THE DIAGNOSTIC PATHWAY THROUGH SCREENING FOR THE EARLY DETECTION OF CANCER AND PRE-CANCER

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October 6, 2021
Achieving Excellence in Cancer Diagnosis: A Workshop
National Academy of Science, Engineering, and Medicine

Screening for Cancer

Potentially preventable cancer cases and deaths

WHO estimate: **30-50**% of deaths from cancer could be prevented

US estimate based on 2014 data (ACS):

- 659,640 (**42**%) cases and 265,150 (**45**%) deaths could be prevented.

*Based on 2018 BRFSS Data; **Chest. 2020:157(1); 236-238.
CA Cancer J Clin 2018;68:31-54; CA Cancer J Clin. 2021;71(1):7-33

Screening for Cancer

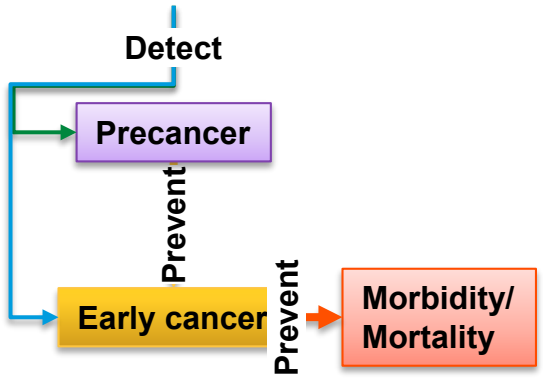
Type of cancer	New cases (rate per 100k)	2021 deaths (rate per 100k)	% distant stage	Screening available?	% screened
All Cancers	1,898,160 (450.5)	608,570 (155.5)		Not for most cancer types	
Colorectal	149,500 (37.8)	52,980 (13.7)	20.9%	Colonoscopy, fecal tests, etc.	71.4%*
Cervix Uteri	14,480 (7.5)	4,290 (2.2)	15.2%	Cytology/HPV DNA	80.2%*
Breast	281,550 (129.1)	43,600 (20.1)	5.8%	Mammography	78.3%*
Lung cancer	235,760 (53.1)	131,880 (38.5)	48.4%	Low-dose CT scan	~16.3%**
Pancreas	60,430 (13.2)	48,220 (11.0)	49.5	None	

Screening for Cancer

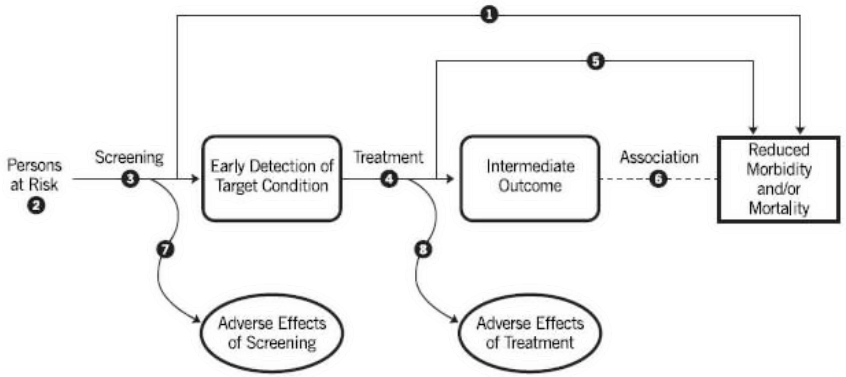
- Detectable preclinical phase (e.g., adenoma, high-grade dysplasia, or early invasive disease)
- Treatment of preclinical disease is more effective than when detected through clinical presentation
- There is a safe, accurate, and effective screening test
- The screening test is both acceptable and feasible
- There is a clearly defined diagnostic pathway for a positive test result
- Equity considerations are defined (it is accessible for those with high burden)

Wilson J, Junger G: Principles and practice of screening for disease. WHO 1968

Screening for Cancer



The USPSTF assesses the evidence across an **analytic framework** on the balance of the **benefits** and **harms**



Screening is performed in people who are 'asymptomatic' for the cancer of interest

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Therefore, safe as well as effective are crucial to recommending a particular screening test or strategy

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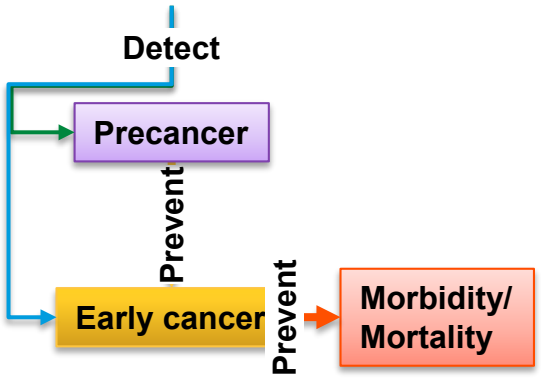
Screening is recommended when **NET BENEFIT** is demonstrated

US Preventive Services Task Force

Screening for Cancer



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Safety

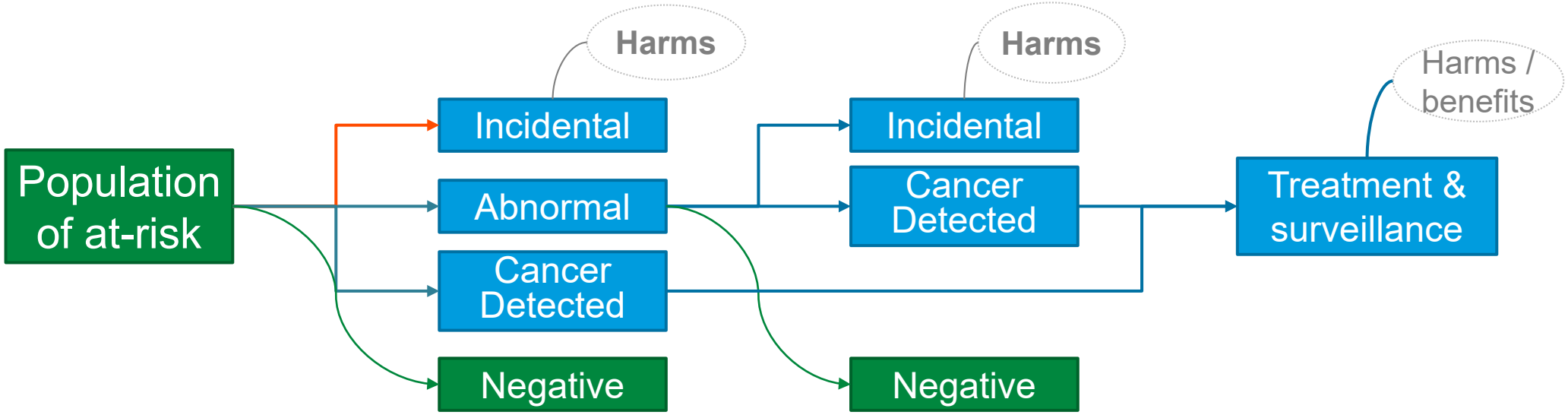
- Direct harms from the test itself
- Harms from the testing process, including harms of diagnostic testing
- Harms from over-diagnosis, false positives, incidental findings, etc.

• Effectiveness

- Effectiveness in reducing morbidity
- Effectiveness in reducing mortality
  - Cancer-specific & overall (all-cause)
- Effectiveness in improving quality of life

Screening for Cancer

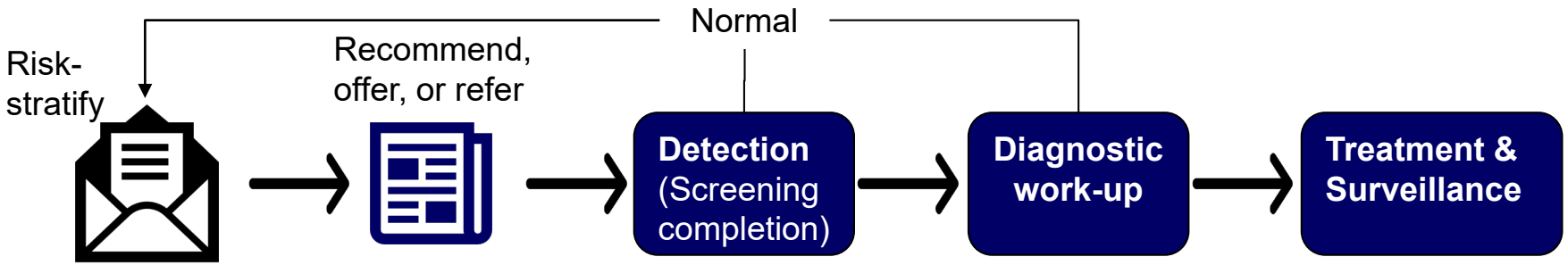
SCREENING AS A MULTISTEP PROCESS



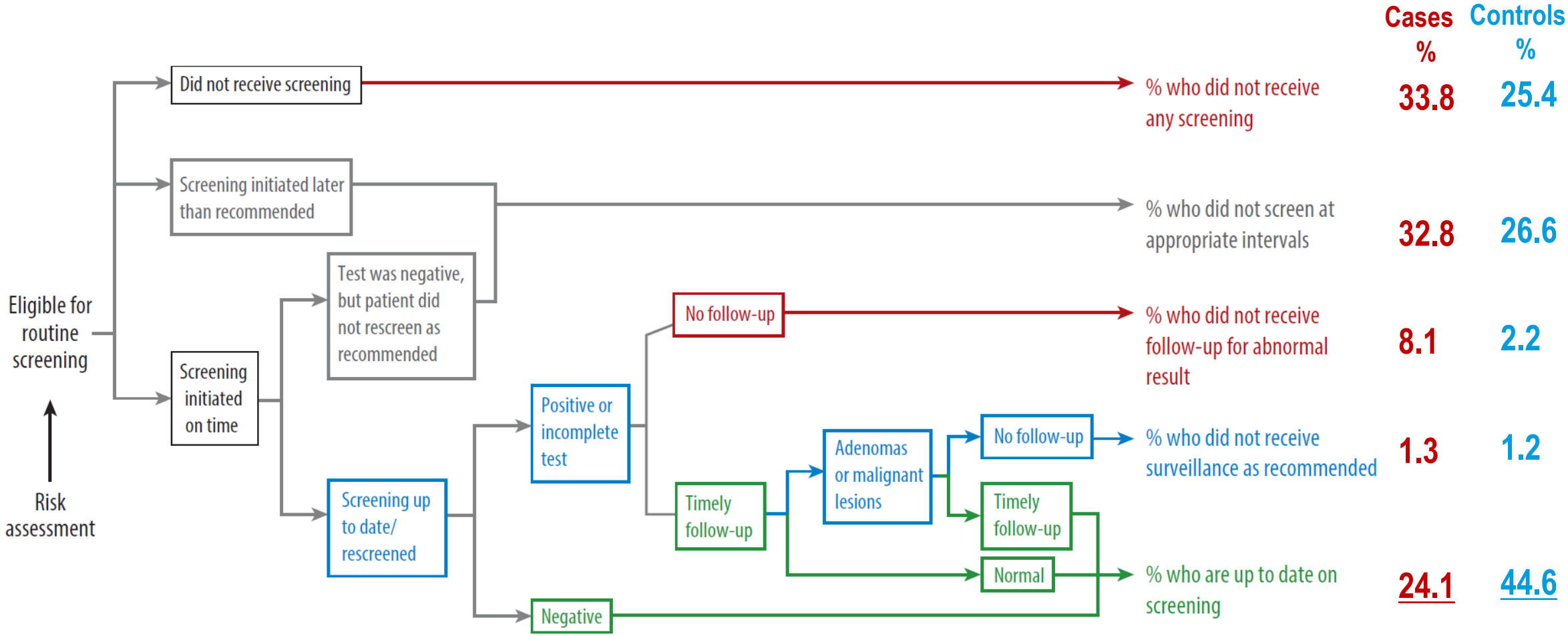
Population management (tracking and monitoring systems); Access to care; social determinants of health; System and community capacity

Screening for Cancer

SCREENING AS A MULTISTEP PROCESS



Impact of failures across the screening process



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Doubeni et al. Gastroenterology. 2019

Doubeni et al. Annual Review of Medicine, 2021

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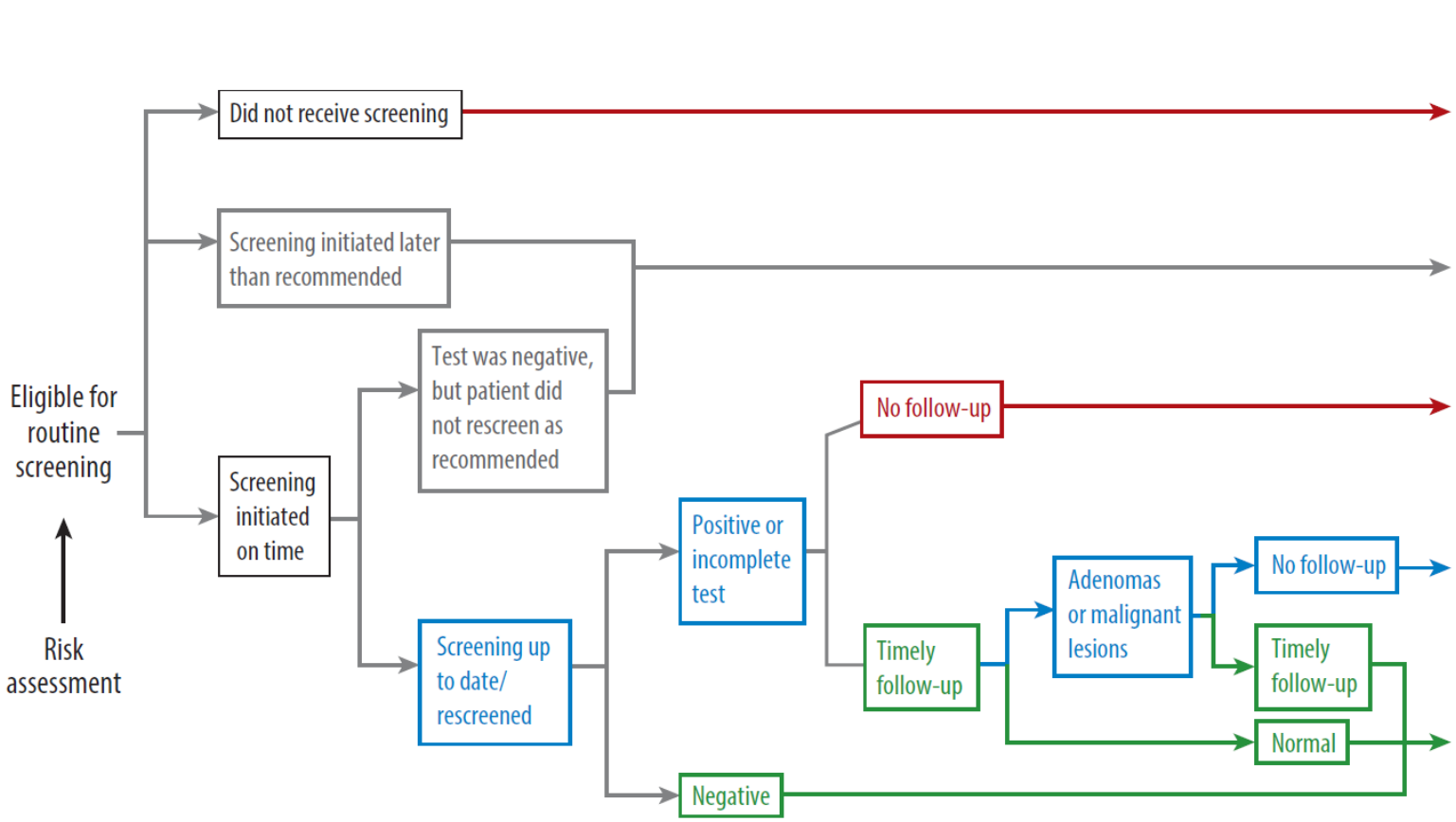

	Cases %	Controls %	OR
% who did not receive any screening	33.8	25.4	2.46
% who did not screen at appropriate intervals	32.8	26.6	2.36
% who did not receive follow-up for abnormal result	8.1	2.2	7.26
% who did not receive surveillance as recommended	1.3	1.2	2.15
% who are up to date on screening	24.1	44.6	Ref

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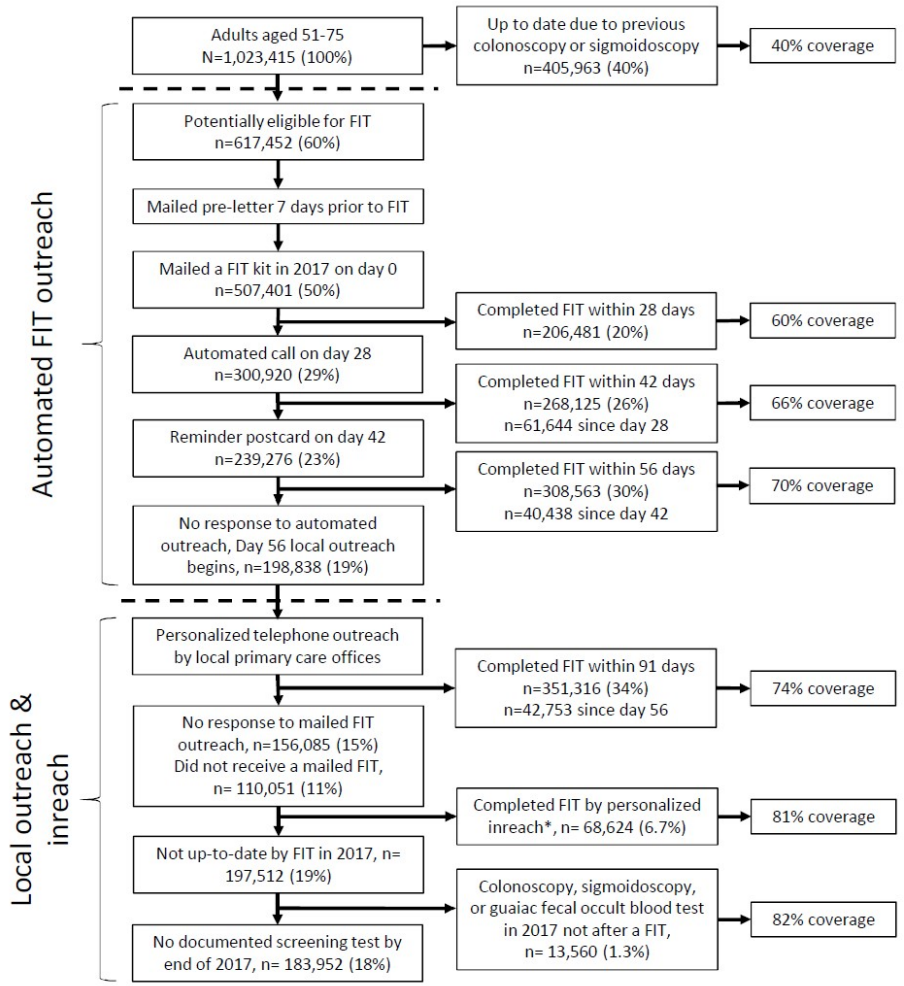
Doubeni et al. Gastroenterology. 2019

Doubeni et al. Annual Review of Medicine, 2021

BEST PRACTICES

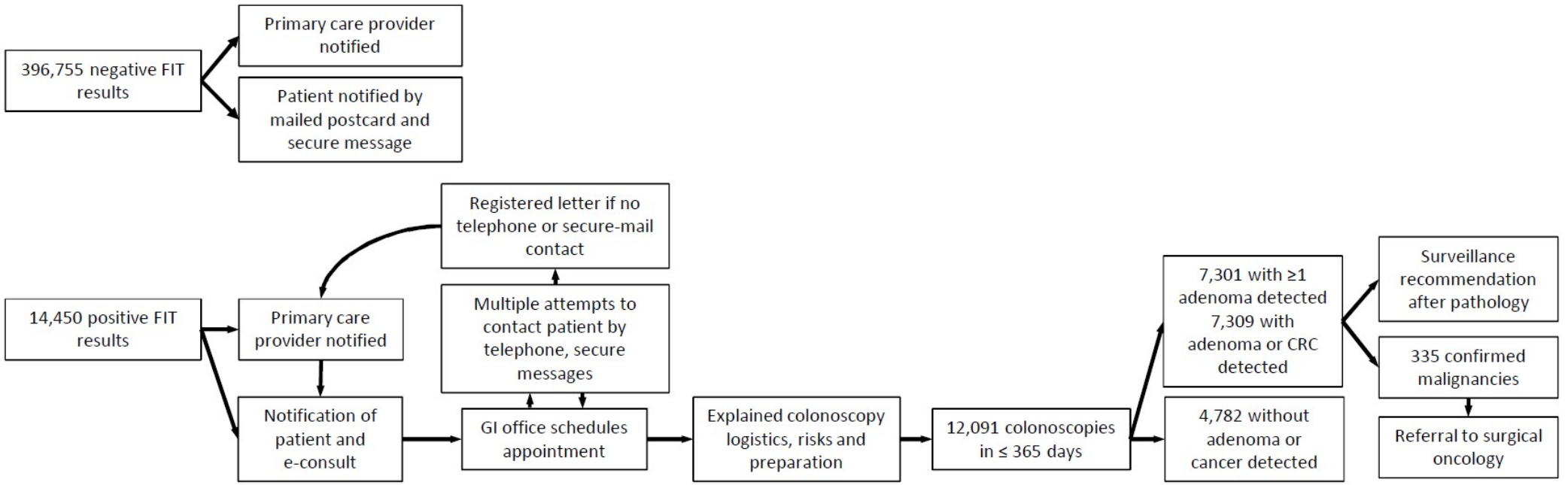
Kaiser Permanente Screening Program

- Program of proactive screening delivery based using fecal immunochemical test
- Goal to achieve high screening rates across populations using Healthcare Effectiveness Data and Information Set (HEDIS) measures
- Timely initiation of screening when age-eligible
- Timely re-screening appropriate intervals
- Ensure high quality screening (QI)
- Timely follow-up when abnormal
- Timely delivery of treatment when cancer is detected



Selby K, et al. Program Components and Results From an Organized Colorectal Cancer Screening Program Using Annual Fecal Immunochemical Testing. CGH. 2020

Best Practices



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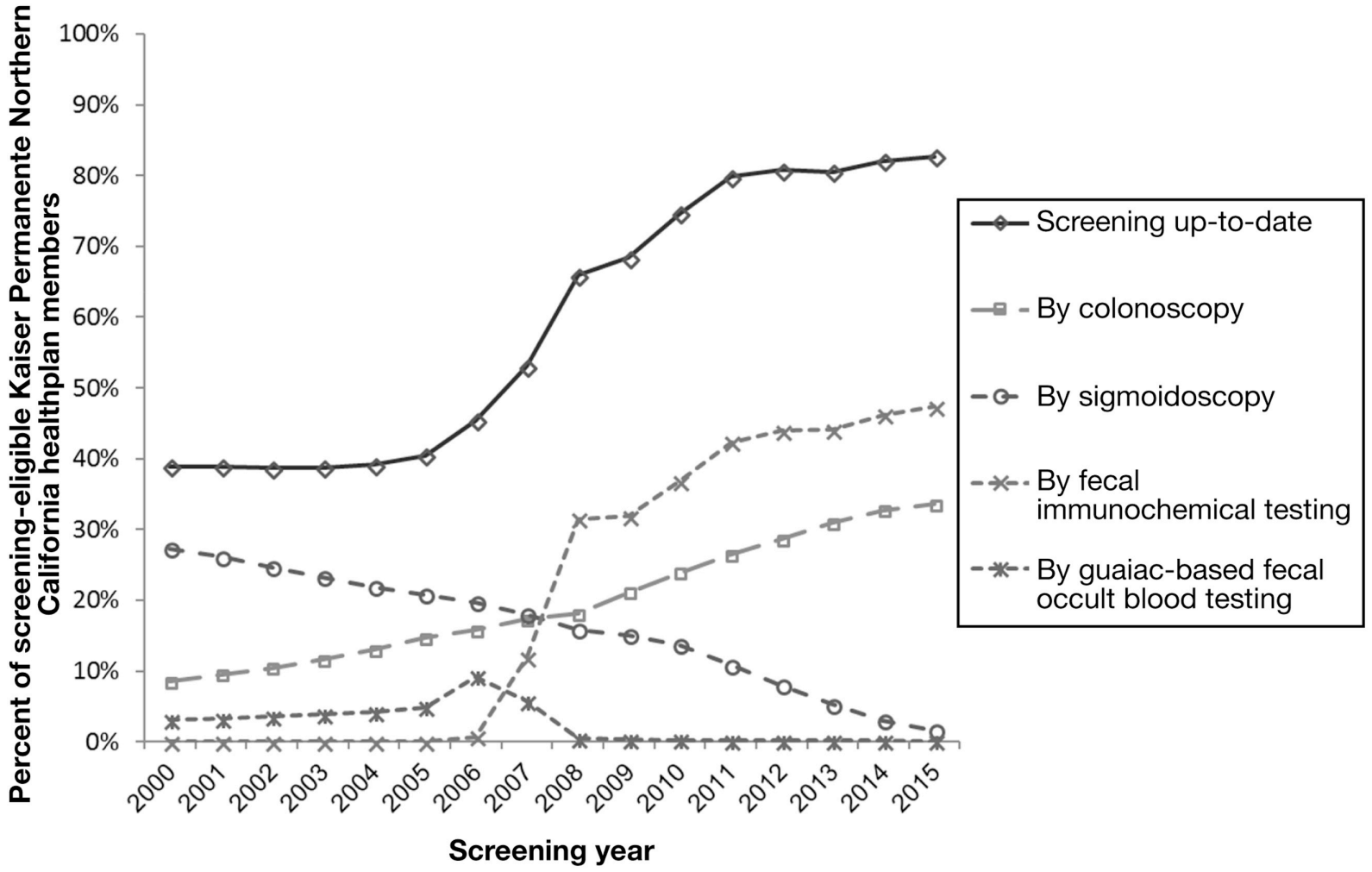
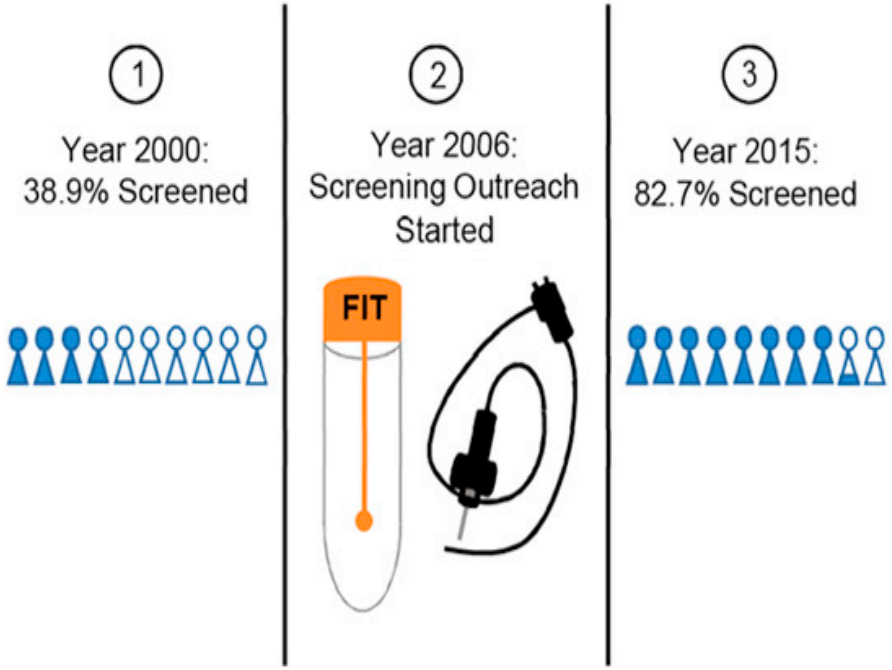
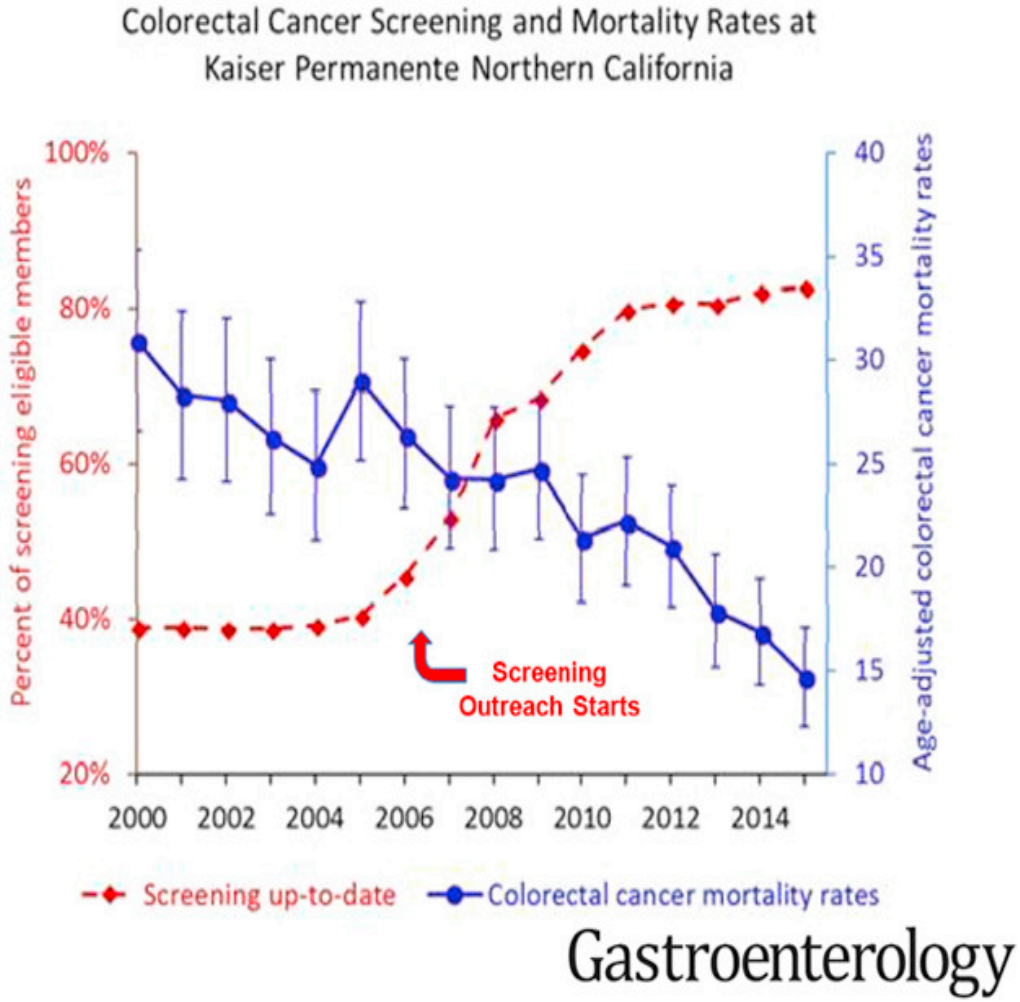
KP SCREENING PROGRAM



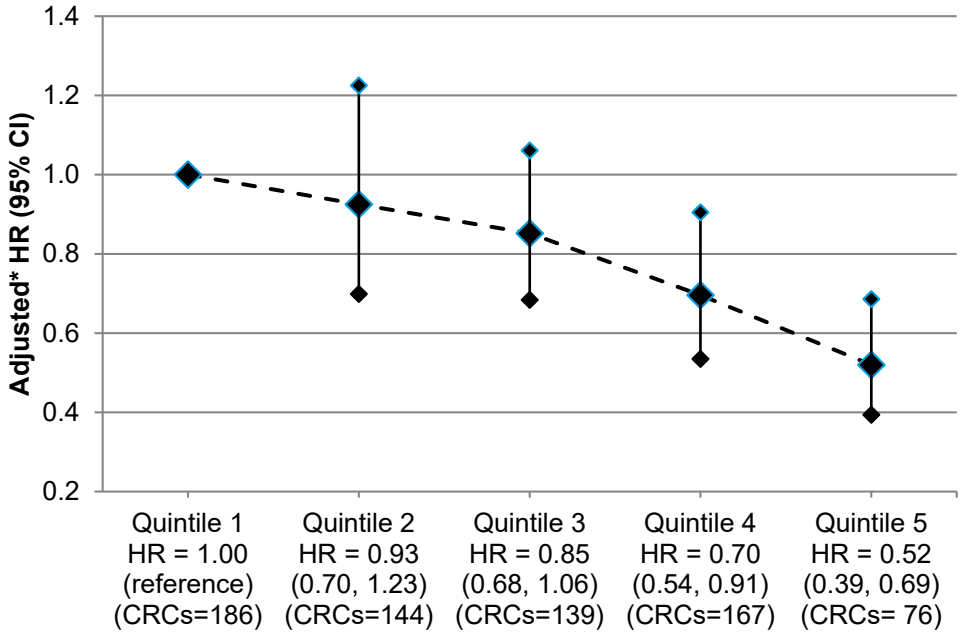
KP SCREENING PROGRAM



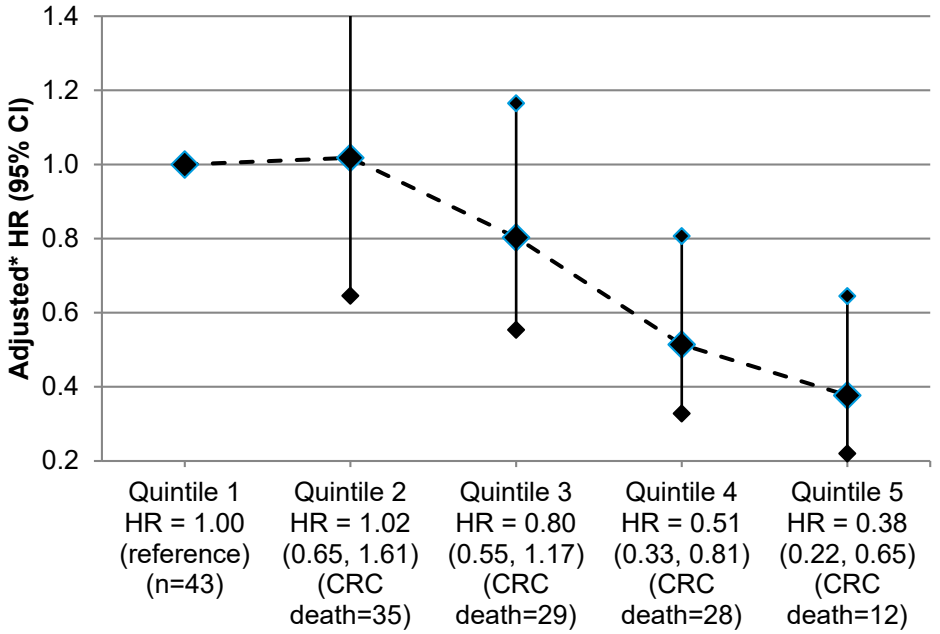


Association of Adenoma Detection Rate and Risk of Incidence and Death from Interval Colorectal Cancer, KPNC

Interval CRC Incidence Risk

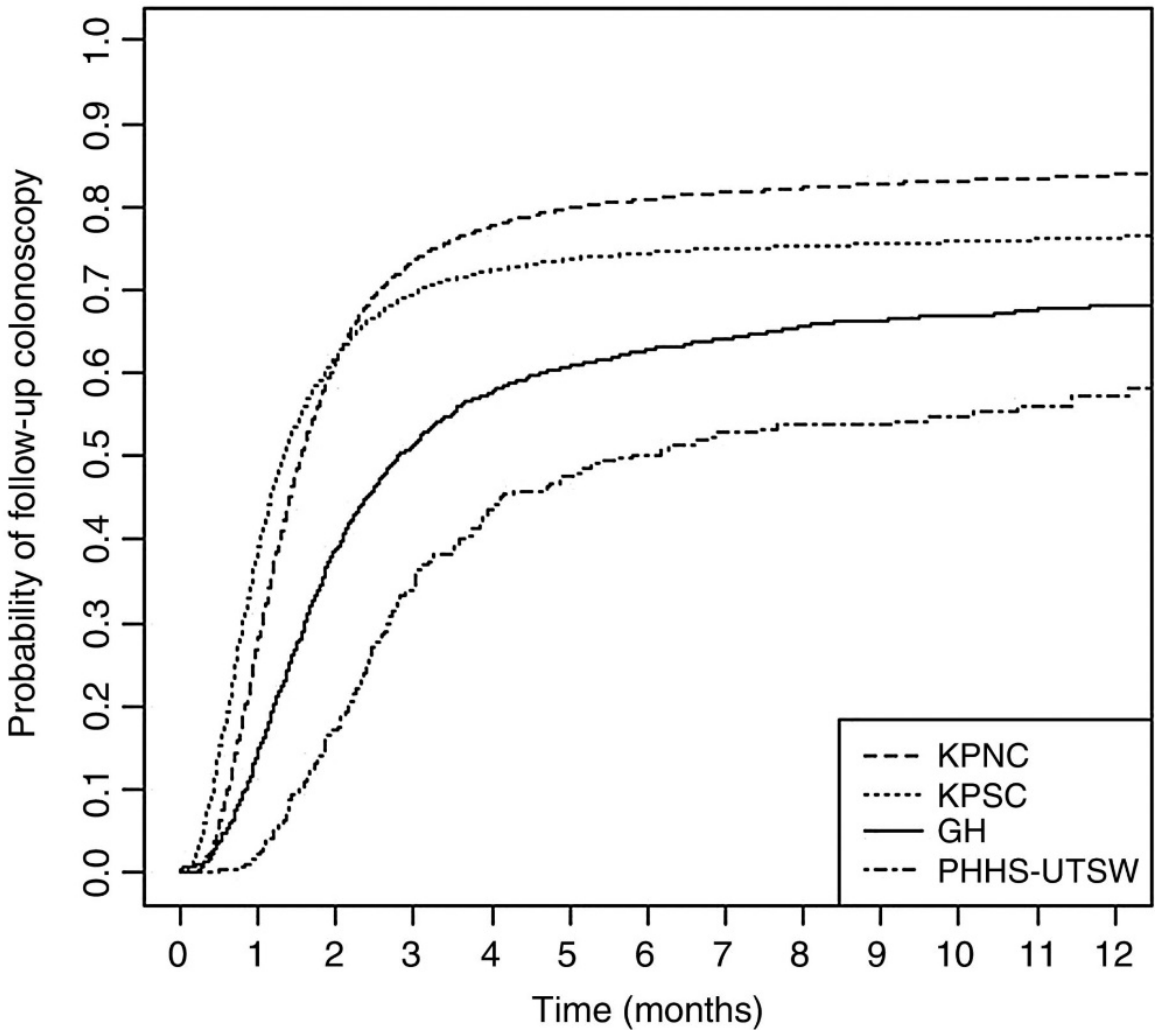


Incidence CRC Mortality risk



Corley et al. NEJM. 2014

Time to follow-up colonoscopy after positive FOBT, PROSPR, 2011–2012.

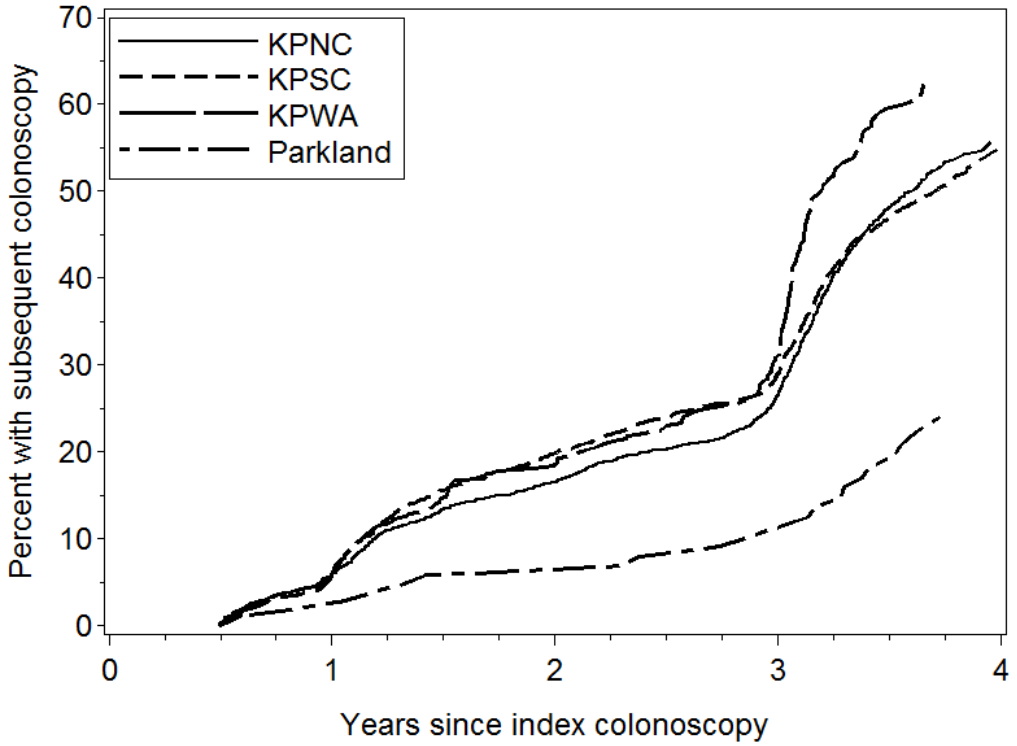


Chubak et al. CEBP 2016;25:344-350

AACR American Association for Cancer Research
Cancer Epidemiology, Biomarkers & Prevention

Adherence to Surveillance Colonoscopy

Time from index colonoscopy to subsequent colonoscopy in PROSPR by healthcare system



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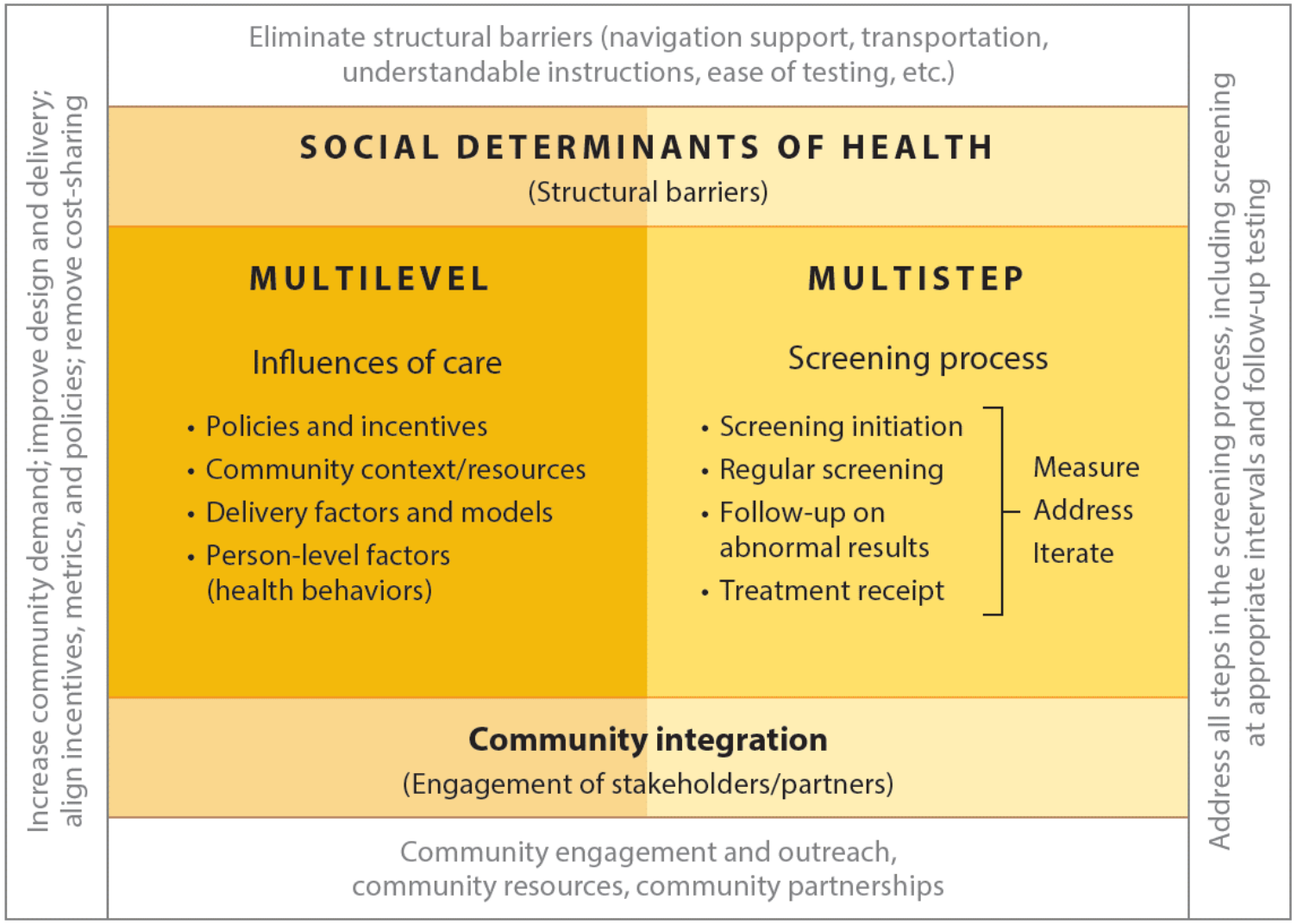
Chubak, et al. CEBP

Abbreviations: KPNC = Kaiser Permanente Northern California; KPSC = Kaiser Permanente Southern California; KPWA = Kaiser Permanente Washington; Parkland = Parkland Health & Hospital System

A Health Equity Framework for Disparities



Annual Review of Medicine. 2021:72:383-398

Thank YOU!