

Colon Cancer – The Preventable Killer

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Gastroenterology of the Rockies

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- What is colon cancer? How does it develop?
- How can we detect and/or prevent colon cancer?
- High risk groups

- College 1996-2000: Rice University, BA Chemistry
- Medical School 2000-2004: UT Southwestern, MD with distinction in research
 - Focused on cancer pathway of Barrett's Esophagus
- Internal Medicine Residency 2004-2007: University of Colorado
 - Research elective: effect of NSAIDs on colon cancer risk
- GI Fellowship 2007-2010: University of Washington
 - Research in cancer (adenocarcinoma) development at cellular level
 - Research in HCV recurrence after liver transplant
- Transplant Hepatology Fellowship 2010-2011: Northwestern University/Northwestern Memorial Hospital

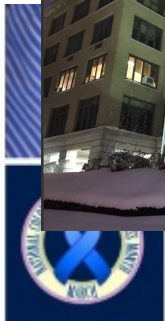
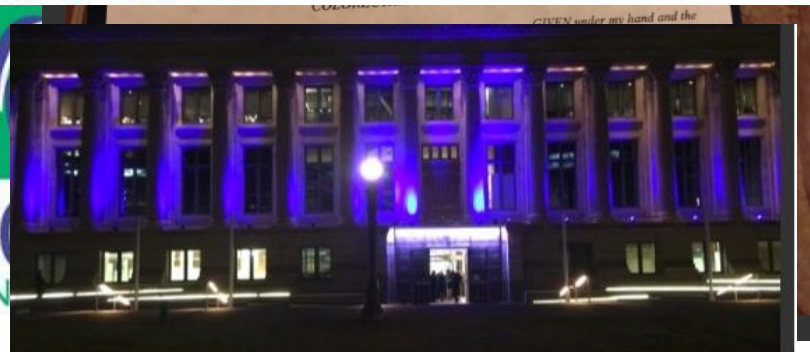


March Is Colorectal Cancer Awareness Month



Prom

on in 2019



COLORECTAL
CANCER

COLORECTAL
AWARENESS



Colon Cancer is Common



President Ronald Reagan 74



Pope John Paul II 72



Vince Lombardi 57



Justice Ginsburg 66



Pele 82



Sharon Osbourne 49



Darryl Strawberry 36



Chadwick Boseman 43



Kirstie Alley 70

Colon Cancer is Common



Jay Monahan
41



Charles Schulz
76



Elizabeth Montgomery
62



Audrey Hepburn
62



Queen Mother
66

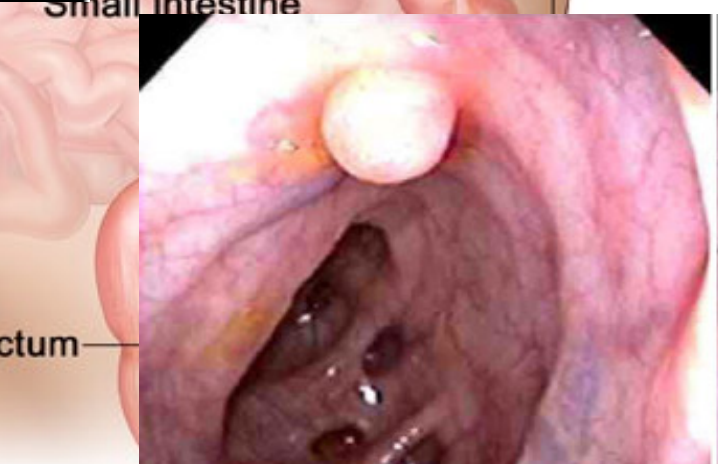
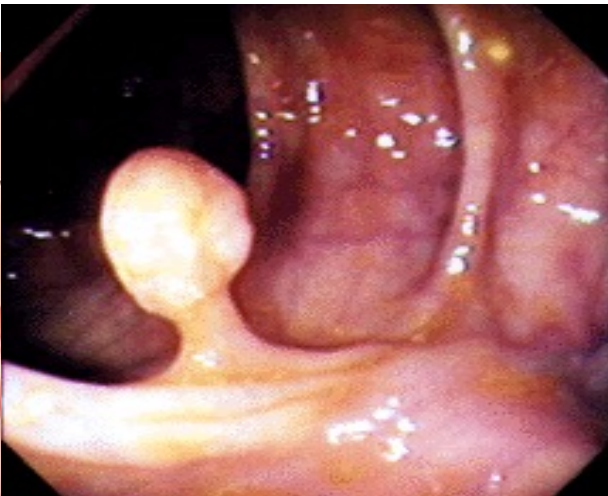


Jackie Gleason
70

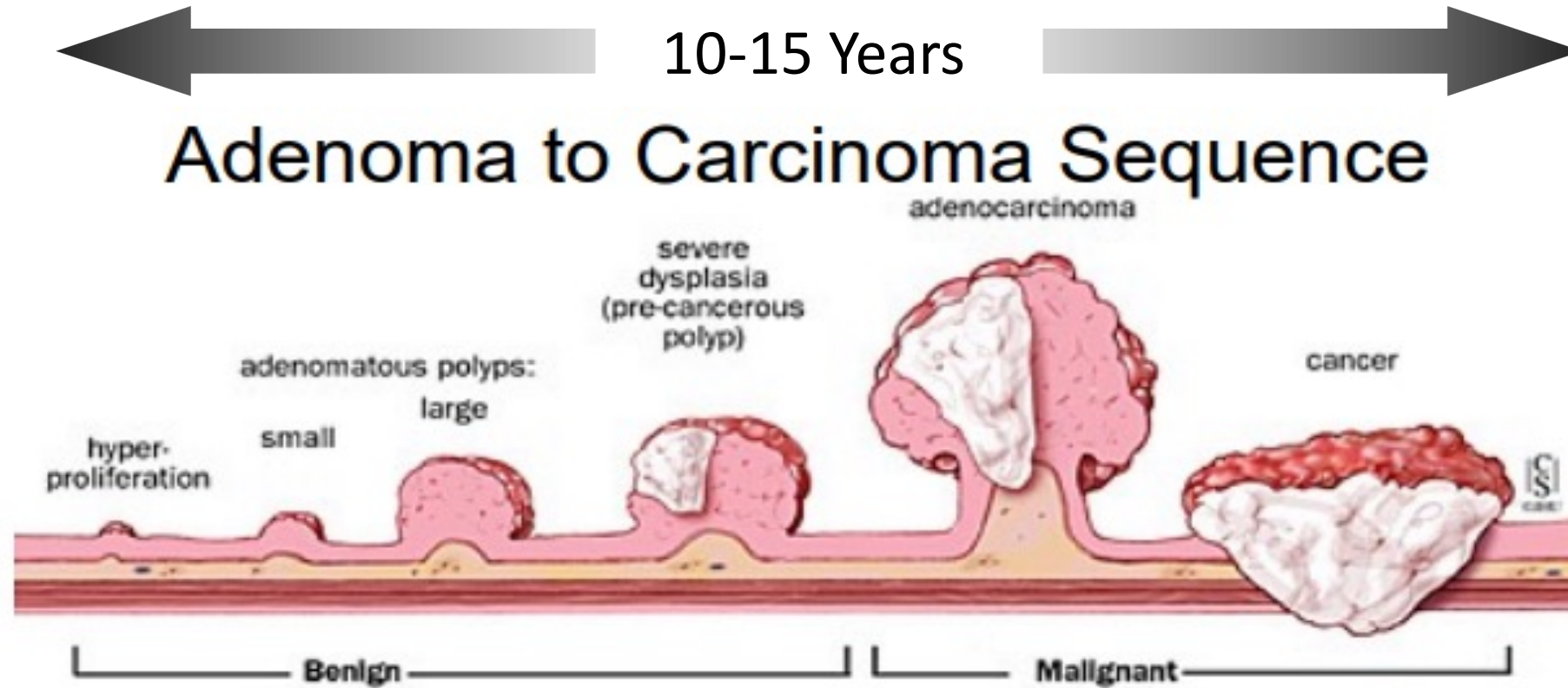
Colorectal cancer is the result of a sequence of biologic events. It is:

- Common
- Lethal
- Preventable

What is Colorectal Cancer?



The Adenoma Carcinoma Sequence



Fewer than 10% of all adenomas become cancerous. However, more than 95% of colorectal cancers develop from adenomas

Polyps



Figure 1. Hyperplastic polyp.



Figure 2. Tubular adenoma (pedunculated).



Figure 3. Tubular adenoma (sessile).

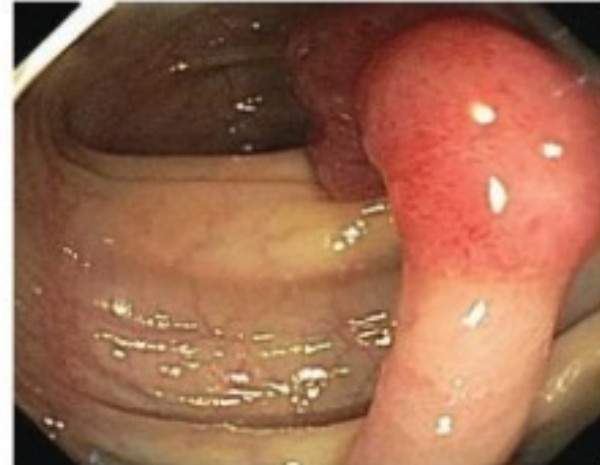
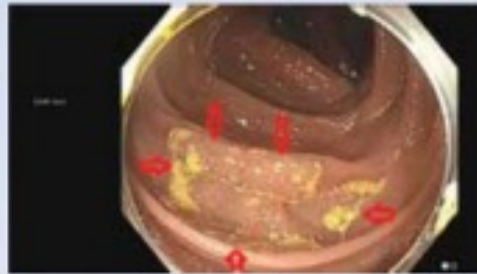


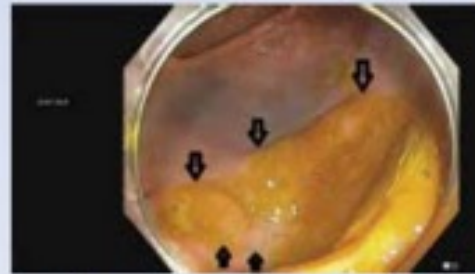
Figure 5. Tubular adenoma with high-grade dysplasia.



FIGURE 3. Advanced serrated lesions



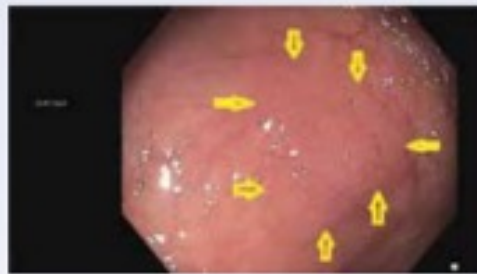
A Arrows delineate the border of a sessile serrated polyp with adherent mucus over the lesion and debris around the perimeter



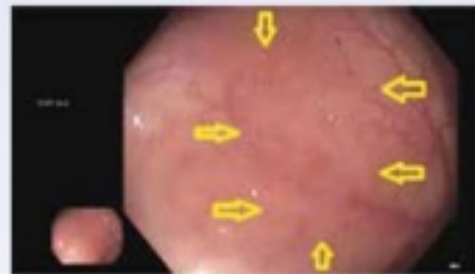
B Right colon sessile serrated polyp with thick layer of adherent mucus – arrows delineate the borders



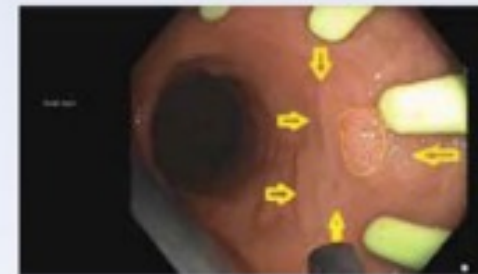
C Arrows delineate edges of a sessile serrated polyp without mucus cap



D Sessile serrated polyp without mucus cap, flatter than the lesion seen in image C

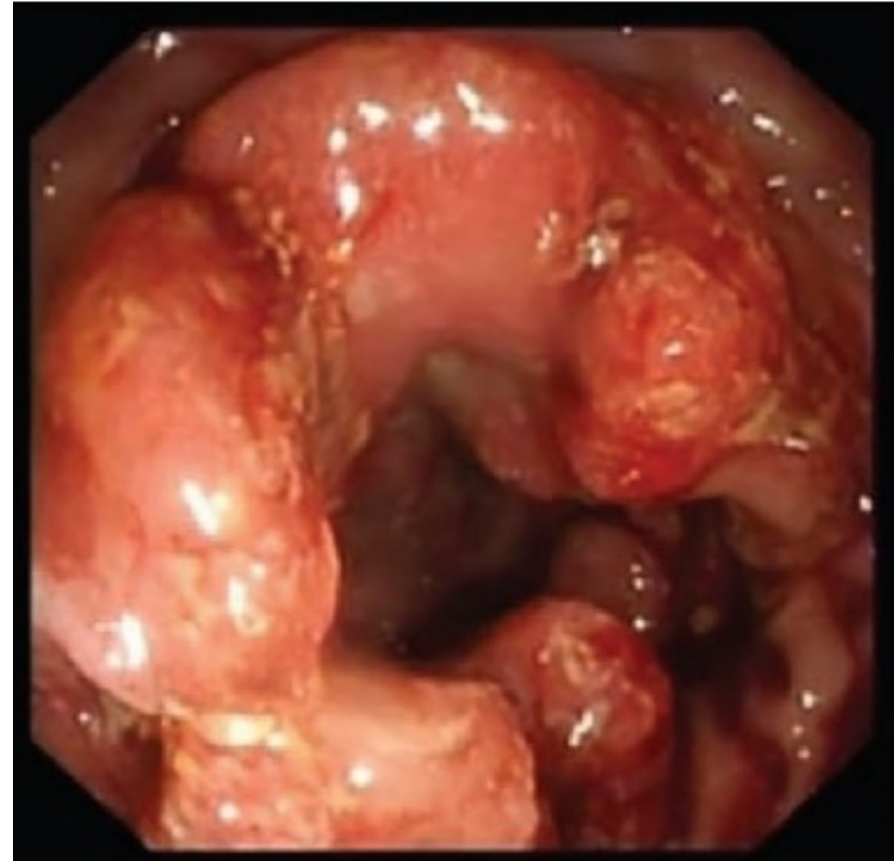


E Extremely flat, subtle sessile serrated polyp without cytological dysplasia

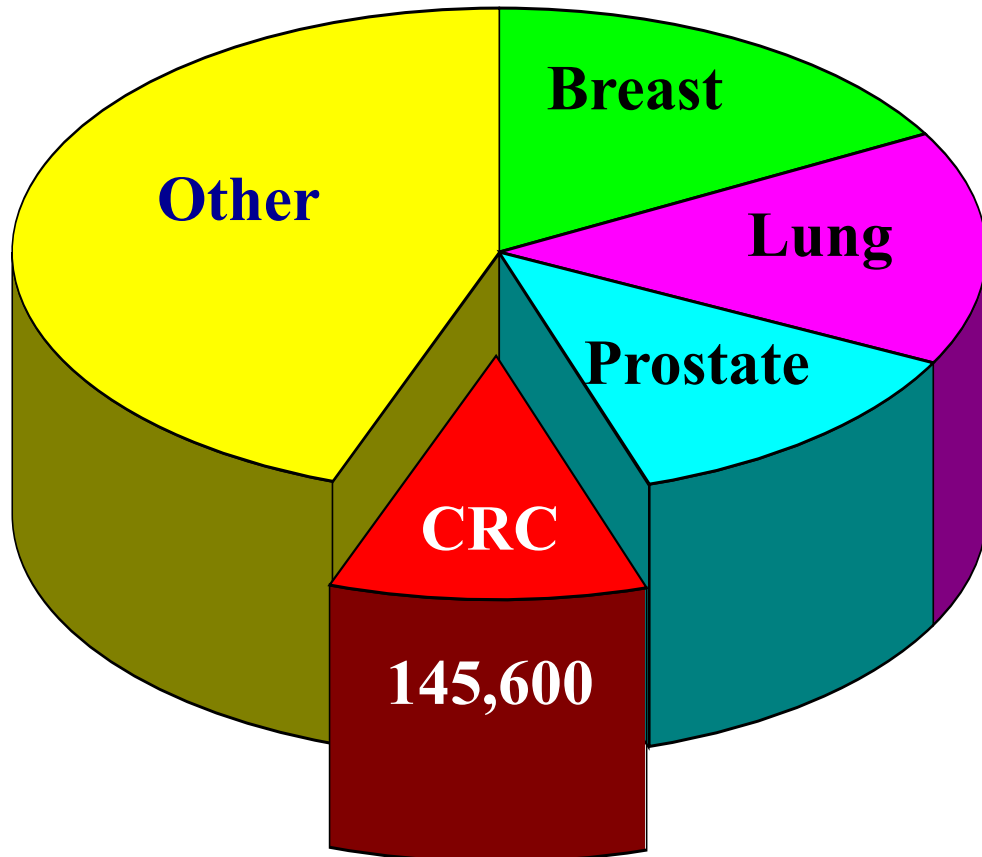


F Sessile serrated polyp with cytological dysplasia. The dysplastic portion is within the yellow line. Arrows mark the perimeter. Black object at bottom is tip of an injection catheter.

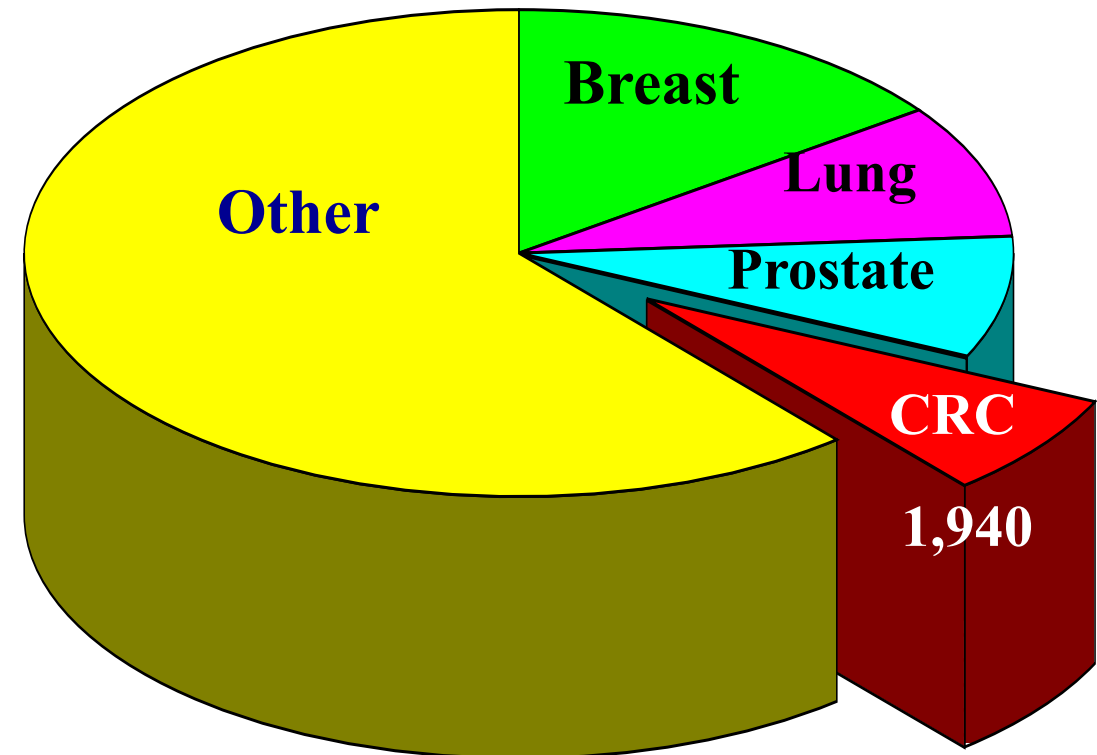
Colon Cancers



United States New Cases - 1,762,450

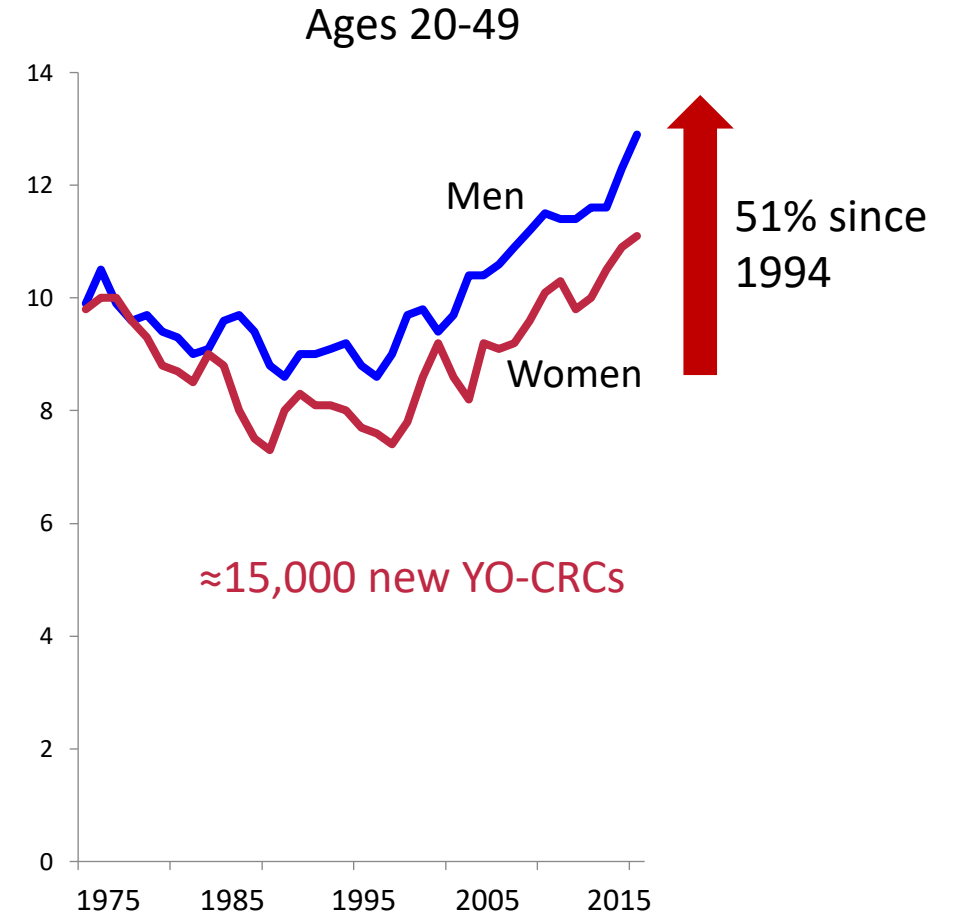
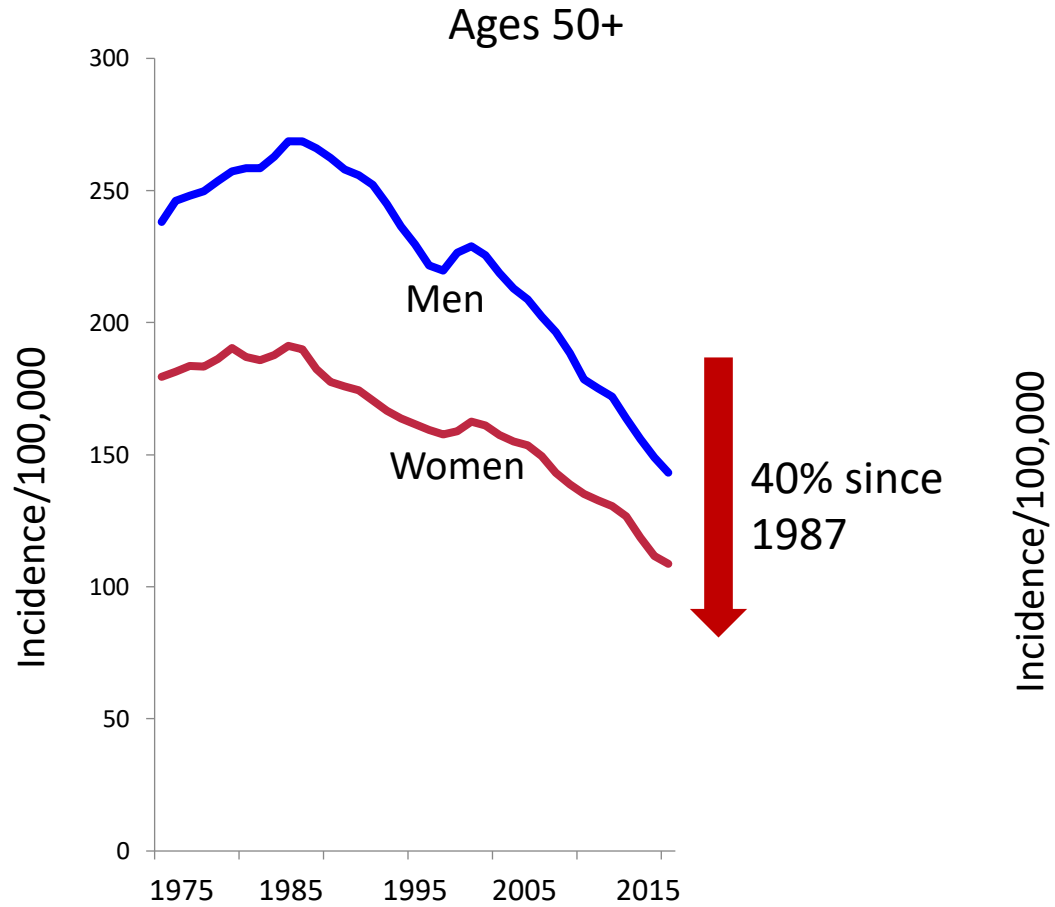


Colorado New Cases - 28,600



CRC Incidence Over Time

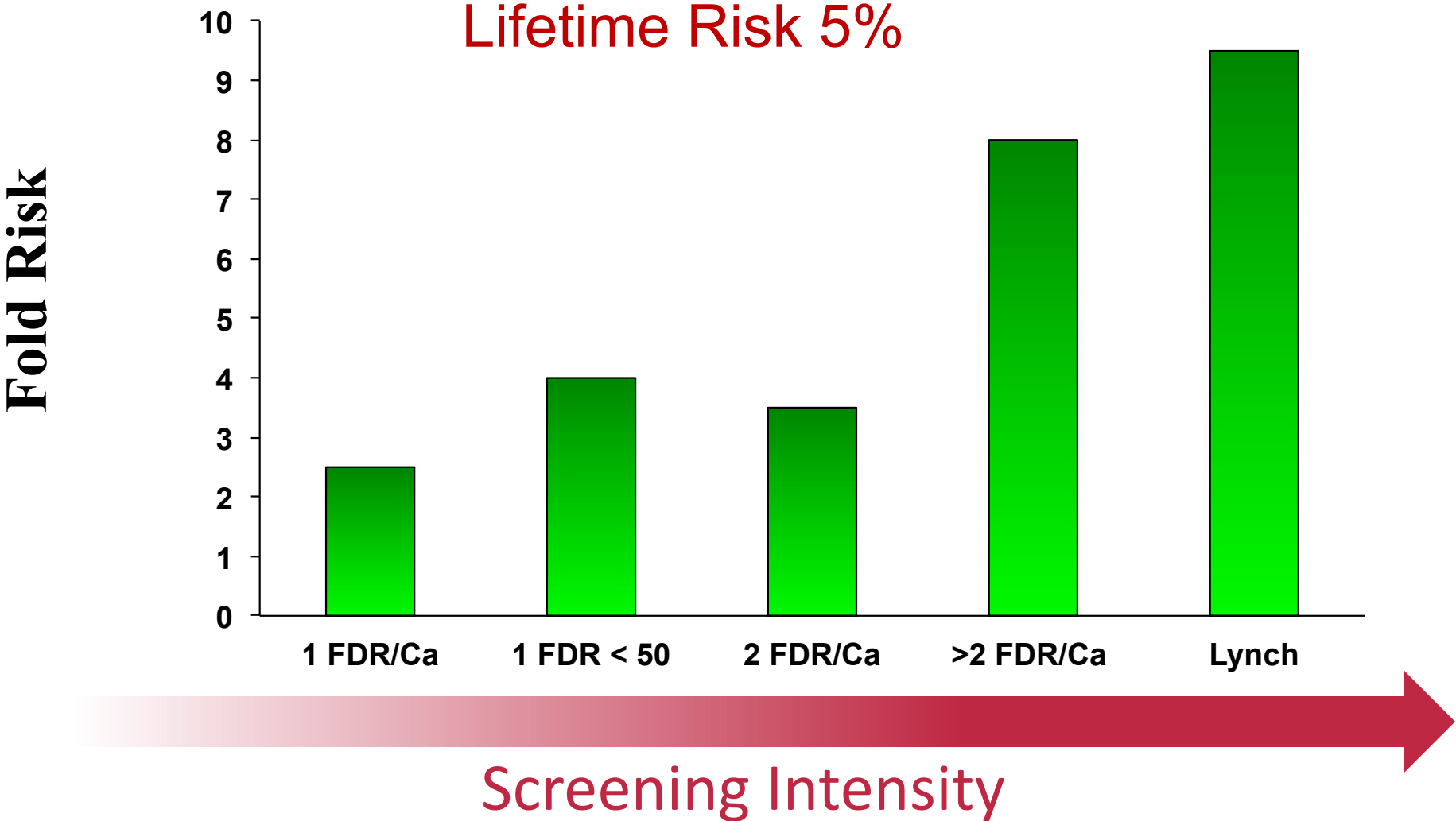
The Good and Bad



Demographic:

- Country of origin
- Age
- Sex
- Race
- Diet
- Family history

Family History and CRC Risk



Demographic:

- Country of origin
- Age
- Sex
- Race/Ethnicity
- Family history

Lifestyle:

- Obesity
- Low physical activity
- Smoking
- Alcohol

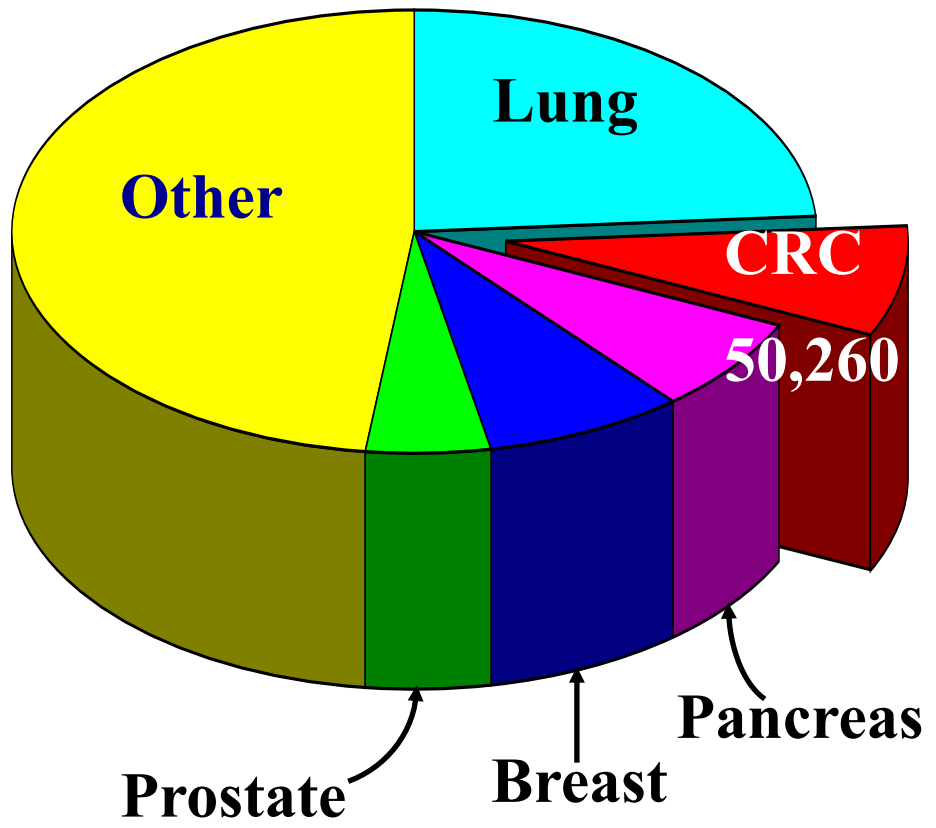
Diet:

- High red/processed meat
- Low fiber containing foods
- Low fruits and vegetables
- Charred/Broiled/Grilled foods
- “Ultra-processed Foods”

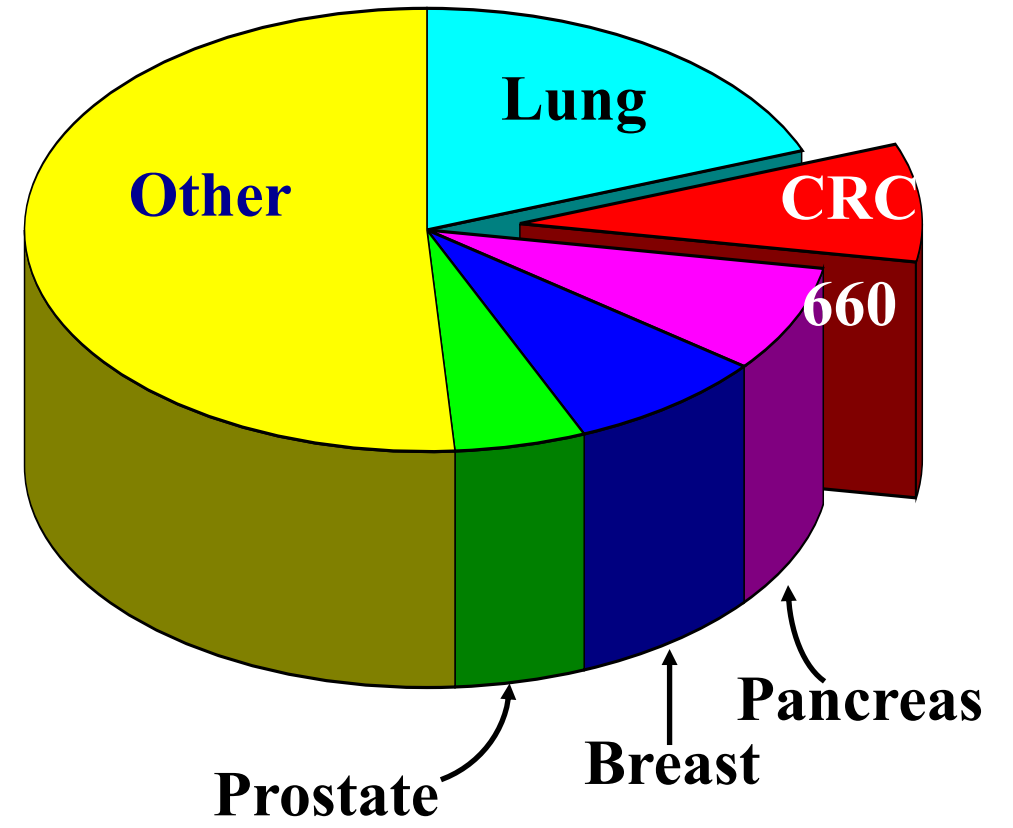
Failure to Get Screened!

CRC is Lethal

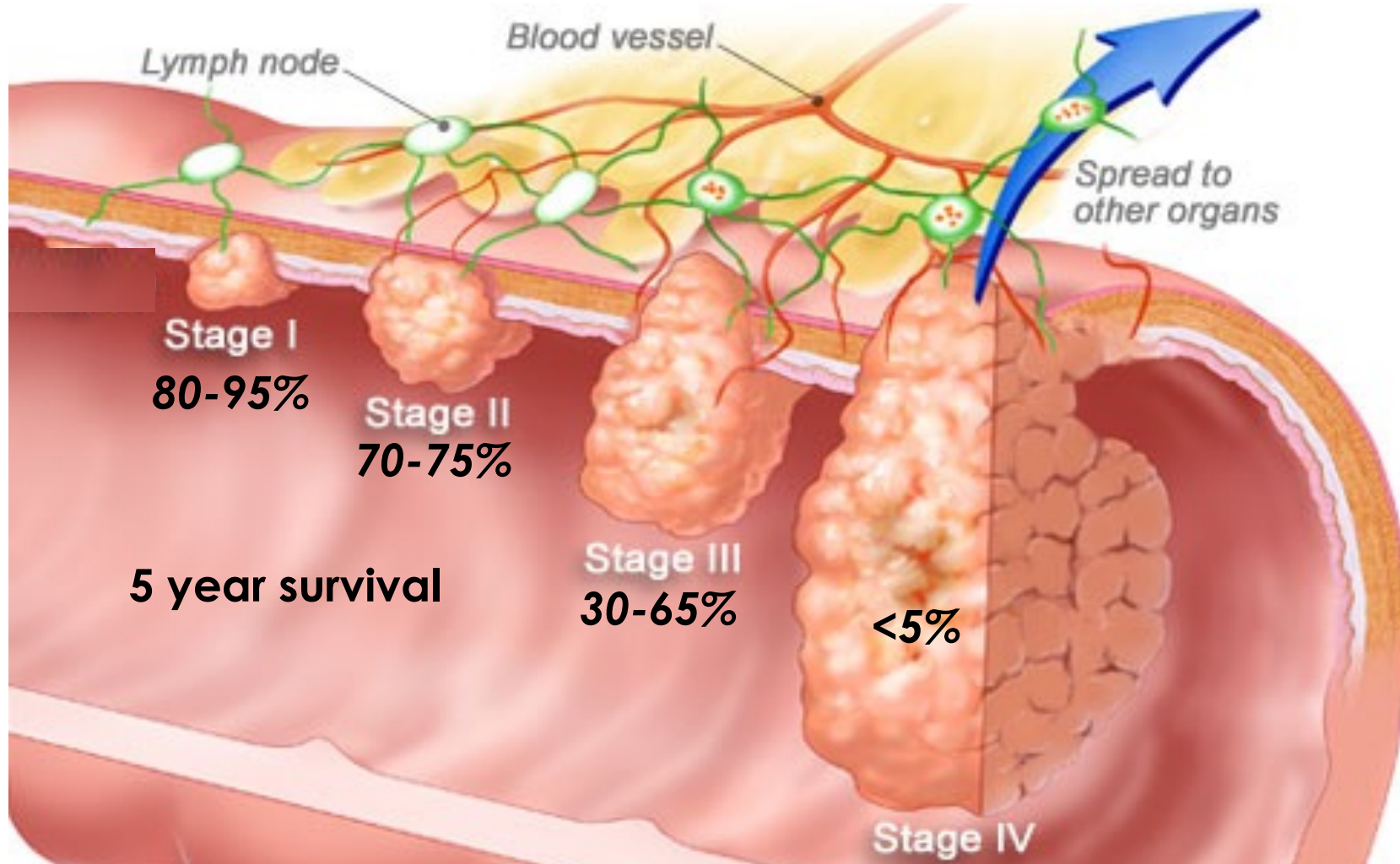
**United States
Deaths- 606,880**



**Colorado
Deaths- 8,120**



CRC Staging



Early Detection is Critical.

CRC is Preventable – Modifiable Risk Factors

Demographic:

- Country of origin
- Age
- Sex
- Race/Ethnicity
- Family history

Lifestyle:

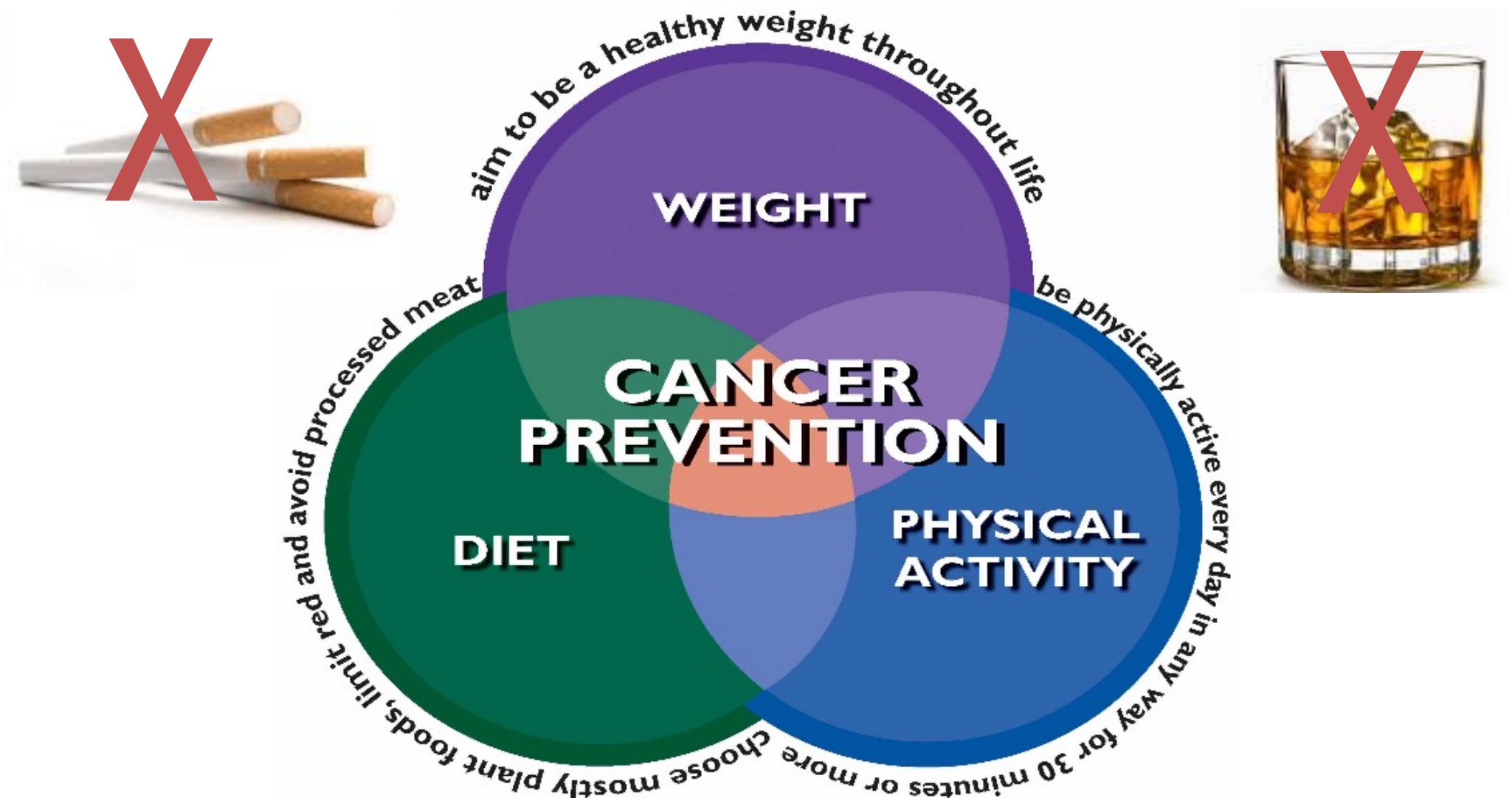
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- Low physical activity
- Smoking
- Alcohol

Diet:

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CRC Prevention



Demographic:

- Country of origin
- Age
- Sex
- Race/Ethnicity
- SES
- Family history

Lifestyle:

- Obesity
- Low physical activity
- Smoking
- Alcohol

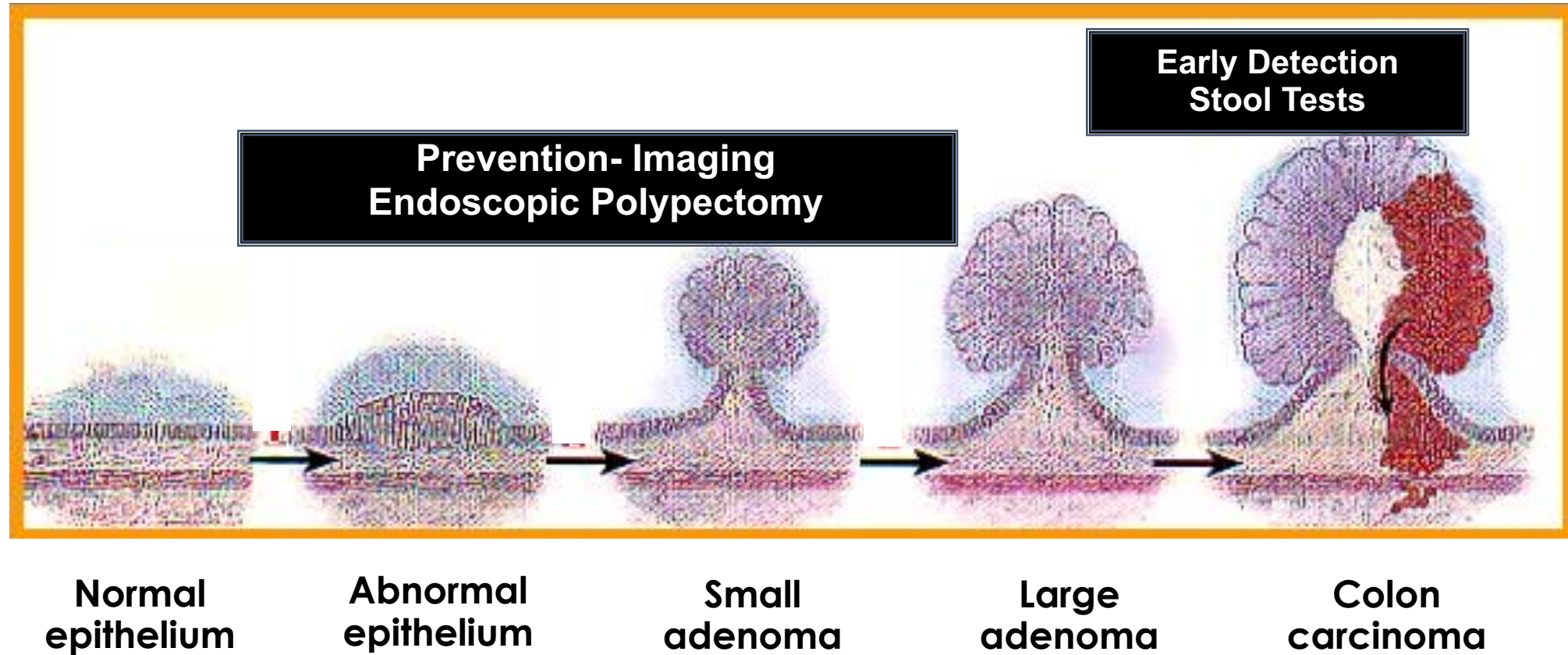
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Protective Factors:

- Aspirin for selected groups
- **Screening**

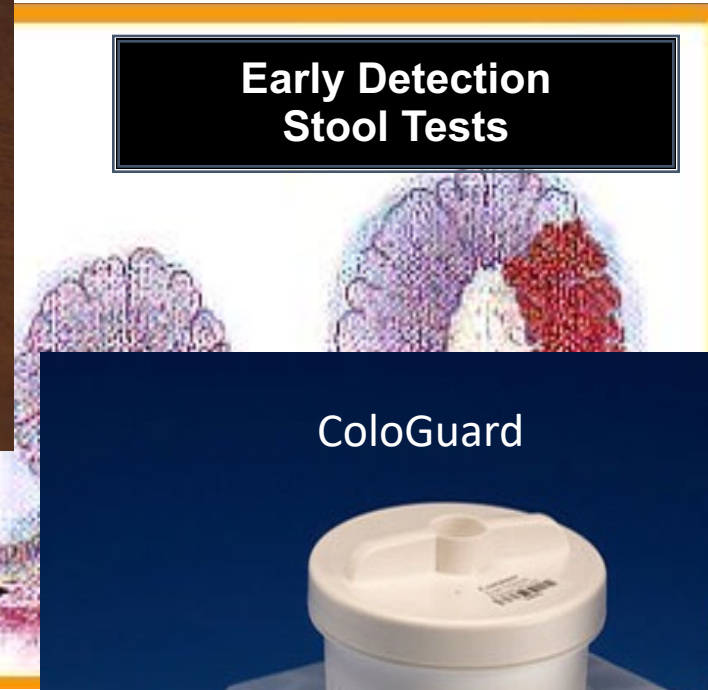
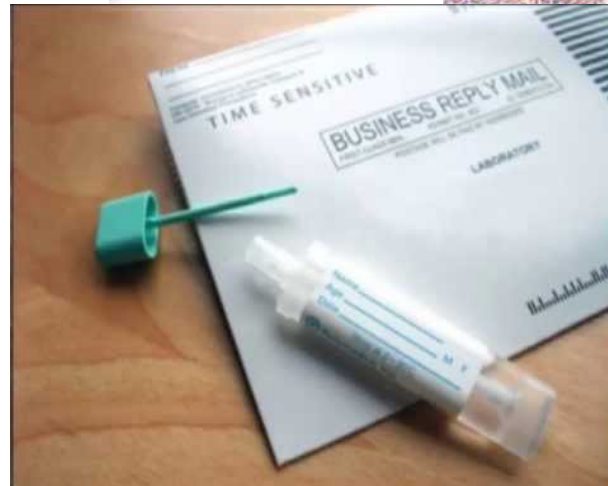
Screening - Prevention and Early Detection



The Adenoma Carcinoma Sequence



Normal epithelium

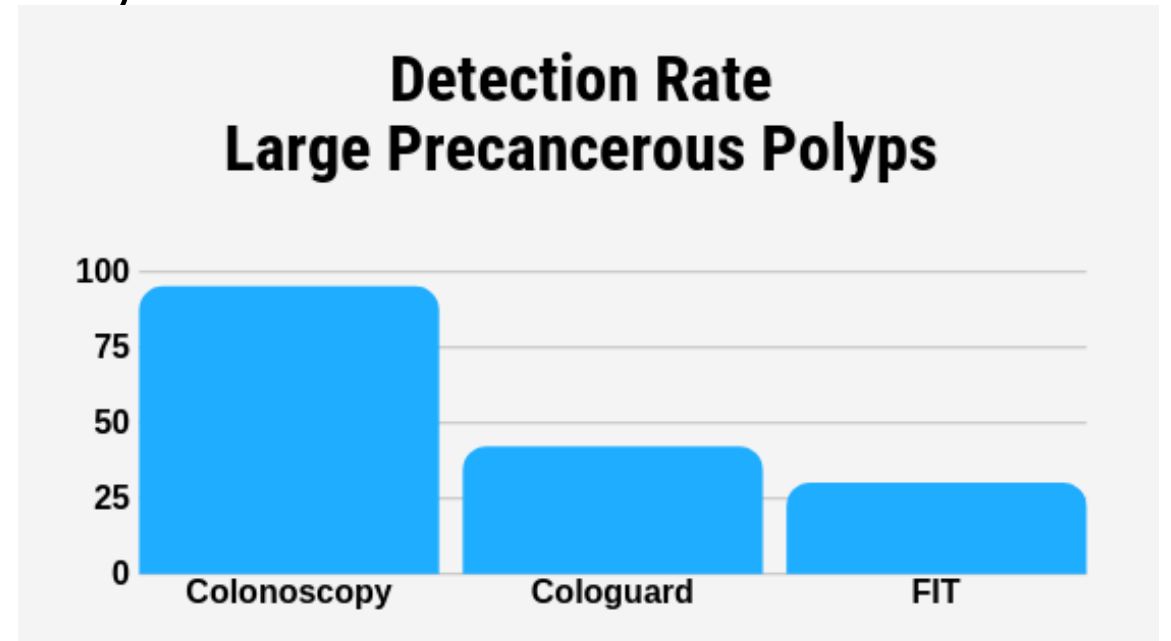


Early Detection Stool Tests



ColoGuard

- Non-invasive assessment for cancer DNA and/or blood in stool
 - Stool sample mailed in
 - Negative (no blood or DNA detected)
 - Positive (blood and/or DNA detected)



Cologuard (Fit + DNA)

Test	Finds Colon Cancer	Finds High Risk Polyps (>10mm)	False Positives	False Negatives (Cancer Miss Rate)
FIT-fecal DNA	92%	42%	12%	Misses 1 in 13 Cancers
Fit Testing	75-80%	30%-40%	<4%	Misses 1 in 5 Cancers
Colonoscopy	95%	>95%	--	0-6%** Interval Cancers

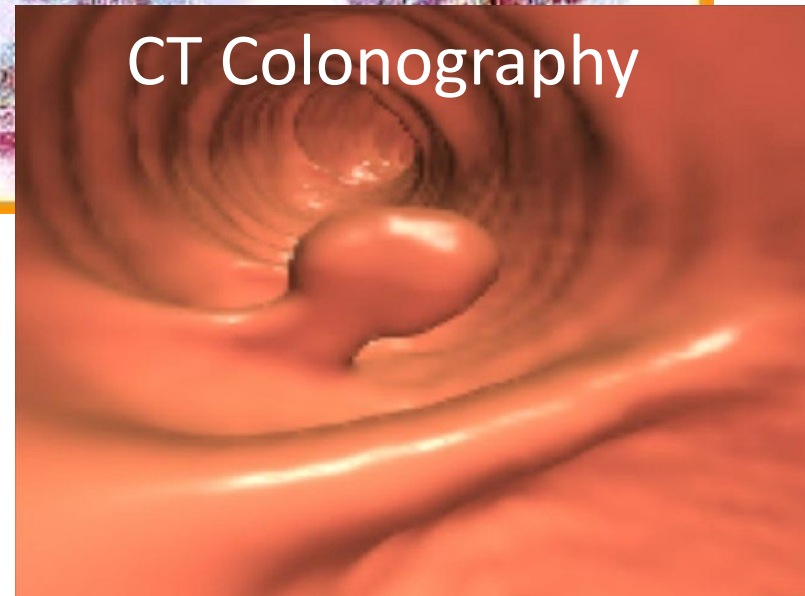
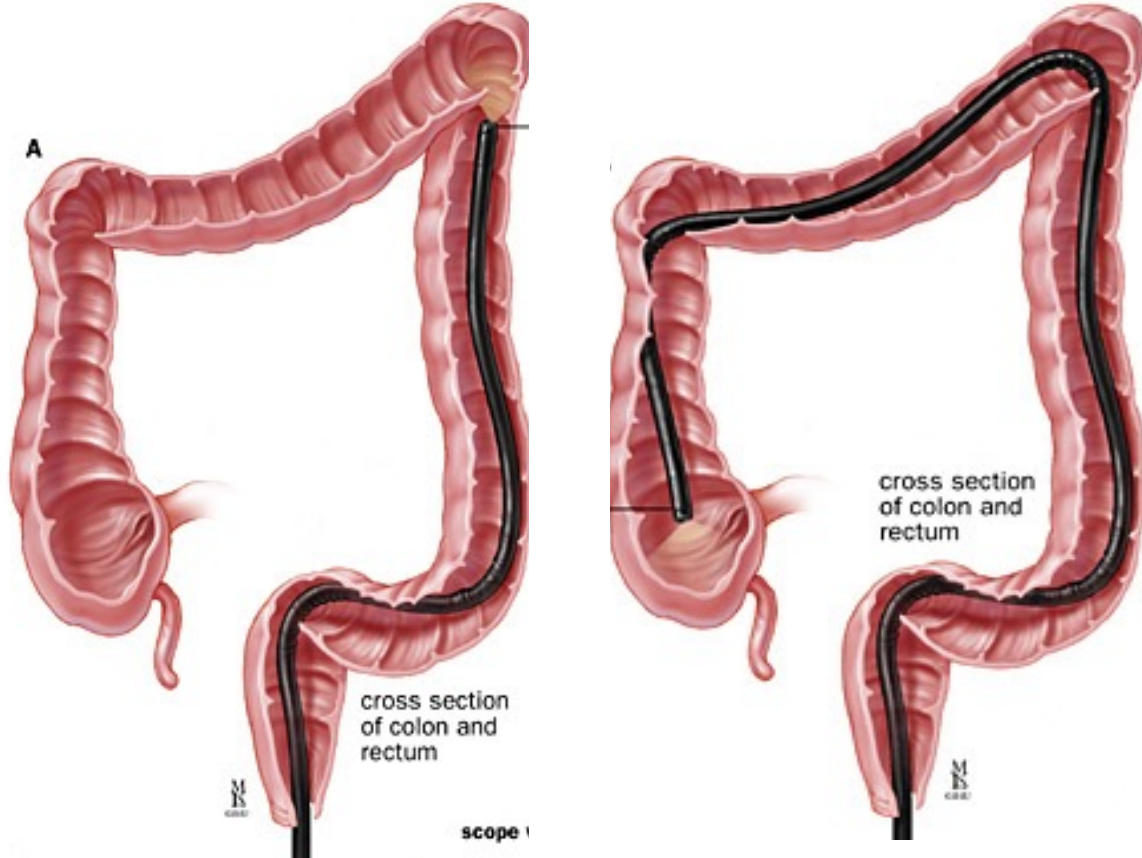
Robertson DJ, Lee JK, Boland CR, et al. *Gastrointest Endosc.* 2017;85(1):2-21.e3.

Imperiale TF, Ransohoff DF, Itzkowitz SH, et al. *N Engl J Med.* 2014;370(14):1287-1297.

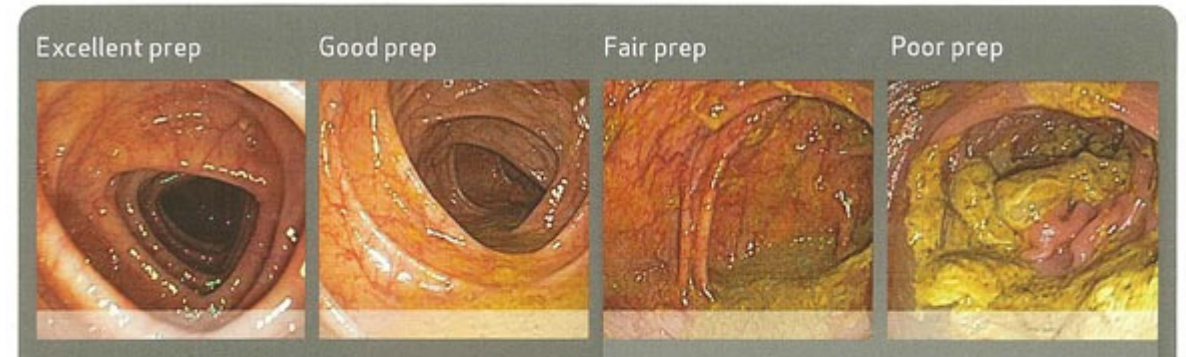
The Adenoma Carcinoma Sequence

**Prevention- Imaging
Endoscopic Polypectomy**

**Early Detection
Stool Tests**



CT Colonography



- Exam Effectiveness, Patient Factors:
 - Split dose prep
 - Good compliance with instructions
 - Low residue diet a couple days prior to exam
 - Avoid constipation prior to starting prep
 - Discuss pre-existing GI issues with your scheduler in case modifications need to be made
 - Read through instructions carefully

Colonoscopy = Prevention

- Most effective colorectal cancer prevention test
- Detects 3x more advanced lesions than FIT
- Detects 2x more advanced lesions than FIT-DNA
- Single test with diagnosis and resection
- Only test able to be performed at 10 year intervals

- Cardiopulmonary Risks < 1%
- Perforation 0.03-0.07% risk
 - 1 in 2,000 (0.05%) considered standard of care
 - Me: 2 perforations in 13 years, performing approximately 1,000 colonoscopies/year
 - 1 perforation was not screening
 - 1 perforation was delayed after resection of large polyp
- Bleeding after polyp removal: 0.5%
 - Higher with large polyp removal
- Death attributable to colonoscopy: 1 in 15,000
- Lifetime odds of death:
 - MVC: 1 in 101
 - Fall: 1 in 102
 - Gun: 1 in 221
 - Drowning: 1 in 1,024

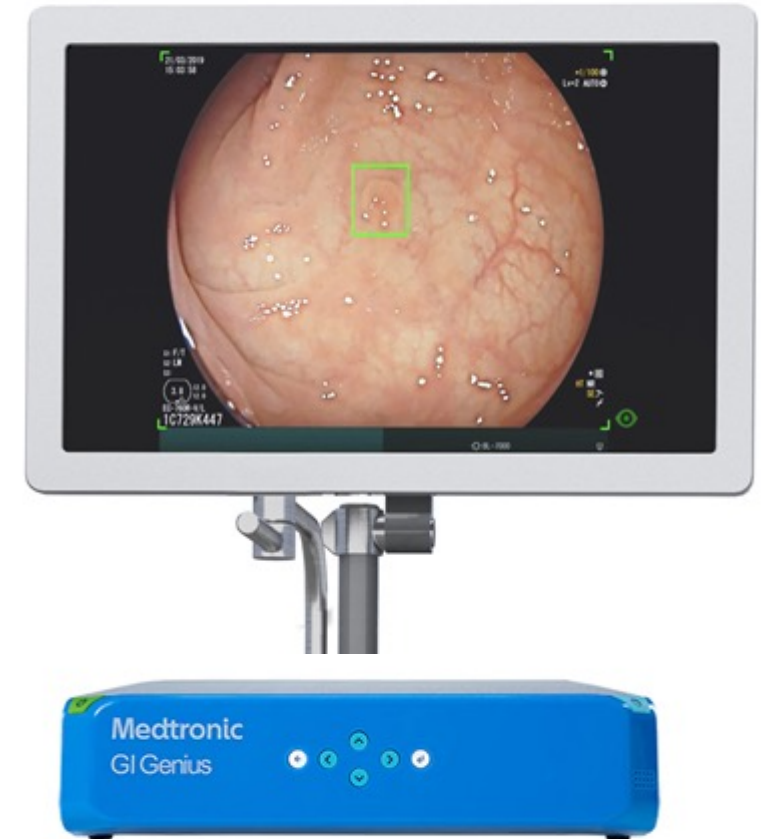
- High-definition colonoscope
- Careful exam of the entire colon
 - At least 6 min (usually closer to 10) spent withdrawing the scope and searching
 - Experienced Endoscopist:
 - > 95% cecal intubation rate.
 - Adenoma Detection Rate (ADR)
 - Lower limit > 20% women, > 30% men
 - US Average ADR 39%
- My metrics April 2022 - Mar 2023:
 - Withdrawal time: 10 min
 - ADR male: 65%
 - ADR female 52%
 - Cecal intubation rate > 95%

- 85,000 people in Norway, Poland, Sweden, Netherlands.
 - One colonoscopy vs no screening.
 - Randomized from population (not from PCP or advertisement). Sent a single letter inviting to screening.
 - Primary Endpoints: Colorectal Cancer incidence and mortality after 10-15 years and all-cause mortality.
 - 1/3rd of endoscopists had ADR < 25%, below minimum acceptable standard in US.
 - Average US ADR is 40%.

- Risk of colon cancer 18% lower in group invited to undergo screening.
- No decreased risk of death overall.
- Is colonoscopy ineffective?

- Only 42% of those invited actually had a colonoscopy
 - All of those invited are included in outcome analysis
- Of those who **actually had colonoscopy**:
 - 31% reduced colon cancer risk
 - 50% reduced risk of death
- Average follow-up period only 5 years
 - Too short to see benefits of polyp removals over time
- Colonoscopy worked for those who had it
 - Works better when done well

- GI of the Rockies: 1st in Colorado to incorporate.
 - Improves ADR + cancer detection 13% in randomized controlled trials
 - 42% → 55%

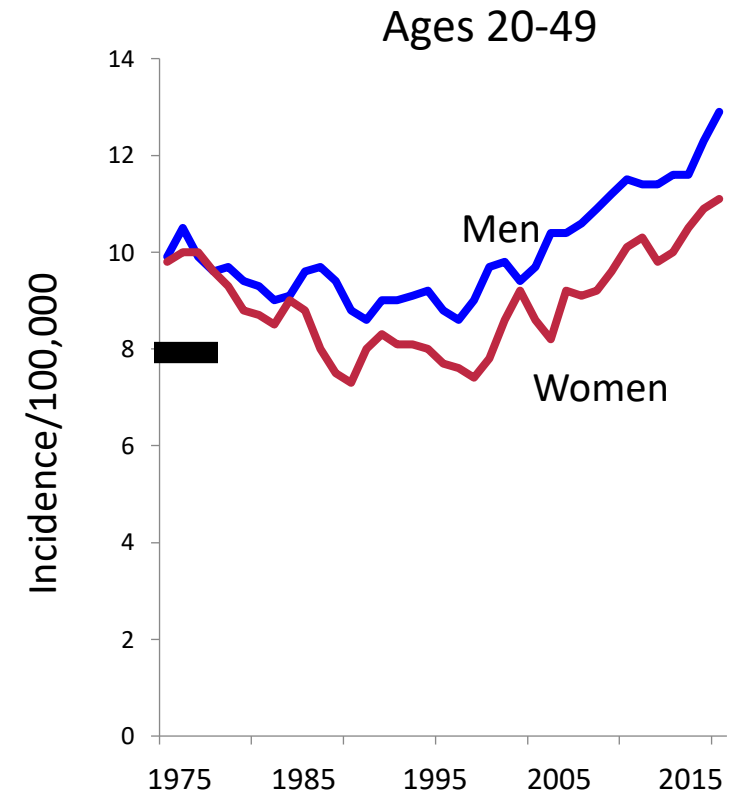


Average risk:

- No personal or FH of colonic neoplasia or IBD
- Start CRC screening at age 45, stop at age 75-85
- Options for screening:
 - FOBT/FIT - annually
 - FIT/DNA - every 3 years
 - Flexible Sigmoidoscopy - every 5 years
 - CT Colonography - every 5 years
 - Colonoscopy - every 10 years
- If done, CRC cases and deaths decrease by 60-80%

Previous Screening Guidelines

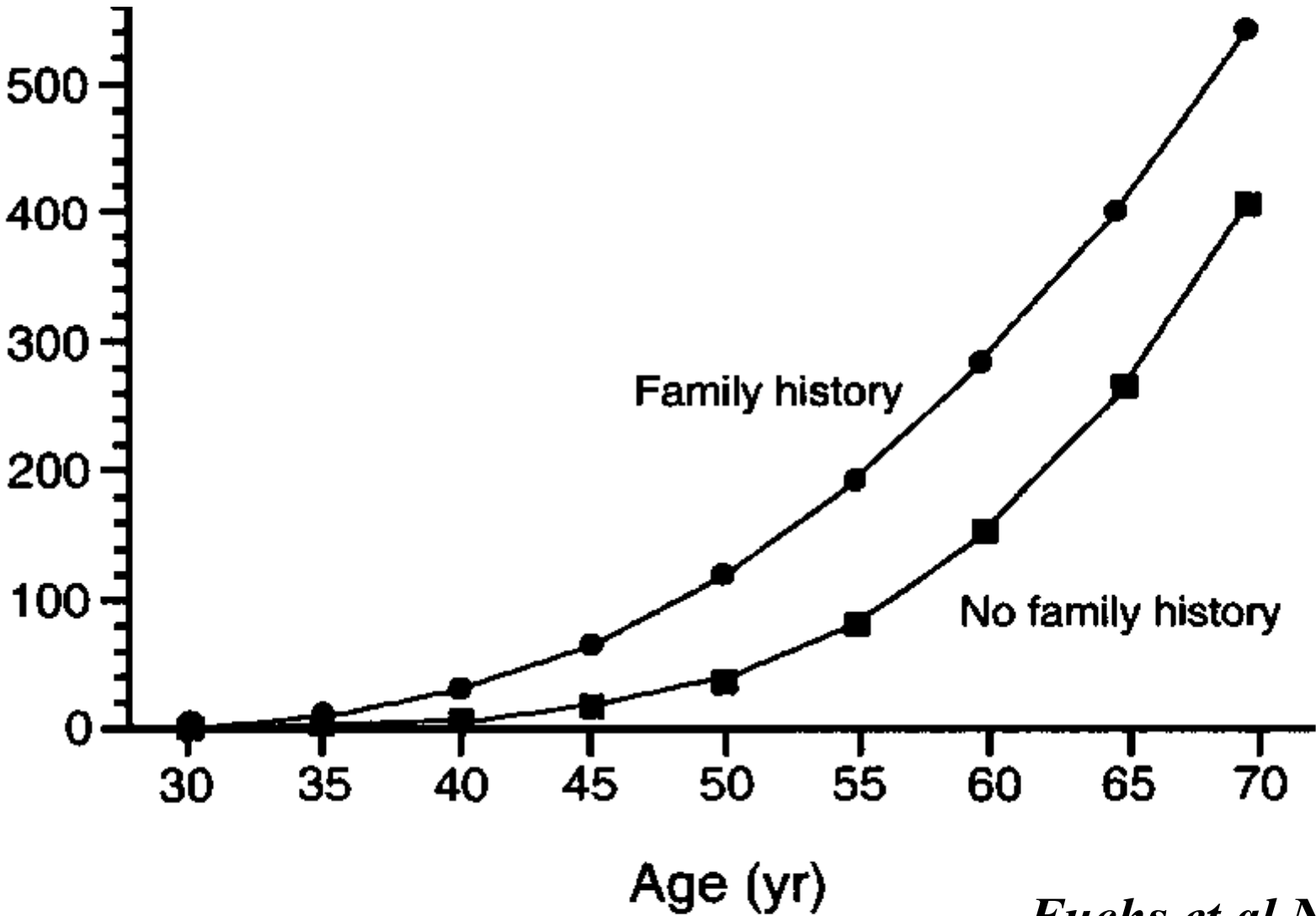
- USPSTF 2016 - “recommends CRC screening starting at age 50 years and continuing until age 75.... multiple screening strategies to choose from” (a recommendation). Individualize screening age 76-85.
- ACS 2017 - Repeated modeling studies using current incidence and mortality rates for the young.
- **Conclusion:** Starting at age 45 led to a 4-8% decrease in number of new CRCs, and an 8 -11% decrease in CRC deaths with a 12-17% increase in the number of colonoscopies needed, compared to starting at age 50.



- USPSTF 2021 - “recommends offering CRC screening starting at age **45 years** and continuing until age 75.... multiple screening strategies to choose from” (a recommendation). Individualize screening age 76-85.
- American Cancer Society 2018 - “recommends that adults aged **45 years** and older with average risk of colorectal cancer undergo regular screening” and continuing until age 75 with any of multiple screening strategies. Individualize screening age 76-85.
- Colorado HOR passed House Bill 20-1103 in 2020.

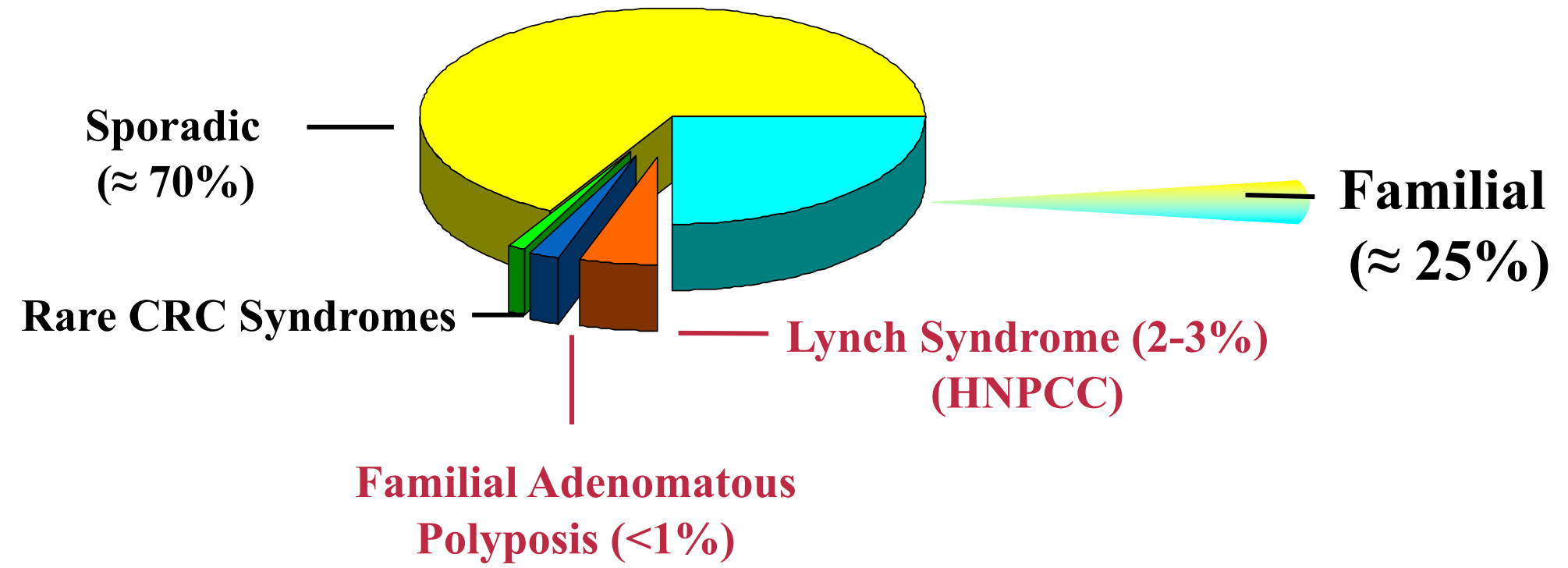
- Increased risk - FDRs of patients with CRC
 - Start at age 40 or earlier depending on # and age of CRCs in family, colonoscopy is preferred
- Hereditary Syndromes
 - Start much earlier (age 12-25), annual colonoscopy

Family History of CRC Increases Risk



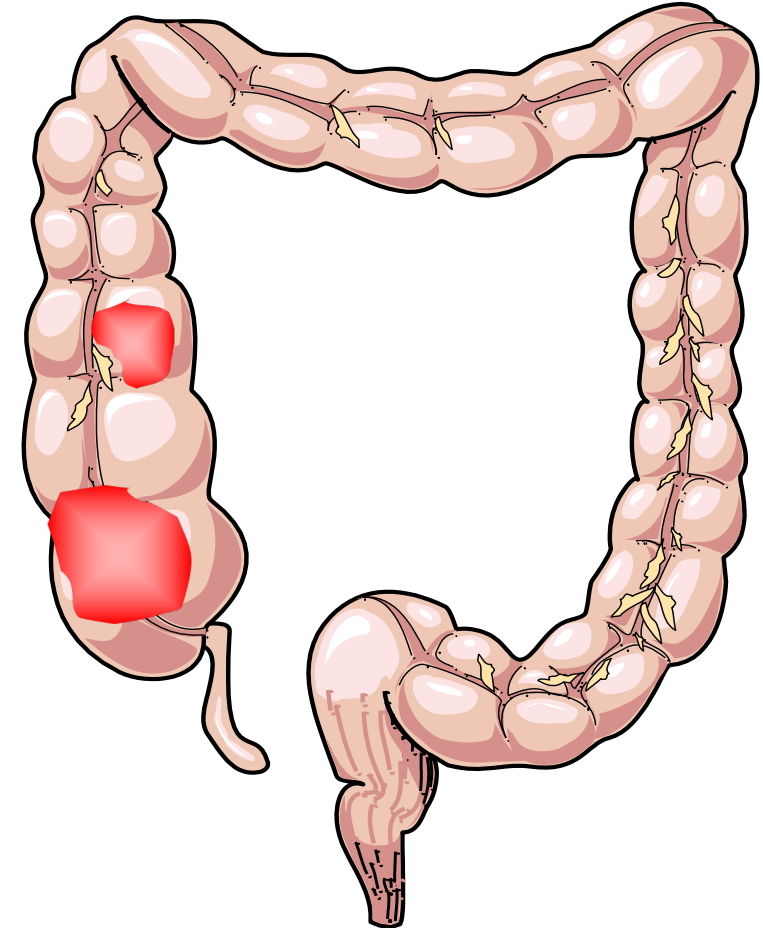
Fuchs et al NEJM 1994

Familial and Hereditary CRC



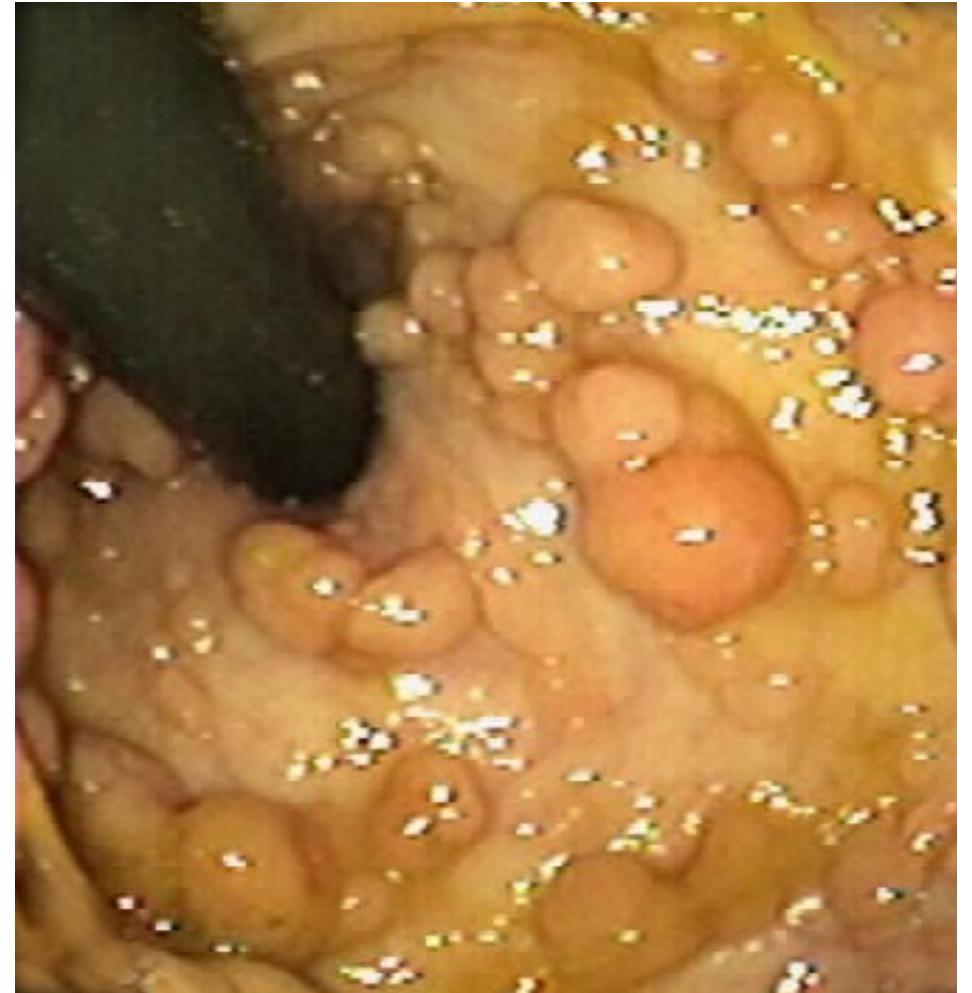
Lynch Syndrome

- Autosomal Dominant - 3% of CRCs
- High CRC risk - up to 50%
- Early onset - 44 yrs
- Proximal location - 65%
- Other cancers (Uterus, Ovary)
- Under recognized (<5%)
- Genetic testing (MMR genes)
- Screening works
 - Annual colonoscopy age 25 or earlier



Familial Adenomatous Polyposis

- Rare - 1/7,000 to 1/22,000
- Autosomal Dominant
- High CRC risk \approx 100%
- Easily recognized
- Genetic testing or screening around age 12
- Surveillance annually



Colorectal Cancer – The Preventable Killer

- Sequential progression from polyp to cancer
- Common:
 - 4th most common cancer in US and CO
 - Decreasing overall, but increasing in the young
- Lethal:
 - 2nd most common cause of cancer death in US and CO
 - Strongly dependent on stage at diagnosis
- Preventable:
 - Prudent lifestyle changes
 - Screening is most effective prevention, as well as early detection strategy
- Familial and hereditary CRC require special attention

- Colonoscopy can **prevent** colon cancer.
 - Start at age 45 average risk
 - Only test recommended for + family history
 - Every 10 years. Sooner if adenomatous polyps/hx colon cancer/fam hx
 - Let your doctor know if you have a family history of colon or other cancers.
- If no colonoscopy, then:
 - FIT yearly or Cologuard (FIT-Fecal DNA) every 3 years
 - Misses some cancers and most high-risk polyps

Thank You!

Questions?



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