged as unclear <sup>3</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=64) <sup>7</sup>	Serious • publication bias was assessed but included only two RCTs and four observational studies not relevant to overview; Small studies; search for unpublished research was not reported in the review.	Very low	Critical
Rees 2010 <sup>49</sup>  Shaheen 2009 <sup>70</sup>	Complete eradication of BE at 12 months	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample sizes (n=117) <sup>7</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Low	Critical; identified post hoc
De Souza 2014 <sup>47</sup>  Shaheen 2009 <sup>70</sup>	Treatment failure at one year	Serious • some concerns due to assessments judged as unclear <sup>4</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=117) <sup>7</sup>	Serious • comprehensive search not undertaken and uncertain about grey literature search	Very low	Critical; identified post hoc
Rees 2010 <sup>49</sup>  Shaheen 2009 <sup>70</sup>	Stricture formation	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Very serious • small sample size (n=117) and very wide CI due to zero events in one group <sup>10</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Pandey 2018 <sup>56</sup>	Perforations	Serious • some concerns due to assessments judged as unclear <sup>3</sup>	No serious limitations	No serious limitations • one study	Serious • small sample size (n=64) <sup>7</sup>	Serious • publication bias was not assessed for this outcome. Search for unpublished research	Very low	Critical

5.1 Radiofrequency ablation (RFA) + Proton Pump Inhibitor (PPI) vs Proton Pump Inhibitor (PPI)								
Review Study (ies)	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Shaheen 2009 <sup>70</sup>			• it is unknown if patients had other GE conditions <sup>5</sup>			was not stated in search strategy.		
Pandey 2018 <sup>56</sup>  Shaheen 2009 <sup>70</sup>	Bleeding	Serious • some concerns due to assessments judged as unclear <sup>3</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>5</sup>	No serious limitations • one study	Serious • small sample size (n=64) <sup>7</sup>	Serious • publication bias was not assessed for this outcome. Search for unpublished research was not stated in search strategy	Very low	Critical

1 Allocation concealment unclear. (Rees 2010 assessment)

2 Assessments in Qumseya 2017 review do not map well to study limitations criteria. Using study-level assessments made in the Rees 2010 review, allocation concealment is at an unclear risk of bias.

3 Assessments as performed or reported in Pandey 2018 are of limited application to the study limitations domain. Using study-level assessment made in the Rees 2010 review, allocation concealment is at an unclear risk of bias.

4 Although the De Souza 2017 assessment yielded a Jadad score of 5, the Rees 2010 review assessment reported this study at an unclear risk of bias for allocation concealment.

5 The reviews do not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

6 Based on low study sample (sample size<rule of thumb of n=300 events) and including little to no absolute effect and appreciable benefit

7 Based on few events/small study sample (sample size<rule of thumb of n=300 events)

8 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm

9 Based on low study sample (sample size<rule of thumb of n=400 people)

10 Based on few events and CI for relative effects include both appreciable benefit and harm. Absolute CI unknown.

## Evidence Set 6: Surgery vs Pharmacological therapy

### Evidence Set 6.1 Anti-reflux surgery vs H2 receptor antagonist/Omeprazole: Results table

Based on one primary study: §Parrilla 2003<sup>71</sup>

6.1 Anti-reflux surgery (Nissen Fundoplication) vs H2 receptor agonist/Omeprazole <sup>a</sup>								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR <sup>†</sup> & GRADE <sup>‡</sup>	Notes
		Study, Country	Surgery	H2RA/ Omeprazole				
All-cause mortality								
Rees 2010 <sup>49</sup>	Mortality	<u>Parrilla 2003</u> <sup>71</sup> , NR	0	0	Not estimable	Not estimable	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	
Progression to EAC								
Rees 2010 <sup>49</sup>	Progression to cancer	<u>Parrilla 2003</u> <sup>71</sup> , NR	2/53 (3.8%)	2/40 (5%)	OR 0.75 (0.10, 5.53)	ARD with intervention: 12 fewer per 1,000 (from 45 fewer to 175 more);  Risk with control: 50 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	Li 2008 provided similar results, with slight difference in the total N, but this did not change the overall effect estimate or ARD.
Progression from non-dysplastic BE to BE with dysplasia								
Rees 2010 <sup>49</sup>	Progression to dysplasia from intestinal metaplasia	<u>Parrilla 2003</u> <sup>71</sup> , NR	1/44* (2.3%)	8/40 (20%)	<b>OR 0.09 (0.01, 0.78)</b>	ARD with intervention: 178 fewer per 1,000 (from 37 fewer to 198 fewer);  Risk with control: 200 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	De novo dysplasia 3/58 in the surgery group and 8/43 in omeprazole group.
Li 2008 <sup>48</sup>	Progression from non-dysplastic BE to BE with dysplasia	<u>Parrilla 2003</u> <sup>71</sup> , NR	3/53* (5.7%)	8/40 (20%)	NR  **RR 0.28 (0.08, 1.00)	ARD with intervention: 144 fewer per 1,000 (from 0 fewer to 184 fewer);  Risk with control: 200 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	1/49 de novo dysplasia among those with successful surgery, 8/40 among the omeprazole group. The difference was statistically significant.
Complete eradication of dysplasia <sup>†</sup>								
Rees 2010 <sup>49</sup>	Complete eradication of dysplasia at 5-years	<u>Parrilla 2003</u> <sup>71</sup> , NR	5/58 (8.6%)	3/43 (7.0%)	OR 1.26 (0.28, 5.58)	ARD with intervention: 17 more per 1,000 (from 49 fewer to 225 more);  Risk with control: 70 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	49 of the 58 patients were considered to have successful surgery
Complete eradication of Barrett's Esophagus (BE) <sup>†</sup>								



6.1 Anti-reflux surgery (Nissen Fundoplication) vs H2 receptor agonist/Omeprazole <sup>a</sup>								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR <sup>†</sup> & GRADE <sup>‡</sup>	Notes
		Study, Country	Surgery	H2RA/ Omeprazole				
Rees 2010 <sup>49</sup>	Complete eradication of BE at 5 years	<u>Parrilla 2003</u> <sup>71</sup> , NR	0/53	0/40	Not estimable	Not estimable	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 5: GRADE domain table for further details on GRADE domain ratings

<sup>†</sup> post-hoc outcome

<sup>\*\*</sup>the effect estimate was not reported in the original SR but calculated by the overview team  
a patients prior to 1992 were given H2RA (ranitidine) and then converted to omeprazole

**Bolded** effect estimates refer to statistically significant results.

Underlined first author name, publication year refers to a unique study included in more than one review.  
§the median (range) age was reported as 50(12-78) in medical arm, and 43(10-71) in surgical group in Li 2008 but according to Rees 2010's only adults were eligible in the review.

\*discrepant data

## Evidence Set 6.1 Anti-reflux surgery vs H2 receptor antagonist/Omeprazole: GRADE domains table

6.1 Anti-reflux surgery (Nissen Fundoplication) vs H2 receptor antagonist/ Omeprazole <sup>a</sup>								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup>  Parrilla 2003 <sup>71</sup>	All-cause mortality	Very serious • some concerns due to assessments judged as unclear and high risk <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Serious • small sample size (although sample is not mentioned for this outcome, but it is apparent from another outcome in this study (n=101)) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Rees 2010 <sup>49</sup>  Parrilla 2003 <sup>71</sup>	Progression to cancer	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Very serious • small sample size (n=101), wide CI including only four events in total <sup>6</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Rees 2010 <sup>49</sup>  Parrilla 2003 <sup>71</sup>	Progression from non-dysplastic BE to BE with dysplasia	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Serious • small sample size (n=101) <sup>7</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Li 2008 <sup>48</sup>  Parrilla 2003 <sup>71</sup>	Progression from non-dysplastic BE to BE with dysplasia	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Serious • small sample size (n=101) <sup>8</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical
Rees 2010 <sup>49</sup>  Parrilla 2003 <sup>71</sup>	Complete eradication of dysplasia at 5 years	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Very serious • small sample size (n=101), wide CI with only eight events in total <sup>6</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Rees 2010 <sup>49</sup>  Parrilla 2003 <sup>71</sup>	Complete eradication of BE at 5 years	Very serious • some concerns due to assessments judged as unclear and high-risk <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Serious • few events, small sample size (n=101) <sup>7</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc

- 1 Authors (Rees 2010) report that due to the nature of the study blinding (performance bias) was impossible and deemed it as unclear risk. However, two other studies in this review with the same explanation were deemed as high risk. This is corroborated by the no blinding assessment (Jadad) in the Li 2008 review; with unclear risk of bias for attrition (Rees 2010).
- 2 High risk for lack of blinding in Jadad assessment (Li 2008 review) reasonably corroborated by high risk of performance and detection biases (Rees 2010 review) for other outcomes in this study. The unclear risk of bias for attrition for other outcomes in this study may also pertain to this outcome.
- 3 Country of conduct may affect the delivery of care in light of potential contextual influences such as a change in the accessibility to the regimens (for pharmacological treatment), and differences in training or equipment (surgical treatment).
- 4 The reviews do not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal
- 5 Likely low study sample based on other outcomes for the same study (sample size < rule of thumb of n=300 events)
- 6 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm
- 7 Based on few events/ small study sample (sample size < rule of thumb of n=300 events)
- 8 Based on few events/ small study sample (sample size < rule of thumb of n=300 events). Relative and absolute CIs include the possibility of little to no effect.

## Evidence Set 7: Chemical ablative technique vs Chemical ablative technique

### Evidence Set 7.1 PDT (5-ALA) vs PDT (Photofrin): Results table

Based on one primary study in abstract: Mackenzie 2008<sup>72</sup>

7.1 Photodynamic therapy (PDT) using 5-ALA vs Photodynamic therapy (PDT) using Photofrin								
Author Year	Outcome	Results: n/N			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study	5-ALA	Photofrin				
Eradication of high-grade dysphagia †								
Rees 2010 <sup>49</sup>	Eradication of high-grade dysphagia	Mackenzie 2008 (abstract) <sup>72</sup> , NR	14/14 (100%)	9/14 (64%)	OR 16.79 (0.83, 340.08)	ARD not calculated, as the data were from an abstract.	AMSTAR: Low Certainty: Very low	The trial reported preliminary data only, as recruitment is not yet complete. Reported as remission in Fayter 2010. RR 1.51 (0.93, 1.55), calculated from the OR
Stricture formation †								
Rees 2010 <sup>49</sup>	Stricture formation	Mackenzie 2008 (abstract) <sup>72</sup> , NR	1/16 (6.3%)	6/16 (28%)	OR 0.11 (0.01, 1.07)	ARD not calculated, as the data were from an abstract.	AMSTAR: Low Certainty: Very low	

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 7.1: GRADE domains table for further details on GRADE domain ratings

<sup>†</sup> post-hoc outcome

## Evidence Set 7.1 PDT (5-ALA) vs PDT (Photofrin): GRADE domains table

7.1 Photodynamic therapy (PDT) using 5-ALA vs Photodynamic therapy (PDT) using Photofrin								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup>  Mackenzie 2008 (abstract) <sup>72</sup>	Eradication of high-grade dysplasia	Very serious • abstract <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>2</sup> • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample sizes (n=32) and very wide CI <sup>4</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Rees 2010 <sup>49</sup>  Mackenzie 2008 (abstract) <sup>72</sup>	Stricture formation	Very serious • abstract <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>2</sup> • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=32) <sup>4</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc

1 Authors identify high risk in 'other bias' domain because in abstract form.

2 Country of conduct may affect the delivery of care in light of potential contextual influences such as differences in training or equipment

3 The reviews do not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

4 Based on few events/ small study sample (sample size < rule of thumb of n=300 events). CI includes little to no effect and appreciable benefit.

## Evidence Set 7.2 PDT with different treatment parameters: Results table

Based on three primary studies: Kelty 2004b<sup>73</sup>; Mackenzie 2007(abSTRACT)<sup>73</sup>; Mackenzie 2009<sup>74</sup>

7.2 PDT with different treatment parameters					
Author Year	Outcome	Results		AMSTAR† & GRADE‡	Notes
		Study	Narrative results		
Multiple outcomes reported narratively †					
Fayter 2010 <sup>50</sup>	Cancer risk at 36 months follow-up	Mackenzie 2007 (abstract) <sup>73</sup>	Patients with HGD receiving high-dose ALA–PDT (60 mg/kg) and high-dose red light (1000 J/cm) had a significant decrease in cancer risk compared with treatment groups with lower doses of photosensitiser and/or lower light doses (3% risk vs 24% risk).	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	ALA–PDT with varying doses of light and comparing red or green light (abstract only) <sup>73</sup>
Fayter 2010 <sup>50</sup>	Lower rates of adenocarcinoma	Mackenzie 2007 (abstract) <sup>73</sup> Mackenzie 2009 <sup>74</sup>	ALA red light was associated with lower rates of adenocarcinoma than green light (8% vs 45%, $p < 0.05$ ). <sup>73</sup> 60-mg ALA red light was statistically significantly more successful than 30-mg ALA red light ( $p=0.03$ ) and 30-mg ALA green light ( $p=0.005$ ). <sup>74</sup>	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low to low	ALA–PDT with varying doses of light and comparing red or green light (abstract only) <sup>73</sup> Discrepancies in what comparisons are: the description compares ALA–PDT with red light vs ALA with green light at 30 or 60 mg/kg, however the results compare 60-mg red light to 30-mg redlight and 60-mg red light to 30-mg green light <sup>74</sup>
Fayter 2010 <sup>50</sup>	Reductions in BE	Kelty 2004b <sup>75</sup>	Among patients with no dysplasia (5 patients per group), 30-mg/kg and fractionated groups showed the greatest reductions in Barrett’s epithelium (results not statistically significant).	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low to low	ALA–PDT at 30 mg/kg or 60 mg/kg at 4- or 6-hour incubation times or with fractionated illumination <sup>75</sup>
Fayter 2010 <sup>50</sup>	Stricture	Kelty 2004b <sup>75</sup> Mackenzie 2007 (abstract) <sup>73</sup>	No patients developed strictures.	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low to low	ALA–PDT with varying doses of light and comparing red or green light (abstract only) <sup>73</sup>
Fayter 2010 <sup>50</sup>	Perforation	Kelty 2004b <sup>75</sup>	Reported no major side effects in terms of perforations.	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low to low	ALA–PDT at 30 mg/kg or 60 mg/kg at 4- or 6-hour incubation times or with fractionated illumination <sup>75</sup>

† see Supplementary table 1 for further details on AMSTAR domain ratings

‡ see Evidence Set 7.2: GRADE domains table for further details on GRADE domain ratings

† post-hoc outcome

## Evidence Set 7.2 PDT with different treatment parameters: GRADE domains table

7.2 PDT with different treatment parameters								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Fayter 2010 <sup>50</sup>  Mackenzie 2007 <sup>73</sup> (abstract)	Cancer risk	Very serious • abstract <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Serious • small sample size (n=72) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Fayter 2010 <sup>50</sup>  Mackenzie 2007 <sup>73</sup> (abstract) Mackenzie 2009 <sup>74</sup>	Lower rates of adenocarcinoma	Very serious to serious <sup>1,2</sup>	Unclear • country of conduct not reported which may affect the delivery of care • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations	Serious • small sample size (n=101) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical
Fayter 2010 <sup>50</sup>  Kelty 2004b <sup>75</sup>	Reductions in BE	Serious <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Serious • small sample size (n=10) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical; post hoc
Fayter 2010 <sup>50</sup>  Kelty 2004b <sup>75</sup> Mackenzie 2007 <sup>73</sup> (abstract)	Strictures	Very serious to serious <sup>1,2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations	Serious • small sample size (n=29) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical
Fayter 2010 <sup>50</sup>  Kelty 2004b <sup>75</sup>	Perforation	Serious <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Serious • small sample size (n=25) <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical

1 Information provided was only in aggregate; assessments made on a study available only in abstract form and as per Rees 2010 assessment, can be indicated at high risk for 'other bias' domain

2 Information provided was only in aggregate with sequence generation unclear for 80% of the included studies, concealment allocation unclear for 90% of the included studies, and blinding was unclear in 62% of the included studies

3 Country of conduct may affect the delivery of care in light of potential contextual influences such as differences in training or equipment

4 The review does not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview

5 Based on few events/ small study sample (sample size < rule of thumb of n=300 events). Insufficient reporting of information to judge extent of imprecision of data.

## Evidence Set 8: Thermal ablative technique vs Surveillance

### Evidence Set 8.1 RFA vs Surveillance (endoscopic): Results table

Based on one primary study: Phoa 2014<sup>76</sup>

8.1 Radiofrequency ablation (RFA) vs Surveillance (endoscopic)								
Author Year	Outcome	Results: n/N; n/year			Effect estimate (95% CI)	Absolute Risk Difference	AMSTAR† & GRADE‡	Notes
		Study, Country	RFA	Surv.				
Progression to EAC								
Qumseya 2017 <sup>51</sup>	Progression to EAC: Cumulative progression over the follow up period	Phoa 2014 <sup>76</sup> , Netherlands	1/68 (1.5%)	6/68 (8.8%)	**RR 0.17 (0.02, 1.35)	ARD with intervention: 73 fewer per 1,000 (from 86 fewer to 31 more);  Risk with control: 88 per 1,000	AMSTAR: Low Certainty: Very low	Cumulative disease progression rates to EAC reported
Qumseya 2017 <sup>51</sup>	Progression to EAC: progression per patient-year	Phoa 2014 <sup>76</sup> , Netherlands	0.00501	0.03852	Not reported <sup>y</sup>	Not estimable	AMSTAR: Low Certainty: Very low to low	Incidence rate of disease progression to EAC reported
Progression from low-grade to high-grade dysplasia (HGD)								
Qumseya 2017 <sup>51</sup>	Progression to high-grade dysplasia	Phoa 2014 <sup>76</sup> , Netherlands	0/68	12/68 (18%)	**RR 0.04 (0.00 to 0.66)  Event rate <sup>yy</sup>	ARD with intervention: 169 fewer per 1,000 (60 fewer to ---)  Risk with control: 176 per 1,000	AMSTAR: Low Certainty: Very low	Cumulative disease progression rates to HGD reported in review but do not provide a difference between groups
Pandey 2018 <sup>56</sup>	Progression to high-grade dysplasia	Phoa 2014 <sup>76</sup> , Netherlands	0/68	18/68 (26%)	**RR 0.03 (0.00, 0.44)	ARD with intervention: 257 fewer per 1,000 (from 148 fewer to ---);  Risk with control: 265 per 1,000	AMSTAR: Critically Low Certainty: Very low to low	The forest plot (figure 5) of Pandey et al., 2018 refers to progression to HGD or cancer; however, Table 2 documents only 1 EAC event in RFA group only.
Qumseya 2017 <sup>51</sup>	Progression to high-grade dysplasia (per patient-year)	Phoa 2014 <sup>76</sup> , Netherlands	0	0.07704	Not reported  Not reported <sup>yyy</sup>	Not estimable	AMSTAR: Low Certainty: Very low to low	Incidence rate of disease progression to HGD reported but do not provide a difference between groups
Eradication of dysplasia								



8.1 Radiofrequency ablation (RFA) vs Surveillance (endoscopic)								
Author Year	Outcome	Results: n/N; n/year			Effect estimate (95% CI)	Absolute Risk Difference	AMSTAR† & GRADE‡	Notes
		Study, Country	RFA	Surv.				
Pandey 2018 <sup>56</sup>	Complete eradication of dysplasia	Phoa 2014 <sup>76</sup> , Netherlands	62/63 (98%)	19/68 (28%)	<b>**RR 3.52 (2.40, 5.17)</b>	ARD with intervention: 704 more per 1,000 (391 more to 1,000 more);  Risk with control: 279 per 1,000	<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low to low	Standardized Mean Difference=98.4; 95% CI=98.63, 98.44); SE=0.02
Eradication of intestinal metaplasia								
Pandey 2018 <sup>56</sup>	Complete eradication of intestinal metaplasia	Phoa 2014 <sup>76</sup> , Netherlands	54/60 (90%)	0/68	<b>**RR 123.30 (7.78, 1954.10)</b>	Not estimable	<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low to low	Standardized Mean Difference=90.00; 95% CI=89.92, 90.08); SE=0.04
Stricture formation								
Pandey 2018 <sup>56</sup>	Stricture formation	Phoa 2014 <sup>76</sup> , Netherlands	8 events were reported, but data was not presented per arm.				<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low to low	
Perforations								
Pandey 2018 <sup>56</sup>	Perforations	Phoa 2014 <sup>76</sup> , Netherlands	No instances of perforation were reported among the 68 patients.				<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low to low	
Bleeding								
Pandey 2018 <sup>56</sup>	Bleeding	Phoa 2014 <sup>76</sup> , Netherlands	One event in total (1/68) was reported, but data was not presented per arm.				<b>AMSTAR:</b> Critically Low <b>Certainty:</b> Very low to low	

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 8.1: GRADE domains table for further details on GRADE domain ratings

<sup>†</sup> post-hoc outcome

**\*\***the effect estimate was not reported in the original SR but calculated by the overview team

<sup>‡</sup> Between groups comparison was not reported but only event rate per arm was provided: RFA: 0.015, 95% CI 0.002, 0.097, p-value 0.000, Surveillance: 0.088, 95% CI 0.040, 0.183, p-value 0.000

<sup>‡‡</sup> RFA: 0.007, 95% CI 0.00, 0.105, p-value 0.001, Surveillance: 0.176, 95% CI 0.103, 0.296, p-value 0.000

<sup>‡‡‡</sup> Between groups comparison was not reported but only event rate per arm was provided: RFA: 0.003, 95% CI -0.004, 0.009, p-value 0.480, Surveillance: 0.077, 95% CI 0.033, 0.121, p-value 0.001 Bolded effect estimates refer to statistically significant results.

Underlined first author name, publication year refers to a unique study included in more than one review.

## Evidence Set 8.1 RFA vs Surveillance (endoscopic): GRADE domains table

8.1 Radiofrequency ablation (RFA) vs Surveillance (endoscopic)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Qumseya 2017 <sup>51</sup> Phoa 2014 <sup>76</sup>	Progression to EAC: cumulative progression over the follow-up period	Unclear • insufficient information to judge <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Very serious • small sample size (n=136) with only seven events in total <sup>4</sup>	Serious • publication bias detected	Very low	Critical
Qumseya 2017 <sup>51</sup> Phoa 2014 <sup>76</sup>	Progression to EAC: progression per patient per year	Unclear • insufficient information to judge <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • zero/ unclear number of events (yet incidence rates generated), small sample size (n=136) <sup>5</sup>	Serious • publication bias detected	Very low to low	Critical
Qumseya 2017 <sup>51</sup> Phoa 2014 <sup>76</sup>	Progression to high-grade dysplasia	Unclear • insufficient information to judge <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	Serious • considerable heterogeneity ( $I^2=79\%$ , $p<0.001$ ). No overlap of CI. No detailed information provided to account for heterogeneity	Serious • small sample size (n=136) <sup>6</sup>	Serious • publication bias detected	Very low	Critical
Pandey 2018 <sup>56</sup> Phoa 2014 <sup>76</sup>	Progression to high-grade dysplasia	Unclear • insufficient information to judge <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=136) <sup>6</sup>	Serious • publication bias was assessed for a composite outcome (progression to HGD or cancer) and included only two RCTs and one observational study not relevant to overview. Small studies; search for unpublished research was not reported in the review.	Very low to low	Critical
Qumseya 2017 <sup>51</sup> Phoa 2014 <sup>76</sup>	Progression to high-grade dysplasia: progression per patient per year	Unclear • insufficient information to judge <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=136) <sup>7</sup>	Serious • publication bias detected	Very low to low	Critical

8.1 Radiofrequency ablation (RFA) vs Surveillance (endoscopic)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Pandey 2018 <sup>56</sup> Phoa 2014 <sup>76</sup>	Complete eradication of dysplasia	Unclear • insufficient information to judge <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=136) <sup>6</sup>	Serious • publication bias assessed that included only two RCTs and four observational studies not relevant to overview; Small studies; search for unpublished research was not reported in the review.	Very low to low	Critical
Pandey 2018 <sup>56</sup> Phoa 2014 <sup>76</sup>	Complete eradication of intestinal metaplasia	Unclear • insufficient information to judge <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=136) <sup>6</sup>	Serious • publication bias assessed but included only two RCTs and with 4 observational studies not relevant to overview; Small studies; search for unpublished research was not reported in the review.	Very low to low	Critical
Pandey 2018 <sup>56</sup> Phoa 2014 <sup>76</sup>	Stricture formation	Unclear • insufficient information to judge <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=136) with only eight events in total <sup>6</sup>	Serious • publication bias was not assessed for this outcome. Search for unpublished research was not reported.	Very low to low	Critical
Pandey 2018 <sup>56</sup> Phoa 2014 <sup>76</sup>	Perforations	Unclear • insufficient information to judge <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=136) with zero events in total <sup>6</sup>	Serious • publication bias was not assessed for this outcome. Search for unpublished research was not reported.	Very low to low	Critical
Pandey 2018 <sup>56</sup> Phoa 2014 <sup>76</sup>	Bleeding	Unclear • insufficient information to judge <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=136) with only one event in total <sup>6</sup>	Serious • publication bias was not assessed for this outcome. Search for unpublished research was not reported.	Very low to low	Critical

1 Presentation of Downs and Black does not map well to risk of bias criteria. No additional information available for use.

2 Unclear if the Cochrane risk of bias tool and the Critical Appraisal Skills Programme checklist were actually used, and how 1-4 ranking was determined. No additional information available for use.

3 The reviews do not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

4 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm.

5 Based on low study sample (sample size < rule of thumb of n=400 people)

6 Based on few events/ small study sample (sample size < rule of thumb of n=300 events)

7 Likely low study sample based on other outcomes for the same study (sample size < rule of thumb of n=400 people)

## Evidence Set 9: Thermal ablative technique combined with pharmacological therapy vs Thermal ablative technique combined with pharmacological therapy

### Evidence Set 9.1 APC + PPI vs MPEC + PPI: Results table

Based on two primary studies: Dulai 2005<sup>58</sup>; Sharma 2006<sup>77</sup>

9.1 Argon plasma coagulation (APC) + Proton Pump Inhibitor (PPI) vs Multipolar electrocoagulation (MPEC) + PPI								
Author Year	Outcome	Results: n/N			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	APC	MPEC				
All-cause mortality								
Rees 2010 <sup>49</sup>	All-cause mortality	Dulai 2005 <sup>58</sup> , NR	0/24	0/24	OR not estimable	Not estimable	AMSTAR: Low Certainty: Very low to low	
Stricture formation †								
Rees 2010 <sup>49</sup>	Stricture formation	Sharma 2006 <sup>77</sup> , NR	1/19 (5.3%)	0/12	OR 2.03 (0.08, 53.87)	Not estimable	AMSTAR: Low Certainty: Very low	

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 9.1: GRADE domains table for further details on GRADE domain ratings

<sup>†</sup> post-hoc outcome

## Evidence Set 9.1 APC + PPI vs MPEC +PPI: GRADE domains table

9.1 Argon plasma coagulation (APC) + PPI vs Multipolar electrocoagulation (MPEC) + PPI								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup>  Dulai 2005 <sup>58</sup>	All-cause mortality	Serious • concern due to unclear assessment <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Serious • small sample size (n=52), CI not estimable, but likely wide <sup>5</sup>	No serious limitations • SR did not assess for publication bias. Although small study, comprehensive search and included search for unpublished literature.	Very low to low	Critical
Rees 2010 <sup>49</sup>  Sharma 2006 <sup>77</sup>	Stricture formation	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • one study	Very serious • small sample size (n=35) and very wide CI with only one event in total <sup>6</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very Low	Critical; identified post hoc

1 Although review authors rated this study at a low risk of bias, the support for judgement provided for allocation concealment did not meet the Cochrane criterion and should be deemed unclear. (Rees 2010 review)

2 Sequence generation, blinding (performance and detection bias), and attrition unclear (Rees 2010 review)

3 Country of conduct may affect the delivery of care in light of potential contextual influences such as a change in the accessibility to the regimens (for pharmacological treatment), and differences in training or equipment (procedural treatment).

4 The review does not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

5 Based on few events/ small study sample (sample size < rule of thumb of n=300 events)

6 Based on few events and CI for relative effects include both appreciable benefit and harm. Absolute CI unknown.

## Evidence Set 9.2 MPEC + PPI vs APC + PPI: Results table

Based on two primary studies: Dulai 2005<sup>58</sup>; Sharma 2006<sup>77</sup>

9.2 Multipolar electrocoagulation (MPEC) vs Argon plasma coagulation (APC)								
Author Year	Outcome	Results: n/N			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	MPEC + PPI	APC + PPI				
Complete ablation of Barrett's esophagus								
Li 2008 <sup>48</sup>	Histological complete ablation of BE	<u>Dulai 2005</u> <sup>58</sup> , NR	21/26 (81%)	17/26 (65%)	Pooled OR 2.01 (0.77, 5.23)	ARD with intervention: 140 more per 1,000 (from 62 fewer to 260 more);  Risk with control: 644 per 1,000	AMSTAR: Critically low Certainty: Very low	Rees 2010 reports as complete eradication and provides percentage data only and does not clearly provide follow-up time, with discordant results for Dulai 2015.
		<u>Sharma 2006</u> <sup>77</sup> , NR	12/16 (75%)	12/19 (63%)				
Treatment failure †								
De Souza 2014 <sup>47</sup>	Treatment Failure (no ablation of BE)	<u>Dulai 2005</u> <sup>58</sup> , NR	5/26 (19%)	9/26 (35%)	Pooled RD -0.14 (-0.33, 0.05), I <sup>2</sup> : 0%  **RR 0.61 (0.30, 1.22)	ARD with intervention: 139 more per 1,000 (249 fewer to 78 more)  Risk with control: 356 per 1,000	AMSTAR: Critically low Certainty: Very low	
		<u>Sharma 2006</u> <sup>77</sup> , NR	4/16 (25%)	7/19 (37%)				

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 9.2: GRADE domains table for further details on GRADE domain ratings

<sup>†</sup> post-hoc outcome

Underlined first author name, publication year refers to a unique study included in more than one review.

## Evidence Set 9.2 MPEC vs APC: GRADE domains table

Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Li 2008 <sup>48</sup>  Dulai 2005 <sup>58</sup> Sharma 2006 <sup>77</sup>	Ablation	Serious • some concerns due to assessments judged as unclear <sup>1</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitations • overlap of CIs, $I^2=0\%$	Serious • small sample size (n=87) <sup>5</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very Low	Critical; identified post hoc
De Souza 2014 <sup>47</sup>  Dulai 2005 <sup>58</sup> Sharma 2006 <sup>77</sup>	Treatment failure	Serious • some concerns due to assessments judged as unclear <sup>2</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>3</sup> • it is unknown if patients had other GE conditions <sup>4</sup>	No serious limitation • $I^2=0\%$ , overlap of CIs	Serious • small sample size (n=87) <sup>5</sup>	Serious • comprehensive search not undertaken and uncertain about grey literature search	Very Low	Critical; identified post hoc

1 Unclear assessment between the two studies in relation to sequence generation (Sharma 2006) and allocation concealment (Dulai 2006; based on authors' supporting text in Rees 2010). It is unclear whether the lack of blinding detected in both studies using the Jadad tool corresponds directly to assessments of performance and detection biases.

2 Assessments made in De Souza 2014 review not adequately detailed. It is reasonable to consider that judgements made in footnote 1 pertain to this outcome.

3 Country of conduct may affect the delivery of care in light of potential contextual influences such as differences in training or equipment

4 The review does not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

5 Based on few events/ small study sample (sample size < rule of thumb of n=300 events). CI includes little to no effect and appreciable benefit.

## Evidence Set 10: Thermal ablative technique vs Chemical ablative technique combined with pharmacological therapy

### Evidence Set 10.1 PDT vs APC + PPI: results table

Based on five primary studies: Hage 2004<sup>79</sup>; Hage 2005<sup>78</sup>; Ragunath 2005<sup>81</sup>; Zopf 2003<sup>82</sup> (abstract); Zopf 2001<sup>83</sup>

10.1 Photodynamic therapy (PDT) vs Argon plasma coagulation (APC) + Proton Pump Inhibitor (PPI)								
Author Year	Outcome	Results: n/N; Mean (SD)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	PDT	APC + PPI				
All-cause mortality								
Rees 2010 <sup>49</sup>	All-cause mortality	Hage 2004 <sup>79</sup> , NR	1/26 (3.8%)	0/14	OR 1.71 (0.07, 44.65)	Not estimable	AMSTAR: Low Certainty: Very low	Hage 2005 and Kelty 2004 use 5-ALA PDT and Ragunath 2005 uses porfimer sodium.
		Kelty 2004 <sup>80</sup> , NR	0/34	0/34	OR not estimable			
		Ragunath 2005 <sup>81</sup> , UK	0/13	0/13	OR not estimable			
Progression to EAC								
Almond 2014 <sup>52</sup>	Cancer incidence	Zopf 2001 <sup>83</sup> , NR	0/4	0/5	Not estimable	Not estimable	AMSTAR: Critically low Certainty: Very low	
		Hage 2004 <sup>79</sup> , NR	0/5	0/3	Not estimable			
		Ragunath 2005 <sup>81</sup> , UK	1/11 (9%)	0/9	**RR 2.50 (0.11, 54.87)			
Progression to high-grade dysplasia								
Almond 2014 <sup>52</sup>	Progression to high-grade dysplasia	Hage 2004 <sup>79</sup> , NR	0/4	0/5	Not estimable	Not estimable	AMSTAR: Critically low Certainty: Very low	
		Ragunath 2005 <sup>81</sup> , UK	0/5	0/3				
Eradication of dysplasia †								
Rees 2010 <sup>49</sup>	Complete eradication of dysplasia at 12 months	Ragunath 2005 <sup>81</sup> , UK	*10/13 (77%)	6/9 (67%)	OR 1.67 (0.25, 11.07)	ARD with intervention: 103 more per 1,000 (from 333 fewer to 290 more);  Risk with control: 667 per 1,000	AMSTAR: Low Certainty: Very low	Fayter 2010 reports that dysplasia eradication was statistically significantly better at 4 months, but not at 12 months, with PDT.  Li 2008 provides concordant data.
Almond 2014 <sup>52</sup>	Complete eradication of dysplasia at 12 months	Hage 2004 <sup>79</sup> , NR	5/5 (100%)	3/3 (100%)	NR  **RR 1.00 (0.64, 1.56)	ARD with intervention: 0 fewer per 1,000 (from 360 fewer to 560 more);	AMSTAR: Critically low Certainty: Very low	



10.1 Photodynamic therapy (PDT) vs Argon plasma coagulation (APC) + Proton Pump Inhibitor (PPI)								
Author Year	Outcome	Results: n/N; Mean (SD)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	PDT	APC + PPI				
						Risk with control: 1,000 per 1,000		
		<u>Ragunath 2005</u> <sup>81</sup> , UK	*8/11 (73%)	6/9 (67%)	NR  **RR 1.09 (0.61, 1.96)	ARD with intervention: 60 more per 1,000 (from 260 fewer to 640 more);  Risk with control: 667 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	
Complete ablation of Barrett’s Esophagus (BE)								
Li 2008 <sup>48</sup>	Histologically complete ablation of BE	<u>Kelty 2004</u> <sup>80</sup> , NR	13/35 (37%)	26/37 (70%)	**RR 0.51 (0.34, 0.77)	ARD with intervention: 289 fewer per 1,000 (from 136 fewer to 390 fewer);  Risk with control: 590 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Results in review are presented as APC+PPI vs PDT but restructured here to align with this table’s presentation. OR favours APC+PPI treatment. The comparator is labelled as ALA-PDT and the intervention is labelled as APC alone in Li 2008.  Fayter 2010 reports no significant difference in rates of complete ablation between groups (Hage 2004).
		<u>Hage 2004</u> <sup>79</sup> , NR	5/26 (19%)	5/14 (36%)				
		<u>Hage 2005</u> <sup>78</sup> , NR	4/19 (21%)	5/10 (50%)				
Eradication of Barrett’s Esophagus (BE)								
Rees 2010 <sup>49</sup>	Complete eradication of BE at 12 months	<u>Hage 2004</u> <sup>79</sup> , NR	18/21 (86%)	8/12 *** (67%)	Pooled OR 0.31 (0.00, 32.60), I <sup>2</sup> =91.5%	<u>Moderate baseline risk:</u> ***ARD with intervention: 284 fewer per 1,000 (from --- to 315 more)  Risk with control: 670 per 1,000	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	Fayter 2010 reports that treatment led to complete reversal of the columnar segment to squamous epithelium in 50% of patients receiving ALA–PDT and 97% of patients receiving APC ( <i>p</i> < 0.0001).
		<u>Kelty 2004</u> <sup>80</sup> , NR	17/34 (50%)	33/34 *** (97%)		<u>High baseline risk:</u> ***ARD with intervention: 61 fewer per 1,000 (from --- to 29 more)		
		<u>Ragunath 2005</u> <sup>81</sup> , UK	*0/13	*0/13				

10.1 Photodynamic therapy (PDT) vs Argon plasma coagulation (APC) + Proton Pump Inhibitor (PPI)								
Author Year	Outcome	Results: n/N; Mean (SD)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	PDT	APC + PPI				
						Risk with control: 970 per 1,000		
Reduction of Barrett's Esophagus (BE) †								
Rees 2010 <sup>49</sup>	Reduction in length (cm) of BE at 12 months	<u>Ragunath 2005</u> <sup>81</sup> , UK	2.31 (1.75) (n=13)	3.22 (1.3) (n=13)	MD -0.91 (-2.10, 0.28)	MD 0.91cm lower (2.1cm lower to 0.28cm higher);  Risk with control: The mean reduction in length (cm) of BE at 12 months was 3.22cm	<b>AMSTAR:</b> Low <b>Certainty:</b> Low	
Fayter 2010 <sup>50</sup>	BE surface reduction	<u>Hage 2004</u> <sup>79</sup> , NR	Both the group receiving fractionated-dose PDT with ALA and the group receiving APC had statistically significantly better results in terms of Barrett's oesophagus surface reduction than the group receiving single-dose PDT. Differences between fractionated-dose PDT and APC were not significant.				<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Compares two different PDT doses to APC.
Li 2008 <sup>48</sup>	Length of regression (median) (endoscopic change)	<u>Ragunath 2005</u> <sup>81</sup> , UK	57% (4 month)  60% (12 months)	65% (4 months)  56% (12 months)	Not estimable	Not estimable	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Data provided by authors was the median percentage regression of BE without additional information.
Fayter 2010 <sup>50</sup>	Reduction in length	<u>Zoeopf 2003</u> <sup>82</sup> , NR	90% reduction for those undergoing ALA-PDT treatment than those receiving APC but fewer treatments were used for APC.				<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low to low	Zoeopf 2003 abstract only.
Eradication of intestinal metaplasia								
Almond 2014 <sup>52</sup>	Complete eradication of intestinal metaplasia	<u>Ragunath 2005</u> <sup>81</sup> , UK	2/11	2/9	NR  **RR 0.82 (0.14, 4.71)	ARD with intervention: 40 fewer per 1,000 (from 191 fewer to 824 more);  Risk with control: 222 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	
Treatment failure (no ablation) †								
De Souza 2014 <sup>45</sup>	Treatment Failure (no ablation of BE)	<u>Hage 2004</u> <sup>79</sup> , NR	1/13 (7.8%)	3/14 (21%)	<b>Pooled RD 0.14 (0.02, 0.27), I<sup>2</sup>=82%<sup>†</sup></b>	<u>Low baseline risk:</u> ARD with intervention: 79 more per 1,000 (14 more to 174 more)	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Opposite of complete eradication of BE (reported above by Rees 2010), with the same three primary

10.1 Photodynamic therapy (PDT) vs Argon plasma coagulation (APC) + Proton Pump Inhibitor (PPI)								
Author Year	Outcome	Results: n/N; Mean (SD)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	PDT	APC + PPI				
		<u>Kelty 2004</u> <sup>80</sup> , NR	18/35 (51%)	4/37 (11%)	<b>**RR 1.72 (1.13, 2.61)</b>	Risk with control: 110 per 1,000		studies, with some discordance in group size. The review labelled the comparator as APC alone. PDT in Hage and Kelty were ALA-PDT but porfimer sodium PDT in Ragunath 2005.
		<u>Ragunath 2005</u> <sup>81</sup> , UK	11/13 (85%)	11/13 (85%)		<u>High baseline risk</u> : ARD with intervention: 612 more per 1,000 (from 110 more to 1,000 more)  Risk with control: 850 per 1,000		
Stricture formation †								
Rees 2010 <sup>49</sup>	Stricture formation	<u>Hage 2004</u> <sup>79</sup> , NR	0/26	1/14 (7.1%)	Pooled OR 0.51 (0.11, 2.44)	ARD with intervention: 31 fewer per 1,000 (from 58 fewer to 81 more);	<b>AMSTAR:</b> Low <b>Certainty:</b> Very low	Fayter 2010 reported that no major side effects in terms of perforations or strictures occurred in the trials (from Kelty 2004 only).
		<u>Kelty 2004</u> <sup>80</sup> , NR	0/34	1/34 (2.9%)		Risk with control: 66 per 1,000		
		<u>Ragunath 2005</u> <sup>81</sup> , UK	*2/13 (15%)	*2/13 (15%)				
Almond 2014 <sup>52</sup>	Stricture	<u>Ragunath 2005</u> <sup>81</sup> , UK	*2/11 (18%)	*1/9 (11%)	NR  ** RR 1.64 (0.18, 15.26)	ARD with intervention: 71 more per 1,000 (from 91 fewer to 1,000 more);  Risk with control: 111 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Almond 2014 included only those with LGD.

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 10.1: GRADE domains table for further details on GRADE domain ratings

<sup>†</sup> post-hoc outcome

\*discrepant data

<sup>†</sup> SR authors seem to have double counted the Hage 2004 data, therefore the MD and I<sup>2</sup> may be different from what is presented. The ARD is calculated based on the RR (based on the three studies).

\*\*the effect estimate was not reported in the original SR but calculated by the overview team

\*\*\* The ARD was not estimable for the pooled estimate because the lower 95% CI is 0.00. The calculated ARDs are, therefore, shown according to moderate and high baseline control group rates.

Bolded effect estimates refer to statistically significant results.

Underlined first author name, publication year refers to a unique study included in more than one review.

## Evidence Set 10.1 PDT vs APC + PPI: GRADE domains table

10.1 Photodynamic therapy (PDT) vs Argon plasma coagulation (APC) + Proton Pump Inhibitor (PPI)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Rees 2010 <sup>49</sup>  Hage 2004 <sup>79</sup> Kelty 2004 <sup>80</sup> Ragunath 2005 <sup>81</sup>	All-cause mortality	Serious • some concern due to assessments judged as unclear <sup>1</sup>	Unclear • country of conduct not reported in two RCTs which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • CI only 1 study; few events across studies	Very serious • small sample size (n=134), very wide CI with only one event in total <sup>15</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Almond 2014 <sup>52</sup>  Zöpf 2001 <sup>83</sup> Hage 2004 <sup>79</sup> Ragunath 2005 <sup>81</sup>	Cancer incidence	Serious • some concern due to assessments judged as unclear <sup>2</sup>	Unclear • country of conduct not reported in two RCTs which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • CI not estimable because of zero events but is likely to overlap among studies.	Serious • small sample size (n=37) <sup>16</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical
Almond 2014 <sup>52</sup>  Hage 2004 <sup>79</sup> Ragunath 2005 <sup>81</sup>	Progression to HGD	Serious • some concern due to assessments judged as unclear <sup>3</sup>	Unclear • country of conduct not reported in one RCT which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • CI not estimable because of zero events but is likely to overlap between studies.	Serious • small sample sizes (n=17). No events. <sup>16</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical
Rees 2010 <sup>49</sup>  Ragunath 2005 <sup>81</sup>	Complete eradication of dysplasia at 12 months	Serious • some concerns due to assessments judged as unclear <sup>4</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study	Very serious • small sample size (n=22), wide CI <sup>17</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Almond 2014 <sup>52</sup>  Hage 2004 <sup>79</sup>	Complete eradication of dysplasia at 12 months	Very serious • concerns due to assessments judged as unclear and high risk <sup>5,6</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study, insufficient data	Very serious • small sample (n=28) <sup>18</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical
Almond 2014 <sup>52</sup>  Ragunath 2005 <sup>81</sup>	Complete eradication of dysplasia at 12 months	Serious • some concerns due to assessments judged as unclear <sup>6</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study	Very serious • small sample (n=26) <sup>17</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical
Li 2008 <sup>48</sup>	Histologically complete	Very serious	Unclear	No serious limitations	Serious	Serious	Very low	Critical

10.1 Photodynamic therapy (PDT) vs Argon plasma coagulation (APC) + Proton Pump Inhibitor (PPI)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Kelty 2004 <sup>80</sup> Hage 2004 <sup>79</sup> Hage 2005 <sup>78</sup>	ablation of BE	• some concerns due to assessments judged as unclear and high risk <sup>7</sup>	• country of conduct not reported which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	• overlap of CIs, I <sup>2</sup> =0%	• small sample size (n=141) <sup>16</sup>	• SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches		
Rees 2010 <sup>49</sup>  Hage 2004 <sup>79</sup> Kelty 2004 <sup>80</sup> Ragunath 2005 <sup>81</sup>	Complete eradication of BE at 12 months	Serious • some concerns due to assessments judged as unclear <sup>8</sup>	Unclear • country of conduct not reported in one RCT which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	Serious • considerable heterogeneity (I <sup>2</sup> =91%, p=0.00061) unaccounted for, no overlap of CIs, variation in effect estimates	Very serious • small sample size (n=134) and very wide CI <sup>17</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Almond 2014 <sup>52</sup>  Ragunath 2005 <sup>81</sup>	Complete Eradication-Intestinal Metaplasia	Serious • some concerns due to assessments judged as unclear <sup>6</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study	Very serious • small sample size (n=20) only four events in total <sup>17</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical
Rees 2010 <sup>49</sup>  Ragunath 2005 <sup>81</sup>	Reduction in length (cm) of BE at 12 months	Serious • some concerns due to assessments judged as unclear <sup>4</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study	Serious • small sample size (n=26), wide CI <sup>19</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Low	Critical; identified post hoc
Fayter 2010 <sup>50</sup>  Hage 2004 <sup>79</sup>	BE surface reduction	Very serious • some concerns due to assessments judged as unclear and high risk <sup>9</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study, insufficient data	Serious • small sample size (n=40) <sup>16</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical
Li 2008 <sup>48</sup>  Ragunath 2005 <sup>81</sup>	Length of regression (median) (endoscopic change)	Serious • some concern due to assessments judged as unclear <sup>10</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study	Serious • small sample size (n=26) <sup>20</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical identified post hoc
Fayter 2010 <sup>50</sup>  Zoepf 2003 <sup>82</sup> (abstract)	Reduction in length	Very serious to serious • abstract <sup>11</sup>	Unclear • country of conduct not reported which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study	Serious • small sample size (n=20) <sup>20</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low to low	Critical

10.1 Photodynamic therapy (PDT) vs Argon plasma coagulation (APC) + Proton Pump Inhibitor (PPI)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
De Souza 2014 <sup>45</sup>  Hage 2004 <sup>79</sup> Kelty 2004 <sup>80</sup> Ragunath 2005 <sup>81</sup>	Treatment failure (no ablation of BE)	Serious • some concerns due to assessments judged as unclear <sup>12</sup>	Unclear • country of conduct not reported in two RCTs which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	Serious • considerable heterogeneity ( $I^2=82\%$ , $p=0.0007$ ) and some variation in overlap of CI	Serious • small sample size ( $n=125$ ) <sup>16</sup>	Serious • comprehensive search not undertaken and uncertain about grey literature search	Very low	Critical; identified post hoc
Rees 2010 <sup>49</sup>  Hage 2004 <sup>79</sup> Kelty 2004 <sup>80</sup> Ragunath 2005 <sup>81</sup>	Stricture formation	Serious • some concerns due to assessments judged as unclear <sup>8</sup>	Unclear • country of conduct not reported in two RCTs which may affect the delivery of care <sup>13</sup> • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations	Very serious • small sample size ( $n=134$ ) <sup>17</sup>	No serious limitations • SR did not assess for publication bias. Although small studies, comprehensive search and included search for unpublished literature.	Very low	Critical; identified post hoc
Almond 2014 <sup>52</sup>  Ragunath 2005 <sup>81</sup>	Stricture formation	Serious • some concerns due to assessments judged as unclear <sup>6</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>14</sup>	No serious limitations • one study	Very serious • few events, small sample size ( $n=20$ ) <sup>17</sup>	Serious • SR did not assess for publication bias, and the review did not perform comprehensive or grey lit searches	Very low	Critical; identified post hoc

1 80% of evidence from studies at unclear risk of bias: allocation concealment, performance bias, and attrition common between studies; remaining study at high risk of bias because of blinding (performance bias). We did not consider detection bias at risk because of the objective nature of the outcome. (Rees 2010 assessment)

2 Assessments made in the Almond 2014 review not adequately described. Using assessments made in Rees 2010, 75% of evidence (two studies) is at unclear risk for allocation concealment, and assessment made for unclear risk of attrition bias for other outcomes may apply to this outcome. Additionally, 22% of evidence (one study) was unclear for sequence generation and high risk for performance and detection bias.

3 Assessments made in the Almond 2014 not adequately described. Using assessments made in Rees 2010, evidence at unclear risk for allocation concealment, and assessment made for unclear risk of attrition bias for other outcomes may apply to this outcome. Additionally, around half of evidence was unclear for sequence generation and high risk for performance and detection bias.

4 Allocation concealment, blinding and attrition unclear (Rees 2010 assessment)

5 High risk for performance and detection bias, unclear remaining domains (Rees 2010 assessment)

6 Assessments made in the Almond 2014 review not adequately described. Using assessments made in Rees 2010, unclear risk for allocation concealment; unclear assessments for performance and detection bias and attrition may be applicable to this outcome.

7 As the primary assessments are made with the Jadad tool (Li 2008 review), information from the Cochrane assessment (Rees 2010 review) was also used for context. Information on Hage 2005 is limited with only Jadad assessment available; it might reasonable to infer study conduct was similar as Hage 2004. High risk of performance and detection bias in 49% of the evidence, with high or unclear in the remainder. Allocation concealment is unclear across the evidence base, and the randomization method is unclear in 49% of the evidence.

8 80% of evidence from studies at unclear risk of bias: allocation concealment, performance and detection bias, and attrition common between studies; remaining study at high risk of bias because of blinding (performance and detection bias). (Rees 2010 assessment).

9 Assessments made in the Fayer 2010 review were provided in aggregate. Using assessments from Rees 2010, high risk of performance bias and detection bias seem reasonable to consider for this outcome. Remaining domains were at unclear risk.

10 Based on both Jadad (Li 2008) and Cochrane (Rees 2010) assessments, unclear risk for allocation concealment and performance and detection biases.

11 Assessments made on a study available only in abstract form; the risk of bias could be serious or very serious but unlikely to be at low risk; information provided was only in aggregate.

12 Assessments made in the De Souza review not adequately described. Using assessments made in the Rees 2010 review, 80% of evidence from studies at unclear risk of bias: allocation concealment, performance and detection bias, and attrition common between studies; remaining study at high risk of bias because of blinding (performance and detection bias).

13 Country of conduct may affect the delivery of care in light of potential contextual influences such as a change in the accessibility to the regimens (for pharmacological treatment), and differences in training or equipment (procedural treatment).

14 The reviews do not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

- 15 Based on few events and CI for relative effects include both appreciable benefit and harm. Absolute CI unknown.
- 16 Based on few events/ small study sample (sample size<rule of thumb of n=300 events)
- 17 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm.
- 18 Based on few events/ small study sample (sample size<rule of thumb of n=300 events). CI includes little to no effect and appreciable benefit.
- 19 Based on low study sample (sample size<rule of thumb of n=400 people).
- 20 Based on few events/ small study sample (sample size<rule of thumb of n=300 events). Insufficient reporting of information to judge extent of imprecision of data.

## Evidence Set 11: Mechanical ablative technique vs Thermal ablative technique

### Evidence Set 11.1 EMR vs RFA

Based on one primary study in abstract: van Vilsteren 2011<sup>59</sup>

11.1 Endoscopic mucosal resection (EMR) vs Radiofrequency ablation (RFA)								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR† & GRADE‡	Notes
		Study, Country	EMR	RFA				
Eradication of cancer †								
Desai 2017 <sup>55</sup>	Complete eradication of neoplasia	van Vilsteren 2011 <sup>59</sup> , The Netherlands/ Germany	25/25 (100%)	NR/22 (96%)	NR	Not estimable	AMSTAR: Critically low Certainty: Very low	Comparisons labelled as stepwise (complete) EMR compared to focal-EMR + RFA. Same primary study as in Chadwick 2014 and Fujii-Lau 2017.
Eradication of dysplasia †								
Chadwick 2014 <sup>53</sup>	Complete eradication of dysplasia (end of treatment)	van Vilsteren 2011 <sup>59</sup> , The Netherlands/ Germany	25/25 (100%)	21/22 (95%)	NR **RR 1.05 (0.93, 1.18)	ARD with intervention: 48 more per 1,000 (from 67 fewer to 172 more);  Risk with control: 955 per 1,000	AMSTAR: Critically low Certainty: Very low	Intervention labelled as EMR and comparator as RFA.
Chadwick 2014 <sup>53</sup>	Complete eradication of dysplasia with no recurrence at follow-up	van Vilsteren 2011 <sup>59</sup> , The Netherlands/ Germany	25/25 (100%)	21/22 (95%)	NR **RR 1.05 (0.93, 1.18)	ARD with intervention: 48 more per 1,000 (from 67 fewer to 172 more);  Risk with control: 955 per 1,000	AMSTAR: Critically low Certainty: Very low	
Eradication of intestinal metaplasia (IM) †								
Desai 2017 <sup>55</sup>	Complete eradication of IM	van Vilsteren 2011 <sup>59</sup> , The Netherlands/ Germany	*NR/25 (92%)	*NR/22 (92%)	NR	Not estimable	AMSTAR: Critically low Certainty: Very low	Text and table differ on CE-IM rates for s-EMR group (20/25 in text).
Chadwick 2014 <sup>53</sup>	Complete eradication of IM (end of treatment)	van Vilsteren 2011 <sup>59</sup> , The Netherlands/ Germany	*24/25 (96%)	*21/22 (95%)	NR **RR 1.01 (0.89, 1.14)	ARD with intervention: 10 more per 1,000 (from 105 fewer to 134 more);  Risk with control: 955 per 1,000	AMSTAR: Critically low Certainty: Very low	*Percentages are discrepant between reviews but results overall are concordant.



11.1 Endoscopic mucosal resection (EMR) vs Radiofrequency ablation (RFA)								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR <sup>†</sup> & GRADE <sup>‡</sup>	Notes
		Study, Country	EMR	RFA				
Chadwick 2014 <sup>53</sup>	Complete eradication of IM with no recurrence at follow-up	van Vilsteren 2011 <sup>59</sup> , The Netherlands/Germany	24/25 (96%)	21/22 (95%)	NR  **RR 1.01 (0.89, 1.14)	ARD with intervention: 10 more per 1,000 (from 105 fewer to 134 more);  Risk with control: 955 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	
<b>Recurrence of EAC</b>								
Fujii-Lau 2017 <sup>54</sup>	Early neoplasia recurrence after complete eradication	van Vilsteren 2011 <sup>59</sup> , The Netherlands/Germany	1/25	0/22	Not estimable  **RR 2.65 (0.11, 62.00)	Not estimable	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Intervention labelled as stepwise complete endoscopic resection (s-EMR) in this review.
<b>Recurrence of dysplasia †</b>								
Fujii-Lau 2017 <sup>54</sup>	Dysplasia recurrence after achieving complete eradication	van Vilsteren 2011 <sup>59</sup> , The Netherlands/Germany	0/25	0/22	Not estimable <sup>‡</sup>	Not estimable	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Low	Recurrence after achieving complete eradication of IM following endoscopic eradication therapy
<b>Recurrence of intestinal metaplasia (IM) †</b>								
Desai 2017 <sup>55</sup>	Recurrence of IM (follow up)	van Vilsteren 2011 <sup>59</sup> , The Netherlands/Germany	3/25 (12%)	NR/22	NR	Not estimable	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	
Fujii-Lau 2017 <sup>54</sup>	IM recurrence	van Vilsteren 2011 <sup>59</sup> , The Netherlands/Germany	2/25	2/22	**RR 0.88 (0.14, 5.73)  Incidence rate <sup>‡‡</sup>	ARD with intervention: 11 fewer per 1,000 (from 78 fewer to 430 more)  Risk with control: 91 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Recurrence after achieving complete eradication of IM following endoscopic eradication therapy
<b>Bleeding †</b>								
Chadwick 2014 <sup>53</sup>	Acute bleeding endoscopically treated	van Vilsteren 2011 <sup>59</sup> , The Netherlands/Germany	5/25 (20%)*	2/22 (9.1%)*	NR  **RR 2.20 (0.47, 10.23)	ARD with intervention: 109 more per 1,000 (from 48 fewer to 839 more);  Risk with control: 91 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	

11.1 Endoscopic mucosal resection (EMR) vs Radiofrequency ablation (RFA)								
Author Year	Outcome	Results: n/N (%)			Effect estimate (95% CI)	Absolute Risk Difference (ARD)	AMSTAR <sup>†</sup> & GRADE <sup>‡</sup>	Notes
		Study, Country	EMR	RFA				
Desai 2017 <sup>55</sup>	Bleeding	<u>van Vilsteren 2011<sup>59</sup></u> , The Netherlands/Germany	6/25 (24%)*	3/22 (13.6%)*	NR  ** RR 1.76 (0.50, 6.22)	ARD with intervention: 104 more per 1,000 (from 68 fewer to 712 more);  Risk with control: 136 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	*Discrepant data between van Vilsteren 2011 in Chadwick 2014 and Desai 2017 but results overall are concordant.
<b>Perforations <sup>†</sup></b>								
Chadwick 2014 <sup>53</sup>	Number of perforations	<u>van Vilsteren 2011<sup>59</sup></u> , The Netherlands/Germany	1/25 (4%)	0/22	Not estimable  **RR 2.65 (0.11, 62.00)	Not estimable	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	Desai 2017 reports the same results.
<b>Stricture <sup>†</sup></b>								
Desai 2017 <sup>55</sup>	Stricture	<u>van Vilsteren 2011<sup>59</sup></u> , The Netherlands/Germany	22/25 (88%)	3/22 (13.6%)	NR  ** <b>RR 6.45 (2.23, 18.66)</b>	ARD with intervention: 743 more per 1,000 (from 168 more to 1,000 more);  Risk with control: 136 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	
<b>Stenosis requiring treatment <sup>†</sup></b>								
Chadwick 2014 <sup>53</sup>	Stenosis requiring treatment (with a median of 3 dilatations; all had large ERs before RFA)	<u>van Vilsteren 2011<sup>59</sup></u> , The Netherlands/Germany	22/25 (88%)	3/21 (14%)	NR  ** <b>RR 6.16 (2.14, 17.74)</b>	737 more per 1,000 (from 163 more to 1,000 more);  Risk with control: 143 per 1,000	<b>AMSTAR:</b> Critically low <b>Certainty:</b> Very low	

<sup>†</sup> see Supplementary table 1 for further details on AMSTAR domain ratings

<sup>‡</sup> see Evidence Set 11.1: GRADE domains tables further details on GRADE domain ratings

<sup>†</sup> post-hoc outcome

\* discordance between reviews

\*\*the effect estimate was not reported in the original SR but calculated by the overview team

<sup>‡</sup> Between groups comparison was not reported but only per arm data reported: Incidence of recurrence (95% CI) per 100 person-year: s-EMR: 1.9 (0.0, 5.6), p-value 0.32. RFA: 1.3 (0.0, 4.9), p-value 0.48

<sup>‡</sup> Between groups comparison was not reported but only per arm data reported: Incidence of recurrence (95% CI) per 100 py: after EMR: 3.8, 95% CI (0.0, 9.1) p-value 0.16 after RFA: 5.3, 95% CI (0.0, 12.6), p-value 0.16 Bolded effect estimates refer to statistically significant results.

Underlined first author name, publication year refers to a unique study included in more than one review.

## Evidence Set 11.1 EMR vs RFA: GRADE domains table

11.1 Endoscopic mucosal resection (EMR) vs Radiofrequency ablation (RFA)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Desai 2017 <sup>55</sup> van Vilsteren 2011 <sup>59</sup>	Complete eradication of neoplasia	Serious • mix of risk of bias across outcomes, some information missing <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>4</sup>	Serious • although review performed grey literature searches, a comprehensive search was not performed	Very low	Critical
Chadwick 2014 <sup>53</sup> van Vilsteren 2011 <sup>59</sup>	Complete eradication of dysplasia (end of treatment)	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>5</sup>	Serious • SR did not assess for publication bias, and although the review performed grey literature searches, a comprehensive search was not performed	Very low	Critical
Chadwick 2014 <sup>53</sup> van Vilsteren 2011 <sup>59</sup>	Complete eradication of dysplasia with no recurrence at follow-up	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>5</sup>	Serious • SR did not assess for publication bias, and although the review performed grey literature searches, a comprehensive search was not performed	Very low	Critical
Desai 2017 <sup>55</sup> van Vilsteren 2011 <sup>59</sup>	Complete eradication of intestinal metaplasia	Serious • mix of risk of bias across outcomes, some information missing <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>4</sup>	Serious • although review performed grey literature searches, a comprehensive search was not performed	Very low	Critical
Chadwick 2014 <sup>53</sup> van Vilsteren 2011 <sup>59</sup>	Complete eradication of intestinal metaplasia (end of treatment)	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>5</sup>	Serious • SR did not assess for publication bias, and although the review performed grey literature searches, a comprehensive search was not performed	Very low	Critical
Chadwick 2014 <sup>53</sup> van Vilsteren 2011 <sup>59</sup>	Complete eradication of intestinal metaplasia with no recurrence at follow-up	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>5</sup>	Serious • SR did not assess for publication bias, and although the review performed grey literature searches, a comprehensive search was not performed	Very low	Critical
Fujii-Lau 2017 <sup>54</sup>	Early neoplasia recurrence	Serious • mix of risk of bias across outcomes,	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47)	Serious • publication bias detected	Very low	Critical; post hoc

11.1 Endoscopic mucosal resection (EMR) vs Radiofrequency ablation (RFA)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
van Vilsteren 2011 <sup>59</sup>	after complete eradication	some information missing <sup>2</sup>			with only one event in total <sup>4</sup>			
Fujii-Lau 2017 <sup>54</sup> van Vilsteren 2011 <sup>59</sup>	Dysplasia recurrence after achieving complete eradication	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) with no events <sup>4</sup>	No serious limitations • not detected by review authors	Low	Critical; post hoc
Desai 2017 <sup>55</sup> van Vilsteren 2011 <sup>59</sup>	Recurrence of IM (follow-up)	Serious • mix of risk of bias across outcomes, some information missing <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>4</sup>	Serious • although review performed grey literature searches, a comprehensive search was not performed	Very low	Critical; post hoc
Fujii-Lau 2017 <sup>54</sup> van Vilsteren 2011 <sup>59</sup>	Intestinal Metaplasia recurrence	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Very serious • small sample size (n=47) with only four events in total <sup>6</sup>	No serious limitations • not detected by review authors	Very low	Critical; post hoc
Chadwick 2014 <sup>53</sup> van Vilsteren 2011 <sup>59</sup>	Acute bleeding endoscopically treated	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Very serious • small sample size (n=47) with only seven events in total <sup>6</sup>	Serious • SR did not assess for publication bias, and although the review performed grey literature searches, a comprehensive search was not performed	Very Low	Critical
Desai 2017 <sup>55</sup> van Vilsteren 2011 <sup>59</sup>	Bleeding	Serious • mix of risk of bias across outcomes, some information missing <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Very serious • small sample size (n=47) with only nine events in total <sup>6</sup>	Serious • although review performed grey literature searches, a comprehensive search was not performed	Very Low	Critical
Chadwick 2014 <sup>53</sup> van Vilsteren 2011 <sup>59</sup>	Number of perforations	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) with only one event in total <sup>4</sup>	Serious • SR did not assess for publication bias, and although the review performed grey literature searches, a comprehensive search was not performed	Very Low	Critical
Desai 2017 <sup>55</sup> van Vilsteren 2011 <sup>59</sup>	Stricture	Serious • mix of risk of bias across outcomes, some information missing <sup>1</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>5</sup>	Serious • although review performed grey literature searches, a comprehensive search was not performed	Very Low	Critical; post hoc

11.1 Endoscopic mucosal resection (EMR) vs Radiofrequency ablation (RFA)								
Review Studies	Outcome	Study Limitations	Indirectness	Inconsistency	Imprecision	Other considerations	Certainty	Importance
Chadwick 2014 <sup>53</sup>  van Vilsteren 2011 <sup>59</sup>	Stenosis requiring treatment	Serious • mix of risk of bias across outcomes, some information missing <sup>2</sup>	No serious limitations • it is unknown if patients had other GE conditions <sup>3</sup>	No serious limitations • one study	Serious • small sample size (n=47) <sup>5</sup>	Serious • SR did not assess for publication bias, and although the review performed grey literature searches, a comprehensive search was not performed	Very Low	Critical

1 Information provided in Desai 2017 review not adequately detailed and information only given for the s-EMR group Tools other than Cochrane used in other reviews for this study; information from across reviews considered together. Unclear sequence generation (Chadwick 2014); concealment and blinding of patients (performance bias) could be at either high or unclear risk based on reporting (Chadwick 2014, Fujii-Lau 2017).

2 No reviews evaluating this study used the Cochrane risk of bias tool; therefore, information was considered from across reviews together. Unclear randomization method (Chadwick 2014); concealment and blinding of patients (performance bias) could be at either high or unclear risk based on reporting (Fujii-Lau 2017; Chadwick 2014).

3 The reviews do not report if the patients had other GE conditions, which was part of the exclusion criteria for this overview, but the effect on treatment is expected to be minimal

4 Based on few events/ small study sample (sample size < rule of thumb of n=300 events). Insufficient reporting of information to judge extent of imprecision of data.

5 Based on few events/ small study sample (sample size < rule of thumb of n=300 events).

6 Based on few events, CI for relative effects include both appreciable benefit and harm, and absolute CI reasonably includes appreciable benefit and harm.

## **Supplementary Tables**

Supplementary Table 1. AMSTAR ratings for included systematic reviews

Supplementary Table 2. Risk of bias/Methodological Assessments of Primary Studies

**Supplementary Table 1. AMSTAR ratings for included systematic reviews**

	<b>Fujii-Lau 2017<sup>54</sup></b>	<b>Desai 2017<sup>55</sup></b>	<b>Qumseya 2017<sup>51</sup></b>	<b>De Souza 2014<sup>47</sup></b>	<b>Almond 2014<sup>52</sup></b>	<b>Chadwick 2014<sup>53</sup></b>	<b>Fayter 2010<sup>50</sup></b>	<b>Rees 2010<sup>49</sup></b>	<b>Li 2008<sup>48</sup></b>	<b>Pandey 2018<sup>56</sup></b>	<b>Codipilly 2018<sup>57</sup></b>
<b>Confidence</b>	<b>Critically low</b> (total score 7; 2 critical domains)	<b>Critically low</b> (total score 4; 3 critical domains)	<b>Low</b> (total score 8; 1 critical domain)	<b>Critically low</b> (total score 2; 4 critical domains)	<b>Critically low</b> (total score 2; 4 critical domains)	<b>Critically low</b> (total score 4; 4 critical domains)	<b>Critically low</b> (total score 6; 2 critical domains)	<b>Low</b> (total score 8; 1 critical domain)	<b>Critically low</b> (total score 3; 4 critical domains)	<b>Critically Low</b> (total score 3; 1 critical domain)	<b>Critically low</b> (total score 6; 2 critical domains)
1. Was an 'a priori' design provided	No	No	Yes	No	No	No	Yes	Yes	No	No	No
2. Was there duplicate study selection and data extraction?	Yes	No	Yes	No	No	Yes	Yes	Yes	No	Can't tell	Yes
3. Was a comprehensive literature search performed?	Yes	No	Yes	No	No	No	Yes	Yes	No	Can't tell	Yes
4. Was the status of publication (i.e., grey literature) used as an inclusion criterion?	Yes	Yes	Can't answer	Can't answer	No	Yes	Yes	Yes	No	Can't tell	Can't tell
5. Was a list of studies (included and excluded) provided?	No	No	No	No	No	No	No	Yes	No	No	No
6. Were the characteristics of the included studies provided?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7. Was the scientific quality of the included studies assessed and documented?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8. Was the scientific quality of the included studies used appropriately in formulating conclusions?	No	No	Yes	No	Can't answer	No	No	No	No	No	Yes

	<b>Fujii-Lau 2017<sup>54</sup></b>	<b>Desai 2017<sup>55</sup></b>	<b>Qumseya 2017<sup>51</sup></b>	<b>De Souza 2014<sup>47</sup></b>	<b>Almond 2014<sup>52</sup></b>	<b>Chadwick 2014<sup>53</sup></b>	<b>Fayter 2010<sup>50</sup></b>	<b>Rees 2010<sup>49</sup></b>	<b>Li 2008<sup>48</sup></b>	<b>Pandey 2018<sup>56</sup></b>	<b>Codipilly 2018<sup>57</sup></b>
<b>Confidence</b>	<b>Critically low</b> (total score 7; 2 critical domains)	<b>Critically low</b> (total score 4; 3 critical domains)	<b>Low</b> (total score 8; 1 critical domain)	<b>Critically low</b> (total score 2; 4 critical domains)	<b>Critically low</b> (total score 2; 4 critical domains)	<b>Critically low</b> (total score 4; 4 critical domains)	<b>Critically low</b> (total score 6; 2 critical domains)	<b>Low</b> (total score 8; 1 critical domain)	<b>Critically low</b> (total score 3; 4 critical domains)	<b>Critically Low</b> (total score 3; 1 critical domain)	<b>Critically low</b> (total score 6; 2 critical domains)
9. Were the methods used to combine the findings of the studies appropriate?	Yes	No	Yes	No	Can't answer	Can't answer	Not applicable	Yes	Yes	No	Yes
10. Was the likelihood of publication bias assessed?	Yes	Yes	Yes	No	No	No	No	No	No	Yes	N/A
11. Was the conflict of interest included?	Can't answer	No	Can't answer	No	No	No	No	Can't answer	Can't answer	No	No

Note: Highlighted texts demonstrate the critical domains



**Supplementary Table 2. Risk of bias/Methodological Assessments of Primary Studies**

Study (Review)	Notes	Outcome	Sequence generation/ randomization method	Allocation concealment	Blinding*†	Attrition†	Selective reporting	Other
Ackroyd 2000 <sup>66</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	All-cause mortality; Progression from IM to dysplasia; Complete eradication of dysplasia at two years; Reduction in length (cm) of BE at 12 months; Reduction in area (%) of BE at 12 months	Unclear	Low	Low	Unclear	High	Low
Ackroyd 2000 <sup>66</sup> (Li 2008) <sup>48</sup>	Jadad score = 4/5. No specification on who was blinded (e.g., patients, physicians, outcome assessors, statisticians). Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Dysplasia eradication; area of regression of BE	Unclear	Sealed envelopes	Double blind	Yes	n/a	n/a
Ackroyd 2000 <sup>66</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 3/5, with no details on specific items.	Treatment failure	n/a	n/a	n/a	n/a	n/a	n/a
Ackroyd 2000 <sup>66</sup> (Fayter 2010) <sup>50</sup>	Use of an adopted checklist (not specified). Neither the outcome specific nor study specific assessments was reported (i.e., provided in aggregate among all included studies).	Evidence of regression	Unclear for almost 80% of the studies	Unclear for almost 90% of the studies	Unclear for almost 62% of the studies	Not carried out in almost 10% of the studies and unclear for almost 20% of the studies	n/a	n/a
Ackroyd 2004 <sup>69</sup> (Li 2008) <sup>48</sup>	Jadad score = 2/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Area of regression of BE	Unclear	Sealed envelopes	None	Yes	n/a	n/a
Ackroyd 2004 <sup>69</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 2/5, with no details on specific items.	Treatment failure at one year	n/a	n/a	n/a	n/a	n/a	n/a
Bright 2007 <sup>68</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	Progression to EAC; Progression to dysplasia at 5 years; Complete eradication of BE at 12 months	Unclear	Low (sealed opaque envelopes)	High	Low	High	Low
Bright 2007 <sup>68</sup> (Li 2008) <sup>48</sup>	Jadad score = 2/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Progression to HDG; Complete ablation (among those with histological change)	Unclear	Unclear	None	Yes	n/a	n/a

Study (Review)	Notes	Outcome	Sequence generation/ randomization method	Allocation concealment	Blinding*†	Attrition†	Selective reporting	Other
Caldwell 1996 <sup>62</sup> (abstract) (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	Reduction in length (cm) of BE at 12 months	Unclear	Unclear	Unclear	Unclear	Unclear	High
Dulai 2005 <sup>58</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	All-cause mortality	Low	Low (sealed opaque envelopes)	Low	Low	Low	Low
Dulai 2005 <sup>58</sup> (Li 2008) <sup>48</sup>	Jadad score = 2/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Histological complete ablation	Unclear	Unclear	None	Yes	n/a	n/a
Dulai 2005 <sup>58</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 2/5, with no details on specific items.	Treatment failure	n/a	n/a	n/a	n/a	n/a	n/a
Hage 2004 <sup>79</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	All-cause mortality; Complete eradication of BE at 12 months; Stricture formation	Unclear	Unclear	High	Unclear	Unclear	Unclear
Hage 2004 <sup>79</sup> (Li 2008) <sup>48</sup>	Jadad score = 2/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Histologically complete ablation of BE	Unclear	Unclear	None	Yes	n/a	n/a
Hage 2004 <sup>79</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 2/5, with no details on specific items.	Treatment failure (no ablation of BE)	n/a	n/a	n/a	n/a	n/a	n/a
Hage 2004 <sup>79</sup> (Almond 2014) <sup>52</sup>	Jadad score = 1/5, with no details on specific items.	Cancer incidence; Progression to HGD; Complete eradication of dysplasia at 12 months	n/a	n/a	n/a	n/a	n/a	n/a
Hage 2004 <sup>79</sup> (Fayter 2010) <sup>50</sup>	Use of an adopted checklist (not specified). Neither the outcome specific nor study specific assessments was reported (i.e., provided in aggregate among all included studies).	BE surface reduction	Unclear for almost 80% of the studies	Unclear for almost 90% of the studies	Unclear for almost 62% of the studies	Not carried out in almost 10% of the studies and unclear for almost 20% of the studies	n/a	n/a
Hage 2005 <sup>78</sup> (Li 2008) <sup>48</sup>	Jadad score = 2/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Histologically complete ablation of BE	Unclear	Unclear	None	Yes	n/a	n/a

Study (Review)	Notes	Outcome	Sequence generation/ randomization method	Allocation concealment	Blinding*†	Attrition†	Selective reporting	Other
Heath 2007 <sup>61</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	All-cause mortality; Progression to EAC at one year	Unclear	Unclear	Unclear	Low	Low	Low
Kelty 2004 <sup>80</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	All-cause mortality; Complete eradication of BE at 12 months; Stricture formation	Low	Unclear	Unclear	Unclear	Unclear	Unclear
Kelty 2004 <sup>80</sup> (Li 2008) <sup>48</sup>	Jadad score = 3/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Histologically complete ablation of BE	Low	Unclear	None	Yes	n/a	n/a
Kelty 2004 <sup>80</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 3/5, with no details on specific items.	Treatment failure (no ablation of BE)	n/a	n/a	n/a	n/a	n/a	n/a
Kelty 2004b <sup>73</sup> (Fayter 2010) <sup>50</sup>	Use of an adopted checklist (not specified). Neither the outcome specific nor study specific assessments was reported (i.e., provided in aggregate among all included studies).	Reductions in BE; Perforations or strictures	Unclear for almost 80% of the studies	Unclear for almost 90% of the studies	Unclear for almost 62% of the studies	Not carried out in almost 10% of the studies and unclear for almost 20% of the studies	n/a	n/a
Mackenzie 2007 <sup>73</sup> (abstract) (Fayter 2010) <sup>50</sup>	Use of an adopted checklist (not specified). Neither the outcome specific nor study specific assessments was reported (i.e., provided in aggregate among all included studies).	Cancer risk; Lower rates of adenocarcinoma; Stricture	Unclear for almost 80% of the studies	Unclear for almost 90% of the studies	Unclear for almost 62% of the studies	Not carried out in almost 10% of the studies and unclear for almost 20% of the studies	n/a	n/a
Mackenzie 2008 <sup>72</sup> (abstract) (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes. It is unclear why there was a high-risk rating under the “other” domain.	Eradication of HGD; Stricture formation	Unclear	Unclear	Unclear	Unclear	Unclear	High (published in abstract)
Mackenzie 2009 <sup>74</sup> (Fayter 2010) <sup>50</sup>	Use of an adopted checklist (not specified). Neither the outcome specific nor study specific assessments was reported (i.e., provided in aggregate among all included studies).	Lower rates of adenocarcinoma	Unclear for almost 80% of the studies	Unclear for almost 90% of the studies	Unclear for almost 62% of the studies	Not carried out in almost 10% of the studies and unclear for almost 20% of the studies	n/a	n/a
Overholt 2005 <sup>67</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes. Support for judgement points to another study.	All-cause mortality; Progression to cancer at latest possible time point; Complete eradication of dysplasia at two years; Stricture formation; Complete eradication of BE over the course of the study (5 years)	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear

Study (Review)	Notes	Outcome	Sequence generation/ randomization method	Allocation concealment	Blinding*†	Attrition†	Selective reporting	Other
Overholt 2005 <sup>67</sup> (Li 2008) <sup>48</sup>	Jadad score = 2/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Dysplasia eradication; Eradication of HGD	Unclear	Unclear	None	Yes	n/a	n/a
Overholt 2005 <sup>67</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 2/5, with no details on specific items.	Treatment failure	n/a	n/a	n/a	n/a	n/a	n/a
Overholt 2007 <sup>65</sup> (Li 2008) <sup>48</sup>	Jadad score = 2/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms	Progression to cancer at 5 years	Unclear	Unclear	None	Yes	n/a	n/a
Parrilla 2003 <sup>71</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	Mortality; Progression to cancer; Progression to dysplasia from intestinal metaplasia; Complete eradication of dysplasia at 5 years; Complete eradication of BE at 5 years	Low	Low	Unclear (nature of study made blinding impossible; interpreted as high risk)	Unclear	Low	Low
Parrilla 2003 <sup>71</sup> (Li 2008) <sup>48</sup>	Jadad score = 3/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Progression from non-dysplastic BE to BE with dysplasia	Low	Sealed envelopes	None	Yes	n/a	n/a
Peters 1999 <sup>63</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	Reduction in length (cm) of BE at 12 months; Reduction in area (%) of BE at 12 months	Low	Unclear	Low	Unclear	Low	Unclear
Phoa 2014 <sup>76</sup> (Qumseya 2017) <sup>51</sup>	Downs & Black 23 (Good). Based on sums, the tool may have been modified. Items relevant to risk of bias tool cannot be distinguished due to reporting. (Poor quality if the score was <15, fair quality if the score was 15–19, and good quality if the score was >20.)	Progression to EAC: cumulative progression over the follow-up period; Progression to EAC: progression/patient-year; Progression to HGD; Progression to HDG: progression/patient-year	n/a	n/a	n/a	n/a	n/a	n/a
Phoa 2014 <sup>76</sup> (Pandey 2018) <sup>56</sup>	Quality assessment was guided by the Cochrane RoB tool and Critical Appraisal Skills Programme (CASP) checklist. They quality was ranked from 1 to 4. This RCT was ranked as 1 (highest quality). Per outcome assessment was not provided.	Progression to HDG; Complete eradication of IM; Complete eradication of dysplasia; Stricture formation; Perforations; Bleeding	NR	NR	NR	NR	NR	NR

Study (Review)	Notes	Outcome	Sequence generation/ randomization method	Allocation concealment	Blinding*†	Attrition†	Selective reporting	Other
Ragunath 2005 <sup>81</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	All-cause mortality; Complete eradication of dysplasia at 12 months; Complete eradication of BE at 12 months; Reduction in length (cm) of BE at 12 months; Stricture formation	Low	Unclear	Unclear	Unclear	Low	Low
Ragunath 2005 (Li 2008)	Jadad score = 3/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Length of regression (median) (endoscopic change)	Low	Unclear	None	Yes	n/a	n/a
Ragunath 2005 <sup>81</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 3/5, with no details on specific items.	Treatment failure (no ablation of BE)	n/a	n/a	n/a	n/a	n/a	n/a
Ragunath 2005 <sup>81</sup> (Almond 2014) <sup>52</sup>	Jadad score = 3/5, with no details on specific items.	Cancer incidence; Progression to HGD; Complete eradication of dysplasia at 12 months; Complete eradication of IM; Stricture	n/a	n/a	n/a	n/a	n/a	n/a
Shaheen 2009 <sup>70</sup> (Rees 2010) <sup>47</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	Progression to EAC at 5-years (or latest time point); Progression to higher grades of dysplasia; Complete eradication of dysplasia at 12 months; Complete eradication of BE at 12 months; Stricture formation	Low	Unclear	Low	Low	Low	Low
Shaheen 2009 <sup>70</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 5/5, with no details on specific items.	Treatment failure at one year	n/a	n/a	n/a	n/a	n/a	n/a
Shaheen 2009 <sup>70</sup> (Qumsey 2017) <sup>51</sup>	Downs & Black 27. Based on sums, the tool may have been modified. Items relevant to risk of bias tool cannot be distinguished due to reporting. (Poor quality if the score was <15, fair quality if the score was 15–19, and good quality if the score was >20.)	Cumulative progression to EAC over follow-up (among those with LGD); Progression to HGD	n/a	n/a	n/a	n/a	n/a	n/a
Shaheen 2009 <sup>70</sup> (Pandey 2018) <sup>56</sup>	Quality assessment was guided by the Cochrane RoB tool and Critical Appraisal Skills Programme (CASP) checklist. They ranked quality from 1 to 4. This study was ranked as 1 (highest	Progression to HGD; Complete; Eradication of intestinal metaplasia; Complete eradication of dysplasia; Perforations; Bleeding	NR	NR	NR	NR	NR	NR

Study (Review)	Notes	Outcome	Sequence generation/ randomization method	Allocation concealment	Blinding*†	Attrition†	Selective reporting	Other
	quality). Per outcome assessment was not provided.							
Sharma 2006 <sup>77</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	Stricture formation	Unclear	Low	Unclear	Unclear	Low	Low
Sharma 2006 <sup>77</sup> (Li 2008) <sup>48</sup>	Jadad score = 2/5. Explanation provided for withdrawals and dropouts, but no information on the total number of withdrawals/ dropouts and relative number between arms.	Histological complete ablation	Unclear (“according to BE length”)	Sealed Envelope	None	Yes	n/a	n/a
Sharma 2006 <sup>77</sup> (De Souza 2014) <sup>47</sup>	Jadad score = 1/5, with no details on specific items.	Treatment failure	n/a	n/a	n/a	n/a	n/a	n/a
van Vilsteren 2011 <sup>59</sup> (Chadwick 2014) <sup>53</sup>	Newcastle-Ottawa scale. No final score, information provided by domain. No indication that outcome-specific items were addressed by item – one assessment provided.	Complete eradication of dysplasia (end of treatment); Complete eradication of dysplasia with no recurrence at follow-up; Complete eradication of IM (end of treatment); Complete eradication of IM with no recurrence at follow-up; Acute bleeding endoscopically treated; Number of perforations; Stenosis requiring treatment	Authors state randomized but not method	n/a	Performance: unknown Detection: low risk	Adequate follow-up rate	n/a	Groups comparable. Other considerations?
			NOS: Representativeness of cohort: 1 Selection of non-exposed cohort: 1 Ascertainment of exposure: 1 Demonstration outcome of interest not present at start: 1 Comparability of cohorts on the basis of the design or analysis: 1 Assessment of outcome: 1 Was the follow-up long enough for outcomes to occur: 1 Adequacy of follow-up cohorts: 1 Reporting: 11 External validity: 3 Interval validity, bias: 4 Internal validity, confounding: 5 Power: 0					
van Vilsteren 2011 <sup>59</sup> (Desai 2017) <sup>55</sup>	Newcastle-Ottawa scale. Score = 7. No indication that outcome-specific items were addressed by item – one assessment provided.	Complete eradication of neoplasia; Complete eradication of IM; Recurrence of IM (follow up); Bleeding; Stricture	n/a	n/a	n/a	n/a	n/a	n/a
			NOS: Representativeness of cohort: 1 Selection of non-exposed cohort: not reported Ascertainment of exposure: 1 Demonstration outcome of interest not present at start: 1 Comparability of cohorts on the basis of the design or analysis: 1 Assessment of outcome: 1 Was the follow-up long enough for outcomes to occur: 1 Adequacy of follow-up cohorts: 1					

Study (Review)	Notes	Outcome	Sequence generation/ randomization method	Allocation concealment	Blinding*†	Attrition†	Selective reporting	Other
van Vilsteren <sup>59</sup> (Fujii-Lau 2017) <sup>54</sup>	Downs and Black. Rating for individual items reported. Those pertaining to risk of bias assessments are provided here.	Early neoplasia recurrence after complete eradication; Dysplasia recurrence after achieving complete eradication; IM recurrence	Score = 1 for random method	Score = 0 for concealment	Score = 0 for patient blinding Score = 0 for blinding of outcome assessors	Score = 1 for loss to follow-up	n/a	n/a
Weinstein 1996 <sup>64</sup> (Rees 2010) <sup>49</sup>	Cochrane RoB tool used. Outcome-specific assessments were reported as pertaining to all outcomes.	Reduction in length (cm) of BE at 12 months; Reduction in area (%) of BE at 12 months	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear
Zopf 2001 <sup>83</sup> (Almond 2014) <sup>52</sup>	Jadad score = 1/5, with no details on specific items.	Cancer incidence	n/a	n/a	n/a	n/a	n/a	n/a
Zoepf 2003 <sup>82</sup> (Fayter 2010) <sup>50</sup>	Use of an adopted checklist (not specified). Neither the outcome specific nor study specific assessments was reported (i.e., provided in aggregate among all included studies).	Reduction in length	Unclear for almost 80% of the studies	Unclear for almost 90% of the studies	Unclear for almost 62% of the studies	Not carried out in almost 10% of the studies and unclear for almost 20% of the studies	n/a	n/a

Abbreviation: n/a=not available.

\*Performance and detection bias

†Outcome-specific assessments.

\*\* Rees 2010 used data from Overholt 2007 to supplement data in Overholt 2005.

## **Appendices**

Appendix 1 List of treatment options

Appendix 2 PICOS table

Appendix 3 PRESS

Appendix 4 Search strategies

Appendix 5 Screening forms

Appendix 6 AMSTAR checklist

Appendix 7 List of excluded reviews at full text

Appendix 8 List of potentially relevant ongoing reviews or trials

Appendix 9 Characteristics of primary studies included in reviews

Appendix 10 Evaluation of overlap of studies and concordance of results among reviews



## Appendix 1. PICOS table

	Inclusion	Exclusion
<b>Population</b>	Adults (≥18 years old) with stage 1 EAC, BE, or low- or high-grade dysplasia, with or without chronic GERD as defined in the systematic reviews.	Those diagnosed with other gastro-esophageal conditions.
<b>Interventions</b>	Treatment for stage 1 EAC, low- or high-grade dysplasia or BE including: Pharmacological therapies such as: PPI, H2 receptor antagonists, Cox-2 inhibitors, Prokinetics and antacids, NSAIDs; Surveillance methods such as: Esophagogastroduodenoscopy (EGD)*† plus biopsy <sup>‡</sup> EGD† plus biopsy plus adjunct techniques‡ (high-definition/high-resolution white light endoscopy, chromoendoscopy, electronic chromoendoscopy, autofluorescence imaging, confocal laser endomicroscopy, light scattering spectroscopy, diffuse reflectance spectroscopy; Endoscopic or Endoscopic Assisted therapies such as: Ablative techniques (thermal or chemical), and mechanical methods (EMR, ESD or combined options) Surgery, including fundoplication and esophagectomy	Any follow-up diagnostic tests, such 24-hour esophageal pH test or any test for staging purposes, such as CT and MRI
<b>Comparators</b>	No management/treatment compared to another management/treatment regimen	
<b>Outcomes</b>	Mortality - all-cause and EAC-related (1, 5 and 10 years, or as available) † Survival (1, 5 and 10 years, or as available) † Progression from non-dysplastic BE to BE with dysplasia, progression from low-grade to high-grade dysplasia, progression to EAC Life threatening, severe, or medically significant consequences (such as requiring hospitalization or prolongation of hospitalization; disabling (limiting self-care or activities of daily living) Quality of life (validated scales only; e.g. SF-36, WHOQUAL) Major or minor medical procedures Psychological effects (e.g., anxiety, stress) Overtreatment  Post-hoc outcomes: Complete eradication of: intestinal metaplasia/BE, dysplasia, high-grade dysplasia, neoplasia Reduction/regression of BE: in length (cm), in area (%) Treatment Failure (no ablation) EAC recurrence  †from the time of allocation to screening or control arm	
<b>Timing</b>	No limits	
<b>Settings</b>	Any setting	
<b>Study designs</b>	Systematic reviews of randomized controlled trials (RCTs)*	SRs that combine results from RCTs with non-

	<b>Inclusion</b>	<b>Exclusion</b>
	*Systematic reviews that combine RCT and non-RCTs will be included if results for RCTs are provided separately from non-RCT studies.	RCTs, controlled before-after, interrupted times series, cohort studies, case-control studies, cross-sectional studies, case series, case reports, and other publication types (editorials, commentaries, notes, letter, opinions) or SRs that only include non-RCT and observational studies.
<b>Language</b>	No language restrictions in the search, however only English articles will be included at full-text.	
<b>Databases</b>	Medline, Embase, Cochrane (CDSR, DARE, HTA)	

## **Appendix 2. List of treatment options**

- Pharmacological therapies, such as:
- Proton pump inhibitors therapy
- H2 receptor antagonists
- Cyclo-oxygenase-2 inhibitors
- Prokinetics and antacids
- Non-steroidal anti-inflammatory drugs (NSAIDs)

Surveillance (primarily diagnostic procedures to enhance early detection):

- High-definition/high-resolution white light endoscopy
- Chromoendoscopy
- Electronic chromoendoscopy
- Autofluorescence imaging
- Confocal laser endomicroscopy
- Light scattering spectroscopy, diffuse reflectance spectroscopy

Endoscopic or Endoscopic Assisted therapies:

- Ablative techniques (eliminate all dysplastic mucosa)
- Thermal: Argon plasma coagulation (APC), Multipolar electrocoagulation (MPEC), Radiofrequency ablation (RFA), Cryotherapy/cryoablation, Laser ablation
- Chemical: Photodynamic therapy (PDT)
- Mechanical methods (remove targeted superficial tissue of the GI tract)
- Endoscopic mucosal resection (EMR)
- Endoscopic submucosal dissection (ESD)

Combined options (i.e., EMR + PDT, PDT + PPI)

Surgery

- Laparoscopic anti-reflux surgery (i.e., fundoplication)
- Esophagectomy

## Appendix 3. PRESS

### PRESS Guideline 2015— Search Submission & Peer Review Assessment<sup>83</sup>

**Searcher's Name:** Becky Skidmore

**E-mail:** [bskidmore@rogers.com](mailto:bskidmore@rogers.com)

**Date submitted:** 7 Mar 2017

**Date needed by:** ASAP (Mar 9, if possible)

**Note to peer reviewers – please enter your information in the Peer Review Assessment area**

**Remember:** this peer review only pertains to your MEDLINE search strategy.

**Search question** (Describe the purpose of the search)

*Title: Benefits and Harms of Treatment for Barrett's Esophagus: An Overview of Systematic Reviews*

*Question: What is the evidence for the benefits and harms of treatment for Barrett's esophagus (BE) on reducing EAC, EAC related and all-cause mortality, and improving quality of life?*

**PICO format** (Outline the PICO for your question, i.e., the Patient, Intervention, Comparison and Outcome)

**P:** Adults ≥18 years with Barrett's Esophagus (BE)

**I:** Treatment strategies for BE including: pharmacological therapies, surveillance methods and endoscopic therapies

**C:** One treatment method vs. another treatment method

**O:** Effectiveness of treatment for BE. Primary/critical outcomes are: all-cause mortality and cancer-related mortality (1,5,10 year as available), survival, incidence of EAC, low- and high-grade dysplasia, stage at diagnosis, life-threatening or medically-significant consequences

(see also PICO table in Protocol for more details)

**Inclusion criteria** (List any inclusion criteria, such as age groups, study designs, to be included)

Systematic reviews

**Exclusion criteria** (List any exclusion criteria, such as study designs, to be excluded)

**Was a search filter applied?** (Remember this pertains only to the MEDLINE strategy)

Yes ☒

No ☐

**If yes, which one?**

Cochrane hedge:

Haynes/McKibbin et al:

CRD (UK):

Other: Modified CADTH, have added in network meta-analyses

PUBMED clinical query:

SIGN (Scottish):

Robinson and Dickerson:

**MEDLINE search interface used**

EBSCO ☐

OVID ☒

PubMed ☒

Other \_\_\_\_\_

**Has the search strategy been adapted (i.e., subject heading and terms reviewed) for other databases? Please check all that apply.**

Ageline	<input checked="" type="checkbox"/>	ERIC	<input type="checkbox"/>
AMED	<input checked="" type="checkbox"/>	LILACS (Latin American and Caribbean Health Sciences Literature)	<input type="checkbox"/>
C2-SPCTRE	<input checked="" type="checkbox"/>	MEDLINE	<input checked="" type="checkbox"/>
CINAHL	<input checked="" type="checkbox"/>	PsycINFO	<input type="checkbox"/>
Cochrane Database of Systematic Reviews (CDSR; Cochrane Reviews)	<input type="checkbox"/>	PreMEDLINE	<input checked="" type="checkbox"/>
Cochrane Central Register of Controlled Trials (CENTRAL; Clinical Trials)	<input type="checkbox"/>	Cochrane HTA	<input type="checkbox"/>
Cochrane Methodology Register (CMR; Methods Studies)	<input type="checkbox"/>	Other	<input type="checkbox"/>
Cochrane Library (all databases)	<input checked="" type="checkbox"/>	Other	<input type="checkbox"/>
Database of Abstracts of Reviews of Effects (DARE; Other Reviews)	<input type="checkbox"/>		
Embase	<input checked="" type="checkbox"/>		

**Other notes or comments that you feel would be useful for the peer reviewer?**

Group has decided to revert back to the original search that included both BE and EAC search terms

**Please paste your MEDLINE strategy here:**

Database: Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) <1946 to Present>

Search Strategy:

```
1  Barrett Esophagus/ (7075)
2  (Barrett* adj1 (esophag* or oesophag* or epitheli* or metaplasia* or syndrome?)).tw,kw. (8135)
3  1 or 2 (9350)
4  ((Barrett* or esophag* or oesophag* or pharynx-esophag* or gastro-esophag* or gastro-oesophag*) adj3 (dysplasia* or
dysplastic* or precancer* or pre-cancer* or premalignan* or pre-malignan*)).tw,kw. (2138)
5  3 or 4 (9835)
6  Esophageal Neoplasms/ (43936)
7  exp Esophagus/ and exp Neoplasms/ (9850)
8  ((esophag* or oesophag* or pharynx-esophag*) adj3 (neoplas* or cancer* or tumour* or tumor* or carcinoma* or malignan* or
metasta* or oncolog* or adenoma* or adenocarcinoma* or adeno-carcinoma* or carcinosarcoma* or carcino-sarcoma*)).tw,kw.
(42666)
9  or/6-8 (57539)
10 5 or 9 (61194)
11 exp Infant/ not (exp Adult/ and exp Infant/) (761289)
12 exp Child/ not (exp Adult/ and exp Child/) (1081083)
13 10 not (11 or 12) (60742)
14 exp Animals/ not (exp Animals/ and Humans/) (4327457)
15 13 not 14 (59461)
16 (comment or editorial or interview or news).pt. (1171650)
17 (letter not (letter and randomized controlled trial)).pt. (950923)
18 15 not (16 or 17) (56366)
19 limit 18 to systematic reviews (1429)
20 meta analysis.pt. (75191)
21 exp meta-analysis as topic/ (15514)
22 (meta-analy* or metanaly* or metaanaly* or met analy* or integrative research or integrative review* or integrative overview* or
research integration or research overview* or collaborative review*).tw,kw. (112084)
23 (systematic review* or systematic overview* or evidence-based review* or evidence-based overview* or (evidence adj3
(review* or overview*)) or meta-review* or meta-overview* or meta-synthes* or "review of reviews" or technology assessment* or
HTA or HTAs).tw,kw. (136923)
24 exp Technology assessment, biomedical/ (9954)
25 (cochrane or health technology assessment or evidence report).jw. (14812)
26 (network adj (MA or MAs)).tw,kw. (2)
27 (NMA or NMAs).tw,kw. (1409)
28 indirect comparison?.tw,kw. (1208)
29 (indirect treatment* adj1 comparison?).tw,kw. (119)
30 (mixed treatment* adj1 comparison?).tw,kw. (349)
31 (multiple treatment* adj1 comparison?).tw,kw. (74)
32 (multi-treatment* adj1 comparison?).tw,kw. (0)
33 simultaneous comparison?.tw,kw. (396)
34 mixed comparison?.tw,kw. (13)
35 or/20-34 (243608)
36 18 and 35 (1247)
37 19 or 36 (1644)
```

\*\*\*\*\*

**Peer Review Assessment  
[For peer reviewers only]**

**Peer reviewer's name:** Kaitryn Campbell

**Press #:** N/A

**E-mail:** kaitryn\_chris@sympatico.ca

**Date completed:** 7 Mar 2017

Please select the one most appropriate answer for each element

	<b>Adequate</b>	<b>Adequate with revisions*</b>	<b>Needs revision*</b>
1. Translation of the research question	X		
2. Boolean and proximity operators	X		
3. Subject headings	X		
4. Natural language / free-text	X		
5. Spelling, syntax and line numbers	X		
6. Limits and filters	X		
7. Search strategy adaptations	X		

\*Provide an explanation or example for "Adequate with revisions" and "needs revision":

Other Comments (please limit to 3-5 sentences): Well done and straight forward. No changes or suggestions.

## Appendix 4. Search strategies

Database: Embase Classic+Embase <1947 to 2018 October 26>, Ovid MEDLINE(R) ALL <1946 to October 25, 2018>

Search Strategy:

- 
- 1 Barrett Esophagus/ (23026)
  - 2 (Barrett\* adj1 (esophag\* or oesophag\* or epitheli\* or metaplasia\* or syndrome?)).tw,kf. (22348)
  - 3 1 or 2 (27331)
  - 4 ((Barrett\* or esophag\* or oesophag\* or pharynx-esophag\* or gastro-esophag\* or gastro-oesophag\*) adj3 (dysplasia\* or dysplastic\* or precancer\* or pre-cancer\* or premalignan\* or pre-malignan\*)).tw,kf. (5923)
  - 5 3 or 4 (28574)
  - 6 Esophageal Neoplasms/ (54194)
  - 7 exp Esophagus/ and exp Neoplasms/ (37262)
  - 8 ((esophag\* or oesophag\* or pharynx-esophag\*) adj3 (neoplas\* or cancer\* or tumour\* or tumor\* or carcinoma\* or malignan\* or metasta\* or oncolog\* or adenoma\* or adenocarcinoma\* or adeno-carcinoma\* or carcinosarcoma\* or carcino-sarcoma\*)).tw,kf. (115152)
  - 9 or/6-8 (144916)
  - 10 5 or 9 (156979)
  - 11 exp Infant/ not (exp Adult/ and exp Infant/) (1653036)
  - 12 exp Child/ not (exp Adult/ and exp Child/) (3188154)
  - 13 10 not (11 or 12) (155770)
  - 14 exp Animals/ not (exp Animals/ and Humans/) (16928885)
  - 15 13 not 14 (118125)
  - 16 (comment or editorial or interview or news).pt. (1857143)
  - 17 (letter not (letter and randomized controlled trial)).pt. (2039050)
  - 18 15 not (16 or 17) (112822)
  - 19 limit 18 to systematic reviews [Limit not valid in Embase; records were retained] (53850)
  - 20 meta analysis.pt. (93528)
  - 21 exp meta-analysis as topic/ (55716)
  - 22 (meta-analy\* or metanaly\* or metaanaly\* or met analy\* or integrative research or integrative review\* or integrative overview\* or research integration or research overview\* or collaborative review\*).tw,kf. (322057)
  - 23 (systematic review\* or systematic overview\* or evidence-based review\* or evidence-based overview\* or (evidence adj3 (review\* or overview\*)) or meta-review\* or meta-overview\* or meta-synthes\* or "review of reviews" or technology assessment\* or HTA or HTAs).tw,kf. (382261)
  - 24 exp Technology assessment, biomedical/ (23572)
  - 25 (cochrane or health technology assessment or evidence report).jw. (38344)
  - 26 (network adj (MA or MAs)).tw,kf. (16)
  - 27 (NMA or NMAs).tw,kf. (4256)
  - 28 indirect\* compar\*.tw,kf. (4481)
  - 29 (indirect treatment\* adj1 compar\*).tw,kf. (605)
  - 30 (mixed treatment\* adj1 compar\*).tw,kf. (1228)
  - 31 (multiple treatment\* adj1 compar\*).tw,kf. (312)
  - 32 (multi-treatment\* adj1 compar\*).tw,kf. (4)
  - 33 simultaneous\* compar\*.tw,kf. (2157)
  - 34 mixed comparison?.tw,kf. (53)

35 or/20-34 (671928)  
36 18 and 35 (2302)  
37 19 or 36 (54111)  
38 37 use medall [MEDLINE RECORDS] (2016)  
39 Barrett esophagus/ (23026)  
40 (Barrett\* adj1 (esophag\* or oesophag\* or epitheli\* or metaplasia\* or syndrome?)).tw,kw. (22711)  
41 39 or 40 (27498)  
42 esophagus dysplasia/ (864)  
43 exp esophagus/ and dysplasia/ (1609)  
44 ((Barrett\* or esophag\* or oesophag\* or pharynx-esophag\* or gastro-esophag\* or gastro-oesophag\*) adj3 (dysplasia\* or dysplastic\* or precancer\* or pre-cancer\* or premalignant\* or pre-malignant\*)).tw,kw. (6007)  
45 or/42-44 (7478)  
46 41 or 45 (29142)  
47 exp esophagus tumor/ (77710)  
48 exp esophagus/ and exp neoplasm/ (37262)  
49 ((esophag\* or oesophag\* or pharynx-esophag\*) adj3 (neoplas\* or cancer\* or tumour\* or tumor\* or carcinoma\* or malignant\* or metastas\* or oncolog\* or adenoma\* or adenocarcinoma\* or adeno-carcinoma\* or carcinosarcoma\* or carcino-sarcoma\*)).tw,kw. (115398)  
50 or/47-49 (152799)  
51 46 or 50 (164217)  
52 exp juvenile/ not (exp juvenile/ and exp adult/) (2337309)  
53 exp Infant/ not (exp Adult/ and exp Infant/) (1653036)  
54 exp Child/ not (exp Adult/ and exp Child/) (3188154)  
55 or/52-54 (3908908)  
56 51 not 55 (162843)  
57 exp animal experimentation/ or exp models animal/ or exp animal experiment/ or nonhuman/ or exp vertebrate/ (47785712)  
58 exp human/ or exp human experimentation/ or exp human experiment/ (37610583)  
59 57 not 58 (10176834)  
60 56 not 59 (159227)  
61 editorial.pt. (1053946)  
62 letter.pt. not (letter.pt. and randomized controlled trial/) (2034134)  
63 60 not (61 or 62) (152899)  
64 meta-analysis/ (244188)  
65 "systematic review"/ (181694)  
66 "meta analysis (topic)"/ (38725)  
67 (meta-analy\* or metanaly\* or metaanaly\* or met analy\* or integrative research or integrative review\* or integrative overview\* or research integration or research overview\* or collaborative review\*).tw,kw. (324815)  
68 (systematic review\* or systematic overview\* or evidence-based review\* or evidence-based overview\* or (evidence adj3 (review\* or overview\*)) or meta-review\* or meta-overview\* or meta-synthes\* or "review of reviews" or technology assessment\* or HTA or HTAs).tw,kw. (385401)  
69 biomedical technology assessment/ (22465)  
70 (cochrane or health technology assessment or evidence report).jw. (38344)  
71 (network adj (MA or MAs)).tw,kw. (16)  
72 (NMA or NMAs).tw,kw. (4274)  
73 indirect\* compar\*.tw,kw. (4543)



74 (indirect treatment\* adj1 compar\*).tw,kw. (607)  
 75 (mixed treatment\* adj1 compar\*).tw,kw. (1251)  
 76 (multiple treatment\* adj1 compar\*).tw,kw. (317)  
 77 (multi-treatment\* adj1 compar\*).tw,kw. (4)  
 78 simultaneous\* compar\*.tw,kw. (2157)  
 79 mixed comparison?.tw,kw. (54)  
 80 or/64-79 (731158)  
 81 63 and 80 (4759)  
 82 81 use emcxd [EMBASE RECORDS] (3269)  
 83 38 or 82 [BOTH DATABASES] (5285)  
 84 2018\*.dt. (1068337)  
 85 38 and 84 [MEDLINE UPDATE RECORDS] (190)  
 86 2018\*.dc. (1460954)  
 87 82 and 86 [EMBASE UPDATE RECORDS] (361)  
 88 85 or 87 [BOTH DATABASES - UPDATE RECORDS] (551)  
 89 remove duplicates from 88 (428)  
 90 89 use medall [MEDLINE UNIQUE UPDATE RECORDS] (184)  
 91 89 use emcxd [EMBASE UNIQUE UPDATE RECORDS] (244)

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Cochrane

Date Run: 30/10/2018 03:06:00

ID	Search Hits
#1	MeSH descriptor: ["Barrett Esophagus"] explode all trees 207
#2	(Barrett* next (esophag* or oesophag* or epitheli* or metaplasia* or syndrome*)):ti,ab,kw 470
#3	#1 or #2 470
#4	((Barrett* or esophag* or oesophag* or (pharynx next esophag*) or (gastro next esophag*) or (gastro next oesophag*)) near/3 (dysplasia* or dysplastic* or precancer* or (pre next cancer*) or premalignan* or (pre next malignan*))) :ti,ab,kw 195
#5	#3 or #4 532
#6	MeSH descriptor: ["Esophageal Neoplasms"] explode all trees 1308
#7	MeSH descriptor: [Esophagus] explode all trees 267
#8	((esophag* or oesophag* or (pharynx next esophag*)) near/3 (neoplas* or cancer* or tumour* or tumor* or carcinoma* or malignan* or metasta* or oncolog* or adenoma* or adenocarcinoma* or (adeno next carcinoma*) or carcinosarcoma* or (carcino next sarcoma*))) :ti,ab,kw 3387
#9	{or #6-#8} 3457
#10	#5 or #9 3673
#11	MeSH descriptor: [Infant] explode all trees 14928
#12	MeSH descriptor: [Child] explode all trees 832
#13	#10 not (#11 or #12) with Cochrane Library publication date Between Jan 2018 and Oct 2018, in Cochrane Reviews, Cochrane Protocols 1

## Appendix 5. Screening forms

### *Title and abstract screening form*

1. Is this record a review (addresses multiple studies within)? (exclude primary studies such as RCTs, cohort, case-control, cross-sectional, case series, case reports, and editorials/ commentaries/ opinion pieces, and protocols)

Notes:

Include clinical practice guidelines and scoping reviews of interest at this level.

- ☐ Yes (include)
- ☐ Unclear (include)
- ☐ No (exclude)

2. Does the review describe a management/treatment regimen for EAC and/or BE and/or low- or high-grade dysplasia? (i.e., pharmacological, surveillance, surgical/mechanical or chemotherapy/radiation, surgery)?

Notes:

If review is not directly on management/treatment (e.g., prognostic factors), please exclude it (also exclude reviews that only consider dietary intakes, physical activities, smoking etc.).

If an otherwise eligible review does not specify the type of esophageal cancer (EAC or ESCC), please include it under "unclear" at this level. If it is only on ESCC, exclude it.

Include reviews that are on cancers of esophagogastric junction (that is located at the borderline between esophagus and stomach).

If a review only focuses on chemotherapy/immunotherapy and/or radiation therapy, please exclude it.

- ☐ Yes (include)
- ☐ Unclear (include)
- ☐ No (exclude)

3. Does the review discuss adults ( $\geq 18$  years)?

- ☐ Yes (include)
- ☐ Unclear (include)
- ☐ No (exclude)

Additional notes (optional)

--

### ***Full-text screening form***

#### **1. Is this record a systematic review of RCTs (or provide a separate analysis for RCTs)?**

Note: In order to fulfill the SR definition, the record must meet all of the following criteria: 1) searched at least one database; 2) reported selection criteria; 3) reported quality appraisal; 4) provided a list and synthesis of included studies.

Notes:

If a review claims assessing risk of bias, but it does not report some details of QA, it would not satisfy the “QA” condition for question 1. As such it should be excluded (please see #2 below for explanation of details).

If a review does not use a specific tool for assessing the quality of included primary studies but just “generic” assessment of risk of bias, please include it as long as it reports some details of QA results. If they just state “low risk of bias” for overall body of evidence for example, you can’t consider that sufficient as you have no idea how they determined that. If they provide at least final rating per study (e.g., low risk, high risk, scoring etc.) +/- additional details, please include it.

If the record is a clinical practice guideline, please exclude it under Q1; however, if it is based on an SR, please check if they have referenced the original SR. If yes, please look the SR up and assess if it meets our eligibility criteria. If yes, please send the note to Nadera with the citation/reference for the SR. If you are unable to locate the full-text of the referenced SR, please request Raymond to locate it for you and keep Nadera copied.

- ☐ Yes (include)
- ☐ No (exclude)
- ☐ Can't tell because abstract only
- ☐ Full-text not available in English
- ☐ Full-text not available (other reasons)

#### **2. Does the SR discuss adults with EAC (stage 1 only), BE, low or high-grade dysplasia?**

Note:

If an SR has mix of children and adults with no separate analyses for adults, please exclude it but make a note of it in the “additional note” section.

Cancer type: If an SR included mix of esophageal cancer types [esophageal adenocarcinoma (EAC) and esophageal squamous cell carcinoma (ESCC or SCC)], with no separate analysis for EAC, please exclude under question 2 “No (exclude)” option.

Cancer stage: If an SR included mix EAC stages e.g., 0, I, II, III with no separate analysis for stages 0 and/or I. Please exclude it under question 2 under “No (exclude)” option.

If an SR does not report the type of esophageal cancer (EAC or SCC), or EAC’s stage (0, I, II, III) and there is no other clue to know if it was EAC with stage 0 and/or I, please exclude it by choosing “unclear” option under question 2 and write the reason in the box.

- ☐ Yes (include)
- ☐ No (exclude)
- ☐ Unclear (please specify what is unclear)

#### **3. Does the review describe a management/treatment regimen for EAC (stage 1) and/or BE and/or low- or high-grade dysplasia? (i.e., pharmacological, surveillance, surgical/mechanical or surgery)?**

Note:

If it addresses another type of treatment/management not listed above, please consult Nadera.

We are not interested in:

perioperative protocols before/ after surgery etc.

Reconstruction after esophagectomy e.g., gastric tube vs whole stomach etc.

Palliation given it is not provided in stage 1

Please do include:

different techniques of the same intervention e.g., different surgery techniques/procedures of the esophagectomy

☐ Yes (include)

☐ No (exclude)

☐ Unclear (please specify what is unclear)

4. Does the SR compare one management/treatment strategy to another management/treatment strategy or to no management/treatment?

☐ Yes (include)

☐ No (exclude)

5. Is there any other reason to exclude this SR?

☐ Yes exclude (please specify in the box)

☐ No, include

Additional notes (optional)

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Optional question for "eligible SRs that includes RCTs but with no sufficient separate data for RCTs". In order to conduct a separate synthesis for RCTs, one would need to go to the primary studies.

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## Appendix 6. AMSTAR checklist

<p><b>1. Was an 'a priori' design provided?</b>  The research question and inclusion criteria should be established before the conduct of the review.  <i>Note: Need to refer to a protocol, ethics approval, or pre-determined/a priori published research objectives to score a "yes."</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Can't answer <input type="checkbox"/> Not applicable
<p><b>2. Was there duplicate study selection and data extraction?</b>  There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.  <i>Note: 2 people do study selection, 2 people do data extraction, consensus process or one person checks the other's work.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Can't answer <input type="checkbox"/> Not applicable
<p><b>3. Was a comprehensive literature search performed?</b>  At least two electronic sources should be searched. The report must include years and databases used (e.g., Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.  <i>Note: If at least 2 sources + one supplementary strategy used, select "yes" (Cochrane register/Central counts as 2 sources; a grey literature search counts as supplementary).</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Can't answer <input type="checkbox"/> Not applicable
<p><b>4. Was the status of publication (i.e. grey literature) used as an inclusion criterion?</b>  The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.  <i>Note: If review indicates that there was a search for "grey literature" or "unpublished literature," indicate "yes." SIGLE database, dissertations, conference proceedings, and trial registries are all considered grey for this purpose. If searching a source that contains both grey and non-grey, must specify that they were searching for grey/unpublished lit.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Can't answer <input type="checkbox"/> Not applicable
<p><b>5. Was a list of studies (included and excluded) provided?</b>  A list of included and excluded studies should be provided.  <i>Note: Acceptable if the excluded studies are referenced. If there is an electronic link to the list but the link is dead, select "no."</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Can't answer <input type="checkbox"/> Not applicable
<p><b>6. Were the characteristics of the included studies provided?</b>  In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g., age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.  <i>Note: Acceptable if not in table format as long as they are described as above.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Can't answer <input type="checkbox"/> Not applicable
<p><b>7. Was the scientific quality of the included studies assessed and documented?</b>  'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo-controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Can't answer <input type="checkbox"/> Not applicable

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*Note: Can include use of a quality scoring tool or checklist, e.g., Jadad scale, risk of bias, sensitivity analysis, etc., or a description of quality items, with some kind of result for EACH study ("low" or "high" is fine, as long as it is clear which studies scored "low" and which scored "high"; a summary score/range for all studies is not acceptable).*

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**8. Was the scientific quality of the included studies used appropriately in formulating conclusions?**

The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.

*Note: Might say something such as "the results should be interpreted with caution due to poor quality of included studies." Cannot score "yes" for this question if scored "no" for question 7.*

- ☐ Yes
- ☐ No
- ☐ Can't answer
- ☐ Not applicable

**9. Were the methods used to combine the findings of studies appropriate?**

For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e., Chi-squared test for homogeneity,  $I^2$ ). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e., is it sensible to combine?).

*Note: Indicate "yes" if they mention or describe heterogeneity, i.e., if they explain that they cannot pool because of heterogeneity/variability between interventions.*

- ☐ Yes
- ☐ No
- ☐ Can't answer
- ☐ Not applicable

**10. Was the likelihood of publication bias assessed?**

An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test, Hedges-Olken).

*Note: If no test values or funnel plot included, score "no". Score "yes" if mentions that publication bias could not be assessed because there were fewer than 10 included studies.*

- ☐ Yes
- ☐ No
- ☐ Can't answer
- ☐ Not applicable

**11. Was the conflict of interest included?**

Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.

*Note: To get a "yes," must indicate source of funding or support for the systematic review AND for each of the included studies.*

- ☐ Yes
- ☐ No
- ☐ Can't answer
- ☐ Not applicable

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*Additional notes (in italics) made by Michelle Weir, Julia Worswick, and Carolyn Wayne based on conversations with Bev Shea and/or Jeremy Grimshaw in June and October 2008 and July and September 2010.*

## Appendix 7. List of excluded reviews at full text

Reason # 1: Not being a systematic review of RCTs (or provide a separate analysis for RCTs), (681 records).

Reason # 2: Not discussing adults with EAC (stage 1 only), BE, low or high-grade dysplasia (98 records).

Reason # 3: Not describing a management/treatment regimen for EAC (stage 1) and/or BE and/or low- or high-grade dysplasia? (i.e., pharmacological, surveillance, surgical/mechanical or surgery), (2 records).

Reason # 4: Not comparing one management/treatment strategy to another management/treatment strategy or to no management/treatment (4 records)

Reason # 5: Non-English language (109 records)

Reason # 6: Full text unavailable (102 records)

S#	Reference	Exclusion Criteria
1	Taioli E, Schwartz RM, Lieberman-Cribbin W, Moskowitz G, van Gerwen M, Flores R. Quality of Life after Open or Minimally Invasive Esophagectomy in Patients With Esophageal Cancer—A Systematic Review. In Seminars in thoracic and cardiovascular surgery 2017 Sep 1 (Vol. 29, No. 3, pp. 377-390). WB Saunders.	Reason #1
2	Joo MK, Park JJ, Chun HJ. Additional benefits of routine drugs on gastrointestinal cancer: statins, metformin, and proton pump inhibitors. Digestive Diseases. 2018;36(1):1-4..	Reason #1
3	Aurello P, Sirimarco D, Mangogna LM, Nigri G, Valabrega S, D'Angelo F, Ramacciato G. Esophagectomy with Esophagocoloplasty for Malignancies: Indications, Technique (with Video), and Results. Systematic Review of the Literature. Journal of Gastrointestinal Surgery. 2017 Sep 1;21(9):1557-61.	Reason #1
4	Kataoka K, Nakamura K, Mizusawa J, Kato K, Eba J, Katayama H, Shibata T, Fukuda H. Surrogacy of progression-free survival (PFS) for overall survival (OS) in esophageal cancer trials with preoperative therapy: Literature-based meta-analysis. European Journal of Surgical Oncology (EJSO). 2017 Oct 1;43(10):1956-61.	Reason #1
5	Law R, Prabhu A, Fujii-Lau L, Shannon C, Singh S. Stent migration following endoscopic suture fixation of esophageal self-expandable metal stents: a systematic review and meta-analysis. Surgical endoscopy. 2018 Feb 1;32(2):675-81.	Reason #2
6	Ma Y, Wu X, Yu J, Zhu J, Pen X, Meng X. Can polysaccharide K improve therapeutic efficacy and safety in gastrointestinal cancer? a systematic review and network meta-analysis. Oncotarget. 2017 Oct 24;8(51):89108.	Reason #2
7	He YM, Yu C, Li WB, Li ZP, Xu N. Evaluation of short-term effectiveness of eight targeted agents combined with chemotherapy for treating esophageal-gastric junction adenocarcinoma: A network meta-analysis. Journal of cellular biochemistry. 2018 Jan;119(1):1183-92.	Reason #2
8	Karstens KF, Izbicki JR, Reeh M. Does the Margin Matter in Esophageal Cancer. Digestive surgery. 2018;35(3):196-203.	Reason #1
9	Thomas T, Loke Y, Beales IL. Systematic review and meta-analysis: use of statins is associated with a reduced incidence of oesophageal adenocarcinoma. Journal of gastrointestinal cancer. 2017 Jul 10:1-3.	Reason #1
10	Chen Y, Zhu HP, Wang T, Sun CJ, Ge XL, Min LF, Zhang XW, Jia QQ, Yu J, Yang JQ, Allgayer H. What is the optimal radiation dose for non-operable esophageal cancer? Dissecting the evidence in a meta-analysis. Oncotarget. 2017 Oct 24;8(51):89095.	Reason #2
11	Büyükkaramikli NC, Blommestein HM, Riemsma R, Armstrong N, Clay FJ, Ross J, Worthy G, Severens J, Kleijnen J, Al MJ. Ramucirumab for treating advanced gastric cancer or	Reason #1

	gastro-oesophageal junction adenocarcinoma previously treated with chemotherapy: an evidence review group perspective of a NICE single technology appraisal. <i>PharmacoEconomics</i> . 2017 Dec 1;35(12):1211-21.	
12	Niezink AG, de Jong RA, Muijs CT, Langendijk JA, Widder J. Pulmonary Function Changes After Radiotherapy for Lung or Esophageal Cancer: A Systematic Review Focusing on Dose-Volume Parameters. <i>The oncologist</i> . 2017 Oct 1;22(10):1257-64.	Reason #1
13	PDQ Screening and Prevention Editorial Board. Esophageal Cancer Screening (PDQ): Health Professional Version. 2002.	Reason #1
14	PDQ Adult Treatment Editorial Board Esophageal Cancer Treatment (PDQ): Health Professional Version. 2002.	Reason #1
15	Tomizawa Y, Konda VJ, Coronel E, Chapman CG, Siddiqui UD. Efficacy, Durability, and Safety of Complete Endoscopic Mucosal Resection of Barrett Esophagus. <i>Journal of clinical gastroenterology</i> . 2018 Mar 1;52(3):210-6.	Reason #1
16	Schlottmann F, Patti MG, Shaheen NJ. Endoscopic treatment of high-grade dysplasia and early esophageal cancer. <i>World journal of surgery</i> . 2017 Jul 1;41(7):1705-11.	Reason #1
17	Iams WT, Villafior VM. Neoadjuvant Treatment for Locally Invasive Esophageal Cancer. <i>World journal of surgery</i> . 2017 Jul 1;41(7):1719-25.	Reason #1
18	Schlottmann F, Patti MG, Shaheen NJ. From Heartburn to Barrett's Esophagus, and Beyond. <i>World journal of surgery</i> . 2017 Jul 1;41(7):1698-704.	Reason #1
19	Loots E, Sartorius B, Madiba TE, Mulder CJ, Clarke DL. Is clinical research in oesophageal cancer in South Africa in crisis? A systematic review. <i>World journal of surgery</i> . 2017 Mar 1;41(3):810-6.	Reason #1
20	Metcalfe C, Avery K, Berrisford R, Barham P, Noble SM, Fernandez AM, Hanna G, Goldin R, Elliott J, Wheatley T, Sanders G. Comparing open and minimally invasive surgical procedures for oesophagectomy in the treatment of cancer: the ROMIO (Randomised Oesophagectomy: Minimally Invasive or Open) feasibility study and pilot trial. <i>Health technology assessment (Winchester, England)</i> 2016; 20 (48): 1-68.	Reason #1
21	Mönig SP, Schiffmann LM. Resection of advanced esophagogastric adenocarcinoma: Extended indications. <i>Der Chirurg; Zeitschrift für alle Gebiete der operativen Medizin</i> . 2016 May;87(5):398-405.	Reason #5
22	Noordman BJ, Wijnhoven BP, Lagarde SM, Biermann K, van der Gaast A, Spaander MC, Valkema R, van Lanschot JJ. Active surveillance in clinically complete responders after neoadjuvant chemoradiotherapy for esophageal or junctional cancer. <i>Diseases of the Esophagus</i> . 2017 Dec 1;30(12):1-8.	Reason #1
23	Irino T, Tsekrekos A, Coppola A, Scandavini CM, Shetye A, Lundell L, Rouvelas I. Long-term functional outcomes after replacement of the esophagus with gastric, colonic, or jejunal conduits: a systematic literature review. <i>Diseases of the esophagus: official journal of the International Society for Diseases of the Esophagus</i> . 2017 Dec;30(12):1-1.	Reason #1
24	Pence K, Correa AM, Chan E, Khaitan P, Hofstetter W, Kim MP. Management of esophageal gastrointestinal stromal tumor: review of one hundred seven patients. <i>Diseases of the esophagus: official journal of the International Society for Diseases of the Esophagus</i> . 2017 Dec;30(12):1-5.	Reason #1
25	Somerville M, Pitt M. Surveillance of Barrett's oesophagus: do we yet know whether it is worthwhile?. <i>Frontline gastroenterology</i> . 2010 Jul 1;1(2):88-93.	Reason #1
26	van Workum F, Berkelmans GH, Klarenbeek BR, Nieuwenhuijzen GA, Luyer MD, Rosman C. McKeown or Ivor Lewis totally minimally invasive esophagectomy for cancer of the esophagus and gastroesophageal junction: systematic review and meta-analysis. <i>Journal of thoracic disease</i> . 2017 Jul;9(Suppl 8):S826-33.	Reason #2



27	Donohoe CL, Reynolds JV. Neoadjuvant treatment of locally advanced esophageal and junctional cancer: the evidence-base, current key questions and clinical trials. <i>Journal of thoracic disease</i> . 2017 Jul;9(Suppl 8):S697-S704.	Reason #1
28	Klevebro F, Ekman S, Nilsson M. Current trends in multimodality treatment of esophageal and gastroesophageal junction cancer–Review article. <i>Surgical oncology</i> . 2017 Sep 1;26(3):290-5.	Reason #1
29	Liu Y, Kou C, Su Y, Zhang Y, You Y, Zhang L, Wang M, Fu Y, Ren X, Yang Y. accelerated or hyperfractionated radiotherapy for esophageal carcinoma: a meta-analysis of randomized controlled trials. <i>OncoTargets and therapy</i> . 2017;10:2971-81.	Reason #1
30	Wang X, Miao C, Chen Z, Li W, Yuan S, Yu J, Hu X. Can involved-field irradiation replace elective nodal irradiation in chemoradiotherapy for esophageal cancer? A systematic review and meta-analysis. <i>OncoTargets and therapy</i> . 2017;10:2087-95.	Reason #1
31	Liu Y, Mu Y, Zhang A, Ren S, Wang W, Xie J, Zhang Y, Zhou C. Cytokine-induced killer cells/dendritic cells and cytokine-induced killer cells immunotherapy for the treatment of esophageal cancer in China: a meta-analysis. <i>OncoTargets and therapy</i> . 2017;10:1897-1908.	Reason #2
32	Lv L, Hu W, Ren Y, Wei X. Minimally invasive esophagectomy versus open esophagectomy for esophageal cancer: a meta-analysis. <i>OncoTargets and therapy</i> . 2016;9:6751-62.	Reason #2
33	Ter Veer E, Ngai LL, Van Valkenhoef G, Mohammad NH, Anderegg MC, van Oijen MG, van Laarhoven HW. Capecitabine, 5-fluorouracil and S-1 based regimens for previously untreated advanced oesophagogastric cancer: A network meta-analysis. <i>Scientific reports</i> . 2017 Aug 2;7(1):7142.	Reason #2
34	Schlottmann F, Patti MG. Current concepts in treatment of Barrett's esophagus with and without dysplasia. <i>Journal of Gastrointestinal Surgery</i> . 2017 Aug 1;21(8):1354-60.	Reason #1
35	Duan X, Yu Z. Neoadjuvant chemoradiotherapy combined with operation vs. operation alone for resectable esophageal cancer: Meta-analysis on randomized controlled trials. <i>Zhonghua wei chang wai ke za zhi= Chinese journal of gastrointestinal surgery</i> . 2017 Jul;20(7):809-15.	Reason #5
36	Du D, Song T, Liang X, Fang M, Wu S. Concurrent chemoradiotherapy with elective lymph node irradiation for esophageal cancer: a systemic review and pooled analysis of the literature. <i>Diseases of the esophagus : official journal of the International Society for Diseases of the Esophagus</i> 2017; 30 (2): 1-9.	Reason #1
37	Dumonceau JM, Deprez PH, Jenssen C, Iglesias-Garcia J, Larghi A, Vanbiervliet G, Aithal GP, Arcidiacono PG, Bastos P, Carrara S, Czako L. Indications, results, and clinical impact of endoscopic ultrasound (EUS)-guided sampling in gastroenterology: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline - Updated January 2017. <i>Endoscopy</i> 2017 Jul 1;49(7):695-714.	Reason #1
38	Li S, Liu H, Diao C, Wang X, Gao M, Li Z, Song L, Gao X, Han J, Wang F, Li W. Prognosis of surgery combined with different adjuvant therapies in esophageal cancer treatment: a network meta-analysis. <i>Oncotarget</i> . 2017 May 30;8(22):36339-353.	Reason #2
39	Yan R, Dang C. Meta-analysis of Transhiatal Esophagectomy in carcinoma of esophagogastric junction, does it have an advantage?. <i>International Journal of Surgery</i> . 2017 Jun 1;42:183-90.	Reason #2
40	Qumseya BJ, Wolfsen HC. The Role of Endoscopic Ultrasound in the Management of Patients with Barrett's Esophagus and Superficial Neoplasia. <i>Gastrointestinal Endoscopy Clinics</i> . 2017 Jul 1;27(3):471-80.	Reason #1
41	Zhu Y, Liu M, Yun X, Wang D, Bai Y, Zhang G, Ji B, Jing C. Meta-Analysis for the Therapeutic Effect of Neoadjuvant Therapy in Resectable Esophageal Cancer. <i>Pathology &amp; Oncology Research</i> . 2017 Jul 1;23(3):657-63.	Reason #2

42	Sun L, Zhang Z, Xu J, Xu G, Liu X. Dietary fiber intake reduces risk for Barrett's esophagus and esophageal cancer. Critical reviews in food science and nutrition. 2017 Sep 2;57(13):2749-57.	Reason #3
43	Van DD, Honoré P, Collignon J, Polus M, Loly C, Mutijima E, De AR, Coucke PA, Louis E, Martinive P. Comprehensive therapeutic strategy for localized esophageal cancer. Second part: interest of multimodal approaches with or without surgery. Revue medicale de Liege. 2017 Apr;72(4):168-74.	Reason #5
44	Mansour NM, El-Serag HB, Anandasabapathy S. Barrett's esophagus: best practices for treatment and post-treatment surveillance. Annals of cardiothoracic surgery. 2017 Mar;6(2):75-87.	Reason #1
45	Visser E, Franken IA, Brosens LA, Ruurda JP, van Hillegersberg R. Prognostic gene expression profiling in esophageal cancer: a systematic review. Oncotarget. 2017 Jan 17;8(3):5566-5577.	Reason #2
46	Zhao Y, Guo C, Hu H, Zheng L, Ma J, Jiang L, Zhao E, Li H. Folate intake, serum folate levels and esophageal cancer risk: an overall and dose-response meta-analysis. Oncotarget. 2017 Feb 7;8(6):10458-69.	Reason #2
47	Zhu H, Luo H, Zhu X, Hu X, Zheng L, Zhu X. Pyruvate kinase M2 (PKM2) expression correlates with prognosis in solid cancers: a meta-analysis. Oncotarget. 2017 Jan 3;8(1):1628-40.	Reason #2
48	Parry K, Ruurda JP, van der Sluis PC, van Hillegersberg R. Current status of laparoscopic transhiatal esophagectomy for esophageal cancer patients: a systematic review of the literature. Diseases of the Esophagus. 2017;30(1):1-7.	Reason #1
49	Van DD, Honoré P, Collignon J, Polus M, Loly C, Mutijima E, De AR, Coucke PA, Louis E, Martinive P. Comprehensive therapeutic strategy for localized esophageal cancer. Revue medicale de Liege. 2017 Feb;72(2):58-63.	Reason #5
50	Chen HL, Shen WQ, Liu K. Radioactive self-expanding stents for palliative management of unresectable esophageal cancer: a systematic review and meta-analysis. Diseases of the Esophagus. 2017 May 1;30(5):1-6.	Reason #2
51	Luo M, Yang Y, Luo D, Liu L, Zhang Y, Xiao F, Yang J, Zhang C, Fu S, Luo Z. Tumor necrosis factor-alpha promoter polymorphism 308 G/A is not significantly associated with esophageal cancer risk: a meta-analysis. Oncotarget. 2016 Nov 29;7(48):79901-79913.	Reason #1
52	Zhang H, Huang Z, Zou X, Liu T. Bevacizumab and wound-healing complications: a systematic review and meta-analysis of randomized controlled trials. Oncotarget. 2016 Dec 13;7(50):82473-81.	Reason #2
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947	Feng H, Zhao Y, Jing T, Ma J, Zhao Y, Zhang J, Wang C, Li B. Traditional and cumulative meta-analysis: Chemoradiotherapy followed by surgery versus surgery alone for resectable esophageal carcinoma. <i>Molecular and clinical oncology</i> . 2018;8(2):342-51.	Reason # 1
948	Lv HW, Xing WQ, Shen SN, Cheng JW. Induction therapy for clinical stage T2N0M0 esophageal cancer: A systematic review and meta-analysis. <i>Medicine</i> . 2018;97(40): e12651.	Reason # 1
949	Mota FC, Cecconello I, Takeda FR, Tustumi F, Sallum RA, Bernardo WM. Neoadjuvant therapy or upfront surgery? A systematic review and meta-analysis of T2N0 esophageal cancer treatment options. <i>International Journal of Surgery</i> . 2018;54(Pt A):176-181.	Reason # 1
950	Zhang Y, Yang X, Geng D, Duan Y, Fu J. The change of health-related quality of life after minimally invasive esophagectomy for esophageal cancer: a meta-analysis. <i>World journal of surgical oncology</i> . 2018;16(1):97.	Reason # 2
951	Fornaro L, Vasile E, Aprile G, Goetze TO, Vivaldi C, Falcone A, Al-Batran SE. Locally advanced gastro-oesophageal cancer: Recent therapeutic advances and research directions. <i>Cancer treatment reviews</i> . 2018;69:90-100.	Reason # 1
952	Bišof V, Juretić A, Stančić-Rokotov D, Rustemović N, Miletić D, Boban M, Omrčen T, Jakić Razumović J, Pavlović I, Fröbe A, Čonkaš M. Clinical recommendations for diagnosis, treatment and monitoring of patients with esophageal and esophagogastric junction cancers. <i>Liječnički vjesnik</i> . 2016;138(9-10):233-239.	Reason # 5
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954	Coccolini F, Nardi M, Montori G, Ceresoli M, Celotti A, Cascinu S, Fugazzola P, Tomasoni M, Glehen O, Catena F, Yonemura Y. Neoadjuvant chemotherapy in advanced gastric and esophago-gastric cancer. Meta-analysis of randomized trials. <i>International Journal of Surgery</i> . 2018;51:120-27.	Reason # 2
955	Washington, Mk. First comprehensive guideline released for the assessment of HER2 in patients with GEA. <i>MLO: medical laboratory observer</i> . 2017;49(3):30-31.	Reason # 1



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957	Achim F, Constantinoiu S. Recent Advances in Minimally Invasive Esophagectomy. <i>Chirurgia</i> . 2018;113:19-37.	Reason # 1
958	Lai A, Lipka S, Kumar A, Sethi S, Bromberg D, Li N, Shen H, Stefaniwsky L, Brady P. Role of Esophageal Metal Stents Placement and Combination Therapy in Inoperable Esophageal Carcinoma: A Systematic Review and Meta-analysis. <i>Digestive diseases and sciences</i> . 2018;63(4):1025-34.	Reason # 2
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963	Lv GY, Yu Y, An L, Sun XD, Sun DW. Preoperative plasma fibrinogen is associated with poor prognosis in esophageal carcinoma: a meta-analysis. <i>Clinical and Translational Oncology</i> . 2018;20(7):853-861.	Reason # 1
964	Karstens KF, Izbicki JR, Reeh M. Does the Margin Matter in Esophageal Cancer. <i>Digestive surgery</i> . 2018;35(3):196-203.	Reason # 1
965	Takeuchi, H. and Kitagawa, Y.. Sentinel node navigation surgery in esophageal cancer. <i>Annals of gastroenterological surgery</i> 2018; 1–7.	Reason # 6
966	Rubenstein JH, Waljee AK, Dwamena B, Bergman J, Vieth M, Wani S. Yield of Higher-Grade Neoplasia in Barrett's Esophagus With Low-Grade Dysplasia Is Double in the First Year Following Diagnosis. <i>Clinical Gastroenterology and Hepatology</i> . 2018;16(9):1529-1530.	Reason # 1
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968	Visrodia K, Zakko L, Wang KK. Mucosal Ablation in Patients with Barrett's Esophagus: Fry or Freeze?. <i>Digestive diseases and sciences</i> . 2018;63(8):2129-35.	Reason # 1
969	Wang D, Vulcano J, Reddy S, Stein A, Gohel T. Su1135 Cap assisted endoscopic resection versus multiband mucosectomy technique for the management of esophageal cancer: A systematic review and meta-analysis. <i>Gastrointestinal endoscopy</i> 2018. 87(6):AB288-AB289.	Reason # 6
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971	Noordman BJ, Wijnhoven BP, Lagarde SM, Biermann K, van der Gaast A, Spaander MC, Valkema R, van Lanschot JJ. Active surveillance in clinically complete responders after	Reason # 1

	neoadjuvant chemoradiotherapy for esophageal or junctional cancer. Diseases of the Esophagus. 2017;30(12):1-8.	
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974	Lam KO, Kwong DL. Target Therapy for Esophageal Adenocarcinoma. In Esophageal Adenocarcinoma 2018 (pp. 51-65). Humana Press, New York, NY.	Reason # 1
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976	Tomizawa Y, Konda VJ, Coronel E, Chapman CG, Siddiqui UD. Efficacy, Durability, and Safety of Complete Endoscopic Mucosal Resection of Barrett Esophagus. Journal of clinical gastroenterology. 2018;52(3):210-16.	Reason # 4
977	Schlottmann F, Patti MG. Current concepts in treatment of Barrett's esophagus with and without dysplasia. Journal of Gastrointestinal Surgery. 2017;21(8):1354-60.	Reason # 1
978	Du D, Song T, Liang X, Fang M, Wu S. Concurrent chemoradiotherapy with elective lymph node irradiation for esophageal cancer: a systemic review and pooled analysis of the literature. Diseases of the Esophagus. 2017;30(2):12471.	Reason # 1
979	Parry K, Ruurda JP, van der Sluis PC, van Hillegersberg R. Current status of laparoscopic transhiatal esophagectomy for esophageal cancer patients: a systematic review of the literature. Diseases of the Esophagus. 2017;30(1):1-7.	Reason # 1
980	Parasa, S., Desai, M., Duvvuri, A., Fathallah, J., Kennedy, K., and Sharma, P.. Surveillance endoscopy reduces mortality among patients with Barrett's esophagus: A systematic review and meta-analysis. American Journal of Gastroenterology 2017. 112 (Supplement 1) S196-S197.	Reason # 1
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982	Yuan Y, Zeng X, Hu Y, Xie T, Zhao Y. Omentoplasty for oesophagogastrostomy after oesophagectomy. Cochrane Database of Systematic Reviews. 2014;(10):CD008446.	Reason # 2
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984	Ronellenfitch U, Schwarzbach M, Hofheinz R, Kienle P, Kieser M, Slinger TE, Jensen K, Burmeister B, Kelsen D, Niedzwiecki D, Schuhmacher C, Urba S, van de V, Walsh T N, Ychou M. Perioperative chemo(radio)therapy versus primary surgery for resectable adenocarcinoma of the stomach, gastroesophageal junction, and lower esophagus. Cochrane Database of Systematic Reviews. 2013;(5):CD008107.	Reason # 2
985	Shoua B, Gholam S, Patel J, Thangarasu S, Cobos E. 439 extraosseous ewing's sarcoma presenting as a scrotal mass. Journal of Investigative Medicine. 2018;66(1):A248-9.	Reason # 6
986	Soriano TT, Eslick GD, Vanniasinkam T. Long-Term Nutritional Outcome and Health Related Quality of Life of Patients Following Esophageal Cancer Surgery: A Meta-Analysis. Nutrition and cancer. 2018;70(2):192-203.	Reason # 1

987	Schlottmann F, Patti MG, Shaheen NJ. Endoscopic treatment of high-grade dysplasia and early esophageal cancer. World journal of surgery. 2017;41(7):1705-11.	Reason # 1
988	Schlottmann F, Patti MG, Shaheen NJ. From Heartburn to Barrett's Esophagus, and Beyond. World journal of surgery. 2017;41(7):1698-704.	Reason # 1
989	Giwa F, Salami A, Abioye AI. Hospital esophagectomy volume and postoperative length of stay: A systematic review and meta-analysis. The American Journal of Surgery. 2018;215(1):155-162.	Reason # 1
990	Farrell B, Pottie K, Thompson W, Boghossian T, Pizzola L, Rashid FJ, Rojas-Fernandez C, Walsh K, Welch V, Moayyedi P. Deprescribing proton pump inhibitors: Evidence-based clinical practice guideline. Canadian Family Physician. 2017;63(5):354-64.	Reason # 1
991	Wani S, Qumseya B, Sultan S, Agrawal D, Chandrasekhara V, Harnke B, Kothari S, McCarter M, Shaukat A, Wang A, Yang J. Endoscopic eradication therapy for patients with Barrett's esophagus-associated dysplasia and intramucosal cancer. Gastrointestinal endoscopy. 2018;87(4):907-31.	Reason # 1
992	Pannala R, Dayyeh BK, Aslanian HR, Enestvedt BK, Komanduri S, Manfredi M, Maple JT, Navaneethan U, Parsi MA, Smith ZL, Sullivan SA. Per-oral endoscopic myotomy (with video). Gastrointestinal endoscopy. 2016;83(6):1051-60.	Reason # 1
993	Thosani N, Dayyeh BK, Sharma P, Aslanian HR, Enestvedt BK, Komanduri S, Manfredi M, Navaneethan U, Maple JT, Pannala R, Parsi MA. ASGE Technology Committee systematic review and meta-analysis assessing the ASGE Preservation and Incorporation of Valuable Endoscopic Innovations thresholds for adopting real-time imaging-assisted endoscopic targeted biopsy during endoscopic surveillance of Barrett's esophagus. Gastrointestinal endoscopy. 2016;83(4):684-98.	Reason # 1
994	Wang A, Pleskow DK, Banerjee S, Barth BA, Bhat YM, Desilets DJ, Gottlieb KT, Maple JT, Pfau PR, Siddiqui UD, Tokar JL. Esophageal function testing. Gastrointestinal endoscopy. 2012;76(2):231-43.	Reason # 1
995	Visrodia K, Zakko L, Singh S, Leggett CL, Iyer PG, Wang KK. Cryotherapy for persistent Barrett's esophagus after radiofrequency ablation: a systematic review and meta-analysis. Gastrointestinal endoscopy. 2018;87(6): 1396-1404	Reason # 1
996	Boghossian, T. A. et al. Deprescribing versus continuation of chronic proton pump inhibitor use in adults. Cochrane Database Syst Rev 3, CD011969 (2017)	Reason # 2

## Appendix 8. List of potentially relevant trials

A list of ongoing Barrett's Oesophagus studies referenced by Fayter 2010<sup>50</sup>:

S#	Investigator	Start date	Interventions	Status
1	Lovat L	February 2006	ALA-PDT vs Ps PDT to study the side effect profile and to establish measures of efficacy in the eradication of dysplasia in Barrett's oesophagus	Expected end February 2009 – but authors stated that the trial was ongoing; 55 out of 66 patients were recruited by January 2009
2	Nava H	February 2004	PDT in two light regimes for HGD and early cancer	Suspended, no reply to e-mail
3	Reed M	April 1995	ALA-PDT (green light) vs placebo (all patients to take omeprazole)	Finished March 1996, no reply to e-mail
4	Wang K	September 2005	Mucosal resection vs resection+PDT	Recruiting, no reply to e-mail

List of Eligible SRs that should be tracked for emerging trials and results in the future:

Codipilly et al., 2018,<sup>57</sup> assessed effect of endoscopic surveillance in patients with Barrett's Esophagus. In addition to observational studies, it included one ongoing randomized clinical trial, the Barrett's Oesophagus Surveillance Study (BOSS), being conducted in more than 100 hospitals and randomizes 3400 BE patients (1700 in each group: surveillance versus no surveillance). No outcome data was reported from this ongoing trial in this review.

Boghossian et al., 2017<sup>87</sup> was a Cochrane review identified through an excluded clinical practice guideline (CPG).<sup>88</sup> The CPG was excluded because it clearly stated that its recommendations does not apply to those with Barrett's esophagus. The referenced SR was on deprescribing versus continuation of chronic proton pump inhibitor use in adults and one of the populations of interest was patients with Barrett's esophagitis. However, it did not identify any study in this population. As such, no results pertaining the BE patients was provided. The review was excluded but it would need to be tracked in the future for any emerging trials.

Additional note: one CPG, Wani et al., 2018<sup>89</sup>, did not qualify as a systematic review and was excluded. Although the conduct of the evidence based does not meet the inclusion criteria, it addresses endoscopic eradication.

## Appendix 9. Characteristics of primary studies in included reviews.

Author Year, Country	Intervention & Comparator	Participant characteristics				
		Participants	Sex (m/f)	Age	Race	GE
Ackroyd 2000 <sup>66</sup> , NR	<b>Intervention (n=18):</b> Photodynamic therapy with 5-Aminolevulinic acid + Proton pump inhibitor (Omeprazole 20 mg od and laser (green light 514 nm) per 3 cm) <b>Comparator (n=18):</b> Proton pump inhibitor (Omeprazole 20 mg od)	36 individuals with BE and confirmed low grade dysplasia	PDT+PPI: 15/3 PPI: 15/3	<b>median (range) in years</b> PDT+PPI: 56 (30–71) PPI: 54 (42–68)	NR	NR
Ackroyd 2004 <sup>69</sup> , NR	<b>Intervention:</b> Argon plasma coagulation <b>Comparator:</b> Endoscopic surveillance + PPI	40 individuals with BE (2 with LGD) who had undergone antireflux surgery	APC: 15/5 Surveillance: 17/3	<b>median (range) in years</b> APC: 47 (41–57) Surveillance: 51 (38–59)	NR	NR
Bright 2007 <sup>68</sup> , NR <i>(long-term follow-up of patients in Ackroyd 2004)</i>	<b>Intervention (n=20):</b> Post-surgery Argon plasma coagulation (up to 6 treatments) <b>Comparator (n=20):</b> Surveillance with PPI	40 individuals with BE (one with low grade dysplasia) <i>(Almond 2014 includes only LGD)</i>	APC: 15/5 Surveillance: 17/3	<b>median (range) in years</b> APC: 56.5 (43–67) Surveillance: 58.3 (42–79)	NR	NR
Caldwell 1996 <sup>62</sup> , NR <i>(published in abstract)</i>	<b>Intervention:</b> Omeprazole 20 mg od <b>Comparator:</b> Cimetidine 300 mg tds	20 individuals (28 entered the study)	NR	NR	NR	NR
Dulai 2005 <sup>58</sup> , NR	<b>Intervention (n=26):</b> Argon plasma coagulation + pantoprazole 40 mg bd <b>Comparator (n=26):</b> Multipolar electrocoagulation + pantoprazole 40 mg bd pantoprazole inc. if symptomatic or persistent oesophagitis	52 individuals with BE (one with LGD) <i>(Almond 2014 includes only LGD)</i>	APC: 21/5 MPEC: 18/8 or 23/3 <i>(differs in Li and Rees)</i>	<b>mean (SD) in years</b> APC: 58 (11) MPEC: 56 (11)	NR	NR
Hage 2004 <sup>79</sup> , NR	<b>Intervention (n=14):</b> Argon plasma coagulation (65 w) <b>Comparator (n=26):</b> 5-Aminolevulinic acid Photodynamic therapy 60 mg/kg (100 J/cm <sup>2</sup> ) or 5-ALA PDT 60 mg/kg (high dose 100 + 20 J/cm <sup>2</sup> divided) administration regime)	40 individuals: 32 with BE and eight with low grade dysplasia <i>(Almond 2014 includes only LGD)</i>	APC: 11/3 PDT: 20/6	<b>median (range) in years</b> APC: 60 (41–69) PDT: unknown (52–72)	NR	NR
Hage 2005 <sup>78</sup> , NR	<b>Intervention (n=10):</b> Argon plasma coagulation <b>Comparator (n=19):</b> Photodynamic therapy	29 individuals: 16 with IM, five with LGD and eight with HDG	APC: 7/3 PDT: 16/3	<b>median (range) in years</b> APC: 54.5 (37–74) PDT: 59 (44–79)	NR	NR
Heath 2007 <sup>61</sup> , USA	<b>Intervention (n=49):</b> Celecoxib 200 mg twice daily or placebo twice daily for at least a year and a maximum of 2 years <b>Comparator (n=51):</b> Placebo	100 individuals	NR	NR	NR	NR
Kelty 2004a <sup>80</sup> , NR	<b>Intervention (n=37):</b> Argon plasma coagulation (65 W) + Proton pump inhibitor	68 individuals with BE with dysplasia (72 entered the study)	APC + PPI: 30/7 PDT + PPI: 28/7	<b>median (range) in years</b> APC + PPI: 59 (28–79) PDT + PPI: 61 (33–83)	NR	NR

Author Year, Country	Intervention & Comparator	Participant characteristics				
		Participants	Sex (m/f)	Age	Race	GE
	<b>Comparator (n=35):</b> Aminolevulinic acid- Photodynamic therapy (85 J/cm2) + Proton pump inhibitor					
Kelty 2004b <sup>75</sup> , NR <i>(might be a subgroup of Kelty 2004a)</i>	<b>Intervention &amp; Comparator:</b> Aminolevulinic acid- Photodynamic therapy at 30 mg/kg or 60 mg/kg at 4- or 6-hour incubation times or with fractionated illumination	25 individuals without dysplasia	58/14	NR	NR	NR
Mackenzie 2007 <sup>73</sup> , NR <i>(published in abstract)</i>	<b>Intervention &amp; Comparator:</b> Aminolevulinic acid-Photodynamic therapy with varying doses of light and comparing red or green light	72 individuals with HGD	NR	NR	NR	NR
Mackenzie 2008 <sup>72</sup> , NR <i>(published in abstract)</i>	<b>Intervention (n=16):</b> Aminolevulinic acid- Photodynamic therapy 60 mg/kg, activated by 1178 J/cm of red laser light <b>Comparator (n=16):</b> Photodynamic therapy with Porfimer sodium (standard protocol (no more details)) Follow up with quadrantic biopsies every 2 cm at 6 weeks, 4 months and 1 year post-therapy	32 (40 recruited) individuals with HGD	NR	NR	NR	NR
Mackenzie 2009 <sup>74</sup> , NR <i>(full publication of Mackenzie 2007)</i>	<b>Intervention:</b> Aminolevulinic acid- Photodynamic therapy with red light at 30 or 60 mg/kg <b>Comparator:</b> Aminolevulinic acid- Photodynamic therapy with green light at 30 or 60 mg/kg	27 individuals with HGD	NR	NR	NR	NR
Overholt 2005 <sup>67</sup> , NR	<b>Intervention (n=138):</b> Photodynamic therapy (130 J/cm2) after 2 mg/kg porfimer sodium, using diffuser with centring balloon. Focal nodules pretreated with 50 J/cm2 PDT with bare fibre with omeprazole 20 mg bd <b>Comparator (n=70):</b> Proton pump inhibitor (Omeprazole 20 mg bd)	208 individuals with high grade dysplasia	PDT + PPI: 117/21 PPI: 59/11	<b>mean (SD) in years</b> PDT + PPI: 66.1 (10.7) PPI: 67.3 (11.0)	NR	NR
Overholt 2007, NR <i>(combined with Overholt 2005 in Li 2008 as it presents the 5-year follow-up)</i>	As above	As above	As above	As above	NR	NR
Parrilla 2003 <sup>71</sup> , NR	<b>Intervention:</b> Surgery (Short Nissen 56 or Collis Nissen 2) with no acid suppression <b>Comparator:</b> Acid suppression (ranitidine 1982 to 1992 omeprazole 20 mg 1992 to 2000)	101 individuals (113 entered the study): 93 with intestinal metaplasia and eight with low grade dysplasia	Surgery: 39/19 Acid suppression: 33/10	<b>median (range) in years</b> Surgery: 43 (10–71) Acid suppression: 50 (12–78)	NR	NR

Author Year, Country	Intervention & Comparator	Participant characteristics				
		Participants	Sex (m/f)	Age	Race	GE
Peters 1999 <sup>63</sup> , NR	<b>Intervention:</b> Ranitidine 150 mg bd <b>Comparator:</b> Omeprazole 20 mg bd	61 individuals with BE; 53 completed the study	Ranitidine: 20/10 Omeprazole: 23/8	<b>median (range) in years</b> Ranitidine: 56 (51-60.5) Omeprazole: 58 (53.5-62)	NR	NR
Phoa 2014 <sup>76</sup> , The Netherlands	<b>Intervention (n=68):</b> Radio frequency ablation <b>Comparator (n=68):</b> Endoscopic surveillance	136 individuals with LGD	RFA: 55/13 Surveillance: 61/7	<b>mean (SD) in years</b> RFA: 63 (10) Surveillance: 63 (9)	NR	NR
Ragunath 2005 <sup>81</sup> , USA	<b>Intervention (n=13):</b> Argon Plasma Coagulation at a power setting of 65 W and argon gas flow at 1.8 l/min in 1 to 6 sessions (mean 5) <b>Comparator (n=13):</b> Photodynamic therapy performed 48 hours after intravenous injection of porfimer sodium 2 mg/kg with a 630 nm red laser light, 200 J/cm through a PDT balloon in 1 session	26 individuals: 23 with LGD and 3 with HGD  (Almond 2014 includes only LGD)	APC: 13/0 PDT: 11/2	<b>median (range) in years</b> APC: 55 (35-79) PDT: 64 (41-86)	NR	NR
Shaheen 2009 <sup>70</sup> , USA	<b>Intervention (n=78):</b> Radio frequency ablation 40 W/cm <sup>2</sup> and 12 J/cm <sup>2</sup> ; repeat RFA at 2, 4, 9 months if residual BE) + high-dose Proton pump inhibitor (40 mg bd) <b>Comparator (n=39):</b> Sham + high-dose Proton pump inhibitor (40 mg bd)	117 individuals (59 LGD and 58 HGD) (127 enrolled)  (Pandey 2018 and Qumseya 2017 only include patients with LGD (n=64 and n=63))	RFA + PPI: 33/9 Sham + PPI: 18/3  (based on 63 LGD patients in Qumseya 2017)	<b>mean (SD) in years</b> RFA + PPI: 65.9 (1.4) Sham + PPI 64.6 (1.9)  (based on 63 LGD patients in Qumseya 2017)	NR	NR
Sharma 2006 <sup>77</sup> , NR	<b>Intervention (n=16):</b> Multipolar electrocoagulation 20 W continuous power <b>Comparator (n=19):</b> Argon plasma coagulation (60W gas flow 1.4 to 1.8 L/min)	35 individuals (3 with LGD)	34 male 1 female	<b>median (range) in years</b> MPEC: 60 (42-68) APC: 65 (32-84)	NR	NR
van Vilsteren 2011 <sup>59</sup> , The Netherlands/ Germany	<b>Intervention (n=22):</b> focal endoscopic mucosal resection + Radiofrequency ablation <b>Comparator (n=25):</b> stepwise endoscopic mucosal resection	47 individuals with HGD and EAC	f-EMR + RFA: 19/3 s-EMR: 21/4	<b>median (range or IQR*) in years</b> f-EMR + RFA: 69 (55-73) s-EMR: 68 (45-88)	NR	NR
Weinstein 1996 <sup>64</sup> , NR	<b>Intervention:</b> Acid suppression with ranitidine (150 mg bd) for 2 years <b>Comparator:</b> Omeprazole 80 mg for 1 year, then 40 mg in second year	106 individuals with Barrett's esophagus	NR	NR	NR	NR
Zoepf 2003 <sup>82</sup> , NR (published in abstract)	<b>Intervention:</b> Aminolevulinic acid-Photodynamic therapy <b>Comparator:</b> Argon plasma coagulation	20 individuals with mixed levels of dysplasia	NR	NR	NR	NR
Zöpf 2001 <sup>83</sup> , NR	<b>Intervention (n=4):</b> Photodynamic therapy <b>Comparator (n=5):</b> Argon plasma coagulation	9 individuals with LGD	NR	NR	NR	NR

\* it is unclear if this was reported as the range or the IQR

ALA: Aminolevulinic acid; APC: Argon plasma coagulation; BE: Barrett's esophagus; EMR: Endoscopic Mucosal Resection; GE: Other gastro-esophageal conditions; MPEC: Multipolar electrocoagulation; NR: not reported; PDT: Photodynamic Therapy; PPI: Proton Pump Inhibitors; RFA: Radiofrequency Ablation

## Appendix 10. Evaluation of overlap of studies and concordance of results among reviews

Evidence Set	Outcome(s)	Total publications <sup>†</sup>	# index publications	# reviews	CCA	Concordance
2.1	Reduction in area (%) of BE at 12 months	3	2	2	0.5	Yes
3.1	Progression to cancer at latest possible time point (up to 2 years)	2	1	2	1	Yes
3.1	Progression to cancer (at 5 years)	2	1	2	1	Yes
3.1	Progression from IM to dysplasia	2	1	2	1	Yes
3.1	Dysplasia eradication	4	2	2	1	Yes, reasonable overlap across reported data.
3.1	Complete eradication of BE over the course of the study (5 years)	4	2	2	1	Yes
3.1	Reduction in length (cm) of BE at 12 months; Reduction in area (%) of BE at 12 months; Area of regression; Evidence of regression	3	1	3	1	Outcomes measured differently across reviews; Li 2008 and Fayter 2010 are concordant for area of regression.
5.1	Progression to cancer at five years or latest time point; Cumulative progression to EAC over follow up	2	1	2	1	n/a: one review reports on patient subset
5.1	Progression to higher grades of dysplasia; Progression to high-grade dysplasia (Qumseya 2017); Progression to high-grade dysplasia (per patient-year) (among those with LGD); Progression to high-grade dysplasia (Pandey 2018)	3	1	3	1	Outcomes measured differently across reviews but the two reviews that report data in the same way are concordant.
5.1	Complete eradication of dysplasia at 12 months; Complete eradication of dysplasia	2	1	2	1	n/a: one reviews reports on patient subset
6.1	Progression to cancer	2	1	2	1	Yes
6.1	Progression to dysplasia from IM; Progression from non-dysplastic BE to BE with dysplasia	2	1	2	1	Different data reported for intervention group, led to discordant results.
7.1	Eradication of high-grade dysplasia	2	1	2	1	Yes
8.1	Progression to high-grade dysplasia	2	1	2	1	Yes
9.2	Histological complete ablation of BE; Treatment failure (no ablation of BE)	6	2	3	1	Yes, likely but some reporting issues.
10.1	Complete eradication of dysplasia at 12 months (see notes column of the evidence set 10.1 for this outcome that comments on 4 month data)				n/a	1 review
10.1	Complete eradication of dysplasia at 12 months	5	2	4	0.5	Concordance not relevant; patient subset in Almond
10.1	Complete eradication of BE at 12 months; Complete eradication of IM	5	3	3	0.333333	Differences in how information reported makes concordance assessment difficult across all three reviews, but Rees 2010 and Almond 2014 results overlap.



Evidence Set	Outcome(s)	Total publications <sup>†</sup>	# index publications	# reviews	CCA	Concordance
10.1	Reduction in length (cm) of BE at 12 months; BE surface reduction; Length of regression (median) (endoscopic change); Reduction in length	4	3	3	0.1666667	n/a: differences in measurement and reporting preclude assessment
10.1	Stricture formation; Stricture	6	3	3	0.5	n/a: Almond 2014 focused on patient subset (LGD), precluding concordance comparison; unclear if this explains inclusion of one trial only. Other two reviews reported information differently.
11.1	Complete eradication of IM; Complete eradication of IM (end of treatment)	2	1	2	1	Yes (although effect estimates not provided in one study, results are similar)
11.1	Complete eradication of IM with no recurrence at follow- up	2	1	2	1	Yes, although effect estimate available for one, available information similar
11.1	Acute bleeding endoscopically treated; Bleeding	2	1	2	1	Yes

<sup>†</sup> including double counting

BE: Barrett's esophagus; CCA: corrected covered area; IM: Intestinal metaplasia; LGD: Low-grade dysplasia