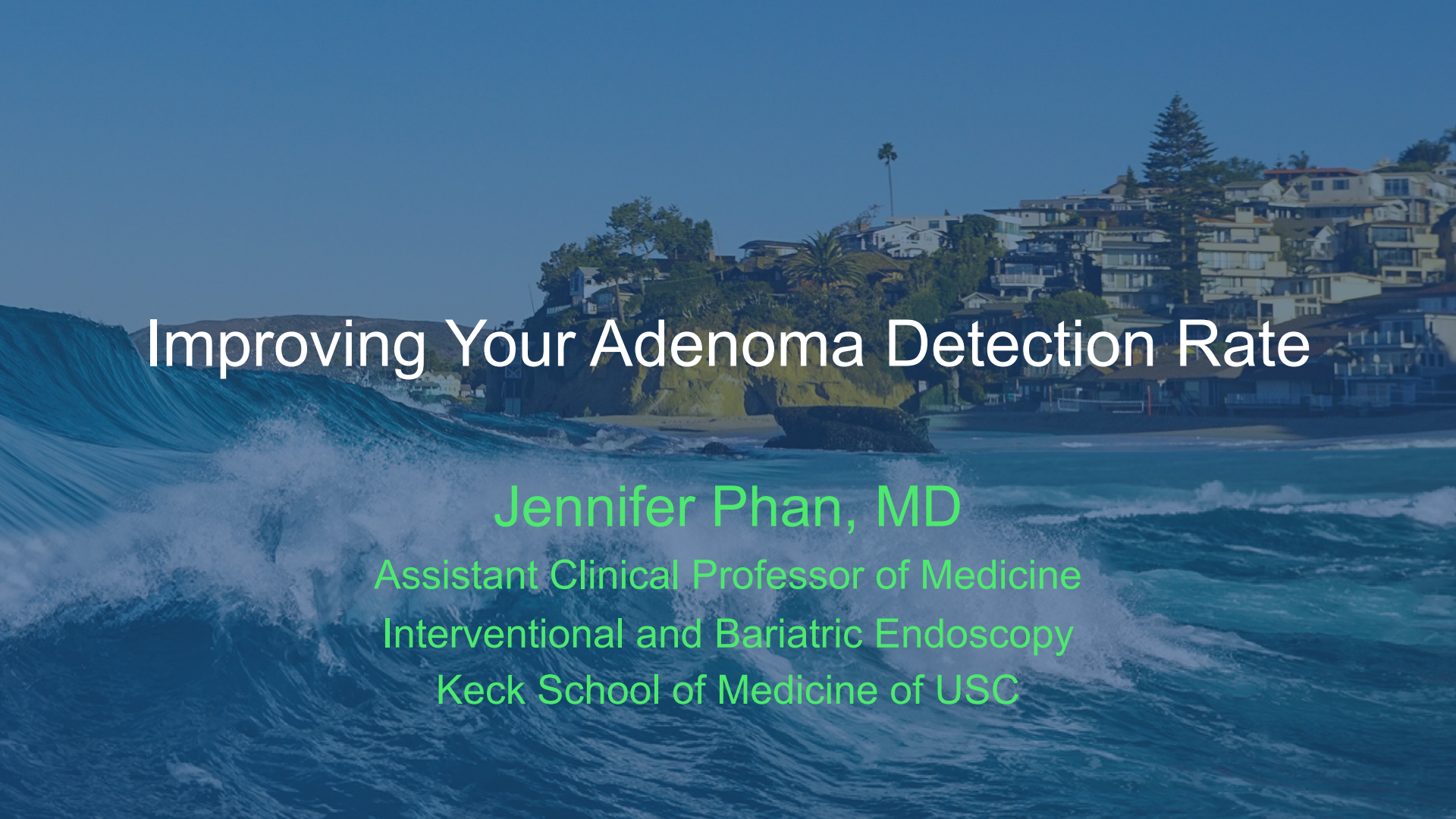
2023 SCSG
GI SYMPOSIUM



Improving Your Adenoma Detection Rate

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Disclosures

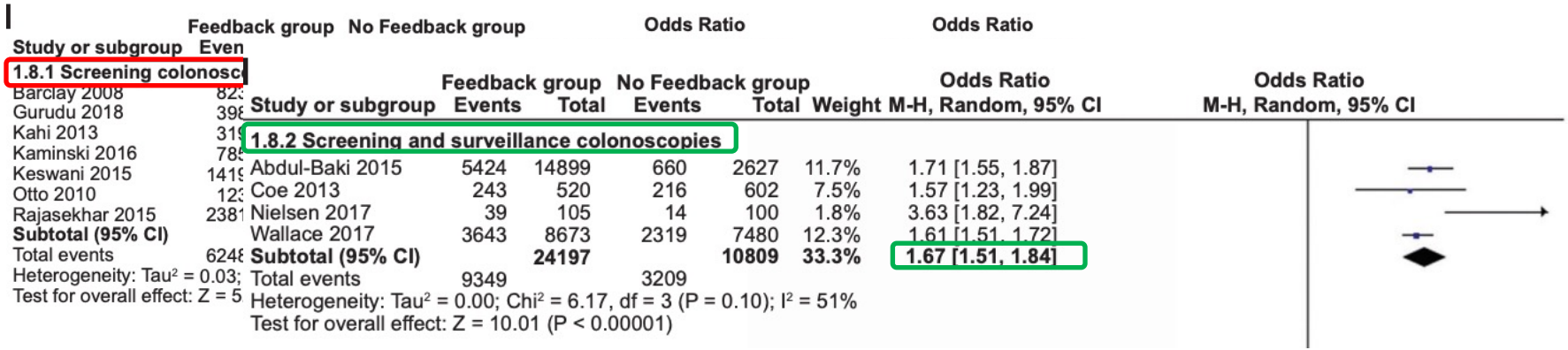
- Boston Scientific
- Olympus
- Cook Medical
- Noah Medical
- Intuitive Surgical

Outline

- Key Factors that affect ADR
  - Endoscopic Training
  - Patient-related Factors
  - Endoscopic Technique
    - Improved Navigation
    - Improved Visualization
  - Endoscopic Unit Support

Endoscopic Training

- Well documented that endoscopists undergoing educational interventions have the highest ADR
  - Tandem colonoscopy (reference standard): adenoma miss rate ~24%[1]
  - Simple feedback



[1]van Rijn JC et al. *AJG*. 2006; [2]Liu et al. *Medicine*. 2020.

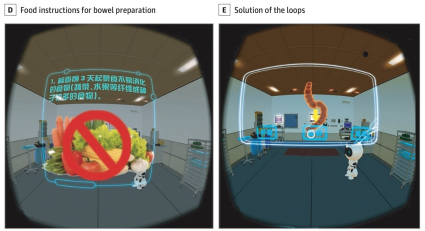
Patient-Related Factors

- Bowel preparation
  - Gold standard: split regimen of 3–4 liters polyethylene glycol (PEG)
    - Split regimen vs traditional day before prep: adenomas RR 1.26; sessile serrated lesions RR 2.48[1]
    - High (3–4L) vs low (2L) volume: no difference in bowel prep (86% vs 87%) but higher pt adherence and completion[2]
  - Patient education regarding bowel preparation
    - 346 patients randomized
    - VR group had significantly higher:
      - ADR (32.6 vs 22.1%)
      - PDR (41.9 vs 26.7%)
      - Pt compliance
      - No difference in detection of SSA or cancer

Original Investigation | Gastroenterology and Hepatology

Educating Outpatients for Bowel Preparation Before Colonoscopy Using Conventional Methods vs Virtual Reality Videos Plus Conventional Methods
A Randomized Clinical Trial

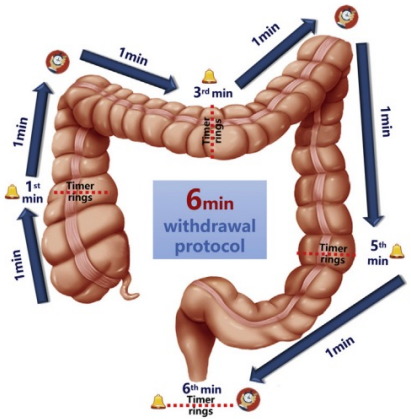
Guorong Chen, MBBS; Yi Zhao, MD; Feng Xie, PhD; Wen Shi, MD; Yingyun Yang, MD; Aiming Yang, MD; Dong Wu, MD

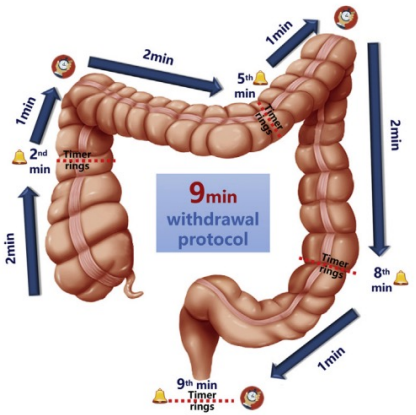


[1]Zawaly et al. *AJG*. 2019; [2]Spadaccini et al. *CGH*. 2020.

Endoscopic Technique
Low Cost Strategies

- Withdrawal Time
  - ASGE recommends at least 6 minute withdrawal





ADR:	27.1%	36.6%
R colon:	7.6%	13.6%
Flat/Sessile:	19.3%	27.4%

Zhou et al. *CGH*. 2022.

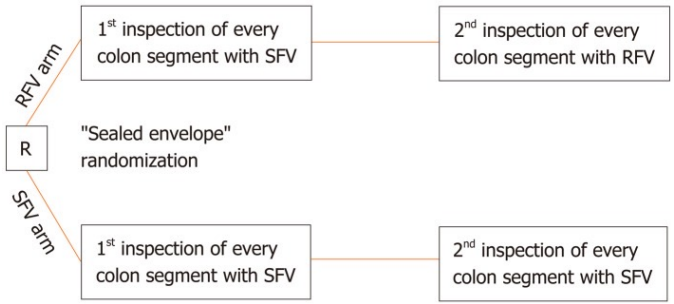
Endoscopic Technique
Low Cost Strategies

- Second look in the right colon
  - Any second look increases ADR 5-20%
  - 1011 patients randomized to second forward view (of R colon) vs standard single view[1]
    - Prospective RCT with 45 endoscopists over 6 Asian Pacific regions
    - Right colon ADR significantly higher with second forward view (27.1% vs 21.6%)
      - SFV identified 58 additional adenomas in 45 patients (9.8%) → changes in surveillance in 15 patients (3%)

Tang et al. *CGH*. 2022.

Endoscopic Technique
Low Cost Strategies

- Second look in the right colon
- Cecal retroflexion



	SFV arm	RFV arm	*P* value
PDR			
1st Inspection	33/88 = 37.5%	35/88 = 39.8%	0.870
2nd Inspection	41/88 = 46.6%	41/88 = 46.6%	1.000
ADR			
1st inspection	30/88 = 34.1%	31/88 = 35.2%	1.000
2nd inspection	39/88 = 44.3%	37/88 = 42%	0.8791

Second inspection of the whole colon leads to increased adenoma detection with no differences between SFV and RFV. Hence, increased detection is most likely a feature of the second inspection itself but not of the inspection mode.

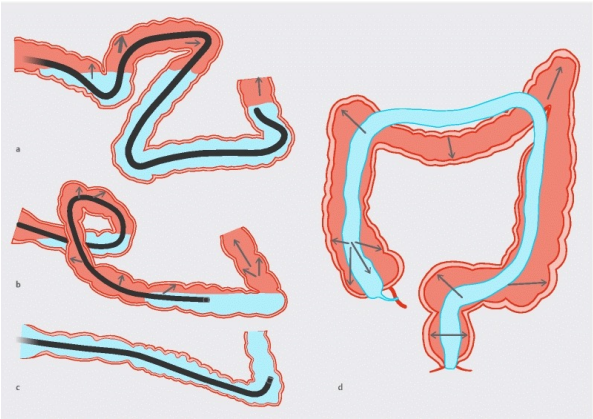
Rath et al. *WJG*. 2020.

Endoscopic Technique
Low Cost Strategies

- Water-aided colonoscopy (exchange, immersion)
  - 1224 patients randomized: WE vs WI vs air insufflation

	WE	WI	Air	p-Value
Overall ADR	49.3% [44.3–54.2]	43.4% [38.5–48.3]	40.4% [35.6–45.3]	.03; >0.99
R colon ADR	24.0% [20.0–28.5]	19.1% [15.4–23.3]	16.9% [13.4–20.9]	.04; >0.99

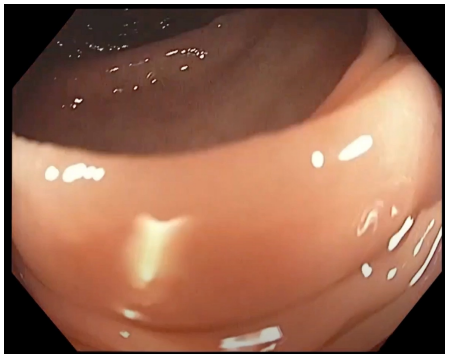
Data strengthens the validity that water *exchange*, but no immersion, can achieve significantly higher ADR then air insufflation



Cadoni et al. *Endoscopy*. 2017.

Endoscopic Technique
Low Cost Strategies

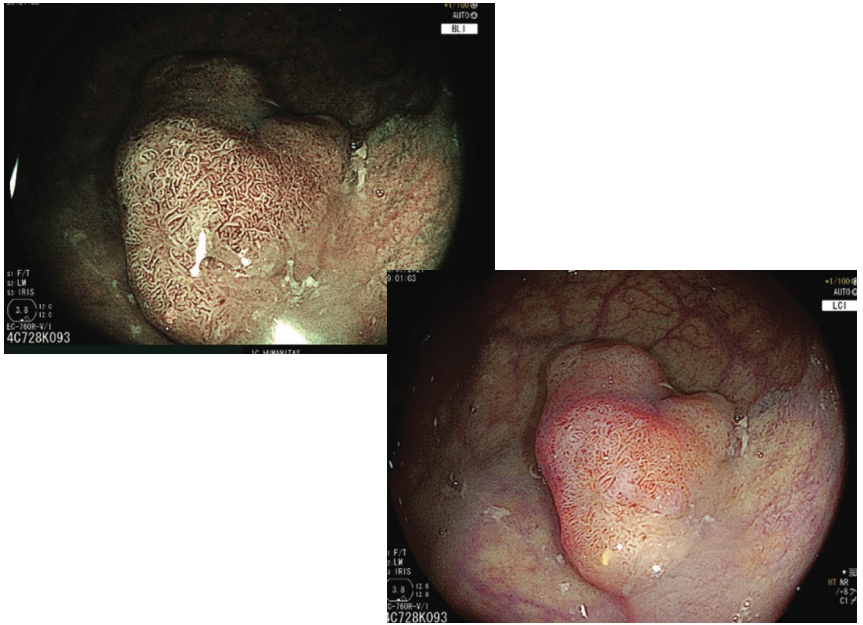
- Goal: decrease blind spots
- Distal cap attachment: protects tissue during introduction and helps avoid “red out”
  - Data is controversial
    - Initial meta-analysis of >4600 patients showed improved ADR with cap[1]
    - More recent RCTs showed no significant different in ADR, proximal ADR, or SSA detection rate[2]
- EndoCuff Vision
  - ADR: RR 1.12 (1.02-1.23); p = 0.02[3]
  - No difference in SSL or proximal colon polyp detection rate



[1]Nutalapati et al. *EIO*. 2018; [2]Marsano et al. *EIO*. 2019; [3]Patel et al. *GIE*. 2021.

Endoscopic Technique
Improve Visualization

- High definition white light imaging + detailed inspection is adequate!
- Chromoendoscopy
  - Indigo Carmine
  - Methylene Blue (+/- oral tablets)
  - Digital
    - Blue laser imaging (BLI)
    - Narrow band imaging (NBI)
    - Linked color imaging (LCI)



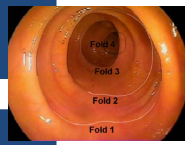
[1]Nutalapati et al. *EIO*. 2018; [2]Marsano et al. *EIO*. 2019; [3]Patel et al. *GIE*. 2021.

Endoscopic Technique
Improve Visualization

Possible missed lesions, adequate examination (27%)

"Elusive Polyps"

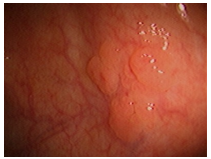
Behind fold



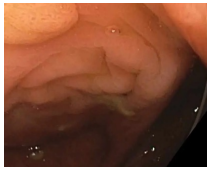
Human variables

Small

Flat/sessile

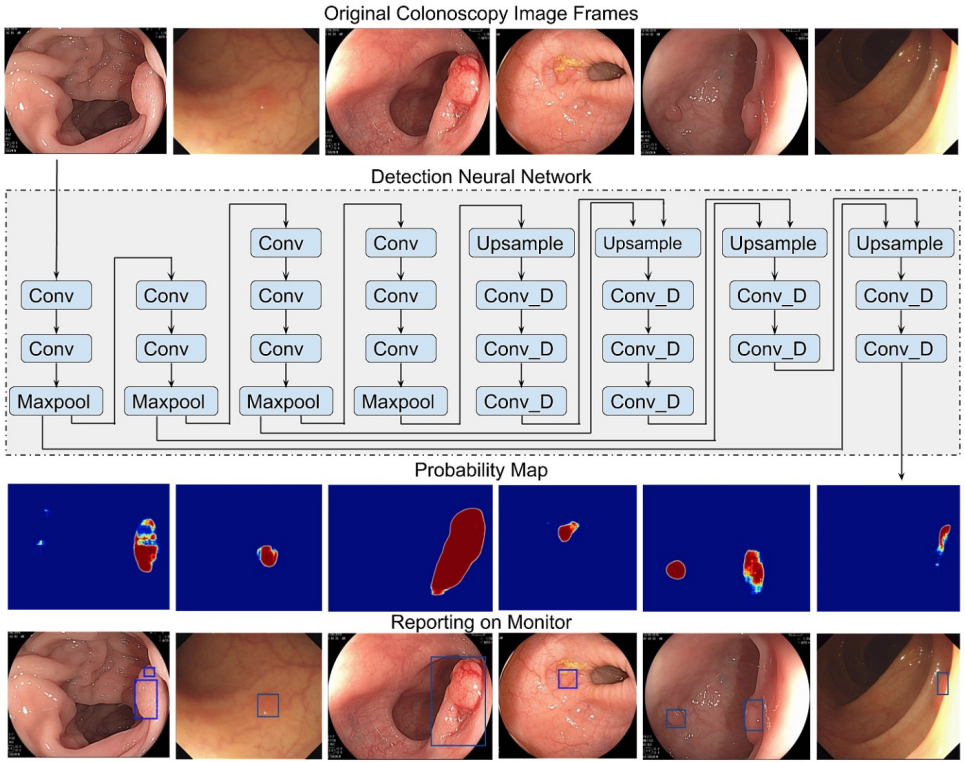


Visual periphery



Endoscopic Technique
Artificial Intelligence

- AI can provide real time support by recognizing:
  - Polyp patterns
  - Suggesting probable histology
  - Provide confidence level for predicted histology
- Two main areas of research:
  - Polyp detection (CADe)
  - Polyp classification (CADx)



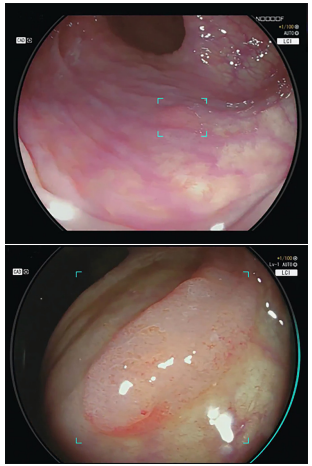
Wang et al. *Nature*. 2018.

Endoscopic Technique
Artificial Intelligence

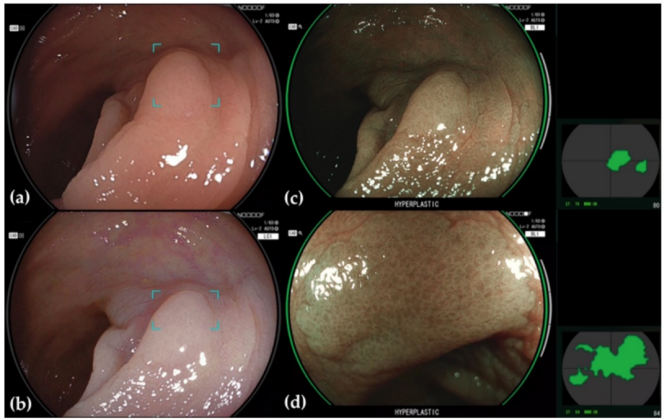
CADe

CADe + CADx

First gen

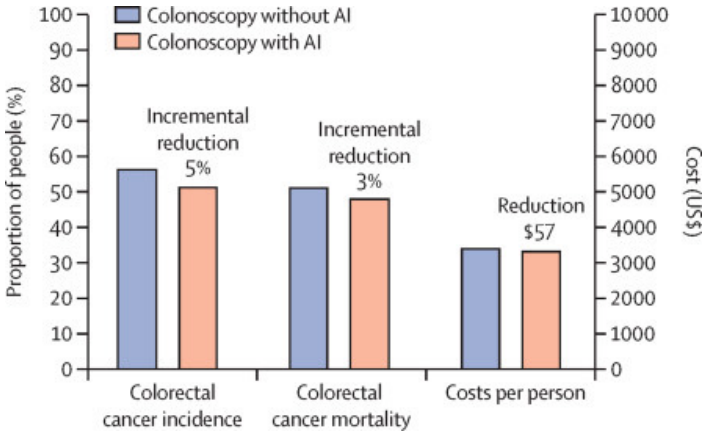


Next gen



Endoscopic Technique
Artificial Intelligence

- AI can increase ADR
  - ADR increased by 6–15.2% depending on investigator's skill and enrollment criteria
  - All randomized RCTs: significant increase in detection rate of small adenomas ≦5mm
    - One study showed increased detection rate of adenomas 6–9mm
  - No significant differences in withdrawal rates
- Can help determine management through CADx system
  - Tamai et al: 82.9% sensitivity and 82.6% specificity in determining T1b lesions
  - "Resect and discard" or "diagnose and leave"



Areia et al. *Lancet*. 2022.

Endoscopic Technique
Artificial Intelligence

Performance and Attitudes Toward Real-time Computer-aided Polyp Detection during Colonoscopy in a Large Tertiary Referral Center in the United States

Fredy Nehme, MD * • Emmanuel Coronel, MD * • Denise A. Barringer, MS • ... Mehnaz A. Shafi, MD • William A. Ross, MD • Phillip S. Ge, MD • Show all authors • Show footnotes

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CADe was activated in 52.1% of cases

Attitude towards AI: 25% fully embrace, 62.5% “Ok with it”

Potential Concerns regarding AI: 68.8% “too many false positives”

37.5% “unnecessarily prolongs procedure”

25% “too distracting”

12.5% “too expensive”

25.% “will not help ADR enough to be worthwhile”

Nehme et al. *GIE*. 2023.

Endoscopic Unit Support

- Intervention Report Card: endoscopist-specific audit and feedback of colonoscopy performance measures
  - Bowel preparation quality, cecal intubation rate, withdrawal time, PDR and ADR
  - Benchmarked against peers
- Multimodal: didactic lectures on withdrawal technique, visualization and polyp detection
  - +/- hands on component or skills improvement training
- Additional observers: dedicated in room nurse for polyp detection
- Withdrawal time monitoring: nurse recording

Table 2. Impact of Interventions on Colonoscopy Quality-Related Outcomes

Quality improvement interventions	Adenoma detection rate (OR, 95% CI)	Polyp detection rate (OR, 95% CI)	Advanced adenoma detection rate (OR, 95% CI)	Quality of Evidence based on GRADE[17]
Report card	1.28 (1.13–1.45)	1.27 (1.11–1.44)	1.28 (0.93–1.77)	Low
Multimodal	1.18 (1.00–1.40)	1.26 (1.04–1.53)	–	Low
Additional observers	1.25 (1.09–1.43)	–	–	Low
Withdrawal time monitoring	1.35 (0.93–1.96)	1.13 (0.89–1.43)	–	Low

Arora et al. *CGH*. 2023.

In Summary

1. Multiple factors related to technology, endoscopist and patient that can assist in improving ADR
2. As the patient population who qualify colorectal cancer screening expands, it becomes vitally important we adapt new techniques or technology to combat human fatigue and error

Thank you

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