Colorectal cancer: colonoscopic surveillance for prevention of colorectal cancer in patients with ulcerative colitis, Crohn's disease and polyps

APPENDICES
Part 1

In separate volume:

Appendix 1 – Scope

NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

SCOPE

1 Guideline title

Colorectal cancer: colonoscopic surveillance for prevention of colorectal cancer in patients with ulcerative colitis, Crohn's disease and polyps.

1.1 Short title

Colonoscopic surveillance for colorectal cancer in high-risk groups: inflammatory bowel disease and polyps.

2 The remit

The Department of Health has asked NICE: 'To produce a short clinical guideline on colonoscopic surveillance for patients with ulcerative colitis, Crohn's disease and polyps to prevent colorectal cancer.'

3 Clinical need for the guideline

3.1 Epidemiology

a) Colorectal cancer is the third most common cancer in the UK, with approximately 32,300 new cases diagnosed and 14,000 deaths in England and Wales each year. Around half of people diagnosed with colorectal cancer survive for at least 5 years after diagnosis.

b) Adults with inflammatory bowel disease (IBD: ulcerative colitis or Crohn's disease) or with polyps have a higher risk of developing colorectal cancer than the general population. Colonoscopic surveillance can be used for

people in these high-risk groups to detect any problems early and potentially prevent progression to colorectal cancer.

c) Polyps can be either precancerous (neoplastic adenomas) or non-precancerous (non-neoplastic, including hyperplastic polyps). Strong evidence suggests that detecting and removing adenomas reduces the risk of cancer. Small polyps are rarely malignant and are unlikely to progress to invasive cancers.

d) The prevalence of ulcerative colitis is approximately 100 to 200 per 100,000 and the annual incidence is 10 to 20 per 100,000 respectively. The risk of colorectal cancer for people with ulcerative colitis is estimated as 2% after 10 years, 8% after 20 years and 18% after 30 years of disease.

e) The prevalence of Crohn's disease is 50 to 100 per 100,000 and the annual incidence is 5 to 10 per 100,000. The risk of developing colorectal cancer for people with Crohn's disease is considered to be similar to that for people with ulcerative colitis for the same extent of colonic involvement.

3.2 Current practice

a) In 2002, the British Society of Gastroenterology (BSG) issued guidelines for surveillance after removal of adenomatous polyps. These recommend that the frequency of post-operative surveillance should depend on the size and number of adenomas removed.

b) The 2002 BSG guidance recommended colonoscopic surveillance for IBD should start 8 to 10 years after onset of extensive colitis. They recommended surveillance every 3 years during the 2nd decade of disease, every 2 years for the 3rd decade and annually from the 4th decade onwards. For left-sided disease they recommended colonoscopy should be started after 15 to 20 years of disease and repeated every 5 years, with flexible sigmoidoscopy in the interim years. The guidance

recommended annual surveillance in patients with primary sclerosing cholangitis (PSC) because of their higher risk for colorectal neoplasia.

c) Guidelines from the BSG in 2004 suggested that people with IBD should discuss with their clinical team whether colonoscopic surveillance is appropriate for them but should comply with the 2002 guidelines.

d) Updated BSG Guidelines for polyps and IBD are being developed at the moment but due to variations in current practice, there is a need for an evidence-based national clinical guideline on colonoscopic surveillance in these high-risk groups.

4 The guideline

The guideline development process is described in detail on the NICE website (see section 6, ‘Further information’).

This scope defines what the guideline will (and will not) examine, and what the guideline developers will consider. The scope is based on the referral from the Department of Health.

The areas that will be addressed by the guideline are described in the following sections.

4.1 Population

4.1.1 Groups that will be covered

a) Adults (18 years and older) with IBD (defined as ulcerative colitis or Crohn's disease involving the large bowel).

b) Adults with polyps (including adenomas) in the colon or rectum.

4.1.2 Groups that will not be covered

a) Children (younger than 18 years).

b) Adults with newly diagnosed or relapsed adenocarcinoma of the colon or rectum.

c) Adults with polyps that have previously been treated for colorectal cancer.

d) Adults with a genetic familial - history of colorectal cancer: hereditary non-polyposis colorectal cancer.

e) Adults with a familial history of polyposis syndromes:familial adenomatous polyposis.

4.2 Healthcare setting

a) Primary care.

b) Secondary care.

4.3 Clinical management

4.3.1 Key clinical issues that will be covered

a) Colonoscopic surveillance (using conventional colonoscopy or chromoscopy) for prevention and early detection of colorectal cancer compared with:

- no surveillance
- surveillance using other methods, such as flexible sigmoidoscopy, double-contrast barium enema, computed tomographic colonography,and tri-modal imaging (high resolution white light endoscopy, narrow-band imaging and auto-fluorescence imaging).

b) Initiation of surveillance and the frequency of ongoing surveillance (considering factors including duration and extent of condition, number, size and location of polyps).

c) Information and support needs of people undergoing or considering undergoing colonoscopic surveillance.

4.3.2 Clinical issues that will not be covered

a) Diagnosis and assessment of IBD or polyps.

b) Diagnosis and management of colorectal cancer.

4.4 Main outcomes

a) Progression to colorectal cancer

b) Stage at presentation.

c) Progression or regression of dysplasia at most recent follow-up of IBD.

d) Overall mortality or survival.

e) Reported adverse effects of colonoscopic surveillance techniques.

f) Health-related quality of life (related to colonoscopic surveillance).

g) Resource use and costs.

4.5 Economic aspects

Developers will take into account both clinical and cost-effectiveness when making recommendations involving a choice between alternative interventions. A review of the economic evidence will be conducted and analyses will be carried out as appropriate. The preferred unit of effectiveness is the quality-adjusted life year (QALY), and the costs considered will usually be only from an NHS and personal social services (PSS) perspective. Further detail on the methods can be found in 'The guidelines manual' (see ‘Further information’).

4.6 Status

4.6.1 Scope

This is the consultation draft of the scope. The consultation dates are 28 October to 25 November 2009.

4.6.2 Timing

The development of the guideline recommendations will begin in January 2010.

5 Related NICE guidance

5.1 Published guidance

5.1.1 NICE guidance to be updated

None.

5.1.2 NICE guidance to be incorporated

This guideline will incorporate the following NICE guidance:

- Computed tomographic colonography (virtual colonoscopy). NICE interventional procedure guidance 129 (2005). Available from www.nice.org.uk/IPG129

5.1.3 Other related NICE guidance

- Improving outcomes in colorectal cancer. Cancer service guidance (2004). Available from www.nice.org.uk/CSGCC
- Wireless capsule endoscopy for investigation of the small bowel. NICE interventional procedure guidance 101 (2004). Available from www.nice.org.uk/IPG101

5.2 Guidance under development

NICE is currently developing the following related guidance (details available from the NICE website):

- Diagnosis and management of colorectal cancer. NICE clinical guideline. Publication expected July 2011.
- The management of Crohn's disease. NICE clinical guideline. Publication date to be confirmed.

6 Further information

Information on the guideline development process is provided in:

- 'How NICE clinical guidelines are developed: an overview for stakeholders the public and the NHS'
- 'The guidelines manual'.

These are available from the NICE website (www.nice.org.uk/guidelinesmanual). Information on the progress of the guideline will also be available from the NICE website (www.nice.org.uk).

Appendix 2 –Review questions and review protocol

KEY CLINICAL QUESTIONS

Review question 1:

- Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease (IBD) or polyps clinically effective compared with no surveillance?

Review question 2:

- Which colonoscopic surveillance technique for prevention and/or early detection of colorectal cancer in adults with IBD or polyps is more clinically effective compared with other methods of surveillance?
- Using conventional colonoscopy or chromoscopy?
- Compared to other methods of surveillance (flexible sigmoidoscopy [FSIG], double-contrast barium enema [DCBE], computed tomographic colonography [CTC], tri-modal imaging [high-resolution white light endoscopy, narrow-band imaging and auto-fluorescence imaging])?
- Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer clinically effective compared with colonoscopic surveillance without a dye (conventional colonoscopy)?

Review question 3:

- When should colonoscopic surveillance be started and what should be the frequency of surveillance?

Review question 4:

- What are the information and support needs of people, or carers of people undergoing or considering undergoing colonoscopic surveillance?

Review protocol for colonoscopic surveillance for patients with ulcerative colitis, Crohn's colitis or polyps in the prevention colorectal cancer.

KEY CLINICAL QUESTION 1		
	Details	**Notes and status**
Review question 1	Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease or polyps clinically effective compared with no surveillance?	
Objective(s)	To determine the safety and effectiveness of colonoscopic surveillance in the prevention of colorectal cancer in high risk groups.	
Criteria for considering studies	PICO	
Population	Adults with ulcerative colitis, Crohn's colitis/disease and polyps (including adenomas) in the colon or rectum.	
Intervention(s)	Colonoscopic surveillance using: • conventional colonoscopy or • chromoscopy.	
Comparator(s)	No surveillance	
Outcome(s)	h) Progression to colorectal cancer and stage at presentation. i) Progression or regression of dysplasia/polyps at most recent follow-up in IBD j) Overall mortality and survival k) Reported adverse effects of colonoscopic surveillance techniques. l) Health related quality of life. m) Resource use and costs.	

How to be searched	As per the Guidelines Manual. No additional databases are required. Date restriction: none. Language restriction: English language. Study design: systematic reviews, RCTs and observational studies.	
Review strategy	GRADE profiles	

1

KEY CLINICAL QUESTION 2A		
	Details	**Notes and status**
Review question 2	Which colonoscopic surveillance technique (using conventional colonoscopy) for prevention and/or early detection of colorectal cancer in adults with IBD or polyps is more clinically effective compared with other methods of surveillance (flexible sigmoidoscopy [FSIG], double-contrast barium enema [DCBE], computed tomographic colonography [CTC], tri-modal imaging [high-resolution white light endoscopy, narrow-band imaging [NBI] and auto-fluorescence imaging)?	
Objective(s)	To determine the safety and effectiveness of colonoscopic surveillance compared with other surveillance techniques in the prevention of colorectal cancer in high-risk groups.	
Criteria for considering studies	PICO	
Population	Adults with ulcerative colitis, Crohn's colitis/disease and polyps (including adenomas) in the colon or rectum.	
Intervention(s)	Colonoscopic surveillance using conventional colonoscopy	
Comparator(s)	Surveillance using other methods (flexible sigmoidoscopy [FSIG], double-contrast barium enema [DCBE], computed tomographic colonography [CTC], tri-modal imaging: narrow-band imaging, high-resolution white light endoscopy and auto-fluorescence imaging	
Outcome(s)	n) Progression to colorectal cancer and stage at presentation. o) Progression or regression of dysplasia/polyps at most recent follow up in IBD. p) Overall mortality and survival. q) Reported adverse effects of colonoscopic	

	surveillance techniques. r) Health-related quality of life. s) Resource use and costs.	
How to be searched	As per the Guidelines Manual. No additional databases are required. Date restriction: none. Language restriction: English language. Study design: systematic reviews, RCTs and back-to-back clinical trials.	
Review strategy	GRADE profiles	

1

KEY CLINICAL QUESTION 2B		
	Details	
Review question 2	Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer clinically effective compared with conventional colonoscopy?	
Objective(s)	To determine the safety and effectiveness of colonoscopic surveillance compared with other surveillance techniques in the prevention of colorectal cancer in high-risk groups.	
Criteria for considering studies	PICO	
Population	Adults with ulcerative colitis, Crohn's colitis/disease or polyps (including adenomas) in the colon or rectum.	
Intervention(s)	Colonoscopic surveillance using chromoscopy	
Comparator(s)	Conventional colonoscopy	
Outcome(s)	t)	Progression to colorectal cancer and stage at presentation.
	u)	Progression or regression of dysplasia/polyps at most recent follow-up in IBD.
	v)	Overall mortality and survival.
	w)	Reported adverse effects of colonoscopic surveillance techniques.
	x)	Health-related quality of life.

	y) Resource use and costs.
How to be searched	As per the Guidelines Manual. No additional databases are required. Date restriction: none. Language restriction: English language. Study design: systematic reviews, RCTs and back-to-back clinical trials.
Review strategy	GRADE profiles

1

KEY CLINICAL QUESTION 3		
	Details	**Notes and status**
Review question 3	When should colonoscopic surveillance be started and what should be the frequency of surveillance?	
Objective(s)	To determine when surveillance should be started and how frequently should it be done for the techniques.	
Criteria for considering studies	PICO	
Population	Adults with ulcerative colitis, Crohn's colitis/disease and polyps (including adenomas) in the colon or rectum.	
Intervention(s)	Colonoscopic surveillance using: • conventional colonoscopy or • chromoscopy	To be modified during consultation – remove colonoscopic surveillance terms and insert prognostic studies filter.
Comparator(s)	• No surveillance • Surveillance using other methods (flexible sigmoidoscopy [FSIG], double-contrast barium enema [DCBE], computed tomographic colonography [CTC], tri-modal imaging [high-resolution white-light endoscopy, narrow-band imaging, and auto-fluorescence imaging])	To be modified during consultation – remove colonoscopic surveillance terms and insert prognostic studies filter.
Outcome(s)	z) Factors including: extent and duration of disease, size, number, site and type of polyps/lesions. aa) Progression to colorectal cancer and stage at presentation.	

	bb) Overall mortality and survival.	
How to be searched	As per the Guidelines Manual. No additional databases are required. Date restriction: none. Language restriction: English language. Study design: no study filter.	
Review strategy	GRADE profiles	

1

KEY CLINICAL QUESTION 4		
	Details	**Notes and status**
Review question 4	What are the information and support needs of people or the carers of people undergoing or considering undergoing colonoscopic surveillance?	
Objective(s)	To determine information and support needs for patients and carers.	
Criteria for considering studies	PICO	
Population	Adults with ulcerative colitis, Crohn's colitis/disease and polyps (including adenomas) in the colon or rectum.	
Intervention(s)	Colonoscopic surveillance using: • conventional colonoscopy or • chromoscopy	
Comparator(s)	• No surveillance • Surveillance using other methods (flexible sigmoidoscopy [FSIG], double-contrast barium enema [DCBE], computed tomographic colonography [CTC], tri-modal imaging [high-resolution white light endoscopy, narrow band imaging and auto-fluorescence imaging])	
Outcome(s)	• Patient satisfaction • Patient experience • Reported adverse effects of colonoscopic surveillance techniques	
How to be searched	As per the Guidelines Manual. No additional databases are required. Date restriction: none. Language restriction: English language. Study design: all study types; especially qualitative studies.	
Review strategy	Meta-thematic analysis	

2

Appendix 3 – Results of GDG short questionnaires

Short Questionnaire for GDG

Name: _____

Position: _____

Affiliation: _____

SECTION A: CLINICAL MANAGEMENT

***Question A1a**: Is it appropriate to group ulcerative colitis and Crohn's disease together as inflammatory bowel disease and consider one pathway for colonoscopic surveillance for them?*

***Question A1b:** In addition to the specified subgroups, are there any additional sub-groups that should be considered separately (if evidence is available)?*

***Question A2:** Is it appropriate to consider all people with polyps and produce guidance for all sub-groups instead of just focusing on adenomas?*

***Question A3:** The comparators that will be considered are flexible sigmoidoscopy (FSIG), double-contrast barium enema (DCBE), computed tomographic colonography (CTC), tri-modal imaging (high resolution white light endoscopy, narrow-band imaging and auto-fluorescence imaging). Are there any surveillance*

techniques that are commonly used for these high-risk groups that have not been covered as comparators?

END OF QUESTIONNAIRE

THANK YOU FOR YOUR TIME

Results

Question A1a: Is it appropriate to group ulcerative colitis and Crohn's disease together as inflammatory bowel disease and consider one pathway for colonoscopic surveillance for them?		Question A1b: In addition to the specified subgroups, are there any additional sub-groups that should be considered separately (if evidence is available)?
GDG1	Yes	No
GDG2	The diseases behave differently but are both associated with an increased risk of cancer. Emphasis needs to be placed on Crohn's colitis not Crohn's elsewhere.	After surgery – surveillance of transitional zones and retained rectal stumps
GDG3	At the moment Crohn's and colitis are put together and the treatment is similar i.e. same drugs used. Although some drugs help Crohn's and not colitis at all. They could follow the same pathway to some extent but the Colonoscopic surveillance must be tailored to the severity not just the condition.	-
GDG4	Yes	No
GDG5	Yes, particularly as some cases remain IBD unclassified. Initially it will probably be best to consider IBD as a whole, but that does not mean that there may not be differences in the final recommendations for each disease.	-
GDG6	Yes (note that it's only Crohn's patients with Crohn's colitis who are at risk though)	-
GDG7	My view would be that if the evidence suggests different outcomes for each condition then there ought to be separate pathways otherwise one pathway would be easier to follow.	-
GDG8	We should consider one pathway for colonoscopic surveillance for them. However, depending on the severity of Crohn's disease it might be more appropriate for those with ulcerative colitis to have more frequent or intensive surveillance but still working towards the same pathway	People on immuno suppression with a strong family history of cancer or those with large colorectal adenomas should also be dealt with centrally.
GDG9	Probably not.	-
SUMMARY: Most members are happy with considering one pathway for inflammatory bowel disease (IBD) combining ulcerative colitis and Crohn's colitis. If evidence is available for post surgery (partial resection) for IBD, or for immunosuppressed individuals or those with a family history separately, the sub-group will be considered.		

Question A2: Is it appropriate to consider all people with polyps and produce guidance for all sub-groups instead of just focusing on adenomas?	
GDG1	This is the area of concern, there is great confusion between the different types of polyps and the individual follow-up requirements. As often the person receiving information will be frequently unaware of the difference between certain kinds of polyps the advice needs to be clear.ie. many of the polyps identified will be hyperplastic and usually require no further surveillance. The number, size and differentiation of the adenomas will determine the follow-up protocol. This is well described in the BSG guidelines.
GDG2	There is published guidance from BSG on polyp surveillance including familial risks and metaplastic polyps It is my opinion that NICE should read this guidance then accept it as it stands and not reinvent the wheel.
GDG3	No – Some polyps which are very common in the bowel are not connected to IBD. Focusing on Adenomas and persons with multiple polyps should have definite guidelines of care. I.e. Colonoscopic surveillance every so many years etc.
GDG4	Yes
GDG5	Yes. I think that would clarify the situation and prepare for changes in the longterm as more data becomes available (e.g. hyperplastic/serrated polyps remain an important grey area at the moment and really need some management guidelines. Solitary Peutz-Jegher polyps and juvenile polyps may also be worth considering).
GDG6	Within polyps cohort, focus will be on adenomas, but comments on other polyp types would be worthwhile Consider covering other surveillance cohorts too – post-colorectal cancer surgery (easy); family history of cancer/ polyposis (complex)
GDG7	-
GDG8	We should look at people with all polyps as adenomas or only a small fraction of polyps.
GDG9	I think guidance should be produced for all groups, but there is still very little data on the subject.
SUMMARY: Most members feel that the different sub-groups for polyps should be considered separately if possible and guidance given accordingly. We will consider all sub-groups but data may not be available for all.	

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Question A3: The comparators that will be considered are flexible sigmoidoscopy (FSIG), double-contrast barium enema (DCBE), computed tomographic colonography (CTC), tri-modal imaging (high resolution white light endoscopy, narrow-band imaging and auto-fluorescence imaging). Are there any surveillance techniques that are commonly used for these high-risk groups that have not been covered as comparators?	
GDG1	Not within imaging.
GDG2	Rigid sigmoidoscopy may be appropriate for a select group.
GDG3	Colonoscopy
GDG4	Colonoscopy
GDG5	-
GDG6	Presumably the above are being compared against colonoscopy. Chromoendoscopy (pan-colonic dye-spraying) needs to be considered too. Other option is "no surveillance"
GDG7	-
GDG8	Flexible Sigmoidoscopy, double contrast enema, colonoscopy, tri-modal imaging, narrow-band imaging, auto-fluorescence imaging, standard CT scan of abdomen should all be used
GDG9	No.
SUMMARY: As per the scope we will be considering colonoscopy and chromoendoscopy as interventions and comparing them to the above listed comparators. Rigid sigmoidoscopy has not been included in this guideline, but as the searches were wide enough to catch any relevant studies for this population using rigid sigmoidscopy.	

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Appendix 4 – Lists of excluded studies

Databases covered for systematic searches

- MEDLINE/MEDLINE In-Process
- EMBASE
- CINAHL (Cumulative Index to Nursing and Allied Health Literature)
- Cochrane Database of Systematic Reviews – CDSR (Cochrane reviews)
- Database of Abstracts of Reviews of Effects – DARE (other reviews)
- Cochrane Central Register of Controlled Trials – CENTRAL (clinical trials)
- Health Technology Assessment (HTA) database (technology assessments)

6.1 Review question 1:

Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease (IBD) or polyps clinically effective compared with no surveillance?

6.1.1 Eligibility criteria

Inclusion criteria

- Population
  - Adults (18 years and older) with IBD (defined as ulcerative colitis or Crohn's disease involving the large bowel).
  - Adults with polyps (including adenomas) in the colon or rectum.
- Intervention
  - Colonoscopic surveillance for prevention and early detection of colorectal cancer.
- Comparators
  - No surveillance.
- Study Design
  - Systematic reviews, RCTs, observational studies.

Exclusion criteria

- Population
  - Children (younger than 18 years).

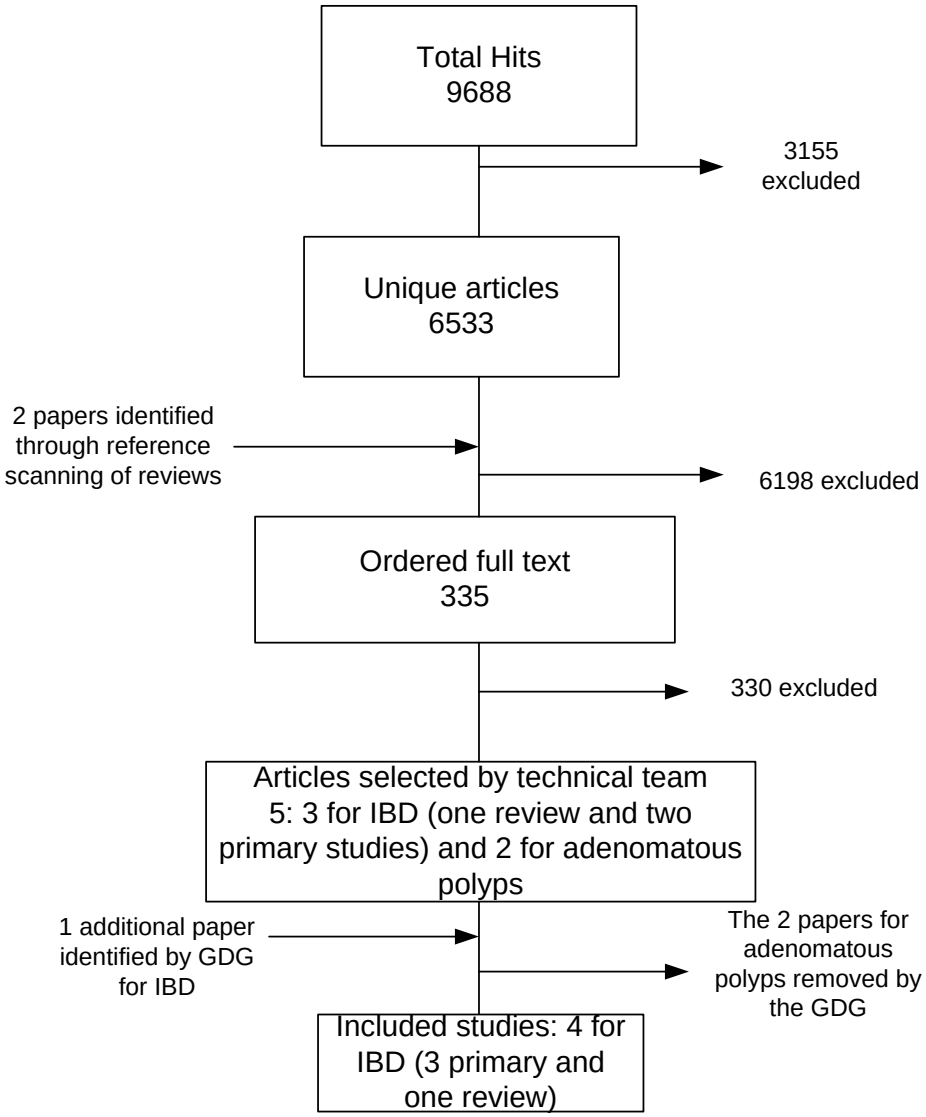
  - Adults with newly diagnosed or relapsed adenocarcinoma of the colon or rectum.
  - Adults with polyps that have previously been treated for colorectal cancer.
  - Adults with a genetic familial history of colorectal cancer: hereditary non-polyposis colorectal cancer.
  - Adults with a familial history of polyposis syndromes: familial adenomatous polyposis.
- Intervention
  - Diagnosis and assessment of IBD or polyps.
  - Diagnosis and management of colorectal cancer.
- Comparators
  - Comparators other than no surveillance.
- Study Design
  - Case series and any single arm uncontrolled studies.

6.1.2 Evidence review results

- Initial 9688 hits including duplicates
- Total of 6533 unique articles
- Additional articles found via daisy chaining: 2
- Excluded on the basis of title and abstract: 6198
- Articles ordered full text: 335

Articles selected for review based on inclusion and exclusion criteria were 2 primary studies for IBD and 2 primary studies for adenomatous polyps. The guideline development group (GDG) felt that the two papers selected for adenomatous polyps were incorrectly selected and were then removed from the review by the technical team. The Group also referred to a new article (Lutgens et al., 2009) that was published in December 2009, which met the inclusion criteria for IBD and was added to the analysis. As the literature searches were done in October 2009, this paper was not identified by the technical team.

6.1.3 Review flow chart



6.1.4 Included studies for people with IBD

Choi PM, Nugent FW, Schoetz DJ et al. (1993) Colonoscopic surveillance reduces mortality from colorectal cancer in ulcerative colitis. Gastroenterology 105: 418–24.

Collins PD, Mpofu C, Watson AJ et al. (2006) Strategies for detecting colon cancer and/or dysplasia in patients with inflammatory bowel disease [update of Cochrane Database Syst Rev. 2004;(2):CD000279; PMID: 15106148]. [Review] [90 refs]. Cochrane Database of Systematic Reviews: CD000279.

Lashner BA, Kane SV, Hanauer SB (1990) Colon cancer surveillance in chronic ulcerative colitis: Historical cohort study. American Journal of Gastroenterology 85: 1083–7.

Lutgens MWMD, Oldenburg B, Siersema PD et al. (2009) Colonoscopic surveillance improves survival after colorectal cancer diagnosis in inflammatory bowel disease. British Journal of Cancer 101: 1671–5.

6.1.5 Included studies for people with adenomatous polyps

None.

6.1.6 Excluded studies

Colon cancer. Regular screenings could save your life. [Review] [0 refs]. 20000630. Mayo Clinic Health Letter Suppl, 1-8. 2000. MEDLINE. EXC - Medical essay on colon cancer. No references

Population screening for colorectal cancer. Drug and Therapeutics Bulletin 44[9], 65-68. 2006. EXC - Narrative review on population-wide screening (excluded at title and abstract)

Reproducibility of colonoscopic findings in Crohn's disease: a prospective multicenter study of interobserver variation. Groupe d'Etudes Therapeutiques des Affections Inflammatoires du Tube Digestif (GETAID). 19880202. Digestive Diseases & Sciences 32[12], 1370-1379. 1987. MEDLINE. EXC - reproducibility of colonscopic findings in Crohn's disease

Ulcerative colitis and colon carcinoma: epidemiology, surveillance, diagnosis, and treatment. The Society for Surgery of the Alimentary Tract, American Gastroenterological Association American Society for Liver Diseases, American Society for Gastrointestinal Endoscopy, American Hepato-Pancreato-Biliary Association. [Review] [0 refs]. 19990120. Journal of Gastrointestinal Surgery 2[4], 305-306. 1998. MEDLINE. EXC - Discussion and summary from a consensus panel

Ahluwalia, J. S., Miser, W. F., and Bova, J. G. Virtual colonoscopy: what is its role in cancer screening?. [Review] [37 refs]. 20070808. Journal of Family Practice 56[3], 186-191. 2007. MEDLINE. EXC - Narrative review on CTC versus colonoscopy

Ahmad, N. A. and Hoops, T. C. The role of colonoscopy for screening of colorectal cancer. [Review] [55 refs]. 20010208. Seminars in Roentgenology 35[4], 404-408. 2000. MEDLINE. EXC - Narrative review - references checked

Ahmadi, A., Polyak, S., and Draganov, P. V. Colorectal cancer surveillance in inflammatory bowel disease: The search continues. World Journal of Gastroenterology 15[1], 61-66. 2009. EXC - Narrative review - references checked

Ahnen, D. J. Controlled clinical trials: The controls are the key. Gastroenterology 110[2], 628-630. 1996. EXC - Narrative review - references checked

Albert, M. B. and Nochomovitz, L. E. Dysplasia and cancer surveillance in inflammatory bowel disease. [Review] [76 refs]. 19890420. Gastroenterology Clinics of North America 18[1], 83-97. 1989. MEDLINE. EXC - Discussion on technical identification of dysplasia and surveillance of IBD - references checked

Allen, J. E. Not quite in a comfort zone. Los Angeles Times -- Southern California Edition (Front Page) , F1. 9-12-2003. EXC - New paper article about colorectal screenings

Almeida, F. F., Araujo, S. E., Santos, F. P., Franco, C. J., Santos, V. R., Nahas, S. C., and Habr-Gama, A. Colorectal cancer screening. [Review] [26 refs]. 20000906. Revista do Hospital Das Clinicas; Faculdade de Medicina da Universidade de Sao Paulo 55[1], 35-42. 2000. MEDLINE. EXC - Narrative review - references checked

Amonkar, M. M., Hunt, T. L., Zhou, Z., and Jin, X. Surveillance patterns and polyp recurrence following diagnosis and excision of colorectal polyps in a medicare population. Cancer Epidemiology Biomarkers and Prevention 14[2], 417-421. 2005. EXC - Surveillance patterns and polyp recurrence

Anderson, J. Clinical practice guidelines: Review of the recommendations for colorectal screening. Geriatrics 55[2], 67-73. 2000. EXC - Review of the recommendations for colorectal screening

Armbrecht, U. Endoscopic screening in the prevention of colorectal cancer. 20010906. European Journal of Cancer Prevention 10[2], 169-172. 2001. MEDLINE. EXC - Discussion paper on colorectal cancer surveillance and guidelines

Atkin, W. Options for screening for colorectal cancer. Scandinavian Journal of Gastroenterology, Supplement 38[237], 13-16. 2003. EXC - Discussion paper on CRC screening

Avidan, B., Sonnenberg, A., Schnell, T. G., Huang, C. S., and Farraye, F. A. What is the appropriate interval for repeat colonoscopy in patients with and without adenomatous polyps found on screening colonoscopy? Evidence-Based Gastroenterology 3[3], 90-91. 2002. EXC - To identify risk factors associated with recurrence of colorectal adenoma

Awais, D., Siegel, C. A., and Higgins, P. D. Modelling dysplasia detection in ulcerative colitis: clinical implications of surveillance intensity. Gut 58[11], 1498-1503. 2009. In-Process. EXC - Mathemateical modelling to check for dysplasia

Axon, A. T. R. Screening and surveillance of ulcerative colitis. Gastrointestinal Endoscopy Clinics of North America 7[1], 129-145. 1997. EXC - Narrative review: ref checked

Baba, R., Nagasako, K., Yashiro, K., Sato, S., Suzuki, S., and Obata, H. Colonoscopic follow-up study after polypectomy. Digestive Endoscopy 4[4], 355-359. 1992. EXC - Follow up

Bader, J.-P. Screening of colorectal cancer. Digestive Diseases and Sciences 31[9 SUPPL.], 43S-56S. 1986. EXC - Discussion on screening of CRC: familial cases, FOBT, risk, cost effectiveness

Bampton, P. A., Sandford, J. J., and Young, G. P. Applying evidence-based guidelines improves use of colonoscopy resources in patients with a moderate risk of colorectal neoplasia.[see comment]. 20020402. Medical Journal of Australia 176[4], 155-157. 18-2-2002. MEDLINE. EXC - Applying evidence-based guidelines

Barkun, A. N., Jobin, G., Cousineau, G., Dube, S., Lahaie, R., Pare, P., Stein, B., and Wassef, R. The Quebec Association of Gastroenterology position paper on colorectal cancer screening - 2003. Canadian Journal of Gastroenterology 18[8], 509-519. 2004. EXC - Guidelines from Quebec - references checked

Barthet, M. and Grimaud, J.-C. Place of endoscopy in the screening of colic cancer in IBD. [French, English]. Acta Endoscopica 36[5], 701-711. 2006. EXC - Narrartive review - excluded at title and abstract

Bauer, W. M. and Lashner, B. A. What is the optimal strategy for colon cancer surveillance in patients with ulcerative colitis?. [Review] [10 refs]. 19990601. Cleveland Clinic Journal of Medicine 66[5], 273. 19-6-0277. MEDLINE. EXC - optimal strategy for colon cancer surveillance in ulcerative colitis [Review] [10 refs]

Bauerfeind, P. Colon tumors and colonoscopy. Endoscopy 33[11], 949-960. 2001. EXC - Narrative review - references checked

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Rabeneck, L., Rumble, R. B., Axler, J., Smith, A., Amrstrong, D., Vinden, C., Belliveau, P., Rhodes, K., Zwaal, C., Mai, V., and Dixon, P. Cancer Care Ontario Colonoscopy Standards: Standards and evidentiary base. Canadian Journal of Gastroenterology 21[SUPPL. D], 5D-24D. 2007. EXC - Candian guidelines on CRC

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Rex, D. Detection of neoplasia at colonoscopy: What next? Endoscopy 40[4], 333-335. 2008. EXC - Discussion paper on surveillance post colonoscopy

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Rex, D. K. Colonoscopy turning the focus on quality. Digestive and Liver Disease 34[12], 831-832. 2002. EXC - Discussion paper on colonoscopy

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Rex, D. K. Colorectal cancer screening: A guide to the guidelines. Canadian Journal of Gastroenterology 13[5], 397-402. 1999. EXC - Narative review on guidelines

Rex, D. K. and Goldblum, J. R. Pro: Villous elements and high-grade dysplasia help guide post-polypectomy colonoscopic surveillance.[see comment]. [Review] [4 refs]. 20080729. American Journal of Gastroenterology 103[6], 1327-1329. 2008. MEDLINE. EXC - Narrartive review - excluded at title and abstract

Rex, D. K., Talley, N. J., Katz, P. O., Hanauer, S. B., and Sandborn, W. J. Report from the ACG: Highlights of the 71st Annual Scientific Meeting of the American College of Gastroenterology, October 20-25, Las Vegas, NV. Reviews in Gastroenterological Disorders 6[4], 227-242. 2006. EXC - Summary from the ACG 2006

Rex, D. K., Winawer, S. J., Laiyemo, A. O., Lanza, E., and Schatzkin, A. Should we shorten or lengthen postpolypectomy surveillance intervals?... Laiyemo AO, Murphy G, Albert PS, et al. Postpolypectomy colonoscopy surveillance guidelines: predictive accuracy for advanced adenoma at 4 years. Ann Intern Med. 2008;148:419-26. [PMID: 18347350]. Annals of Internal Medicine 149[5], 360-361. 2-9-2008. EXC - Editorial paper

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Rockey, D. C., Gupta, S., Matuchansky, C., Sutradhar, R., Paszat, L., Rabeneck, L., Johnson, C. D., Chen, M., and Toledano, A. Y. Accuracy of CT colonography for colorectal cancer screening... Johnson CD, Chen M-H, Toledano AY, et al. Accuracy of CT colonography for detection of large adenomas and cancers. N Engl J Med 2008;359:1207-17. New England Journal of Medicine 359[26], 2842-2844. 25-12-2008. EXC- Accuracy of CTC for CRC screening

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Ross, C. C. Screening for colorectal cancer.[see comment]. [Review] [25 refs]. 19890112. American Family Physician 38[6], 105-114. 1988. MEDLINE. EXC - Screening for colorectal cancer[Review] [25 refs] Ref checked

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Rozen, P., Baratz, M., Fefer, F., and Gilat, T. Low incidence of significant dysplasia in a successful endoscopic surveillance program of patients with ulcerative colitis. Gastroenterology 108[5], 1361-1370. 1995. EXC - endoscopic surveillance with low incidence of significant dysplasia

Rubenstein, J. H., Waljee, A. K., Jeter, J. M., Velayos, F. S., Ladabaum, U., and Higgins, P. D. R. Cost effectiveness of ulcerative colitis surveillance in the setting of 5-aminosalicylates. American Journal of Gastroenterology 104[9], 2222-2232. 2009. EXC - Cost effectiveness of UC surveillance in the setting of 5-aminosalicylates

Rubin, D. T. and Kavitt, R. T. Surveillance for Cancer and Dysplasia in Inflammatory Bowel Disease. Gastroenterology Clinics of North America 35[3], 581-604. 2006. EXC - Narrative review of surveillance for IBD and current guidelines - references checked

Rubin, P. H. Adenomas in ulcerative colitis: endoscopic polypectomy or colectomy?. [Review] [5 refs]. 19991221. Inflammatory Bowel Diseases 5[4], 304-305. 1999. MEDLINE. EXC - endoscopic polypectomy or colectomy?. [Review] [5 refs]

Rutter, M. D., Saunders, B. P., Wilkinson, K. H., Schofield, G., and Forbes, A. Intangible costs and benefits of ulcerative colitis surveillance: A patient survey. Diseases of the Colon and Rectum 49[8], 1177-1183. 2006. EXC - cost and benefits of ulcerative colitis

Rutter, M. D., Saunders, B. P., Wilkinson, K. H., Kamm, M. A., Williams, C. B., and Forbes, A. Most dysplasia in ulcerative colitis is visible at colonoscopy. Gastrointestinal Endoscopy 60[3], 334-339. 2004. EXC - Single arm surveillance study for UC

Rutter, M. D., Saunders, B. P., Wilkinson, K. H., Rumbles, S., Schofield, G., Kamm, M. A., Williams, C. B., Price, A. B., Talbot, I. C., and Forbes, A. Thirty-Year Analysis of a Colonoscopic Surveillance Program for Neoplasia in Ulcerative Colitis. Gastroenterology 130[4], 1030-1038. 2006. EXC - Thirty-Year Analysis of a Colonoscopic Surveillance Program: no comparative arm

Sampliner, R. E. and Garewal, H. S. Endoscopic polypectomy reduces mortality from colorectal cancer. Archives of Internal Medicine 155[16], 1711-1712. 11-9-1995. EXC - Discussion paper on colorectal polypectomy

Sanchez, W., Harewood, G. C., and Petersen, B. T. Evaluation of polyp detection in relation to procedure time of screening or surveillance colonoscopy. American Journal of Gastroenterology 99[10], 1941-1945. 2004. EXC - Single arm - studying the procedure of surveillance

Sanduleanu, S. and Stockbrugger, R. W. Screening for Colorectal Cancer: Medical and Economic Aspects. Scandinavian Journal of Gastroenterology, Supplement 38[239], 73-77. 2003. EXC - Narrative review on coloerctal surveillance and costs - references checked

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Saunders, B. P. Colon tumours and colonoscopy. Endoscopy 37[11], 1094-1097. 2005. EXC - Discussion paper on colonoscopy

Schoen, R. E. The case for population-based screening for colorectal cancer. [Review] [54 refs]. 20020416. Nature Reviews Cancer.[1], 65-70. 2002. MEDLINE. EXC - Discussion paper on population wide colorectal screening

Schuman, B. M. Premalignant lesions of the gastrointestinal tract. Surveillance regimens for three treatable disorders. [Review] [13 refs]. 19920318. Postgraduate Medicine 91[2], 219-222. 19-6-2000. MEDLINE. EXC - Narrartive review - excluded at title and abstract

Scotiniotis, I., Lewis, J. D., and Strom, B. L. Screening for colorectal cancer and other GI cancers. Current Opinion in Oncology 11[4], 305-311. 1999. EXC - FOBT, HNPCC, hepatocellular ca

Seow, C. H., Ee, H. C., Willson, A. B., and Yusoff, I. F. Repeat colonoscopy has a low yield even in symptomatic patients. Gastrointestinal Endoscopy 64[6], 941-947. 2006. EXC - To be used for RQ3

Shanahan, F. and Quera, R. CON: surveillance for ulcerative colitis-associated cancer: time to change the endoscopy and the microscopy.[see comment][comment]. [Review] [36 refs]. 20041007. American Journal of Gastroenterology 99[9], 1633-1636. 2004. MEDLINE. EXC - Narative review: ref checked

Sherlock, P., Lipkin, M., and Winawer, S. J. The prevention of colon cancer. [Review] [112 refs]. 19800825. American Journal of Medicine 68[6], 917-931. 1980. MEDLINE. EXC - Narrative review - references checked

Shinya, H. and Wolff, W. I. Colonoscopy. [Review] [32 refs]. 19760901. Surgery Annual 8, 257-295. 1976. MEDLINE. EXC - Narrartive review - excluded at title and abstract

Solomon, M. J. and Schnitzler, M. Cancer and inflammatory bowel disease: Bias, epidemiology, surveillance, and treatment. World Journal of Surgery 22[4], 352-358. 1998. EXC - Discussion paper on the risk of CRC in IBD

Spiro, H. M. Surveillance for colonic polyps. [Review] [23 refs]. 19880908. Mount Sinai Journal of Medicine 55[3], 251-255. 1988. MEDLINE. EXC - Surveillance for colonic polyps. [Review] [23 refs]

St.John, D. J. B. Screening for rectal cancer. Hepato-Gastroenterology 47[32], 305-309. 2000. EXC - Screening for rectal cancer

Stern, M. A., Fendrick, A. M., McDonnell, W. M., Gunaratnam, N., Moseley, R., and Chey, W. D. A randomized, controlled trial to assess a novel colorectal cancer screening strategy: the conversion strategy--a comparison of sequential sigmoidoscopy and colonoscopy with immediate conversion from sigmoidoscopy to colonoscopy in patients with an abnormal screening sigmoidoscopy. 20000830. American Journal of Gastroenterology 95[8], 2074-2079. 2000. MEDLINE. EXC - Included in RQ2

Stevenson, G. Screening for colorectal cancer and suspected lower gastrointestinal bleeding. Abdominal Imaging 20[4], 381-383. 1995. EXC - Discussion paper on colonoscopy

Stoffel, E. M., Turgeon, D. K., Stockwell, D. H., Normolle, D. P., Tuck, M. K., Marcon, N. E., Baron, J. A., Bresalier, R. S., Arber, N., Ruffin, M. T., Syngal, S., Brenner, D. E., and Great Lakes New England Clinical Epidemiology and Validation Center of the Early Detection Research Network. Chromoendoscopy detects more adenomas than colonoscopy using intensive inspection without dye spraying.[see comment]. 20090318. Cancer Prevention Research 1[7], 507-513. 2008. MEDLINE. EXC - To be used for RQ2

Sugarbaker, P. H. Endoscopy in cancer diagnosis and management. Hospital Practice 19[11], 111-122. 1984. EXC - Discussion paper on the technique of endoscopy

Suzuki, K., Muto, T., Shinozaki, M., Higuchi, Y., Sawada, T., and Saito, Y. Results of cancer surveillance in ulcerative colitis. Journal of Gastroenterology 30[SUPPL. 8], 40-42. 1995. EXC - No comparative arm

Tereschuk, D. and Paulk, D. Colorectal cancer screening modalities, guidelines, and a look at the future. [Review] [11 refs]. 20020920. JAAPA 15[6], 22-28. 2002. MEDLINE. EXC - Review article: ref checked

Thomas, T., Nair, P., Dronfield, M. W., and Mayberry, J. F. Management of low and high-grade dysplasia in inflammatory bowel disease: The gastroenterologists' perspective and current practice in

the United Kingdom. European Journal of Gastroenterology and Hepatology 17[12], 1317-1324. 2005. EXC - Management of low and high-grade dysplasia in IBD

Togashi, K., Hewett, D. G., Radford-Smith, G. L., Francis, L., Leggett, B. A., and Appleyard, M. N. The use of indigocarmine spray increases the colonoscopic detection rate of adenomas. 20091001. Journal of Gastroenterology 44[8], 826-833. 2009. MEDLINE. EXC - To be used for RQ2

Tolliver, K. A. and Rex, D. K. Colonoscopic polypectomy. [Review] [60 refs]. 20080612. Gastroenterology Clinics of North America 37[1], 229-251. 20-1-2008. MEDLINE. EXC- Narrative review

Triantafillidis, J. K. Screening and prevention of colorectal cancer. Annals of Gastroenterology 19[2], 108-109. 2006. EXC - Discussion paper on colorectal cancer screening

Tsianos, E. V. Risk of cancer in inflammatory bowel disease (IBD). European Journal of Internal Medicine 11[2], 75-78. 2000. EXC - Discussing risk and natural history of IBD

Turunen, M. J. and Jarvinen, H. J. Cancer in ulcerative colitis: what failed in follow-up? 19860404. Acta Chirurgica Scandinavica 151[8], 669-673. 1985. MEDLINE. EXC - Case series with malignancies

Ullman, T., Odze, R., and Farraye, F. A. Diagnosis and management of dysplasia in patients with ulcerative colitis and Crohn's disease of the colon. Inflammatory Bowel Diseases 15[4], 630-638. 2009. EXC - Diagnosis and management of dysplasia in pts with UC and CD

Ullman, T. A. Colonoscopic surveillance in inflammatory bowel disease. Current Opinion in Gastroenterology 21[5], 585-588. 2005. EXC - Review on Colonoscopic surveillance in IBD

Ullman, T. A. Preventing neoplastic progression in ulcerative colitis. [Review] [48 refs]. 20050711. Journal of Clinical Gastroenterology 39[4:Suppl 2], Suppl-9. 2005. MEDLINE. EXC - Review on preventing neoplastic progression in UC

Vainio, H. and Miller, A. B. Primary and Secondary Prevention in Colorectal Cancer. Acta Oncologica 42[8], 809-815. 2003. EXC - Narrative review - excluded at title and abstract

Vajnar, J. Diagnostic imaging review. 20071113. JAAPA 20[4], 64. 20-1-2966. MEDLINE. EXC - Diagnostic imaging review

Van Dam, J. Prevention of colorectal cancer by endoscopic polypectomy. Annals of Internal Medicine 123[12], 949-950. 15-12-1995. EXC - Discussion paper on preventiong colorectal cancer by endoscopic polypectomy

van den Broek, F. J. C., Fockens, P., Van, Eeden S., Reitsma, J. B., Hardwick, J. C. H., Stokkers, P. C. F., and Dekker, E. Endoscopic tri-modal imaging for surveillance in ulcerative colitis: Randomised comparison of high-resolution endoscopy and autofluorescence imaging for neoplasia detection; and evaluation of narrow-band imaging for classification of lesions. Gut 57[8], 1083-1089. 2008. EXC - To be used for RQ2

Vemulapalli, R. and Lance, P. Cancer surveillance in ulcerative colitis: More of the same or progress? Gastroenterology 107[4], 1196-1199. 1994. EXC - Narative review: ref checked

Wallace, M. B. Improving colorectal adenoma detection: technology or technique?. [Review] [14 refs]. 20070517. Gastroenterology 132[4], 1221-1223. 2007. MEDLINE. EXC - Discussing clinical techniques of surveillance

Waye, J. D. and Braunfeld, S. Surveillance intervals after colonoscopic polypectomy. 19820722. Endoscopy 14[3], 79-81. 1982. MEDLINE. EXC - Risk of missing an adenoma

Wayne, J. It ain't over 'til it's over: retrieval of polyps after colonoscopic polypectomy. Gastrointestinal Endoscopy 62[2], 257-259. 2005. EXC - Discussion paper on histological study of resected polyps

Weller, D. A. and Schutz, S. M. The Norwegian guidelines for surveillance after polypectomy: 10-year intervals. 19980105. Gastrointestinal Endoscopy 46[5], 476-477. 1997. MEDLINE. EXC - Norwegian guidelines on surveillance post polypectomy

Whelan, G. Ulcerative colitis--what is the risk of developing colorectal cancer?. [Review] [43 refs]. 19910624. Australian & New Zealand Journal of Medicine 21[1], 71-77. 1991. MEDLINE. EXC - risk of developing colorectal cancer [Review] [43 refs]

Wilkins, T., LeClair, B., Smolkin, M., Davies, K., Thomas, A., Taylor, M. L., and Strayer, S. Screening colonoscopies by primary care physicians: a meta-analysis.[erratum appears in Ann Fam Med. 2009 Mar-Apr;7(2):181]. [Review] [38 refs]. 20090519. Annals of Family Medicine 7[1], 56-62. 2009. MEDLINE. EXC - Safety and effectiveness of colonoscopies perfomed by pry care physicians

Williams, C. B. and Bedenne, L. Management of colorectal polyps: is all the effort worthwhile?. [Review] [160 refs]. 19911010. Journal of Gastroenterology & Hepatology 5, Suppl-65. 1990. MEDLINE. EXC - Management of colorectal polyps [Review] [160 refs]

Williams, C. B. Polyp follow-up: how, who for and how often? 19851119. British Journal of Surgery 72, Suppl-6. 1985. MEDLINE. EXC - Pilot study

Winawer, S., Fletcher, R., Rex, D., Bond, J., Burt, R., Ferrucci, J., Ganiats, T., Levin, T., Woolf, S., Johnson, D., Kirk, L., Litin, S., and Simmang, C. Colorectal cancer screening and surveillance: Clinical guidelines and rationale - Update based on new evidence. Gastroenterology 124[2], 544-560. 2003. EXC - CRC screening and surveillance: Update based on new evidence

Winawer, S. J. Appropriate intervals for surveillance. 19990407. Gastrointestinal Endoscopy 49[3:Pt 2], t-6. 1999. MEDLINE. EXC - RQ3

Winawer, S. J., Schottenfeld, D., and Flehinger, B. J. Colorectal cancer screening. Journal of the National Cancer Institute 83[4], 243-253. 1991. EXC - Narrative review and guideline for colorectal cancer screening. References checked

Winawer, S. J., Schottenfeld, D., and Flehinger, B. J. Colorectal cancer screening.[see comment]. [Review] [130 refs]. 19910320. Journal of the National Cancer Institute 83[4], 243-253. 20-2-1991. MEDLINE. EXC- Narrative review - references checked

Winawer, S. J., Fletcher, R. H., Miller, L., Godlee, F., Stolar, M. H., Mulrow, C. D., Woolf, S. H., Glick, S. N., Ganiats, T. G., Bond, J. H., Rosen, L., Zapka, J. G., Olsen, S. J., Giardiello, F. M., Sisk, J. E., Van, Antwerp R., Brown-Davis, C., Marciniak, D. A., and Mayer, R. J. Colorectal cancer screening: Clinical guidelines and rationale. Gastroenterology 112[2], 594-642. 1997. EXC - Clinical guidelines and rationale for CRC

Winawer, S. J., Zauber, A. G., Fletcher, R. H., Stillman, J. S., O'Brien, M. J., Levin, B., Smith, R. A., Lieberman, D. A., Burt, R. W., Levin, T. R., Bond, J. H., Brooks, D., Byers, T., Hyman, N., Kirk, L., Thorson, A., Simmang, C., Johnson, D., Rex, D. K., US Multi-Society Task Force on Colorectal Cancer, and American Cancer Society. Guidelines for colonoscopy surveillance after polypectomy: a consensus update by the US Multi-Society Task Force on Colorectal Cancer and the American Cancer Society. [Review] [83 refs]. 20060622. Gastroenterology 130[6], 1872-1885. 2006. MEDLINE. EXC - American guidelines based on literature review for post polypectomy surveillance. - references checked

Winawer, S. J. New post-polypectomy surveillance guidelines. Practical Gastroenterology 31[8], 30-42. 2007. EXC - post-polypectomy surveillance guidelines

Winawer, S. J., St John, D. J., Bond, J. H., Rozen, P., Burt, R. W., Waye, J. D., Kronborg, O., O'Brien, M. J., Bishop, D. T., and Kurtz, R. C. Prevention of colorectal cancer: guidelines based on new data. WHO Collaborating Center for the Prevention of Colorectal Cancer. 19950511. Bulletin of the World Health Organization 73[1], 7-10. 1995. MEDLINE. EXC - WHO guidelines based on recent literature - references checked

Winawer, S. J., Zauber, A. G., O'Brien, M. J., May, Nah Ho, Gottlieb, L., Sternberg, S. S., Waye, J. D., Bond, J., Schapiro, M., Stewart, E. T., Panish, J., Ackroyd, F., Kurtz, R. C., Shike, M., Lightdale, C. J., Gerdes, H., Hornsby-Lewis, L., Edelman, M., and Fleisher, M. Randomized comparison of surveillance intervals after colonoscopic removal of newly diagnosed adenomatous polyps. New England Journal of Medicine 328[13], 901-906. 1993. EXC - To be used for RQ3

Winawer, S. J. Screening of colorectal cancer. Surgical Oncology Clinics of North America 14[4], 699-722. 2005. EXC- Narrative review - references checked

Woolfson, I. K., Eckholdt, G. J., Wetzel, C. R., Gathright, Jr, Ray, J. E., Hicks, T. C., Timmcke, A. E., and Ferrari, B. T. Usefulness of performing colonoscopy one year after endoscopic polypectomy. Diseases of the Colon and Rectum 33[5], 389-393. 1990. EXC - performing colonoscopy one year after endoscopic polypectomy

Yashiro, K., Nagasako, K., Sato, S., Suzuki, S., and Obata, H. Follow-up after polypectomy of colorectal adenomas. The importance of total colonoscopy. 19890927. Surgical Endoscopy 3[2], 87-91. 1989. MEDLINE. EXC - For RQ3

Young, G. P. Post-polypectomy surveillance - Who and how. Practical Gastroenterology 31[7], 19-25. 2007. EXC - Review article: Ref checked

Zauber, A. G. and Winawer, S. J. Initial management and follow-up surveillance of patients with colorectal adenomas. Gastroenterology Clinics of North America 26[1], 85-101. 1997. EXC - Narrative review: ref checked

Zauber, A. G. Quality control for flexible sigmoidoscopy: which polyps count?[comment]. [Review] [37 refs]. 20040623. Gastroenterology 126[5], 1474-1477. 2004. MEDLINE. EXC - Review: ref checked

Ziebert, J. J. Colorectal cancer screening: the old and the new.[see comment]. [Review] [15 refs]. 20010329. Texas Medicine 97[2], 46-48. 2001. MEDLINE. EXC - a symposium on what pry care needs to know

6.2 *Review question 2A:*

Which colonoscopic surveillance technique for prevention and/or early detection of colorectal cancer in adults with IBD or polyps is more clinically effective compared with other methods of surveillance (flexible sigmoidoscopy, double-contrast barium enema, computed tomographic colonography, tri-modal imaging [high-resolution white light endoscopy, narrow-band imaging and auto-fluorescence imaging])?

6.2.1 Eligibility criteria

Inclusion criteria

- Population
  - Adults (18 years and older) with IBD (defined as ulcerative colitis or Crohn's disease involving the large bowel).
  - Adults with polyps (including adenomas) in the colon or rectum.
- Intervention

  - Other methods of surveillance (flexible sigmoidoscopy, double-contrast barium enema, computed tomographic colonography, tri-modal imaging, high-resolution white light endoscopy, narrow-band imaging and auto-fluorescence imaging)
- Comparators
  - Conventional colonoscopy
- Study Design
  - Systematic review, RCTs, controlled back to back clinical trials

Exclusion criteria

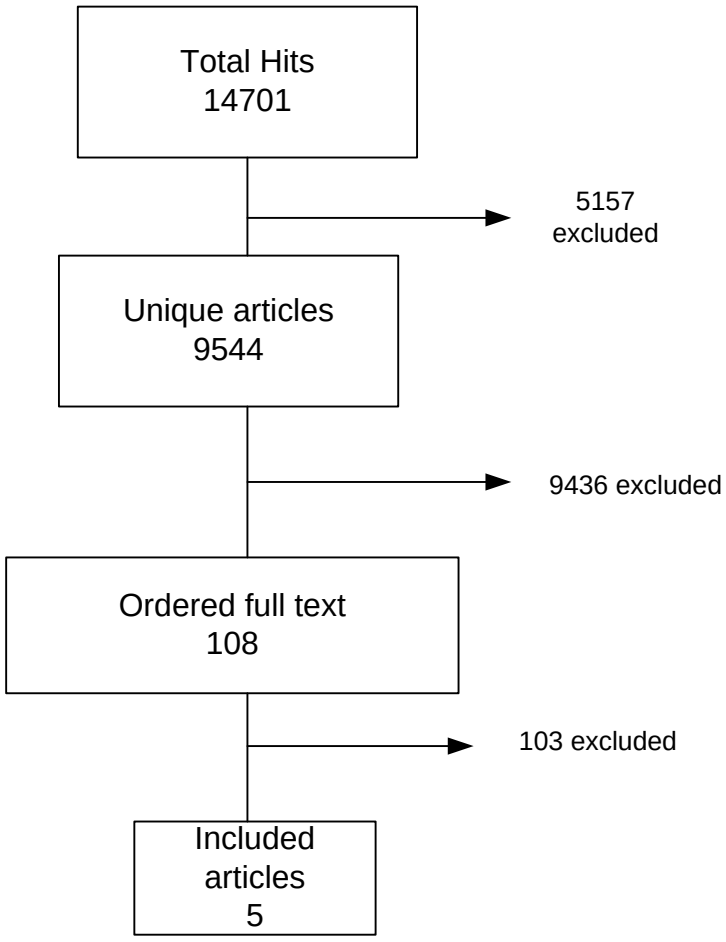
- Population
  - Children (younger than 18 years).
  - Adults with newly diagnosed or relapsed adenocarcinoma of the colon or rectum.
  - Adults with polyps that have previously been treated for colorectal cancer.
  - Adults with a genetic familial history of colorectal cancer: hereditary non-polyposis colorectal cancer.
  - Adults with a familial history of polyposis syndromes: familial adenomatous polyposis.
- Intervention
  - Interventions other than those listed above.
- Comparators
  - Comparators other than conventional colonoscopy.
- Study Design
  - Systematic review, RCTs, controlled back-to-back clinical trials.

6.2.2 Evidence review results

- Initial 14,701 hits including duplicates
- Total of 9544 unique articles
- Excluded on the basis of title and abstract: 9436
- Articles ordered full text: 108

Articles selected for review based on inclusion and exclusion were 5 studies, 1 primary study for people with IBD and 4 (2 primary studies, 2 systematic reviews) for people with adenomatous polyps.

6.2.3 Review flow chart



6.2.4 Included studies for people with IBD

Dekker E, Van den Broek FJC, Reitsma JB, Hardwick JC, Offerhaus GJ, van Deventer SJ et al. (2007) Narrow-band imaging compared with conventional colonoscopy for the detection of dysplasia in patients with longstanding ulcerative colitis. Endoscopy: 39(3):216–221.

6.2.5 Included studies for people with adenomatous polyps

Mulhall BP, Veerappan GR, Jackson JL (2005) Meta-analysis: Computed tomographic colonography. Annals of Internal Medicine: 142(8):635–650.

Rex DK, Mark D, Clarke B, Lappas JC, Lehman GA (1995) Flexible sigmoidoscopy plus air-contrast barium enema versus colonoscopy for evaluation of symptomatic patients without evidence of bleeding. Gastrointestal Endoscopy: 42(2):132–138.

Van den Broek FJ, Reitsma JB, Curvers WL, Fockens P, Dekker E (2009). Systematic review of narrow-band imaging for the detection and differentiation of neoplastic and non-neoplastic lesions in the colon. Gastrointestinal Endoscopy: 69(1):124–135.

Winawer SJ, Stewart ET, Zauber AG, Bond JH, Ansel H, Waye JD et al.(2000) A comparison of colonoscopy and double-contrast barium enema for surveillance after polypectomy. New England Journal of Medicine: 342(24):1766–1772.

6.2.6 Excluded studies

Halligan, S., Lilford, R. J., Wardle, J., Morton, D., Rogers, P., Wooldrage, K., Edwards, R., Kanani, R., Shah, U., and Atkin, W. Design of a multicentre randomized trial to evaluate CT colonography versus colonoscopy or barium enema for diagnosis of colonic cancer in older symptomatic patients: The SIGGAR study. Trials [Electronic Resource] 8, 32. 2007. In-Data-Review. excluded: trial still on going as of when papaer was ordered

van den Broek, F. J. C., Fockens, P., Van, Eeden S., Kara, M. A., Hardwick, J. C. H., Reitsma, J. B., and Dekker, E. Clinical Evaluation of Endoscopic Trimodal Imaging for the Detection and Differentiation of Colonic Polyps. Clinical Gastroenterology and Hepatology 7[3], 288-295. 2009. excluded: not looking at the clinical question

Pickhardt, P. J. Screening: CT colonography: time for clinical implementation. 20090713. Nature Reviews Clinical Oncology 6[4], 187-188. 2009. MEDLINE. EXC - Update on the ACRIN CTC trial - reference checked

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6.3 Review question 2B:

Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer clinically effective compared with colonoscopic surveillance with conventional colonoscopy?

6.3.1 Eligibility criteria

Inclusion criteria

- Population
  - Adults (18 years and older) with IBD (defined as ulcerative colitis or Crohn's disease involving the large bowel).
  - Adults with polyps (including adenomas) in the colon or rectum.
- Intervention
  - Chromoscopy.
- Comparators
  - Conventional colonoscopy.
- Study Design
  - Systematic review, RCTs, controlled back-to-back clinical trials.

Exclusion criteria

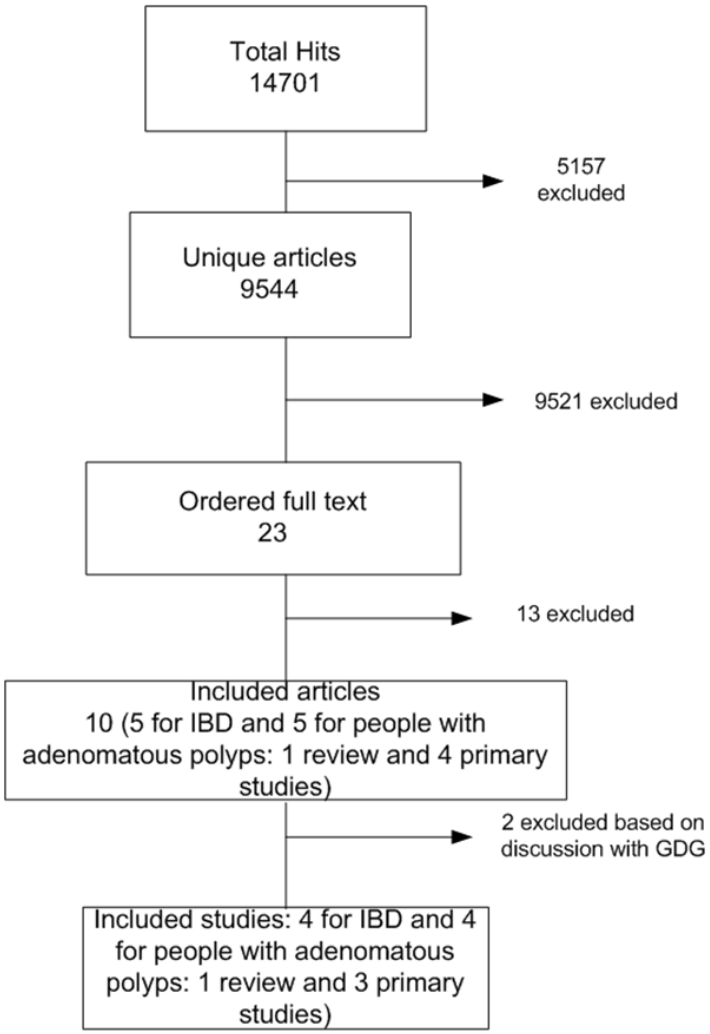
- Population
  - Children (younger than 18 years).
  - Adults with newly diagnosed or relapsed adenocarcinoma of the colon or rectum.
  - Adults with polyps that have previously been treated for colorectal cancer.
  - Adults with a genetic familial history of colorectal cancer: hereditary non-polyposis colorectal cancer.
  - Adults with a familial history of polyposis syndromes: familial adenomatous polyposis.
- Intervention
  - Interventions other than chromoscopy.
- Comparators
  - Comparators other than conventional colonoscopy.
- Study Design
  - Systematic review, RCTs, controlled back-to-back clinical trials.

6.3.2 Evidence review results

- Initial 14,701 hits including duplicates
- Total of 9544 unique articles
- Excluded on the basis of title and abstract: 9521
- Articles ordered full text: 23

Articles selected for review based on inclusion and exclusion were 10 studies, 5 for people with IBD and 5 for people with adenomatous polyps. One study for each population Hurlstone et al. (2004) and Hurlstone et al. (2005) that met the inclusion criteria but was excluded from the review after discussion with the GDG and advice from the editors of the journal because the author's methods were discredited. Therefore the relevant evidence was 4 primary studies for people with IBD and 1 systematic review and 3 primary studies for people with adenomatous polyps.

6.3.3 Review flow chart



6.3.4 Included studies for people with IBD

Kiesslich R, Goetz M, Lammersdorf K et al. (2007) Chromoscopy-guided endomicroscopy increases the diagnostic yield of intraepithelial neoplasia in ulcerative colitis. Gastroenterology 132: 874–82.

Kiesslich R, Fritsch J, Holtmann M et al. (2003) Methylene blue-aided chromoendoscopy for the detection of intraepithelial neoplasia and colon cancer in ulcerative colitis. Gastroenterology 124: 880–8.

Marion JF, Waye JD, Present DH et al. (2008) Chromoendoscopy-targeted biopsies are superior to standard colonoscopic surveillance for detecting dysplasia in inflammatory bowel disease patients: A prospective endoscopic trial. American Journal of Gastroenterology 103: 2342–9.

Rutter MD, Saunders BP, Schofield G et al. (2004) Pancolonic indigo carmine dye spraying for the detection of dysplasia in ulcerative colitis. Gut 53: 256–60.

6.3.5 Included studies for people with adenomatous polpys

Brooker JC, Saunders BP, Shah SG et al. (2002) Total colonic dye-spray increases the detection of diminutive adenomas during routine colonoscopy: A randomized controlled trial. Gastrointestinal Endoscopy 56: 333–8.

Brown SR, Baraza W, Hurlstone P (2007) Chromoscopy versus conventional endoscopy for the detection of polyps in the colon and rectum. [Review]. Cochrane Database of Systematic Reviews: CD006439.

Lapalus M-G, Helbert T, Napoleon B et al. (2006) Does chromoendoscopy with structure enhancement improve the colonoscopic adenoma detection rate? Endoscopy 38: 444–8.

Le RM, Coron E, Parlier D et al. (2006) High resolution colonoscopy with chromoscopy versus standard colonoscopy for the detection of colonic neoplasia: A randomized study. Clinical Gastroenterology and Hepatology 4: 349–54.

6.3.6 Excluded studies

Brooker J, Shah S, Suzuki N, Thapar C, Thomas H, and Williams CB (2000). Pan-colonic dye spray to aid adenoma detection during colonoscopy: a randomized controlled trial. Gut 46[Suppl 2]: A77. EXC - used the later study with more recent results

Brooker JC, Saunders BP, Shah SG and Eisen G (2003). Total colonic dye spray increases the yield of colonoscopy. Evidence-Based Gastroenterology 4[1]: 18–19. 2003. EXC - Abstract, results taken from the fully published study

Chiu HM, Chang CY, Chen CC, Lee YC, Wu MS, Lin JT, Shun CT and Wang HP (2007). A prospective comparative study of narrow-band imaging, chromoendoscopy, and conventional colonoscopy in the diagnosis of colorectal neoplasia. Gut 56(3): 373–379. MEDLINE. EXC - To be covered with the other comparators question

De Palma GD, Rega M, Masone S, Persico M, Siciliano S, Addeo P and Persico G (2006). Conventional colonoscopy and magnified chromoendoscopy for the endoscopic histological prediction of diminutive colorectal polyps: a single operator study. World Journal of Gastroenterology 12(15): 2402–2405. MEDLINE. EXC - Single arm study

Hurlstone DP, Cross SS, Slater R, Sanders DS and Brown S (2004). Detecting diminutive colorectal lesions at colonoscopy: A randomised controlled trial of pan-colonic versus targeted chromoscopy. Gut 53(3): 376–380. EXC - excluded from review based on discussion with GDG

Hurlstone DP, Sanders DS, Lobo AJ, McAlindon ME and Cross SS (2005). Indigo carmine-assisted high-magnification chromoscopic colonoscopy for the detection and characterisation of intraepithelial neoplasia in ulcerative colitis: A prospective evaluation. Endoscopy 37(12): 1186–1192. EXC - excluded from review based on discussion with GDG

Ibarra-Palomino J, Barreto-Zúñiga R, Elizondo-Rivera J, Bobadilla-Díaz J and Villegas-Jiménez A (2002). Application of chromoendoscopy to evaluate the severity and interobserver variation in chronic non-specific ulcerative colitis. Revista de gastroenterología de México 67(4): 236–240. EXC - In Spanish, only abstract in English

Kiesslich R, Jung M, DiSario JA, Galle PR and Neurath M. F (2004). Perspectives of Chromo and Magnifying Endoscopy: How, How Much, When, Whom Should We Stain? Journal of Clinical Gastroenterology 38(1): 7-13. EXC - Narrative review - references checked

Le Rhun M, Coron E, Parlier D, Nguyen JM, Canard JM, Alamdari A, Sautereau D, Chaussade S and Galmiche JP (2005). Coloscopie de haute résolution avec chromoscopie versus coloscopie standard pour la détection des polypes. Résultats d'une étude prospective randomisée en groupes paralleles [abstract]. Endoscopy 37(3): 305, abstract. EXC - Abstract full study in 2006 included

Rutter M, Bernstein C, Matsumoto T, Kiesslich R and Neurath M (2004). Endoscopic appearance of dysplasia in ulcerative colitis and the role of staining. [Review] [12 refs]. Endoscopy 36(12): 1109–1114. MEDLINE. EXC - Narrative review, references checked

Stoffel EM, Turgeon DK, Stockwell DH, Normolle DP, Tuck MK, Marcon NE, Baron JA, Bresalier RS, Arber N, Ruffin MT, Syngal S, Brenner DE and Great Lakes New England Clinical Epidemiology and Validation Center of the Early Detection Research Network (2008). Chromoendoscopy detects more adenomas than colonoscopy using intensive inspection without dye spraying. Cancer Prevention Research 1(7): 507–513. MEDLINE. EXC - Included patients that could previously have CRC

Su MY, Hsu CM, Ho YP, Chen PC, Lin CJ and Chiu CT (2006). Comparative study of conventional colonoscopy, chromoendoscopy, and narrow-band imaging systems in differential diagnosis of neoplastic and non-neoplastic colonic polyps. American Journal of Gastroenterology 101(12): 2711–2716. MEDLINE. EXC - Included people who had CRC previously

Tischendorf JJ, Wasmuth HE, Koch A, Hecker H, Trautwein C and Winograd R (2007). Value of magnifying chromoendoscopy and narrow band imaging (NBI) in classifying colorectal polyps: a prospective controlled study. Endoscopy 39 (12): 1092–1096. MEDLINE. EXC - Included people with previous CRC

Togashi K, Hewett D, Whitaker D, Hume G, Radford-Smith G, Francis L, Pandeya N.and Appleyard M (2005). Does the use of indigocarmine spray increase the colonoscopic detection rate of advanced adenomas? Journal of Gastroenterology 128 (4 suppl 2), Abstract. EXC - 2009 study available

Togashi K, Hewett DG, Radford-Smith GL, Francis L, Leggett BA and Appleyard MN (2009). The use of indigocarmine spray increases the colonoscopic detection rate of adenomas. Journal of Gastroenterology 44 (8): 826–833. MEDLINE. EXC - Included people who previously had CRC

Waye JD, Ganc AJ, Khelifa HB, Kotrilik J, Kumar A, Ogoshi K and Roig GV (2002). Chromoscopy and zoom colonoscopy. Gastrointestinal Endoscopy 55 (6): 765–766. EXC - Narrative comment on the use of chromoendoscopy for the treatment of Barrett's oesophagus

6.4 Review question 3:

When should colonoscopic surveillance be started and what should be the frequency of surveillance?

6.4.1 Eligibility criteria

Inclusion criteria

- Population
  - Adults (18 years and older) with IBD (defined as ulcerative colitis or Crohn's disease involving the large bowel).
  - Adults with polyps (including adenomas) in the colon or rectum.
- Intervention
  - Chromoscopy or conventional colonoscopy.
- Factors
  - Looking at any prognostic factors or surveillance schemes for colorectal cancer.
- Study design
  - No study design filter.

Exclusion criteria

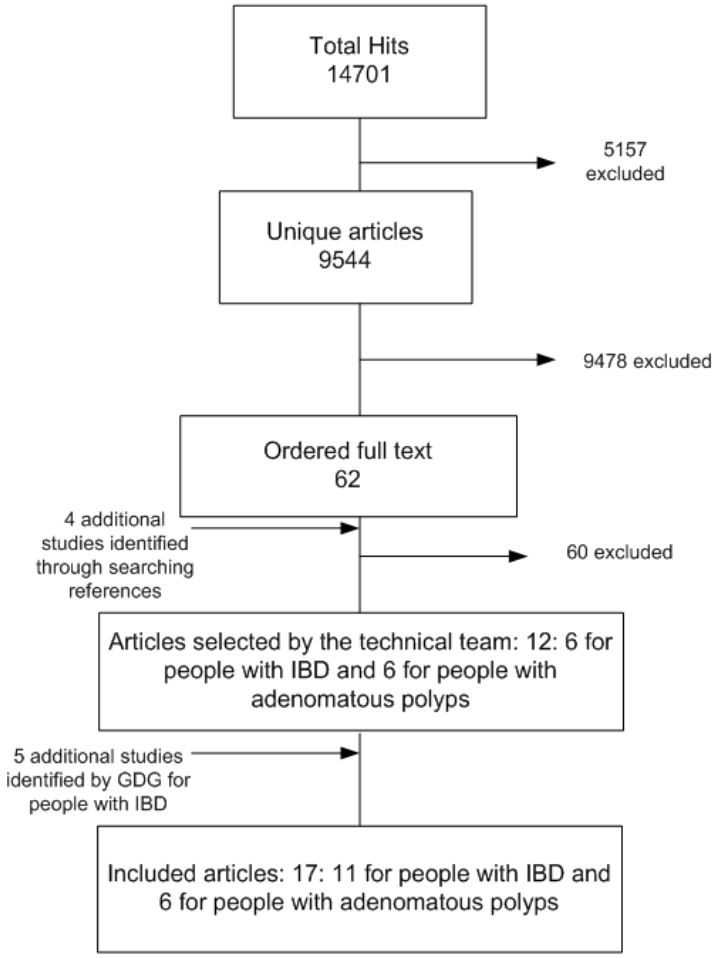
- Population
  - Children (younger than 18 years).
  - Adults with newly diagnosed or relapsed adenocarcinoma of the colon or rectum.
  - Adults with polyps that have previously been treated for colorectal cancer.
  - Adults with a genetic familial - history of colorectal cancer: hereditary non-polyposis colorectal cancer.
  - Adults with a familial history of polyposis syndromes: familial adenomatous polyposis.
- Intervention
  - Interventions other than chromoscopy or conventional colonoscopy.

6.4.2 Evidence review results

- initial 14,701 hits including duplicates
- Total of 9544 unique articles
- Excluded on the basis of title and abstract: 9478
- Articles ordered full text: 62
- Additional articles found via daisy chaining: 4 (for people with adenomatous polyps).

Articles selected for review based on inclusion and exclusion criteria were 6 for people with IBD and 6 for people with adenomatous polyps. Additionally 5 primary articles for people with IBD were given by the GDG that were not identified by the technical team. The technical team decided to broaden the search criteria and identify other similar relevant prognostic studies that may have been missed because of strict search strategies and/or strict inclusion or exclusion criteria. This work is currently ongoing and results of the broader review will be available after consultation.

6.4.3 Review flow chart



6.4.4 Included studies for people with IBD

Askling J, Dickman PW, Karlen P et al. (2001) Family history as a risk factor for colorectal cancer in inflammatory bowel disease. Gastroenterology 120(6):1356–1362 (Abstract).

Eaden JA, Abrams KR, Mayberry JF (2001) The risk of colorectal cancer in ulcerative colitis: a meta-analysis. Gut 48: 526–35.

Gupta RB, Harpaz N, Itzkowitz S et al. (2007) Histologic inflammation is a risk factor for progression to colorectal neoplasia in ulcerative colitis: a cohort study. Gastroenterology 133: 1099–105.

Karlen P, Kornfeld D, Brostrom O et al. (1998) Is colonoscopic surveillance reducing colorectal cancer mortality in ulcerative colitis? A population based case control study. Gut 42: 711–4.

Manning AP, Bulgim OR, Dixon MF et al. (1987) Screening by colonoscopy for colonic epithelial dysplasia in inflammatory bowel disease. Gut 28: 1489–94.

Odze RD, Farraye FA, Hecht JL et al. (2004) Long-term follow-up after polypectomy treatment for adenoma-like dysplastic lesions in ulcerative colitis. Clinical Gastroenterology and Hepatology 2(7):534–541.

Rutter M, Saunders B, Wilkinson K et al. (2004) Severity of inflammation is a risk factor for colorectal neoplasia in ulcerative colitis. Gastroenterology 126: 451–9.

Rutter MD, Saunders BP, Wilkinson KH et al. (2004) Cancer surveillance in longstandinq ulcerative colitis: Endoscopic appearances help predict cancer risk. Gut 53: 1813–6.

Rutter MD, Saunders BP, Wilkinson KH et al. (2006) Thirty-year analysis of a colonoscopic surveillance program for neoplasia in ulcerative colitis. Gastroenterology 130: 1030–8.

Soetikno RM, Lin OS, Heidenreich PA et al. (2002) Increased risk of colorectal neoplasia in patients with primary sclerosing cholangitis and ulcerative colitis: A meta-analysis. Gastrointestinal Endoscopy 56: 48–54.

Velayos FS, Loftus J, Jess T et al. (2006) Predictive and protective factors associated with colorectal cancer in ulcerative cColitis: a case-control study. Gastroenterology 130: 1941–9

6.4.5 Included studies for people with adenomatous polpys

Kronborg O, Jorgensen OD, Fenger C et al. (2006) Three randomized long-term surveillance trials in patients with sporadic colorectal adenomas. Scandinavian Journal of Gastroenterology 41: 737–43.

Lieberman DA, Weiss DG, Harford WV et al. (2007) Five-year colon surveillance after screening colonoscopy. Gastroenterology 133: 1077–85.

Lieberman DA, Moravec, M, Holub, J et al. (2008) Polyp size and advanced histology in patients undergoing colonoscopy screening: implications for CT colonography. Gastroenterology 135(4):1100–1105.

Martinez ME, Baron JA, Lieberman DA et al. (2009) A pooled analysis of advanced colorectal neoplasia diagnoses after colonoscopic polypectomy. Gastroenterology 136(3):832–841.

Nusko G, Mansmann U, Kirchner T et al. (2002) Risk related surveillance following colorectal polypectomy. 9530. Gut 51: 424–8.

Saini SD, Kim HM, Schoenfeld P (2006) Incidence of advanced adenomas at surveillance colonoscopy in patients with a personal history of colon adenomas: a meta-analysis and systematic review. Gastrointestinal Endoscopy 64(4):614–626.

6.4.6 Excluded studies

Colonoscopic surveillance has value in chronic Crohn's colitis (2001). Laparoscopic Surgery Update 9 (8): 93. EXC - Short medical magazine discussion.

Colorectal cancer screening: how often is often enough? (2004) Emergency Medicine 36(3): 53–54. EXC - Short medical magazine update.

Colorectal screening and the risk of advanced proximal neoplasia in asymptomatic adults (2001). Emergency Medicine 33(5): 77. EXC - Short medical magazine article.

Do benign diminutive adenomas mandate colonoscopy? (1997) Emergency Medicine 29(5): 117. EXC - Magazine article - no references.

Is colonoscopy indicated for small adenomas? (1999) Emergency Medicine 31(2): 65. EXC - Short magazine article - no references.

Bauer J (2003). Despite our best efforts, rate of recurrence of colorectal polyps is high. Registered Nurse Journal 66(5): 20. EXC - News update on recurrence of colorectal polyps.

Atkin WS, Morson BC and Cuzick J (1992). Long-term risk of colorectal cancer after excision of rectosigmoid adenomas. New England Journal of Medicine 326(10): 658–662. MEDLINE. EXC - intervention was rigid sigmoidscopy and one of the exclusion criteria was colonoscopy.

Atkin WS, Williams CB, Macrae FA and Jones S (1992). Randomised study of surveillance intervals after removal of colorectal adenomas at colonoscopy [abstract]. Gut 33(Suppl 1): S52. EXC - conference abstract - full article available.

Baba R, Nagasako K, Yashiro K, Sato S, Suzuki S and Obata H (1992). Colonoscopic follow-up study after polypectomy. Digestive Endoscopy 4(4), 355–359. EXC - Included people who previously had CRC.

Baxter NN, Goldwasser MA, Paszat LF, Saskin R, Urbach DR and Rabeneck L (2009). Association of colonoscopy and death from colorectal cancer. Annals of Internal Medicine 150(1): 1–8. EXC - Case control study but the controls were not true controls (not indivduals that had polypectomy without surveillance).

Beck DE, Opelka FG, Hicks TC, Timmcke AE, Khoury DA and Gathright JB Jr (1995). Colonoscopic follow-up of adenomas and colorectal cancer. Southern Medical Journal 88(5), 567–570. EXC - Narrative review -references checked.

Bond JH (2003). Update on colorectal polyps: Management and follow-up surveillance. Endoscopy 35(8): S35-S40. EXC - Narrative review refrences checked.

Bonithon-Kopp C, Piard F, Fenger C, Cabeza E, O'Morain C, Kronborg O and Faivre J (2004). Colorectal adenoma characteristics as predictors of recurrence. Diseases of the Colon & Rectum 47(3): 323–333. EXC - Included in the reviews included for analysis.

Ebell M (2000). Does biannual colonoscopy improve survival in patients with ulcerative colitis? Evidence-Based Practice 3(7): 1-10, insert. EXC - Not available through British Library.

Ebell M (2002). Is colonoscopy a reasonable screening test for colon cancer in patients aged 40 to 49? Evidence-Based Practice 5(9), 9–10, 2p. EXC - Not available through British Library.

Ebell M (2002). Which patients with colorectal polyps are at greater risk of early recurrence? Evidence-Based Practice 5(12), 8–9, 2p. EXC - Conference abstract.

Ekbom A, Helmick C, Zack M.and Adami HO (1990). Ulcerative colitis and colorectal cancer. A population-based study. New England Journal of Medicine 323(8), 1228–1233. EXC - No comparison of risks with dysplasia - only age.

Farmer RG (1989). Inflammatory bowel disease: who should be screened for cancer. Emergency Medicine 21(19): 52. EXC - Medical magazine article on screening for IBD.

Friedlich MS, Guindi M and Stern HS (2004). The management of dysplasia associated with ulcerative colitis: colectomy versus continued surveillance. Canadian Journal of Surgery 47(3): 212–214. EXC - Individual case report.

Friedman LC, Webb JA and Everett TE (2004). Psychosocial and medical predictors of colorectal cancer screening among low-income medical outpatients. Journal of Cancer Education 19(3): 180–186. EXC - Studying predictors of colorectal cancer in low-income families.

Jess T, Loftus EV Jr, Velayos FS, Harmsen, WS. Zinsmeister AR, Smyrk TC, Tremaine WJ, Melton LJ III, Munkholm P and Sandborn WJ (2006). Incidence and prognosis of colorectal dysplasia in inflammatory bowel disease: a population-based study from Olmsted County, Minnesota. Inflammatory Bowel Diseases 12(8): 669–676. MEDLINE. EXC - Not all the patients were undergoing colonoscopic surveillance

Jonkers D, Ernst J, Pladdet I, Stockbrugger R and Hameeteman W (2006). Endoscopic follow-up of 383 patients with colorectal adenoma: An observational study in daily practice. European Journal of Cancer Prevention 15(3), 202–210. EXC - Case series.

Jørgensen OD, Kronborg O and Fenger C (1995). A randomized surveillance study of patients with pedunculated and small sessile tubular and tubulovillous adenomas. The Funen adenoma follow-up study. Scandinavian Journal of Gastroenterology 30(7): 686–692. EXC - results included in the included reviews and updated information in the included Kronborg et al. study.

Jørgensen OD, Kronborg O and Fenger C (1994). Biennial versus quadrennial colonoscopic surveillance of patients with pedunculated and small sessile tubular and tubulovillous adenomas [abstract]. Gut 35 (Suppl 4): A65. EXC - Abstract from conference proceedings - full study article available.

Khoury DA, Opelka FG, Beck DE, Hicks TC, Timmcke AE and Gathright JB (1996). Colon surveillance after colorectal cancer surgery. Diseases of the Colon & Rectum 39(3): 252–255. EXC - Patients previously had colorectal adenocarcinoma.

Krist AH, Jones RM, Woolf SH, Woessner SE, Merenstein D, Kerns JW, Foliaco W and Jackson P (2007). Timing of repeat colonoscopy: disparity between guidelines and endoscopists' recommendation.. American Journal of Preventive Medicine 33(6): 471–478. EXC - Study comparing the practice of endoscopists and guideline recommendations for colonoscopic surveillance.

Kronborg O, Hage,E, Adamsen S and Deichgraeber E (1983). Follow-up after colorectal polypectomy. I. A comparison of the effectiveness of repeated examinations of the colon every 6 and 24 months after removal of stalked polyps. Scandinavian Journal of Gastroenterology 18(8): 1089–1093. EXC - Results taken from 2006 article.

Kronborg O, Hage E, Adamsen S and Deichgraeber E (1983). Follow-up after colorectal polypectomy. II. Repeated examinations of the colon every 6 months after removal of sessile adenomas and adenomas with the highest degrees of dysplasia. Scandinavian Journal of Gastroenterology 18(8): 1095–1099. EXC - Results taken from the 2006 paper.

Kronborg O, Hage E and Deichgraeber E (1981). The clean colon. A prospective, partly randomized study of the effectiveness of repeated examinations of the colon after polypectomy and radical surgery for cancer. Scandinavian Journal of Gastroenterology 16(7): 879–884. EXC - Results taken from the 2006 paper.

Laiyemo AO, Pinsky PF, Marcus PM, Lanza E, Cross AJ, Schatzkin A and Schoen RE (2009). Utilization and yield of surveillance colonoscopy in the continued follow-up study of the polyp prevention trial. Clinical Gastroenterology and Hepatology 7(5): 562–567. EXC - Case series.

Lakatos L, Mester G, Erdelyi Z, David G, Pandur T, Balogh M, Fischer S, Vargha P and Lakatos PL (2006). Risk factors for ulcerative colitis-associated colorectal cancer in a Hungarian cohort of patients with ulcerative colitis: Results of a population-based study. Inflammatory Bowel Diseases 12(3): 205–211. EXC - Included people with a familial history.

Martinez ME, Sampliner R, Marshall JR, Bhattacharyya AK, Reid ME and Alberts DS (2001). Adenoma characteristics as risk factors for recurrence of advanced adenomas. Gastroenterology 120(5): 1077–1083. EXC - Studying adenoma recurrence with respect to diet.

Martinez ME, Henning SM and Alberts DS (2004). Folate and colorectal neoplasia: relation between plasma and dietary markers of folate and adenoma recurrence. American Journal of Clinical Nutrition 79(4): 691–697. EXC - studying association of plasma and diet with adenoma recurrence.

Masala G, Bagnoli S, Ceroti M, Saieva C, Trallori G, Zanna I, d'Albasio G and Palli D (2004). Divergent patterns of total and cancer mortality in ulcerative colitis and Crohn's disease patients: the Florence IBD study 1978–2001. Gut 53(9): 1309–1313. EXC - Identifies causes of mortality for IBD patients.

Matek W, Guggenmoos-Holzmann I and Demling L (1985). Follow-up of patients with colorectal adenomas. Endoscopy 17(5): 175-181. EXC - Case series.

Mayer DK (1992). Commentary on long-term risk of colorectal cancer after excision of rectosigmoid adenomas [original article by Atkin W et al (1992) appears in New England Journal of Medicine 326(10):658–62]. ONS Nursing Scan in Oncology 1(2): 5. EXC - Commentary/ discussion paper - not available through British library.

Morris DS, Ewen KM and Selderbeek H (1985). Colonoscopy and the follow up of colorectal carcinoma. New Zealand Medical Journal 98(791): 1009–1010. EXC - Case series of patients getting surveillance post resection for colorectal cancer.

Niv Y, Hazazi R, Levi Z and Fraser G (2008). Screening colonoscopy for colorectal cancer in asymptomatic people: A meta-analysis. Digestive Diseases and Sciences 53(12): 3049–3054.EXC - Systematic review of diagnostic yields of screening colonoscopy for asymptomatic patients.

Olsen HW, Lawrence WA, Snook CW and Mutch WM (1998). Review of recurrent polyps and cancer in 500 patients with initial colonoscopy for polyps. Diseases of the Colon & Rectum 31(3): 222–227. EXC - Case series of patients undergoing surveillance after polyps detection.

Rubin PH, Friedman S, Harpaz N, Goldstein E, Weiser J, Schiller J, Waye JD and Present DH (1999). Colonoscopic polypectomy in chronic colitis: Conservative management after endoscopic resection of dysplastic polyps. Gastroenterology 117(6): 1295–1300. EXC - Small case series of 48 patients with mean follow-up of 4.1 years.

Rubin, D. T., Rothe, J. A., Hetzel, J. T., Cohen, R. D., and Hanauer, S. B. Are dysplasia and colorectal cancer endoscopically visible in patients with ulcerative colitis?[see comment]. 20070726. Gastrointestinal Endoscopy 65[7], 998-1004. 2007. MEDLINE. EXC - studying the endoscopic visibility of dysplasia and CRC in UC

Schoen, R. E., Pinsky, P. F., Weissfeld, J. L., Bresalier, R. S., Church, T., Prorok, P., Gohagan, J. K., and Prostate, Lung Colorectal and Ovarian Cancer Screening Trial Group. Results of repeat sigmoidoscopy 3 years after a negative examination.[see comment]. 20030709. JAMA 290[1], 41-48. 2-7-2003. MEDLINE. EXC - Sigmoidscopy results

Schoen, R. E., Gerber, L. D., and Margulies, C. The pathologic measurement of polyp size is preferable to the endoscopic estimate. Gastrointestinal Endoscopy 46[6], 492-496. 1-12-1997. EXC - Studying the methods of determining polyp size, comparing endoscopists estimates and pathologists measurements

Schuman, B. M. Premalignant lesions of the gastrointestinal tract. Surveillance regimens for three treatable disorders. [Review] [13 refs]. 19920318. Postgraduate Medicine 91[2], 219-222. 19-6-2000. MEDLINE. EXC - Discussion paper on Barrett's oesophagus, UC and adenomatous polyps surveillance

Seow, C. H., Ee, H. C., Willson, A. B., and Yusoff, I. F. Repeat colonoscopy has a low yield even in symptomatic patients. Gastrointestinal Endoscopy 64[6], 941-947. 2006. EXC - Included people who previously had CRC

Shaughnessy, A. Is it necessary to perform a colonoscopy in patients found to have small adenomas on screening sigmoidoscopy? Evidence-Based Practice 1[11], -7, insert. 1998. EXC - Not available by british library

Snapper, S. B., Syngal, S., and Friedman, L. S. Ulcerative colitis and colon cancer: more controversy than clarity. [Review] [80 refs]. 19980611. Digestive Diseases 16[2], 81-87. 1998. MEDLINE. EXC - Narrative review - references checked

Thomas, G. Morales, Richard E.Sampliner, Harinder S.Garewal, Brian, Fennerty, and Mikel, Aickin. The difference in colon polyp size before and after removal. Gastrointestinal Endoscopy 43[1], 25-28. 1-1-1996. EXC - Narrative review, references checked

Ullman, T., Odze, R., and Farraye, F. A. Diagnosis and management of dysplasia in patients with ulcerative colitis and Crohn's disease of the colon. Inflammatory Bowel Diseases 15[4], 630-638. 2009. EXC - Narrative review - references checked

Van Stolk, R. U., Beck, G. J., Baron, J. A., Haile, R., and Summers, R. Adenoma characteristics at first colonoscopy as predictors of adenoma recurrence and characteristics at follow-up. The Polyp Prevention Study Group. 19980723. Gastroenterology 115[1], 13-18. 1998. MEDLINE. EXC - Included in the reviews included in the analysis

Winawer, S. J. Appropriate intervals for surveillance. 19990407. Gastrointestinal Endoscopy 49[3:Pt 2], t-6. 1999. MEDLINE. EXC - Narrative review - references checked

Winawer, S. J., Zauber, A. G., Fletcher, R. H., Stillman, J. S., O'Brien, M. J., Levin, B., Smith, R. A., Lieberman, D. A., Burt, R. W., Levin, T. R., Bond, J. H., Brooks, D., Byers, T., Hyman, N., Kirk, L., Thorson, A., Simmang, C., Johnson, D., Rex, D. K., US Multi-Society Task Force on Colorectal Cancer, and American Cancer Society. Guidelines for colonoscopy surveillance after polypectomy: a consensus update by the US Multi-Society Task Force on Colorectal Cancer and the American Cancer Society. [Review] [83 refs]. 20060622. Gastroenterology 130[6], 1872-1885. 2006. MEDLINE. EXC - American guidelines based on literature review for post polypectomy surveillance. - references checked

Winawer, S. J., Zauber, A. G., O'Brien, M. J., May, Nah Ho, Gottlieb, L., Sternberg, S. S., Waye, J. D., Bond, J., Schapiro, M., Stewart, E. T., Panish, J., Ackroyd, F., Kurtz, R. C., Shike, M., Lightdale, C. J., Gerdes, H., Hornsby-Lewis, L., Edelman, M., and Fleisher, M. Randomized comparison of surveillance intervals after colonoscopic removal of newly diagnosed adenomatous polyps. New England Journal of Medicine 328[13], 901-906. 1993. EXC - Included in the reviews included in the analysis

Yamaji, Y., Mitsushima, T., Ikuma, H., Watabe, H., Okamoto, M., Kawabe, T., Wada, R., Doi, H., and Omata, M. Incidence and recurrence rates of colorectal adenomas estimated by annually repeated colonoscopies on asymptomatic Japanese
9523. Gut 53[4], 568-572. 2004. EXC - Included people who cancer at index colonoscopy

Yashiro, K., Nagasako, K., Sato, S., Suzuki, S., and Obata, H. Follow-up after polypectomy of colorectal adenomas. The importance of total colonoscopy. 19890927. Surgical Endoscopy 3[2], 87-91. 1989. MEDLINE. EXC - Included people who previously had CRC

6.5 Review question 4:

What are the information and support needs of people, or carers of people undergoing or considering undergoing colonoscopic surveillance?

6.5.1 Eligibility criteria

Inclusion criteria

- Population
  - Adults (18 years and older) with IBD (defined as ulcerative colitis or Crohn's disease involving the large bowel) considering colonscopy.
  - Adults with polyps (including adenomas) in the colon or rectum considering colonscopy.
- Intervention

  - Any discussion of patient preference or views on the procedure or the process of surveillance.
- Study design
  - No study design filter.

Exclusion criteria

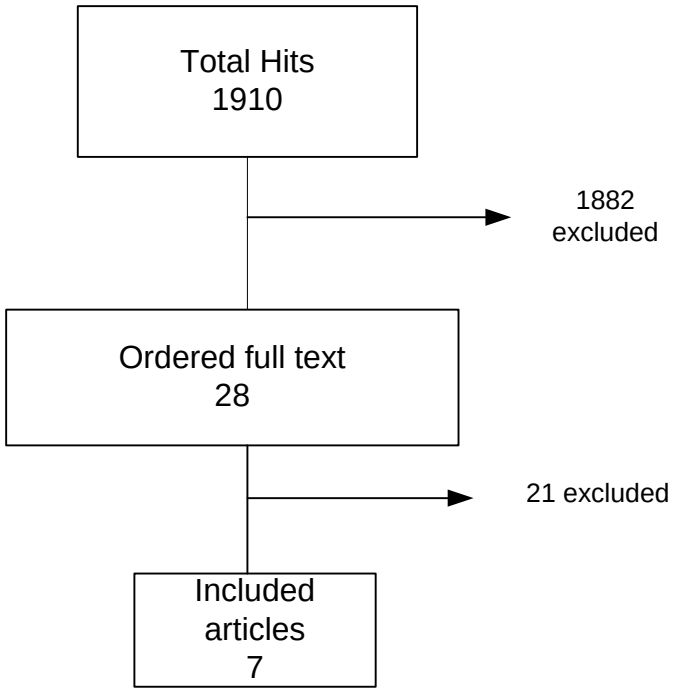
- Population
  - Children (younger than 18 years).
  - Adults with newly diagnosed or relapsed adenocarcinoma of the colon or rectum.
  - Adults with polyps that have previously been treated for colorectal cancer.
  - Adults with a genetic familial history of colorectal cancer: hereditary non-polyposis colorectal cancer.
  - Adults with a familial history of polyposis syndromes: familial adenomatous polyposis.
- Intervention
  - Views or preferences on interventions other than chromoscopy or conventional colonoscopy or surveillance.

6.5.2 Evidence review results

- Initial 1910 hits including duplicates
- Excluded on the basis of title and abstract: 1882
- Articles ordered full text: 28

Articles selected for review based on the inclusion and exclusion criteria were seven primary studies. It was agreed not to split by the evidence by groups for this question.

6.5.3 Review flow chart



6.5.4 Included studies (both groups)

Brotherstone H, Miles A, Robb KA, Atkin W, Wardle J. The impact of illustrations on public understanding of the aim of cancer screening. Patient Education and Counseling 2006; 63(3 SPEC. ISS.):328-335.

Makoul G, Cameron KA, Baker DW, Francis L, Scholtens D, Wolf MS. A multimedia patient education program on colorectal cancer screening increases knowledge and willingness to consider screening among Hispanic/Latino patients. Patient Education and Counseling 2009; 76(2):220-226.

Miles A, Atkin WS, Kralj-Hans I, Wardle J. The psychological impact of being offered surveillance colonoscopy following attendance at colorectal screening using flexible sigmoidoscopy. Journal of Medical Screening 2009; 16(3):124-130.

Rutter MD, Saunders BP, Wilkinson KH, Schofield G, Forbes A. Intangible costs and benefits of ulcerative colitis surveillance: A patient survey. Diseases of the Colon and Rectum 2006; 49(8):1177-1183.

Sequist TD, Zaslavsky AM, Marshall R, Fletcher RH, Ayanian JZ. Patient and physician reminders to promote colorectal cancer screening A randomized controlled trial. Archives of Internal Medicine 2009; 169(4):364-371.

Sheikh RA, Kapre S, Calof OM, Ward C, Raina A. Screening Preferences for Colorectal Cancer: A Patient Demographic Study. Southern Medical Journal 2004; 97(3):224-230.

Thiis-Evensen E, Wilhelmsen I, Hoff GS, Blomhoff S, Sauar J. The psychologic effect of attending a screening program for colorectal polyps. Scandinavian Journal of Gastroenterology 1999; 34(1):103-109.

6.5.5 Excluded studies

Freedom from inflammatory bowel disease: Keys to personalized ulcerative colitis management. Gastroenterology and Hepatology 4[5 SUPPL. 13], 5-14. 2008. excluded: not looking at the clinical question of interest

Akerkar, G. A., Yee, J., Hung, R., and McQuaid, K. Patient experience and preferences toward colon cancer screening: a comparison of virtual colonoscopy and conventional colonoscopy.[see comment]. 20011018. Gastrointestinal Endoscopy 54[3], 310-315. 2001. MEDLINE. excluded: comparing ctc to conventional colonoscopy

Angelucci, E., Orlando, A., Ardizzone, S., Guidi, L., Sorrentino, D., Fries, W., Astegiano, M., Sociale, O., Cesarini, M., Renna, S., Cassinotti, A., Marzo, M., Quaglia, A., Sergi, M. D., Simondi, D., Vernia, P., Malesci, A., and Danese, S. Internet use among inflammatory bowel disease patients: an Italian multicenter survey. European Journal of Gastroenterology & Hepatology 21[9], 1036-1041. 2009. In-Process. excluded: not looking at the clinical question of interest

Bosworth, H. B., Rockey, D. C., Paulson, E. K., Niedzwiecki, D., Davis, W., Sanders, L. L., Yee, J., Henderson, J., Hatten, P., Burdick, S., Sanyal, A., Rubin, D. T., Sterling, M., Akerkar, G., Bhutani, M. S., Binmoeller, K., Garvie, J., Bini, E. J., McQuaid, K., Foster, W. L., Thompson, W. M., Dachman, A., and Halvorsen, R. Prospective comparison of patient experience with colon imaging tests.[see comment]. 20060914. American Journal of Medicine 119[9], 791-799. 2006. MEDLINE. excluded: not looking at the clinical question of interest

Denberg, T. D., Coombes, J. M., Byers, T. E., Marcus, A. C., Feinberg, L. E., Steiner, J. F., and Ahnen, D. J. Effect of a mailed brochure on appointment-keeping for screening colonoscopy: A randomized trial. Annals of Internal Medicine 145[12], 895-900. 2006. excluded: appointment-keeping for screening colonoscopy

Eaden, J., Abrams, K., Shears, J., and Mayberry, J. Randomized controlled trial comparing the efficacy of a video and information leaflet versus information leaflet alone on patient knowledge about surveillance and cancer risk in ulcerative colitis. 20030305. Inflammatory Bowel Diseases 8[6], 407-412. 2002. MEDLINE. excluded: covered by makoul, 2009 and brotherstone, 2006

Gray, J. R., Leung, E., and Scales, J. Treatment of ulcerative colitis from the patient's perspective: a survey of preferences and satisfaction with therapy. Alimentary Pharmacology & Therapeutics 29[10], 1114-1120. 15-5-2009. In-Process. excluded: not looking at the clinical question of interest

Halligan, S., Altman, D. G., Taylor, S. A., Mallett, S., Deeks, J. J., Bartram, C., I, and Atkin, W. CT colonography in the detection of colorectal polyps and cancer: systematic review, meta-analysis, and proposed minimum data set for study level reporting. Radiology 237(3), 893-904. 2005. excluded: CT colonography in the detection of colorectal polyps and cancer

Halligan, S., Lilford, R. J., Wardle, J., Morton, D., Rogers, P., Wooldrage, K., Edwards, R., Kanani, R., Shah, U., and Atkin, W. Design of a multicentre randomized trial to evaluate CT colonography versus colonoscopy or barium enema for diagnosis of colonic cancer in older symptomatic patients: The SIGGAR study. Trials 8, 2007. Article Number: 32. Date of Publication: 27 Oct 2007. 2007. excluded: CT colonography versus colonoscopy or barium enema for diagnosis of colonic cancer in older symptomatic patients

Lacy, B. E., Weiser, K., Noddin, L., Robertson, D. J., Crowell, M. D., Parratt-Engstrom, C., and Grau, M. V. Irritable bowel syndrome: Patients' attitudes, concerns and level of knowledge. Alimentary Pharmacology and Therapeutics 25[11], 1329-1341. 2007. excluded: not looking at the clinical question of interest

Lydeard, S. Endoscopy: a patient's view. 19900206. Practitioner 233[1468], 696. 19-5-0099. MEDLINE. excluded: not looking at the clinical question

Macrae, F. A., Tan, K. G., and Williams, C. B. Towards safer colonoscopy: A report on the complications of 5000 diagnostic or therapeutic colonoscopies. Gut 24[5], 376-383. 1983. excluded: not looking at the clinical question of interest

Miles, A., Wardle, J., and Atkin, W. Receiving a screen-detected diagnosis of cancer: The experience of participants in the UK flexible sigmoidoscopy trial. Psycho-Oncology 12[8], 784-802. 2003. excluded: not looking at the clinical question of interest

Pernotto, D. A., Bairnsfather, L., and Sodeman, W. "Informed consent" interactive videodisc for patients having a colonoscopy, a polypectomy, and an endoscopy. 19960401. Medinfo 8, t. 1995. MEDLINE. excluded: discussion on informed consent

Robinson, R. J., Hart, A. R., and Mayberry, J. F. Cancer surveillance in ulcerative colitis: A survey of patients' knowledge. Endoscopy 28[9], 761-762. 1996. excluded: covered in the list of included papers

Schroy, P. C., Glick, J. T., Wilson, S., Robinson, P. A., and Heeren, T. C. An effective educational strategy for improving knowledge, risk perception, and risk communication among colorectal adenoma patients. Journal of Clinical Gastroenterology 42[6], 708-714. 2008. excluded: not looking at the clinical question of interest

Shen, B. Managing medical complications and recurrence after surgery for Crohn's disease. Current Gastroenterology Reports 10[6], 606-611. 2008. excluded: not looking at the clinical question of interest

Terheggen, G., Lanyl, B., Schanz, S., Hoffmann, R. M., Bohm, S. K., Leifeld, L., Pohl, C., and Kruis, W. Safety, feasibility, and tolerability of ileocolonoscopy in inflammatory bowel disease. Endoscopy 40[8], 656-663. 2008. excluded: not looking at the clinical question of interest

Wardle, J., Williamson, S., Sutton, S., Biran, A., McCaffery, K., Cuzick, J., and Atkin, W. Psychological impact of colorectal cancer screening. Health Psychology 22[1], 54-59. 2003. excluded: covered by Thiis-Evensen, 1999 and Miles, 2009

Waye, J. D. The best way to painless colonoscopy. Endoscopy 34[6], 489-491. 2002. excluded: covered by included papers

White, T. J., Avery, G. R., Kennan, N., Syed, A. M., Hartley, J. E., and Monson, J. R. T. Virtual colonoscopy vs conventional colonoscopy in patients at high risk of colorectal cancer - A prospective trial of 150 patients. Colorectal Disease 11[2], 138-145. 2009. excluded: clonoscopy versus ctc

Appendix 5 –Search strategies and literature search

Scoping searches

Scoping searches were undertaken in September 2009 using the following websites and databases (listed in alphabetical order); browsing or simple search strategies were employed. The search results were used to provide information for scope development and project planning.

Guidance/guidelines	**Systematic reviews/economic evaluations**
Age Concern England	Clinical Evidence
American Gastroenterological Association	Cochrane Database of Systematic Reviews (CDSR)
American Society of Colon & Rectal Surgeons	Database of Abstracts of Reviews of Effects (DARE)
Association of Coloproctology of Great Britain and Ireland	Health Economics Evaluations Database (HEED)
Beating Bowel Cancer	Health Technology Assessment (HTA) Database
British Geriatric Society	NHS Economic Evaluation Database (NHS EED)
British Society of Gastroenterology	NHS R&D Service Delivery and Organisation (NHS SDO) Programme
Canadian Medical Association Infobase	National Institute for Health Research (NIHR) Health Technology Assessment Programme
Clinical Knowledge Summaries	TRIP Database
Core	
Department of Health	
Guidelines International Network (GIN)	
Lynn's Bowel Cancer Campaign	
National Association for Crohn's and Colitis (NACC)	
National Health and Medical Research Council (Australia)	
National Institute for Health and	

Clinical Excellence (NICE) New Zealand Guidelines Group NHS Evidence – National Library of Guidelines NHS Evidence – Specialist Collections Primary Care Society for Gastroenterology Royal College of General Practitioners Royal College of Nursing Royal College of Paediatrics and Child Health Royal College of Pathologists Royal College of Physicians Royal College of Surgeons Scottish Intercollegiate Guidelines Network (SIGN) US National Guidelines Clearinghouse	

Main searches

The following sources were searched for the topics presented in the sections below.

- Cochrane Database of Systematic Reviews – CDSR (Wiley)
- Cochrane Central Register of Controlled Trials – CENTRAL (Wiley)
- Database of Abstracts of Reviews of Effects – DARE (CRD Databases)
- Health Technology Assessment Database HTA (CRD Databases)
- CINAHL (EBSCO and NHS Evidence – Search 2.0)
- EMBASE (Ovid)
- MEDLINE (Ovid)

- MEDLINE In-Process (Ovid)
- PSYCINFO (Ovid)

The searches were conducted in November 2009. The aim of the searches was to provide evidence on colonoscopic surveillance (using conventional colonoscopy or chromoscopy) for prevention and early detection of colorectal cancer compared with no surveillance. Search filters for systematic reviews, randomised controlled trials, and observational studies were appended to the search strategies to retrieve high quality papers (see **Identification of systematic reviews, randomised controlled trials, and observational studies**).

The MEDLINE search strategy is presented below. It was translated for use in all of the other databases.

Database: Ovid MEDLINE(R)<1950 to October Week 5 2009>

Date searched: 11th November 2009

Search strategy:

---

1. ulcerative colitis/
2. (ulcer$ adj4 colitis).tw.
3. (rectocolitis or colitide$).tw.
4. crohn disease/
5. crohn$.tw.
6. ((terminal or regional or granulomatous) adj3 (ileitis or colitis)).tw.
7. (ileocolitis or enteritis).tw.
8. inflammatory bowel disease/
9. (inflam$ adj3 bowel$ adj3 (disease$ or disorder$)).tw.
10. polyps/
11. intestinal polyps/
12. colonic polyps/
13. exp adenomatous polyps/
14. (polyp? or adenoma$).tw.
15. ((adenomatous or famil$ or hereditary or inherit$) adj3 polyposis).tw.
16. (gardner adj syndrom$).tw.
17. or/1-16
18. exp colonoscopy/
19. (colonoscop$ or coloscop$ or sigmoidoscop$ or chromoscop$).tw.
20. mass screening/
21. population surveillance/
22. or/18-21

23. 17 and 22

Identification of evidence on surveillance using other methods.

The searches were conducted in November 2009. The aim of the searches was to provide evidence on colonoscopic surveillance (using conventional colonoscopy or chromoscopy) for prevention and early detection of colorectal cancer compared with surveillance using other methods, such as flexible sigmoidoscopy, double-contrast barium enema, computed tomographic colonography,and tri-modal imaging (high resolution white light endoscopy, narrow-band imaging and auto-fluorescence imaging).

The MEDLINE search strategy is presented below. It was translated for use in all of the other databases.

Database: MEDLINE(R) <1950 to November Week 2 2009>

Date searched: 23rd November 2009

Search strategy:

---

1. ulcerative colitis/ use mesz
2. (ulcer$ adj4 colitis).tw. use mesz
3. (colitide$ or rectocolitis).tw. use mesz
4. crohn disease/ use mesz
5. crohn$.tw. use mesz
6. ((terminal or regional or granulomatous) adj3 (ileitis or colitis)).tw. use mesz
7. (ileocolitis or enteritis).tw. use mesz
8. inflammatory bowel disease/ use mesz
9. (inflam$ adj3 bowel$ adj3 (disease$ or disorder$)).tw. use mesz
10. polyps/ use mesz
11. intestinal polyps/ use mesz
12. colonic polyps/ use mesz
13. exp adenomatous polyps/ use mesz
14. (polyp? or adenoma$).tw. use mesz
15. ((adenomatous or famil$ or hereditary or inherit$) adj3 polyposis).tw. use mesz
16. (gardner adj syndrom$).tw. use mesz
17. or/1-16
18. sigmoidoscopy/ use mesz

19. proctoscopy/ use mesz
20. (sigmoid?oscop$ or proctosigmoid?oscop$ or colonograp$ or proctoscop$ or rectoscop$).tw. use mesz
21. fsig.tw. use mesz
22. barium sulfate/ use mesz
23. enema/ use mesz
24. 22 and 23
25. (barium adj3 (enema$ or exam$)).tw. use mesz
26. (double adj2 contrast$ adj2 (enema$ or exam$)).tw. use mesz
27. (contrast$ adj2 enema$).tw. use mesz
28. (clysma$ or clyster$ or enteroclysis$).tw. use mesz
29. dcbe.tw. use mesz
30. or/24-29
31. colonography, computed tomographic/ use mesz
32. (comput$ adj2 tomograp$ adj2 (colonograp$ or pneumocolon$)).tw. use mesz
33. (ct adj2 (colonograp$ or pneumocolon$)).tw. use mesz
34. (virtual adj2 (colonoscop$ or pneumocolon$)).tw. use mesz
35. (trimodal$ adj2 imag$).tw. use mesz
36. (tri adj2 modal$ adj2 imag$).tw. use mesz
37. (high adj2 resolution adj2 endoscop$).tw. use mesz
38. (white adj2 light adj2 endoscop$).tw. use mesz
39. wle.tw. use mesz
40. (narrow adj2 band adj2 imag$).tw. use mesz
41. (narrowband adj2 imag$).tw. use mesz
42. nbi.tw. use mesz
43. fluorescence/ use mesz
44. microscopy, fluorescence/ use mesz
45. (autofluorescence adj2 (imag$ or endoscop$)).tw. use mesz
46. (auto adj fluorescence adj2 (imag$ or endoscop$)).tw. use mesz
47. or/18-21,30-46
48. 17 and 47

Identification of evidence on the information and support needs of people undergoing or considering undergoing colonoscopic surveillance.

The searches were conducted in December 2009. The aim of the searches was to provide evidence on the information and support needs of people undergoing or considering undergoing colonoscopic surveillance.

The MEDLINE search strategy is presented below. It was translated for use in all of the other databases.

Database: Ovid MEDLINE(R) <1950 to November Week 3 2009>

Date searched: 10th December 2009

Search strategy:

---

1. Colitis, Ulcerative/
2. (ulcer$ adj4 colitis).tw.
3. (rectocolitis or colitide$).tw.
4. crohn disease/
5. crohn$.tw.
6. ((terminal or regional or granulomatous) adj3 (ileitis or colitis)).tw.
7. (ileocolitis or enteritis).tw.
8. inflammatory bowel disease/
9. (inflam$ adj3 bowel$ adj3 (disease$ or disorder$)).tw
10. polyps/
11. intestinal polyps/
12. colonic polyps/
13. exp adenomatous polyps/
14. (polyp? or adenoma$).tw.
15. ((adenomatous or famil$ or hereditary or inherit$) adj3 polyposis).tw.
16. (gardner adj syndrom$).tw.
17. or/1-16
18. exp colonoscopy/
19. proctoscopy/
20. (colonoscop$ or coloscop$ or colonograp$ or chromoscop$ or sigmoid?oscop$ or proctosigmoid?scop$ or proctoscop$ or rectoscop$).tw.
21. fsig.tw.
22. barium sulfate/
23. enema/
24. 22 and 23
25. (barium adj3 (enema$ or exam$)).tw.
26. (double adj2 contrast$ adj2 (enema$ or exam$)).tw
27. (contrast$ adj2 enema$).tw.
28. (clysma$ or clyster$ or enteroclysis$).tw.
29. dcbe.tw.
30. or/24-29

31. colonography, computed tomographic/
32. (comput$ adj2 tomograp$ adj2 (colonograp$ or pneumocolon$)).tw.
33. (ct adj2 (colonograp$ or pneumocolon$)).tw.
34. (virtual adj2 (colonoscop$ or pneumocolon$)).tw.
35. (trimodal$ adj2 imag$).tw.
36. (tri adj2 modal$ adj2 imag$).tw.
37. (high adj2 resolution adj2 endoscop$).tw.
38. (white adj2 light adj2 endoscop$).tw.
39. wle.tw.
40. (narrow adj2 band adj2 imag$).tw.
41. (narrowband adj2 imag$).tw.
42. nbi.tw.
43. fluorescence/
44. microscopy, fluorescence/
45. (autofluorescence adj2 (imag$ or endoscop$)).tw.
46. (auto adj fluorescence adj2 (imag$ or endoscop$)).tw.
47. population surveillance/
48. mass screening/
49. or/18-21,30-48
50. 17 and 49
51. Qualitative research/
52. Nursing Methodology Research/
53. Interview/
54. Questionnaires/
55. Narration/
56. Health Care Surveys/
57. (qualitative$ or interview$ or focus group$ or questionnaire$ or narrative$ or narration$ or survey$).tw.
58. (ethno$ or emic or etic or phenomenolog$ or grounded theory or constant compar$ or (thematic$ adj3 analys$) or theoretical sampl$ or purposive sampl$).tw.
59. (hermeneutic$ or heidegger$ or husser$ or colaizzi$ or van kaam$ or van manen$ or giorgi$ or glasser$ or strauss$ or ricoeur$ or spiegelberg$ or merleau$).tw.
60. (metasynthes$ or meta-synthes$ or metasummar$ or meta-summar$ or metastud$ or meta-stud$).tw.
61. or/51-60
62. 50 and 61
63. Patients/

64. Family/
65. Spouses/
66. Caregivers/
67. or/63-66
68. Pamphlets/
69. Needs Assessment/
70. Information Centers/
71. Information Services/
72. Health Education/
73. Information Dissemination/
74. Counseling/
75. Social Support/
76. Self-Help Groups/
77. Self Care/
78. or/68-77
79. 67 and 78
80. Patient Education as Topic/
81. Patient Education Handout.pt.
82. Consumer Health Information/
83. ((patient$ or famil$ or relative$ or carer$ or caregiver$ or care-giver$ or spous$ or husband$ or wife$ or wive$ or partner$) adj5 (educat$ or informat$ or communicat$ or pamphlet$ or handout$ or hand-out$ or hand out$ or booklet$ or leaflet$ or support$ or need$ or advice$ or advis$)).ti.
84. ((patient$ or famil$ or relative$ or carer$ or caregiver$ or care-giver$ or spous$ or husband$ or wife$ or wive$ or partner$) adj5 (counsel$ or selfhelp$ or self-help$ or self help$ or selfcar$ or self-car$ or self car$)).ti.
85. or/80-84
86. 79 or 85
87. 50 and 86
88. exp patients/px
89. exp parents/px
90. exp family/px
91. caregivers/px
92. stress, psychological/
93. Emotions/
94. Anxiety/
95. Fear/
96. exp consumer satisfaction/

97. ((patient$ or parent$ or famil$ or carer$ or caregiver$ or care-giver$ or inpatient$ or in-patient$) adj2 (experience$ or belief$ or stress$ or emotion$ or anx$ or fear$ or concern$ or uncertain$ or unsure$ or thought$ or feeling$ or felt$ or view$ or opinion$ or perception$ or perspective$ or attitud$ or satisfact$ or know$ or understand$ or aware$)).tw.
98. or/88-97
99. 50 and 98
100. 62 or 87 or 99
101. limit 100 to english language

Identification of systematic reviews, randomised controlled trials, and observational studies

Search filters for systematic reviews, randomised controlled trials, and observational studies were appended to the search strategy on **Identification of evidence on colonoscopic surveillance (and evidence on surveillance using other methods** above to retrieve high quality evidence.

The MEDLINE search filters are presented below. They were translated for use in the MEDLINE and EMBASE searches.

Systematic Reviews

1. Meta-Analysis.pt.
2. Meta-Analysis as Topic/
3. Review.pt.
4. exp Review Literature as Topic/
5. (metaanaly$ or metanaly$ or (meta adj2 analy$)).tw.
6. (review$ or overview$).tw.
7. (systematic$ adj4 (review$ or overview$)).tw.
8. ((quantitative$ or qualitative$) adj4 (review$ or overview$)).tw.
9. ((studies or trial$) adj1 (review$ or overview$)).tw.
10.(integrat$ adj2 (research or review$ or literature)).tw.
11.(pool$ adj1 (analy$ or data)).tw.
12.(handsearch$ or (hand adj2 search$)).tw.
13.(manual$ adj2 search$).tw.
14. or/1-13

Randomised Controlled Trials

1. Randomized Controlled Trial.pt.
2. Controlled Clinical Trial.pt.
3. Clinical Trial.pt.
4. exp Clinical Trials as Topic/
5. placebos/
6. Random Allocation/
7. Double-blind Method/
8. Single-Blind Method/
9. Cross-Over Studies/
10. ((random$ or control$ or clinical$) adj2 (trial$ or stud$)).tw.
11. (random$ adj2 allocat$).tw.
12. placebo$.tw.
13. ((singl$ or doubl$ or trebl$ or tripl$) adj (blind$ or mask$)).tw.
14. (crossover$ or (cross adj over$)).tw.
15. or/1-14

Observational Studies

1. Epidemiological studies/
2. exp case-control studies/
3. exp cohort studies/
4. Cross-Sectional Studies/
5. Comparative Study.pt.
6. case control$.tw.
7. case series.tw.
8. (cohort adj (study or studies)).tw.
9. cohort analy$.tw
10. (follow up adj (study or studies)).tw.
11. (observational adj (study or studies)).tw.
12. longitudinal.tw.
13. prospective.tw.
14. retrospective.tw.
15. cross sectional.tw.
16. or/1-15

Health economics

Sources

The following sources were searched to identify economic evaluations and quality of life data relating to colonoscopic surveillance (using conventional colonoscopy or chromoscopy) for prevention and early detection of colorectal cancer compared with no surveillance

- Health Economic Evaluations Database – HEED (Wiley)
- NHS Economic Evauation Database – NHS EED (Wiley and CRD website)
- EMBASE (Ovid)
- MEDLINE (Ovid)
- MEDLINE In-Process (Ovid)

Strategies

The searches were undertaken in November 2009. The MEDLINE search strategy presented in the sections RQ1 and RQ2 were used and translated for use in NHS EED and HEED. Filters to retrieve economic evaluations and quality of life papers were appended to the MEDLINE search strategy to identify relevant evidence.

The MEDLINE economic evaluations and quality of life search filters are presented below. They were translated for use in the MEDLINE In-Process and EMBASE databases.

Economics evaluations

1. Economics/
2. exp "Costs and Cost Analysis"/
3. Economics, Dental/
4. exp Economics, Hospital/
5. exp Economics, Medical/
6. Economics, Nursing/
7. Economics, Pharmaceutical/
8. Budgets/
9. exp Models, Economic/
10. Markov Chains/

11. Monte Carlo Method/
12. Decision Trees/
13. econom$.tw.
14. cba.tw.
15. cea.tw.
16. cua.tw.
17. markov$.tw.
18. (monte adj carlo).tw.
19. (decision adj2 (tree$ or analys$)).tw.
20. (cost or costs or costing$ or costly or costed).tw.
21. (price$ or pricing$).tw.
22. budget$.tw.
23. expenditure$.tw.
24. (value adj2 (money or monetary)).tw.
25. (pharmacoeconomic$ or (pharmaco adj economic$)).tw.
26. or/1-25

Quality of life

1. "Quality of Life"/
2. quality of life.tw.
3. "Value of Life"/
4. Quality-Adjusted Life Years/
5. quality adjusted life.tw.
6. (qaly$ or qald$ or qale$ or qtime$).tw.
7. disability adjusted life.tw.
8. daly$.tw.
9. Health Status Indicators/
10. (sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).tw.
11. (sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).tw.
12. (sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).tw.
13. (sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).tw.
14. (sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).tw.

15. (euroqol or euro qol or eq5d or eq 5d).tw.
16. (qol or hql or hqol or hrqol).tw.
17. (hye or hyes).tw.
18. health$ year$ equivalent$.tw.
19. utilit$.tw.
20. (hui or hui1 or hui2 or hui3).tw.
21. disutili$.tw.
22. rosser.tw.
23. quality of wellbeing.tw.
24. quality of well-being.tw.
25. qwb.tw.
26. willingness to pay.tw.
27. standard gamble$.tw.
28. time trade off.tw.
29. time tradeoff.tw.
30. tto.tw.
31. or/1-30

Appendix 6 – Evidence tables

Review question 1: People with inflammatory bowel disease

Evidence table for review question 1: Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease clinically effective compared with no surveillance?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
Choi 1993	Prospective case control study. The authors compared the groups for: a) age at diagnosis of ulcerative colitis (UC) b) age at diagnosis of cancer c) duration of UC before cancer. No statistically significant difference was found by the Mann-Whitney test (P > 0.05)	The median follow-up after diagnosis of cancer until death or last visit was 4.9 years (range 0.4–11.4 years) for the surveillance group and 1.4 years (range 0.1–12.1 years) for the no surveillance group.	Patients with ulcerative colitis from the Lahey Clinic Medical Center in Seattle, USA (N = 050). Patients with duration of disease of 8 years or more and extension of disease proximal to the sigmoid colon were included. CRC incidence: 41 had colorectal carcinoma out of 2050 patients; 19 of those had surveillance and 22 did not have surveillance.	The patients on surveillance had biopsies every 2 years (every 3 years in the early years of the programme) after negative results on two consecutive annual examinations. Any specimens with suspicion of dysplasia were reviewed by two pathologists. In patients with biopsies indefinite dysplasia was investigated every 6–12 months, for low-grade dysplasia it was 3–6 months and for high-grade dysplasia or for a dysplasia-associated lesion or mass, colectomy was advised.	No surveillance	Survival analysis was done using the Kaplan-Meier product limit method. The statistical significance of differences was analysed by the Tarone-Ware method. ***Duke's Stage of carcinoma when detected:*** 15/19 were detected at Duke's stage A or B for the surveillance group versus 9/22 for the no surveillance group (P = 0.039). The removal of two patients whose colorectal carcinoma was detected without surveillance still showed a statistically significant difference (P = 0.036). ***5-year survival:*** 5-year overall survival rate was 77.2%±10.1% for the surveillance group versus 36.3%±12.7% for the no surveillance group (P = 0.026). Removing the patients whose colorectal carcinoma was detected without surveillance still showed a statistically significant difference (P = 0.037) and 5-year overall survival in the surveillance arm changed to 76.2%±12.1%. The 5-year survival of the two groups by Dukes' stage did not show a statistically significant difference (P > 0.05). ***Overall Mortality:*** 4 deaths occurred in the surveillance group versus 11 in the	The authors state that the big difference in the follow-up time between the two groups was the high early mortality rate for the no surveillance group. The study compared the two groups for three different criteria and found no statistical significance.

Evidence table for review question 1: Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease clinically effective compared with no surveillance?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
						no surveillance group.	
Lashner 1990	Historical cohort study Crude survival analysis was done using Kaplan-Meier product limit survival curves and differences in the two groups were adjusted to remove confounding factors via Cox proportional hazards model.	Eligible patients entered the registry on June 15 1984, until death or the end of the study on November. 15 1986	Patients (N = 186) were taken from the Chicago inflammatory bowel disease registry. Eligible patients had extensive ulcerative colitis (defined as continued disease from any point proximal to the splenic flexure to the distal rectum) with at least 9 years of disease duration. Cohort 1: n = 91 had surveillance at least once during the study period. Cohort 2: n = 95 had no surveillance within the study (but could have it outside).	Colonoscopic surveillance at least once during the study period. Patients had 4.2± 3.0 (range 1–16) colonoscopies during the study period and at a mean of 17 years after symptom onset. Patients who were found to have cancer on referral or their first colonoscopy were excluded.	No surveillance within the programme	No statistically significant difference was seen between the two groups in sample size, sex, age at symptom onset and family history for colon cancer. There was no morbidity or mortality directly from colonoscopy. A total of 92%of people from the surveillance group and 94% from the control group had complete vital status information at the end of the study. ***Duration of disease at colectomy:*** 19±2.7 years in the surveillance group versus 14.3±11.8 years in the control group. ***Colectomy:*** 33 people in the surveillance group versus 51 in the control group. Colectomy was performed 4 years later in the surveillance group. ***Indication for colectomy: cancer –*** 3 people in the surveillance group versus 6 in the control group; ***dysplasia -*** 10 people in the surveillance group versus 3 in the control group; ***active disease:*** 20 people in the surveillance group versus 42 in the control group. ***Mortality:*** 6 people in the surveillance group versus 14 in the control group. However, the deaths caused by cancer were more frequent in the surveillance group than in the control group, where deaths were more frequent because of exacerbation. The survival curves showed a significant reduction in	The authors mention potential sources of bias for misclassification for both surveillance and cancer. As some patients had their dysplasia discovered in programmes outside the study surveillance and some patients not receiving surveillance could have had surveillance outside the surveillance programme within the study, further error could have been introduced. The sample size of the study was also small and this could potentially favour the null hypothesis. The study had an overall follow up of 93% of patients giving it a high validity. The authors also performed a Cox proportional hazards model to adjust for prognostic factors.

Evidence table for review question 1: Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease clinically effective compared with no surveillance?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
						mortality in the surveillance group ($p < 0.05$). **Using the Cox proportional hazards model** the surveillance group had 61% reduction in mortality compared with the control group. The relative risk for death was 0.39 (95% CI, 0.15–1.00). ***Cancer detection rate:*** the surveillance group had 67% increased cancer detection rate compared with the control group. The relative risk for cancer detection was 1.67(95% CI, 0.30–9.33). ***Colectomy:*** the surveillance group had 47% reduction in colectomy rate compared with the control group. The relative risk for colectomy was 0.53 (95% CI, 0.34–0.83).	
Lutgens 2009	Retrospective case control study. The characteristics of people in the surveillance group and non-surveillance group were compared for the type of IBD, gender, comorbidity, median age at	Data were taken from 1971 to 1 July 2006 (primary end point of the study) or the date of death. When a patient was lost to follow-up, the last visit to the hospital was recorded as end of follow-up.	Patients with IBD (N = 149; 89 with ulcerative colitis, 59 with Crohn's disease and 1 with indeterminate colitis) with CRC were taken from a nationwide pathology database (PALGA) in the Netherlands. Overall 42 deaths occurred from 145 (29%) people and metastasised CRC was the direct	Colonoscopic surveillance (n = 23) For the surveillance group patients had to have at least one or more surveillance colonoscopies at regular intervals (every 1–3 years). The surveillance had to be done with the intention of detecting neoplasia and by taking four random biopsies every 10 cm in addition to targeted biopsies of suspicious areas.	No surveillance (n = 126)	Survival analyses were calculated by Kaplan-Meier curves and Cox regression analyses were used for calculations and the Tarone-Ware method was used to compare the differences between the survival curves. ***Overall Survival*** The overall 5-year survival rates were 100% in the surveillance group and 65% in the non-surveillance group ($P = 0.029$). ***Overall Mortality*** One patient from the surveillance group died compared with 29 in the non-surveillance group ($P = 0.047$). The CRC-related 5-year mortalities were 0%	The study has both ulcerative colitis and Crohn's disease patients within the analysis. There were no statistically significant differences seen between the two groups in patient characteristics. Cox regression analysis was used to see the effect of type of IBD, age at CRC diagnosis, comorbidity, presence of primary sclerosing cholangitis and surveillance on CRC-related mortality.

Evidence table for review question 1: Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease clinically effective compared with no surveillance?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
	IBD diagnosis, median age at CRC diagnosis, presence of primary sclerosing colangitis, median interval between onset of IBD symptoms and diagnosis of CRC and mean follow-up time after CRC. No statistically significant difference was found between the groups.	21% (31 patients) were lost to follow-up. Four of these were immediately after diagnosis of CRC and were excluded from survival analysis.	cause of death for 30 of those (six patients died from metastasis of a different cancer, and another six died from complications from colectomy.	Surveillance started after a median of 14.3 (standard 8) years after diagnosis of IBD. CRC developed after a median of 6.4 years (range 1–21) after initiation of surveillance.		in the surveillance group and 26% in the non-surveillance group (P = 0.042). Cox regression analysis showed that colonoscopic surveillance improved survival and CRC-related mortality but this did not reach statistical significance (P = 0.10, and 0.08 when 11 patients that had simultaneous IBD and CRC diagnosis were excluded). When the 11 patients were excluded, the 5-year overall mortality changed to 0% in the surveillance group and 36% in the non-surveillance group (P = 0.02). The CRC-related mortality changed to 0% and 29% (P = 0.03). ***Tumour Stage*** Tumour classification was not available for 11 patients (93%). There were 12 (52%) patients in the surveillance group in whom tumours were detected at stage 0 or 1 (AJCC – American Joint Committee on Cancer, which is equivalent to T in situ and T1, T2, NO, MO) compared with 28 (24%) in the no surveillance group (P = 0.004). There were fewer people with advanced stage tumours, stage 3B–C and 4 tumours (AJCC, which is equivalent to T3, T4, N1, N2, MO, M1), in the surveillance group compared with 48 (42%) in the non-surveillance group (P = 0.049). ***5-ASA prescription*** Ten patients (7%) did not have any information regarding the use of 5-ASA	The authors tried to minimise selection bias by excluding patients that were diagnosed with IBD and CRC simultaneously. The authors stated that lack of randomisation may lead to volunteer bias, but felt that because the mean duration of disease was longer (22.7 years versus 19.3 years) this was not a major issue. Four cancers in the surveillance group were found to be interval cancers, but it was hard to determine if these were due to failure of detection during a previous colonoscopy.

Evidence table for review question 1: Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease clinically effective compared with no surveillance?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
						prescription, so were excluded from the analysis. Out of the included 139 people, 119 (86%) had used 5-ASA during the course of their disease and 64 (54%) of those had 5-ASA medication for more than three-quarters of their disease duration and all developed CRC. In the surveillance group 20 (100%) and 96 (77%) in the no surveillance group had used 5-ASA preparations (P = 0.08). Using Cox regression, the effect of 5-ASA on survival and surveillance is not significant (P = 0.96 and P = 0.098 respectively).	

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1 Review question 2A: People with Inflammatory bowel disease

2 **Colonoscopic surveillance for colorectal cancer in high-risk groups: polyps.**

Evidence table for review question 1B: Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with polyps clinically effective compared with no surveillance?

Study ID	Study Design	Follow-up	Population	Intervention	Comparison	Outcomes	Comments
E. Thiss-Evensen, 1999.	Prospective cohort study. Population randomised into a screening (intervention) group and a control group.	1983–1996 Study represents 9600 person-years of follow up.	Screening (intervention group): 400 men and women in Oslo, Norway. Control group: 399. 324 (81%) out of the 400 enrolled attended the screening because of the presence of polyps in 1983, 277 (85%) were still alive in 1996. In the control group of 399, 358 (89%) were still alive. 210 (76%) from the screening group and 241 (68%) in the control group, altogether 451 people (71%) attended in 1996. Mean age of people attending was 67.4 years in the screening group and 67 years in the control group. Range: 63–72 years in both groups.	Screening intervention with FSIG and colonoscopy.	No screening.	Forty-eight of the controls (12% of the original group of 399) had a colonoscopic examination between 1983 and 1996. Ten of these people had a total of 18 adenomas removed, 8 of which measured 5–10 mm in diameter and the largest 10 mm; none showed more than moderate dysplasia. In the screening group 27 (7% of the original group of 400) had had a colonoscopy other than the study colonoscopies in 1983, 1985 and 1989. Three of these people (1%) each had one adenoma removed, the largest measuring 5 mm in diameter and showing moderate dysplasia. **Incidence of CRC:** 12 people had CRC diagnosed in the course of 13 years of observation. Two people in the screening group had CRC compared with 10 in the control group (relative risk 0.2; 95% CI, 0.03–0.95, P = 0.02). **Overall mortality:** overall accumulated death rate, from January 1983 to December 1994, showed 55 (14%) deaths in the screening group, compared with 35 (9%) in the	324 (81%) people accepted FSIG screening at the initial stage (mean age 54.4 years). People in whom polyps were detected had a full colonoscopy with polypectomy and were offered follow up by colonoscopy with polypectomy. People in the control group were not informed about their status as enrolled control. The people in both groups matched for age, sex and body mass index.

Evidence table for review question 1B: Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with polyps clinically effective compared with no surveillance?

Study ID	Study Design	Follow-up	Population	Intervention	Comparison	Outcomes	Comments
						control group (relative risk 1.57; 95% CI, 1.03–2.4, P = 0.02). The higher mortality in the screening group could be explained by a collectively higher frequency of deaths caused by coronary heart disease, cerebrovascular accidents, sudden death, chronic obstructive lung disease and alcohol abuse (P = 0.03). ***Adverse effects*** There were no complications from the endoscopic examinations and polypectomies.	
O.D. Jorgensen, 1993, 2007.	Prospective randomised study of patients with colorectal adenomas subject to different surveillance follow up. The group was compared with controls from the normal Danish population, Eide (1986) and Stryker (1987), matched for age and sex.	Long term (1–24 years) colonoscopic surveillance.	Population of patients with all types of adenomas regardless of size and method of removal. 2041 patients were included from 1978 to 2002. Their ages were between 24 and 76 years old (average 60.8 years for men and 60.1 years for women). 497 men and 362 women had advanced adenoma that is,. Adenomas > 10 mm A clean colon was achieved before patients were included in the study. No patient had a history of Familial adenomatous polyposis (FAP), Hereditary Nonpolyposis Colorectal	Surveillance intervention with colonoscopy supplemented with double contrast barium enema (DCBE). Colonoscopy was performed in all patients and complete in 1871; incomplete colonoscopy was supplemented by DCBE in 148 leaving 22	No surveillance.	115 of 2041patients had reached 24 years after inclusion at November 2002. Colonoscopy had been performed 6289 times and DCBE 998 times during 13993 patient years of surveillance. Compliance: 72.9% in men and 76.3% in women. Colonoscopy was complete in 95% of the examinations for men and 92% for women. **Incidence of CRC:** CRC was found in 27 (23.48%) of the 115 that reached 24 years (relative risk 0.65; 95% CI, 0.43–0.95) of which fourteen were men (relative risk 0.54; 95% CI, 0.29–0.90) and 13 were women (relative risk 0.86; 95% CI 0.46–1.46). At the end of the study, three patients died from CRC (relative risk 0.12; 95% CI, 0.03–0.36). **Risk of CRC relative to various reference populations:** RR (95% CI)	The relative risk of CRC and death from CRC in the total study population (2041 patients) was calculated from 1978 to 2002 by dividing the observed number by the number expected in a standard Danish population with the same age and sex distribution. The estimates of RR were adjusted for differences in the age, sex and calendar specific incidence and death rates.

Evidence table for review question 1B: Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with polyps clinically effective compared with no surveillance?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
			Cancer (HNCC) or IBD. Patients participating in a chemoprevention trial were excluded.	who had documentation of a clean colon without neoplasia.		Large (≥ 10 mm) adenomas – 0.16 (0.08–0.30) Severe dysplastic adenomas – 0.09 (0.04–0.17) Villous adenomas – 0.96 (0.46–1.76) All with adenomas – 0.89 (0.43–1.64) Large (≥ 10 mm) adenomas – 0.57 (0.27–1.04) **Adverse effects:** severe complications from surveillance examinations were seen in 20 patients and two died from these complications. One death was from diagnostic colonic perforation and the other from coronary occlusion after colonoscopy with polypectomy.	

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1 Review question 2A: People with adenomatous polyps

Evidence table for review question 2A (a,b): Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease or polyps clinically effective compared with comparators?

<table>
<tr><th>Study ID</th><th>Study Design</th><th>Follow-up</th><th>Population</th><th>Intervention</th><th>Comparison</th><th>Outcomes</th><th>Comments</th></tr>
<tr>
<td>Van den Broek, 2009</td>
<td>Systematic review of three randomised control trials (RCT): Narrow band imaging (NBI) versus white light endoscopy (WLE)
• Rex and Helbig, 2007
• Alder, 2007
• Inoue, 2008</td>
<td colspan="4">
Percentage of patients with at least 1 adenoma and mean number of adenomas per examined patient for NBI versus WLE (RCTs)
<table>
<tr><th>Author (RCT): NBI vs WLE</th><th>No. of NBI</th><th>No. of WLE</th><th>Patients with adenoma detected by NBI (%)</th><th>Patients with adenoma detected by WLE (%)</th><th>Odds ratio (95% CI) of NBI vs WLE</th><th>No. of adenomas detected by NBI (mean per patient)</th><th>No. of adenomas detected by WLE (mean per patient)</th><th>Relative ratio (95% CI)</th></tr>
<tr><td>Rex and Helbig, 2007</td><td>217</td><td>217</td><td>140 (65%)</td><td>145 (67%)</td><td>0.90 (0.61-1.34)</td><td>403 (1.86)</td><td>395 (1.82)</td><td>1.02 (0.89-1.17)</td></tr>
<tr><td>Alder, 2007</td><td>198</td><td>198</td><td>45 (23%)</td><td>33 (17%)</td><td>1.47 (0.89-2.42)</td><td>65 (0.33)</td><td>51 (0.26)</td><td>1.27 (0.88-1.84)</td></tr>
<tr><td>Inoue, 2008</td><td>122</td><td>121</td><td>51 (42%)</td><td>41 (34%)</td><td>1.40 (0.83-2.36)</td><td>103 (0.84)*</td><td>66 (0.55)*</td><td>1.55 (1.14-2.11)</td></tr>
<tr><td>Pooled results</td><td>537</td><td>536</td><td>236 (44%)</td><td>219 (41%)</td><td>1.19(0.86-1.64)</td><td>571 (1.06)</td><td>512 (0.96)</td><td>1.23 (0.93-1.61)</td></tr>
</table>
*Includes 2 invasive cancers

Rex and Helbig, 2007: Four hundred and thirty four patients were included aged 50 years or older with intact colon. There was no difference in the percent of patients with adenoma for the entire cohort in WLE (67%) vs NBI (65%) (p = 0.61).
One highly experienced endoscopist performed all examinations. No complication occurred.

Alder, 2007: Four hundred and one patients were included (mean age 59.4 years, 52.6% men). Adenomas were detected more frequently in the NBI group (23%) than in the control (17%) with a number of 17
</td>
<td>Inoue, 2008 demonstrated a significantly improved adenoma detection rate by NBI vs WLE (mean number of adenomas per evaluated patient, 0.84 vs 0.55; p = .046). No advantage for NBI could be demonstrated when the proportions of patients with at least 1 adenoma was compared between NBI and WLE.
An insufficient allocation method caused inadequate distribution of NBI procedures among all participating endoscopists

Rex and Helbig and Adler et al could not demonstrate an increased adenoma detection rate (both per lesion and per patient) by NBI in 2 large randomized studies.

Some differences existed among the 3 randomized studies:
• Rex and Helbig use high-definition monitors, which may improve</td>
</tr>
</table>

Evidence table for review question 2A (a,b): Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease or polyps clinically effective compared with comparators?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
		colonoscopies needed to find one additional adenoma patient; **however the difference was not statistically significant *(p = 0.129).*** seven endoscopists without previous experience with NBI performed the examinations. **Inoue, 2008:** Two hundred and five polyps were removed from 109 (44.86%) patients; 127 (67%) were assigned to the NBI group and 78 (38%) to the control group (WLE). Of the 205 polyps detected, 169 (82.4%) were neoplastic, with 66 (39.1%) detected in the control group and 103 (60.1%) detected in the NBI group. Six endoscopists with unknown experience performed the examinations, of whom 1 performed >60% of the examinations. There were **no immediate complications**. All patients were contacted within 2 weeks after the procedure, and **none of them reported any significant adverse effects from colonoscopy or polyp resection**.				adenoma detection compared with standard monitors. • Differences in NBI-systems, inclusion criteria, and experience of endoscopists. The pooled result of the 3 randomized studies revealed a non significant increase in patients with at least 1 adenoma (odds ratio [OR] 1.19; 95% CI, 0.86-1.64) or total number of adenomas (OR 1.23; 95% CI, 0.93-1.61) when NBI was used for detection.
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
Dekker, 2007	Prospective RCT: Cross-over study design		Forty-two patients with longstanding ulcerative colitis. The study group comprised 31 men and 11 women with a mean age (±SD) of 50 ± 11.2 years. The mean duration (±SD) of their ulcerative colitis was 21 ± 8.6 years.	Narrow-banding imaging (NBI)	Conventional colonoscopy	**The number of patients** with true positive findings (8 for NBI vs. 7 for WLE) and false-positive findings (9 for NBI vs. 6 for WLE) for the endoscopic procedures ***was not significantly different (p = 0.705 and p = 0.581, respectively).***	All participants underwent NBI and conventional colonoscopy with at least 3 weeks between the 2 procedures to allow healing of any biopsy sites. All colonoscopies were performed by one of three experienced endoscopists, who were blinded with respect to the

Evidence table for review question 2A (a,b): Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease or polyps clinically effective compared with comparators?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
						There was no significant difference in the number of detected neoplastic lesions between the 2 techniques (9 for NBI vs. 12 for WLE, p = 0.672). **Only the number of false-positive lesions was significantly higher for NBI than is was for WLE (43 vs. 16, p = 0.015)**	endoscopic and histopathological findings of the first procedure. The Narrow-binding imaging system used in this study was a first generation prototype, which might explain the low yield of NBI.
Rex, 1995	RCT		One hundred and forty-nine patients aged 40 years or more with symptoms suggestive of colonic disease were randomized. Mean age was 63 years.	Flexible sigmoidoscopy (FSIG) plus air-contrast barium enema (ACBE).	Colonoscopy	More of the patients undergoing colonoscopy first had at least one adenoma, and this difference approached significance (OR, 2.07; 95% CI, 0.90-4.92). More large adenomas (≥5mm and ≥1cm) were detected in patients undergoing colonoscopy first, but these differences did not reach significance. Patients initially undergoing FSIG plus ACBE were more likely to require the alternative procedure (colonoscopy) than were patients initially undergoing colonoscopy to require ACBE (OR, 4.46; 95% CI, 1.47-16.4).	Patient with incomplete initial colonoscopy and patients with polyps seen on FSIG plus barium enema underwent alternative procedure (barium enema or colonoscopy). No significant difference was noted in demographic, historical, clinical, or biochemical variables between the 2 groups. The strategy of initial FSIG plus ACBE detected more patient with diverticulosis than did initial colonoscopy, whereas the strategy of initial colonoscopy detected more patients with adenomas (p = 0.06)

Evidence table for review question 2A (a,b): Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease or polyps clinically effective compared with comparators?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
Mulhall, 2005	Systematic review and Meta-Analysis on CT colonography	Prospective studies of adults undergoing CT Colonography after full bowel preparation, with colonoscopy as the gold standard were selected. Data on sensitivity and specificity overall and for detection of polyps less than 6mm, 6 to 9mm, and greater than 9mm in size were abstracted. Thirty three studies provided data on 6393 patients. **The overall pooled per patient sensitivity:** for CT colonography was 70% (95% CI, 53% to 87%). Sensitivity increased progressively as polyp size increased: It was 48% (CI, 25% to 70%) (Range, 14% to 86%) for detection of polyps smaller than 6mm, 70% (CI, 55% to 84%) (Range, 30% to 95%) for polyps 6 to 9mm, and 85% (CI, 79% to 91%) (Range, 48% to 100%) for polyps larger than 9mm. Each of these analyses was statistically heterogeneous. **Overall pooled per patient specificity:** Specificity was more consistent across polyp sizes. Overall, CT colonography was 86% specific (CI, 84% to 88%) on the basis of data from 14 studies. Specificity improved as polyp size increased, and the results were homogeneous within each stratum. Four studies reported specificity for detection of polyps smaller than 6mm, and the pooled specificity from these studies was 91% (CI, 89% to 95%). For polyps 6 to 9mm in size (6 studies), specificity was 93% (CI, 91% to 95%) and to 97% (CI, 96% to 97%) for polyps larger than 9mm (15 studies).				Characteristics of the CT colonography scanner, including width of collimation, type of detector, and mode of imaging, explained some of the heterogeneity. Limitations: the studies differed widely, and the extractable variables explained only a small amount of the heterogeneity. Only a few studies examined the newest CT colonography.
Winawer, 2000	Controlled trial comparing colonoscopy and double-contrast barium enema (DCBE)		Nine hundred and seventy three patients underwent one or more colonoscopic examinations for surveillance. In 580 of these patients, 862 paired colonoscopic examinations and barium enema was performed.	Colonoscopic and barium enema examination.	Colonoscopic examination without barium enema.	Polyps were detected in 392 of the 862 colonoscopic examinations (45%); adenomas were detected in 242 colonoscopic examinations (28%). Findings on barium enema were positive in 222 of the 862 paired examinations (26%) and in 139 of the 392 colonoscopic examinations in which one or more polyps were detected (rate of	The study design permitted a direct blinded comparison of colonoscopic examination with barium enema without interfering with complete colonoscopy in each patient. Colonoscopy was used as the reference measure with the knowledge that it is not perfect and does miss polyps. In this study, the rate of missed adenomas was 20% for

Evidence table for review question 2A (a,b): Is colonoscopic surveillance for prevention and/or early detection of colorectal cancer in adults with inflammatory bowel disease or polyps clinically effective compared with comparators?							
Study ID	**Study Design**	**Follow-up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
						detection of polyps, 35%; CI, 31% - 40%). Half of these polyps were adenomas, and the remainder were primarily normal mucosal tags, with some hyperplastic polyps.	colonoscopic examination, and all missed polyps were ≤1.0cm.

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Review question 2B: People with Inflammatory bowel disease

Evidence Table for Review question 2B: Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with Inflammatory Bowel Disease clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?

Study ID	Study Design	Follow up	Population	Intervention	Comparison	Outcomes	Comments
Kiesslich 2003	Prospective randomised trial. Randomised 1:1 into two groups A or B – chromoendoscopy (with the use of a dye) or with conventional endoscopy respectively. The randomization was done using a computer aided system and the results were kept in a sealed envelope and opened only before the colonoscopy by an independent	None	Total (N=165): group A- chromoendoscopy (n=84) and group B- conventional endoscopy (n=81). 263 consecutive patients with clinically inactive, long standing ulcerative colitis (≥8 years) were recruited from an outpatient clinic in University of Mainz, Germany. The sample size was calculated to be 170 patients (85 in each group) using alpha as 0.05 and a power of 90%	Chromoscopy using 0.1% methylene blue (A, n=84). For group A the colon was stained in a segmented fashion, 30 cm at a time using a spraying catheter (Olympus PW-IL, Hmaburg, Germany). After 1-minute excess dye was removed by suction and staining was considered complete when the tiny glandular duct openings of the mucosa were (pits) were clearly visible. Magnification	Conventional colonoscopy (B, n=81). In group B the colonoscopy was performed using conventional video colonoscopes The average duration for the procedure was 35±9.3 minutes (range 19-59 minutes)	***Targeted biopsies*** An average of 40.8 biopsies was taken per patient: 42.2 biopsies per patient in group A and 38.2 in group B. For A, 14.4/42.2 biopsies were targeted compared to 4.3/38.2 biopsies in group B (P=0.044). ***Colorectal neoplasia*** A total of 46 neoplastic lesions were seen in 19 patients. 42 of these lesions were intraepithelial neoplasia (32 LGD, 10 HGD and 4 invasive cancers). More dysplasia was detected in group A compared to B (32 versus 10; P = 0.003). Group A / Group B / P value N: 84 / 81 / - Patients with IN: 13 / 6 / NS Total number IN lesions: 32 / 10 / 0.00315 LGD lesions: 24 / 8 / - HGD lesions: 8 / 2 / - Invasive cancers: 3 / 1 / NS Polypoid lesions: 8 / 6 / NS IN in flat muscoa (Fisher exact test): 24 / 4 / 0.0007 NS: not significant; IN: intraepithelial neoplasia *Adapted from Table 5 in Kiesslich 2003* ***Extent of disease/ inflammation - not relevant for guideline*** There was a significantly better correlation between the	RCT with well reported blinding, concealment, inclusion and exclusion criteria with a consort chart explaining the same. Sample size calculated to be 85 required in each arm, 87 recruited but due to insufficient bowel preparation each arm had less than required participants. The two arms were compared for age, duration of UC, body mass index, stool frequency, rectal bleeding, temperature, haemoglobin, prevalence of

Evidence Table for Review question 2B: Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with Inflammatory Bowel Disease clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?							
Study ID	**Study Design**	**Follow up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
	person who was blinded to the study question.		and a 3-fold increase in the yield of neoplasia detection for chromoendoscopy compared to conventional colonoscopy (which was found to be 10% from literature). 174 patients were recruited but 9 had insufficient bowel preparation (3 in group A and 6 in group B) and were excluded	endoscopy with the Pentax zoom colonoscope and the Olympus extra magnification colonoscope was used to classify the lesions. The average duration for the procedure was 44±12.2 minutes (range 28-68 minutes)		endoscopic assessment of degree (P = 0.0002) and extent (89% vs. 52%; P < 0.0001) of colonic inflammation and the histopathologic findings compared with the conventional colonoscopy group. ***Diagnostic Accuracy*** The use of dye allowed for differentiation of neoplastic lesions with a sensitivity of 93%, specificity of 93%, positive predictive value of 83% and negative predictive value of 98%.	primary sclerosing cholangitis, family history of colorectal cancer, maintenance mesalamine therapy and no statistically significant difference was seen
Kiesslich 2007	Prospective randomised trial. Randomised 1:1 into two groups A or B – chromoscopy with endomicroscopy (with the use of a dye) or with confocal laser	None	Total (N=161): group A-chromoendoscopy (n=80) and group B-conventional endoscopy (n=73). 192 consecutive patients with long standing ulcerative colitis (≥8 years) in clinical	Chromoscopy using 0.1% methylene blue with endomicroscopy (A, n=80). The confocal laser endoscope was advanced into the ileum of caecum and 5ml of fluorescein was injected at	Conventional colonoscopy (B, n=73). Colonscopy was performed using conventional video endoscopes (Pentax EC 3830FK). Four biopsy specimens	***Biopsy specimens*** About 50% less biopsies were needed per patient in group A versus group B, 21.2 compared to 42.2 respectively (P=0.008). Significantly less number of biopsies were needed for group A: 1688 compared to 3081 (P=0.008) The total number of biopsy specimens containing intraepithelial neoplasia was 57 in group A compared to 7 in group B (P<0.0001). ***Targeted biopsies*** The total number of targeted biopsies was 312 for group A versus 227 for group B (P<0.0001) The total number of targeted biopsy specimens containing	RCT with well reported blinding, concealment, inclusion and exclusion criteria with a consort chart available from a supplement. Sample size calculated to be 54 required in each arm, and 80 and 73 were

Evidence Table for Review question 2B: Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with Inflammatory Bowel Disease clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?

Study ID	Study Design	Follow up	Population	Intervention	Comparison	Outcomes	Comments
	endoscopy respectively. The randomization was done using a computer aided system and the results were kept in a sealed envelope and opened only before the colonoscopy by an independent person who was blinded to the study question.		remission were recruited from an outpatient clinic in University of Mainz, Germany. The sample size was calculated to be 114 patients (57 in each group) using alpha as 0.05 and a power of 90% and a 3.5-fold increase in the yield of neoplasia detection for chromoendoscopy. 161 patients were recruited but 8 had insufficient bowel preparation and were excluded and 153 completed the study protocol.	a final concentration of 10%. 0.1% of methylene blue was then used for in a segmented fashion, 30 cm at a time using a spraying catheter (Olympus PW-IL, Hmaburg, Germany) and excess dye was removed by suction. staining was considered complete when the tiny glandular duct openings of the mucosa were (pits) were clearly visible. Random (10-15 cm) and targeted biopsies were taken – taking 42 minutes (range 29-64).	were taken every 10 cm for random biopsies and targeted biopsies were also taken whenever possible. The average duration for the procedure was 31 minutes (range 18-48 minutes)	intraepithelial neoplasia was 57 in group A compared to 13 in group B (P<0.0001). ***Colorectal neoplasia*** A total of 23 neoplastic lesions were seen in 15 patients. All of these lesions were intraepithelial neoplasia (15 LGD, 8HGD). Group A detected 4.75 fold more neoplasia compared to B (19 versus 4; P = 0.005). Group A detected significantly more flat neoplasia compared to B (16 versus 2; P = 0.002). **Group A / Group B / P value** N: 80 / 73 / - Patients with IN: 11 / 4 / 0.097 NS Total number IN lesions: 19 / 4 / 0.005 LGD lesions: 12 / 3 / - HGD lesions: 7 / 1 / - Polypoid lesions: 3 / 2 / - IN in flat muscoa (Fisher exact test): 16 / 2 / 0.002 NS: not significant; IN: intraepithelial neoplasia *Adapted from Table 6 in Kiesslich 2007* ***Diagnostic Accuracy*** The presence of neoplastic changes could be predicted by endomicroscopy with a sensitivity of 94.7%, specificity of 98.3%, accuracy 97.8%.	recruited in the two arms. The two arms were compared for age, duration of UC, body mass index, stool frequency, rectal bleeding, temperature, haemoglobin, prevalence of primary sclerosing cholangitis, family history of colorectal cancer, maintenance mesalamine therapy and no statistically significant difference was seen. However, ins[ite of clinical inactive UC in all patients, on average there was more extended colonic inflammation in group B compared to A.
Marion 2008	Prospective, single blinded trial	None	People with ulcerative or Crohn's colitis	Chromoscopy with 0.1% methylene	1) Random non-targeted conventional	The number of positive finding of LGD and HGD was compared among the different methods using exact two-tailed McNemar's test.	The different techniques were performed on the

Evidence Table for Review question 2B: Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with Inflammatory Bowel Disease clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?

Study ID	Study Design	Follow up	Population	Intervention	Comparison	Outcomes	Comments
	with three methods within the same patient population. Due to limited evidence in the area, no sample size calculation was done but from other studies (Kielisslich 2007 and Rutter 2004) planned for 200 patients but interim analysis (after about 100 patients) was done and this article reports the results from the interim analysis.		(N=102, 64 male and 34 female) were included for the study at Mount Sinai Medical Centre, New York, USA People more than 18 years of age with a confirmed diagnosis of extensive ulcerative colitis defined as at least left sided (n=79) or Crohn's colitis involving at least one-third of the colon (n=23). The median age of onset was 27 years (range 3-65) and the median duration of disease was 21.5 years (range 5-75) and all had enrolled in a surveillance programme at time of study. 39% had previous	blue dye. A dye sprayer was used to spray 0.1% methylene blue dye during reintubation to the caecum. After reinsertion to the caecum, the scope was withdrawn slowly and the mucosa examined after dye spray and any visible lesions were biopsied or removed by endoscopic resection. The method took 15 minutes and 12 seconds (range 5:09 - 28:35). The authors report that the only significant equipment	colonoscopy - the colon was examined and four quadrant random biopsies were taken from segments defined by the endoscopist using multibite forceps. 2) Targeted conventional colonoscopy - additionally any visible lesions were identified, described and were either biopsied or removed by endoscopic resection. The two methods took a median time of 22 minutes, 11 seconds (range 5:27 - 55:29).	***Dysplasia yield by method (per patient)*** The combination of targeted colonoscopy and chromoscopy was significantly more effective than random biopsies, 20 people with dysplasia were found compared to 3 (P<0.0002), but two patients were found to have dysplasia only by random biopsy and not by any of the two targeted methods. Chromoscopy was significantly more effective than random biopsies, 17 people with dysplasia were found compared to 3 (P<0.001). Chromoscopy showed a higher yield of dysplasia then targeted conventional colonoscopy, 17 people with dysplasia were found compared to 9 but it did not reach statistical significance (P=0.057). ***Dysplasia yield by method (per biopsy)*** With random conventional colonoscopy 3264 biopsies were obtained and 3245 (98.8%) were negative for dysplasia, 16 (0.4%) were indefinite for dysplasia and 3 (0.09%) showed LGD, therefore 19 were definite or indefinite for dysplasia (0.58%). With the targeted conventional colonoscopy 50 biopsies were done, of which 35 (70%) were negative for dysplasia, 2 (4%) were indefinite for dysplasia, 12 (24%) showed LGD and 1 (2%) showed HGD, therefore there were 15 definite or indefinite for dysplasia (30%). The mean size of dysplastic lesions detected was 0.49cm^2 With chromoscopy a total of 82 additional biopsies were taken, of which 47 (57%) were negative, 13 (16%) were indefinite for dysplasia, 21 (26%) had LGD and 1 (1%) had HGD; therefore there were 35 definite or indefinite for dysplasia (43%). The mean size of dysplastic lesions detected was 1.3cm^2 **Table: Dysplasia yield by method per patient**	patients back to back and the pathology specimens were analysed by an expert gastrointestinal pathologist who was blinded to he method of collection. There is no long-term follow up and the authors state that methylene blue may cause DNA damage with white light exposure and therefore long-term implications of single stranded DNA breaks and oxidative changes in patients with colitis are unknown.

Evidence Table for Review question 2B: Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with Inflammatory Bowel Disease clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?

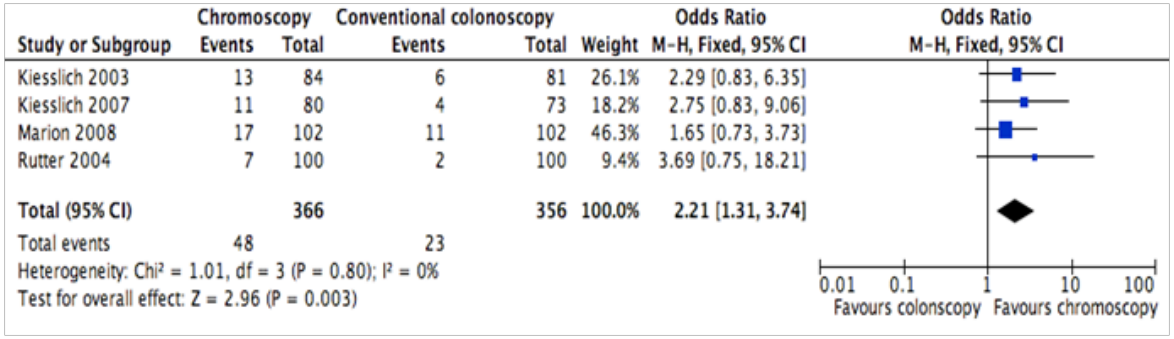
Study ID	Study Design	Follow up	Population	Intervention	Comparison	Outcomes	Comments
			documented dysplasia (38 LGD, 2 HGD, 10 indefinite for dysplasia). Four had polyploid lesions, others had uncharacterised or not visible (detected using random biopsy). All patients received standard bowel preparation (Fleets Phosphoda, Miralax, or Citrate of Magnesia-based preps) and each patient acted as his or her own control	expense is the dye spray catheter ($185) and can be sterilsed and used up to 20 times and the study used the cheaper methylene blue dye over the indigo carmine dye		Random non-targeted Targeted with and without dye (D) (ND) Total Dysplasia (D) 1 19 20 No Dysplasia (ND) 2 83 85 Total 3 99 *P<0.0002* Chromoscopy Random non-targeted Dysplasia 1 16 17 No Dysplasia 2 83 85 Total 3 99 *P<0.001* Chromoscopy Targeted conventional colonoscopy Dysplasia 6 11 17 No Dysplasia 3 82 85 Total 9 93 *P=0.057* ***NS*** *Adapted from Tables 2 and 3 from Marion 2008* Agreement between chromoscopy findings and colectomy for the 4 patients that had colectomy: 3 with dysplasia and 1 without (though 1/3 was HGD not all LGD as detected by chromoscopy.	
Rutter 2004	Prospective, single blinded trial with three methods within the same patient population. Each patient underwent	None	Patients (N=100) with longstanding extensive ulcerative colitis [UC] attending Routine colonoscopic surveillance for ulcerative colitis at St Mark's	Chromoscopy with 0.1% indigo carmine The indigo carmine dye was delivered via a specially designed dye spray catheter (Olympus PW-	1) Non-targeted quadrantic - on initial intubation, inspection of the entire colonic mucosa was done on withdrawal. At	***Dysplasia yield by method (per biopsy)*** ***Non-targeted quadrantic biopsies*** A total of 2904 non-targeted biopsies were taken, a mean of 29 per patient. No dysplasia was detected in any of these biopsies. ***Targeted biopsies*** Overall, 157 suspicious mucosal areas were detected in 61 patients. 43 abnormalities (from 20 patients) were detected during the pre-dye spray colonoscopy, and following	The different techniques were performed on the patients back to back and all biopsy specimens were analysed by one of two experienced gastrointesinal

Evidence Table for Review question 2B: Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with Inflammatory Bowel Disease clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?							
Study ID	**Study Design**	**Follow up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
	back to back colonoscopic examinations: first with random colonoscopic surveillance examination, followed by colonoscopic surveillance targeted and then using pancolonic indigo carmine dye spray.		Hospital, UK. There were 61 male and 39 female patients. With a median age of 53 years (range 33–79); median age at onset of UC was 27 years (range 7–67); and the median duration of colitis was 24 years (range 8–52). For 11 patients this was their index screening and 89 patients had undergone surveillance previously. The documented proximal extent of macroscopic inflammation was the transverse colon in 12 patients, hepatic flexure in four patients, ascending colon in one patient, and pancolonic in 83 patients. The study size was calculated	5V1). After allowing a few seconds for the dye to settle onto the mucosal surface, excess pools of indigo carmine were suctioned. The mucosa was then scrutinised, and any abnormalities not identified on the initial examination were biopsied or removed. The median time for the procedure was 10 minutes (range 4-22).	10 cm intervals, the mucosa was photographed and quadrantic non-targeted colonic biopsies taken as per the ASG guidelines (about 2-40 per colon). 2) Pre-dye spray targeted -in addition, any suspicious area of mucosa was photographed and biopsied or removed, as clinically indicated. Suspicious areas were defined as any mucosal irregularity that was not felt to be entirely consistent with chronic or active ulcerative colitis,	indigo carmine dye spraying 114 additional abnormalities (in 55 patients) were detected. Median size was 4 mm (range 1–40). Six of the abnormalities were pedunculated, 69 were sessile, 75 were flat topped elevated abnormalities, and seven abnormalities were described as irregular appearing mucosa. ***Pre-dye spray targeted biopsies*** Of the 43 abnormalities detected during the pre-dye spray colonoscopy, nine lesions were hyperplastic polyps and 32 were inflammatory or post-inflammatory polyps. Two patients had dysplastic lesions (a 20 mm sessile lesion on quiescent mucosa at the hepatic flexure in a 71 year old male with no previous dysplasia and a 15 mm sessile lesion on mildly inflamed mucosa in the sigmoid colon in an 80 year old female with previous dysplasia, who has repeatedly declined surgery unless cancer was detected). Targeted biopsies showed low grade dysplasia, confirming the endoscopist's impression that these were dysplasia associated lesions/masses [DALMs]. ***Dye spray targeted biopsies*** Both DALM lesions were visible after indigo carmine dye spraying. Of the 114 additional abnormalities detected following dye spraying, seven were dysplastic (from five patients). Five of these were tubular adenomas with LGD, and two were serrated adenomas with LGD. Three of the lesions were described as flat lesions and four were sessile. The size of these well circumscribed adenomas ranged from 2 to 6 mm. Two adenomas were found in the caecum, two at the hepatic flexure, two in the transverse colon, and one in the descending colon. Two of the adenomas occurred proximal to the extent of colitis and five were within the UC extent (four in well healed disease, one in an area of mild inflammation). Of the other 107 abnormalities detected following dye spraying, 41 were hyperplastic polyps, 65 post-inflammatory and inflammatory polyps, and one was described as villiform mucosa but without dysplasia.	histopathologists, who were blinded to the protocol used. Any specimen showing dysplasia was independently reported by both, and in the event of interobserver variation a consensus opinion was reached. According to the authors despite being back to back colonoscopies, the lesions viewed by the dye were not missed lesions as that would give a missed rate of 350% and felt they minimised this by doing a meticulous examination.

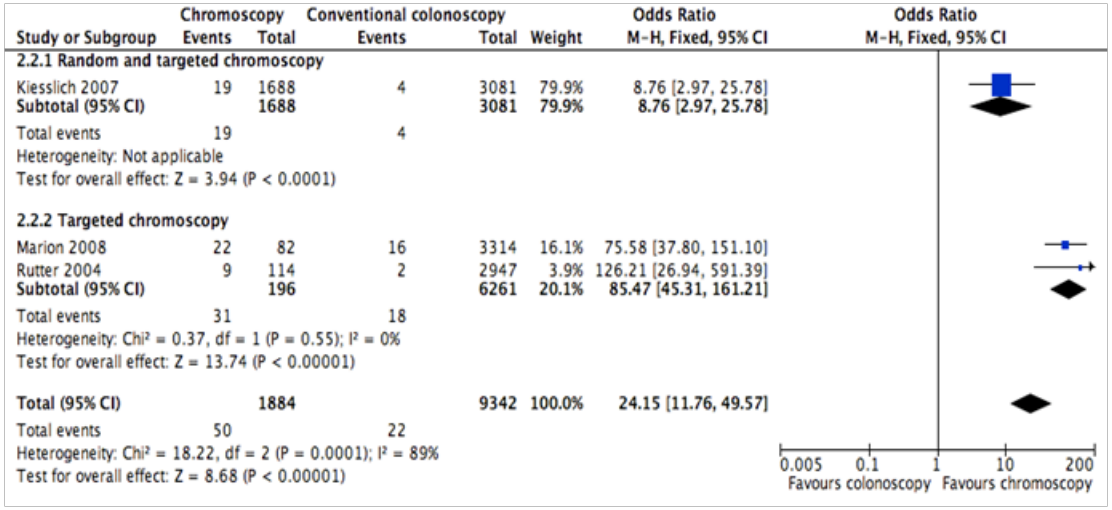
Evidence Table for Review question 2B: Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with Inflammatory Bowel Disease clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?							
Study ID	**Study Design**	**Follow up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
			to be 100 based on a pre-dye spray dysplasia detection rate of 8% and an assumption of using dye doubling the rate (power of 90% and alpha of 0.05). 108 consecutive people were invited and 101 consented but one case was abandoned at the patient's request.		regardless of whether or not it was felt to be dysplastic. The median time for the procedure was 11 minutes (range 4-18).	***Dysplasia detection summary*** With regard to dysplasia detection, the non-targeted biopsy protocol (2904 biopsies) detected no dysplasia from 100 patients, the pre-dye spray targeted biopsy protocol (43 biopsies) detected two dysplastic lesions in two of the 100 patients, and the dye spray targeted biopsy protocol (114 biopsies) detected these two dysplastic lesions plus seven additional dysplastic lesions in five more of the 100 patients. Thus overall, dysplasia was detected in 7% of patients. There was a strong statistical trend towards an increase in dysplasia detection with dye spraying (7/100 patients v 2/100 patients; p=0.06, paired exact test). Compared with the non-targeted biopsy protocol, the targeted biopsies detected dysplasia in significantly more patients (7/100 patients v 0/100 patients; p=0.02, paired exact test).	

Forest Plots: People with Inflammatory bowel disease

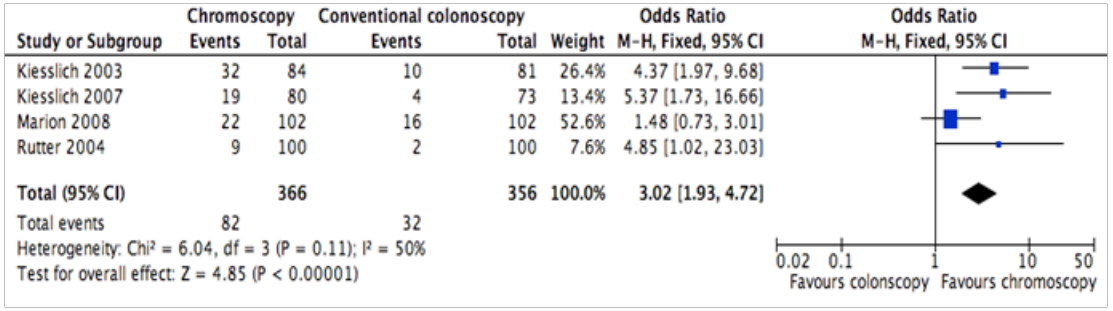
Outcome 1: Mean number of patients detected with intraepithelial neoplasia



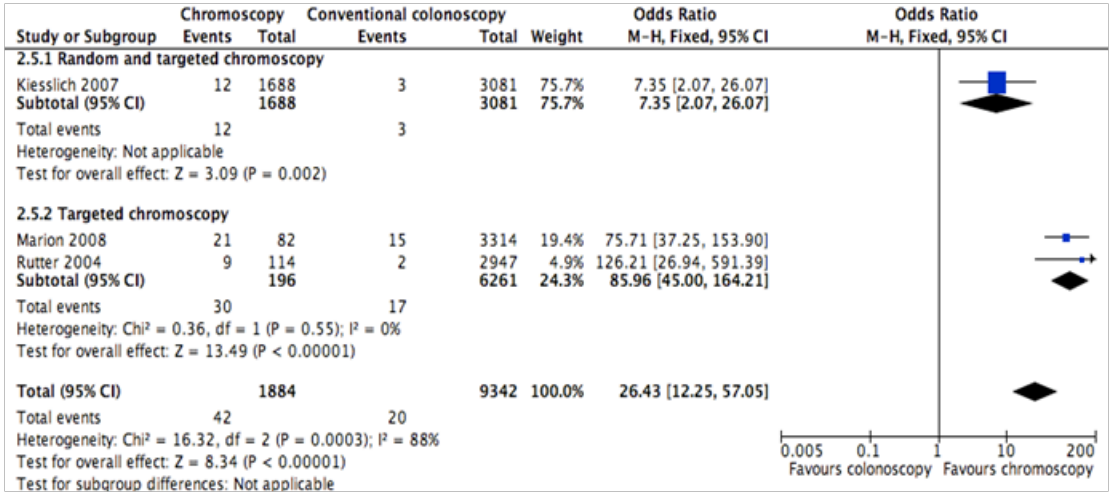
Outcome 2: Mean number of intraepithelial neoplastic lesions detected per biopsy



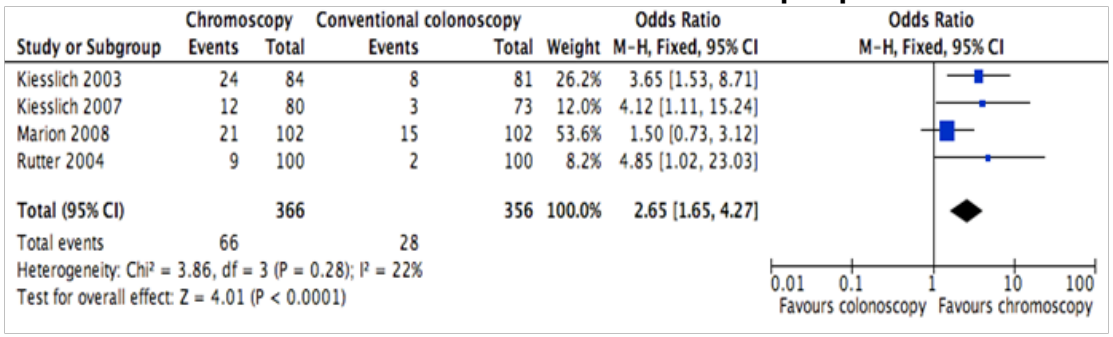
Outcome 3: Mean number of intraepithelial neoplastic lesions detected per patient



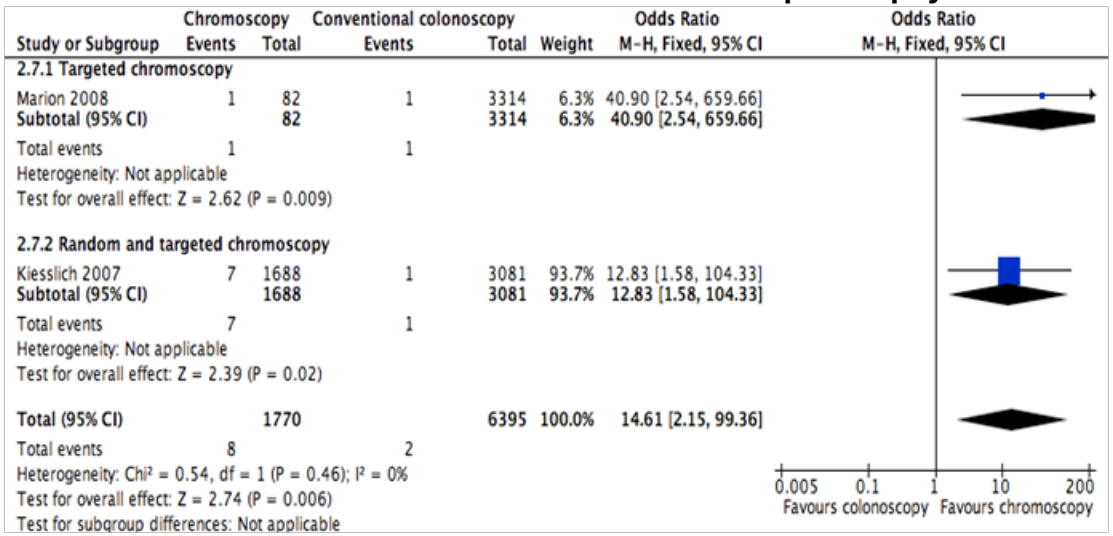
Outcome 4: Mean number of LGD lesions detected per biopsy



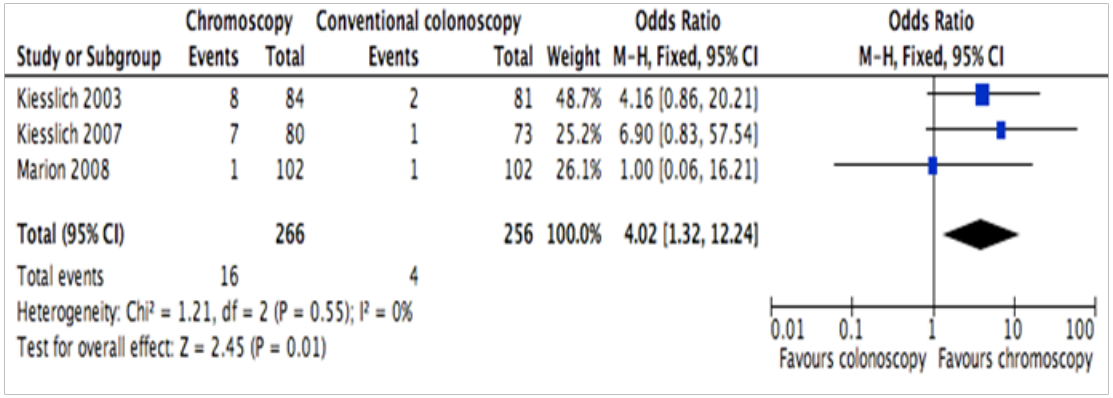
Outcome 5: Mean number of LGD lesions detected per patient



Outcome 6: Mean number of HGD lesions detected per biopsy



Outcome 7: Mean number of HGD lesions detected per patient



Review question 2B: People with adenomatous polyps

Evidence Table for Review question 2B (b): Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with adenomatous polyps clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?

Study ID	Study Design	Follow up	Population	Intervention	Comparison	Outcomes	Comments
Brown, 2007	Systematic review of RCTs Cochrane review – included four RCTs indentified: Brooker, 2002; Hurlstone, 2004; Lapalus, 2006; Le Rhun, 2004 (total of 1009 participants)	Databases searched from 1966-October 2006	**Included:** participants undergoing chromoscopic or conventional colonoscopy for investigation of gastrointestinal symptoms or as apart of a screening programme **Excluded:** Patients undergoing surveillance for IBD or Patients undergoing surveillance for known polyposis syndromes (FAP) or (HNPCC)	Chromoscopy	Conventional colonoscopy	Detection outcomes based on number of polyps and neoplastic lesions detected. All significantly in favour of chromoscopy ***Primary outcomes*** The number of polyps (neoplastic and non-neoplastic) detected was significantly greater for all studies and highly significantly greater when the studies were combined (WMD fixed 0.77 (95% CI 0.52, 1.01). This enhanced yield was maintained even if neoplastic lesions only were considered (WMD fixed 0.35 (95% CI 0.23, 0.47). However, tests for heterogeneity were significant in this analysis group. This may be indicative of the yield of neoplastic lesions which varied significantly between studies. Almost all patients had either no polyps or 1 polyp. It was therefore estimated that over 95% of patients would have 0, 1 or 2 polyps and that a standard deviation of 2.00 for polyps and 1.00 for neoplastic lesions was reasonable and in agreement with the data from the 1 study that gave that data. Again there was a significant difference in favour of the chromoscopy group (OR (fixed) 2.13 (95% CI 1.47, 3.10) which was maintained when considering neoplastic lesions only (OR (fixed) 1.61 (95% CI 1.24, 2.09). ***Secondary outcomes*** With regard to secondary outcomes the number of diminutive neoplastic lesions and the number of patients with at least 1 diminutive neoplastic lesion were all increased in favour of chromoscopy compared with conventional colonoscopy (WMD fixed 0.27 (95% C I 0.14, 0.40) and OR (fixed) 1.71 (95% CI 1.23, 2.37) respectively. In addition, the number of	Good Cochrane review - 2 of studies in UK were single pass chromoscopy and the 2 French were 'back-back' - which is known to increase polyp yield as shown by other studies (Hixson, 1990; Rex, 1997). They also miscalculated the number of neoplastic lesions detected in the control group for the power calculation. After their removal (due to heterogeneity) - Chromoscopy is still favoured. This heterogenetity was not there when pooled for patient with at least 1 polyp or 1 neoplastic lesion, rather than just number of polyps/ neoplastic

Evidence Table for Review question 2B (b): Is colonoscopic surveillance with a dye (chromoscopy) for prevention and/or early detection of colorectal cancer in adults with adenomatous polyps clinically effective compared to colonoscopic surveillance without dye (conventional colonoscopy)?							
Study ID	**Study Design**	**Follow up**	**Population**	**Intervention**	**Comparison**	**Outcomes**	**Comments**
						patients with 3 or more neoplastic lesions was more than twice as likely to be detected using chromoscopy (OR (fixed) 2.55 (CI 1.49-4.36). The trend of enhanced detection of polyps (neoplastic and nonneoplastic) with chromoscopy was maintained even if outcome measures were considered for the proximal and distal colon separately. Although also showing this trend two outcome variables failed to show a significant difference: - total number of neoplastic lesions and diminutive neoplastic lesions detected in the distal colon.	lesions. Chromoscopy favoured in all studied outcomes, with more than twice as much detection for patients with 3 or more polyps and maintained for both distal and proximal colon. They conclude that chromoscopy should be gold standard test for polyp detection till further research is done on the newer techniques. Data from the Hurlstone et al. (2004) study was not included for this guideline.

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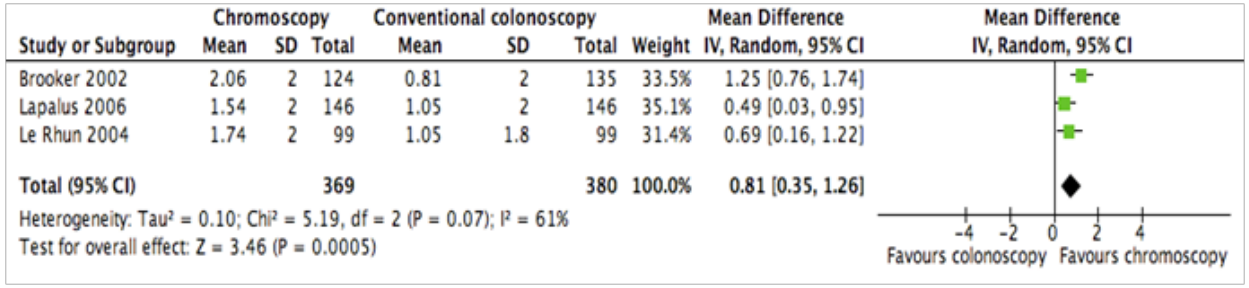
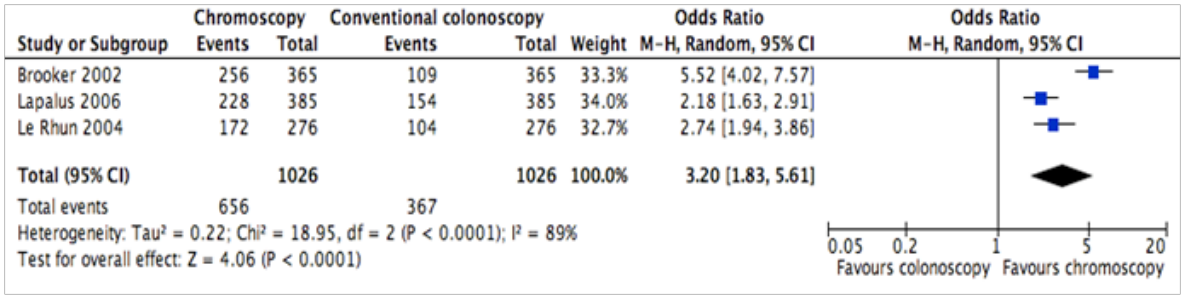
Forest Plots: People with adenomatous polyps

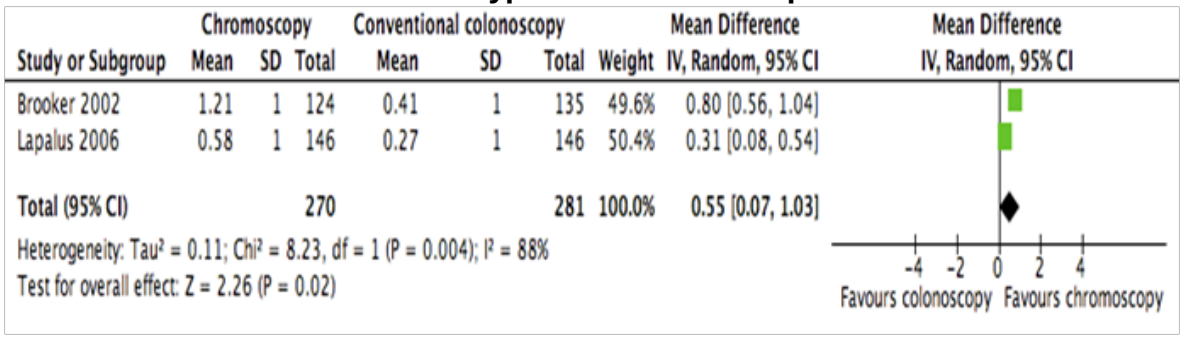
Outcome 1: Total number of Polyps detected



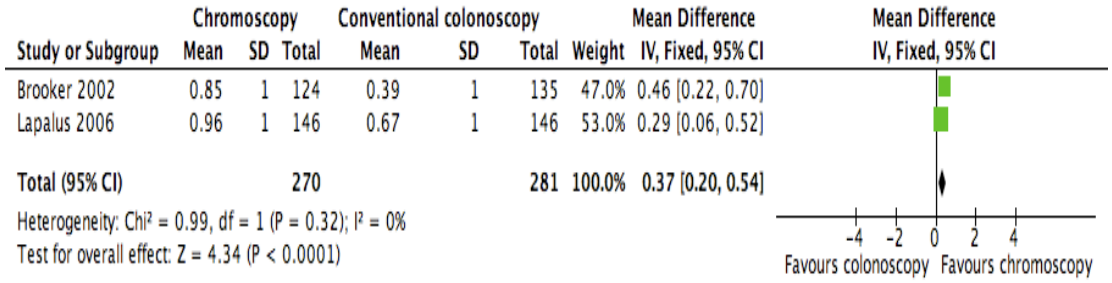
Outcome 2: Mean number of polyps detected by each method per total polyps detected



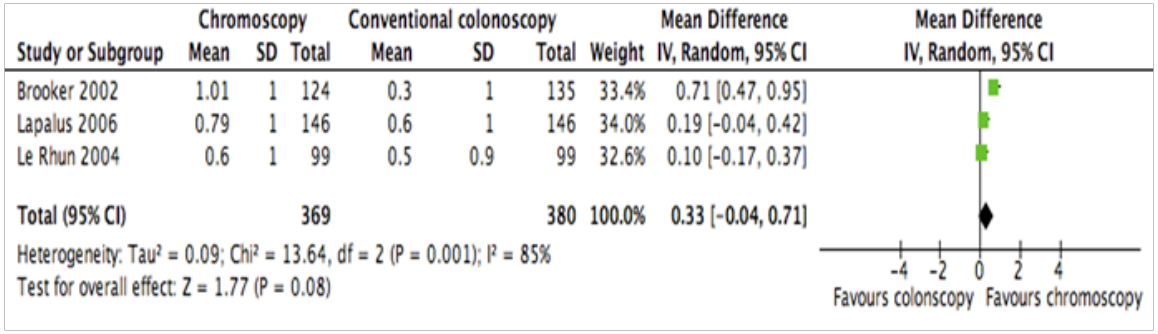
Outcome 3: Total number of Polyps detected in the proximal colon



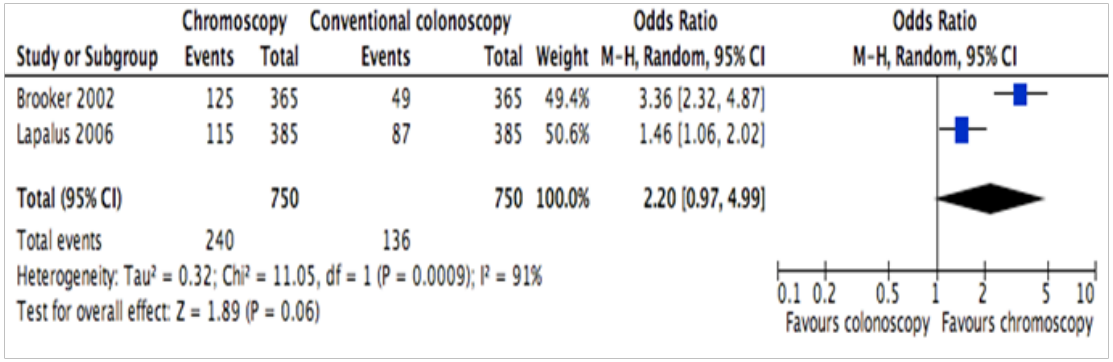
Outcome 4: Total number of polyps detected in the distal colon



Outcome 5: Total number of neoplastic lesions detected



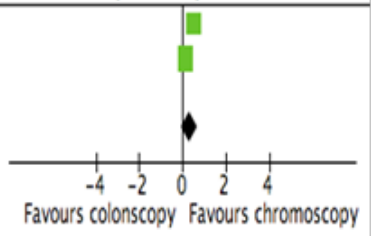
Outcome 6: Mean number of neoplastic lesions detected by each method per total biopsies



Outcome 7: Total number of neoplastic lesions detected in the proximal colon

Study or Subgroup	Chromoscopy Mean	SD	Total	Conventional colonoscopy Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Brooker 2002	0.79	1	124	0.26	1	135	49.4%	0.53 [0.29, 0.77]
Lapalus 2006	0.43	1	146	0.29	1	146	50.6%	0.14 [-0.09, 0.37]
Total (95% CI)			270			281	100.0%	**0.33 [-0.05, 0.71]**

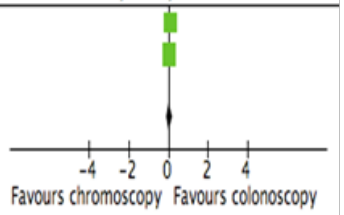
Heterogeneity: Tau² = 0.06; Chi² = 5.21, df = 1 (P = 0.02); I² = 81%
Test for overall effect: Z = 1.71 (P = 0.09)



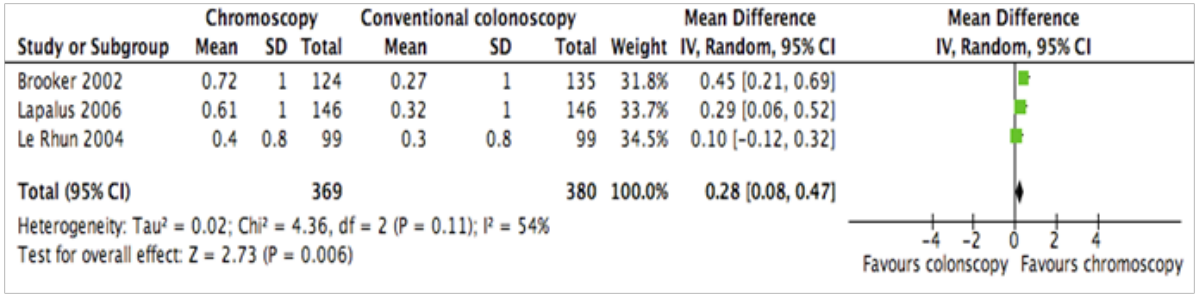
Outcome 8: Total number of neoplastic lesions detected in the distal colon

Study or Subgroup	Chromoscopy Mean	SD	Total	Conventional colonoscopy Mean	SD	Total	Weight	Mean Difference IV, Fixed, 95% CI
Brooker 2002	0.22	1	124	0.1	1	135	47.0%	0.12 [-0.12, 0.36]
Lapalus 2006	0.36	1	146	0.3	1	146	53.0%	0.06 [-0.17, 0.29]
Total (95% CI)			270			281	100.0%	**0.09 [-0.08, 0.26]**

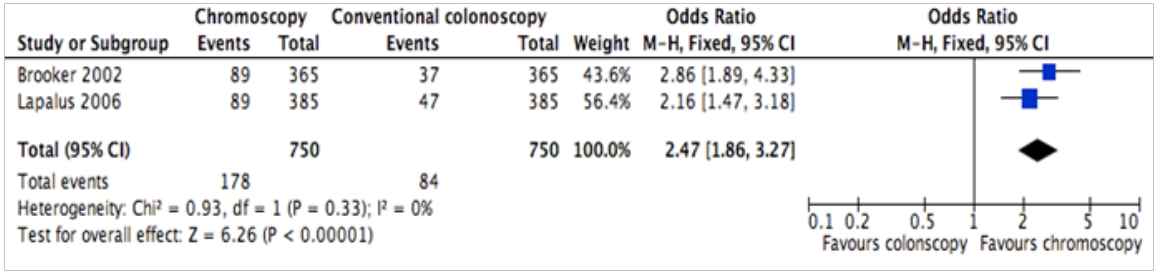
Heterogeneity: Chi² = 0.12, df = 1 (P = 0.73); I² = 0%
Test for overall effect: Z = 1.03 (P = 0.30)



Outcome 9: Total number of diminutive adenomas detected



Outcome 10: Mean number of diminutive adenomas detected by each method per total number of lesions



Review question 3: People with Inflammatory bowel disease

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?

Study ID	Study Design	Follow up	Population	Prognostic factors or surveillance	Outcomes	Comments
Askling 2001	Population-based cohort study	For individuals in the regional cohorts, start of follow-up was from last of: January 1, 1958, and date of diagnosis of IBD. For individuals only identified in the inpatient register, start of follow-up was from last of: January 1, 1987, and date of first discharge with IBD from 1964 to 1995. End of follow-up was set to	19,876 people with ulcerative colitis (UC) or Crohn's disease (CD) born between 1941 and 1995. Individuals with UC or CD were identified in 4 population-based cohorts, and in an population-based inpatient register. This register contains individual-based information on Swedish inpatient care since 1964, nationwide since 1987. First-degree relatives were identified through linkage to the nationwide generation register, which holds	Relation of family history with colorectal cancer. The authors assessed the relative risk (RR) for CRC compared with the general population using standardized incidence ratios (SIRs), and the RR for CRC within the cohort using Poisson regression. SIRs were calculated by dividing the observed number of cancers with that expected, based on sex-, age-, and calendar period–specific incidence rates. 95% confidence intervals (CIs) were calculated assuming a Poisson distribution for the observed number of cases. Patients with UC and CD were analyzed separately and in the same model, after testing for interaction between type of IBD and extent of disease. Regression models were adjusted for attained age, sex, extent of inflammation (UC: proctitis, left-sided colitis, pancolitis, or unspecified; CD: ileal, ileocolonic, colorectal, or unspecified), cohort of origin (regional vs. inpatient cohort),	In total, 35,710 parents, 35,137 siblings, and 27,027 offspring were identified. To identify first-degree relatives with CRC or IBD, the cohort of relatives was linked to the cancer register from 1958 to 1995, to the inpatient register from 1964 to 1995, and also to the cohort of patients. Participants / Family history of CRC / RR [95%CI] All (UC+CD) / No / 1.0 (reference) Yes / 2.5 [1.4 to 4.4] Relative aged <50 at CRC / 9.2 [3.7 to 23] Relative aged ≥50 at CRC / 1.7 [0.8 to 3.4] UC: ulcerative colitis; CD: Crohn's disease; CRC: colorectal cancer; RR: relative risk; CI: confidence intervals *Risk of colorectal cancer with family history, adapted from table 2*	The study was a single arm cohort and the determination of relatives with history of colorectal cancer was retrospective. The statistical analyses were done by comparing the risk of colorectal cancer with the general population.

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
		first of: date of death, date of emigration, resection of the colon (analysis of colon cancer) or rectum (analysis of rectal cancer), or December 31, 1995.	information on all first-degree relatives to Swedish residents born in 1941 or later. First-degree relatives who emigrated or died before 1960, who both immigrated and emigrated before 1992, or who immigrated after 1992 could not be identified. Relations registered as adoptions were excluded.	family history of CRC or IBD, and type of IBD. Models also including age at diagnosis/first discharge with IBD, time since diagnosis/ first discharge with IBD, and calendar period were considered, but yielded similar risk estimates. Family history of CRC was treated as a binary variable (yes vs. no), but also according to the age at diagnosis of CRC of the relative (no, <50 years, ≥50 years).		

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
Eaden 2001	Meta-analysis of 116 studies. A literature search using Medline with the explosion of references identified 194 studies. Of these, 116 met the inclusion criteria from which the number of patients and cancers detected could be extracted. Overall pooled estimates, with 95% confidence intervals (CI), of cancer prevalence	All published reports citing the risk of CRC in UC were collected by conducting a literature search on Medline A comprehen sive search of reference lists of all review articles and of the retrieved original studies was performed to find studies not identified by the Medline search. This identified 194 independe	The meta-analysis was conducted according to the guidelines produced by the NHS Centre for Reviews and Dissemination at York University. Patients with ulcerative colitis only. Studies that obviously combined patients with UC and Crohn's disease in a common analysis were also excluded.	A total of 194 studies were identified. Of these, five reported cancer mortality data, did not give details concerning the background population, two included patients with Crohn's disease, four were reviews only, 26 were updated by subsequent studies, and 31 overlapped with other studies or included the same patients. This left 116 studies suitable for inclusion in the analysis. Risk of colorectal cancer for patients with: 1) Overall all ulcerative colitis 2) Total colitis 3) By the duration of colitis 4) Variation based on geographical location 5) Depending on colectomy 6) Risk based on 10-year intervals 7) For children (not relevant for this guideline)	***Review results*** Overall 54478 patients were studied and a total of 1698 CRCs were detected: 9846 patients had total colitis, among which 700 cancers were found. Fifty four studies (with 22730 patients and 844 cancers) included data on age at cancer diagnosis with a mean of 43.2 years (95% CI 40.5 to 45.9) and 61 studies reported the duration of colitis at cancer diagnosis with a mean of 16.3 years (95% CI 15.0 to 17.6). ***Prevalence of CRC*** ***Overall*** The overall prevalence of CRC in any patient with UC, a random effects model produced an overall pooled estimate of the prevalence to be 3.7% (95% CI 3.2 to 4.2). Total colitis: Patients with total colitis: 35 studies there were 8351 patients with pancolitis and 451 cases of cancer. The random effects model produced an overall pooled estimate of the prevalence to be 5.4% (95% CI 4.4 to 6.5). ***Duration of colitis, 10-year intervals*** Of the 116 studies, 41 reported duration of colitis, from these studies the overall incidence rate of CRC for any patient with colitis was 3 per 1000 patient years duration (pyd) (95% CI 2/1000 to 4/1000). The corresponding annual incidence rate of CRC in the general population given by the Office of National Statistics is 0.6 per 1000 population. Of the 41studies, 19 reported results stratified into10 year intervals of disease duration. For the first 10 years the incidence rate was 2/1000 patient years duration [pyd] (95% CI 1/1000 to 2/1000), for the second decade the incidence rate was estimated to be 7/1000 pyd (95% CI 4/1000 to12/1000), and in the third decade the incidence rate was 12/1000 pyd (95% CI 7/1000 to 19/1000). These incidence rates corresponded to cumulative probabilities of 2% by 10 years, 8% by 20 years, and 18% by 30 years. Total colitis: Six reported data for patients with total colitis. The cumulative risk of CRC was 2.1% (95% CI 1.0 to 3.2%) at 10 years, 8.5 % (95% CI 3.8 to 13.3%) at 20 years, and 17.8% (95% CI 8.3 to 27.4%) at 30 years. ***Geographical location***	Meta - analysis pooled study of individual epidemiological studies. Simply pooled results from single arm studies, weighted by sample size.

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
	and incidence were obtained using a random effects model on either the log odds or log incidence scale, as appropriate	nt studies dating back to 1925.			UK: In the UK, 4/1000 pyd (95% CI 3/1000 to 5/1000). ***Colectomy*** The panproctocolectomy rate alone did not exert a statistically significant effect on the CRC risk (z=0.4, p=0.7). When all forms of surgery were considered (panproctocolectomy + resections of varying degree), the reported CRC incidence rate increased with higher rates of surgical intervention.	

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?

Study ID	Study Design	Follow up	Population	Prognostic factors or surveillance	Outcomes	Comments
Gupta 2006	A single cohort of patients with UC undergoing regular endoscopic surveillance for dysplasia was studied.	Records of patients	All patients in the Mount Sinai Hospital gastrointestinal pathology and surgical pathology registries who had undergone at least 1 surveillance colonoscopy between January 1996 and December 1997, a period chosen to allow for long-term follow-up. A total of 543 UC patients were identified that underwent surveillance colonoscopy between January 1996 and December 1997, but 125 were excluded for having dysplasia at index colonoscopy. Study population was N=418	Degree of inflammation at each biopsy site was graded using a histologic activity index. Progression to neoplasia was analyzed in proportional hazards models with inflammation summarized in 3 different ways and each included as a time-changing covariate: (1) mean inflammatory score (IS-mean), (2) binary inflammatory score (IS-bin), and (3) maximum inflammatory score (IS-max). The degree of inflammation for each biopsy site was scored as follows: 0, inactive/absent; 1, mild; 2, moderate; or 3, severe. Potential confounders (including disease extent, duration, age at diagnosis, or presence of primary sclerosing cholangitis or the use of aminosalicylates, purine analogue immunomodulators, corticosteroids, or folic acid) were analyzed in univariate testing and, when significant, in a multivariable model. Covariates were added, 1 at a time, to a multivariable model with IS-mean if they had a P value < .20 in either the any or advanced neoplasia univariate analyses.	***Univariate analysis*** On univariate analysis, a significant relationship was found between inflammation and progression to advanced neoplasia (defined as LGd, HGD or CRC). Measuring inflammation as the mean over the length of surveillance (IS-mean), a 3-fold increased risk for advanced neoplasia was observed (HR=3.0; 95% CI: 1.4 to 6.3). ***Multivariate analysis*** Mesalamine was included in the multivariable model, but it was neither independently significant (P=0.12 for any neoplasia and P=0.60 for advanced neoplasia) nor did it alter the relationship between inflammation and either any neoplasia or advanced neoplasia. There was a significant relationship between exposure to surveillance colonoscopy and the subsequent detection of advanced neoplasia. IS-mean and frequency of colonoscopy were therefore considered together in multivariable analyses. HR [95% CI] Any neoplasia (n=65) / Advanced neoplasia (n=15) IS-mean: 1.4 [0.9 to 2.3] **NS** / 3.8 [1.7 to 8.6] One or more colonoscopies per year: 1.7 [0.9 to 3.1] **NS** / 5.4 [1.7 to 17.0] IS-mean: inflammation score mean; HR: hazard ratio; 95%CI: 95%CI confidence interval Multivariate analysis, adapted from table 5.	Single arm retrospective cohort. The authors assume a detection bias that showed an increased risk for advanced neoplasia with the increased surveillance.
Karlén	Retrospecti	The	Patients with	Conventional colonoscopic	All participants were diagnosed as having total or extensive	The authors

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?

Study ID	Study Design	Follow up	Population	Prognostic factors or surveillance	Outcomes	Comments
1998	ve nested case control study. The controls were matched individually for: a) Age at diagnosis (± 5 years) b) Duration of disease c) Extent of disease at diagnosis d) Sex Matched analyses were performed using conditional logistic regression analyses.	presence/ absence of surveillanc e in colorectal cancer deaths for cases was taken from a Swedish National register from 1975 till the end point of the study (31 Dec. 1988)	ulcerative colitis were taken from Stockholm County and Uppsala Health Care region in Sweden (N=4664). Total study population was 142 patients with at least 5 years of ulcerative colitis. Cases: 40: All patients in the study that had died from colorectal cancer after 1975 and had not been diagnosed with colorectal cancer at the time of diagnosis with ulcerative colitis. Controls: 102: The ratio was to be 3:1 but due to strict criteria 120 controls were not found.	surveillance (only those with intention of cancer surveillance included, along with index colonoscopy) As the colonscopies were performed in different hospitals follow-up routines were different. Majority surveyed every first or second year with biopsy specimens taken from 6-10 different locations locations in the colon 8-10 years after diagnosis.	(inflammation reaching at least proximal to the hepatic flexure) colitis. The relative risks for colorectal cancer mortality were calculated using odds ratios obtained. Ten of the 102 controls (9.8%) underwent colectomy within five years, prior to diagnosis of cancer of the patient. ***At least one surveillance colonoscopy*** was seen in 2/40 cases and 8/102 controls: Relative risk (RR) =0.29, 95% CI (0.06 to 1.31). ***Two or more surveillance colonoscopies*** was seen in 1/40 cases and 12/102 controls: RR=0.22, 95% CI (0.03 to 1.74). 10/102 controls underwent colectomy within five years prior to diagnosis of cancer of the case. Surveillance colonoscopy / No. of cases / No. of controls / RR / 95% CI Never / 38 / 84 / 1.0 / Ref. Ever / 2 / 18 / 0.29 / 0.06, 1.31 **NS** Never / 38 / 84 / 1.0 / Ref. 1 / 1 / 6 / 0.43 / 0.05, 3.76 **NS** 2+ / 1 / 12 / 0.22 / 0.03, 1.74 **NS** RR: relative risk; CI: confidence interval; Ref.: reference; **NS**: not statistically significant *Surveillance colonoscopies adapted from table 2*	matched the controls to the cases, and the controls had to be alive at the time of death of the case. The controls also had to have some part of the colon intact five years prior to the diagnosis of cancer of the case though 10% underwent colectomy. As there were only 40 deaths the power of the study was low. Some confounders were controlled for by matching but a main one of pharmalogical treatment was not studied (sulphasalazine). Both these limitations were identified by the authors
Manning 1987	Prospectiv e study of surveillanc e for	Information on all patients was taken	189 patients with colitis who had undergone Colonoscopy.	DET group with and without routine colonoscopic surveillance in patients with long standing colitis.	The patient characteristics compared for the two groups: DET group / Non-DET group N: 112 / 77 Male: Female: 57:55 / 36:41	A single pathologist sought the dysplasia and the UC population

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
	colorectal epithelial dysplasia by regular colonoscopy in patients with longstanding, extensive colitis – DET group with all other patients with colitis who have undergone colonoscopy - non-DET group. Information was taken from departmental records and case note review.	from 1978 up to the end of 1984	DET group: 112 patients, 366 colonoscopies had their disease for eight years or longer in Duration, which was Extensive or Total by at least one of (a) barium enema (b) colonoscopic appearances (c) colonic histology; non-DET group: 77 had colitis of less than eight years' Duration and/or disease that was not Extensive or Total by any criterion. The characteristics of the two groups were compared for gender, age at onset, and colitis diagnosis.	The 112 patients in the DET group had undergone 366 colonoscopies, nine having had a further 13 examinations before the duration of their disease had reached eight years. Of the 112 patients in the DET group, 13 underwent colectomy after a single colonoscopy, one of whom (patient 6) had subtotal colectomy and subsequent colonoscopies, leaving 100 DET patients who can be regarded as an ongoing surveillance group (SG). Non-DET group: Colonoscopy results n patients without long standing colitis not part of regular surveillance. The non-DET group had undergone 106 colonoscopies including the 13 examinations on subsequent DET group patients.	Age at onset in yrs Mean ±SD: 29.3±11.2 / 38.1±16.7 Diagnosis: Ulcerative colitis: 98 / 50 Crohn's disease: 5 / 12 Indeterminate idiopathic colitis: 9 / 15 DET group: colitis >8 years duration and extensive or total; Non-DET group: colitis<8 years and/or not extensive or total *The patient characteristics adapted from table 1* ***Dysplasia and Cancer*** Of the 189 patients, 42 had dysplasia on at least one Occasion, 36 being in the DET group and six in the non-DET group (x^2= 14.5; p<0.0 1). Cancer and HGD were only seen in DET group patients but LGD was observed in both groups. <u>DET Group</u> Of the 36 with dysplasia in the DET group, two patients (patients 6 and 36) underwent colonoscopy for confirmation of carcinoma suspected on barium enema. Patient 6 had a polypoid lesion in the sigmoid colon both on barium enema and at colonoscopy with HGD on biopsy; patient 36, with a caecal lesion radiologically, with HGD on biopsies taken from the transverse colon. A carcinoma was subsequently resected surgically in each case. In a further 11 patients dysplasia was detected at first colonoscopy; in 10 this was LGD and in one HGD (patient 34). Colectomy findings: In the DET group 17 patients had resective surgery for colitis after colonoscopy. Of these, dysplasia had been diagnosed in five: in two (patients 6 and 36) the colonoscopies had been done with a prior suspicion of carcinoma that was subsequently confirmed; in one (patient 34) HGD was noted at first colonoscopy and carcinoma resected; in one (patient 2) HGD was noted during surveillance and carcinoma resected; one patient (patient 35) had LGD at first colonoscopy after 11 years of disease but no dysplasia was seen in the colectomy specimen. Of those without a preoperative diagnosis of dysplasia, two patients had colectomy	was significantly more than CD/ indeterminate idiopathic IBD. The study compared patient characteristics for the two groups for gender, age at onset, and colitis diagnosis and no significant difference was found. The study did not find a significant difference in increased dysplasia risk with the increased duration of disease but the authors' note that this can be due to the small numbers in the groups with longer duration of disease. The authors note that in a highly select group with extensive colitis, HGD was detected in only one of 354

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?

Study ID	Study Design	Follow up	Population	Prognostic factors or surveillance	Outcomes	Comments
					after a single non-dysplastic colonoscopy and LGD was seen. Only three surveillance group patients had surgical resection during surveillance, in one case this being for HGD with carcinoma being found in the resected specimen (patient 2). <u>Non-DET group</u> Colectomy findings: In the non-DET group, six patients of 77 showed dysplasia, all LGD. Three of these (patients 38, 40, and 42) had surgery subsequently for failed medical management with no dysplasia noted in the resected specimens. ***Surveillance group*** In the surveillance group, a total of 354 examinations had been carried out, 33 patients in the surveillance group had dysplasia on at least one occasion, in 59 out of 152 colonoscopies. 58 were LGD and at 1 (patient 2) was HGD. The 67 surveillance group patients without dysplasia had undergone 202 colonoscopies. The extent of their disease had been determined by radiology in 40. Decade of disease* +(%) 0 (%) Total 1st 7 (10.3) 61(89.7) 68 2nd 28 (17.5) 132 (82.5) 169 3rd 19 (19.6) 78 (80.4) 97 4th 4 (33.3) 8 (66.7) 12 5th 1 (25) 3 (75) 4 *1st decade:8-10 years of disease; +:dysplasia; 0: no dysplasia *Incidence of dysplasia adapted from table 3*	colonoscopies on 100 patients, this in association with a Dukes' A. While there are difficulties in the recognition of LGD, it was found more commonly in people with extensive ulcerative colitis.
Odze, 2004	Retrospective comparative study The groups were compared for various patient	The mean length of follow-up evaluation averaged 82.1 months and 71.8 months for the 2 UC	Patients were chosen by a retrospective search through the pathology files of the Brigham and Women's Hospital and Beth Israel	UC patients with adenoma-like DALMs, compared to UC patients with sporadic DALMs and non-UC patients with adenomas as controls. At each endoscopy, UC patients were subjected to a standardized biopsy protocol that consisted of 4-quadrant	Of the 28 UC patients who were followed-up by endoscopic surveillance (i.e., 6 patients had a colectomy), 39% underwent at least one endoscopic surveillance procedure per year, 43% had one procedure every second year, and 18% had 1 procedure every 3 years during the course of follow-up evaluation (mean number of endoscopies, 4.4; range, 1 -1 3). There were no differences in the frequency of follow-up surveillance endoscopies between the 2 UC subgroups. The extent of colitis was categorised as total (involvement of	Small comparative study with three arms. The patient characteristics for the three arms were compared. There is no mention of blinding of the

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
	characteristics. Overall, the 34 UC patients and the 49 non-UC control patients showed a statistically similar distribution of polyps, mean polyp size, prevalence of high-grade dysplasia, and prevalence of a villous, or tubulovillous, growth pattern.	groups adenoma-like DALMs and sporadic adenomas respectively, and 60.4 months for the non-UC controls. The length of follow-up evaluation was recorded from the date of the patients' initial polypectomy to either the most recent endoscopic procedure or colonic resection. The there were no significant differences with regard	Deaconess Medical Center, Boston, MA, between 1990 and 1995. These patients were stratified into 2 subgroups: one group consisted of 24 patients who had an adenoma-like DALM Ideated within' "an area of histologicallly confirmed chronic, or chronic active, colitis and the other group consisted of 10 UC patients who had an adenoma-like DALM located outside of the most proximal extent of chronic, or chronic active, colitis. In this latter group, the DALMs were considered unrelated to the patient's UC	biopsies every 10 cm, in addition to sampling of all elevated, nodular, or mass-like areas. Non-UC control patients underwent less frequent endoscopies (mean 1.6; range, 1-4), according to the American College of Gastroenterology guidelines for surveillance of patients with colonic adenomas.	rectum to caecum), subtotal (involvement of rectum to ascending colon or proximal or distal transverse colon), or left-sided only (rectum or rectum and sigmoid colon). Of the 34 UC patients, 12 (35%), 14 (41%), and 8 (24%) had microscopically confirmed pancolitis, subtotal colitis, or limited left-sided colitis, respectively, at the time of initial polypectomy. The mean duration of disease was 9.2 years (±8.4 yr). Twenty-four patients had an adenoma-like DALM (26 polyps in total) present within an area of previously microscopically confirmed colitis, whereas 10 had polyps (12 polyps in total) located proximal to an area of colitis and, therefore, were considered sporadic adenomas. 3 of the 24 UC patients with an adenoma-like DALM were under the age of 40, however, their outcome was similar to that of patients greater than 40 years of age. The other 18 patients had an initial polypectomy followed by endoscopic surveillance, with a mean follow-up period of 82.1 months (range, 17-156 months). These patients had a mean of 4.4 colonoscopies per patient (range, 1-13 colonoscopies). Of these 18 patients under surveillance, 10 (56%) were followed-up for more than 7 years (84 mo), of which 7 (39%) were followed-up for more than 8 years. ***UC patients with adenoma-like DALM*** Of the 24 patients, 6 had a total colectomy within 6 months of their initial endoscopic polypectomy procedure because of their DALM. Of the 6 patients, 1 patient had an isolated focus of low-grade dysplasia present in their resection specimen, but none of the other resected patients had evidence of either flat dysplasia or adenocarcinoma. Three patients did not have any other polyps present in their colectomy specimen; whereas 2 patients had 1 adenoma-like DALM and 1 patient had 2 adenoma-like lesions present in their resection specimens. The other 18 patients had an initial polypectomy followed by endoscopic surveillance, with a mean follow-up period of 82.1 months (range, 17-156 months). These patients had a mean of 4.4	pathologists to the biopsy specimens but all specimens were independently analysed by two pathologists and no inter-observer variability was seen.

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?

Study ID	Study Design	Follow up	Population	Prognostic factors or surveillance	Outcomes	Comments
		to male/ female ratio, mean age, mean duration of disease, polyp location or size, the degree of dysplasia, or type of growth pattern between the 2 UC patient subgroups.	and, therefore represented a sporadic adenoma. They were compared with were compared with the outcome of 49 non-UC patients who were treated similarly for a sporadic adenoma as controls.		colonoscopies per patient (range, 1-13 colonoscopies). Of these 18 patients under surveillance, 10 (56%) were followed-up for more than 7 years (84 mo), of which 7 (39%) were followed-up for more than 8 years. Study Group: UC **patients** groups; Non-UC patients Characteristics: adenoma likeDALM; sporadic adenoma; sporadic adenoma Total number (Colectomy/ Surveillance): 24 (6/18); 10 (0/10); 49 (0/49) Mean follow-up (months): 82.1; 71.8; 60.4 Patients with new polyps: 15 (63%); 5 (50%); 24 (49%) Mean polyp size (cm): 0.73; 0.43; 0.58 Dysplasia LGD (%): 25 (89%); 4 (67%); 29 (74%) Dysplasia HGD (%): 3(11%); 2 (33%); 10 (26%) Patients with flat dysplasia[a] (%): 1 (4%); 0 (0%); NA No. of patients who had or developed cancer: 1 (4%); 0 (0%); 0 (0%) (a): One patient had dysplasia in the colectomy specimen; none developed dysplasia on endoscopic surveillance. NA: not applicable *Follow-up results of polyps, adapted from table 2*	
Rutter, 2004b	Case control study	Between 1 January 1988 and 1 January 2002 for determining the cases of colorectal neoplasia	St Mark's Hospital (London, U.K.) established a surveillance program for patients with long-standing extensive UC in 1971. Between 1	The surveillance cohort was studied for the prognostic factors based on colonoscopic features: backwash ileitis, shortened colon, tubular colon, featureless colon, scarring, segment of severe inflammation, normal colonic appearance, post-inflammatory polyps and colonic stricture.	The median surveillance interval was 2.19 years (interquartile range 1.83–2.45 years), and the median number of surveillance colonoscopies per patient was 5 (unadjusted caecal intubation rate 96%). ***Type and site of dysplasia*** Fourteen cases developed colorectal cancer (two Dukes' A, three Dukes' B, seven Dukes' C, and two disseminated malignancies), eight cases developed high-grade dysplasia, and 14 developed low grade dysplasia. Thirty-two patients developed adenomatous polyps within an area of inflamed colitic mucosa (24 with mild dysplasia, seven with moderate dysplasia, and one with severe dysplasia); 53% of dysplasias were detected in the rectum or	Cases and controls were well matched. The study was retrospective. No details on the number of pathologists confirming the diagnoses.

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?

Study ID	Study Design	Follow up	Population	Prognostic factors or surveillance	Outcomes	Comments
			January 1988 and 1 January 2002, 525 patients with longstanding extensive UC underwent 1217 surveillance colonoscopies, from whom 68 patients developed colorectal neoplasia while on surveillance. They were matched with 136 controls.	The controls were patients with longstanding extensive UC but without neoplasia (controls, n=136), derived from the prospective UC surveillance database.	sigmoid colon. ***Colorectal neoplasia*** The univariate analyses looked at the prognostic factors: backwash ileitis, shortened colon, tubular colon, featureless colon, scarring, segment of severe inflammation, normal colonic appearance, post-inflammatory polyps and colonic stricture and in the multivariate analyses only normal colonic appearance, post-inflammatory polyps and colonic stricture showed independently significant risk for colorectal neoplasia. Variable / Group / Odds Ratio [95% CI] / P value Normal colonic appearance: No 1 0.003; Yes 0.38 [0.19 to 0.73] Post-inflammatory polyps: No 1 0.005; Yes 2.29 [1.28 to 4.11] Colonic stricture: No 1 0.05; Yes 4.62 [1.03 to 20.8] OR: Odds Ratio;95% CI: confidence intervals *Multivariate analysis on the full cohort, adapted from table 3.*	
Rutter, 2004c	Case control study	From January 1, 1988, up till January 1, 2002	All cases of colorectal neoplasia detected from our surveillance program between January 1, 1988, and January 1, 2002, were studied (n= 68). Each patient was	Segmental colonoscopic and histological inflammation was recorded by using a simple score (0, normal; 1, quiescent/chronic inflammation; and 2, 3, and 4, mild, moderate, and severe active inflammation, respectively). Other data studied included history of primary sclerosing cholangitis, family history of colorectal cancer,	***Colorectal neoplasia*** Univariate analysis showed a highly significant correlation between the colonoscopic (odds ratio, 2.54, 95%CI 1.45 to 4.44; P= 0.001) and histological (odds ratio, 5.13, 95%CI 2.36 to 11.14; P < 0.001) inflammation scores and the risk of colorectal neoplasia. No other factors reached statistical significance. On multivariate analysis, only the histological inflammation score remained significant (odds ratio, 5.13, 95%CI 2.36 to 11.14; P < 0.001) therefore showed the same odds ratio as per the univariate analysis.	Matching was for sex, colitis extent, age at onset, duration of colitis, and year of index surveillance colonoscopy. The study was a retrospective case control study and the authors used only one value for inflammation

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
			matched with 2 control patients from the same surveillance population (n=136).	and smoking and drug history (mesalamine 5-aminosalicylic acid, azathioprine, and folate).		which does not account for changes in inflammation over the course of the disease and there was no validation of the scoring system.
Rutter, 2006	Data was obtained from the prospective surveillance database, medical records, colonoscopy, and histology reports at St Mark's hospital. The policy for dysplasia management has changed through the years but at the time of the study it was that	The total was 5932 patient-years (mean, 8.5 years) of follow-up. The primary end point was defined as follows: (1) death, (2) colectomy, (3) withdrawal from the surveillance program, or (4) the census date (January 1, 2001), which ever event	St Mark's Hospital (London, U.K.) established a surveillance program for patients with long-standing extensive UC in 1971. The surveillance population comprised 600 patients (343 male, 257 female). The median age at onset of colitic symptoms was 28 years (range, 1–64 years). Cumulative patient-year follow-up evaluation to primary end point was 5080 years (mean,	1) The incidence of neoplasia and/ or cancer by disease duration. 2) Progression to cancer by stage of dysplasia. Patients with histologically proven UC and macroscopic inflammation proximal to the splenic flexure (judged initially by barium enema but since the mid-1970s by colonoscopy) were offered 1 to 2 yearly surveillance colonoscopies from 8 years after symptom onset. Segmental nontargeted mucosal biopsy specimens were taken, along with biopsy specimens, from any suspicious areas of mucosa. In the year between surveillance colonoscopies a rectal mucosal biopsy examination was performed. Patients advised for	***Overall colonoscopy data*** 2627 colonoscopies were performed (600 index procedures and 2027 surveillance colonoscopies). The median number of colonoscopies per patient was 3 (range, 1–17). The cecal intubation rate was 98.7%. A median of 8 biopsy specimens was taken per colonoscopy. ***Incidence of Neoplasia*** Overall, 111 patients had 215 episodes of neoplasia (ie, dysplasia or CRC). After excluding sporadic adenomas, there were 163 episodes of neoplasia in 91 patients. The maximal grade of preoperative neoplasia per patient was CRC in 17, HGD in 18, and LGD in 37 patients. Using Kaplan-Meier curves, the actuarial cumulative incidence of neoplasia by disease duration was 1.5% at 10 years, 7.7% at 20 years, 15.8% at 30 years, 22.7% at 40 years, and 27.5% at 45 years. ***Progression to cancer by dysplasia*** <u>Indefinite for dysplasia</u> - 32 patients developed 36 episodes of indefinite dysplasia (5.3%). Over 217 patient-years of follow-up evaluation (median, 9.0 years), 17 patients developed no further dysplasia, 5 developed LGD (mean interval, 5.1 years; 2 of whom later developed HGD), and 1 patient developed CRC that was diagnosed 0.7 years later. <u>LGD-</u> 47 patients (7.8%) developed 78 episodes of LGD. One patient had prior HGD. Of the other 46 patients, 10 were referred for colectomy, and 36 had surveillance. 20% of hose that had colectomy (2 of 10) had cancer in the colectomy specimen and 19.4% (7 of 36) developed CRC who had surveillance. In total, 19.6% (9 of 46) of patients with LGD developed CRC, and 39.1% (18 of 46) of patients with LGD developed either HGD or CRC.	Study with long-term (30 years) follow-up but was a single arm prospective cohort. Validated dysplasia classification was used (Inflammatory Bowel Disease Dysplasia Morphology Study Group classification) and was reported by two experienced pathologists separately. Any discrepancies in dysplasia grading found were reviewed in a blinded fashion by an experienced histopathologist.

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
	dysplasia was reported independently by two experienced pathologists, and if either low-grade dysplasia (LGD) or high-grade dysplasia (HGD) was confirmed, the patient was advised to have a colectomy. Sporadic adenomas detected proximal to the extent of the colitis were removed endoscopically. If the lesion was considered to be a DALM, the	occurred first. Information was obtained for patients who left the programme Secondary end points in these patients were (1) well without dysplasia or CRC on January 1, 2001; (2) death, either definitely from CRC, possibly from CRC, (3) colonic surgery resulting in withdrawal from the surveillance program, either; (4)	8.5 years).	colectomy that declined surgery underwent more intensive surveillance programme.	HGD- 19 patients developed 30 episodes of HGD (3.2%). 11 were referred for immediate colectomy. Eight patients declined surgery and continued on surveillance: over a total of 19 years follow-up evaluation (median, 1.9 years). For those undergoing immediate colectomy, 45.5% (5 of 11) had cancer in the specimen; for those continuing on surveillance, 25% (2 of 8) developed CRC. In total, 36.8% (7 of 19) of patients with HGD developed CRC. DALMs - 20 patients developed 28 lesions considered to be DALMs. Nineteen (15 patients) contained LGD, and 9 (7patients) contained HGD. A total of 21.4% of patients with low-grade DALMs developed CRC. Of those undergoing immediate colectomy, 30% had cancer in the colectomy specimen. A total of 28.6% of patients with high-grade DALMs developed CRC. Of those undergoing immediate colectomy, 33.3% had cancer in the colectomy specimen. None of the 5 patients who continued surveillance after endoscopic resection of a DALM developed CRC. Sporadic Adenomas - Sporadic adenomas were detected at 52 colonoscopies in 32 patients. During more than 207 patient-years of follow-up evaluation (median, 4.7 y), 8 patients developed recurrent adenomas. Two patients developed CRC(within 5 years after having an adenoma resected from the same colonic segment, and the other 2.5 years after having an adenoma resected from a different colonic segment). In total 6.2% (2 of 32) of patients with adenomas developed CRC. This risk was not significantly higher than that of the whole study population (p=0.67). ***Overall incidence of cancer*** CRC was detected in 30 patients on surveillance (5% of the study population), and in an additional 8 patients after leaving surveillance (6.3% in total). Twenty-one patients were male, 17 were female. The median age at onset of colitic symptoms was 30 years (range, 12–32 years), compared with 28 years (range, 1–64 years) for the 562 patients who did not develop cancer (p=0.8). The median age at diagnosis of cancer was 55.5 years (range, 31–87 years). The median duration of UC at cancer diagnosis was 23.5 years (range, 11–48 years). Within surveillance, then actuarial cumulative incidence of CRC by	Survival analyses were done using Kaplan-Meier curves.

Evidence Table for Review question 3: When should colonoscopic surveillance for adults with IBD be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
	patients were also advised for colectomy.	emigration; or (5) patient untraceable.			disease duration was 0% at 10 years, 2.5% at 20 years, 7.6% at 30 years, 10.8% at 40 years, and 13.5% at 45 years. Ten of the surveillance cancers were Dukes' A, 6 B, 9 C, and 4 disseminated malignancies. ***Cancer survival*** Cancer follow-up evaluation. Thirty percent of these patients ultimately died from CRC, comprising 100% of those with disseminated malignancy, 33.3% with Dukes' C, 16.7% with Dukes' B, and 10% with Dukes' A cancer. The 5-year survival rate was 100% for Dukes' A, 80% for B, 80% for C, and 0% for disseminated malignancy. The overall 5-year survival rate was 73.3% and the 10-year survival rate was 62.9%. ***Colectomy*** 89 patients (14.8% of the study population) underwent colonic surgery during the surveillance programme. The adjusted (recalculated for age at time of either colectomy or cancer diagnosis) showed an actuarial cumulative incidence of 5.2% at 40 years, 8.0% at 50 years, 15.9% at 60 years, 25.7% at 70 years, and 47.3% at 80 years. ***Adverse events*** There were no documented complications of perforation or bleeding.	
Soetikno et al. 2002	Meta-analysis of 11 studies. Searches done in MEDLINE from January 1985 to December 2001. In addition, a manual search was performed	Review from January 1985 to December 2001.	To be included in the meta-analysis, each study had to contain information on the size of the population at risk, that is, the number of patients with UC and PSC and the observed number of patients with colorectal (CR)	Risk for colorectal dysplasia and carcinoma in patients with primary sclerosing cholangitis (PSC) and ulcertiave colitis (UC).	***Risk of colorectal dysplasia*** Patients with ulcerative colitis and primary sclerosing cholangitis are at increased risk of colorectal dysplasia and carcinoma compared with patients with ulcerative colitis alone; OR = 4.79, 95% CI [3.58 to 6.41] with the Mantel-Haenszel method, and OR = 5.11, 95% CI [3.15 to 8.29] with the Der Simonian and Laird method. ***Risk of colorectal cancer*** This increased risk is present even when the risk of colorectal carcinoma alone is considered; OR = 4.09, 95% CI [2.89 to 5.76] and OR = 4.26, 95% CI [2.80 to 6.48] by using, respectively, the Mantel-Haenszel and the Der Simonian and Laird methods.	Three reviewers independently searched MEDLINE, but only a limited ket words used: inflammatory bowel disease, ulcerative colitis, and sclerosing cholangitis. Manual searches and relevant abstracts from conferences were

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Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
	for relevant articles and the proceedings from meetings of the American Gastroenterological Association, the American College of Gastroenterology, and the American Association for the Study of Liver Diseases (between 1992 and 2001). Studies published in full, those performed prospectively, and those that used strict criteria for the		neoplasia. In addition, the study had to contain information concerning the prevalence of CR neoplasia in a control population, patients with UC who did not have PSC. Both populations had to be followed for the detection of CR neoplasia by using similar methods. Case control studies were excluded because these mandate by design non-random selection of case and control patients.			also searched. Additional information needed to reconstruct a two-by-two table was requested from the authors. The methodological quality of the relevant studies was assessed. Quantitative data was abstracted on the number of patients with UC with and without PSC and the number with CR neoplasia and CR carcinoma. Quality assessment and quantitative abstraction were performed by 3 investigators who also resolved disagreements The investigators also contacted authors of studies

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Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
	diagnosis of UC and PSC received the highest score of 4. Ambiguity or absence of information in any category resulted in a score of zero for that category.					to clarify and obtain missing quantitative data. Each study was given a score based on the type of publication, study design, and reliability of the diagnosis of UC and PSC.
Velayos 2006	Retrospective case control study	All patients with chronic ulcerative colitis (CUC) evaluated at the Mayo Clinic Rochester between January 1, 1976, and December 31, 2002	Mayo Clinic centralised diagnostic index, utilizing inpatient and outpatient discharge diagnoses, pathology reports, and endoscopic reports, identified all patients with CUC during study period. Cases of colorectal	The patient, clinical, endoscopic, and therapeutic factors identified in literature as associated or potentially associated with CRC risk among patients with CUC were recorded. Additionally demographic information and data on all potential confounders was also collected. All data was then registered on a standardized form using pre-specified definitions of variables. Demographic information abstracted includes the following: gender; ethnicity;	Conditional logistic regression, adjusted for age at colitis diagnosis and colitis duration, identified a final set of variables independently associated with colorectal cancer. The majority of the study population was male and white. Most patients had extensive colitis; only 2 cases and 2 controls (1%) had proctitis. ***Univariate analysis*** A diagnosis of CRC in a first-degree relative was the only patient factor significantly associated with CRC. A prior diagnosis of pseudopolyps was significantly associated with CRC. No treatment variables were found to be significantly associated with CRC, although a trend between immunosuppressive therapy for >1 year and CRC was observed. ***Multivariate analysis*** The backward elimination conditional logistic analysis, adjusted for age at CUC diagnosis and the duration of CUC, identified the most influential variables independently associated with CRC in the study population. Characteristic Odds Ratio [95% CI]	At least 1 study author confirmed the diagnosis of CUC for all cases and controls, assessing study eligibility without knowledge of risk variable data. The study also considered treatments having a protective effect on IBD, but treatment for IBD is outside the scope for this

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Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance**	**Outcomes**	**Comments**
			cancer (n=188) were matched with controls (n=188). The distribution of geographic residence was approximately equal among cases and controls and evenly spread across the 3 categories.	age at CUC diagnosis; age at CRC diagnosis (cases) or equivalent follow-up (controls); and geographic residence, categorized as either Minnesota, 5-state region (Iowa, Illinois, North Dakota, South Dakota, and Wisconsin), or elsewhere. Patient variables collected included the following: diagnosis of CRC in a first-degree relative; tobacco use at CUC diagnosis (current smoker, exsmoker, or never smoker); continuous tobacco use for more than 1 year and treatments used.	Family history CRC — OR=3.7 [1.0 to 13.2] Smoking status after diagnosis of CUC — OR=0.5 [0.2 to 0.9] Primary sclerosing cholangitis — OR=1.1 [0.5 to 2.3] Pseudopolyps — OR=2.5 [1.4 to 4.6] <1 surveillance colonoscopy — OR=1.0 1 or 2 surveillance colonoscopies — OR=0.4 [0.2 to 0.7] >2 surveillance colonoscopies — OR=0.3 [0.1 to 0.8] OR: Odds ratio; 95%CI: 95%CI confidence interval *Selected outcomes from multivariate analyses, Adapted from table 5.*	guideline.

Review question 3: People with adenomatous polyps

Evidence Table for Review question 3A: When should colonoscopic surveillance for adults with adenomatous polyps be started and what should be the frequency of surveillance?

Study ID	Study Design	Follow up	Population	Prognostic factors or surveillance programmes	Outcomes	Comments
Kronborg 2006	Randomised surveillance study. The groups were compared for patient characteristics. Size was measured immediately after polypectomy Years of observation were calculated from the first polypectomy to the most recently performed surveillance, or to censoring due to death, refusal to undergo surveillance, or	10 years	Between 1981 and 1991 a total of 673 patients (382 men, 291 women; age, 28-77 years) with newly diagnosed adenomas were allocated at random to cither 2 years (group A) or 4 years (group B) between surveillance examinations. From 1981 to 1987, 73 patients with flat and sessile adenomas (more than 5 mm in diameter) and villous adenomas were randomly allocated to either intervals of 6 months (group C) or 12 months (group D) between examinations	Colonoscopic surveillance: group A = 2 years, group B = 4 years, group C = 6 months, group D = 12 months, E= 12 months and F= 24 months, between surveillance examinations. Different surveillance intervals, 6 12, 24 months. Double-contrast barium enema (DCBE) was added if colonoscopy was incomplete. In patients with multiple polyps or unsatisfactory bowel preparation, colonoscopy was repeated within 3 months. Surveillance examinations were done mainly by colonoscopy, but DCBE was used if	***Colorectal neoplasia and adenoma detection*** *B versus A* After the first follow-up period (24 months in A and 48 months in B) fewer patients had adenomas detected in group A than in group B but it was not statistically significant (58 of 292 versus 64 of 232; RR = 0.7, 95% CI 0.5 to1.0), and the number of patients with significant neoplasia did not differ (10 of 292 versus 13 of 232; RR= -0.6, 95% CI 0.3 to 1.4). Overall, adenomas were detected in a smaller proportion of surveillance examinations in group A than in group B (123 of 684 versus 83 of 300; RR = 0.7, 95% CI 0.5 to 0.8). The same was true of significant new neoplasia (18 of 684 versus 17 of 300; RR = 0.5, 95% CI 0.2 to -0.9). In group A the total number of patients having new adenomas and new significant neoplasia was 95 and 16, respectively. In group B the figures were 77 and 17, respectively. New adenomas tended to be detected more often in the A group, but advanced new adenomas appeared equally as frequently in groups A and B. Overall, larger size contributed mainly to the advanced state (19 and 21 patients), whereas severe dysplasia and villousness was seen in 3 patients in both arms. However, CRC was diagnosed significantly more often in group B. *D versus C* The number of patients was limited, but the cumulative number of surveillance years was 10 years on average in both groups. Advanced new adenomas tended to be more frequent in the D group (p=0.08), but the one case of cancer was detected in group C at a planned examination 6 months after a "clean colon". The cancer was in early stage and the patient developed another early CRC more than 5 years later. Nearly all new adenomas were in advanced stage because of large size alone. *F versus E* The two groups were similar initially and the average time of surveillance was 5 years. The number of colonoscopies was nearly	The age, sex, and polyp characteristics of the patients were distributed evenly in the two groups. The study was randomised by random numbers but no details of concealment or blinding of pathologists is mentioned. Advanced adenomas were defined as those with severe dysplasia or being at least 10 mm in diameter or villous.

Evidence Table for Review question 3A: When should colonoscopic surveillance for adults with adenomatous polyps be started and what should be the frequency of surveillance?

Study ID	Study Design	Follow up	Population	Prognostic factors or surveillance programmes	Outcomes	Comments
	emigration. Proportions were compared as relative risks (RR) with 95% confidence intervals. RR was calculated as the risk in the group with the longest interval of surveillance.		during the first 5 years and then every year in all. Finally, 200 patients with similar adenomas to those in groups C and D were randomized to intervals of 12 months (group E) or 24 months (group F), the intake being from 1988 to 2000. Patients were excluded if colorectal cancer (CRC) was detected at the initial examination, or if they had a history of previous colorectal neoplasia (carcinoma or adenoma), familial adenomatous polyposis (FAP)	the patient refused colonoscopy. If a surveillance examination was done more than 3 months after the date planned, the examination was considered 'in between'. Patients without complete colonoscopy and less than optimal compliance were kept in the study	twice as high in group E, but the number of new adenomas regardless of state was similar. There was no significant difference in risk of CRC but the two cancers in group E were both early stage, one being detected 12 months after a "clean colon" (a mucinous tumour), the other, 57 months after a "clean colon" and the patient's refusal to undergo further examinations. In group F the cancers were more advanced. Three of the four patients had a "clean colon" 24 months before the CRC was detected during a planned examination, but one had many recurrences at the site of the original large sessile adenoma in the rectum, before the cancer was detected (Dukes' B). **Relative risks of new adenomas and carcinomas during surveillance with 95% CI** **B versus A** / **D versus C** / **F versus E** **New adenomas**: **0.88 (0.69-1.12)** / **0.82 (0.43-1.52)** / **0.88 (0.57-1.34)** **Advanced new adenomas**: **1.15 (0.61 2.15)** / **3.12 (0.87 14.50)*** / **0.97 (0.40 2.35)** **Colorectal carcinomas**: **6.22 (1.06-117, 48)**** / **1.93 (0.38-13.94)** ***p=0.08; **p = 0.04.** *Adapted from Table V Kronborg 2006* ***Adverse events*** *B versus A* Seven complications to colonoscopy were minor and treated without surgery, six during surveillance. The perforations occurred during surveillance in each of the two groups were treated successfully with suture alone. A perforation during initial colonoscopy in group A proved fatal, the patient dying of septicemia after inadequate closure of a temporary colostomy. A: two diagnostic perforations and two therapeutic perforations and B: one diagnostic perforation and one polypectomy syndrome. *D versus C* Two severe complications (1 diagnostic perforation and 1 polypectomy	

Evidence Table for Review question 3A: When should colonoscopic surveillance for adults with adenomatous polyps be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance programmes**	**Outcomes**	**Comments**
			or hereditary non-polyposis colorectal cancer (HNPCC).		syndrome) were seen in the C group, but both patients were fully restored. No severe complications were found in group D. *F versus E* Two colonoscopic perforations were seen, both patients being fully restored after surgery (one diagnostic perforation in each group).	
Lieberman 2007	Patients with cancer or adenomas with high-grade dysplasia had follow-up based on physician decisions. Five hundred one participants with no neoplasia at baseline were matched by age to patients with adenomas ≥10 mm and assigned to surveillance at 5 years.	5.5 years	Participants were enrolled in 13 Veterans Affairs Medical Centres between February 1994 and January 1997.24 Centres were selected to achieve geographic and racial diversity. Among patients who met the eligibility criteria, 1463 (31.4%) declined to participate, 3196 eligible patients were enrolled, and 3121 had complete colonoscopy examinations to the caecum.	Surveillance intervals of 2 or 5 years and adenoma detection in groups based on index colonoscopy results: according to the following hierarchy: no neoplasia, hyperplastic polyp, 1 or 2 tubular adenomas <10 mm, 3 or more tubular adenomas <10 mm, tubular adenoma ≥10 mm, adenoma with villous histology (25% or more), adenoma with high-grade dysplasia, invasive cancer.	One thousand one hundred seventy-one patients with neoplasia and 501 subjects with no neoplasia at baseline were scheduled to have at least 1 follow-up colonoscopy within 5.5 years. ***Neoplasia detection*** The relative risk in patients with baseline neoplasia was 1.92 (95% CI 0.83 to 4.42) with 1 or 2 tubular adenomas <10 mm, 5.01 (95% CI 2.10 to11.96) with 3 or more tubular adenomas <10 mm, 6.40 (95% CI 2.74 to14.94) with tubular adenoma >10 mm, 6.05 (95% CI 2.48 to14.71) for villous adenoma, and 6.87 (95% CI 2.61 to18.07) for adenoma with high-grade dysplasia. The most serious outcome was the finding of invasive cancer or high-grade dysplasia. The rates of interval high-grade dysplasia or cancer per 1000 person-years of follow-up. The risk of high-grade dysplasia or cancer per 1000 person-years of follow-up was 0.7 with no neoplasia at baseline, 1.5 with tubular adenomas <10 mm, 6.4 with large tubular adenomas (>10 mm), 6.2 villous adenomas, 26.0 with high-grade dysplasia.	All pathology was reviewed locally and sent for blinded central pathology review. When there was a discrepancy, a third referee pathologist reviewed the material. The authors compared demographic factors (age, race) and possible risk factors for advanced neoplasia (family history, smoking, use of non-steroidal anti-inflammatory drugs) to determine whether the surveillance cohort was similar to patients who did not receive surveillance. In the neoplasia group, the rate of active smoking was higher in patients who had no surveillance compared with those with

Evidence Table for Review question 3A: When should colonoscopic surveillance for adults with adenomatous polyps be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance programmes**	**Outcomes**	**Comments**
						surveillance (33.8% vs. 21.7%, respectively, (P<0.001). There were no significant differences in the control group.
Lieberman 2008	During the study period, the Clinical Outcomes Research Initiative repository (CORI) consortium included 65 practice sites in 25 states. Ten sites contributed more than 500 reports, 6 sites contributed 100-500 reports, and 1 site contributed less than 100 reports.	Retrospective, registry	Patients were asymptomatic adults receiving colonoscopy for screening during 2005 from 17 practice sites, which provide both colonoscopy and pathology reports to the Clinical Outcomes Research Initiative repository. Patients were included in this analysis if they were over age 20 years undergoing screening with no symptoms of lower gastrointestinal pathology.	Colonoscopic surveillance for polyps less than 10 mm. Size of polyp and location of polyp's association with advanced histology.	Three asymptomatic groups were included: average risk, family history of CRC or adenoma, and patients receiving colonoscopy for a positive faecal occult blood test or polyp found at screening sigmoidoscopy. Patients were stratified by indication group. Among 13,992 asymptomatic patients who had screening colonoscopy, 6360 patients (45%) had polyps, with complete histology available in 5977 (94%) patients. ***Advanced histology*** The proportion with advanced histology (defined as an adenoma with villous or serrated histology, high-grade dysplasia, or an invasive cancer) was 1.7% in the 1 to 5mm group, 6.6% in the 6 to 9 mm group, 30.6% in the greater than 10mm group. ***Distal location*** Distal location was associated with advanced histology in the 6 to 9 mm group (P = 0.04) and in the greater than 10-mm group (P = 0.002).	Sensitivity analysis was done to determine how misclassification of polyp size would impact the outcome. The analysis assumed that polyps were either overestimated in size by 1 mm (for example, a 10-mm polyp is reclassified as 9 mm) or underestimated (a 9-mm polyp is reclassified as 10 mm). Advanced histology was defined as an adenoma with villous or serrated histology, high-grade dysplasia, or an invasive cancer. The risk factors compared were age, sex, race, indication for colonoscopy (that were similar) and location of largest polyp
Martinez 2009	Pooled analysis of	Median follow-up	Individual patients:	Determining the actual risk of	Advanced colorectal neoplasia was diagnosed in 1082 (11.8%) of the patients, 58 of whom (0.6%) had invasive cancer.	Patient level data was used from the included

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Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance programmes**	**Outcomes**	**Comments**
	eight North American studies (six were randomized controlled trials). Schatzkin A et al. (2000); Baron et al. (1999 and 2003); Winawer et al. (1993); Alberts et al. (2000 and 2005); Greenberg et al. (1994); Lieberman et al. (2000)	period of 47.2 months	included average-risk individuals with a first-time diagnosis of adenomatous polyps. Study inclusion studies (1) 800 or more study participants; (2) complete baseline colonoscopy with removal of one or more adenomas and removal of all visualized lesions; (3) a specified schedule of sur-veillance follow-up (4) end point data regarding the number, size, and histopathology of adenomas and colorectal cancers detected.	developing advanced adenomas and cancer after polypectomy or the factors that determine risk.	***Definitions*** Definitions for adenomas were as follows: tubular ≤25% villous component), tubulovillous (26%-75% villous component), or villous (>75% villous component). They considered advanced adenomas to be those that had one or more of the following features: 10 mm in diameter or larger, presence of high-grade dysplasia, or greater than 25% villous features (also classified as tubulovillous or villous histology). They then combined advanced adenomas and invasive cancer into an end point of advanced colorectal neoplasia or metachronous advanced neoplasia. ***Risk factors for advanced metachronous adenomas*** Risk of a metachronous advanced adenoma was higher among patients with 5 or more baseline adenomas (24.1%; standard error, 2.2) and those with an adenoma 20 mm in size or greater (19.3%; standard error, 1.5). Risk factor patterns were similar for advanced adenomas and invasive cancer. ***Risk factors for metachronous advanced neoplasia*** Multivariate analyses, older age (P < 0.0001 for trend) and male sex (odds ratio [OR], 1.40; 95% confidence interval [CI], 1.19-1.65) were associated significantly with an increased risk for metachronous advanced neoplasia, as were the number and size of prior adenomas (P < .0001 for trend), the presence of villous features (OR, 1.28; 95% CI, 1.07-1.52), and proximal location (OR, 1.68; 95% CI, 1.43-1.98). High-grade dysplasia was not associated independently with metachronous advanced neoplasia after adjustment for other adenoma characteristics.	studies. Of the 10,021 men and women who were enrolled in the individual studies, we excluded patients who had a colorectal cancer present at baseline (n = 27) and those who did not have a follow-up colonoscopy performed after the first 6 months of study (n = 827) because these likely were individuals who were not under typical postpolypectomy surveillance. Thus, data for 9167 (91.5%) patients remained for inclusion in our pooled analyses.
Nusko 2002	Follow up records of 1159	Records from 1978 to	A total of 3134 patients undergoing	Identifying risk factors determining surveillance	A total of 3134 patients undergoing endoscopic removal of colorectal adenomas between 1978 and 1996. Single adenomas were found in 1052 patients (53.6%) and 797 (46.4%) had multiple initial lesions.	Large registry data, studying risk factors. All patients were offered a

Evidence Table for Review question 3A: When should colonoscopic surveillance for adults with adenomatous polyps be started and what should be the frequency of surveillance?						
Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance programmes**	**Outcomes**	**Comments**
	patients undergoing surveillance examination. The following statistical procedures were performed: (1) Multiple regression analysis (2) Likelihood ratio tests (3) Calculation of the times t0.05, t0.10, and t0.20 for the relevant risk groups based on their hazard functions. (4) 1000 Bootstrap samples	1996	endoscopic removal of colorectal adenomas were prospectively recorded on the Erlangen Registry of Colorectal Polyps between 1978 and 1996. The patients had no previous history of colorectal adenomas or carcinomas. Patients with a familial history of adenomatous polyposis or hereditary non-polyposis colon cancer syndrome, or inflammatory bowel disease were excluded.	intervals for patients with metachronous adenomas of advanced pathology	Mean age at the initial clearing examination for patients who were followed up was 57.08 years (SD 11.25) compared with 59.74 (SD 11.61) for those who were not followed up. A total of 1159 patients underwent regular follow up examinations: 747 (64%) of these patients were males and 412 (36%) were females. One hundred patients (8.6%) had a parental history of colorectal carcinoma while in 24 patients (2.1%) the relevant data were not available. ***Risk factors for advanced metachronous adenomas*** Considering only patients with tubular adenomas at the initial clearing procedure, a multivariate model for related observations revealed that adenoma size (p<0.0001), multiplicity (p=0.021), parental history of colorectal carcinoma (p=0.0168), and an interactive effect between size and sex (p=0.00392) were significant predictive variables. Male patients with large adenomas had a significantly higher risk of developing advanced metachronous adenomas than other patients. ***Stratification:*** Low-risk group containing patients with no parental history of colorectal carcinoma and with only small (<10 mm) tubular adenomas at the initial clearing examination, 12.2 (95% CI 10.1 to 15.2) years were needed for advanced adenomas to develop in more than 10% of patients. The estimate for the 5% was 10.4 years (95% CI 4.1–13.2) and for 20% was16.2 years (95% CI 10.5–19.2). High-risk group containing all other patients: those with multiple or large adenomas, tubulovillous or villous adenomas, or a parental history of colorectal carcinoma. 6.1 (95% CI 3.2 to 11.5) years were needed for advanced adenomas to develop in more than 10% of patients. The estimate for the 5% was 0.5 years (95% CI 0.1–1.6) and for 20% was15.6 years (95% CI 11.5–18.2).	chance to participate in a scheduled follow up programme, however 1849 patients either refused follow up or underwent examinations at other endoscopy departments. There were no statistically significant differences in baseline patient or adenoma characteristics between patients who underwent surveillance and those who did not. Bivariate analyses done apart from univariate analyses to adjust for confounding covariates. Sensitivity analyses done using bootstrapping. Kept despite Saini 2006 as the outcomes used there did not include the ones extracted from this primary paper.
Saini 2006	Systematic review and meta analysis	Three electronic databases (MEDLIN,	Included: study population was patients with a personal history	Nine hundred seventy-one references were identified but fifteen	Bonithon-Kopp et al (2000) showed that the only RR that was statistically significant for number of adenomas only: RR 3.26 (95% CI 1.81 to 5.89).	All Mesh and free key words used for the searches were given in the paper. The

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	Study included: Baron et al. (1999), Bonithon-Kopp et al (2000) Cordero el al (1999), Fornasarig et al (1998), Fossi el al (2001), Hixson el al (1994), Jørgensen el al (1995), Lund el al (2001), Martinez el al (2001), Noshirwani el al (2000), Nusko el al (2002), Paspatis el al (1995), Schatzkin el al (2000), Van Stolk el al (1998), Winawer el al (1993)	PREMEDLINE, and EMBASE) were searched from January 1980 to January 2003	of adenomas. Studies enrolling patients with a personal history of hereditary nonpolyposis colorectal cancer (HNPCC), familial adenomatous polyposis (FAP), CRC, or inflammatory bowel disease (IBD) were excluded.	primary studies were included. Identifying risk factors associated with advanced adenomas.	Martinez et al (2001) showed that the only RR that was statistically significant for size only: RR 1.77 (95% CI 1.30 to 2.41) Van Stolk et al (1998) did not find any statistical significant RR for any factors. Winawer el al (1993) the incidence of advanced adenomas at 3-year surveillance colonoscopy was 1.4% in the low-risk patients versus 5-4% in the high-risk patients: RR 3.87 (95% CI 1.09 to13.66). Advanced adenoma defined as adenomas ≥ 1 cm, villous histological features, or with cancer. ***Number and size*** Four trials: Bonithon-Kopp et al (2000), Martinez el al (2001), Van Stolk el al (1998), Winawer el al (1993): provided adequate data to determine the incidence of recurrent advanced adenomas at surveillance colonoscopy on the basis of (1) number of adenomas at index colonoscopy (>3 vs. 1-2) the pooled RR was 2.52 (95% CI 1.07-5.97), and the pooled absolute risk difference was 5% (95% CI 1%-10%) and (2) size of the largest adenoma at index colonoscopy (≥1 cm [large] vs. <1 cm [small]) the pooled RR was 1.39 (95% CI 0.86-2.26), and the pooled absolute risk difference was 2% (95% CI -2% to 6%) The heterogeneity was significant for both cases p<0.001 and p<0.05. ***Histological diagnosis*** Three trials: Bonithon-Kopp et al (2000), Martinez el al (2001), Van Stolk el al (1998): provided adequate data to determine the incidence of recurrent advanced adenomas at surveillance colonoscopy on the basis of adenoma histologic features (tubulovillous/ villous vs. tubular). The pooled RR was 1.26 (95% CI 0.95-1.66), and the pooled absolute risk difference was 2% (95% CI -1% to 4%). The test of heterogeneity for the pooled RR was not significant (p>0 .2), indicating that the individual studies did not demonstrate significant differences in the RR of recurrent advanced adenomas. ***Dysplasia*** Two studies: Bonithon-Kopp et al (2000) and Van Stolk el al (1998) provided adequate data to determine the incidence of recurrent	PRISMA chart was available.

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Study ID	**Study Design**	**Follow up**	**Population**	**Prognostic factors or surveillance programmes**	**Outcomes**	**Comments**
					advanced adenomas on the basis of the degree of dysplasia at index colonoscopy (high grade vs. no high grade dysplasia). The pooled RR was 1.84 (95% CI 1.06-3.19), and the pooled absolute risk difference was 4% (95%CI 0-8%). The test of heterogene¬ity for the pooled RR was not significant (p>0 .2) ***Risk factors for advanced adenomas at surveillance*** Nine studies identified a total of 5 risk factors that were associated with advanced adenomas at surveillance colonoscopy: (1) number of adenomas, (2) size of largest adenoma, (3) incomplete index colonos-copy, (4) concurrent proximal and distal adenomas, and (5) parental history of CRC. ***Risk factors for recurrence of adenomas*** 14 studies, reported a total of 6 risk factors: (1) number of adenomas, (2) size of largest adenoma, (3) patient age, (4) tubulovillous/ villous features or severe dysplasia, (5) advanced adenoma, and (6) adenoma in the proximal colon.	

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Review question 4: People with Inflammatory bowel disease adenomatous polyps

Table 1 - Information and support needs for people/carers of patients undergoing or considering undergoing colonoscopic surveillance: Evidence table for IBD and polyps

Study ID	Study Design	Population	Intervention	Outcomes	Comments
Sequist et al, 2009[i]	A randomized control trial (RCT) to promote colorectal cancer (CRC) *screening*.	Participants included 21860 patients aged 50 to 80 years who were overdue for CRC *screening*. Allocated to patient intervention group: 10930 patients (all received allocation intervention). Allocated to patient control group: 10930.	Patients overdue for CRC *screening* received a mailing, which included the following: (1) an educational pamphlet detailing *screening* options, (2) a dedicated telephone number to schedule FSIG or colonoscopy. The initial mailing occurred during the first month of the intervention and a second mailing was sent to patients still overdue for *screening* 6 months later.	The primary study outcome was completion of one of the following 3 options during the 15-month study period: FOBT, FSIG, or colonoscopy. The secondary outcome was detection of colorectal adenomas. ***Screening* rates:** Patients who received the mailing were significantly more likely to complete colorectal cancer *screening* than those who did not (44.0% versus 38.1%; p<.001). The impact of the mailing did not differ between women and men. **Detection of adenomas:** Detection of adenomas tended to be greater among patients who received mailings compared with the control group (5.7% vs. 5.2%; p=.10).	All data were collected from the electronic record, and study outcomes were assessed 15 months following the start of the intervention for all randomized patients.
Rutter et al, 2006	A 58-question self-administered postal	Two hundred and eighty one of 329 patients (85.4%)	Colonoscopy:		

Study ID	Study Design	Population	Intervention	Outcomes	Comments
	questionnaire design looking at : • The quality of life of patients on surveillance. • Colonoscopy • Kranz health opinion survey • surveillance	responded. Median age was 55 (range, 26-84) years. One hundred sixty-seven patients were male and 114 female (no significant difference from nonrespondents: *P = 0.88*). Median duration of colitis was 25 (range, 10-53) years. Patients had undergone a median of six surveillance colonoscopies (range, 1-15; total number, 1777).	• *convenience.* 39% respondents found the bowel preparation difficult to take. • *Experience of colonoscopy.* 60.2% respondents found their last colonoscopy comfortable or very comfortable, 30.1% found it uncomfortable, and 9.7% found it very uncomfortable. Patients expressed less discomfort with more experienced colonoscopists (r=0.20, p=0.0007). There was a correlation between comfort and pethidine dose (r=0.16, p=0.007, i.e., those with more discomfort were given more pethidine) • *Complication.* 16.4% respondents experienced abdominal pain (attributed to the procedure) in the week following their last colonoscopy of which 3.7% stated that the pain interfered with everyday activities. Post-procedural pain was strongly related to the Hospital Anxiety and Depression Scale (HADS) anxiety score (p<0.0001) but not with the drug doses used during the procedure. Five patients (1.7%) reported complications following previous colonoscopies. Surveillance: • *Information.* When asked about the level of involvement in the treatment decision-making, 65.5% reported being content with their current involvement, whereas 34.2% preferred to be more involved and only 0.4% wished to be less involved. Asked about the amount of information they had received about the surveillance programme, 83.8% thought they had received the right amount of information, 16.2% thought they had received too little, and no patient thought they had received too much. 35.8% had sought other sources of information. 91.4% described the information given as easy to understand, 2.6% thought it was difficult and 6.1% could not remember being given information. • *The surveillance program.* 97.8% of the patients felt that the surveillance was important for them. • *Cancer concern.* 96.4% respondents thought that the surveillance program gave them reassurance, while 3.6% stated that the		

Study ID	Study Design	Population	Intervention	Outcomes	Comments
			programme made them more anxious. When asked about the effect of the surveillance programme on reducing risk of colorectal, 1.8%patients believed it completely removed the risk, 67.9% believed it greatly reduced the risk, 24.4% believed it moderately reduced the risk, and 5.9% believed it slightly reduced the risk.		

<table>
<tr><th>Study ID</th><th>Study Design</th><th>Population</th><th>Intervention</th><th>Outcomes</th><th>Comments</th></tr>
<tr>
<td>Makoul et al, 2009[ii]</td>
<td>A pretest – posttest design to assess a multimedia patient Education Program (PEP) that provides information about CRC and CRC screening, and encourages people to talk with their physicians about getting screened.</td>
<td>A total of 270 adults, age 50-80 years, participated in Spanish for all phases of the pretest – posttest design.</td>
<td>Patients were randomly assigned to a version of the multimedia program that opened with either a positive or a negative introductory appeal. Structured interviews assessed screening behaviour, willingness to consider screening options, intention to disscuss CRC screening with the doctor. Two versions of a 5-minute PEP in both Spanish and English (using information gained through a series of structured interviews and focus groups in a primarily Spanish-speaking community) was developed.</td>
<td>
Screening relevant knowledge[iii]
<table>
<tr><th>Item</th><th>Pretest (%)</th><th>Posttest (%)</th><th>p</th></tr>
<tr><td>Screening options:</td><td></td><td></td><td></td></tr>
<tr><td>FSIG</td><td>11.5</td><td>53</td><td><.001</td></tr>
<tr><td>Colonoscopy</td><td>23.3</td><td>57</td><td><.001</td></tr>
</table>
Willingness to consider CRC screening[iv]
<table>
<tr><th>Screening options</th><th>Pretest (%)</th><th>Posttest (%)</th><th>p</th></tr>
<tr><td>FSIG</td><td>54.1</td><td>78.1</td><td><.001</td></tr>
<tr><td>Colonoscopy</td><td>64.8</td><td>84.4</td><td><.001</td></tr>
</table>
The tables above show increase in the participants' knowledge of the primary screening options and willingness to consider CRC screening following exposure to the patient education program.
The program made more than 90% of patients want to discuss CRC with their doctors. There was no significant difference between response to the positive and negative introductory appeals in terms of this intention (90.4% and 94.5% respectively).
</td>
<td>The paper refers to patient/community education. The program involved the patients/community on how to make screening information and options easier. Information was tailored to the community/patient needs.
Overall, there was no difference in participant response to both positive and negative appeals.

Limitations:
Focus was on Spanish-speaking adults in a Hispanic/latino community which precludes generalization to a broader audience</td>
</tr>
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Study ID	Study Design	Population	Intervention	Outcomes	Comments
Sheikh et al, 2004	A questionnaire design study to determine patients *screening* preferences.	Adult patients attending the internal medicine and family practice clinics were chosen on the basis of availability and ease of collecting data. One hundred and ninety three patients responded to the questionnaire.	A description of *screening* procedures given in a packet	One hundred and fifty four (79.8%) of the 193 preferred some sort of *screening*. Of those who had had a previous colonoscopy, 55% preferred a repeat *screening*, compared with only 30% of those who had never had a colonoscopy (p = 0.017). Of those who had had a previous sigmoidoscopy, 53% preferred a repeat *screening*, compared with only 33% of those who had never had a sigmoidoscopy, although the differences were not statistically significant.	The study demonstrates diversity in patient choices for CRC *screening*.
Brotherstone et al,2006	Randomly allocating people to study the effectiveness of visual illustrations in improving people's understanding of the preventive aim of Flexible Sigmoidoscopy (FSIG) screening	318 people aged 60-64 were sent a timed, dated appointment to attend FSIG screening.	They were randomized either to be sent a written leaflet alone (n=151) or a written leaflet along with a set of illustrations showing the development of cancer from polyps and removal of polyps during FSIG (n=167). A sample of 123 (39%) of the 318 people to whom the information was sent were selected at random for a telephone interview within two to four weeks of the information materials being sent out. The interviews were recorded and transcribed, and coded by two	**The primary outcome** was awareness of the preventive aim of FSIG screening. Of the 123 randomly selected for interview, 25 could not be contacted, 16 telephone numbers were incorrect, 2 respondents had communication difficulties, 4 were on holiday during the interview period, and 3 of the interviews were terminated prematurely. 8 people declined to be interviewed. 65 (53%) interviews were completed and recorded, 35 (54%) with participants who were sent the written information only and 30 (46%) with those who had been sent illustrations as well. **No significant difference in age, gender or socioeconomic status between people who were interviewed (n=65) and those who were not (n=58).** In the **written information group, 57%** had	The leaflet was based on materials that had been piloted and were used in the UK FSIG Trial. The leaflet contained comprehensive information about FSIG screening, risk factors for colorectal cancer, how screening works, what the test involves, what happens if pre-cancers are found, whether there are risks associated with having the test, and the reliability of the

<table>
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<tr><td></td><td></td><td></td><td>independent raters who were blind to condition (leaflet only or leaflet and illustrations). Logistic regression was used to see whether the illustrations enhanced understanding of the preventive aim of FSIG screening.</td><td>good understanding of the aims of the test, whilst in the group who were sent written information and illustrations, 84% had good understanding.
The addition of the illustrations resulted in significantly better understanding (OR = 3.75; CI: 1.16-12.09; p = 0.027) which remained significant after controlling for age, gender and socioeconomic status (OR = 10.85; CI: 1.72-68.43; p = 0.011).</td><td>test.

Wide CI that was not accounted for in the study</td></tr>
<tr><td>Thiis-Evensen et al, 1999.</td><td>Postal questionnaire design aimed to study the psychologic effect of attending a screening program.</td><td>Four hundred and fifty-one individuals invited for a colonoscopic examination to detect and remove colorectal polyps. Mean age was 67.2 years (range, 63-72 years), and 48% were women.
As controls for those subjected to endoscopy, a group of 447 matched for age and sex were randomly drawn from the population registry.</td><td>Fourteen days and 3 and 17 months after the examination, the attendees received by mail a questionnaire composed of Goldberg’s General Health Questionnaire (GHQ-28), the Hospital Anxiety and Depression Scale (HADS) and questions designed to evaluate how the attendees had experienced the colonoscopic screening examination and to register whether polyps had been detected. Questionnaires were sent to a total of 429 individuals.The same questionnaire was also mailed to the control group (matched for age and sex) that did not enrol in the endoscopic screening</td><td>Replies given in 409 returned questionnaires of 429 that were mailed to the screened group 14 days after the examination (%).
<table>
<tr><th>Questions</th><th>Replies</th></tr>
<tr><td>Were polyps found at the examination?</td><td></td></tr>
<tr><td>Yes</td><td>294 (72)</td></tr>
<tr><td>No</td><td>96 (24)</td></tr>
<tr><td>Do not remember</td><td>16 (4)</td></tr>
<tr><td>Did you find the examination uncomfortable?</td><td></td></tr>
<tr><td>Yes, very</td><td>21 (5)</td></tr>
<tr><td>Moderately</td><td>184 (45)</td></tr>
<tr><td>No</td><td>204 (50)</td></tr>
<tr><td>Would you attend a repeat examination in 5 years time?</td><td></td></tr>
<tr><td>Yes</td><td>368 (90)</td></tr>
<tr><td>No</td><td>9 (2)</td></tr>
<tr><td>I am not sure</td><td>31 (7.6)</td></tr>
<tr><td>Are you content to have attended this endoscopic examination?</td><td></td></tr>
<tr><td>Yes</td><td>405(99.3)</td></tr>
<tr><td>No</td><td>2 (0.5)</td></tr>
<tr><td>I am not sure</td><td>1 (0.2)</td></tr>
</table></td><td>The lower and more favourable scores for GHQ-28 and HADS in the screened group compared with controls may be due to a sense of relief lasting for several months after successful participation with no serious findings.</td></tr>
</table>

Study ID	Study Design	Population	Intervention	Outcomes	Comments
			study.	The scores for both GHQ-28 and HADS were lower, indicating a lower level of psychiatric morbidity among those attending the examination than the controls. There was a trend towards higher scores with increasing time after the examination in the screened group.	
Miles et al, 2009	Postal survey examining the psychological impact of being assigned to colonoscopic surveillance following detection of adenomatous polyps at FSIG *screening*.	Participants were men and women aged 55-64, at average risk of getting CRC. People with no polyp = 26,573, lower risk polyps removed at flexible sigmoidoscopy = 7401 and higher risk polyps who underwent colonoscopy and were either assigned to CS = 1543 or discharged = 183 (n = 35,700). A sub-sample (n = 6389) had also completed a detailed questionnaire prior to *screening* attendance making it possible to compare pre and post *screening* results in this group.	Participants were sent a detailed questionnaire 3 – 6 months after *screening*, by which time they had been told whether or not they needed colonoscopic surveillance. The response rate to the questionnaire was 90%.	**Primary outcome variables:** ***Bowel cancer worry*** was assessed before and after *screening* with the question: 'How worried are you about getting bowel cancer' (response options on a 4-point Likert scale: 'not worried at all, a bit worried, quite worried, very worried') ***Psychological distress*** was measured post *screening* using the 12-item version of the General Health Questionnaire (GHQ-12) ***Positive psychological consequences of*** *screening* were assessed post *screening* using three items from the positive emotional subscale of the Psychological Consequences of *screening* Questionnaire (PCQ) **Secondary outcome variables:** ***Reassurance*** was assessed post *screening* using a single item on reassurance from the PCQ. ***Bowel symptoms*** were assessed before and after *screening* with questions related to bowel movement. ***GP attendance*** was measured before and after *screening* using one question: 'About how many times have you been to see your GP in the last 3months. It was scored so that high scores	

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				indicated more visits. **Results** People offered surveillance reported lower psychological distress and anxiety than those with either no polyp ($p<0.05$) or lower risk polyps ($p<0.01$). The surveillance group also reported more positive emotional benefits of *screening* than the other outcome groups. Post *screening* bowel cancer worry and bowel symptoms were higher in people assigned to surveillance, but both declined over time, reaching levels observed in either one or both of the other two groups found to have polyps, suggesting these results were a consequence of polyp detection rather than surveillance	

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[i] The screening options in this study also looked at FOBT and the result reported included of FOBT screening.

[ii] The screening options in this study also looked at FOBT

[iii] Results report the % of participants at pretest and posttest who provided correct answers. Pretest – posttest differences were evaluated with McNemar's test.

[iv] Results report the % of participants at pretest and posttest indicating willingness to consider primary screening options. Pretest – posttest differences were evaluated with McNemar's test.