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Artificial Intelligence in Colonoscopy in the Community Setting

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Background

- Colorectal Cancer (CRC) is the second leading cause of death by cancer in both men and women. This number has continued to decline over the last few decades due to screening colonoscopies
- Colonoscopy is both a diagnostic and therapeutic intervention. Colon polyps can be visualized and excised once detected.
- Detection of precancerous lesions can vary based on factors such as bowel preparation, quality of equipment, and the skill and comfort level of the endoscopist. Missed polyps can result in interval cancers

Background (cont.)



- Adenoma Detection Rate (ADR)) is a standardized metric used by endoscopist. ADR is defined by the American College of Gastroenterology as the percentage of patients age 45 and older undergoing a screening colonoscopy who have 1 or more precancerous polyp detected
- ADRs vary from 7% to 52%, with a goal of an ADR target greater than or equal to 25%
- An increased in ADR results in a lower risk of interval colon cancer. Some estimates show that a 1% increase in ADR lowers the risk of interval colon by as much as 6%

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Background (cont.)



- Artificial Intelligence (AI), particularly machine learning, has had a growing role in the field of endoscopy
- AI can potentially serve as an effective second endoscopist in term positively impacting the ADR
- One such AI system is the GI Genius™, by Medtronic, which has been shown in RCTs to have as much as a 30% increase in ADR

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- We aim to assess the impact of the use of artificial intelligence in colonoscopy on the adenoma detection rate in a community-based outpatient setting.

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Methods

- This study received an **“IRB Exempt Determination”** via CARRIE (C.A.R.R.I.E. Submission ID #: 2022-1096).
- We conducted a retrospective analysis of all patients undergoing a screening colonoscopy in an outpatient community setting. Colonoscopy reports from two endoscopists and correlating pathology reports from 2/2022 to 12/2022 were reviewed. With 7/2022 being the timepoint of implementation of Medtronic’s Artificial intelligence system GI Genius™.
- We included 1,278 patients in age range 45 years to 80 years undergoing an elective colonoscopy for screening purposes.

Methods (cont.)

- **Exclusion Criteria:**
 - Prior history of colon resection or colorectal cancer
 - Unable to complete the colonoscopy given poor bowel preparation
 - Charts included keywords indicating gastrointestinal disease including Ulcerative Colitis or Chron's Disease
 - History of a positive Cologuard test

Methods (cont.)



- We compared the adenoma detection rate (ADR) of two trained endoscopists prior to the implementation to the artificial intelligence system their ADRs after the implementation of the artificial intelligence system. Patient recall times were also compared in categories of 10 year, 5 year, 3 year, 1 year, and less than 1 year.
- Continuous variables were analyzed using a t-test

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Results



Endoscopist	Pre-AI ADR	Post-AI ADR
Endoscopist 1	37.04	35.13
Endoscopist 2	60.59	56.82

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Results (cont.)



	Pre AI ADR %	Post AI ADR %
Mean	48.8126362	45.9718149
Variance	277.32947	235.28735
Observations	2	2
Pearson Correlation	1	
Hypothesized Mean Difference	0	
df	1	
t Stat	3.05717036	
P(T<=t) one-tail	0.1006273	
t Critical one-tail	6.31375151	
P(T<=t) two-tail	0.20125459	
t Critical two-tail	12.7062047	

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Recall Time for Operator 1

	Pre-AI Frequency	Pre-AI Percent	Post-AI Frequency	Post-AI Percent
No Follow up Required	7	1.99%	8	2.86%
<1 years	6	1.70%	4	1.43%
3 years	72	20.45%	51	18.21%
5 years	104	29.55%	99	35.36%
10 years	163	46.31%	118	42.14%

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Recall Time for Operator 2



	Pre-AI Frequency	Pre-AI Percent	Post-AI Frequency	Post-AI Percent
No Follow up Required	2	0.59%	5	1.62%
<1 years	29	8.50%	16	5.18%
3 years	78	22.87%	67	21.68%
5 years	149	43.70%	141	45.63%
10 years	81	23.75%	78	25.24%

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Conclusion

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- There appears to be no statistically significant difference in adenoma detection rates with the addition of artificial intelligence during a screening colonoscopy
- Given the data for recall time for colonoscopy is not statistically matched, this data remains observational
- Further larger studies will be needed to validate these findings
- Artificial Intelligence has had a large impact in many fields including medicine and the field of gastroenterology. Our results show the need for improvement in this technology.

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