

10TH ANNUAL ***DIGESTIVE DISEASES: NEW ADVANCES***

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How to Increase the Adenoma Detection Rate (ADR) ?

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National Colorectal Cancer Roundtable



Disclosures

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Topics to Be Covered

1. Definition of adenoma detection rate (ADR)
2. Importance of ADRs as a quality metric
3. Other polyp detection rates (PDRs)
4. Impact of lowering screening age to 45 on ADRs
5. How to improve ADRs

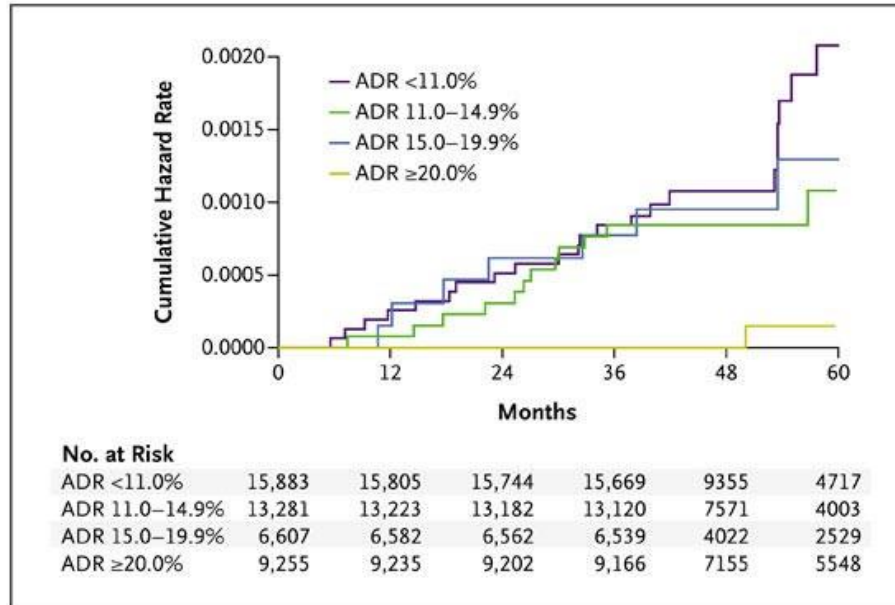
Colonoscopy Quality Indicators (US-MSTF)

Metric	Target
Adenoma Detection Rate (ADR)	≥ 25%
Cecal intubation rate (diagnostic/surveillance)	≥ 90% / ≥95%
Adequate bowel prep	≥ 85%
Withdrawal time (mean)	≥ 6 minutes
Correct screening/surveillance interval recommended	≥ 90%

Adenoma Detection Rate (ADR): Definition

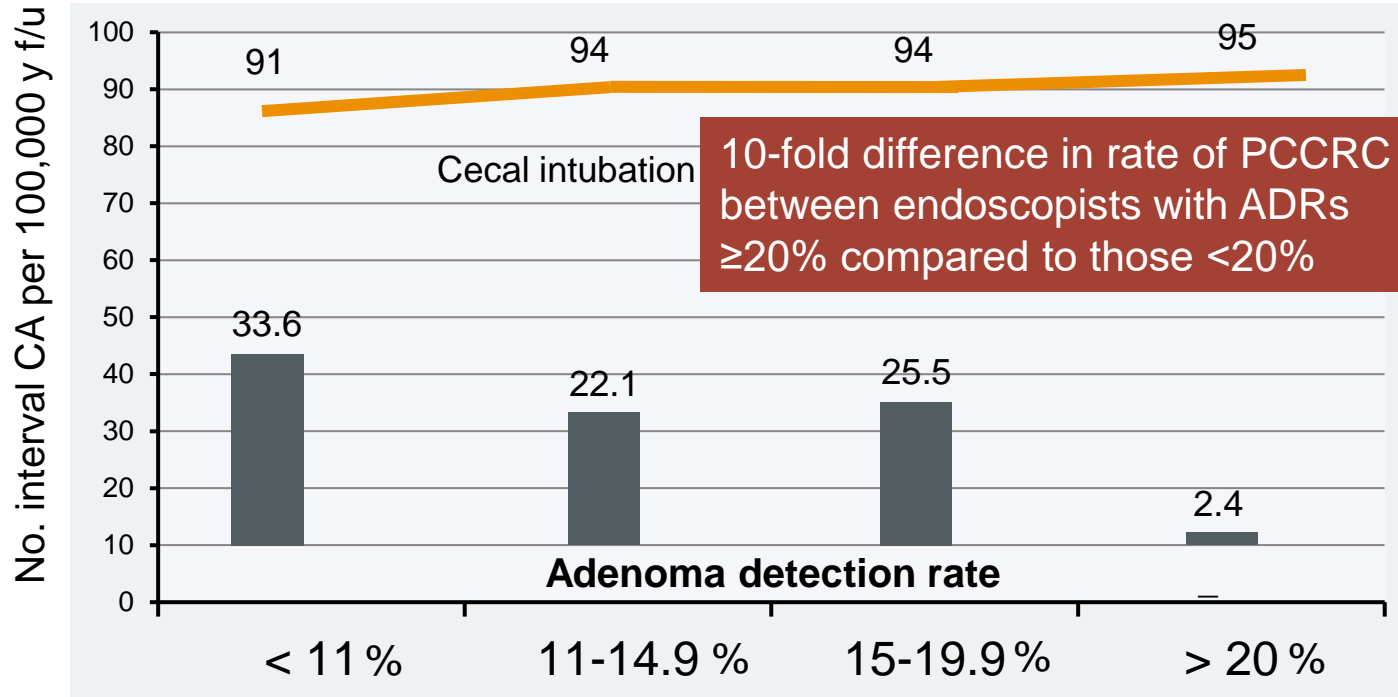
- “Fraction of patients (age 50-75) undergoing first-time screening colonoscopy who have at least 1 adenoma detected.”
- **Minimal threshold:**
 - Male patients: 30%
 - Female patients: 20%
 - Overall: 25%
- **Other adenoma metrics sometimes used:**
 - AADR: Advanced adenoma detection rate
 - APC: Adenomas per colonoscopy
 - AMR: Adenoma miss rate

High ADRs Correlate With Lower Rates of Post-Colonoscopy CRC (Interval CRC)

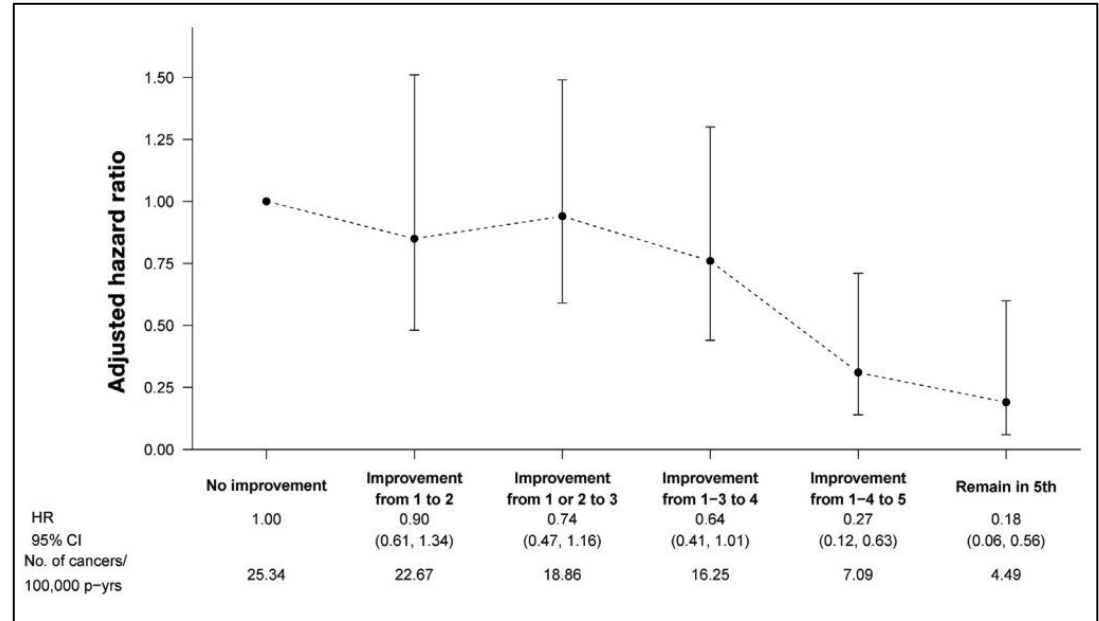
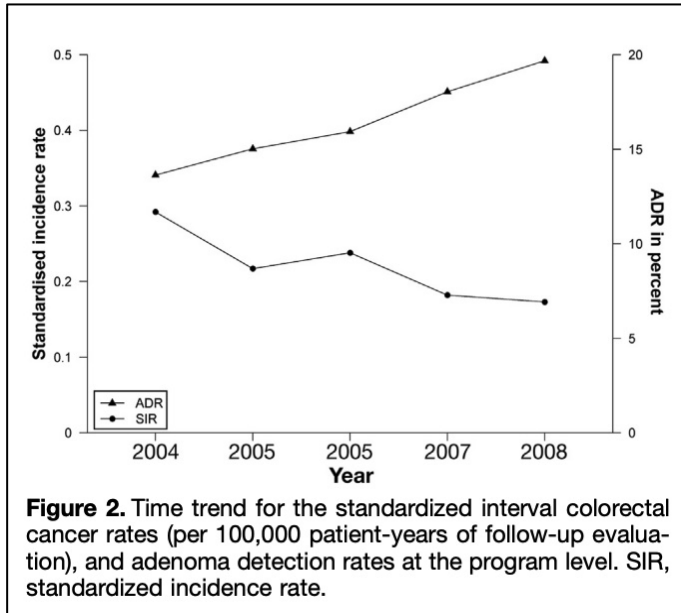


ADRs and Interval CRC

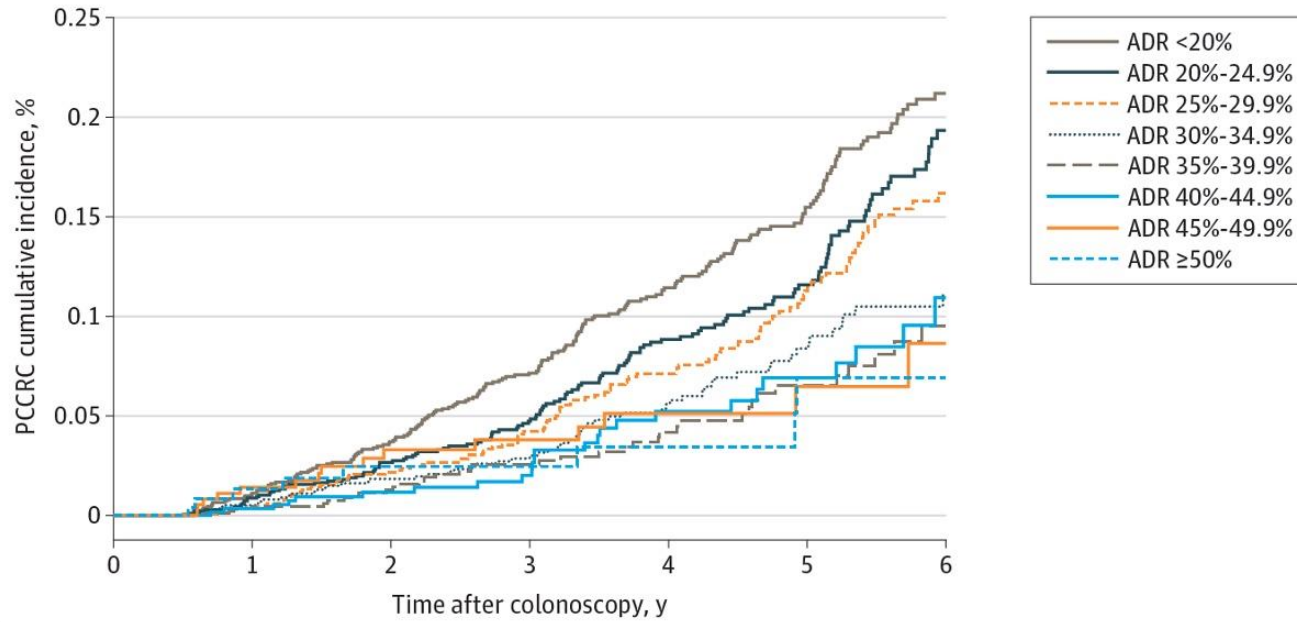
45,000 subjects/42 interval cancers



As Physicians Increase Their ADRs, Rates of Post-Colonoscopy CRC (PCCRC) Get Better

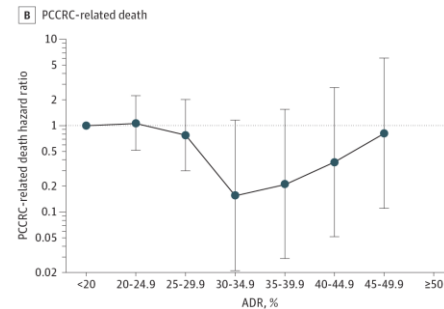
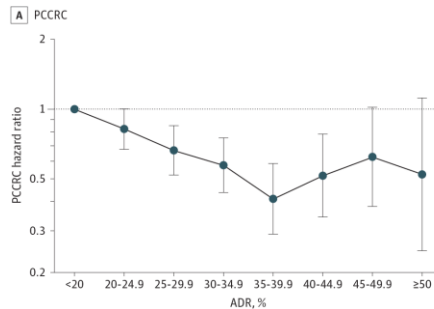
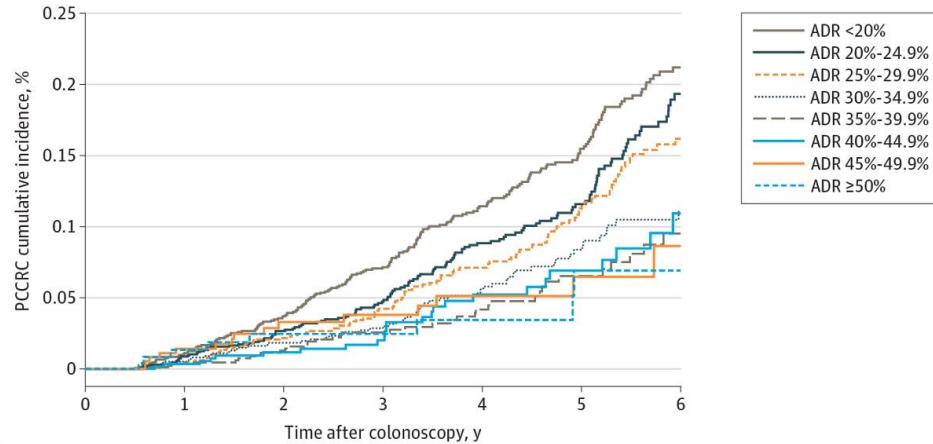


Higher ADRs: Lower Risk of PCCRC



Higher ADRs: Lower Risk of PCCRC and PCCRC-Related Death

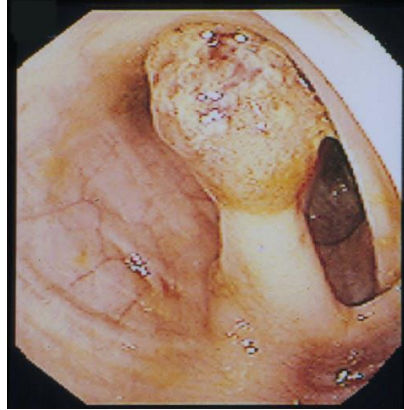
- Kaiser Permanente System
- 2011-2017
- 852,624 negative c'scopies
- 383 physicians
- 3.5 yr follow-up (>2.4M P-Y)
- SSA/Ps included in ADR



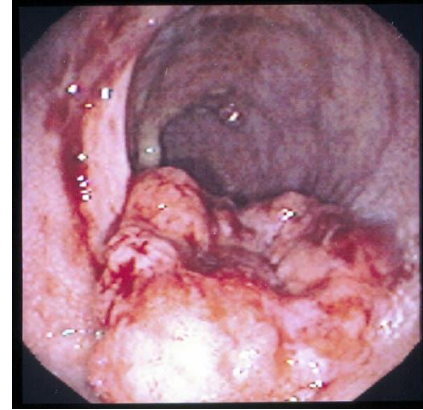
Adenoma-Carcinoma Sequence



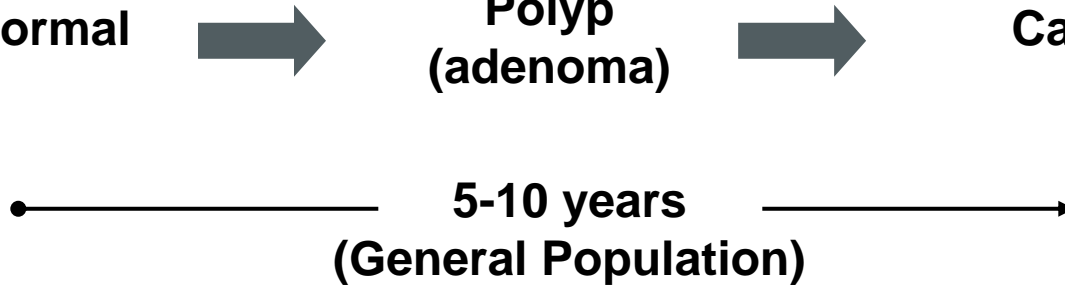
Normal



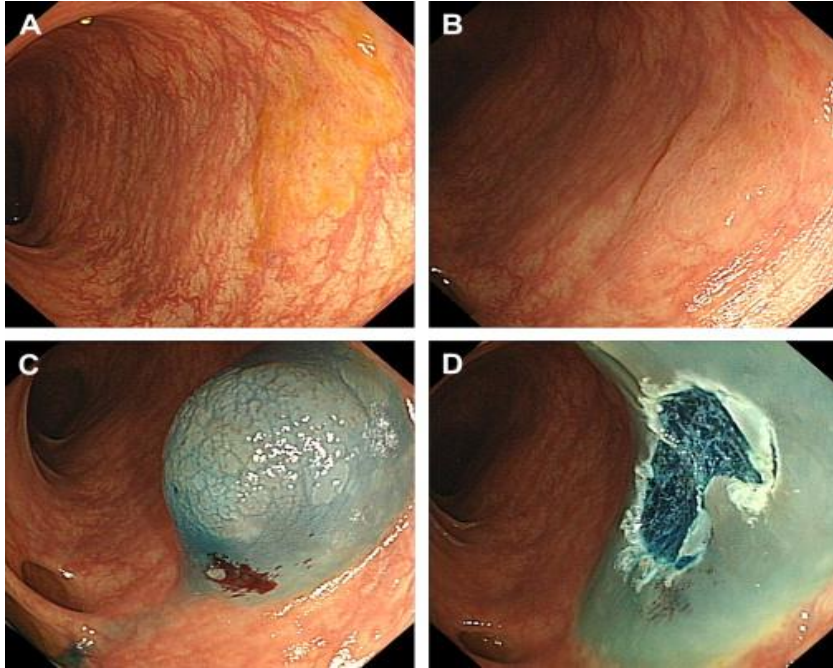
**Polyp
(adenoma)**



Cancer



Sessile Serrated Polyp/Adenoma



- Often flat, pale.
- Difficult to detect even with excellent prep
- Usually found in the proximal colon
- Ill-defined borders – need to assure complete resection
- Give rise to 15-25% of all CRCs

ADR Correlates With Adenoma Miss Rate (AMR)

- AMR – based on tandem colonoscopy studies.
- Definition:
 - “Number of adenomas detected during the second colonoscopy, divided by the total number of adenomas detected during the tandem colonoscopy.”
- Meta-analysis of 15,152 colonoscopies

Adenoma miss rate	AMR	26%
Advanced adenoma miss rate	AAMR	9%
Serrated polyp miss rate	SMR	27%
Sessile serrated adenoma/polyp miss rate	SMR-ADR	24%

Adenoma Miss Rate (AMR): Higher for Small, Tubular, Flat/Sessile Adenomas

Variable	Adenoma Miss rate
Size	
• Diminutive (<5 mm)	28%
• Small (6-9 mm)	17%
• Large (≥ 1 cm)	6%
Pathology	
• Tubular	31%
• Tubulovillous/villous	5%
Morphology	
• Flat	34%
• Sessile	30%
• Semi-pedunculated	12%
Location	
• Proximal	26%
• Distal	28%

Other Polyp Detection Rates (PDR)

Acronym	Detection of:	Considerations
SSL-DR	Sessile serrated lesions	Interobserver variation among pathologists
SP-DR	Total serrated polyps	<ul style="list-style-type: none">• Hyperplastic polyps + sessile serrated lesions• Incentivizes removal of distal diminutive HPs
CSSP-DR	Clinically significant serrated polyps	Larger, dysplastic polyps.
PSP-DR	Proximal serrated polyps	<ul style="list-style-type: none">• Correlates with PCCRC• Potential gaming of polyp location

Higher Proximal Serrated Polyp Detection Rate Correlates with Lower PCCRC Rates (Regardless of Cancer Stage, Location or Patient Gender)

- Netherlands; 2014-2020
- Age 55-76 yrs
- Positive FITs
- PSPDR: SSPs proximal to descending colon
- 277,555 colonoscopies; 441 endoscopists
- Median ADR 66.3%; median PSPDR 11.9%

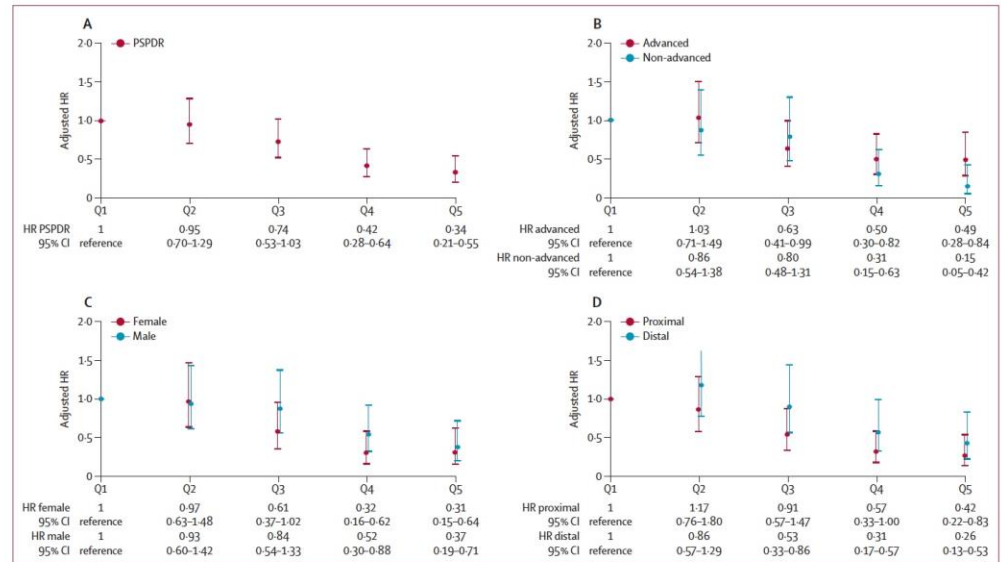


Figure 2: Adjusted HRs for interval post-colonoscopy colorectal cancer according to quintile of PSPDR, overall (A), stratified by cancer stage (B), stratified by sex (C), and stratified by location (D) HRs were adjusted for sex and age (except for C), and random effect was applied to adjust for correlation within endoscopists. Proximal indicates located proximal to the splenic flexure, including the splenic flexure; distal indicates located distal to the splenic flexure. HR-hazard ratio. PSPDR-proximal serrated polyp detection rate.

Among Endoscopists With Very High ADR (66%+), a Low PSPDR Diminished the Protection Against PCCRC

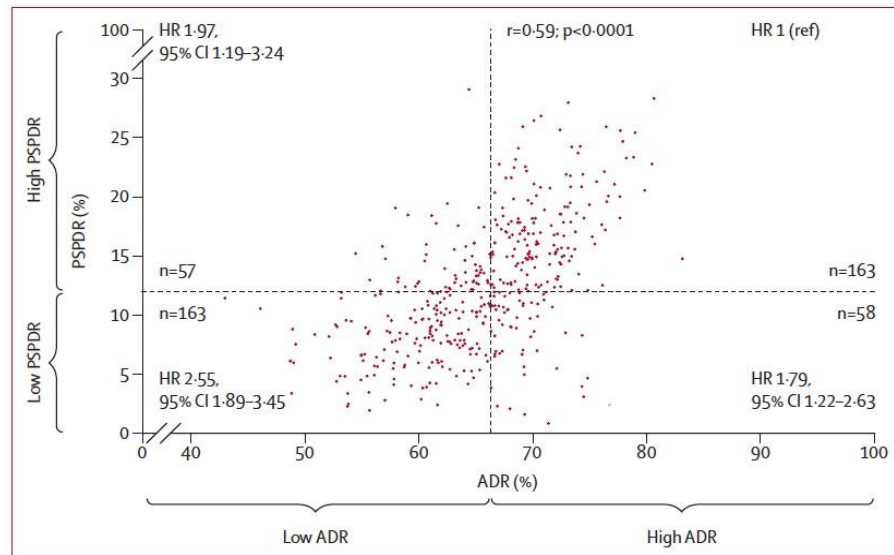


Figure 3: Risk of interval post-colonoscopy colorectal cancer for endoscopists with a high PSPDR and a high ADR compared with endoscopists with a high PSPDR and a low ADR, low PSPDR and high ADR, or low PSPDR and low ADR

The dashed vertical line indicates the median ADR (66.3%) and the dashed horizontal line indicates the median PSPDR (11.9%). HRs are adjusted for age and sex. Random effects were used for endoscopists. Endoscopist count per group is indicated. ADR=adenoma detection rate. HR=hazard ratio. PSPDR=proximal serrated polyp detection rate.

ADR in Ages 45-49 yr: Somewhat Lower than 50-54 yr

- National GI Quality Improvement Consortium (GI QuIC) Registry
- 2014–2020
- 2,806,539 average risk screening colonoscopies in ages 45–75

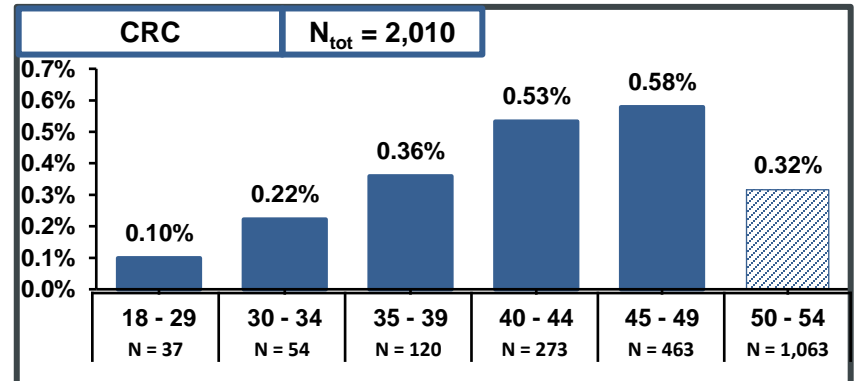
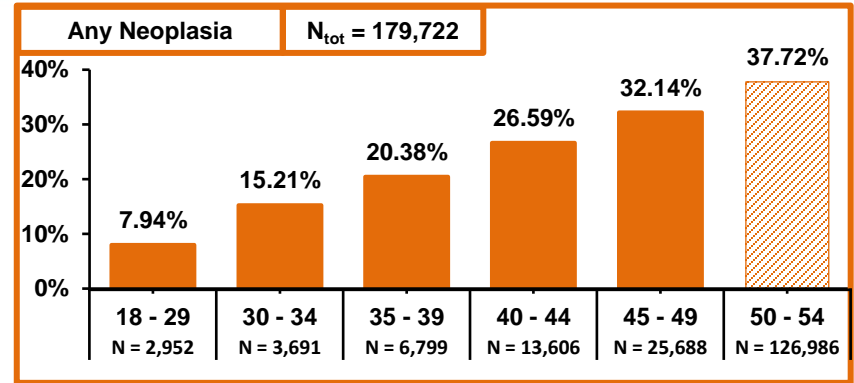
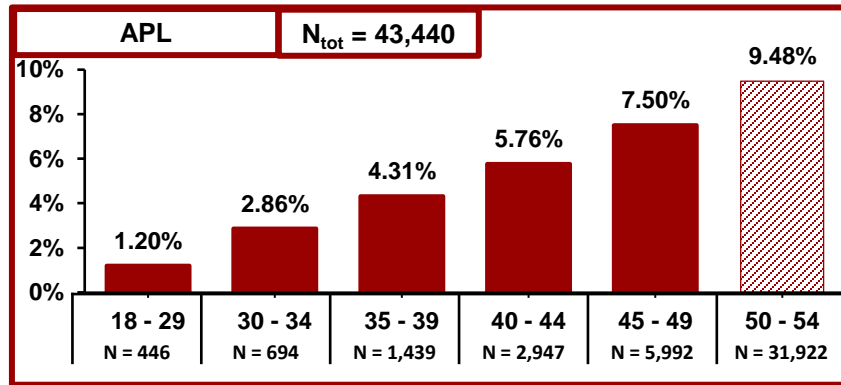
	45–49 yr	50–54 yr	50–75 yr
Overall			
• ADR (mean)	28.6%	31.9%	36.3%
• Procedures (n)	47,213	1,014,193	2,759,326
Male pts			
• ADR (mean)	32.9%	37.0%	41.5%
• Procedures (n)	9,928	470,146	1,270,382
Female pts			
• ADR (mean)	22.8%	25.6%	30.1%
• Procedures (n)	16,372	529,084	1,477,418

Prevalence of Neoplasia in Individuals <50 yo

123 AMSURG ASCs across 29 States; 2014–2021

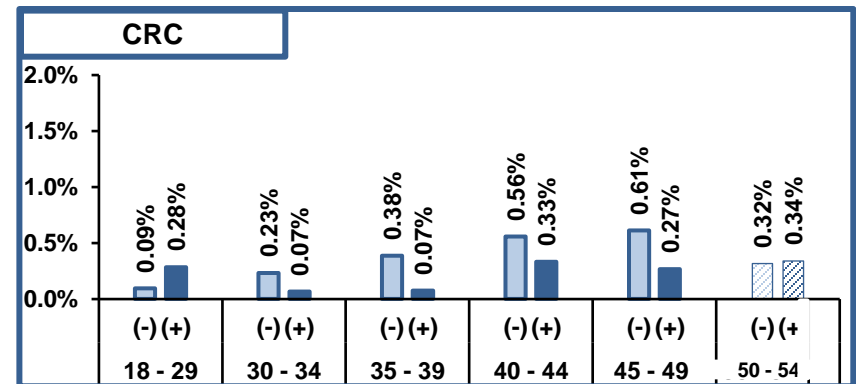
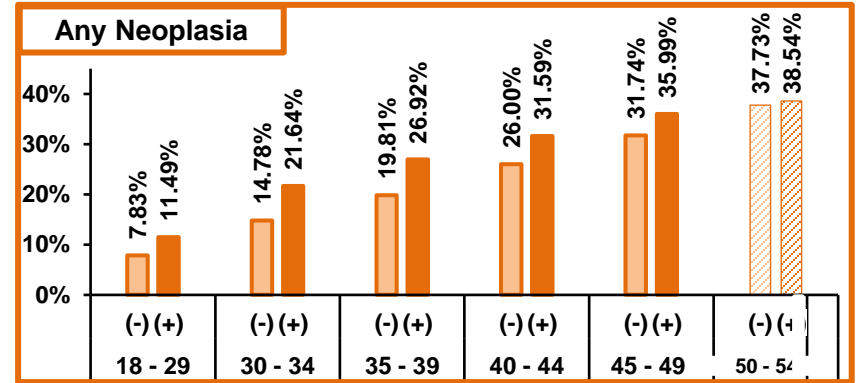
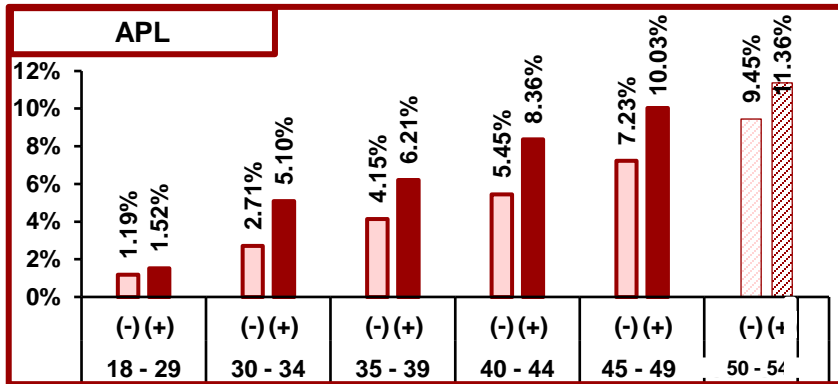
562,559 high quality screening colonoscopies

- Age 45–49: 79,934
- Age 18–44: 145,998
- Age 50–54: 336,627



Prevalence of Neoplasia: Effect of Family History of CRC

With a FH of CRC, the polyp pathology is similar to that of individuals 5 years older.

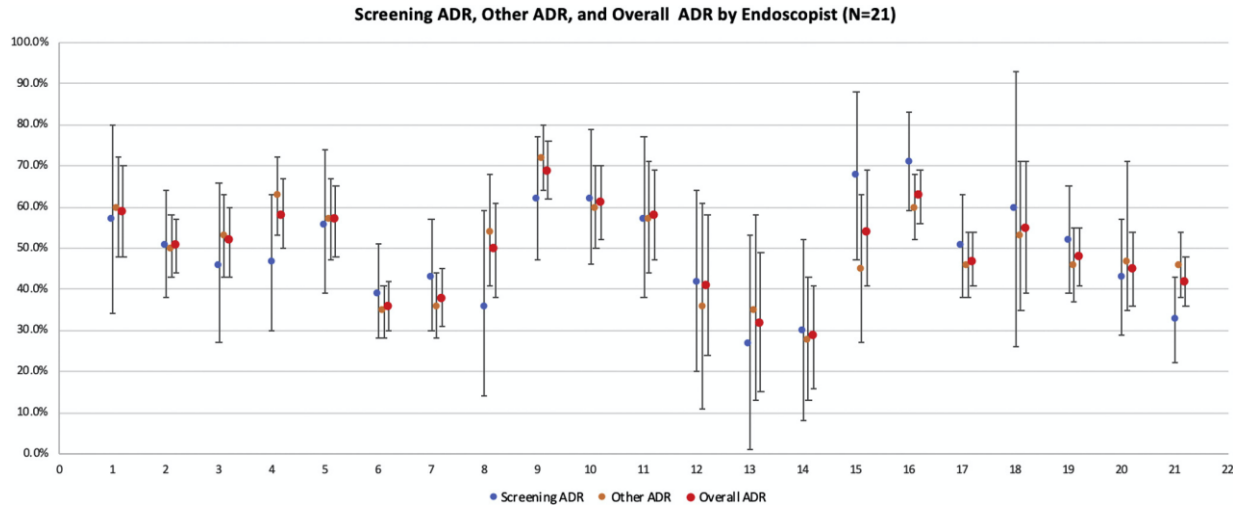


Factors Associated With Higher ADRs

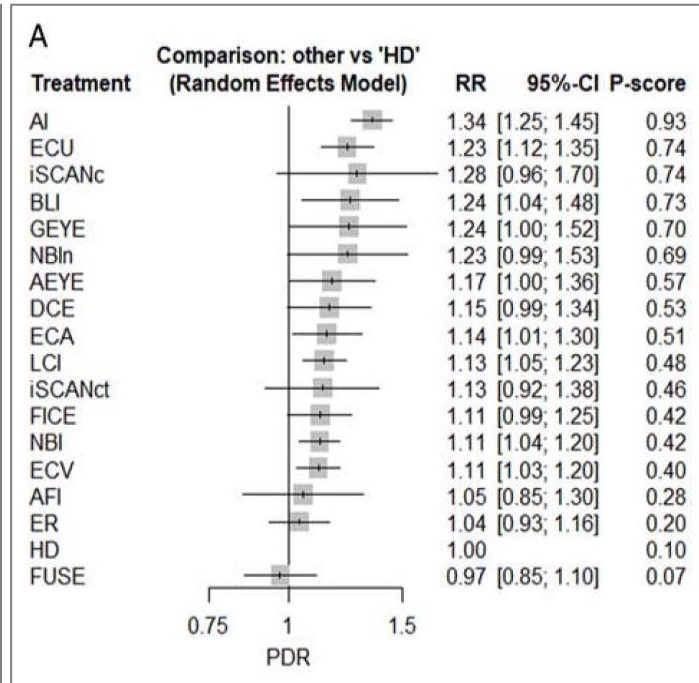
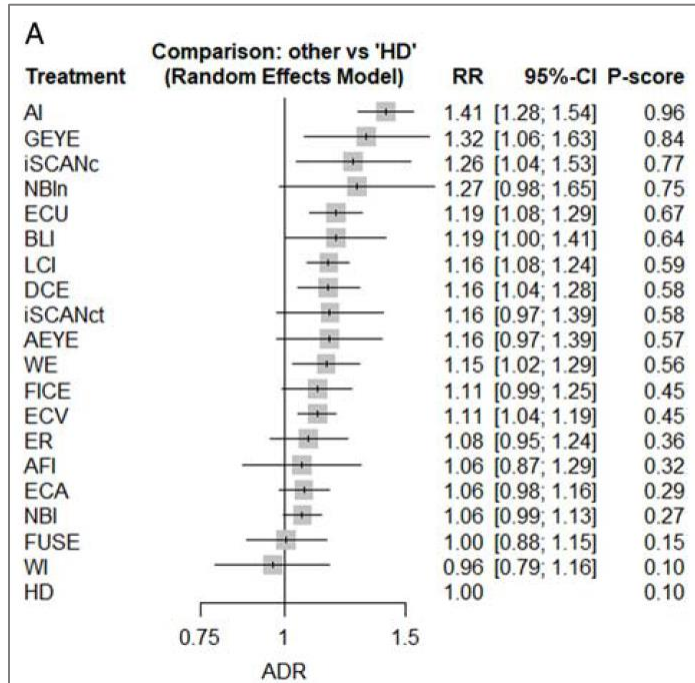
Level	Measures
Pre-procedure	<ul style="list-style-type: none"> • Split dose bowel prep • Measurement and reporting system in place (with feedback)
Procedure (technical)	<ul style="list-style-type: none"> • Sufficient cleansing • Adequate insufflation • Detailed mucosal exposure • Double right colon exam (2nd pass, or cecal retroflexion) • Longer withdrawal time
Proceduralist	<ul style="list-style-type: none"> • Fully trained and committed endoscopist • Providing feedback to proceduralist about their ADR • Years in practice (higher ADRs with <u>fewer</u> years in practice) • Endoscopist gender (<u>female GIs</u> have higher ADRs) • More than one observer (eg. Fellows, endoscopy nurses/techs)
Mucosal exposure enhancement	<ul style="list-style-type: none"> • Distal attachment (Endocuff; cap/hood) • FUSE scopes • Third Eye
Lesion enhancement	<ul style="list-style-type: none"> • High definition scopes • Chromoendoscopy • Natural Band Imaging (NBI; "virtual chromoendoscopy") • Artificial intelligence (Computer Aided Detection; CADe)
Procedure indication	<ul style="list-style-type: none"> • FIT or mt-sDNA positive colonoscopies – 15-20% higher ADR

ADR Does Not Vary Much in Screening vs Surveillance Colonoscopies

- Two VA medical centers over 6 months; 2015
- 2,268 colonoscopies; 21 gastroenterologists
- Screening (29%), surveillance (48%), diagnostic (23%)



ADR and PDR: Comparing Endoscopic Modalities



Endocap (ECA); Endocuff (ECU); Endocuff Vision (ECV); AmplifEYE (AEYE), balloon/retrograde (G-EYE); I-Scan (iSCANc), I-Scan tone enhancement (iSCANct); Endoring (ER); dye-based chromoendoscopy (DCE); Linked color imaging (LCI); water exchange (WE); water immersion (WI); autofluorescence imaging (AFI); full spectrum (FUSE); blue light imaging (BLI)
Aziz et al. *J Clin Gastro.* 2022.

What About AI?

- Computer-aided characterization (CADx)



Figure 2 Examples of computer-aided characterization

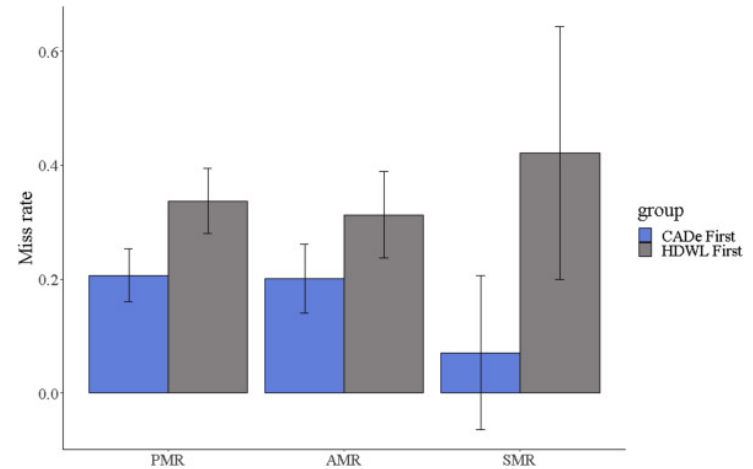
- Computer-aided detection (CADe)
 - Meta-analysis of 17 RCTs; 16,000 pts; mostly non-USA
 - ADR:
 - CAdE (45.3%) vs. standard (37.9%) (RR 1.28; 95% CI 1.17-1.40)
 - Among tandem colonoscopy studies:
 - AMR lower if the first procedure was CAdE rather than WLE

What About AI?



What About US Data?

- Four US centers; expert endoscopists with high ADRs
- Computer aided detection (CADe, n=116) was compared with high definition white light (HDWL, n=116) in a tandem colonoscopy study
- Patients randomized to colonoscopy with CADe first followed by HDWL, or vice-versa
- Polyp miss rates (PMR), adenoma miss rates (AMR), and sessile serrated lesion miss rates (SMR) were all significantly lower in the CADe-first group. BUT:
- **Adenoma detection rate difference was not statistically significant (50.4% vs 43.6%)**



What About US Data?

Improvement in Adenomas per Colonoscopy Using a Computer-Aided Detection Device



Randomized trial, standard vs. CAdE colonoscopy



1359 screening and surveillance participants

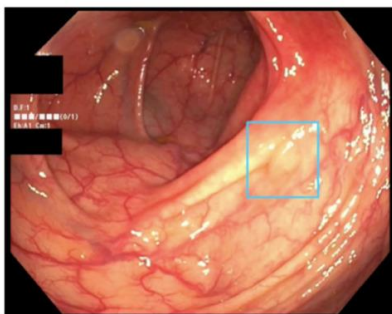


5 U.S.-based academic and community centers

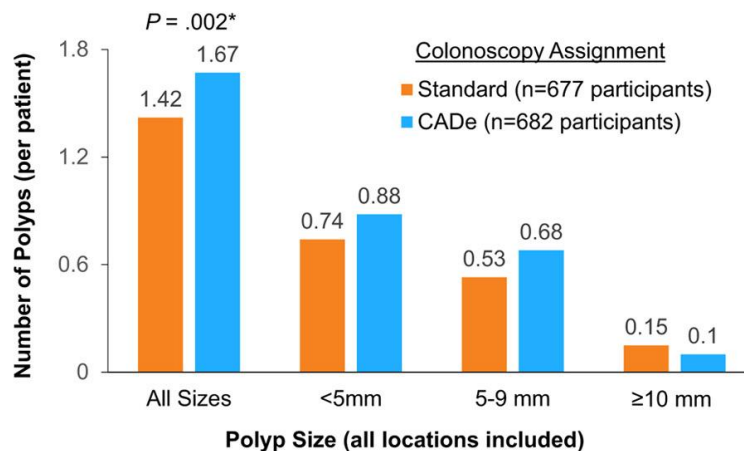


22 experienced endoscopists

↑ 27%
in adenomas per colonoscopy



Detection of a 4-mm adenoma in the hepatic flexure by the computer-aided detection (CAdE) device



***Adenoma detection rate difference was not statistically significant (47.8% vs 43.9%)**

Conclusions

1. ADR remains the most important and easily calculated quality metric. Targets may be revised.
2. Other polyp detection rates are becoming important.
3. Screening 45-49 yo has minimal impact on ADRs.
4. Many approaches to increase ADR.
5. Role of AI is not clear when ADRs are already high.
6. Know your ADR, and improve if necessary.
7. Choose your best approach and remain vigilant over the years.

