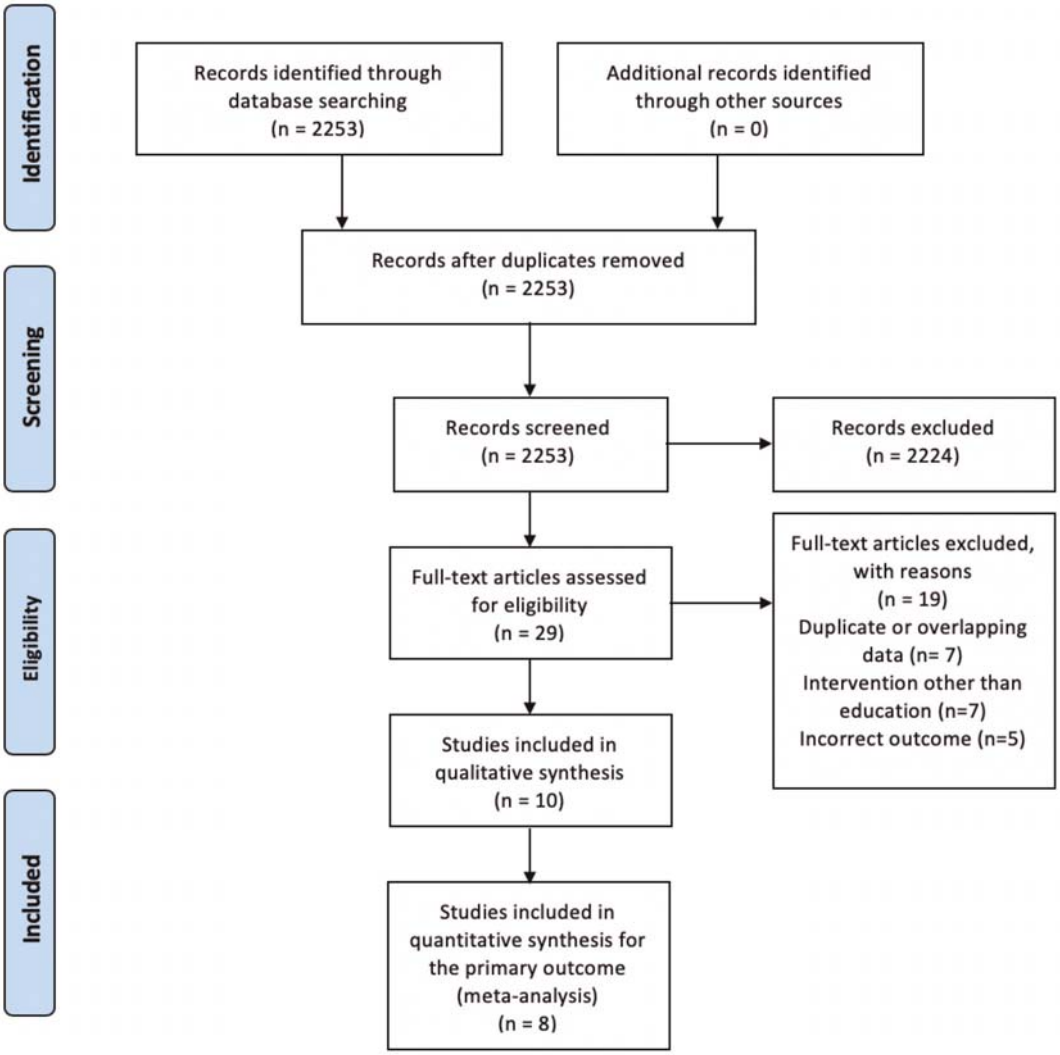
Supplementary material

SUPPLEMENTARY FIGURES

Supplementary Figure 1. Prisma study flow diagram. From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097



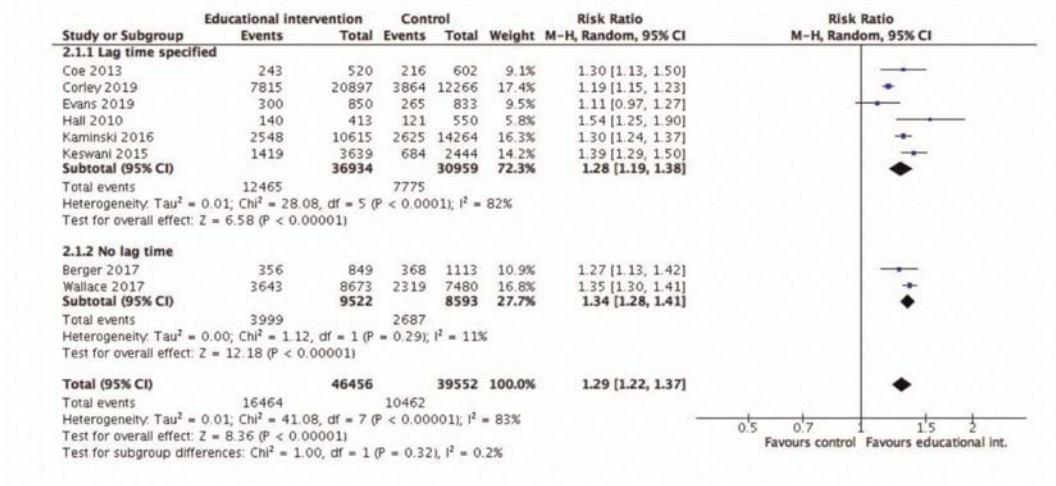
Supplementary material

Supplementary Figure 2. Risk of bias for randomized controlled trials.[23]

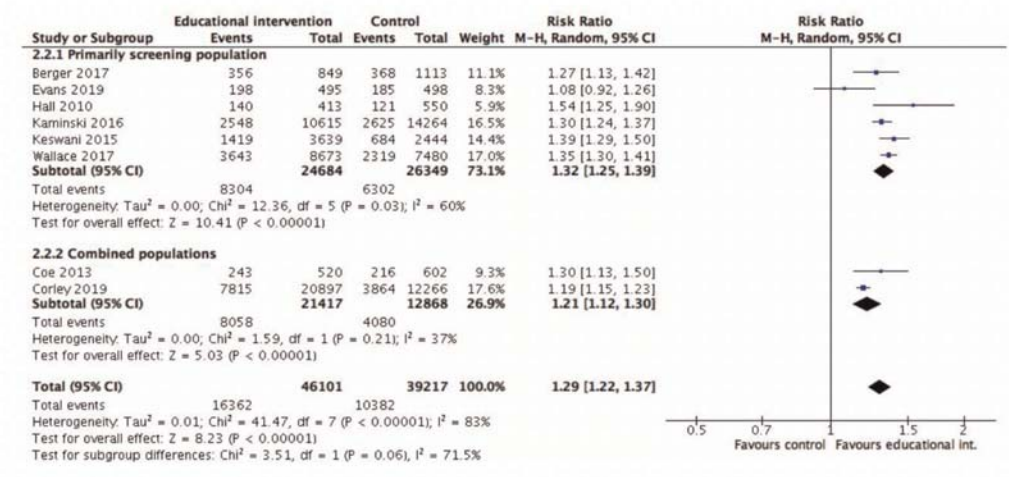
Supplementary material

Supplementary Figure 3. Forest plots for subgroup analyses:

a) Lag time: specified vs. unclear or no lag time



b) Indication for colonoscopy



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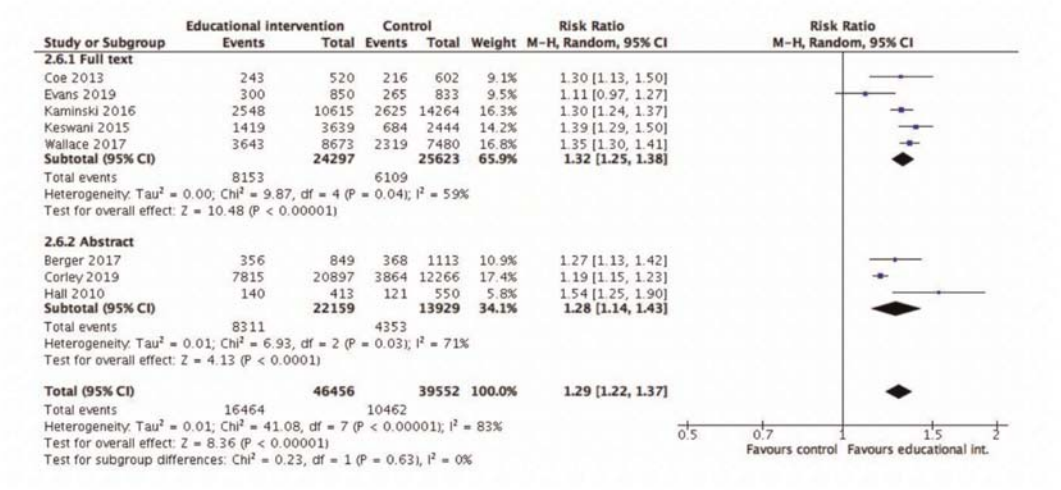
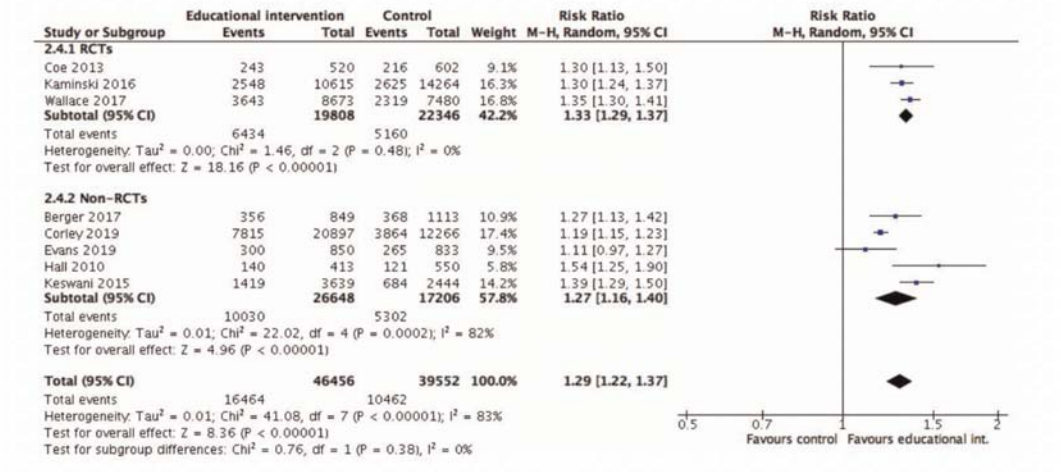
c) Full text vs. abstract



d) RCTs vs. observational (original design with before and after comparisons for the RCTs).



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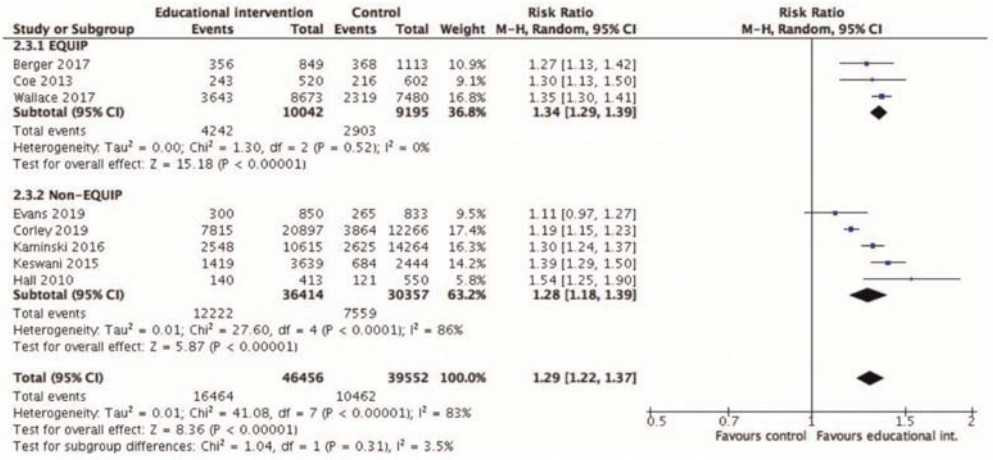
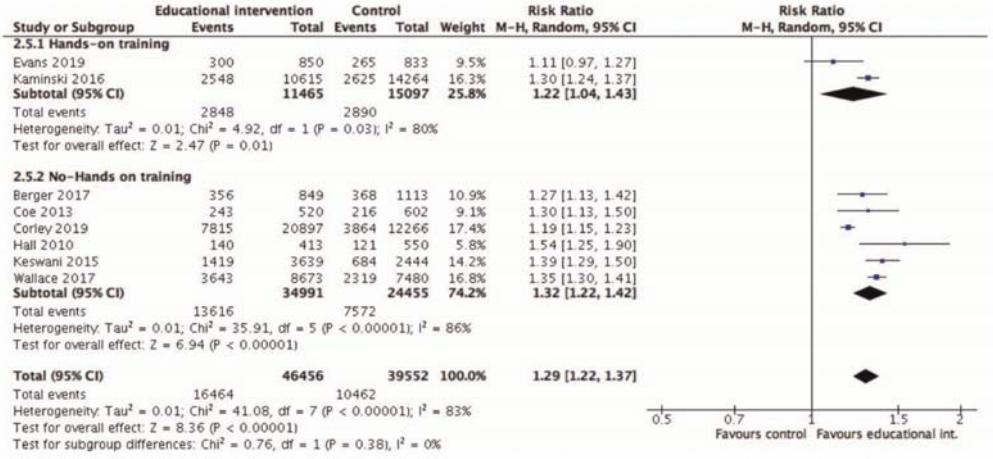
e) EQUIP-based strategies vs. others



f) Hands-On vs. No hands-on educational interventions



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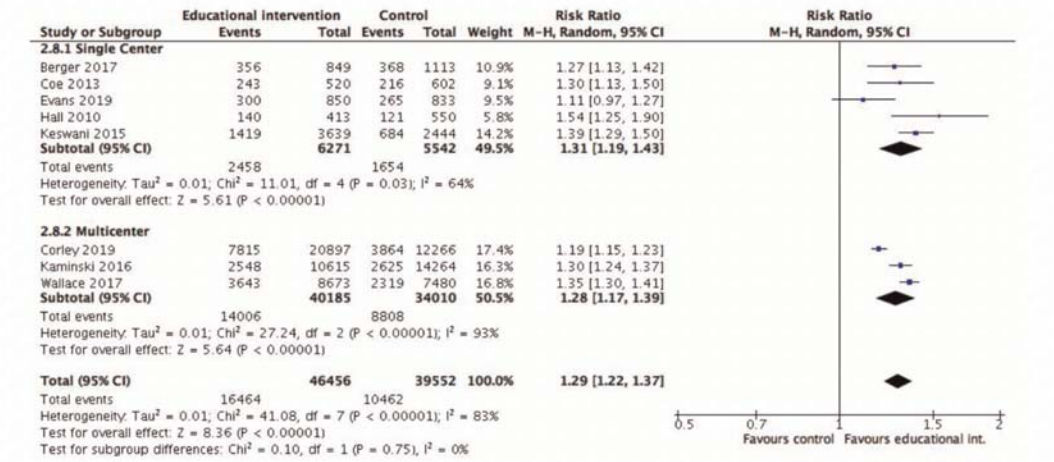
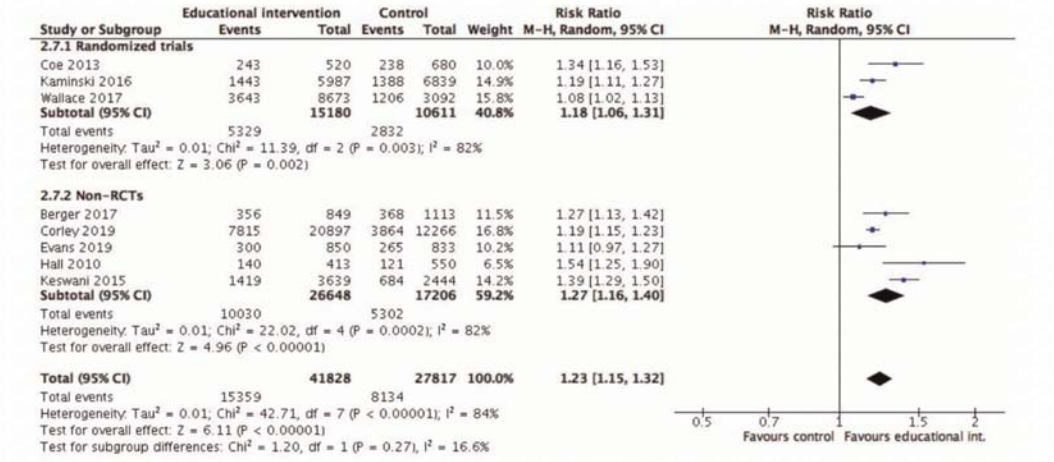
g) Multicenter vs. Single Center



h) RCTs with randomized to experimental and control groups data



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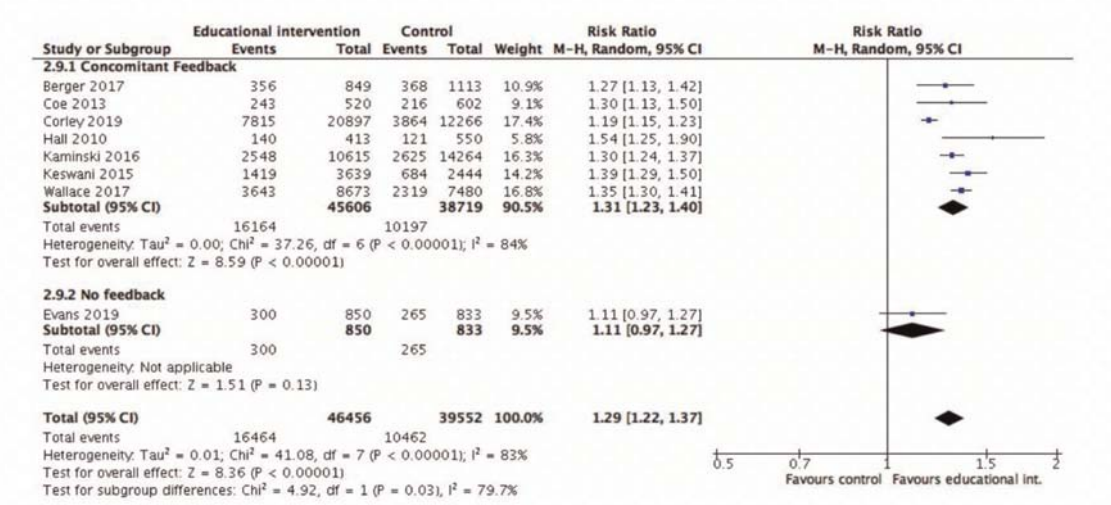
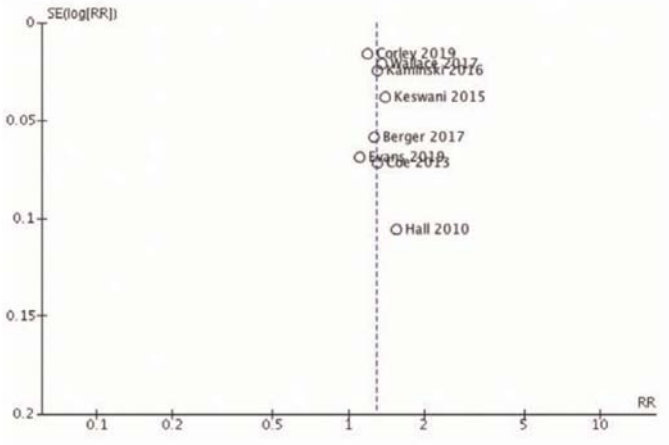
i) Studies with interventions with and without concomitant feedback



Supplementary Figure 4. Funnel plot for analysis of primary outcome (ADR).



Supplementary material

Supplementary Table 1 PRISMA checklist [20]. From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	Title page
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1-2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3-4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	4
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	4

Supplementary material

Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Supplementary appendix 2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	6
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	6
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6-7
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	7
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	7-8
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	8/ Supplemental 3
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	9/ Tables 1&2
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	13

Supplementary material

Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	9-12, Figure 1
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	9-12
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	12
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	13
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	13
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	15-16
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	16
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	Title Page

Supplementary material

Supplementary Table 2 Risk of bias assessments using Newcastle Ottawa Scale [21].

Ref.	Cohort selection (max 4)	Quotes for cohort selection	Comparability (max 2)	Quotes for cohort comparability	Assessment of outcomes (max 3)	Quote for assessment of outcomes	Comments
Coe 2013	****	Selection of the cohort was representative, delivery of training was well-documented by study investigators.	**	For the present systematic review we are analyzing data from the intervention arm of an RCT, with before and after comparisons	**	Research personnel recorded the data and reviewed it with the endoscopists. Outcome assessment was not blinded. Complete follow-up	
Berger 2017	***	A detailed explanation of the ascertainment of the exposure is not provided.		Self-controlled. No adjusted analyses were provided.		A detailed explanation of the assessment of the outcome, length of follow-up was not provided.	Abstract format limits the description of the methodology

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Corley 2019	**	A detailed explanation of the ascertainment of the exposure is not provided.	*	Adjusted analysis (Cox regression) was performed for one of the study outcomes	A detailed explanation of the assessment of the outcome, length of follow-up was not provided.	Abstract format limits the description of the methodology
Hall 2010	**	A detailed explanation of the ascertainment of the exposure is not provided.		Self-controlled. No adjusted analyses were provided.	A detailed explanation of the assessment of the outcome, length of follow-up was not provided.	Abstract format limits the description of the methodology
Kaminski 2016	****	Selection of the cohort was representative, delivery of training was well-documented by study investigators.	**	For the present systematic review we are analyzing data from the intervention arm of an RCT, with before and after comparisons	***	Research personnel recorded the data in a database. Outcome assessment was not blinded. Complete follow-up.

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Keswani 2015	****	Selection of the cohort was representative, delivery of training was well-documented by study investigators.	*	Self-controlled. Adjusted analyses were conducted.	***	Research personnel recorded the data in a database. Outcome assessment was not blinded. Complete follow-up.
Wallace 2017	****	Selection of the cohort was representative, delivery of training was well-documented by study investigators.	**	For the present systematic review, we are extracting and analyzing the data from the intervention arm of an RCT, with before and after comparisons. Adjusted analyses were conducted.	**	Data was entered by physicians or nurse assistant into a data software (specifically designed for the study).

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Evans 2019	***	The Colonoscopy Clinical Skills Program is well-documented and organized by the Canadian Association of Gastroenterology. Data was obtained from secure records (i.e. electronic medical records)	*	No adjusted analyses were provided, however, information about comparability is provided.	***	Adequate follow up is reported. Outcome assessment was done with electronic medical records.	

Supplementary material

Supplementary Table 3a Summary of characteristics of studies included in systematic review, but not meta-analysis, of primary outcome.

Author, year	Study type	Country	Number of study sites	Endoscopists (N =)	Colonoscopies (n =)	Patient sex (% male)	Median patient age	Indication (% screening-related)
Rank 2011	OBS	USA	5	N/R	N/R	N/R	N/R	N/R
Salden 2012	OBS	USA	1	9	1,041/ 2,730	N/R	N/R	N/R

OBS, observational study; GI, gastroenterologist; Sx, surgeon; NOS, Newcastle-Ottawa Scale[27]; N/R = not reported
*Conference abstract.

Supplementary material

Supplementary Table 3b Summary of interventions and outcomes from studies included in systematic review, but not meta-analysis, of primary outcome.

Author, year	Description of educational intervention	Frequency of intervention	Lag time after intervention*	Follow-up after measurement	Preintervention ADR	Post-intervention ADR	Other outcomes reported
Rank 2011	Feedback on ADR and WT in addition to possible financial incentives for meeting WT targets.	N/R	N/R	36 months	28.0 (M) 20.0 (F)	42.0 (M) 29.0 (F)	SPDR
Salden 2012	Lectures, video-training and individual feedback and supervision during colonoscopy.	Once	None	24 months	17.2-32.4	25.4-32.7	CIR, pADR

ADR, adenoma detection rate; CIR, cecal intubation rate; WT, withdrawal time; SPDR, sessile polyp detection rate; PDR, polyp detection rate; ANDR, advanced neoplasia detection rate; CDR, cancer detection rate; N/R, not reported.
*Lag time refers to time between intervention and start of post-intervention measurement of outcome(s).