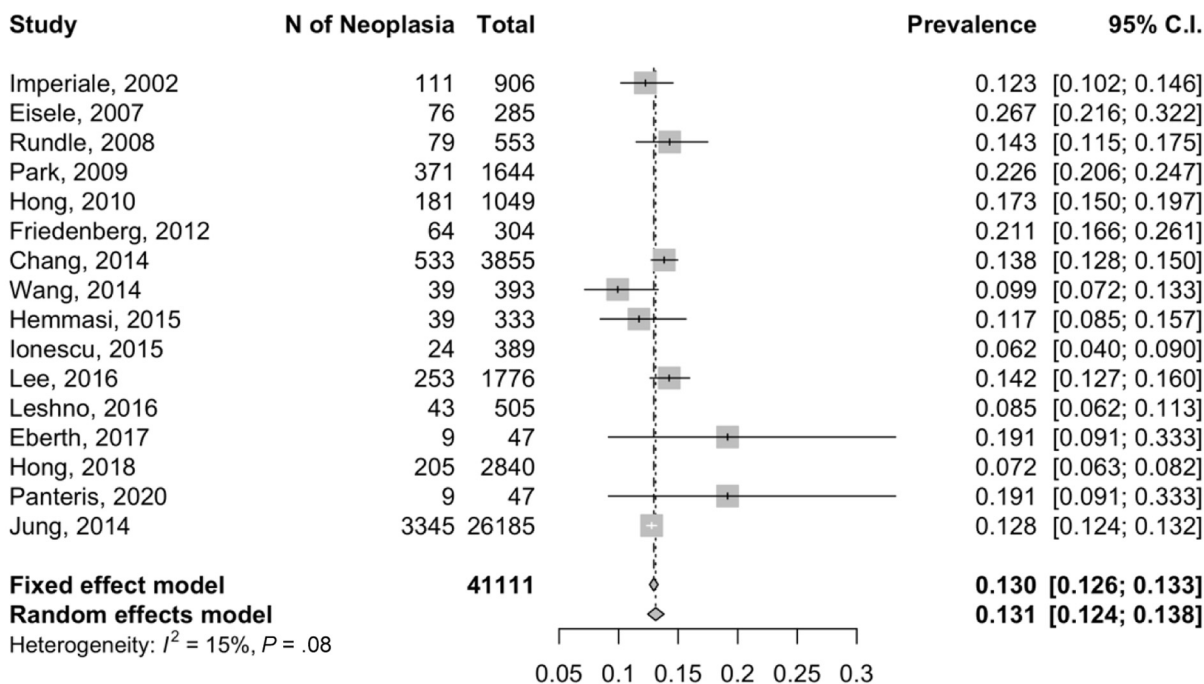
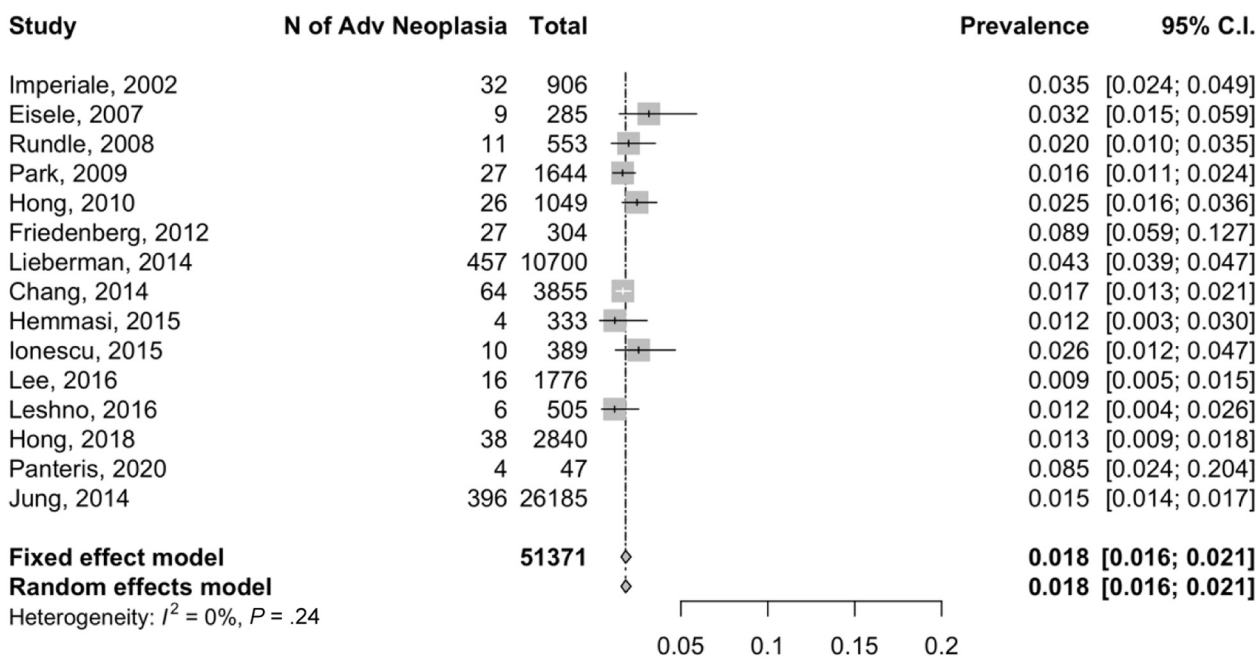


**Supplementary Figure 1.** Funnel plot analyses of studies assessing yield of screening colonoscopy for individuals younger than 50 years. (A) Overall neoplasia (EAO-CRN). (B) Advanced neoplasia (EAO-aCRN).

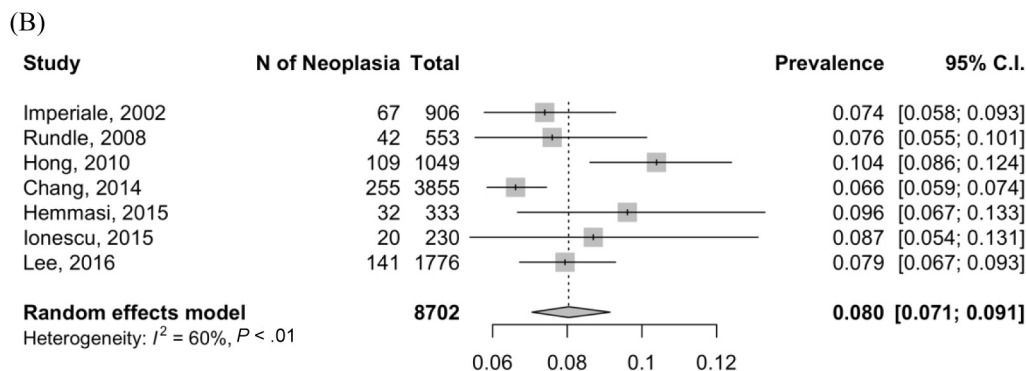
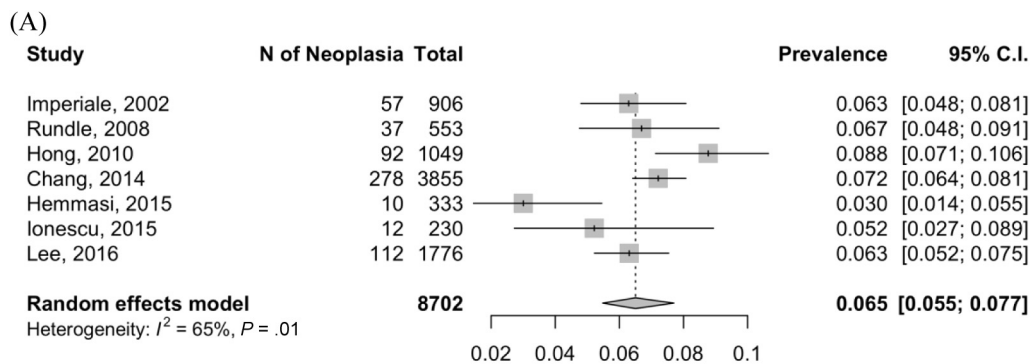
(A)



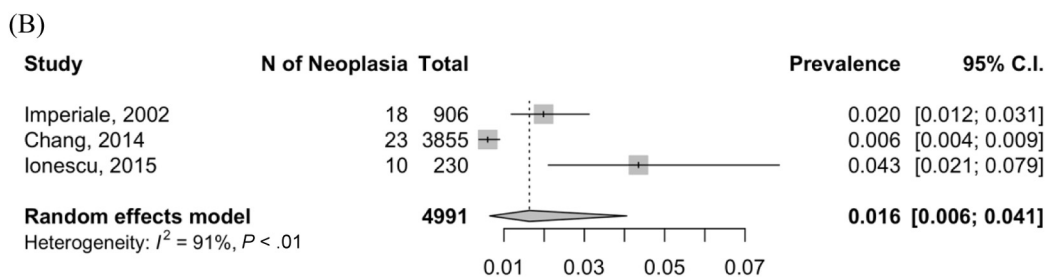
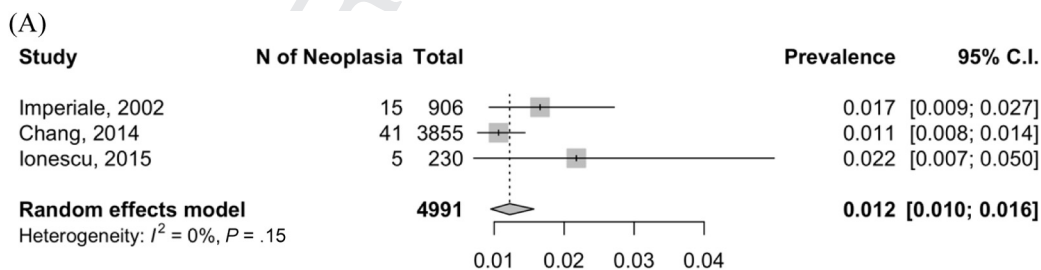
(B)



Supplementary Figure 2. Sensitivity analysis excluding outliers. (A) EAO-CRN. (B) EAO-aCRN.

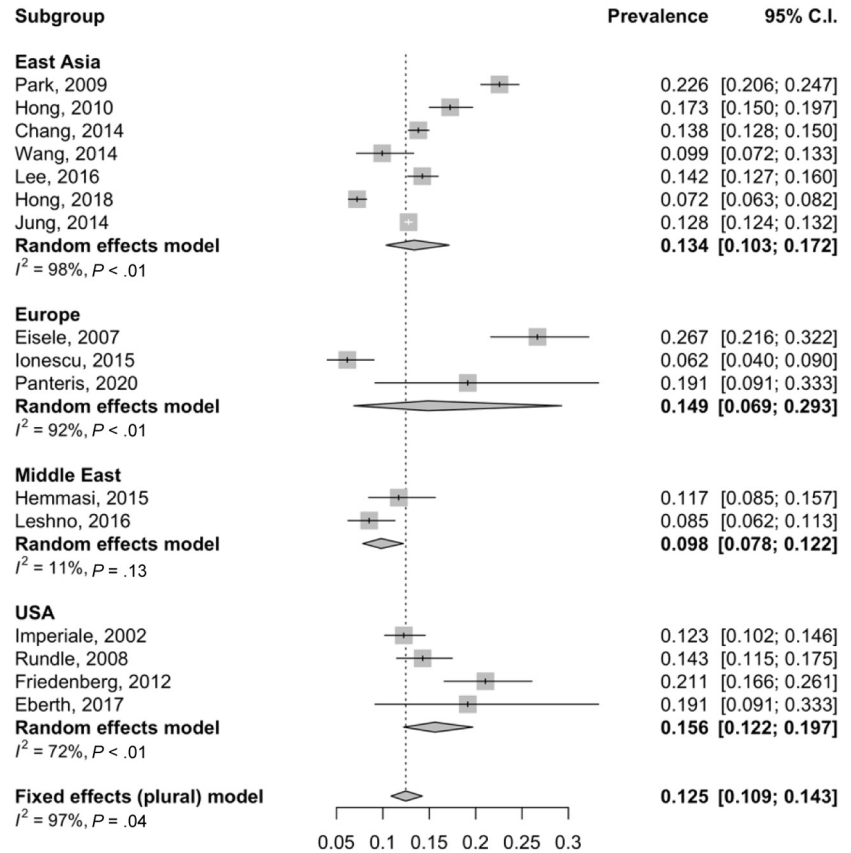


**Supplementary Figure 3.** CRN yield on screening colonoscopy by location within the colon. (A) Proximal EAO-CRN. (B) Distal EAO-CRN.

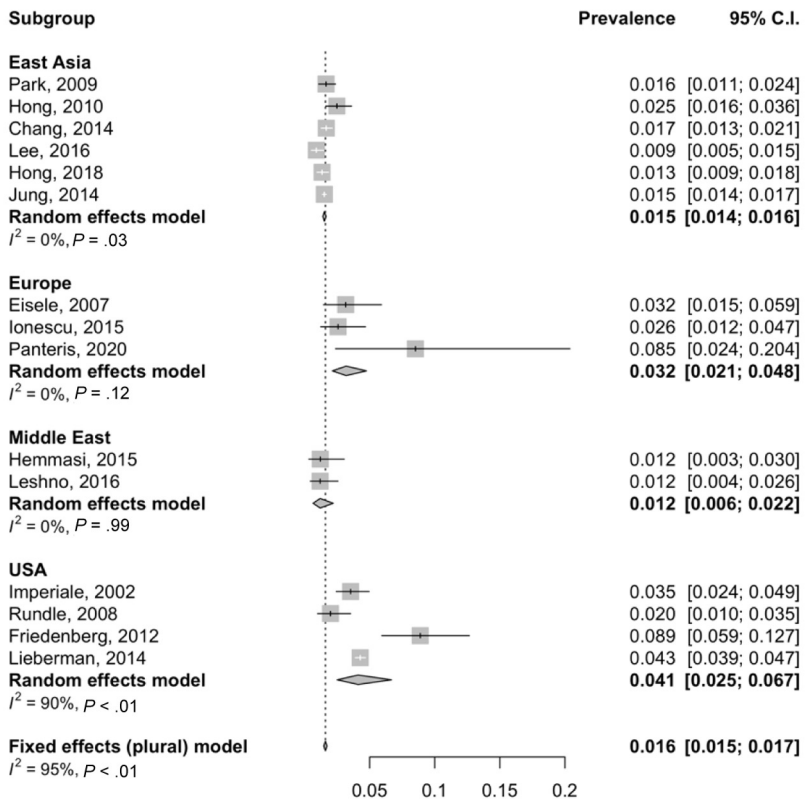


**Supplementary Figure 4.** aCRN yield on screening colonoscopy by location within the colon. (A) Proximal EAO-aCRN. (B) Distal EAO-aCRN.

(A)

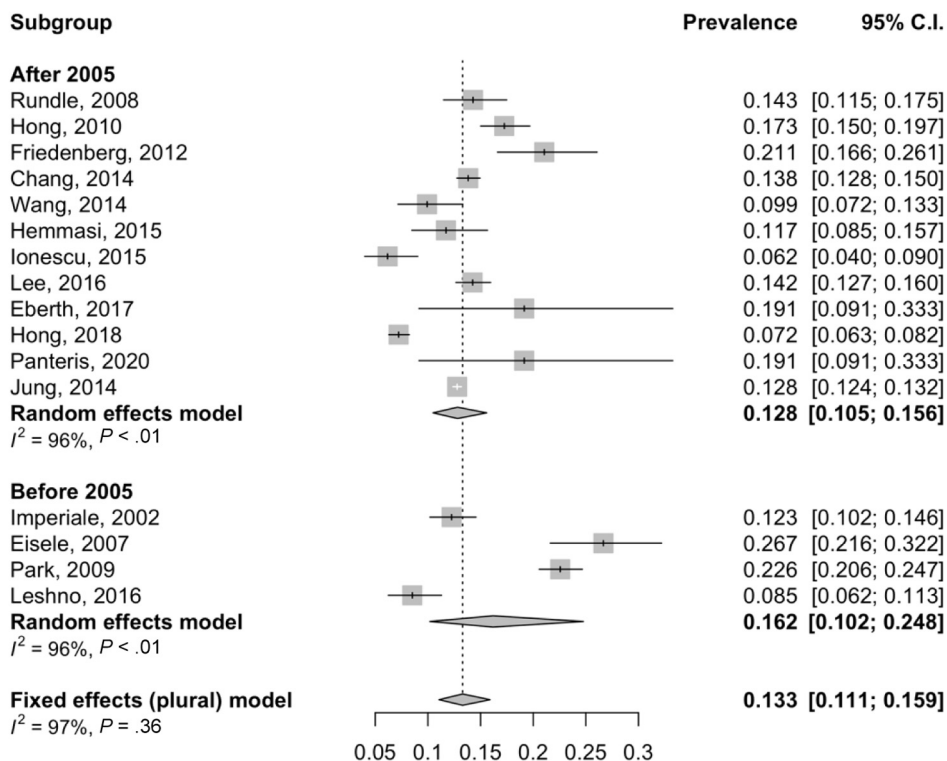


(B)

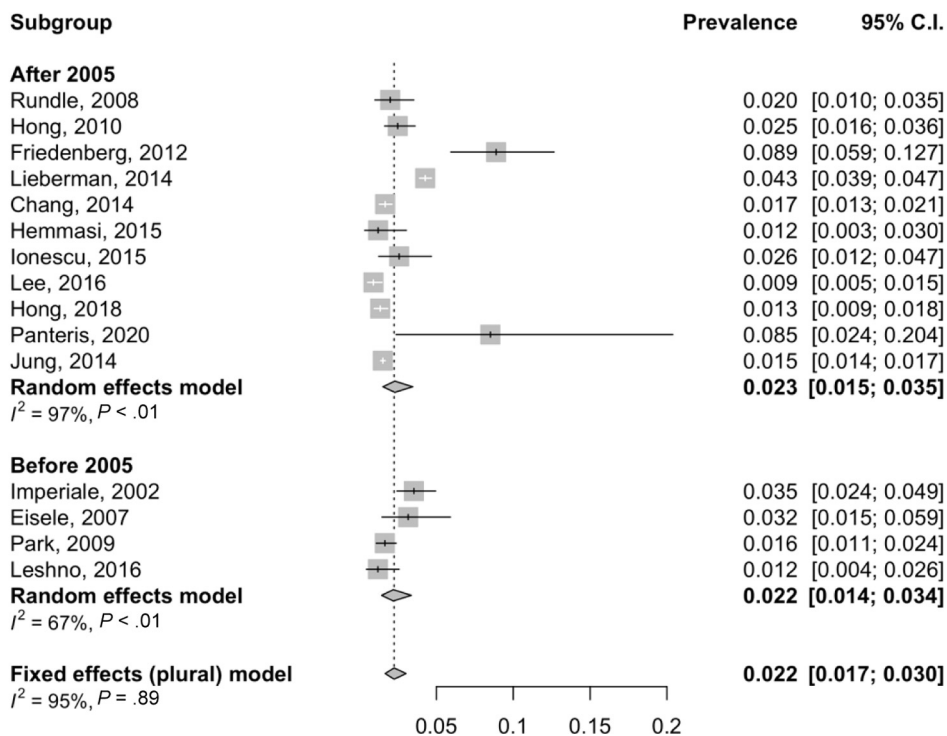


**Supplementary Figure 5.** CRN yield on screening colonoscopy for individuals younger than 50 years by geographic location. (A) Overall neoplasia (EAO-CRN). (B) Advanced neoplasia (EAO-aCRN).

(A)

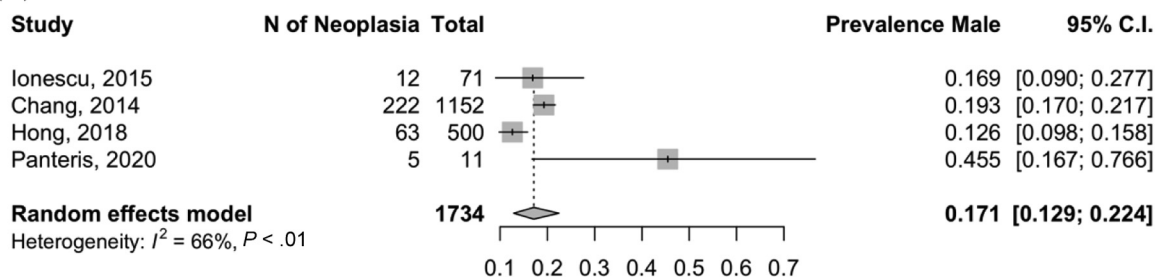


(B)

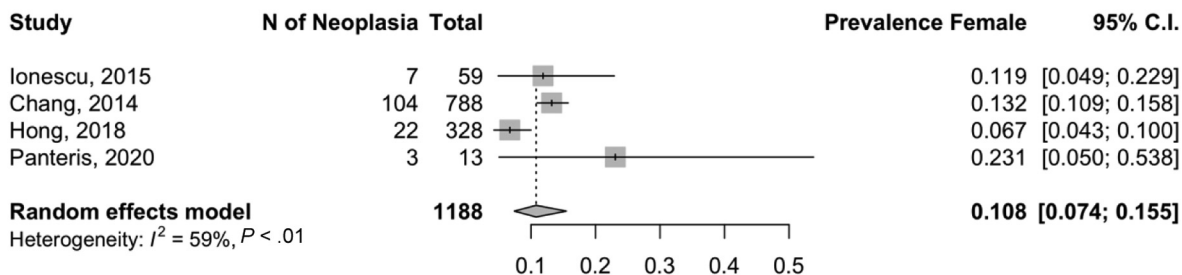


Supplementary Figure 6. CRN yield on screening colonoscopy for individuals younger than 50 years by study start time (before 2005 vs after 2005). (A) EAO-CRN. (B) EAO-aCRN.

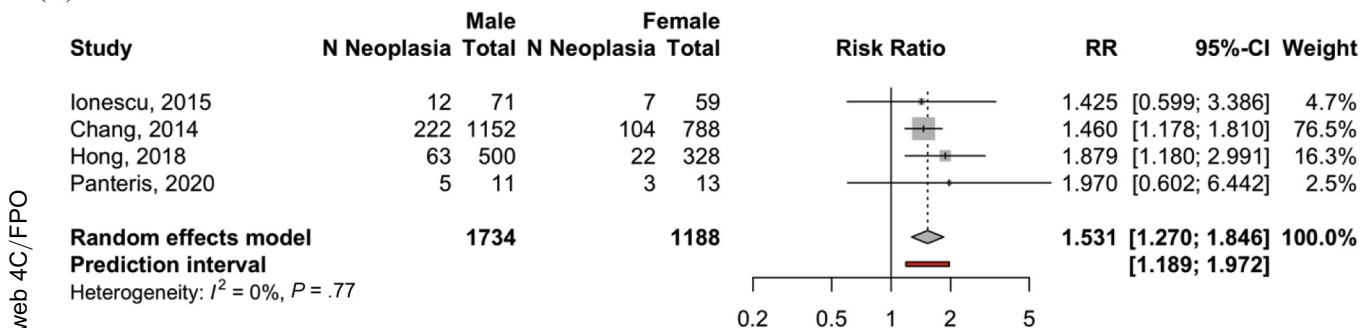
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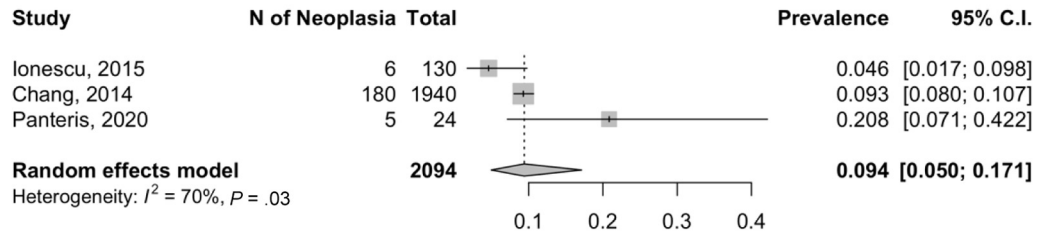


Supplementary Figure 7. CRN yield on screening colonoscopy for age 45–49 years, by sex. (A) Male. (B) Female. (C) Relative risk.

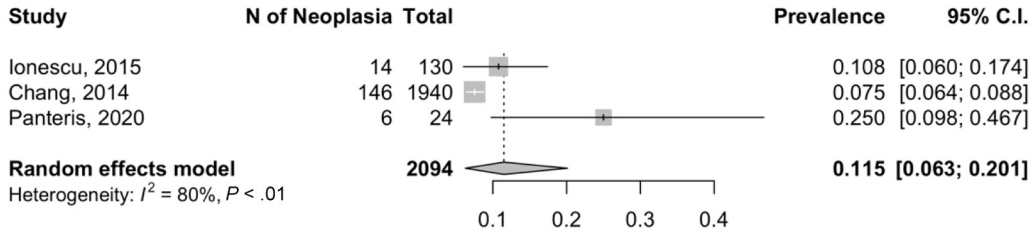
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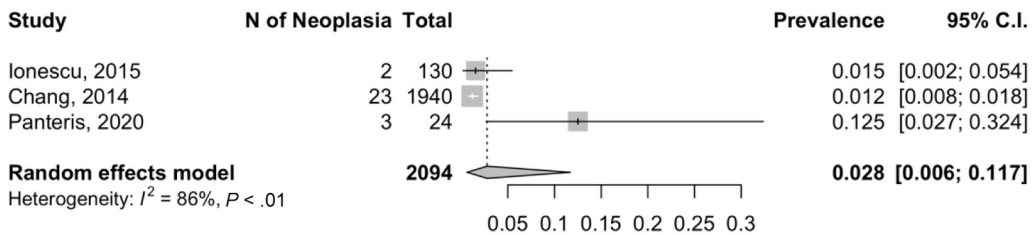
(A)



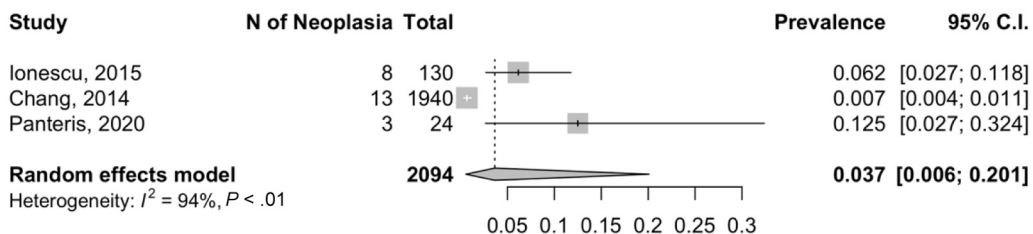
(B)



(C)



(D)



**Supplementary Figure 8.** CRN yield on screening colonoscopy for age 45–49 years, by location within the colon. (A) Proximal EAO-CRN. (B) Distal EAO-CRN. (C) Proximal EAO-aCRN. (D) Distal EAO-aCRN.

**Supplementary Table 1.**Databases Searched: MEDLINE, Embase and Web of Science

MEDLINE (via Ovid MEDLINE® and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions, 1946 to present)

Search dates = 12/19/2018, 7/28/2020

1	exp Colonic Polyps/
2	exp Adenoma, Villous/
3	(exp Adenoma/ or exp Polyps/) and (exp Colonoscopy/ or exp Colon/)
4	advanced adenoma*.tw,kf.
5	colon polyp*.tw,kf.
6	colonic adenoma*.tw,kf.
7	colonic polyp*.tw,kf.
8	colorectal adenoma*.tw,kf.
9	hyperplastic polyp*.tw,kf.
10	serrated adenoma*.tw,kf.
11	serrated polyp*.tw,kf.
12	sessile serrated adenoma*.tw,kf.
13	sessile serrated polyp*.tw,kf.
14	traditional serrated adenoma*.tw,kf.
15	tubular adenoma*.tw,kf.
16	tubulovillous adenoma*.tw,kf.
17	villous adenoma*.tw,kf.
18	or/1-17
19	exp Incidence/
20	exp Prevalence/
21	exp Risk/
22	inciden*.tw,kf.
23	prevalen*.tw,kf.
24	rate.tw,kf.
25	risk.tw,kf.
26	percentage.tw,kf.
27	or/19-26
28	Adult/
29	Young Adult/
30	Adolescent/
31	Middle Aged/
32	Age Factors/
33	exp Age of Onset/
34	exp Age Distribution/
35	adult*.tw,kf.

**Supplementary Table 1.**Continued

MEDLINE (via Ovid MEDLINE® and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions, 1946 to present)

Search dates = 12/19/2018, 7/28/2020

36	middle age*.tw,kf.
37	man.tw,kf.
38	men.tw,kf.
39	wom#n.tw,kf.
40	((2* or 3* or 4* or 5* or twenty* or twenties* or thirty* or thirties* or forty* or forties* or fifty* or fifties*) adj3 (age or ages or aged or year or years or old).tw,kf.
41	or/28-40
42	18 and 27 and 41
43	(exp aged/ or exp child/ or exp infant/) not (adolescent/ or young adult/ or adult/ or middle aged/)
44	42 not 43
45	exp animals/ not exp humans/
46	44 not 45
47	exp comment/ or exp editorial/ or exp letter/ or (systematic review or meta-analysis or metaanalysis).ti.
48	46 not 47

Embase (via Elsevier, Embase.com, 1947 to present)

Search date = 12/19/2018

#1	colon polyp'/exp
#2	'villous adenoma'/exp
#3	('adenoma'/exp OR 'polyp'/exp) AND ('colonoscopy'/exp OR 'colon'/exp)
#4	'advanced adenoma*':ab,ti
#5	'colon polyp*':ab,ti
#6	'colonic adenoma*':ab,ti
#7	'colonic polyp*':ab,ti
#8	'colorectal adenoma*':ab,ti
#9	'hyperplastic polyp*':ab,ti
#10	'serrated adenoma*':ab,ti
#11	'serrated polyp*':ab,ti
#12	'sessile serrated adenoma*':ab,ti
#13	'sessile serrated polyp*':ab,ti
#14	'traditional serrated adenoma*':ab,ti

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Supplementary Table 1. Continued

Embase (via Elsevier, Embase.com, 1947 to present)	
Search date = 12/19/2018	
#15	'tubular adenoma':ab,ti
#16	'tubulovillous adenoma':ab,ti
#17	'villous adenoma':ab,ti
#18	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17
#19	'incidence'/exp
#20	'prevalence'/exp
#21	'risk'/exp
#22	inciden*:ab,ti
#23	prevalen*:ab,ti
#24	rate:ab,ti
#25	risk:ab,ti
#26	percentage:ab,ti
#27	#19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26
#28	'adult'/de
#29	'young adult'/de
#30	'adolescent'/de
#31	'middle aged'/de
#32	'onset age'/exp
#33	'age distribution'/exp
#34	adult*:ab,ti
#35	'middle age':ab,ti
#36	man:ab,ti
#37	men:ab,ti
#38	wom?:n:ab,ti
#39	((2* OR 3* OR 4* OR 5* OR twenty* OR twenties* OR thirty* OR thirties* OR forty* OR forties* OR fifty* OR fifties*) NEAR/3 (age OR ages OR aged OR year OR years OR old)):ab,ti
#40	#28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39
#41	#18 AND #27 AND #40
#42	('aged'/exp OR 'child'/exp) NOT ('adolescent'/de OR 'young adult'/de OR 'adult'/de OR 'middle aged'/de)
#43	#41 NOT #42
#44	[animals]/lim NOT [humans]/lim
#45	#43 NOT #44

Supplementary Table 1. Continued

Embase (via Elsevier, Embase.com, 1947 to present)		
Search date = 12/19/2018		
#46	'note'/exp OR 'editorial'/exp OR 'letter'/exp OR 'systematic review':ti OR 'meta-analysis':ti OR metaanalysis:ti	2341
#47	#45 NOT #46	2342
#48	#47 AND ('article'/it OR 'article in press'/it OR 'review'/it OR 'short survey'/it)	2343
Web of Science Core Collection (via Clarivate Analytics, including Science Citation Index Expanded 1974 to present, and Social Sciences Citation Index 1974 to present)		2344
Search date = 12/19/2018		2345
#1	(TS=("advanced adenoma*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2346
#2	(TS=("colon polyp*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2347
#3	(TS=("colonic adenoma*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2348
#4	(TS=("colonic polyp*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2349
#5	(TS=("colorectal adenoma*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2350
#6	(TS=("hyperplastic polyp*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2351
#7	(TS=("serrated adenoma*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2352
#8	(TS=("serrated polyp*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2353
#9	(TS=("sessile serrated adenoma*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2354
#10	(TS=("sessile serrated polyp*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2355
#11	(TS=("traditional serrated adenoma*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2356
#12	(TS=("tubular adenoma*)) AND DOCUMENT TYPES: (Article OR Abstract of Published Item OR Review)	2357

**Supplementary Table 1.**Continued

Web of Science Core Collection (via Clarivate Analytics,  
including Science Citation Index Expanded 1974 to present,  
and Social Sciences Citation Index 1974 to present)

Search date = 12/19/2018

#13 (TS=("tubulovillous adenoma\*")) AND DOCUMENT  
TYPES: (Article OR Abstract of Published  
Item OR Review)

#14 (TS=("villous adenoma\*")) AND DOCUMENT  
TYPES: (Article OR Abstract of Published  
Item OR Review)

#15 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR  
#8 OR #9 OR #10 OR #11 OR #12 OR #13 OR  
#14) AND DOCUMENT TYPES: (Article OR  
Abstract of Published Item OR Review)

#16 (TS=("inciden\*")) AND DOCUMENT TYPES: (Article  
OR Abstract of Published Item OR Review)

#17 (TS=("prevalen\*")) AND DOCUMENT TYPES: (Article  
OR Abstract of Published Item OR Review)

#18 (TS=("rate")) AND DOCUMENT TYPES: (Article OR  
Abstract of Published Item OR Review)

#19 (TS=("risk")) AND DOCUMENT TYPES: (Article OR  
Abstract of Published Item OR Review)

#20 (TS=("percentage")) AND DOCUMENT TYPES: (Article  
OR Abstract of Published Item OR Review)

#21 (#16 OR #17 OR #18 OR #19 OR #20) AND DOCUMENT  
TYPES: (Article OR Abstract of Published Item  
OR Review)

#22 (TS=("adult\*")) AND DOCUMENT TYPES: (Article OR  
Abstract of Published Item OR Review)

#23 (TS=("middle age\*")) AND DOCUMENT TYPES: (Article  
OR Abstract of Published Item OR Review)

#24 (TS=("man")) AND DOCUMENT TYPES: (Article OR  
Abstract of Published Item OR Review)

#25 (TS=("men")) AND DOCUMENT TYPES: (Article OR  
Abstract of Published Item OR Review)

#26 (TS=("wom?n")) AND DOCUMENT TYPES: (Article OR  
Abstract of Published Item OR Review)

#27 (TS(("twenty\*" OR "twenties\*" OR "thirty\*" OR "thirties\*"  
OR "forty\*" OR "forties\*" OR "fifty\*" OR "fifties\*")  
NEAR/3 ("age" OR "ages" OR "aged" OR "year"  
OR "years" OR "old"))) AND DOCUMENT TYPES:  
(Article OR Abstract of Published Item OR Review)

#28 (#22 OR #23 OR #24 OR #25 OR #26 OR #27) AND  
DOCUMENT TYPES: (Article OR Abstract of Published  
Item OR Review)

#29 (#15 AND #21 AND #28) AND DOCUMENT TYPES:  
(Article OR Abstract of Published Item OR Review)

#30 (TI=("systematic review" OR "meta-analysis"  
OR "metaanalysis")) AND DOCUMENT TYPES:  
(Article OR Abstract of Published Item OR Review)

#31 (#29 NOT #30) AND DOCUMENT TYPES: (Article OR  
Abstract of Published Item OR Review)

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**Supplementary Table 2.** Publication and Outcomes Data for All Included Studies

First author, year of publication	Country	Study period	Risk of bias	No. of patients younger than 50 y	Reason for colonoscopy	Data reported <sup>a</sup>
Imperiale, 2002 <sup>34</sup>	United States	1995–2000	Low	906	Employee-sponsored colonoscopy screening	EAO-CRN, EAO-aCRN, sex, colon location, age 40–49 y
Eisele, 2007 <sup>35</sup>	Germany	1998–2003	Low	285	Health assessment program for male military personnel	EAO-CRN, EAO-aCRN, age 40–49 y
Rundle, 2008 <sup>36</sup>	United States	2004–2006	Low	553	Employee-sponsored wellness examination including colonoscopy screening	EAO-CRN, EAO-aCRN, sex, colon location, age 40–49 y,
Park, 2009 <sup>37</sup>	Korea	2003–2004	Low	1644	Routine screening	EAO-CRN, EAO-aCRN, age 20–29 y, 30–39 y, 40–49 y
Hong, 2010 <sup>38</sup>	Korea	2005–2009	Low	1049	Employee-sponsored wellness program including colonoscopy screening	EAO-CRN, EAO-aCRN, sex, colon location, age 40–44 y, 45–49 y,
Friedenberg, 2012 <sup>39</sup>	United States	2007–2010	Low	304	Routine screening for African Americans	EAO-CRN, EAO-aCRN, colon location, age 45–49 y
Lieberman, 2014 <sup>52</sup>	United States	2000–2011	Low	10,700	Routine screening, all polyps >9 mm	EAO-aCRN, age <50 y
Chang, 2014 <sup>40</sup>	Taiwan	2006–2009	Low	3855	Voluntary health checkup including colonoscopy screening	EAO-CRN, EAO-aCRN, sex, colon location, age 40–44 y, 45–49 y
Wang, 2014 <sup>41</sup>	Taiwan	2009–2011	Low	393	Routine screening	EAO-CRN, age <45 y
Hemmasi, 2015 <sup>42</sup>	Iran	2009–2012	Low	333	Voluntary health checkup including colonoscopy screening	EAO-CRN, EAO-aCRN, sex, colon location, age 40–49 y
Ionescu, 2015 <sup>43</sup>	Romania	2007–2008 and 2012–2013	Low	389	Routine screening	EAO-CRN, EAO-aCRN, sex, colon location, age <50 y, 40–44 y, 45–49 y
Jung, 2015 <sup>44</sup>	Korea	2010–2011	Low	2319	Comprehensive health screening program	EAO-CRN, EAO-aCRN
Lee, 2016 <sup>45</sup>	Korea	2012–2014	Low	1776	Routine health checkup including colonoscopy screening	EAO-CRN, EAO-aCRN, colon location, age <40 y, 40–44 y, 45–49 y
Leshno, 2016 <sup>46</sup>	Israel	1995–2014	Low	505	Routine screening	EAO-CRN, EAO-aCRN, sex, age 40–49 y
Eberth, 2018 <sup>47</sup>	United States	2014–2016	Low	47	Routine screening for African Americans facilitated by statewide programs for patient navigation	EAO-CRN, age 45–49 y
Hong, 2018 <sup>48</sup>	China	2013–2014	Low	2840	Routine screening	EAO-CRN, EAO-aCRN, sex, age ≤39 y, 40–44 y, 45–49 y
Panteris, 2020 <sup>49</sup>	Greece	2017	Low	47	Individual request on a free access basis	EAO-CRN, EAO-aCRN, sex, location, age 45–49 y

**Supplementary Table 3.** Risk of Bias in Included Studies Using the Joanna Briggs Institute's Critical Appraisal Checklist for Studies Reporting Prevalence Data

First author, year of publication	Sample representativeness	Sampling method	Sample size	Study subjects and setting	Sample coverage	Use of validated metrics for identifying condition	Standard reliable measurement of condition	Appropriate statistical analysis	Response rate
Imperiale, 2002 <sup>34</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Eisele, 2007 <sup>35</sup>	No	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Rundle, 2008 <sup>36</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Park, 2009 <sup>37</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Hong, 2010 <sup>38</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Friedenberg, 2012 <sup>39</sup>	No	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Lieberman, 2014 <sup>52</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Chang, 2014 <sup>40</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Wang, 2014 <sup>41</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Hemmasi, 2015 <sup>42</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Ionescu, 2015 <sup>43</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Jung, 2015 <sup>44</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Lee, 2016 <sup>45</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Leshno, 2016 <sup>46</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Eberth, 2018 <sup>47</sup>	No	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Hong, 2018 <sup>48</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA
Panteris, 2020 <sup>49</sup>	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	NA

NA, not applicable

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