



A Modeling Study Investigating the Potential of Multi-Cancer Early Detection Screening in Reducing Cancer Incidence and Mortality in Elevated-Risk Groups

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Jagpreet Chhatwal^{1,2,3*}, Jade Xiao³, Andrew ElHabr³, Christopher Tyson⁴, Xiting Cao⁴, Ashish Deshmukh⁵, Sana Raoof⁶, A. Mark Fendrick⁷, Andrew Briggs⁸, A. Burak Ozbay⁴, Paul Limburg⁴, Tomasz M. Beer⁴

¹Center for Health Technology Assessment, Mass General Brigham, Boston, MA, USA, ²Center for Health Decision Science, Harvard University, Boston, MA, USA, ³Value Analytics Labs, Boston, MA, USA, ⁴Exact Sciences Corporation, Madison, WI, USA, ⁵Medical University of South Carolina, Charleston, SC, USA, ⁶Memorial Sloan Kettering Cancer Center, New York, NY, USA, ⁷School of Public Health, University of Michigan, Ann Arbor, MI, USA, ⁸London School of Hygiene & Tropical Medicine, London, UK | *Corresponding author: JagChhatwal@mgh.harvard.edu

1 BACKGROUND

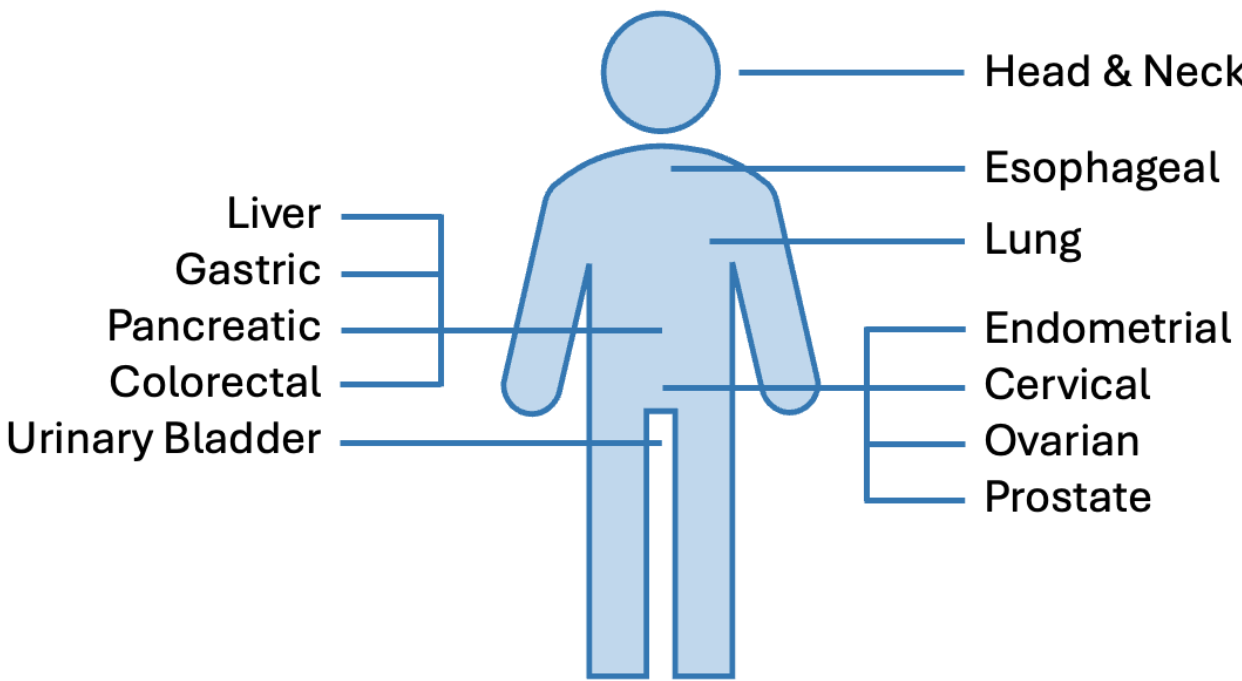
- Cancer is the second leading cause of death in the United States, with more than 618,000 cancer-related deaths predicted in 2026.¹
- Early detection is associated with a higher chance of survival, but currently around half of cancers are detected at an advanced stage.²
- Routine screening is recommended for only four cancer types (breast, cervical, colorectal, and lung),³ and two-thirds of incident cancers lack routine screening guidelines.⁴
- Multi-cancer early detection (MCED) tests can simultaneously detect several cancer types and are intended to be used alongside standard-of-care (SoC) screening.

2 OBJECTIVE

To evaluate the potential impact of an MCED test in terms of the reduction in cancer incidence and mortality in the general population and elevated-risk groups.

3 METHODS

- We developed **Simulation Model for MCED (SiMCED)**,⁵ a microsimulation model of 14 solid tumor cancer types:



- MCED test sensitivities were derived from a large, multi-center, prospectively-collected, retrospective case-control study (ASCEND-2).⁶
- After a cancer diagnosis, individuals followed SEER survival curves to determine the time and cause of death.⁴
- Using a 10-year horizon, we simulated the life course of 5 million adults aged 50-84 years representing the US population, as well as 3 elevated-risk groups:
 - Smokers**, former and current,
 - Heavy alcohol users**, and
 - Individuals with a family history of cancer**, ≥1 first-degree relative with a cancer diagnosis.
- We compared outcomes under two screening strategies:
 - SoC**: SoC screening without MCED testing, and;
 - SoC + MCED**: SoC screening supplemented by perfect adherence to annual MCED testing for individuals aged 50-84 years.

4 RESULTS

- Tables 1 and 2** present cancer-specific 10-year reductions in, respectively, stage IV cancer incidence and cancer mortality.
- Relative reductions were consistent across the general population and elevated-risk groups.
- Figure 1** compares 10-year stage shift across the general population and elevated-risk groups.

Table 1. Reductions in 10-year stage IV cancer incidence (per 100,000) for the general population and elevated-risk groups.

Cancer type	General population			Smokers			Heavy alcohol users			Family history of cancer		
	SoC	SoC + MCED	Change	SoC	SoC + MCED	Change	SoC	SoC + MCED	Change	SoC	SoC + MCED	Change
Breast	106	48	-58 (-55%)	114	54	-60 (-53%)	142	68	-74 (-52%)	131	62	-69 (-53%)
Cervical	12	2	-10 (-83%)	9	2	-7 (-78%)	11	2	-9 (-82%)	9	2	-7 (-78%)
Colorectal	236	83	-153 (-65%)	288	108	-180 (-62%)	321	120	-201 (-63%)	293	109	-184 (-63%)
Endometrial	39	22	-17 (-44%)	35	21	-14 (-40%)	38	22	-16 (-42%)	48	28	-20 (-42%)
Esophageal	49	24	-25 (-51%)	53	27	-26 (-49%)	106	54	-52 (-49%)	54	28	-26 (-48%)
Gastric	79	29	-50 (-63%)	99	39	-60 (-61%)	94	37	-57 (-61%)	120	46	-74 (-62%)
Head and Neck	172	70	-102 (-59%)	205	86	-119 (-58%)	364	153	-211 (-58%)	184	78	-106 (-58%)
Kidney	74	37	-37 (-50%)	69	35	-34 (-49%)	59	31	-28 (-47%)	71	37	-34 (-48%)
Liver	66	20	-46 (-70%)	74	26	-48 (-65%)	88	31	-57 (-65%)	86	30	-56 (-65%)
Lung	765	388	-377 (-49%)	2,021	1,092	-929 (-46%)	829	440	-389 (-47%)	848	452	-396 (-47%)
Ovarian	50	34	-16 (-32%)	53	38	-15 (-28%)	54	39	-15 (-28%)	63	45	-18 (-29%)
Pancreatic	211	72	-139 (-66%)	281	103	-178 (-63%)	262	97	-165 (-63%)	276	100	-176 (-64%)
Prostate	202	197	-5 (-2%)	122	119	-3 (-2%)	152	148	-4 (-3%)	127	124	-3 (-2%)
Urinary Bladder	47	6	-41 (-87%)	33	6	-27 (-82%)	28	5	-23 (-82%)	35	6	-29 (-83%)
Total	2,108	1,032	-1,076 (-51%)	3,456	1,756	-1,700 (-49%)	2,548	1,247	-1,301 (-51%)	2,345	1,147	-1,198 (-51%)

Table 2. Reductions in 10-year cancer mortality (per 100,000) for the general population and elevated-risk groups.

Cancer type	General population			Smokers			Heavy alcohol users			Family history of cancer		
	SoC	SoC + MCED	Change	SoC	SoC + MCED	Change	SoC	SoC + MCED	Change	SoC	SoC + MCED	Change
Breast	120	79	-41 (-34%)	116	78	-38 (-33%)	142	96	-46 (-32%)	130	87	-44 (-33%)
Cervical	18	9	-9 (-52%)	13	6	-6 (-50%)	15	7	-8 (-51%)	13	6	-7 (-51%)
Colorectal	284	168	-116 (-41%)	336	205	-131 (-39%)	375	228	-147 (-39%)	338	206	-132 (-39%)
Endometrial	60	47	-13 (-22%)	51	41	-10 (-20%)	55	44	-11 (-20%)	69	55	-14 (-21%)
Esophageal	83	69	-14 (-17%)	88	74	-14 (-16%)	175	146	-29 (-16%)	90	74	-15 (-17%)
Gastric	105	73	-32 (-30%)	134	93	-41 (-30%)	130	91	-40 (-30%)	163	113	-50 (-31%)
Head and Neck	114	79	-35 (-31%)	124	86	-38 (-31%)	217	149	-67 (-31%)	109	76	-33 (-30%)
Kidney	89	63	-26 (-29%)	78	57	-21 (-27%)	66	48	-18 (-27%)	78	58	-20 (-26%)
Liver	177	141	-36 (-20%)	204	164	-40 (-20%)	243	195	-47 (-20%)	238	192	-46 (-19%)
Lung	962	802	-160 (-17%)	2,462	2,070	-392 (-16%)	994	829	-166 (-17%)	1,014	846	-168 (-17%)
Ovarian	64	56	-8 (-12%)	64	57	-7 (-11%)	64	57	-7 (-11%)	74	66	-9 (-12%)
Pancreatic	288	238	-51 (-18%)	386	317	-68 (-18%)	358	293	-65 (-18%)	376	309	-67 (-18%)
Prostate	79	77	-2 (-2%)	36	35	-1 (-2%)	44	43	-1 (-3%)	37	36	-1 (-2%)
Urinary Bladder	94	64	-30 (-32%)	73	55	-19 (-25%)	63	47	-16 (-25%)	76	56	-20 (-26%)
Total	2,537	1,965	-572 (-23%)	4,165	3,337	-827 (-20%)	2,941	2,274	-667 (-23%)	2,806	2,179	-627 (-22%)

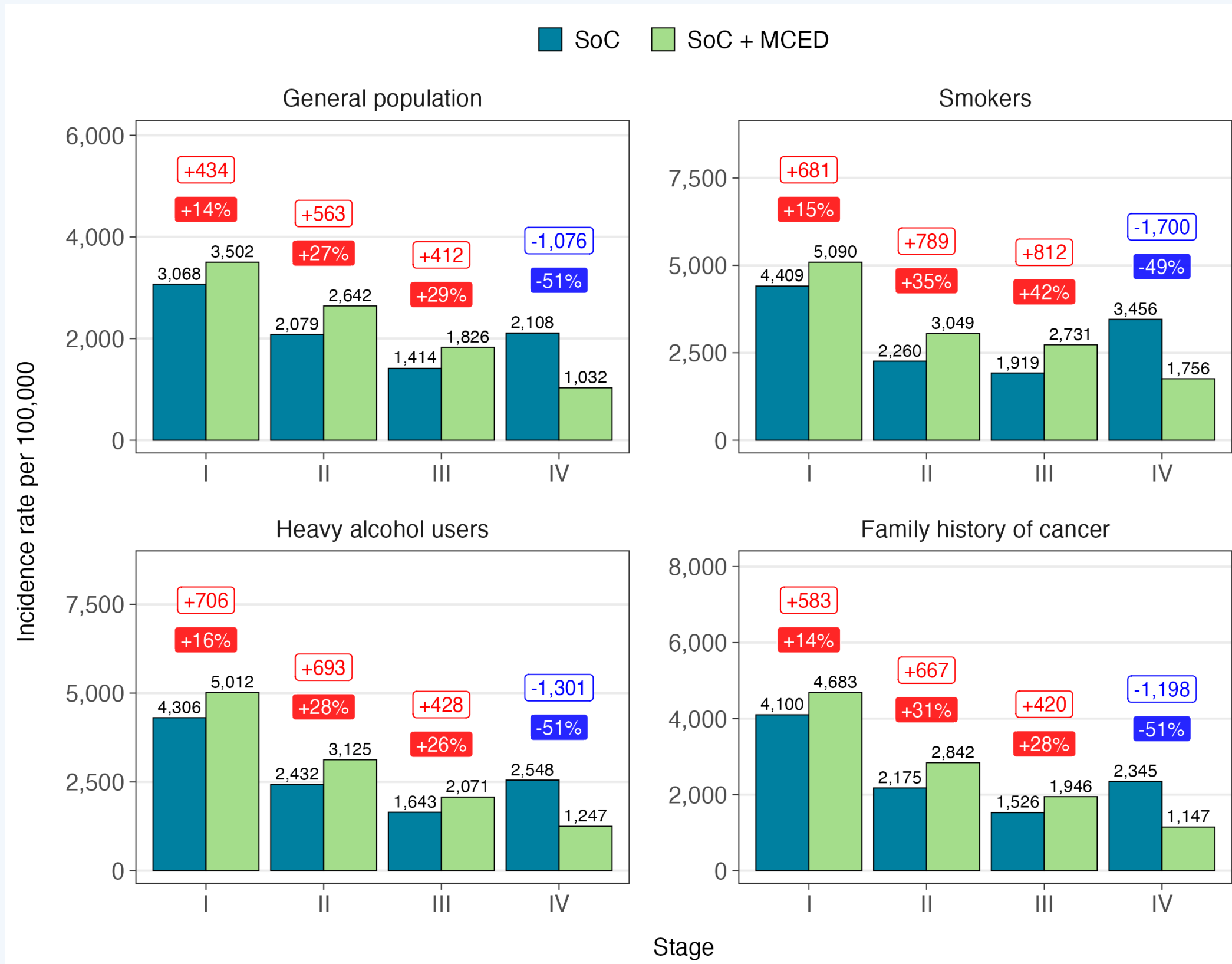


Figure 1. 10-year stage shift (per 100,000) for the general population and elevated-risk groups.

5 CONCLUSION

SoC screening supplemented by MCED testing may reduce stage IV cancer incidence and mortality in the general population and elevated-risk groups.

6 REFERENCES

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This study was funded by Exact Sciences Corp., Madison, WI.