



**BC Cancer Agency**

CARE + RESEARCH

*An agency of the Provincial Health Services Authority*

# Colonoscopy Education Day

## Top Colonoscopy articles 2017

October 25, 2017

Dr. Carla Nash

# Disclosures

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- Relationships with commercial interest
  - Honoraria: Abbvie
  - Honoraria: Pfizer
- Managing potential bias:
  - No expected bias in this presentation

# Outline

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- Patient preparation
- Technique
- Devices

# Patient preparation

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- 18-30% colonoscopies hampered by poor bowel prep
- Adequacy of bowel prep multifactorial
  - Dietary restriction
  - Split dose/same day purgative
  - Comorbidities (DM, constipation)
  - Compliance
- Risk factors for poor bowel prep
  - Non compliance with instructions
  - Longer wait times
  - Lower education level

*Chan, BMC Gastroenterol, 2011*

# Enhanced instructions improve the quality of bowel preparation for colonoscopy: a meta-analysis of randomized controlled trials

Xiaoyang Guo, MD,<sup>1,\*</sup> Zhiping Yang, MD,<sup>1,\*</sup> Lina Zhao, MD,<sup>2,\*</sup> Felix Leung, MD,<sup>3,4</sup> Hui Luo, MD,<sup>1</sup> Xiaoyu Kang, MD,<sup>1</sup> Xin Li, MD,<sup>5</sup> Hui Jia, MD,<sup>1</sup> Shengye Yang, MD,<sup>1</sup> Qin Tao, MD,<sup>1</sup> Yanglin Pan, MD,<sup>1</sup> Xuegang Guo, MD<sup>1</sup>

Xian, China; North Hills, Los Angeles, California, USA

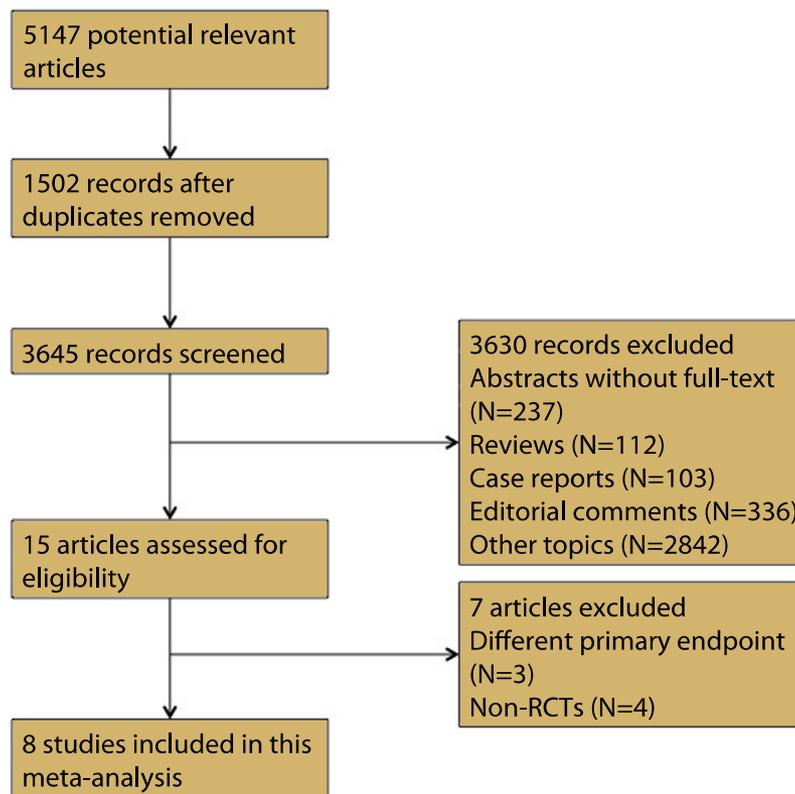
Guo, GIE, 2017

- English studies with terms educate/instruct AND colonoscopy or bowel preparation
- RCT's comparing enhanced instructions (EI) vs regular instructions (RI)
- Study participants: >18 years old undergoing colonoscopy
- Outcome: Rate of adequate bowel prep
  - Boston BP score  $\geq 5$
  - Ottawa BP score  $< 6$
  - Universal Prep assessment scale  $< 3$
  - Harefield Cleansing scale A or B

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**Figure 1.** Search strategies. *RCT*, randomized controlled trial.

# Enhanced instructions improve the quality of bowel preparation for colonoscopy: a meta-analysis of randomized controlled trials

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**TABLE 1. Details of studies included in this meta-analysis**

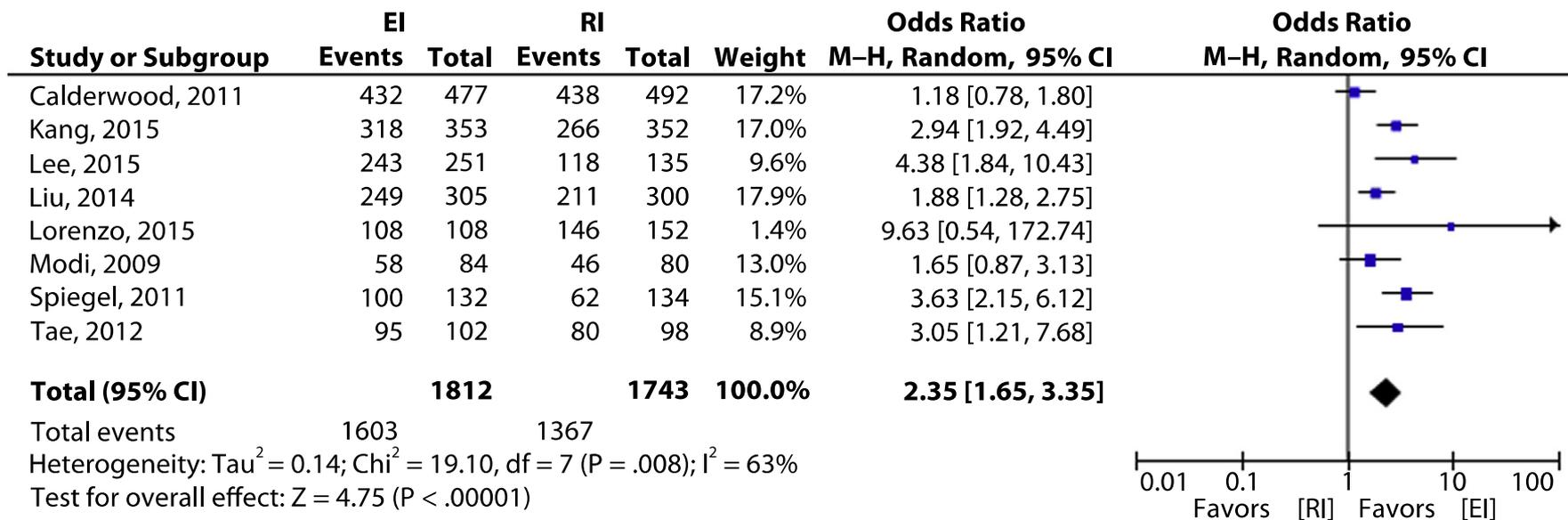
	Calderwood et al, 2011 <sup>18</sup>	Kang et al, 2015 <sup>5</sup>	Lee et al, 2015 <sup>15</sup>	Liu et al, 2014 <sup>12</sup>
Location	USA	China	Korea	China
Design	RCT	RCT	RCT	RCT
Blinding	Single	Single	Single	Single
Total number	969	770	386	605
EI	Visual aid	Social media app	Telephone, SMS	Telephone
RI	Written instructions	Verbal and written instructions	Verbal and written instructions	Verbal and written instructions
Indications	Screening	Mixed	Screening	Mixed
Primary endpoint	Rate of adequate BP	Rate of adequate BP	Rate of adequate BP	Rate of adequate BP
BP scale	BBPS	OBPS	BBPS	OBPS
Purgative	4 L of PEG or 4 L of PEG + bisacodyl	4 L of PEG-ELP	2 L of PEG + ascorbate solution	2 L of PEG-ELP or 1.5 L of sodium phosphate
Administration method	NR	Split dose	Split dose	Single dose
Diet restriction	NR	Clear liquid	Low-residue	Clear liquid
Timing of EI	NR	15 days before	2 days before	1 day before
Cecum intubation rate	NR	97.2% vs 93.2%	99.2% vs 98.5%	94.9% vs 85.4%
Insertion time (min), mean ± SD	7.0 ± 3.7 vs 7.0 ± 3.7	7.2 ± 4.6 vs 9.1 ± 4.8	3.5 ± 3.5 vs 3.4 ± 3.1	7.7 ± 5.1 vs 7.6 ± 4.3
Withdrawal time (min), mean ± SD	8.0 ± 3.7 vs 7.0 ± 3.0	7.2 ± 2.2 vs 7.4 ± 2.1	9.8 ± 10.9 vs 9.1 ± 7.6	6.2 ± 2.3 vs 7.8 ± 2.8
BP score, mean ± SD	6.0 ± 0.7 vs 6.0 ± 0.7	3.6 ± 1.7 vs 4.5 ± 1.8	6.8 ± 1.3 vs 6.3 ± 1.4	3.0 ± 2.3 vs 4.9 ± 3.2

RCT, Randomized controlled trial; EI, enhanced instructions; SMS, short message service; RI, regular instructions; BP, bowel preparation; BBPS, Boston Bowel Preparation Scale; OBPS, Ottawa Bowel Preparation Scale; HCS, Harefield Cleansing Scale; UPAS, Universal Preparation Assessment Scale; PEG, polyethylene glycol; NR, not reported; SD, standard deviation.

# Enhanced instructions improve the quality of bowel preparation for colonoscopy: a meta-analysis of randomized controlled trials

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**Figure 2.** Forest plot comparing the bowel preparation quality between the enhanced instruction (EI) and regular instruction (RI) groups. *CI*, confidence interval.

# Secondary outcomes

Parameter	EI	RI	OR	p
Cecal intubation	97.0%	92.4%	2.77 (1.73-4.42)	<0.001
Insertion time	7.3 +/- 5.3 m	7.9 +/- 6.8 m	MD -0.57 m (-1.38-0.24)	0.170
Withdrawal time	7.6 +/- 5.3 m	8.5 +/- 4.7 m	MD -0.28 m (-0.49—0.06)	0.010
PDR	30.8%	36.0%	1.25 (0.93-1.68)	0.140
AE	30.9%	31.7%	0.76 (0.54-1.07)	0.120
Willing to repeat	90.5%	83.1%	1.91 (1.20-3.04)	0.006

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- Enhanced instructions in addition to written/verbal instructions can improve bowel prep quality
  - Compliance is improved
  - ?more understandable instructions, more interactive, more repetition improves memory
- EI results in improved procedure factors
  - Higher cecal intubation rates, shorter insertion times

# Technique

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- Interval cancers after colonoscopy are more common in right colon

*Brenner, Ann Intern Med, 2011*  
*Singh, Gastro, 2010*

- Proximal adenomas associated with higher risk of subsequent advanced neoplasia

*Martinez, Gastro, 2009*

- May be due to missed right sided lesions or different polyp pathology
  - Colonoscopy techniques such as tandem colonoscopy, cecal retroflexion, water aided can increase ADR
  - Devices such as 3<sup>rd</sup> eye retroscope, full spectrum endoscopy

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# Efficacy of segmental re-examination of proximal colon for adenoma detection during colonoscopy: a randomized controlled trial

## Authors

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## Institutions

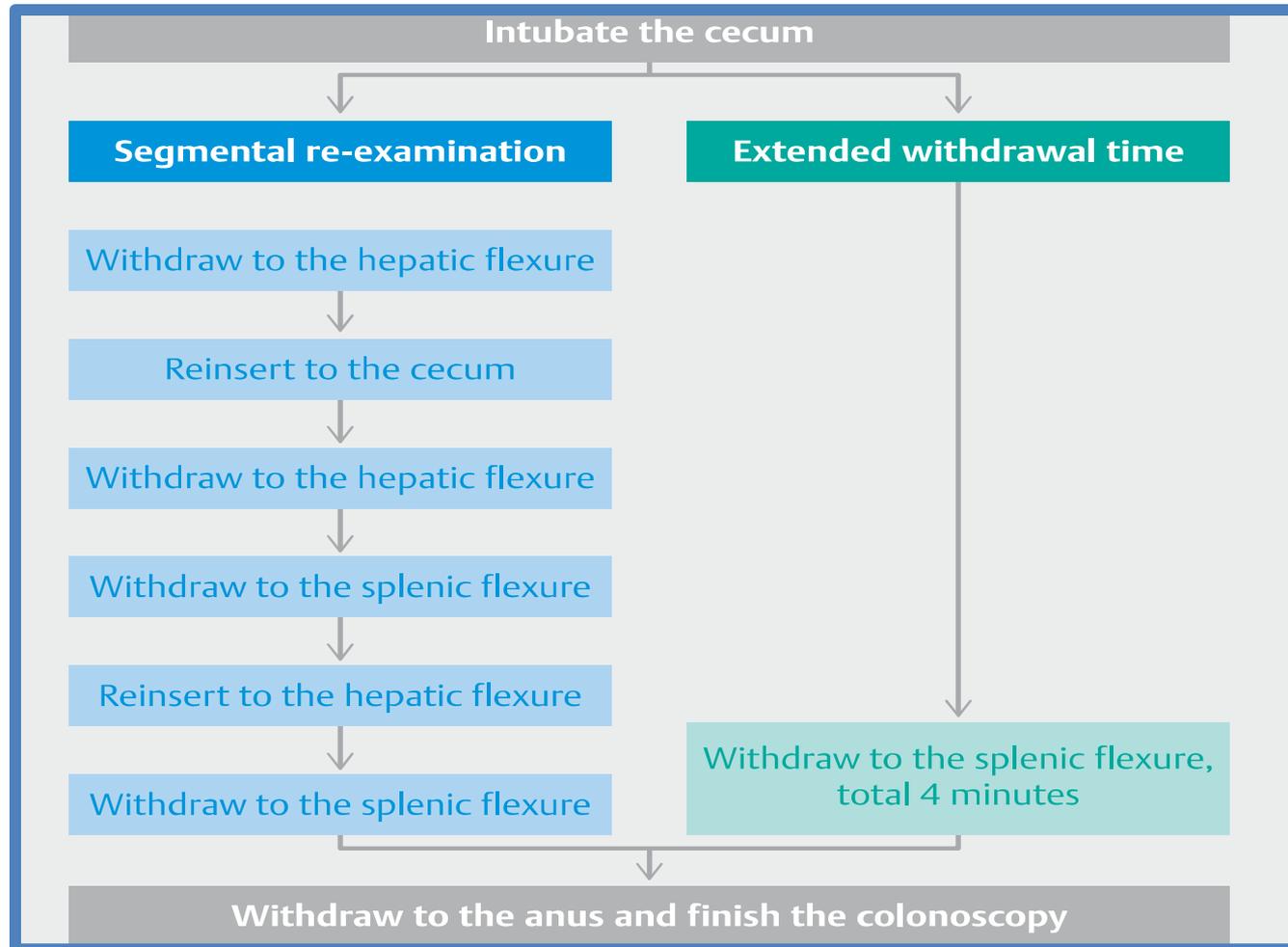
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# Efficacy of segmental re-examination of proximal colon for adenoma detection during colonoscopy: a randomized controlled trial

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- Prospective single blinded study of patients 18-80 years undergoing colonoscopy with intermediate or high risk of advanced adenoma at Shandong University Hospital
- Exclusions: advanced colon cancer, IBD, prior proximal resection, IBD, polyposis syndrome, poor bowel prep, unable to intubate cecum
- Primary outcome: proximal ADR
- Secondary outcomes: PDR, ADR, mean number polyps/adenomas, withdrawal times

# Efficacy of segmental re-examination of proximal colon for adenoma detection during colonoscopy: a randomized controlled trial



# Efficacy of segmental re-examination of proximal colon for adenoma detection during colonoscopy: a randomized controlled trial

► **Table 1** Baseline characteristics.

	Segmental re-examination, n = 178	Extended withdrawal time, n = 182	P value
Age, mean ± SD, years	55.0 ± 11.0	54.9 ± 10.3	0.92
Female sex, n (%)	83 (46.6)	80 (44)	0.61
Colon cancer in first-degree relative, n (%)	9 (5.1)	7 (3.8)	0.58
Smoking, n (%)	46 (25.8)	37 (20.3)	0.21
Previous colonoscopy, n (%)	34 (19.1)	46 (25.3)	0.16
Abdominal surgery, n (%)	16 (9.0)	14 (7.7)	0.66
Quality of bowel preparation, BBPS, n			0.63
▪ 6	40	35	
▪ 7	46	48	
▪ 8	44	55	
▪ 9	48	44	

BBPS, Boston Bowel Preparation Scale score.

# Efficacy of segmental re-examination of proximal colon for adenoma detection during colonoscopy: a randomized controlled trial

► **Table 2** Detection rates.

	Segmental re-examination, % (95%CI)	Extended withdrawal time, % (95%CI)	P value
PDR	50.6 (43.2–57.9)	55.5 (48.3–62.7)	0.13
ADR	38.2 (31.1–45.3)	38.5 (31.4–45.5)	0.96
▪ Advanced ADR	5.6 (3.1–10.0)	3.3 (1.5–7.0)	0.29
▪ Proximal PDR	41.6 (34.6–45.3)	33.5 (26.7–48.8)	0.11
▪ Proximal ADR	33.1 (26.2–40.1)	23.6 (17.5–29.8)	0.045
▪ Proximal advanced ADR	2.2 (0.9–5.6)	0.5 (0.1–3.0)	0.17

CI, confidence interval; PDR, polyp detection rate; ADR, adenoma detection rate.

# Efficacy of segmental re-examination of proximal colon for adenoma detection during colonoscopy: a randomized controlled trial

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- Segmental re-examination of the proximal colon could increase ADR without extending withdrawal time

# Devices

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- Cap assisted colonoscopy uses a transparent cap attached to the tip of the colonoscope to flatten folds
- Compared to standard colonoscopy, increases colonic neoplasia detection rate and cecal intubation rate

*Westwood, Dis Colon Rectum, 2012*

*Ng, Am J Gastroenterol, 2012*

# Impact of cap-assisted colonoscopy on detection of proximal colon adenomas: systematic review and meta-analysis

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*Desai, GIE, 2017)*

- Literature review
- Eligible studies:
  - RCT or retrospective with control groups
  - ADR primary outcome
  - Info on proximal adenomas or regional classification
  - Info on individuals with proximal adenomas

# Impact of cap-assisted colonoscopy on detection of proximal colon adenomas: systematic review and meta-analysis

**TABLE 1. Number of right-sided adenomas reported among CC and SC groups among inclusion studies**

Study	Design	Country	Population	Total no. of patients (CC:SC)
Rastogi et al 2012 <sup>11</sup>	RCT	USA	Screening or surveillance	420 (210:210)
Kim et al 2015 <sup>13</sup>	Retrospective	South Korea	Screening	1023 (515:508)
Horiuchi et al 2013 <sup>12</sup>	Retrospective	Japan	Screening, hematochezia, heme-positive stools, other	2301 (1165:1136)
de Wijkerslooth et al 2012 <sup>10</sup>	RCT	Netherlands	Screening	1339 (656:683)
Hewett et al 2010 <sup>28</sup>	Tandem study, intervention trial	USA	Screening, surveillance, other	100 (52:48)
Pohl et al 2015 <sup>29</sup>	RCT	USA	Screening, surveillance, heme-positive stools, other	1143 (561:552)

**TABLE 1. Continued**

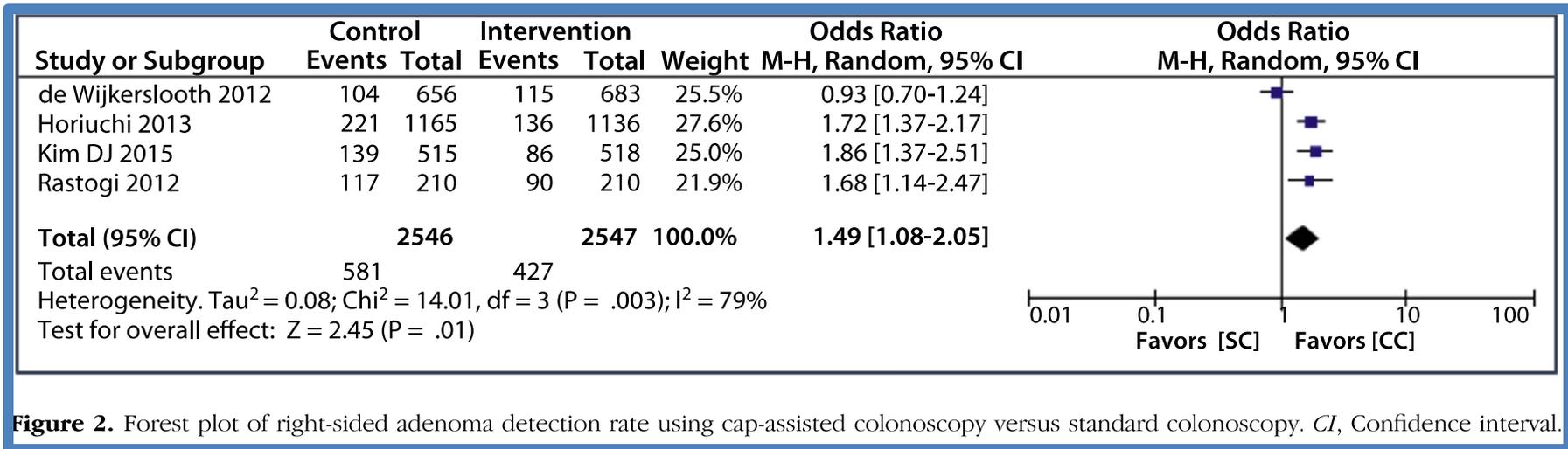
Male:female	Mean age (y)	
	CC	SC
398:22	60.7	61.3
549:474	55.0	54.44
1484:817	65.4	64.8
685:654	60	60
57:43	61	62.9
709:404	62	61.5

CC, Cap-assisted colonoscopy; SC, standard colonoscopy; RCT, randomized controlled trial; ADR, adenoma detection rate; NA, not available.

# Impact of cap-assisted colonoscopy on detection of proximal colon adenomas: systematic review and meta-analysis

Study	Right-sided ADR n (%)		Right-sided adenomas n		Right-sided adenoma per person	
	CC	SC	CC	SC	CC	SC
Rastogi et al 2012 <sup>11</sup>	117 (56%)	90 (43%)	278	169	1.32	.8
Kim et al 2015 <sup>13</sup>	139 (27%)	86 (16.9%)	236	129	.45	.25
Horiuchi et al 2013 <sup>12</sup>	221 (19%)	136 (12%)	358	261	.31	.23
de Wijkerslooth et al	104 (16%)	115 (17%)	164	171	.25	.25
Hewett et al 2010 <sup>28</sup>	NA	NA	71	88	1.37	1.83
Pohl et al 2015 <sup>29</sup>	NA	NA	321	309	.57	.56

# Impact of cap-assisted colonoscopy on detection of proximal colon adenomas: systematic review and meta-analysis



**Figure 2.** Forest plot of right-sided adenoma detection rate using cap-assisted colonoscopy versus standard colonoscopy. *CI*, Confidence interval.

# Impact of cap-assisted colonoscopy on detection of proximal colon adenomas: systematic review and meta-analysis

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- CC leads to 6% more r-ADR compared to SC, 4% more flat adenomas and 3% more diminutive adenomas

# Full spectrum colonoscopy

## Full-spectrum (FUSE) versus standard forward-viewing colonoscopy in an organised colorectal cancer screening programme

Cesare Hassan,<sup>1</sup> Carlo Senore,<sup>2</sup> Franco Radaelli,<sup>3</sup> Giovanni De Pretis,<sup>4</sup> Romano Sassatelli,<sup>5</sup> Arrigo Arrigoni,<sup>6</sup> Gianpiero Manes,<sup>7</sup> Arnaldo Amato,<sup>3</sup> Andrea Anderloni,<sup>8</sup> Franco Armelao,<sup>4</sup> Alessandra Mondardini,<sup>6</sup> Cristiano Spada,<sup>9</sup> Barbara Omazzi,<sup>7</sup> Maurizio Cavina,<sup>5</sup> Gianni Miori,<sup>4</sup> Chiara Campanale,<sup>9</sup> Giuliana Sereni,<sup>5</sup> Nereo Segnan,<sup>2</sup> Alessandro Repici<sup>8,10</sup>

*Gut (66):1949-1955*

- 658 patients in a FIT based regional CRC screening program randomized to FUSE or SC
- No difference in ADR, A-ADR, SSPDR or per polyp analysis

# Endocuff assisted colonoscopy

## Adenoma detection with Endocuff colonoscopy versus conventional colonoscopy: a multicentre randomised controlled trial

SC van Doorn,<sup>1</sup> M van der Vlugt,<sup>1</sup> ACTM Depla,<sup>2</sup> CA Wientjes,<sup>3</sup> RC Mallant-Hent,<sup>4</sup> PD Siersema,<sup>5</sup> KMAJ Tytgat, H Tuynman,<sup>1,2</sup> SD Kuiken,<sup>3</sup> GMP Houben,<sup>2</sup> PCF Stokkers,<sup>3</sup> LMG Moons,<sup>5</sup> PMM Bossuyt,<sup>6</sup> P Fockens,<sup>1</sup> MW Mundt,<sup>4</sup> E Dekker<sup>1</sup>

*Gut* 66:438-445

- RCCT 530 patients with endocuff assisted colonoscopy vs 533 standard colonoscopy
- More adenomas in EAC group (722 vs 621) but mean adenomas per patient (1.36 vs 1.17) was not statistically significant ( $p=0.08$ ) and ADR was similar

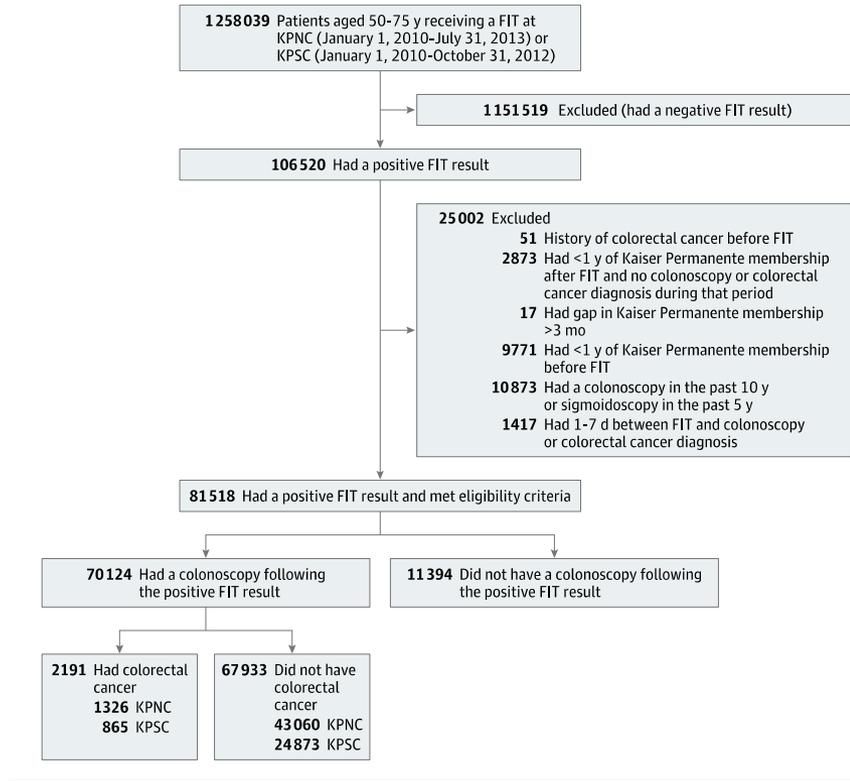
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# Association Between Time to Colonoscopy After a Positive Fecal Test Result and Risk of Colorectal Cancer and Cancer Stage at Diagnosis

Douglas A. Corley, MD, PhD; Christopher D. Jensen, PhD, MPH; Virginia P. Quinn, PhD, MPH;  
Chyke A. Doubeni, MD, MPH; Ann G. Zauber, PhD; Jeffrey K. Lee, MD, MAS; Joanne E. Schottinger, MD;  
Amy R. Marks, MPH; Wei K. Zhao, MPH; Nirupa R. Ghai, PhD; Alexander T. Lee, MD; Richard Contreras, MS;  
Charles P. Quesenberry, PhD; Bruce H. Fireman, MA; Theodore R. Levin, MD

# Association Between Time to Colonoscopy After a Positive Fecal Test Result and Risk of Colorectal Cancer and Cancer Stage at Diagnosis

Figure 1. Flow of Patients Through the Study



FIT indicates fecal immunochemical test; KPNC, Kaiser Permanente Northern California; KPSC, Kaiser Permanente Southern California.

# Association Between Time to Colonoscopy After a Positive Fecal Test Result and Risk of Colorectal Cancer and Cancer Stage at Diagnosis

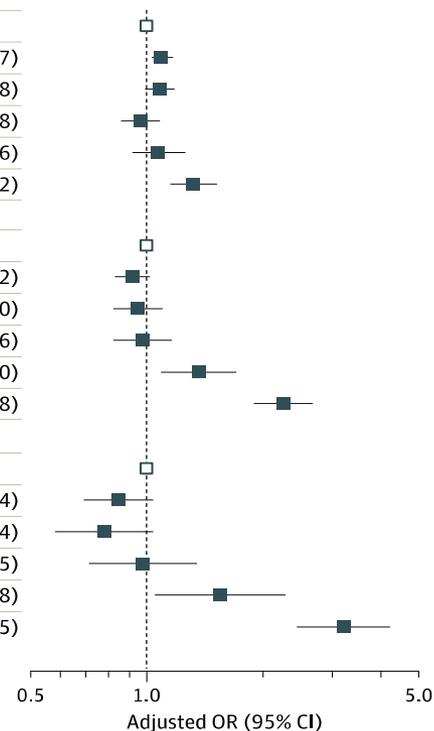
Table 2. Colorectal Cancer Outcomes in Patients Who Received a Colonoscopy After a Positive FIT Result

Characteristics	Time to Colonoscopy, No. of Patients (%) <sup>a</sup>							Total
	8-30 Days	2 Months	3 Months	4-6 Months	7-9 Months	10-12 Months	>12 Months	
Advanced adenoma <sup>b</sup>	2135 (8.1)	2168 (9.0)	779 (9.3)	429 (8.4)	114 (8.9)	75 (10.5)	247 (11.6)	5947 (8.8)
Any colorectal cancer	807 (3.0)	685 (2.8)	265 (3.1)	165 (3.1)	58 (4.3)	37 (4.9)	174 (7.6)	2191 (3.1)
Advanced-stage colorectal cancer <sup>c</sup>								
Present	219 (0.8)	173 (0.7)	60 (0.7)	46 (0.9)	17 (1.3)	14 (1.9)	72 (3.1)	601 (0.9)
Unknown	3 (<1)	2 (<1)	2 (<1)	2 (<1)	0	1 (0.1)	4 (0.2)	14 (<1)
Colorectal cancer stage								
0	129 (0.5)	113 (0.5)	39 (0.5)	32 (0.6)	7 (0.5)	6 (0.8)	17 (0.7)	343 (0.5)
I	314 (1.2)	275 (1.1)	122 (1.4)	48 (0.9)	19 (1.4)	5 (0.7)	40 (1.7)	823 (1.2)
II	142 (0.5)	122 (0.5)	42 (0.5)	37 (0.7)	15 (1.1)	11 (1.5)	41 (1.8)	410 (0.6)
III	169 (0.6)	133 (0.5)	56 (0.6)	32 (0.6)	12 (0.9)	9 (1.2)	49 (2.1)	460 (0.7)
IV	50 (0.2)	40 (0.2)	4 (<1)	14 (0.3)	5 (0.4)	5 (0.7)	23 (1.0)	141 (0.2)
Unknown	3 (<1)	2 (<1)	2 (<1)	2 (<1)	0	1 (0.1)	4 (0.2)	14 (<1)
No colorectal cancer	26 369 (97.0)	23 959 (97.2)	8401 (96.9)	5086 (96.9)	1277 (95.7)	711 (95.1)	2130 (92.4)	67 933 (96.9)

# Association Between Time to Colonoscopy After a Positive Fecal Test Result and Risk of Colorectal Cancer and Cancer Stage at Diagnosis

Figure 2. Time to Colonoscopy After a Positive FIT and Adjusted Risk<sup>a</sup> of Advanced Adenoma, Any Colorectal Cancer, and Advanced-Stage Colorectal Cancer

Time to Colonoscopy After Positive FIT Result	No. of Cases/ Total No. of Patients Receiving Colonoscopy After Positive FIT Result	Rate (95% CI) <sup>b</sup>	Adjusted OR (95% CI)
<b>Advanced adenoma</b>			
8-30 d	2135/26369	81 (78-84)	1 [Reference]
2 mo	2168/23959	91 (87-94)	1.09 (1.03-1.17)
3 mo	779/8401	93 (87-99)	1.08 (0.99-1.18)
4-6 mo	429/5086	84 (77-92)	0.97 (0.86-1.08)
7-12 mo	189/1988	95 (82-108)	1.07 (0.92-1.26)
>12 mo	247/2130	116 (102-130)	1.32 (1.15-1.52)
<b>Any colorectal cancer</b>			
8-30 d	807/27176	30 (28-32)	1 [Reference]
2 mo	685/24644	28 (26-30)	0.92 (0.83-1.02)
3 mo	265/8666	31 (27-34)	0.95 (0.82-1.10)
4-6 mo	165/5251	31 (27-36)	0.98 (0.82-1.16)
7-12 mo	95/2083	46 (37-55)	1.37 (1.09-1.70)
>12 mo	174/2304	76 (65-86)	2.25 (1.89-2.68)
<b>Advanced-stage colorectal cancer</b>			
8-30 d	219/27173	8 (7-9)	1 [Reference]
2 mo	173/24642	7 (6-8)	0.85 (0.69-1.04)
3 mo	60/8664	7 (5-9)	0.78 (0.58-1.04)
4-6 mo	46/5249	9 (6-11)	0.98 (0.71-1.35)
7-12 mo	31/2082	15 (10-20)	1.55 (1.05-2.28)
>12 mo	72/2300	31 (24-38)	3.22 (2.44-4.25)



# Wait time to colonoscopy

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- No increase in risk of overall CRC or advanced CRC with colonoscopy within 10 months
  - Higher risk of Stage II CRC at 7-9 months
  - Higher risk of any CRC, Stage II and IV, advanced stage CRC after 10 months

# Questions

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