

SUPPLEMENTAL MATERIAL

Understanding Characteristics of Who Undergoes Testing is Crucial for the Development of Diagnostic Strategies to Identify Individuals at Risk for Early-age Onset Colorectal Cancer

Ravy K. Vajravelu MD MSCE, Shivan J. Mehta MD MBA MSHP, and James D. Lewis MD
MSCE on behalf of the EOCRC TrEnDS Study Group

CONTENTS	PAGE
Supplemental methods	2
Supplemental table 1. General population cohort demographic characteristics stratified by year	3
Supplemental figure 1. Trends in incidence rates of risk factors potentially eligible for early CRC screening or for diagnostic evaluation among the general population ages 18 – 49.	4

Supplemental methods: General population cohort inclusion and exclusion criteria

Optum contains patient-level data from April 1, 2000 – June 30, 2019. We used data from January 1, 2004 – December 31, 2018 to derive the study results. We chose 2004 as the study start year because it was the first year Optum captured complete inpatient data. We also used data from April 1, 2000 – December 31, 2003 to assess exclusion criteria.

Individuals 18 – 49 years-old without gaps in enrollment were eligible for inclusion in the general population cohort. Individuals with the following symptom, conditions, and procedures within the first 180 days of enrollment were excluded because they may reflect underlying prevalent EOCRC or they could have led to testing that incidentally diagnosed prevalent EOCRC.

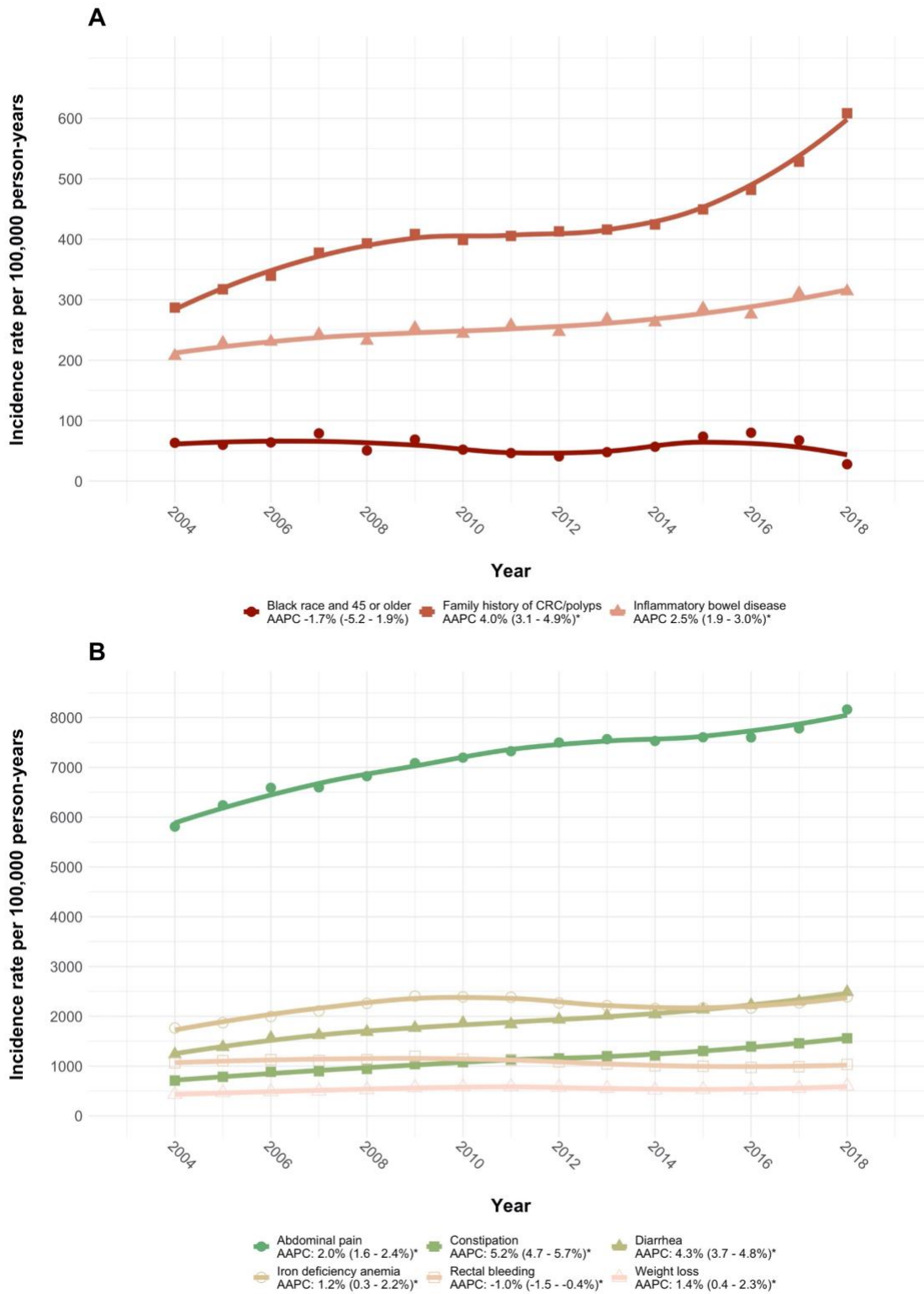
- Symptoms and conditions: Abdominal pain, arteriovenous malformations of the intestine, bowel obstruction, celiac disease, change in bowel habits, cholangitis, cholecystitis, constipation, diarrhea, diverticulitis, fatigue, functional dyspepsia, gastroparesis, hemorrhoids, *Helicobacter pylori* infection, inflammatory bowel disease, iron deficiency anemia, irritable bowel syndrome, menorrhagia, nausea/vomiting, pancreatitis, rectal bleeding, small intestinal bacterial overgrowth, weight loss
- Procedures: Colonoscopy, flexible sigmoidoscopy, fecal occult blood testing, fecal immunochemical testing, fecal immunochemical testing-fecal DNA testing, CT colonography, barium enema, CT-abdomen/pelvis, MRI-abdomen/pelvis

For individuals without exclusions, follow-up started on the later of 181 days after enrollment, age 18, or January 1, 2004. Follow-up ended on the earlier of the last day of enrollment, age 50, the day after EOCRC diagnosis, or December 31, 2018. Individuals with fewer than 180 days of follow-up were excluded.

Supplemental table 1. General population cohort demographic characteristics stratified by year

Year	n	Person-years	Female (%)	Race/ethnicity (%)					Age (%)				Black race and 45 – 49 (%)
				Asian	Black	Hispanic	White	Unknown	18 – 29	30 – 39	40 – 44	45 – 49	
2004	6952240	5569843	51	4	7	10	60	19	30	34	19	18	1
2005	7014261	5627166	51	4	7	10	60	19	30	33	19	18	1
2006	6949004	5624830	50	4	7	11	59	18	31	33	18	18	1
2007	6836400	5524038	50	5	8	11	59	17	32	33	18	18	1
2008	6480982	5392348	50	5	8	11	60	16	32	32	17	18	1
2009	6089985	5104117	50	5	9	11	61	13	32	32	17	18	2
2010	5631243	4761991	50	5	9	12	63	11	32	32	17	18	2
2011	5438966	4617969	50	5	10	12	64	9	33	32	17	18	2
2012	5247172	4486072	49	6	9	12	65	8	34	32	17	17	2
2013	5148812	4334437	49	6	9	12	65	8	35	32	17	17	2
2014	4886066	4022659	49	6	9	13	64	8	35	32	16	16	1
2015	4918253	3979028	48	6	9	14	62	9	35	33	16	16	1
2016	5013661	4043789	48	6	9	14	59	11	36	33	15	16	1
2017	4921598	3971881	48	6	9	14	57	14	36	33	15	16	1
2018	4813848	3859205	48	5	8	12	51	24	36	34	15	16	1

Supplemental figure 1. Trends in incidence rates of risk factors potentially eligible for early CRC screening or for diagnostic evaluation among the general population ages 18 – 49.



Panel A: Trend in incidence rates of risk factors eligible for early CRC screening

Panel B: Trend in incidence rates of alarm and non-alarm symptoms eligible for diagnostic evaluation

Notes: * Indicates AAPC 95% CI does not cross 0. Smooth trend lines were generated using LOESS.