Colorectal Cancer Screening and Surveillance

Peter P. Stanich, M.D.
Associate Professor
Division of Gastroenterology, Hepatology & Nutrition
Director, GHN Section of Intestinal Neoplasia and Hereditary Polyposis
The Ohio State University Wexner Medical Center

MedNet21
Center for Continuing Medical Education

The Ohio State University
Wexner Medical Center

Disclosures

- Research support from Pfizer (Study PI)
- Research support from PTEN Research Foundation (Study PI)
- Research support from Janssen (Site PI)
- Research support from Emtora (Site PI)
- Research support from Freenome (Site PI)
- Research support from Guardant (CO-I)

Agenda

1. Definitions
2. Why is CRC important?
3. Early onset CRC
4. CRC screening options
5. Discussion of colonoscopy for screening
6. Surveillance recommendations
7. Genetic testing criteria

Definitions

- Screening
  - To identify polyps/cancer in a patient without a personal history of cancer or precancerous lesions
  - No signs/symptoms of suspected colorectal disease
- Surveillance
  - To identify polyps/cancer in an individual with previously identified polyps/cancer
  - No signs/symptoms of suspected colorectal disease
- Diagnostic
  - Signs/symptoms of suspected colorectal disease

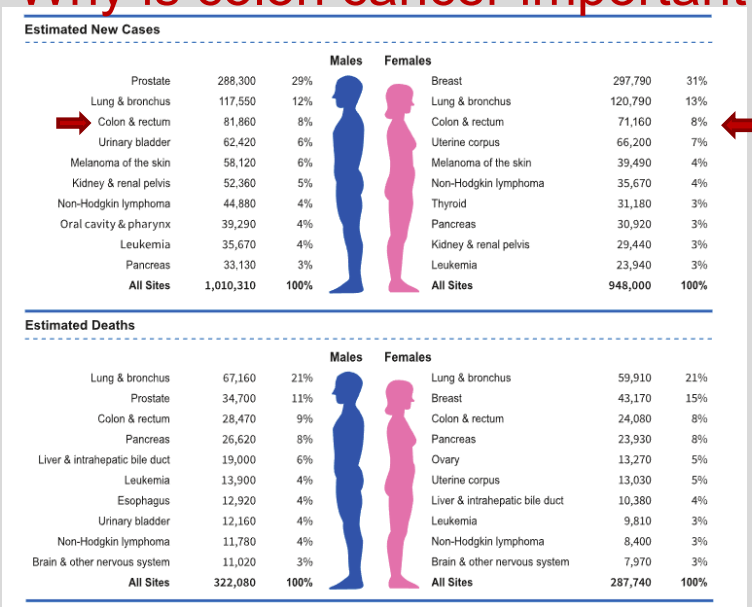
Baron et al. Recommended Intervals Between Screening and Surveillance Colonoscopies. Mayo Clin Proc. 8.2013.

Definitions

- Average risk
  - No personal history of colon neoplasia
  - No family history of CRC or advanced adenoma in a first degree relative (parents, siblings, children)
- High risk
  - This definition varies by guideline, but for USMSTF and today's lecture this is:

<u>First degree relative with CRC, advanced adenoma or advanced serrated adenoma</u>

Why is colon cancer important?



Estimated New Cases

			Males	Females			
Prostate	288,300	29%			Breast	297,790	31%
Lung & bronchus	117,550	12%			Lung & bronchus	120,790	13%
Colon & rectum	81,860	8%			Colon & rectum	71,160	8%
Urinary bladder	62,420	6%			Uterine corpus	66,200	7%
Melanoma of the skin	58,120	6%			Melanoma of the skin	39,490	4%
Kidney & renal pelvis	52,360	5%			Non-Hodgkin lymphoma	35,670	4%
Non-Hodgkin lymphoma	44,880	4%			Thyroid	31,180	3%
Oral cavity & pharynx	39,290	4%			Pancreas	30,920	3%
Leukemia	35,670	4%			Kidney & renal pelvis	29,440	3%
Pancreas	33,130	3%			Leukemia	23,940	3%
All Sites	**1,010,310**	**100%**			**All Sites**	**948,000**	**100%**

Estimated Deaths

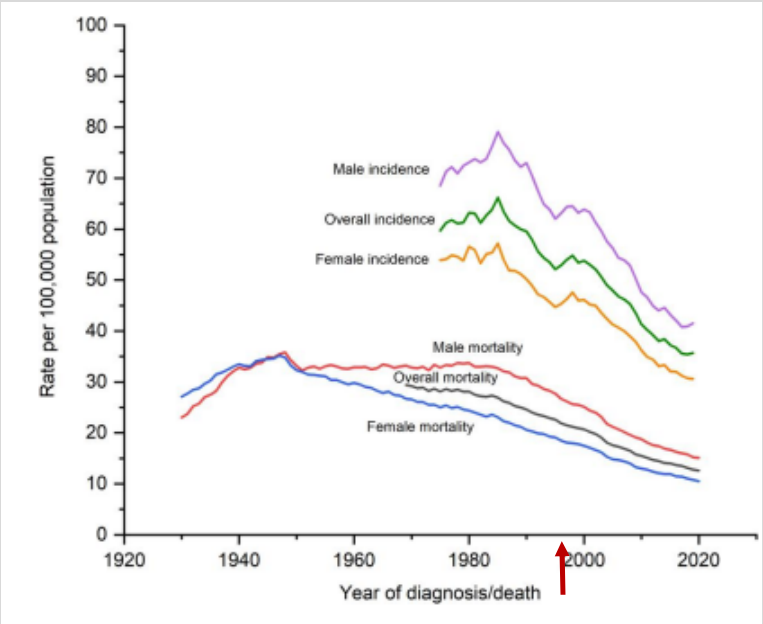
			Males	Females			
Lung & bronchus	67,160	21%			Lung & bronchus	59,910	21%
Prostate	34,700	11%			Breast	43,170	15%
Colon & rectum	28,470	9%			Colon & rectum	24,080	8%
Pancreas	26,620	8%			Pancreas	23,930	8%
Liver & intrahepatic bile duct	19,000	6%			Ovary	13,270	5%
Leukemia	13,900	4%			Uterine corpus	13,030	5%
Esophagus	12,920	4%			Liver & intrahepatic bile duct	10,380	4%
Urinary bladder	12,160	4%			Leukemia	9,810	3%
Non-Hodgkin lymphoma	11,780	4%			Non-Hodgkin lymphoma	8,400	3%
Brain & other nervous system	11,020	3%			Brain & other nervous system	7,970	3%
All Sites	**322,080**	**100%**			**All Sites**	**287,740**	**100%**

Siegel RL, et al. Cancer statistics, 2023. CA Cancer J Clin. 2023;73(1):17-48. doi:10.3322/caac.21763

A CANCER J CLIN 2023.

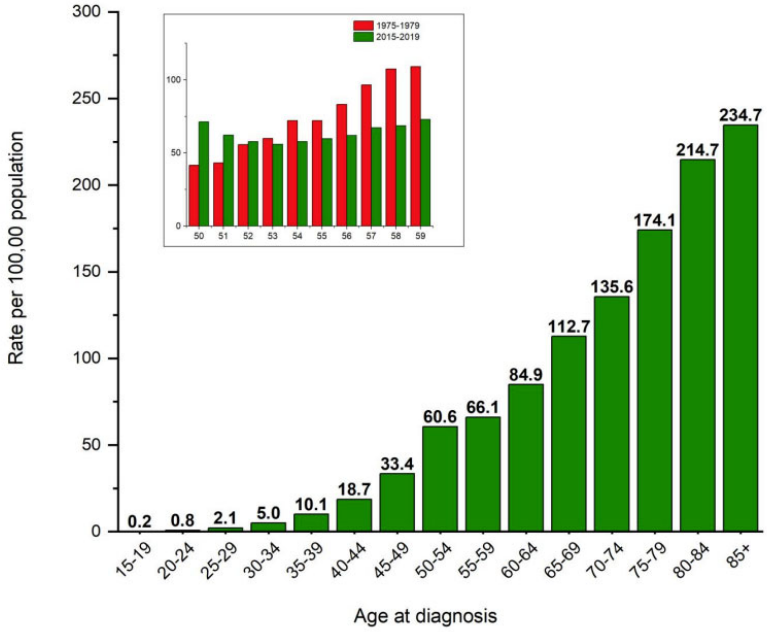
***Overall lifetime risk is about 4%**

CRC incidence and mortality trends per 100k



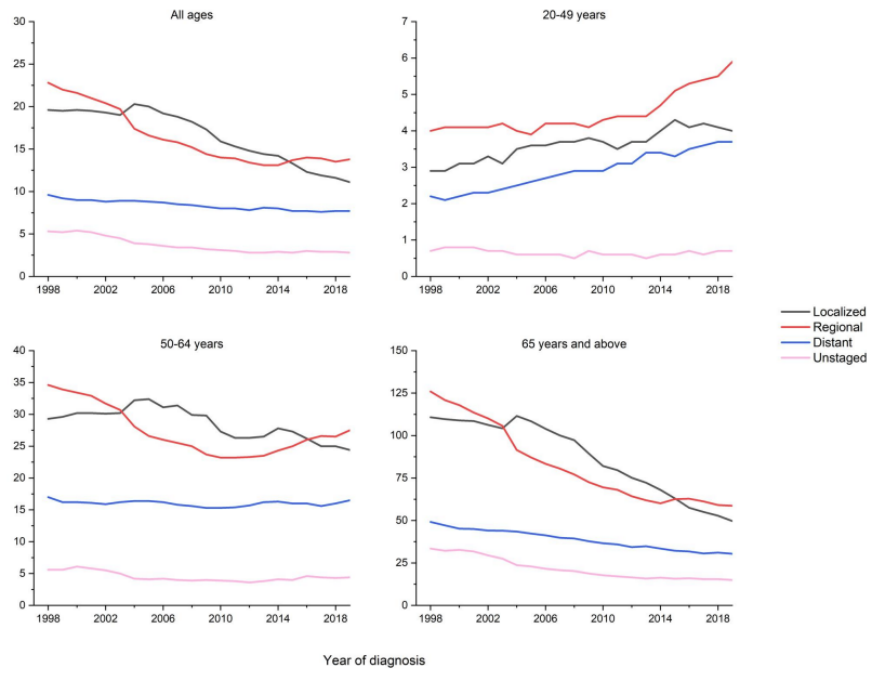
Siegel RL, et al. Colorectal cancer statistics, 2023. *CA Cancer J Clin*. 2023; 73(3): 233-254. doi:10.3322/caac.21772

CRC rates by age per 100k



Siegel RL, et al. Colorectal cancer statistics, 2023. *CA Cancer J Clin*. 2023; 73(3): 233-254. doi:10.3322/caac.21772

CRC incidence by age and stage per 100k



Siegel RL, et al. Colorectal cancer statistics, 2023. *CA Cancer J Clin*. 2023; 73(3): 233-254. doi:10.3322/caac.21772

How can we reduce advanced EOCRC?

Small steps any healthcare provider can take

- Aggressively investigate red flag symptoms of CRC, **even in young people**
- Be aware of family history of colorectal cancer and how this will impact screening for your patient

Red flag symptoms in young people

It is clear that diagnosis of CRC under age 45 is delayed

- Patients frequently report symptoms being dismissed by their providers… this needs to change
- 4 red flag symptoms were significantly associated with early-onset CRC in a large study
  - Abdominal pain, Rectal bleeding, Diarrhea, IDA
  - 1, 2, or ≥3 of were was associated with a 1.9-, 3.6-, and 6.5- fold increased risk respectively.

Fritz et al. Red-flag signs and symptoms for earlier diagnosis of early-onset colorectal cancer. JNCI 2023

Colon Cancer Screening

- Multiple modalities available
  - Colonoscopy
  - Flexible sigmoidoscopy
  - Fecal immunochemical testing (FIT)
  - Multi-target stool DNA

* Remember - Any screening is better than none…

Importance of colon cancer screening

Screening modality	Frequency	Mean CRC cases averted Per 1,000 individuals
FIT	**Yearly**	**50**
FOBT	**Yearly**	**42**
sDNA-FIT	Yearly	57
sDNA-FIT	**every 3 years**	**47**
Colonoscopy	**every 10 years**	**58**
CT colonography	every 5 years	53
Flexible sigmoidoscopy	every 5 years	49

Adapted from USPSTF. JAMA 2021

Colon cancer screening

- Multiple guidelines exist:
  - American College of Gastroenterology (2021)
  - National Comprehensive Cancer Network (continuously updated)
  - **US Multi-Society Task Force on Colorectal Cancer (updated 2021)**
  - US Preventative Services Task Force (2021)
  - American College of Physicians (2023)**

US MSTF screening guidelines

- **Average-risk CRC screening at age 45**
  - Incidence in 45- to 49-year-olds is similar to the incidence observed in 50-year-olds when CRC screening was first recommended.

Table 3.Life-Years Gained, Additional Colonoscopies Required, and Adverse Events of Screening per 1000 Individuals Screened at Ages 45-75 Compared With Ages 50-75

	Additional life-years gained	CRC prevented	CRC death averted	Additional tests required	Additional adverse events
Tier 1					
Colonoscopy every 10 y	16-34	1-4	1-2	Colonoscopy: 756-800	2
Annual FIT	17-33	1-4	1	FIT: 3387-3520 Colonoscopy: 175-205	1
Triennial sDNA–FIT	16-31	1-4	1	sDNA–FIT: 1166-1201 Colonoscopy: 177-196	<1
Flexible sigmoidoscopy every 5 y	13-30	1-3	1	Flexible sigmoidoscopy: 743-801 Colonoscopy: 170-192	<1
CT colonography every 5 y	14-31	1-3	1	CT colonography: 798-806 Colonoscopy: 153-165	1

Data is per 1,000 individuals

Patel et al. Updates on Age to Start and Stop Colorectal Cancer Screening: Recommendations From the U.S. Multi-Society Task Force on Colorectal Cancer. Gastroenterology 2021

USPSTF 2021

Recommendation Summary

Population	Recommendation	Grade
Adults aged 50 to 75 years	The USPSTF recommends screening for colorectal cancer in all adults aged 50 to 75 years. See the "Practice Considerations" section and Table 1 for details about screening strategies.	A
Adults aged 45 to 49 years	The USPSTF recommends screening for colorectal cancer in adults aged 45 to 49 years. See the "Practice Considerations" section and Table 1 for details about screening strategies.	B
Adults aged 76 to 85 years	The USPSTF recommends that clinicians selectively offer screening for colorectal cancer in adults aged 76 to 85 years. Evidence indicates that the net benefit of screening all persons in this age group is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the patient's overall health, prior screening history, and preferences.	C

USPSTF, https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/colorectal-cancer-screening

Where are we at now with earlier start of CRC screening?

As of 2021 –

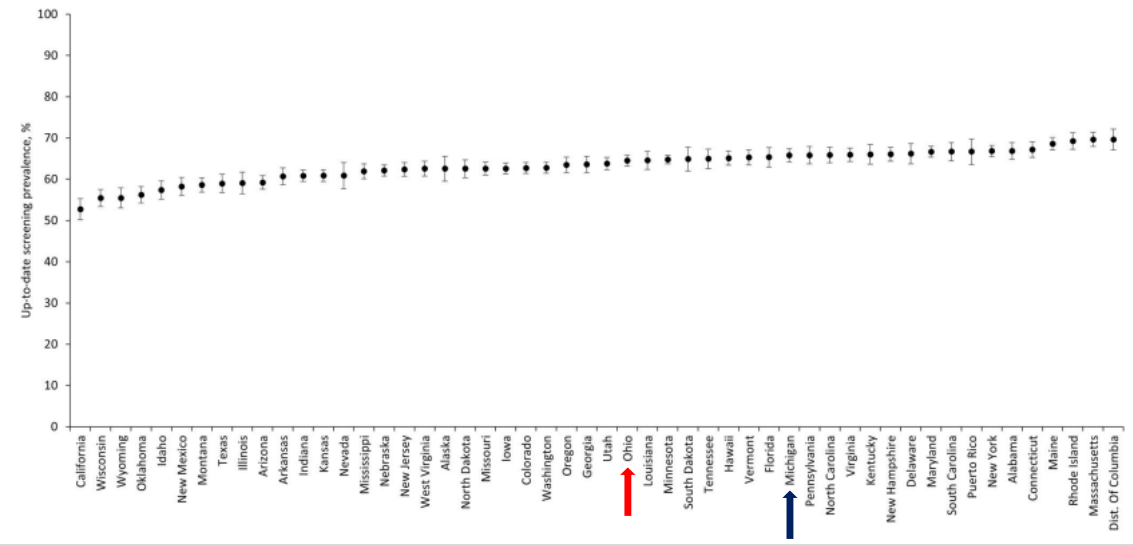
- 20% of eligible 45 – 49-year-olds were up to date with screening
- Only 7.6% of uninsured

Lots of room for improvement!

Star J et al. Colorectal cancer screening test exposure patterns in US adults ages 45-49 years, 2019-2021. J Natl Cancer Inst. 2024.

CRC screening rates by state

Siegel RL, et al. Colorectal cancer statistics, 2023. *CA Cancer J Clin*. 2023; 73(3): 233-254. doi:10.3322/caac.21772 (CC BY-NC-ND)



Blood-based testing is coming

- Tests detect genomic or epigenomic changes in cell-free DNA shed by colorectal tumors into blood
- Similar sensitivity and specificity for CRC to stool based testing had been reported
- Many project approval in 2024 or 2025

Potential for improvement

Blood-based testing may help close screening gap

- Being offered blood-based testing increased uptake by 17.5%

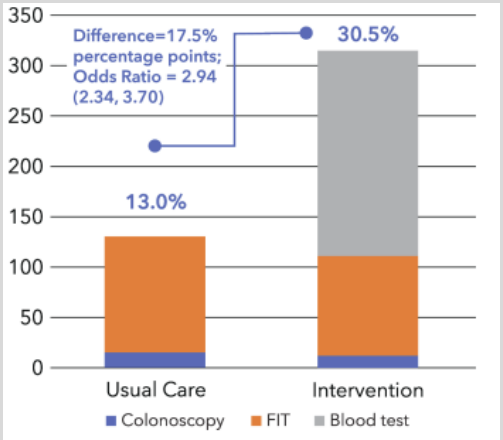


Figure 2 Participation in colorectal cancer screening by study condition and test modality. This bar chart shows the number of patients who were screened for colorectal cancer, by each screening modality: faecal immunochemical testing (FIT), colonoscopy and the commercially available blood test (Guardant SHIELD).

Coronado GD, Jenkins CL, Shuster E, *et al*
Blood-based colorectal cancer screening in an integrated health system: a randomised trial of patient adherence
Gut Published Online First: 04 January 2024. doi: 10.1136/gutjnl-2023-330980

Non-Endoscopic options

- FIT preferred to FOBT
  - Better performance
  - Less reliance on dietary restrictions
  - Single sample to collect (FOBT is supposed to be 2-3 samples)
  - Remember – FOBT in the office with rectal exam is NOT ACCEPTABLE

Levin et al. Screening and Surveillance for the Early Detection of Colorectal Cancer and Adenomatous Polyps, 2008: A Joint Guideline from the American Cancer Society, the US Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology. *CA: A Cancer Journal for Clinicians, 2008.*

Why is FIT preferred over mt-sDNA?

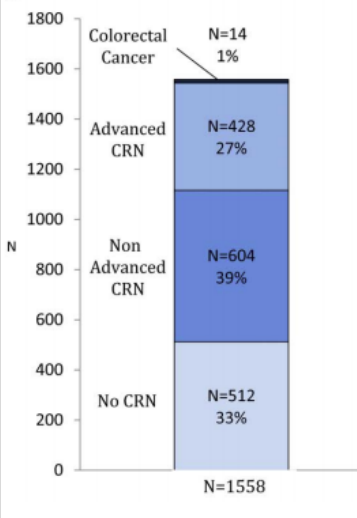
- Annual FIT is more effective and less costly than Fecal DNA every 3 years (…and colonoscopy every 10)

Modality	Interval	QALY/person	$/person
FIT	Yearly	**18.747**	**2,407**
sDNA-FIT	every 3 y	18.7423	5,190
Colonoscopy	every 10 y	18.7455	4,173

Adapted from Ladabaum U , Mannalithara A . Comparative effectiveness and cost-effectiveness of a multi-target stool DNA test to screen for colorectal neoplasia. Gastroenterology 2016.

What to expect after a positive FIT or mt-sDNA

Study of all mt-sDNA patients at Mayo Clinic over 3 years (16,469 subjects)



Advanced Neoplasia **PPV= 28%**

Eckmann, Jason D et al. "Multitarget Stool DNA Screening in Clinical Practice: High Positive Predictive Value for Colorectal Neoplasia Regardless of Exposure to Previous Colonoscopy." *The American journal of gastroenterology* vol. 115,4 (2020): 608-615. doi:10.14309/ajg.0000000000000546 (CC BY)

Timeline after positive stool screening

- Colonoscopy by 6 months
  - This is when risk for colorectal cancer becomes significantly increased

Corley JAMA 2017

What needs done with + FIT/mt-sDNA and – colonoscopy?

- Guidelines: If colonoscopy high quality, no further testing needs done and recommend following standard screening/surveillance

- Study of 205 patients with this situation:
  - 5 (2.4%) aerodigestive cancers during follow-up
    - The expected number of cancers was 6
    - **Risk ratio of 0.8 (95% CI, 0.3–1.9) relative to SEER population**

Rex AJG 2017 and Berger CGH 2020.

USMSTF High-Risk Screening Guidelines (ACG 2021 is similar)

Table 5. **MSTF recommendations for persons with high-risk family histories not associated with polyp syndromes**

Colorectal cancer or an advanced adenoma in two first-degree relatives diagnosed at any age OR colorectal cancer or an advanced adenoma in a single first-degree relative at age <60 years	Colonoscopy every 5 years beginning 10 years before the age at diagnosis of the youngest affect interval or age 40, whichever is earlier; for those with a single first-degree relative with colorectal cancer in whom no significant neoplasia appears by age 60 years, physicians can offer expanding the interval between colonoscopies
Colorectal cancer or an advanced adenoma in a single first-degree relative diagnosed at age ≥60 years	Begin screening at age 40 years; tests and intervals are as per the average-risk screening recommendations (**Table 4**)

FDR with CRC or adv. adenoma – start at age 40

***If the CRC or Adv adenoma was under age 60, then every 5 years!**

Also recommend treating advanced serrated lesions in same fashion

Rex, Douglas K et al. "Colorectal Cancer Screening: Recommendations for Physicians and Patients from the U.S. Multi-Society Task Force on Colorectal Cancer." *The American journal of gastroenterology* vol. 112,7 (2017): 1016-1030. doi:10.1038/ajg.2017.174 (CC BY)

How effective is screening colonoscopy?

In a meta-analysis of 43 publications and more than 15,000 tandem colonoscopies, **miss rates** were:

- **26% for adenomas** (95% confidence interval [CI] 23%–30%)
- **9% for advanced adenomas** (95% CI 4%–16%)
- **27% for serrated polyps** (95% CI 16%–40%).

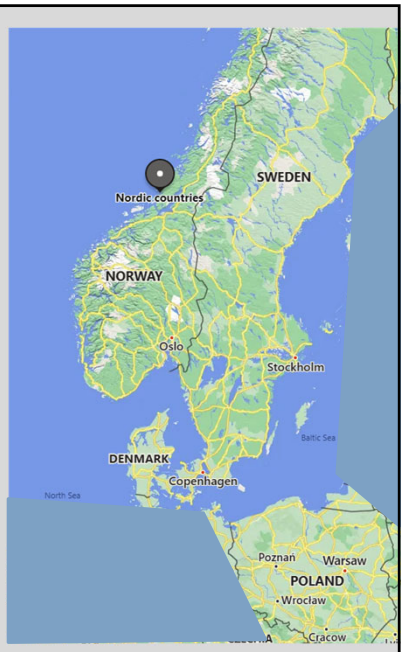
Gastroenterology 2019 1561661-1674.e11DOI: (10.1053/j.gastro.2019.01.260)

ESTABLISHED IN 1812 OCTOBER 27, 2022 VOL. 387 NO. 17

Effect of Colonoscopy Screening on Risks of Colorectal Cancer and Related Death

M. Bretthauer, M. Løberg, P. Wieszczy, M. Kalager, L. Emilsson, K. Garborg, M. Rupinski, E. Dekker, M. Spaander, M. Bugajski, Ø. Holme, A.G. Zauber, N.D. Pilonis, A. Mroz, E.J. Kuipers, J. Shi, M.A. Hernán, H.-O. Adami, J. Regula, G. Hoff, and M.F. Kaminski, for the NordICC Study Group*

- NORDICC study is a very controversial publication
  - Discussed in popular press on day of release
- People 55-64 years, trial from 2009 – 2014
- Pragmatic randomized trial
  - 84.5k participants
  - 1:2 ratio either to **be invited** for a single screening colonoscopy (the invited group) or to receive **no invitation or screening** (the usual-care group)



Results

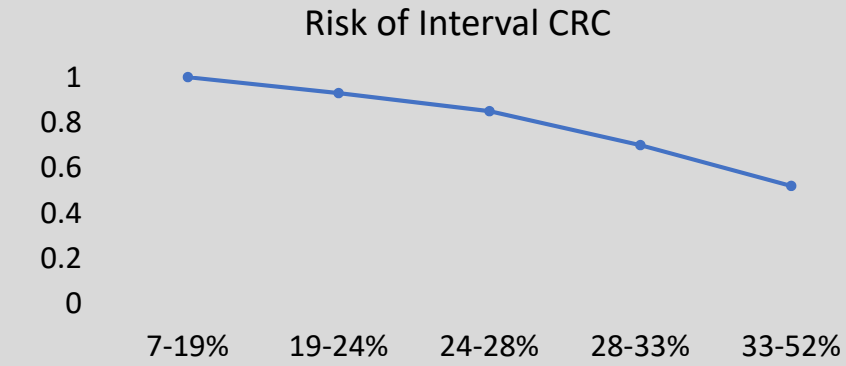
- 28,220 invited for colonoscopy but only 11,843 (42%) had procedure
- ADR variable between countries – 14% in Sweden, 27-35% in others
- ITT – risk reduction of 18% for CRC, no change in mortality
- But in per protocol analysis –
  - 31% reduction in CRC risk and 50% reduction in mortality

NORDICC take home points

- Colonoscopy for CRC screening works when people get the test
- Further benefit may be seen when data analyzed again in 5-10 years as further benefit of polypectomy is realized
- Colonoscopy benefit may be overestimated and more in line with other methods like sigmoidoscopy

Importance of EFFECTIVE Colonoscopy

- Corley et al. NEJM 2014 evaluated over 300k colonoscopies by 136 GI docs



Adenoma detection rate (ADR) - Rate of screening procedures with adenoma removed

Each 1.0% increase in ADR was associated with a 3.0% decrease in the risk of interval colon cancer

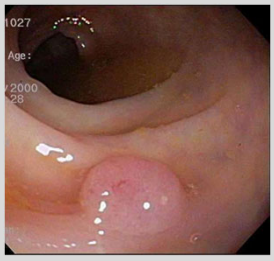
Importance of EFFECTIVE Colonoscopy (FIT+)

Table 2. Risk Factors for Interval PCCRC: Multivariable Cox Regression Model*

Variable	HR	95% CI	P Value
Center			
Academic	Reference	Reference	Reference
Nonacademic hospital	3.74	1.31–10.66	0.014
Endoscopy center	3.87	1.31–11.43	0.014
ADR, per 1% increase	0.95	0.92–0.97	<0.001

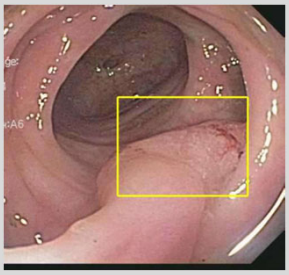
Wisse et al. Annals of Intern Med 2022.

Adenomatous colon polyps



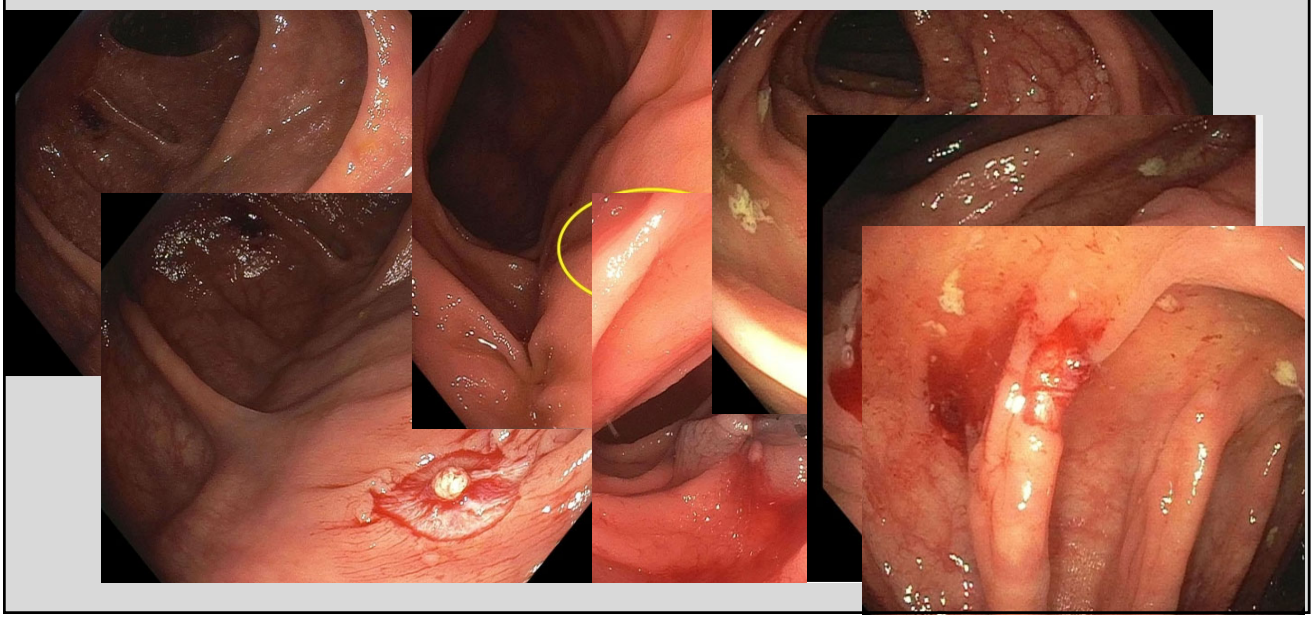
Classifications:

- Endoscopic appearance
  - Sessile: Base is attached to the wall
  - Pedunculated: Mucosal stalk from polyp to wall

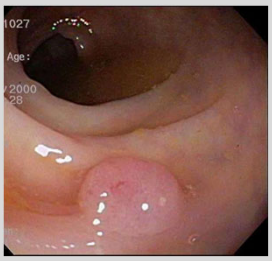


- Pathology
  - Tubular (80% of adenomas)
  - Tubulovillous (mixed)
  - Villous (finger-like glands, higher risk)

Sessile adenomatous polyps



Adenomatous colon polyps



- By definition, they are all dysplastic

- Even the small tubular adenomas that don't have it mentioned on pathology reports

Adenomatous colon polyps

Classifications:

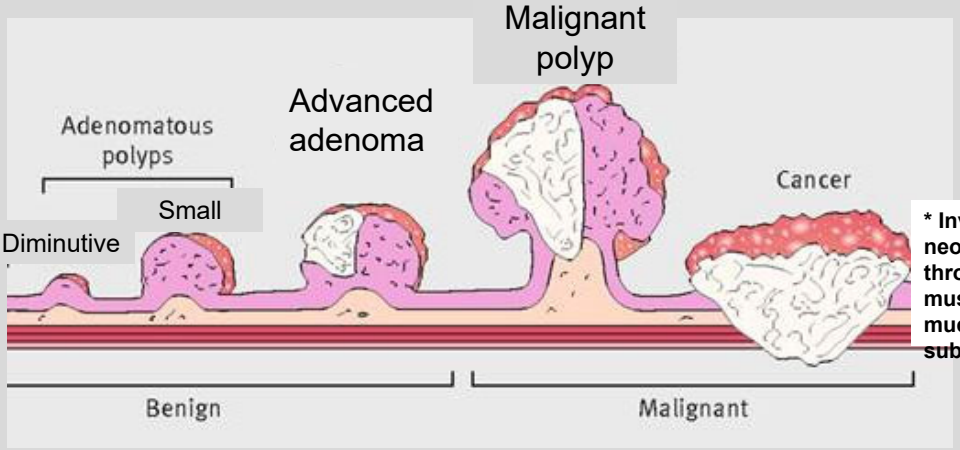
- **Advanced** adenomas:

1. High-grade dysplasia
2. > 1 cm size
3. Villous histology (ie. villous or tubulovillous)

- These are higher risk for progression to CRC and development of future CRC

***3 or more adenomas at a single colonoscopy is also a risk factor**

Adenoma to Carcinoma sequence



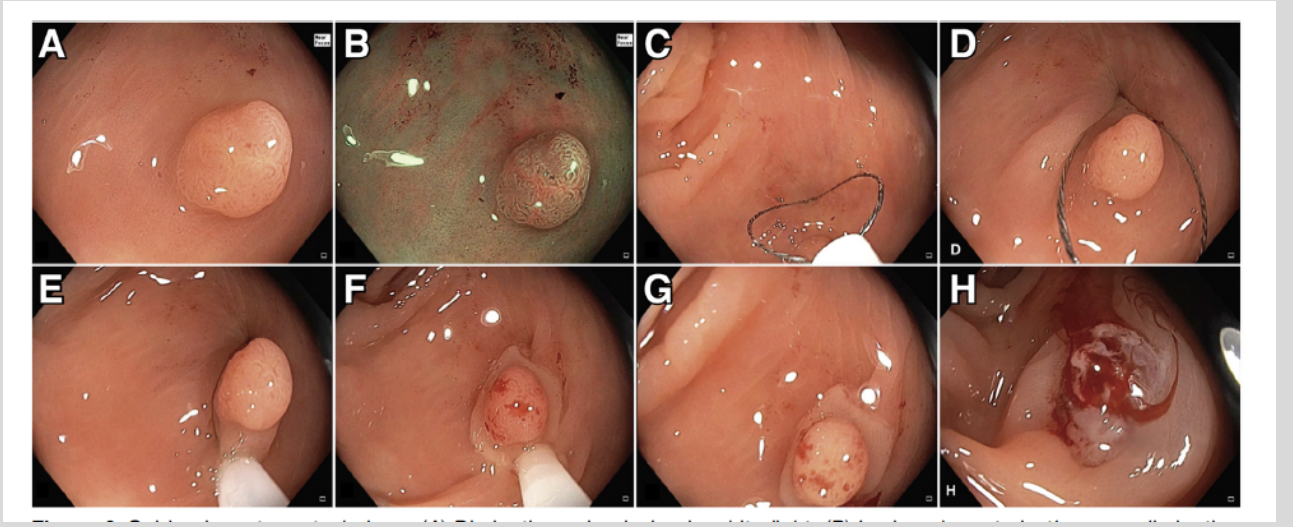
*** Invasion of neoplastic cells through the muscularis mucosa into the submucosa**

< 5% of adenomas progress, takes 7 - 15 years

Adapted from Colorectal adenocarcinoma: risks, prevention and diagnosis, *BMJ* 2016

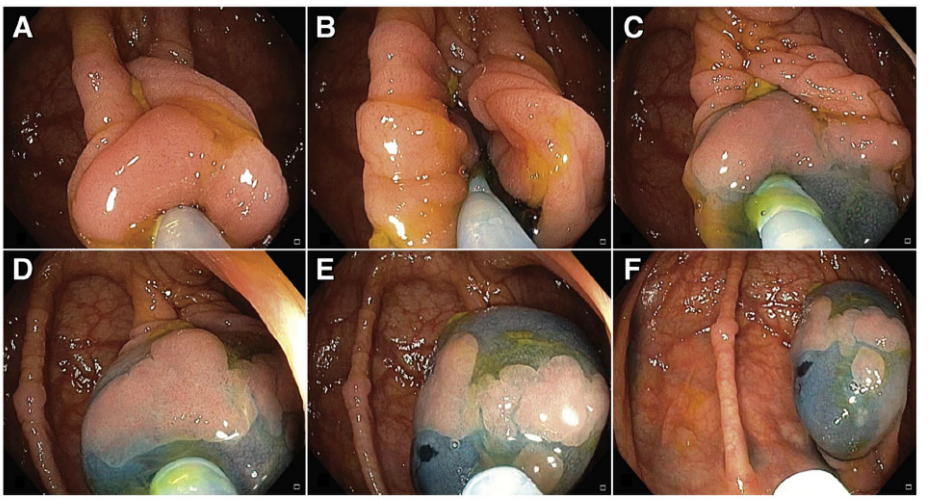
Thrumurthy S G, et al. Colorectal adenocarcinoma: risks, prevention and diagnosis *BMJ* 2016; 354 :i3590 doi:10.1136/bmj.i3590

Cold snare technique



Kaltenbach, Tonya, et al. Endoscopic Removal of Colorectal Lesions: Recommendations by the US Multi-Society Task Force on Colorectal Cancer. The American Journal of Gastroenterology 115(3):p 435-464, March 2020. (CC BY)

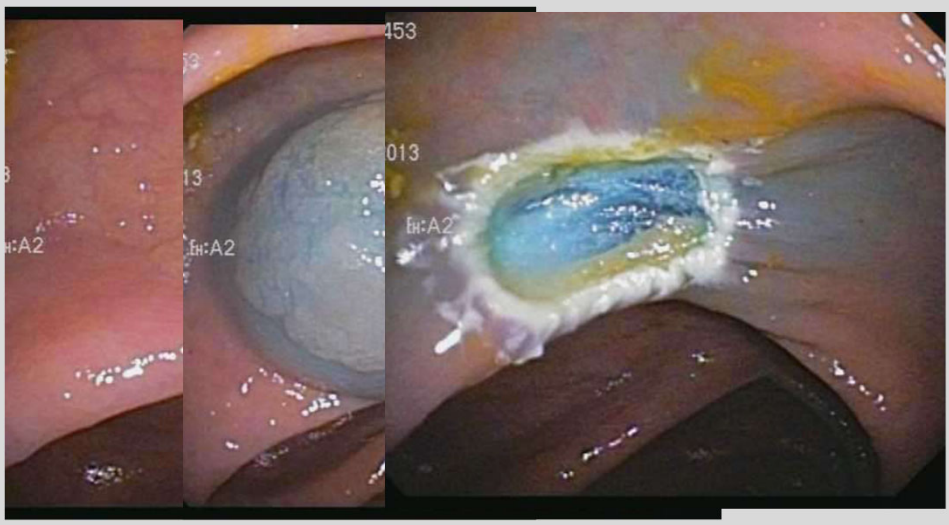
Endoscopic resection techniques



Kaltenbach, Tonya, et al. Endoscopic Removal of Colorectal Lesions: Recommendations by the US Multi-Society Task Force on Colorectal Cancer. The American Journal of Gastroenterology 115(3):p 435-464, March 2020. (CC BY)

Sessile serrated lesions

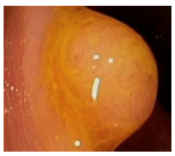
- They can be very hard to see!



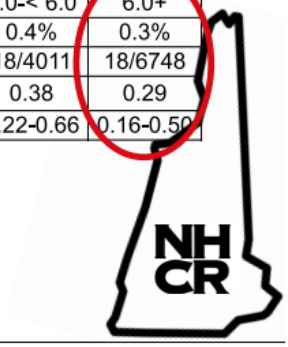
SSA detection rate also seems to be important

Endoscopist SSLDR and Post Colonoscopy CRC Risk

Sessile serrated lesion Detection Rate (SSLDR)						
		<1.0	1.0-<2.0	2.0-<4.0	4.0-< 6.0	6.0+
Unadjusted risk	%	1.4%	0.6%	0.6%	0.4%	0.3%
	N	58/4117	46/8075	22/3950	18/4011	18/6748
Adjusted Hazard	HR	1.0	0.41	0.45	0.38	0.29
	95% CI	Ref	0.28-0.61	0.27-0.75	0.22-0.66	0.16-0.50



SSLDR of 6% or greater provided optimal protection from PCCRC



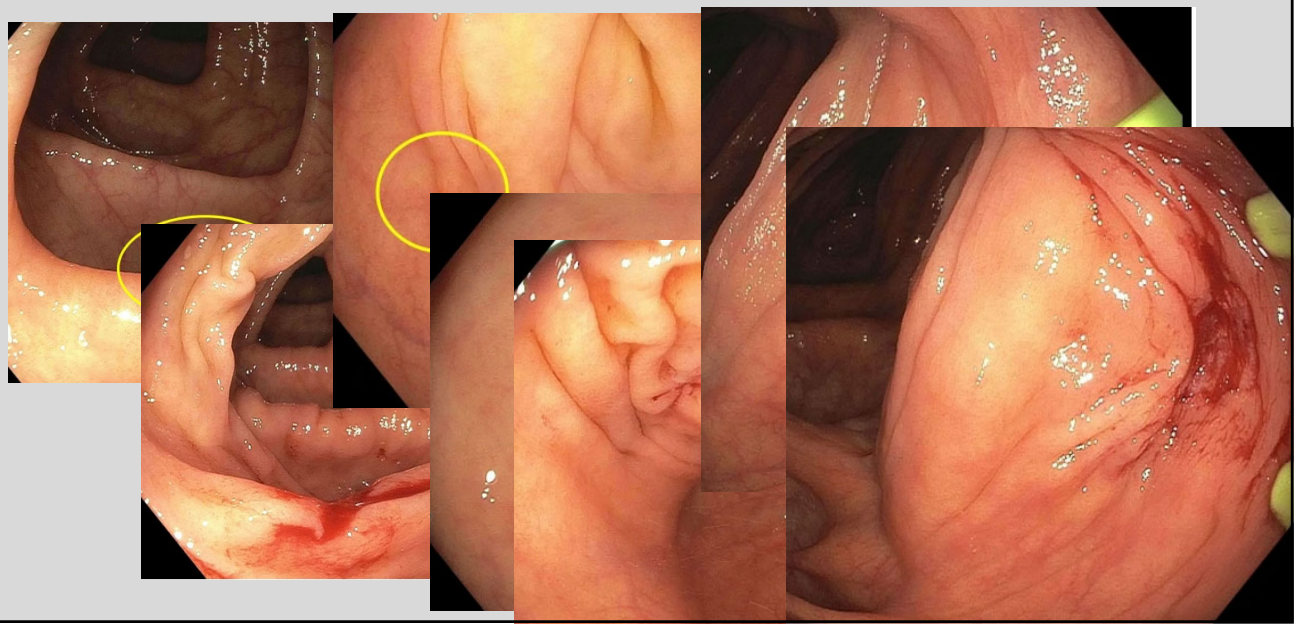
Anderson et al. *Am J Gastroenterol.* 2023. doi:10.14309/ajg.0000000000002403

AJG The American Journal of GASTROENTEROLOGY

"We observed a 14% reduction in PCCRC for each 1% increase in SSLDR"

Anderson, Joseph C. et al. Higher Serrated Polyp Detection Rates Are Associated With Lower Risk of Postcolonoscopy Colorectal Cancer: Data From the New Hampshire Colonoscopy Registry. The American Journal of Gastroenterology 118(11):p 1927-1930, November 2023. | DOI: 10.14309/ajg.0000000000002403

Sessile serrated lesions



Why is bowel prep adequacy important?

- **If patients rated as inadequate (any section under a 0 or 1 on BPPS), *they should be coming back in less than 1 year***

Optimizing Adequacy of Bowel Cleansing for Colonoscopy: Recommendations From the US Multi-Society Task Force on Colorectal Cancer

David A. Johnson[1], Alan N. Barkun[2], Larry B. Cohen[3], Jason A. Dominitz[4], Tonya Kaltenbach[5], Myriam Martel[2], Douglas J. Robertson[6,7], C. Richard Boland[8], Frances M. Giardello[9], David A. Lieberman[10], Theodore R. Levin[11] and Douglas K. Rex[12]

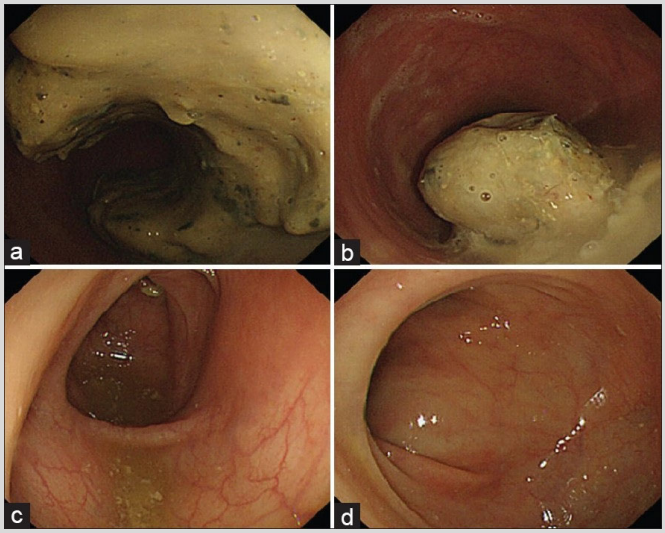
Am J Gastroenterol advance online publication, 16 September 2014; doi:10.1038/ajg.2014.272

EFFECT OF INADEQUATE PREPARATION ON POLYP/ ADENOMA DETECTION AND RECOMMENDED FOLLOW-UP INTERVALS

Recommendations

2. If the colonoscopy is complete to cecum, and the preparation ultimately is deemed inadequate, then the examination should be repeated, generally with a more aggressive preparation regimen, within 1 year; intervals shorter than 1 year are indicated when advanced neoplasia is detected and there is inadequate preparation (***Strong recommendation, low-quality evidence***).
3. If the preparation is deemed adequate and the colonoscopy is completed then the guideline recommendations for screening or surveillance should be followed (***Strong recommendation, high-quality evidence***).

Boston Bowel Prep



Kim, Eun-Jin, et al. A Korean experience of the use of Boston Bowel Preparation Scale: A Valid and Reliable Instrument for Colonoscopy-Oriented Research. Saudi Journal of Gastroenterology 20(4):p 219-224, Jul–Aug 2014. | DOI: 10.4103/1319-3767.136950

Comparing the Real-World Effectiveness of Competing Colonoscopy Preparations: Results of a Prospective Trial

Phillip Gu, MD[1,2], Daniel Lew, MD[1,3], Sun Jung Oh, MD[1], Aarshi Vipani, MD[1], Jeffrey Ko, MD[1], Kevin Hsu, MD[1], Ebrahim Mirakhor, MD[1], Varun Pattisapu, MD[1], Tia Bullen, RN[1,3], Garth Fuller, MS[1,4-6], Brennan M.R. Spiegel, MD, MSHS[1,3-5,7] and Christopher V. Almario, MD, MSHPM[1,3-6]

Am J Gastroenterol 2019;114:305–314.

METHODS: **We included patients aged ≥18 years, who presented for an outpatient colonoscopy at a large medical center serving more than 70 academic and community-based endoscopists who are free to prescribe the bowel prep of their choice. The primary outcome was bowel cleansing quality as measured by the Boston Bowel Preparation Scale. We performed regression models with random effects on the outcomes to adjust for confounding.**

Tolerability

- After adjusting for prep-, provider-, and patient-related factors in multivariable logistic regression analysis with random effects, **we found that patients receiving the below were all significantly more likely to complete the prep compared with those prescribed GoLYTELY.**
- Prepopik/Clenpiq ($P < 0.001$)
- Magnesium citrate ($P = 0.014$)
- Suprep ($P < 0.001$)
- OsmoPrep ($P = 0.003$)
- MiraLAX with Gatorade ($P < 0.001$)
- MoviPrep ($P = 0.001$)

Table 3. Multivariable regressions on BBPS total score and adequate bowel cleansing (N = 4,339)

Variable	BBPS total score, mean ± s.d.	Adjusted *P* value[a]	Adequate bowel cleansing,[b] n (%)	OR (95% CI)[a]
Prescribed bowel prep				
GoLYTELY	6.67 ± 1.87	Reference	430 (84.0)	Reference
MoviPrep	7.11 ± 1.62	0.004	267 (91.1)	1.44 (0.85–2.44)
MiraLAX with Gatorade	7.09 ± 1.64	<0.001	2,499 (92.5)	1.76 (1.24–2.49)
Prepopik/Clenpiq	7.01 ± 1.59	0.18	205 (90.7)	1.24 (0.70–2.21)
Suprep	7.28 ± 1.66	<0.001	426 (90.6)	1.37 (0.86–2.16)
Magnesium citrate	6.89 ± 1.56	0.39	48 (90.6)	1.54 (0.57–4.17)
OsmoPrep	7.04 ± 1.86	0.27	67 (81.7)	0.70 (0.36–1.37)
Bowel prep completion				
Did not complete prep	6.89 ± 1.88	Reference	298 (86.6)	Reference
Fully completed the prep	7.07 ± 1.66	0.23	3,606 (91.2)	1.36 (0.96–1.93)
Unknown	7.43 ± 1.52	0.07	38 (95.0)	2.82 (0.64–12.37)
Bowel prep dosing				
Day-before dosing	6.97 ± 1.70	Reference	2,392 (89.4)	Reference
Split dosing	7.18 ± 1.63	0.001	1,550 (93.2)	1.35 (1.05–1.74)

Gu, Phillip MD, et al. Comparing the Real-World Effectiveness of Competing Colonoscopy Preparations: Results of a Prospective Trial. The American Journal of Gastroenterology 114(2):p 305-314, February 2019. | DOI: 10.14309/ajg.0000000000000057

ADR going up across practices

Table 2. ADR for screening colonoscopy per physician

	Overall		
	Physician N	Mean ADR (SD)[a]	Adjusted ADR[b]
Overall	1,140	36.80 (10.21)	39.08
2014	1,025	33.93 (11.76)	36.36
2015	1,131	35.80 (11.06)	38.25
2016	1,131	36.95 (11.16)	39.36
2017	1,130	38.01 (10.82)	40.62
2018	1,103	38.12 (10.98)	40.01

ADR, adenoma detection rate.
[a]Per physician.
[b]Adjusted to the US population aged 50 years and older per 2010 US census data,

Shaukat et al. Benchmarking Adenoma Detection Rates for Colonoscopy: Results From a US-Based Registry. AJG 2021

AI (computer aided detection)

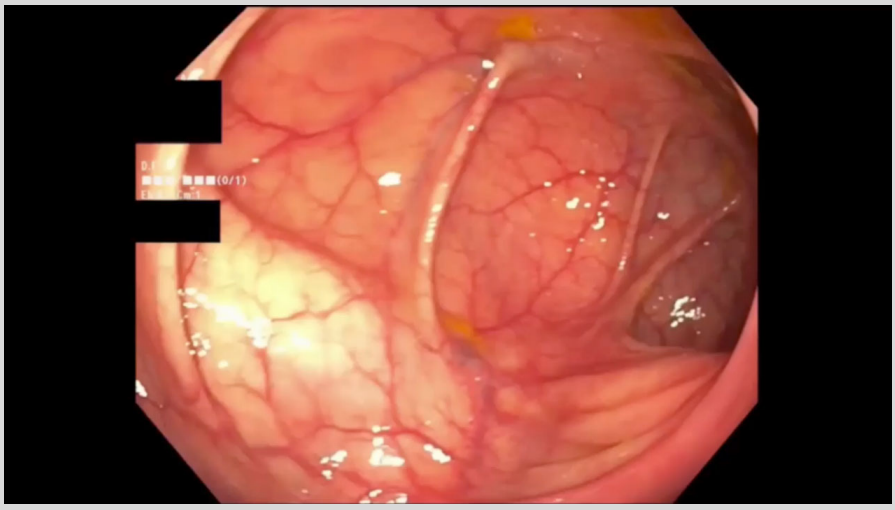
Effectiveness of CAD vs. Control on ADR Meta-Analysis			
	Events	Total	
CAD	791	2163	**36.6%**
White light	558	2192	**25.5%**

Risk Ratio
1.44 (1.27 - 1.62)

Hassan et al. GIE 2021.

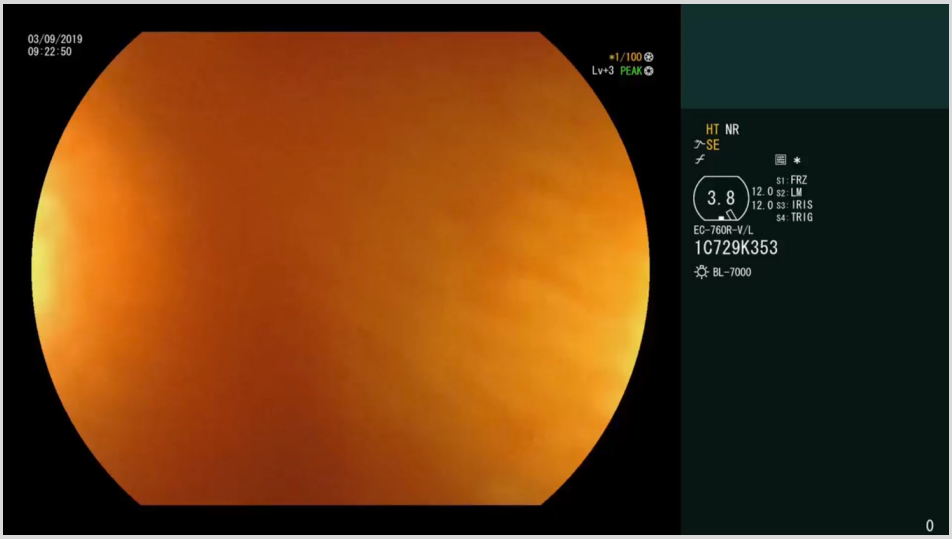
AI in action – computer aided colon polyp detection

From Shaukat et al. Gastroenterology 2022

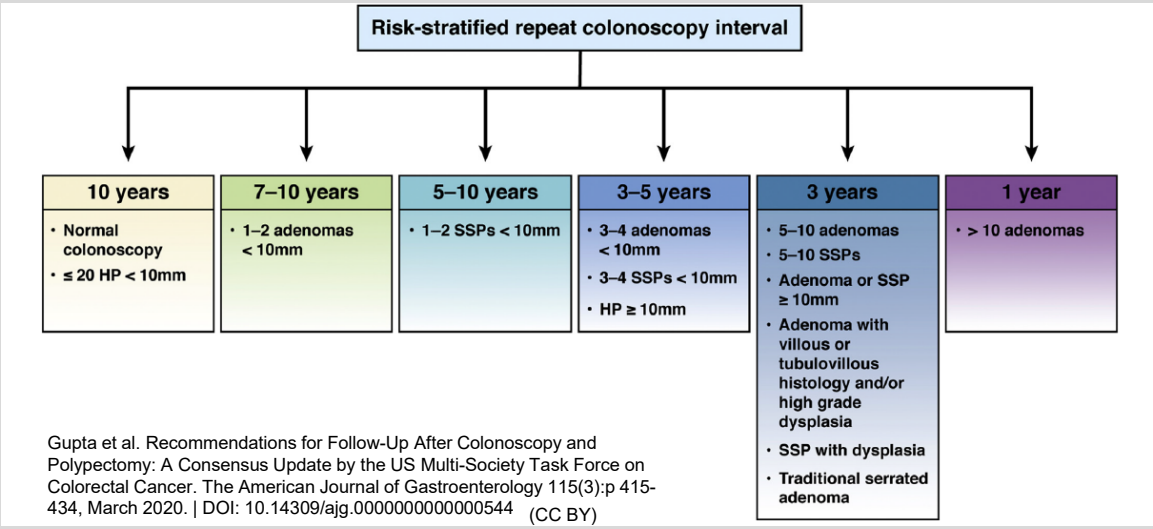


AI in action – computer aided colon polyp detection

From Livovsky et al. Gastrointestinal Endoscopy 2021



Surveillance Recommendations



Gupta et al. Recommendations for Follow-Up After Colonoscopy and Polypectomy: A Consensus Update by the US Multi-Society Task Force on Colorectal Cancer. The American Journal of Gastroenterology 115(3):p 415-434, March 2020. | DOI: 10.14309/ajg.0000000000000544 (CC BY)

The Updated Surveillance Recommendations from 2019

7–10 years

- 1–2 adenomas < 10mm

3–5 years

- 3–4 adenomas < 10mm
- 3–4 SSPs < 10mm
- HP ≥ 10mm

Gupta et al. Recommendations for Follow-Up After Colonoscopy and Polypectomy: A Consensus Update by the US Multi-Society Task Force on Colorectal Cancer. The American Journal of Gastroenterology 115(3):p 415-434, March 2020. | DOI: 10.14309/ajg.0000000000000544 (CC BY)

Colon cancer surveillance

Table 7 Recommendations for Second Surveillance Stratified by Adenoma Findings at Baseline and First Surveillance

Baseline finding	Recommended interval for first surveillance	Finding at first surveillance	Recommended interval for next surveillance
1–2 tubular adenomas <10 mm	7–10 y	Normal colonoscopy[a] 1–2 tubular adenomas <10 mm 3–4 tubular adenomas <10 mm Adenoma ≥10 mm in size; or adenoma with tubulovillous/villous histology; or adenoma with high grade dysplasia; or 5–10 adenomas <10 mm	10 y ← 7–10 y 3–5 y 3 y
3–4 tubular adenomas <10 mm	3–5 y	Normal colonoscopy[a] 1–2 tubular adenomas <10 mm 3–4 tubular adenomas <10 mm Adenoma ≥10 mm in size; or adenoma with tubulovillous/villous histology; or adenoma with high grade dysplasia; or 5–10 adenomas <10 mm	10 y ← 7–10 y 3–5 y 3 y
Adenoma ≥10 mm in size; or adenoma with tubulovillous/villous histology; or adenoma with high-grade dysplasia; or 5–10 adenomas <10 mm	3 y	Normal colonoscopy[a] 1–2 tubular adenomas <10 mm 3–4 tubular adenomas <10 mm Adenoma ≥10 mm in size; or adenoma with tubulovillous/villous histology; or adenoma with high grade dysplasia; or 5–10 adenomas <10 mm	5 y ← 5 y 3–5 y 3 y

Gupta et al. Recommendations for Follow-Up After Colonoscopy and Polypectomy: A Consensus Update by the US Multi-Society Task Force on Colorectal Cancer. The American Journal of Gastroenterology 115(3):p 415-434, March 2020. | DOI: 10.14309/ajg.0000000000000544 (CC BY)

When to stop?

- Screening:
  - USPSTF recommends stopping at 75, with consideration of continuing through 85 based on comorbidities
  - USMSTF has similar recommendations with individualized recommendations from 76-85 and no screening after age 85
- Surveillance – No formal recommendations. Should be individualized, based on assessment of risks, benefits and comorbidities
  - 75-85 is likely reasonable
  - If colon cancer found, would patient accept/be offered surgery and/or chemotherapy?

US Preventive Services Task Force. Screening for colorectal cancer: US Preventive Services Task Force recommendation statement . JAMA 2021.

van Hees et al. Should colorectal cancer screening be considered in elderly persons without previous screening? A cost-effectiveness analysis. Ann Intern Med. 2014.

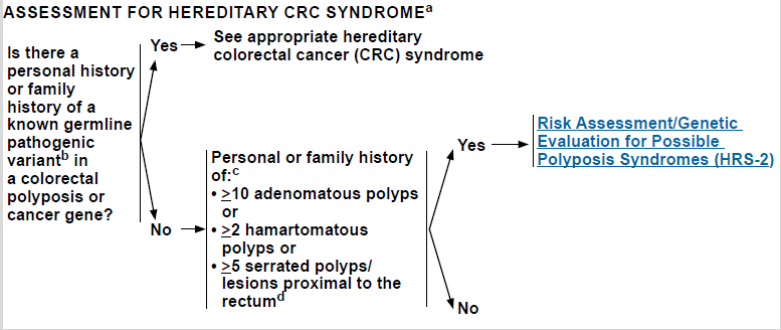
Lieberman et al. Guidelines for Colonoscopy Surveillance After Screening and Polypectomy: A Consensus Update by the US Multi-Society Task Force on Colorectal Cancer. Gastroenterology 2012.

When to refer patients to GI Genetics in 2023

- Colorectal cancer at any age
- Personal and family history suspicious for Lynch syndrome
- More than 10 cumulative colon adenomas
- More than 2 cumulative GI hamartomas
- Family members with a known hereditary cancer syndrome

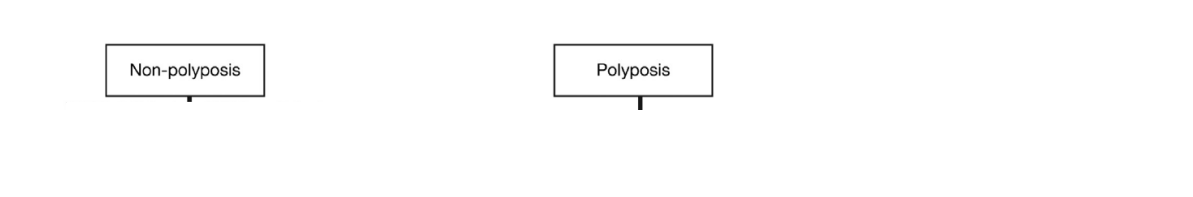
Important cumulative colon polyp numbers

- **10** adenomas
- **5** sessile serrated lesions (2 greater than 1 cm) proximal to the rectum
- **2** hamartomas



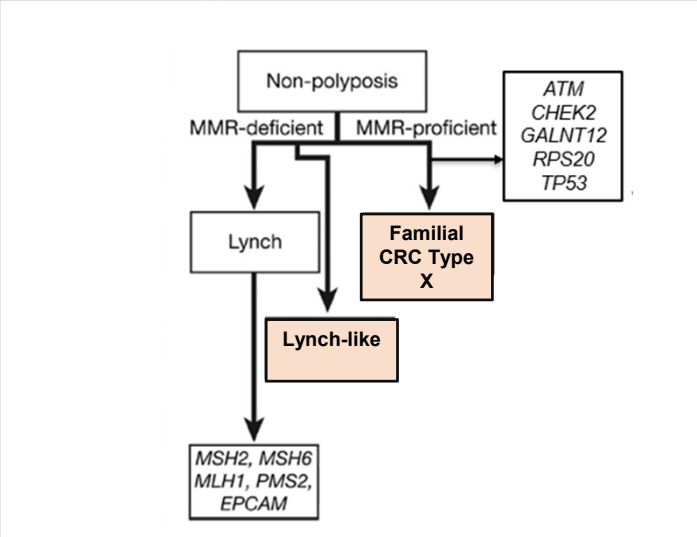
NCCN Clinical Practice Guidelines. Genetic/Familial High-Risk Assessment: Colorectal. 2.2022.

Differential of Hereditary GI syndromes



Valle. Recent discoveries in the Genetics of Familial Colorectal cancer and Polyposis. CGH 2017.

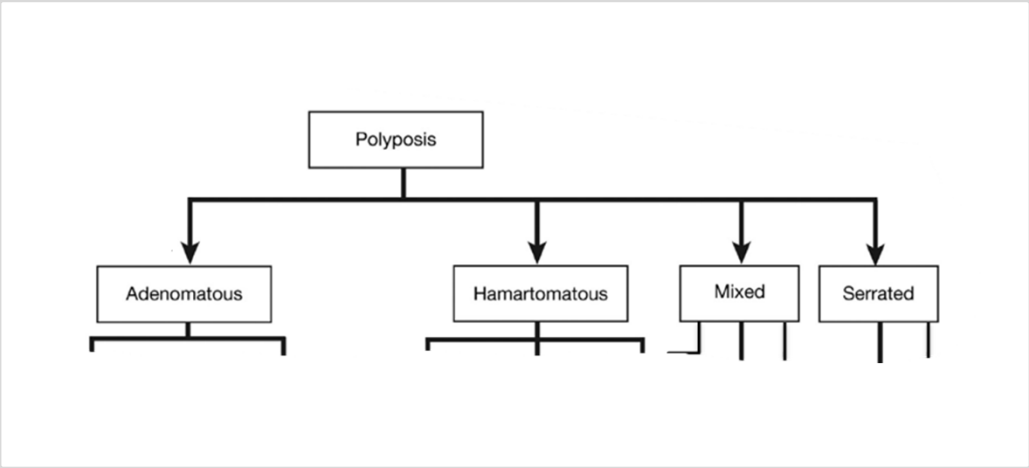
Differential of Hereditary GI syndromes



Clinical diagnoses are shaded

Valle. Recent discoveries in the Genetics of Familial Colorectal cancer and Polyposis. CGH 2017. (CC BY-NC-ND)

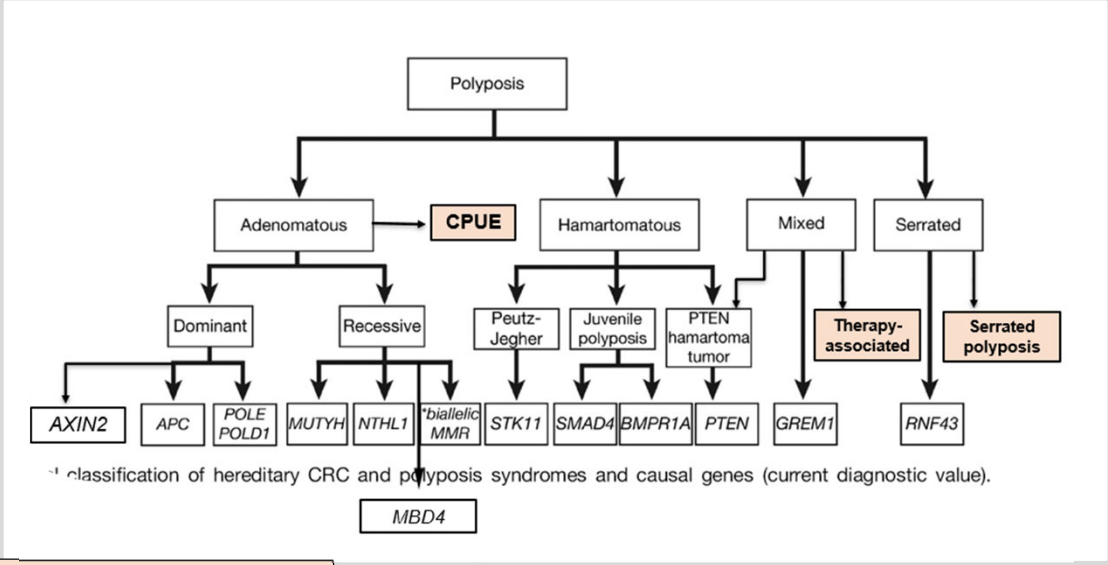
Differential of Hereditary GI syndromes



Clinical diagnoses are shaded

Valle. Recent discoveries in the Genetics of Familial Colorectal cancer and Polyposis. CGH 2017. (CC BY-NC-ND)

Differential of Hereditary GI syndromes



classification of hereditary CRC and polyposis syndromes and causal genes (current diagnostic value).

Clinical diagnoses are shaded

Valle. Recent discoveries in the Genetics of Familial Colorectal cancer and Polyposis. CGH 2017.

Interpreting Genetic Testing Results

- Key to Remember – 90% of VUS end up being benign!

Non-Disease Causing	?	Disease Causing
Benign Likely Benign	VUS Variant of Uncertain Significance	**Pathogenic** **Likely Pathogenic**
Not included on modern reports	Do Not Use for Management	**These Are Used for Management**

Adapted from Powers et al. Genetic testing for hereditary gastrointestinal cancer syndromes: Interpreting results in today's practice. Curr Treat Options Gastro. 2019.

Summary

- Colorectal cancer screening and surveillance is important and beneficial
- Be mindful of red flag symptoms at any age
- Multiple options for screening exist
- High quality colonoscopy is key