

# LOW-VALUE CANCER SCREENINGS IN THE VETERANS HEALTH ADMINISTRATION

RATES AND FACTORS ASSOCIATED WITH OVERUSE OF BREAST, CERVICAL, COLORECTAL, & PROSTATE CANCER TESTING

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# Objectives

- Define low-value cancer screening
- Understand rates of low-value testing
- Clarify factors associated with low-value testing

Associated publication:

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# Defining Low-Value Healthcare

Healthcare that....

does not provide a benefit

**OR**

Where potential harms outweigh benefits

# Low-Value Cancer Screenings

Screening patients when **potential benefit** from diagnosis of cancer exceeds **potential harm** from procedure, short-term risks from testing, or complications, such as:

- Life expectancy shorter than time for cancer to develop
- Illness burden raises risk of complications
- Testing unacceptable for patient
- Downstream harms from testing “cascades”

# Acknowledgements

**Goal is care quality (safe, timely, appropriate, beneficial,  
and patient-centered)**

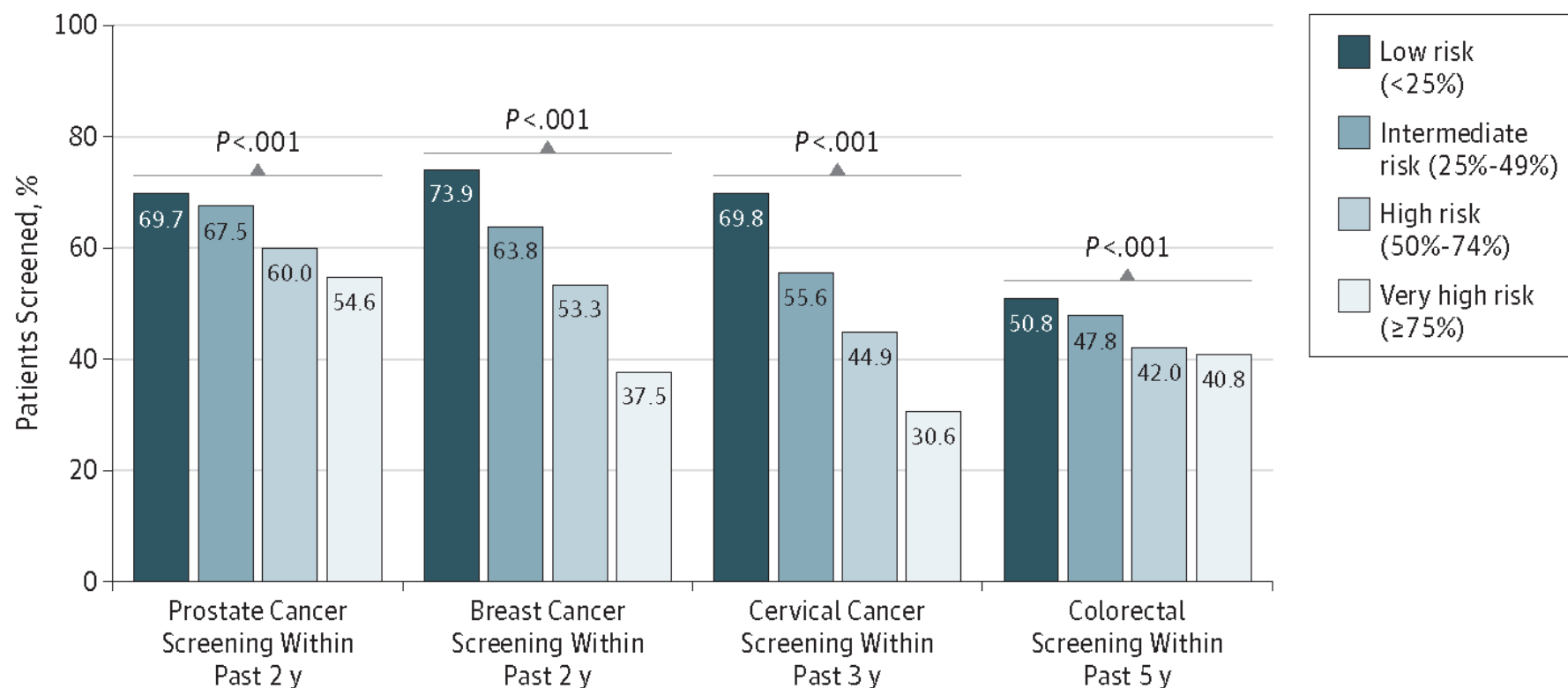
- Nuanced conversation
- Finite resources
- Exacerbation of health inequities
  - May divert from underscreened patients that could benefit
  - Harms may compound injury or burden to already disadvantaged groups

# Scope of Low-Value Cancer Screening

- National survey of Medicare patients<sup>1</sup>
  - Should be screened (65-75y with LE > 10y): 40% not up to date
  - 40% of adults  $\geq$  85y recently screened for CRC
  - 49% with LE < 5 years recently screened
- 18% of Veterans  $\geq$  75y receive low-value PSA testing<sup>2</sup>

# Scope of Low-Value Cancer Screening

Survey (2000 – 2010) of 27,000 patients:



# Summary of Cancer Screening Risks/Benefits

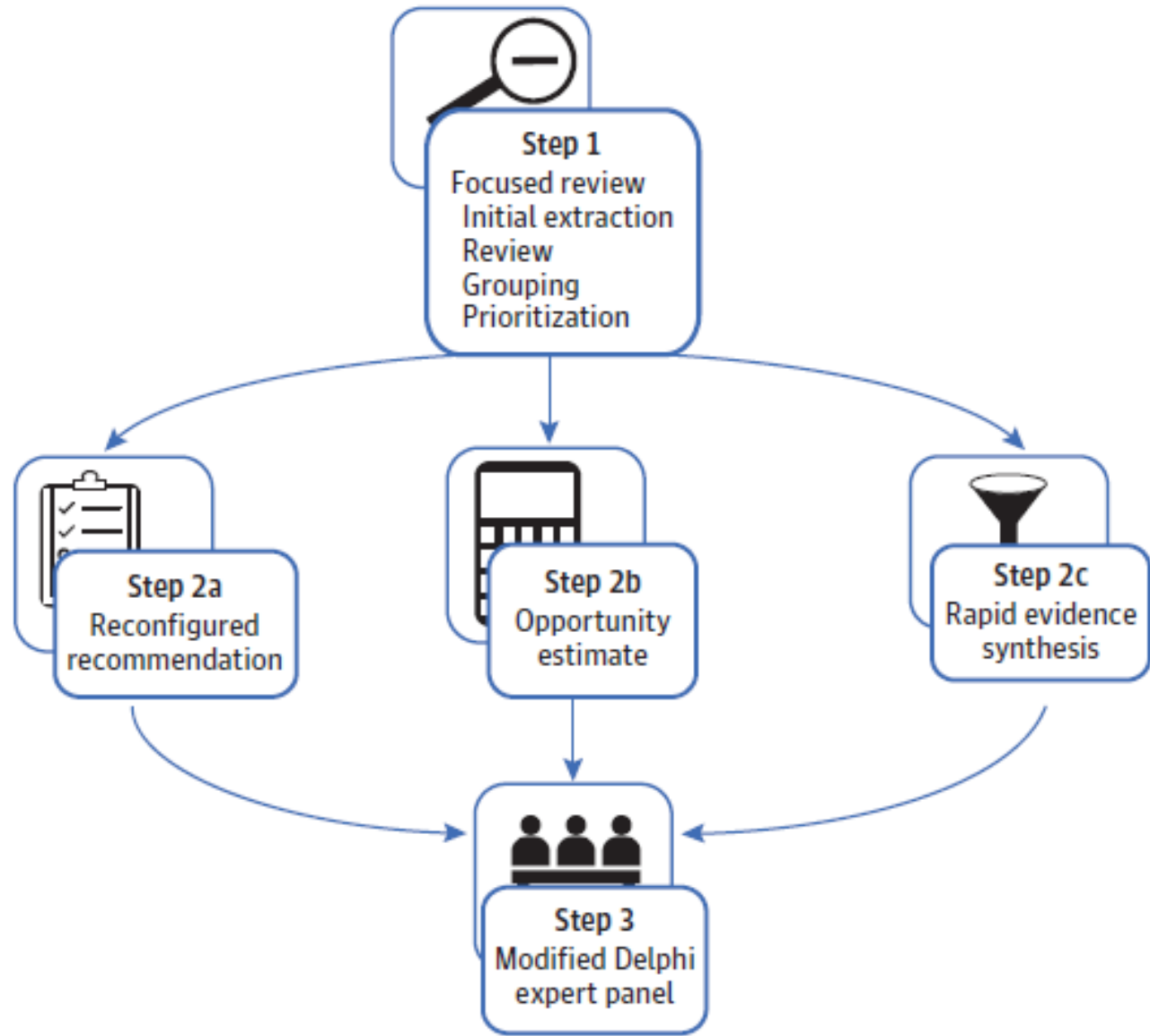
	<b>Time to develop</b>	<b>Lifetime ca. risk</b>	<b>Screen risks</b>
<b>Breast</b>	8-20y	12.9%	Overdiagnosis (0-54%) False-positives (14-27%)
<b>Cervical</b>	10-15y	0.6%	Discomfort/anxiety/trauma False-positives Pregnancy adverse outcomes
<b>CRC</b>	10-15y	4.1%	Anxiety Electrolyte dysfunction & falls from prep, Sedation, Perforation (1%/year of age),
<b>Prostate</b>	12y	12.5%	Anxiety Overdiagnosis (23-50%) Biopsy complications (2%)



Cancer	Organization	When to stop
<b>Breast</b>	USPSTF, ACOG, ACP ACS, ACOG	Age $\geq$ 75 < 10y life expectancy
<b>Cervical</b>	USPSTF ACS, ACP, Am Society for Colposcopy	Age > 65 if adequate testing, hysterectomy with cervix removed Age > 65 if adequate testing
<b>Colorectal</b>	USPSTF ACP	Age > 85 Age > 75 or < 10y life expectancy
<b>Prostate</b>	USPSTF ACS, Society Clinical Oncology American Urologic Association	Age $\geq$ 70 < 10y life expectancy Age $\geq$ 70 or < 10-15y life expectancy

ACOG = American College Obstetricians and Gynecologists, ACP = American College of Physicians, ACS = American Cancer Society, USPSTF = US Preventative Services Task Force

# Low-Value Definition



	<b>Breast</b>	<b>Cervical</b>	<b>Colorectal</b>	<b>Prostate</b>
<b>Action</b>	Do not do screening mammography	Do not perform cervical cancer screening (cervical cytology or HPV testing)	Do not do screening colonoscopy, screening sigmoidoscopy, FIT, or FOBT	Don't screen for prostate cancer using prostate specific antigen
<b>Among</b>	Average-risk women < 40y or with a life expectancy < 10y	Women < 21y, > 65y and at low risk, or with prior total hysterectomy for benign disease	Average-risk adults < 50y or with a life expectancy < 10y	Men < 50, > 69, or with a life expectancy of <15y
<b>Exclusions</b>		Prior history of exposure to DES, HIV, a weakened immune system, high-grade precancerous lesion, or cervical cancer		African Americans* and men with a family history of prostate cancer
<b>Definitions</b>	Average-risk: No personal history of breast cancer, a genetic mutation known to increase risk of breast cancer [e.g., BRCA], or a history of previous radiotherapy to the chest at a young age	Low risk: no history of a high-grade precancerous lesion and either [(3 negative Pap test results in a row) or (2 negative co-test results in a row)], with the most recent test performed after age 60  High-grade: CIN 2, CIN 3, or HSIL	Average-risk: (1) no prior colectomy; (2) no history of colorectal cancer; (3) no history of colon polyps; (4) no history of inflammatory bowel disease; and (5) no family history of colorectal cancer	
<b>Validity</b>	8.5	8	8	8.5
<b>Source</b>	American College of Physicians	USPSTF	American College of Physicians	American College of Physicians

*\*Exclude AA/Black men: individualize screening 40-54y based on increased risk*

# Defining Low-Value for Cancer Screenings: Our definitions

	<b>Definition</b>
<b>Numerator</b>	Average-risk patient tested outside of age range or mortality risk > 50% in 1 year (by CAN score)
<b>Denominator</b>	All average-risk patients with CPT or ICD-defined screening in FY17
<b>Repeat procedures</b>	Most recent as index
<b>Exclusion by risk or history</b>	Family history of cancer, recent symptoms (e.g., for 12 months prior to test), personal history of cancer, other life factors in past 10-14 years prior to test

# Defining Low-Value for Cancer Screenings: Our definitions

	Breast	Cervical	Colorectal	Prostate
<b>Numerator (i.e. low-value screening)</b>	Average-risk females < 40 years or LE < 1 year	Average-risk females < 21 years, > 65 years with prior adequate screenings, <sup>a</sup> or with prior hysterectomy	Average-risk adults < 50 years or LE < 1 year	Average-risk males, age < 50 years, > 69 years, or LE < 1 year
<b>Denominator</b>	Average-risk females $\geq$ 18 years with screening mammography	Average-risk females $\geq$ 18 years with screening PAP and/or high-risk HPV testing	Average-risk adults $\geq$ 18 years with screening colonoscopy, sigmoidoscopy, or fecal occult home test	Average-risk males $\geq$ 18 years with screening PSA
<b>Repeat procedure logic</b>	Included only if no prior mammography in prior 11 months (presumed repeat was diagnostic)	PAP and HPV occurring on separate dates within a 90-day window counted as single index event in FY17	Only most recent screen over 12 months of FY17 (repeat presumed due to incomplete colonoscopy)	Only most recent PSA included over 12 months of FY17
<b>Exclusions (from both numerator and denominator)</b>	Family history of breast cancer, personal history of genetic carrier risk, breast cancer, breast mass, or received radiation in past 10 years.	HIV/AIDS, history of exposure to diethylstilbestrol before birth, abnormal PAP smear, or cervical cancer in past 10 years.	Personal history of colectomy; colorectal cancer; colon polyps; inflammatory bowel disease; or family history of colorectal cancer in past 14 years. Gastrointestinal symptoms in 12 months prior to the index screening.	<b>African American race/ethnicity*</b> ; family history of prostate cancer; personal history of prostate cancer in prior 10 years. Urinary or prostate-related symptoms in 90 days prior to index PSA.

*\*Exclude AA/Black men: individualize screening 40-54y based on increased risk*

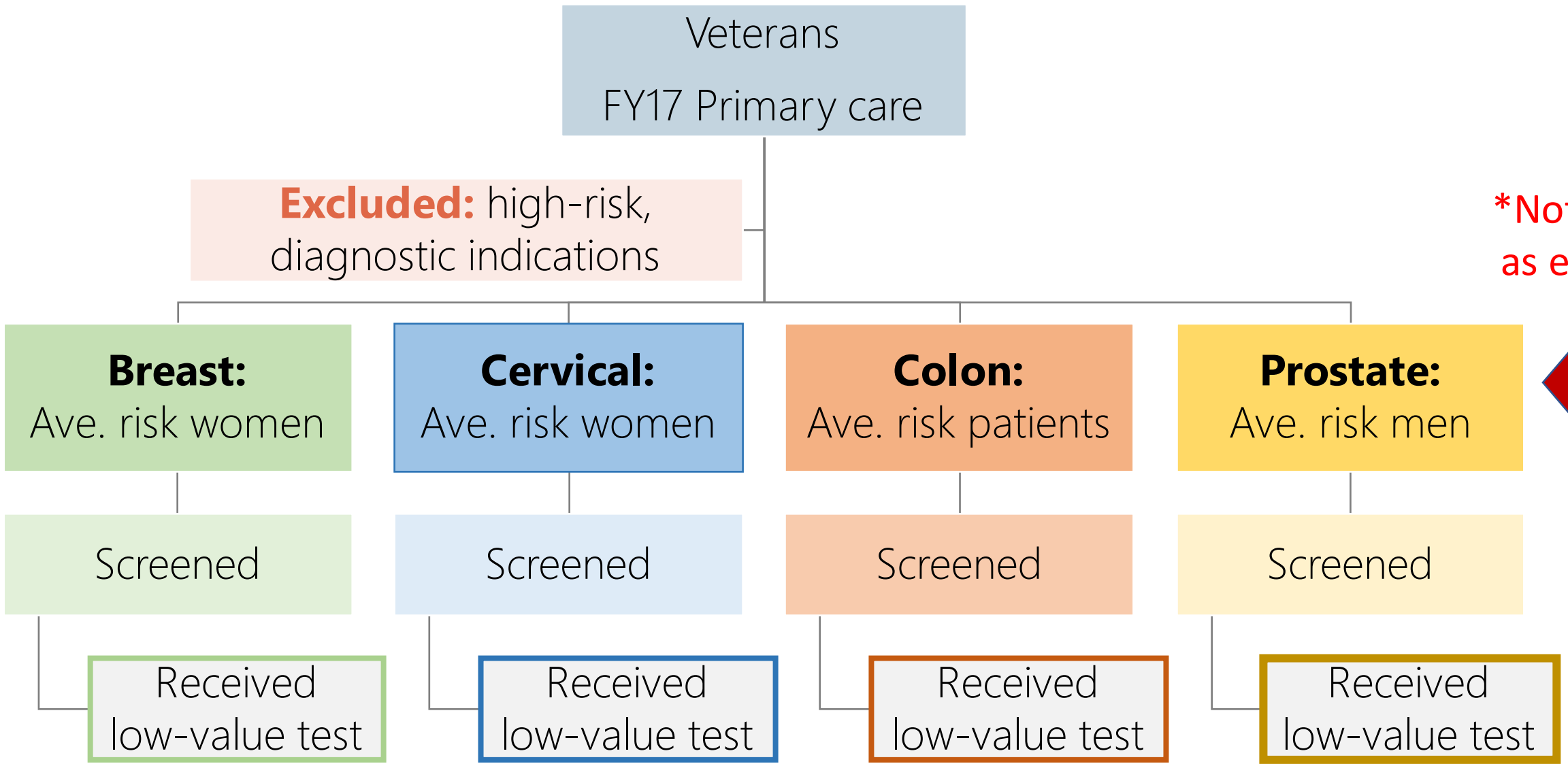
# Selecting the Cohort for This Study

Primary care in FY17

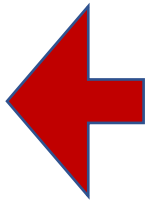
Average-risk

Screened

**Low-Value Tests**



\*Not same as eligible



*E.g., gastrointestinal bleed  
in prior 12 mo.*

**Exclusion:**

Any Exc code in period of  
time before Index date

**Index Date:**

Date of last  
included CPT  
code in FY17

16

9/30/2002

9/30/2016

10/1/2017

**High Risk:**

Any High-risk code  
during FY03 (14y)  
through Index date

*E.g., colon cancer diagnosis  
in past 14y*

**Cancer Screen  
Inclusion:**

Any Included CPT  
code during FY2017

*E.g., "44388" CPT (colonoscopy) –  
If > 1, most recent as index date*



# Statistical Analysis: Associated Factors

Multivariate models including three sets of multilevel factors:

## Patient:

- Sex (for colon cancer only)
- Race (Black, White, Other)\*
- Gagne - categorical (Low 0-1 vs. High  $\geq 2$ ) – Q4FY16
- JFI Frailty – categorical ( $< 3$ ,  $\geq 3$ ) – Q4FY16
- Med household income by zip code, 2017
- High school grad rate by zip code, 2017
- Copay exemption
- [Sensitivity analysis: Agent orange exposure flag (prostate cohort)]

## Ordering clinician:

- Physician vs. NP/PA
- Age
- Gender
- Patient's usual provider (by quarter – matched to PCMM)
- FTE

## Facility (sta5a level, Q4FY16):

- VAMC/CBOC
- Average FTE providers
- Average panel size (adjusted MD/NP)
- Geographic region
- Rural/urban status
- Complexity level
- Academic affiliation

+

## Organizational:

- Team-based care
- Continuity
- Access

Data excluded if missing: patient (7-15%), clinic (4-15%), clinician (18-82%)  
SE Heteroskedastic robust, account for clustering within clinic

# Part I: Describing the State of Low-Value Care

5,993,010  
FY17 Primary care

**Excluded:** high-risk,  
diagnostic indications

**Breast:**  
469,045 women  
average-risk

21,930 screened  
(1.4%)

633 low-value  
(2.9%)

**Cervical:**  
458,086 women  
average-risk

65,511 screened  
(14.3%)

630 low-value  
(1.0%)

**Colon:**  
5,770,622 patients  
average-risk

299,765 screened  
(5.2%)

6,790 low-value  
(2.9%)

**Prostate:**  
4,647,479 men  
average-risk

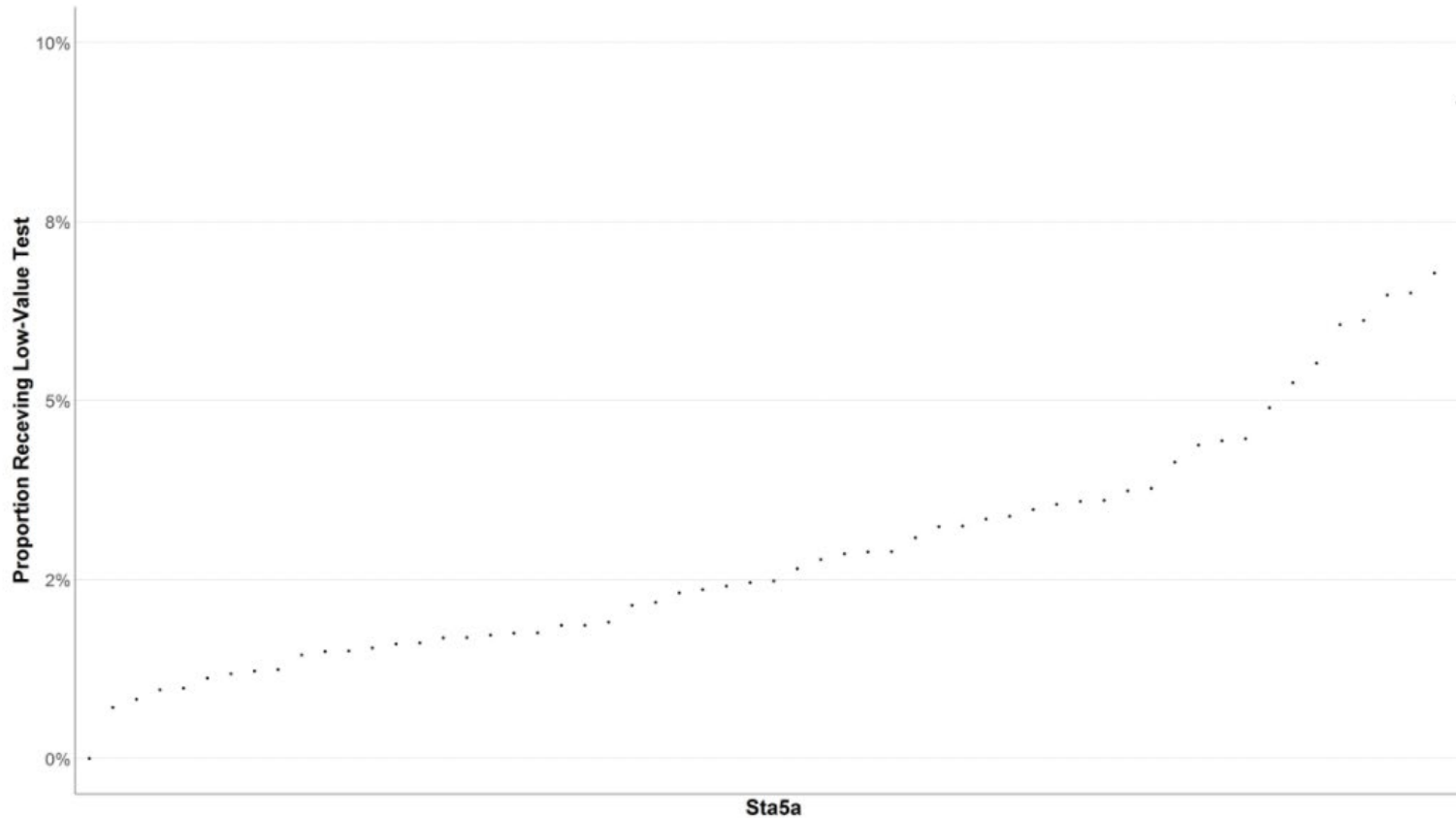
903,613 screened  
(19.4%)

350,705 low-value  
(38.8%)

# Breast Cancer: Demographics

	Screened n = 21,930	Received low-value test n = 633
Age, mean y (SD)	55 (9)	35 (3)
Race and ethnicity, %		
Black, non-Hispanic	37	36
Hispanic/other/unknown*	8	8
White, non-Hispanic	55	55
High comorbidity, %	7	4
High frailty score, %	57	50
Pay a copay for VA care, %	4	2
HS diploma/by county, %	58	58
Median income/by county	58k	59k

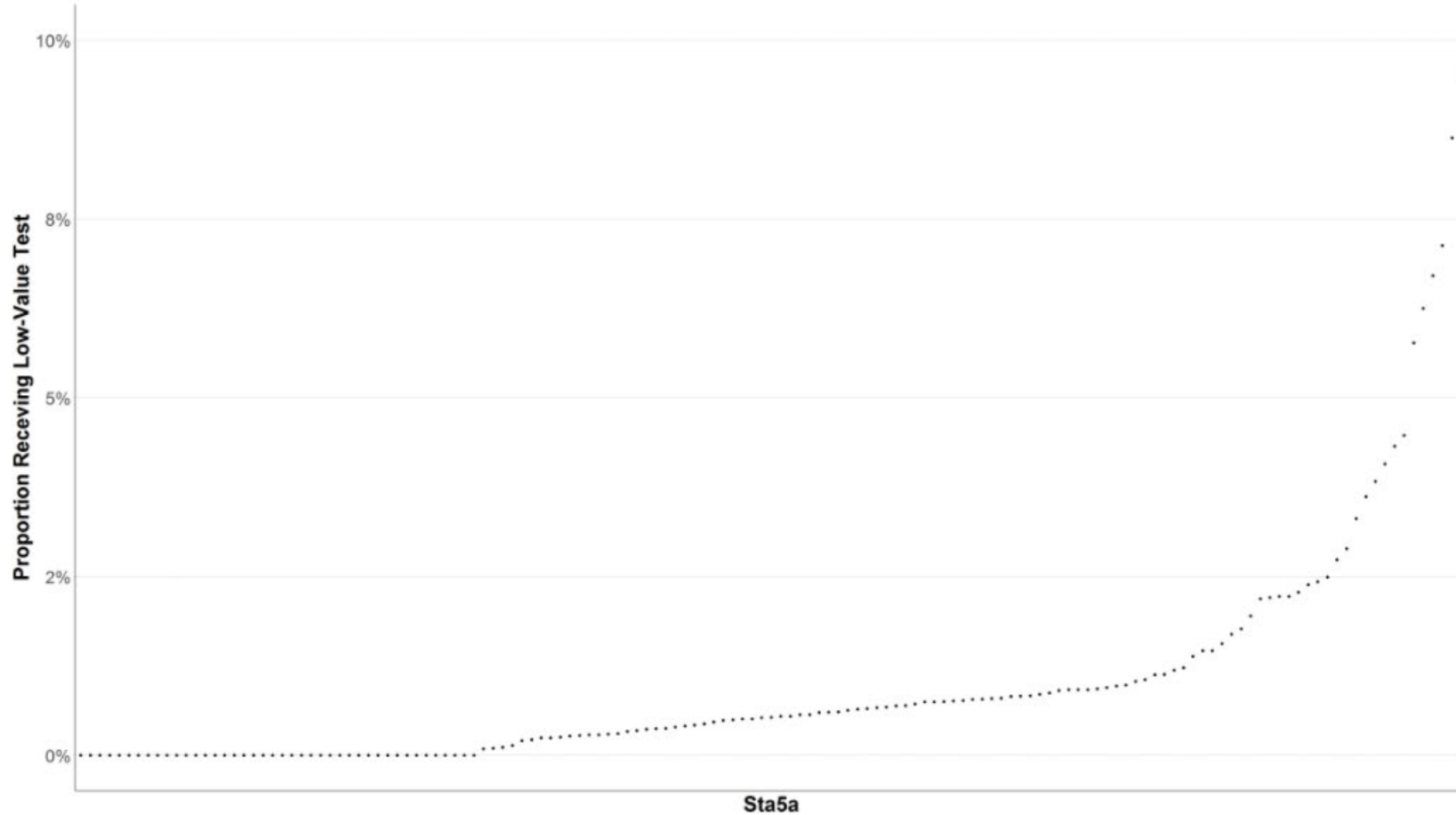
# Facility Variation: Low-Value Breast Cancer Tests



# Cervical Cancer: Demographics

	<b>Screened n = 65,511</b>	<b>Received low-value test n = 630</b>
Age, mean y (SD)	44 (13)	70 (4)
Race and ethnicity, %		
Black, non-Hispanic	36	18
Hispanic/other/unknown	10	7
White, non-Hispanic	54	76
High comorbidity, %	5	12
High frailty score, %	50	64
Pay a copay for VA care, %	4	8
HS diploma/by county, %	58	58
Median income/by county	59k	57k

# Facility Variation: Low-Value Cervical Cancer Tests

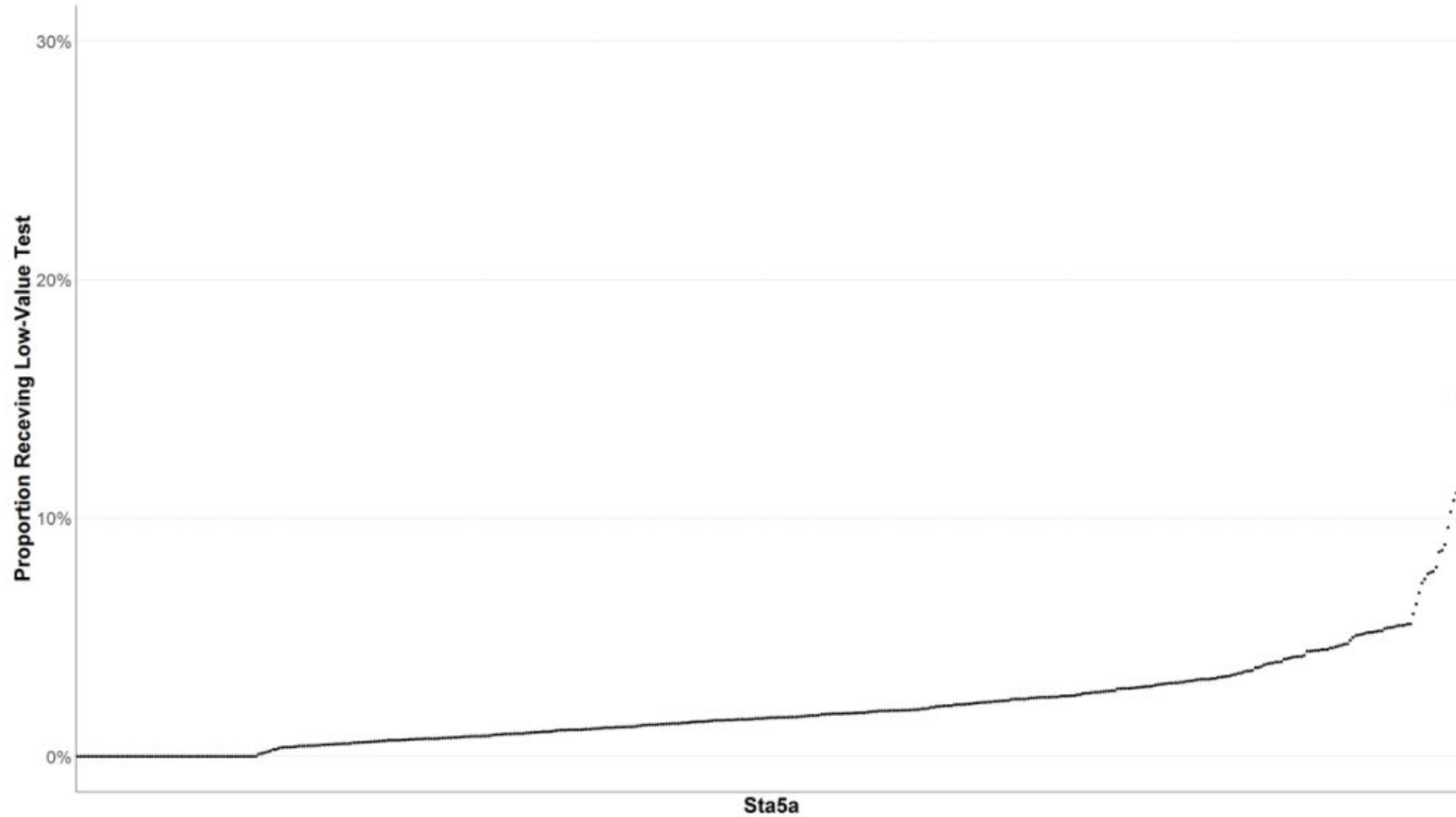


# Colorectal Cancer: Demographics

	<b>Screened n = 299,765</b>	<b>Received low-value test n = 6,790</b>
Female sex, %	6	12
Age, mean y (SD)	64 (8)	42 (8)
Race and ethnicity, %		
Black, non-Hispanic	20	28
Hispanic/other/unknown	7	9
White, non-Hispanic	73	63
High comorbidity, %	8	5
High frailty score, %	46	50
Pay a copay for VA care, %	7	5
HS diploma/by county, %	58	57
Median income/by county	56k	57k



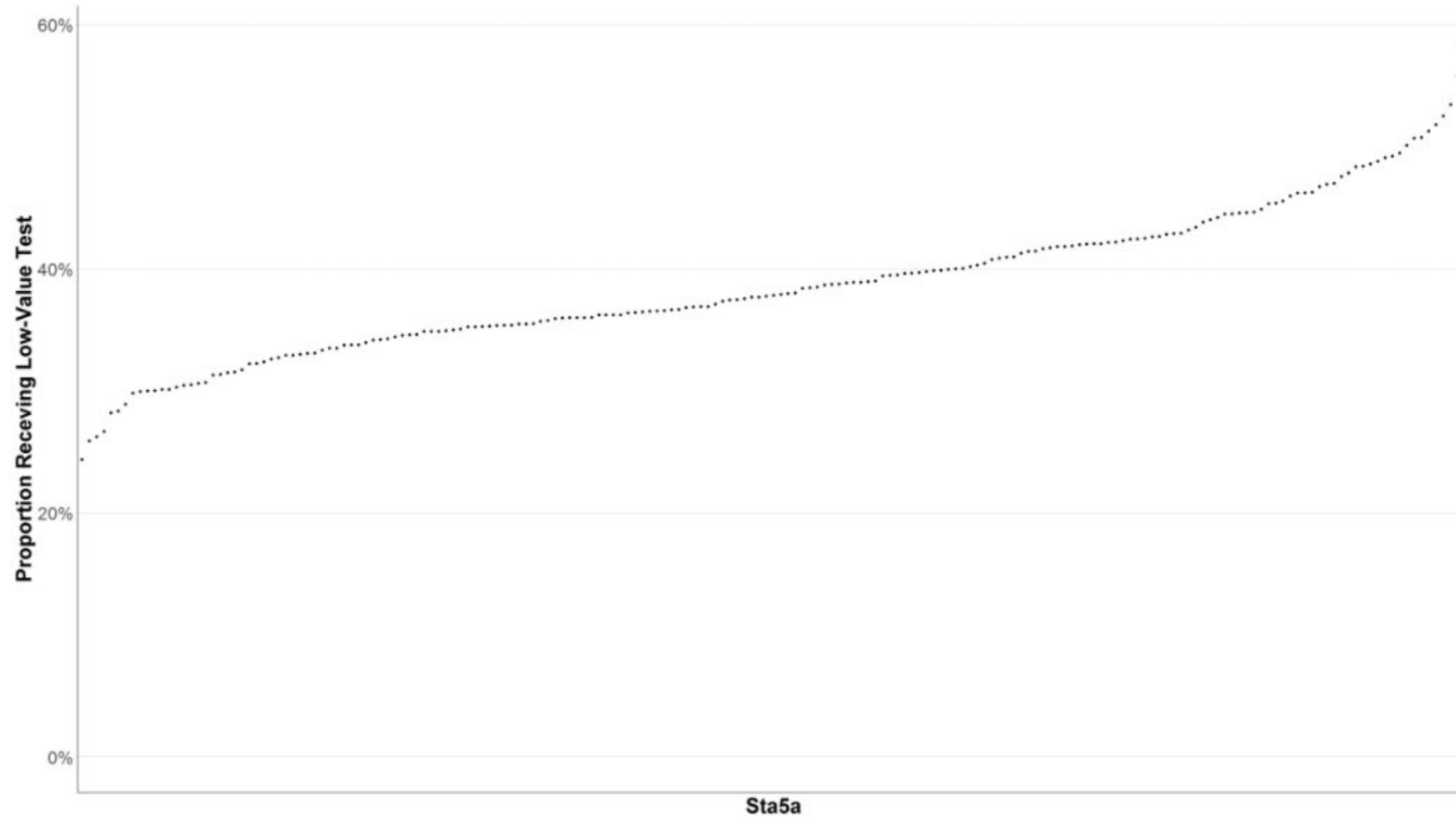
# Facility Variation: Low-Value Colon Cancer Tests



# Prostate Cancer: Demographics

	<b>Screened n = 903,612</b>	<b>Received low-value test n = 350,705</b>
Age, mean y (SD)	66 (10)	70 (13)
Race and ethnicity, %		
Black, non-Hispanic	-	
Hispanic/other/unknown	4	5
White, non-Hispanic	96	96
High comorbidity, %	10	10
High frailty score, %	50	49
Pay a copay for VA care, %	8	11
HS diploma/by county, %	59	59
Median income/by county	57k	57k

# Facility Variation: Low-Value Prostate Cancer Tests



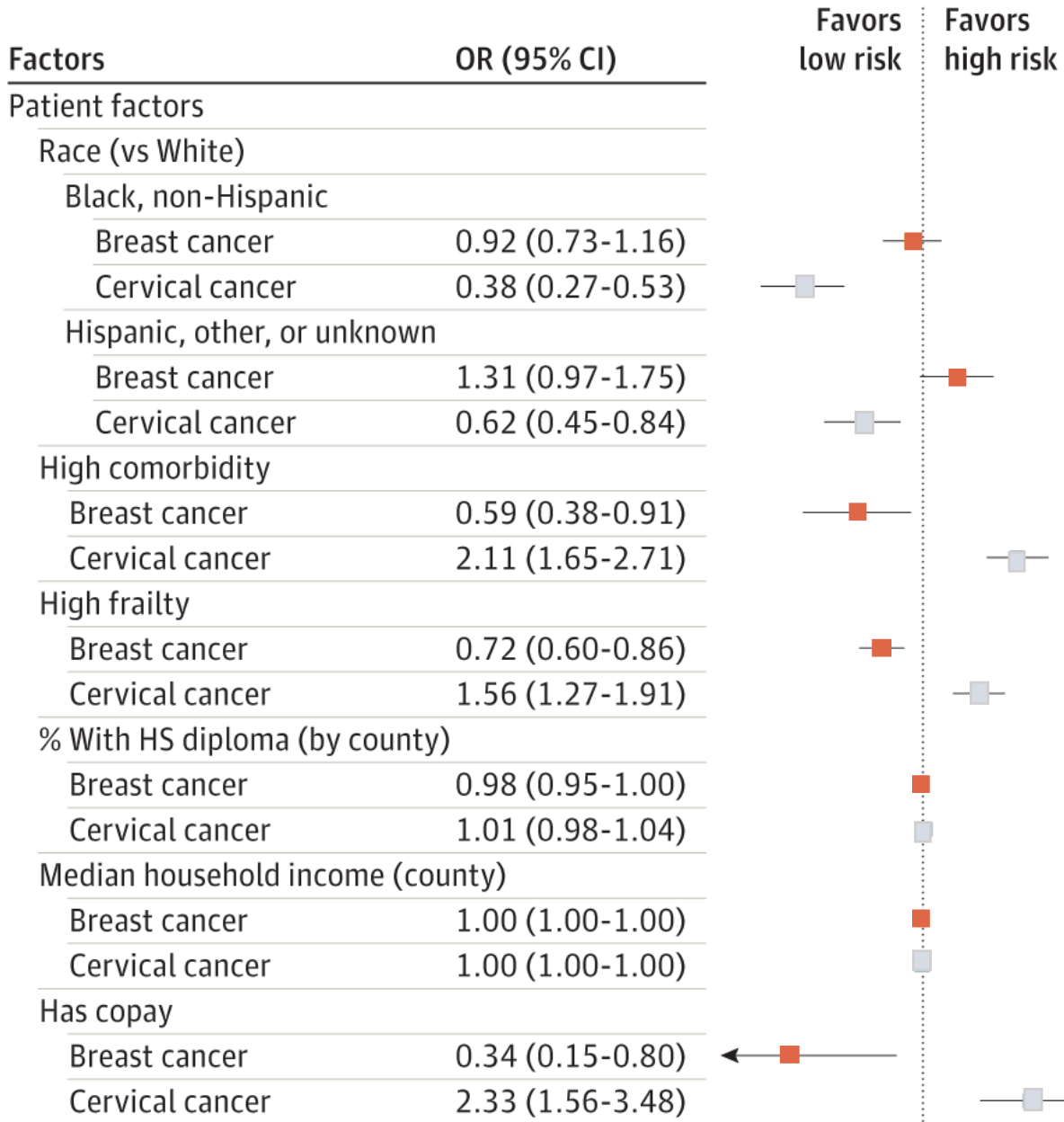
# Summary of Part I Findings

- Rare low-value testing for 3 cancers
  - < 3% of all screenings
- EXCEPT for prostate cancer
  - 8% of all average-risk men  $\geq$  18 years
  - 39% of all screenings
- Wide facility-level variation in where low-value testing occurred

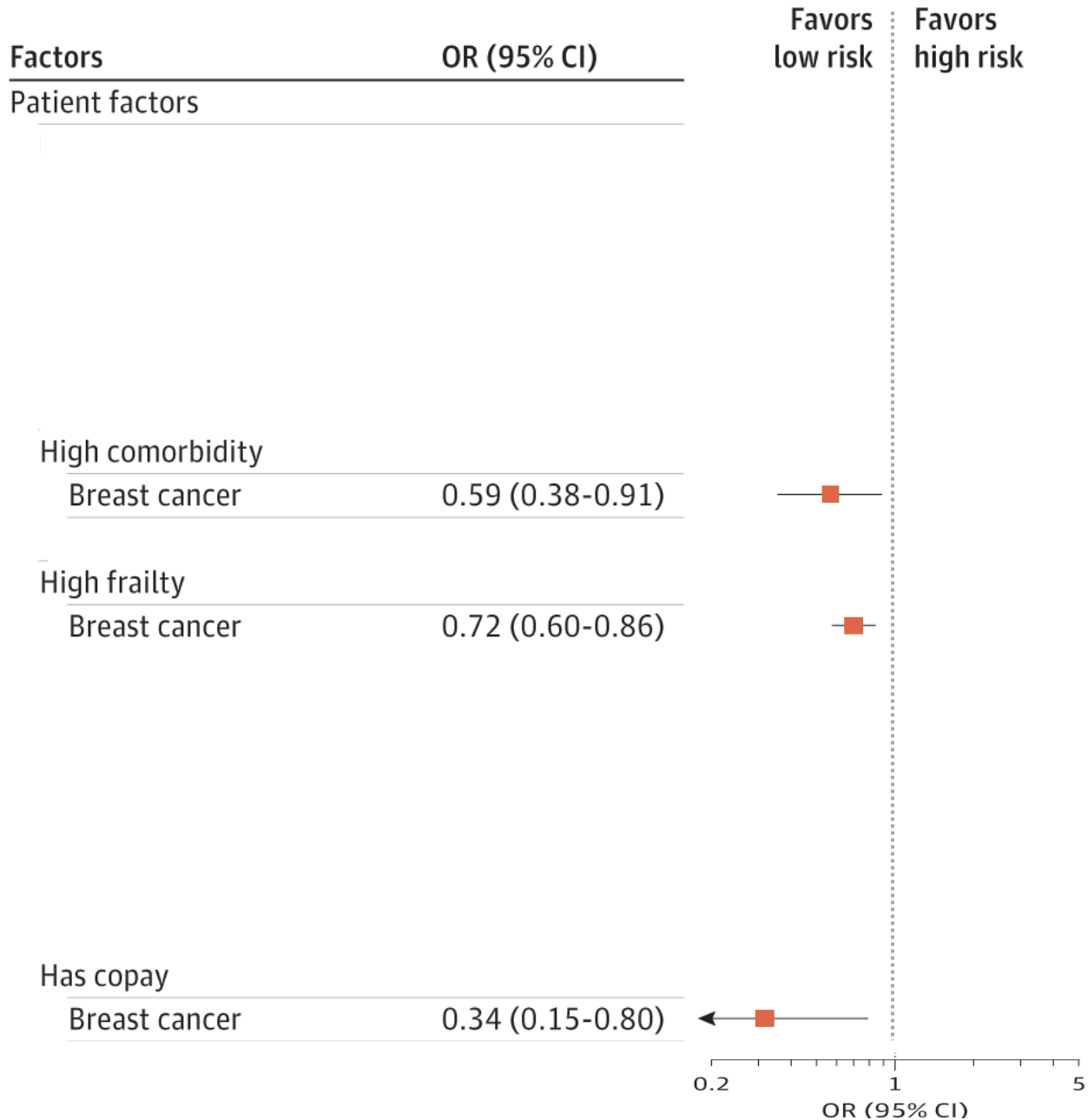
# Part II: Factors Associated With Low-Value Care

# Probability of Receipt of Low-Value Test Among Screened

	<b>Breast</b>	<b>Cervical</b>	<b>Colorectal</b>	<b>Prostate</b>
<b>Patient factors</b>	2.8 (2.4-3.3)	1.1 (0.8-1.4)	2.2 (2.0-2.4)	38.1 (37.3-38.9)
<b>+ clinic/org.</b>	2.8 (2.4-3.2)	1.2 (0.9-1.4)	2.2 (2.0-2.4)	38.2 (37.4-39.0)
<b>+ clinician</b>	2.2 (1.9-2.6)	0.8 (0.6-1.0)	1.7 (1.5-1.9)	37.8 (36.9-38.6)



# Breast Cancer

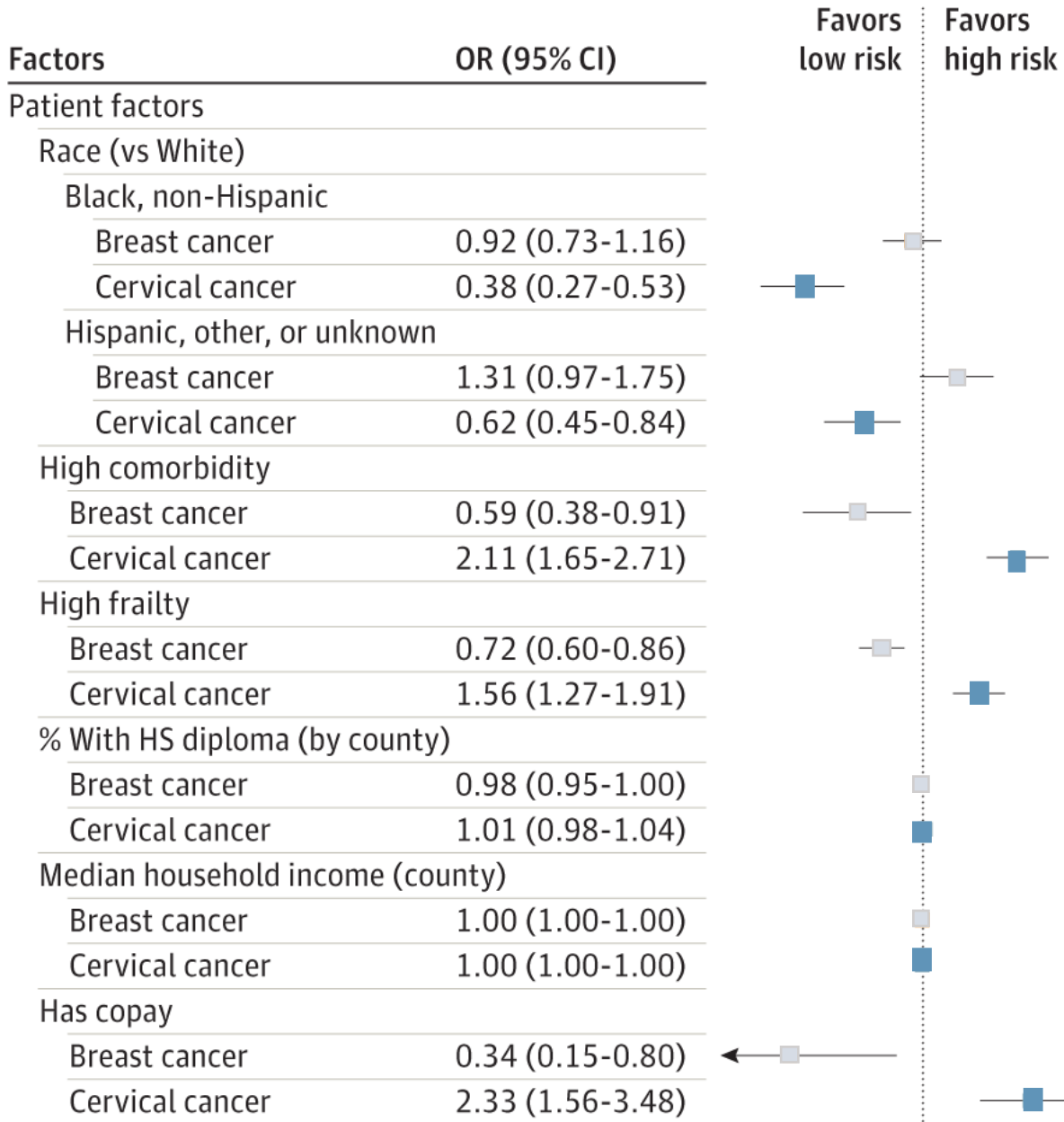


**Less likely** to receive low-value breast cancer test, if screened:

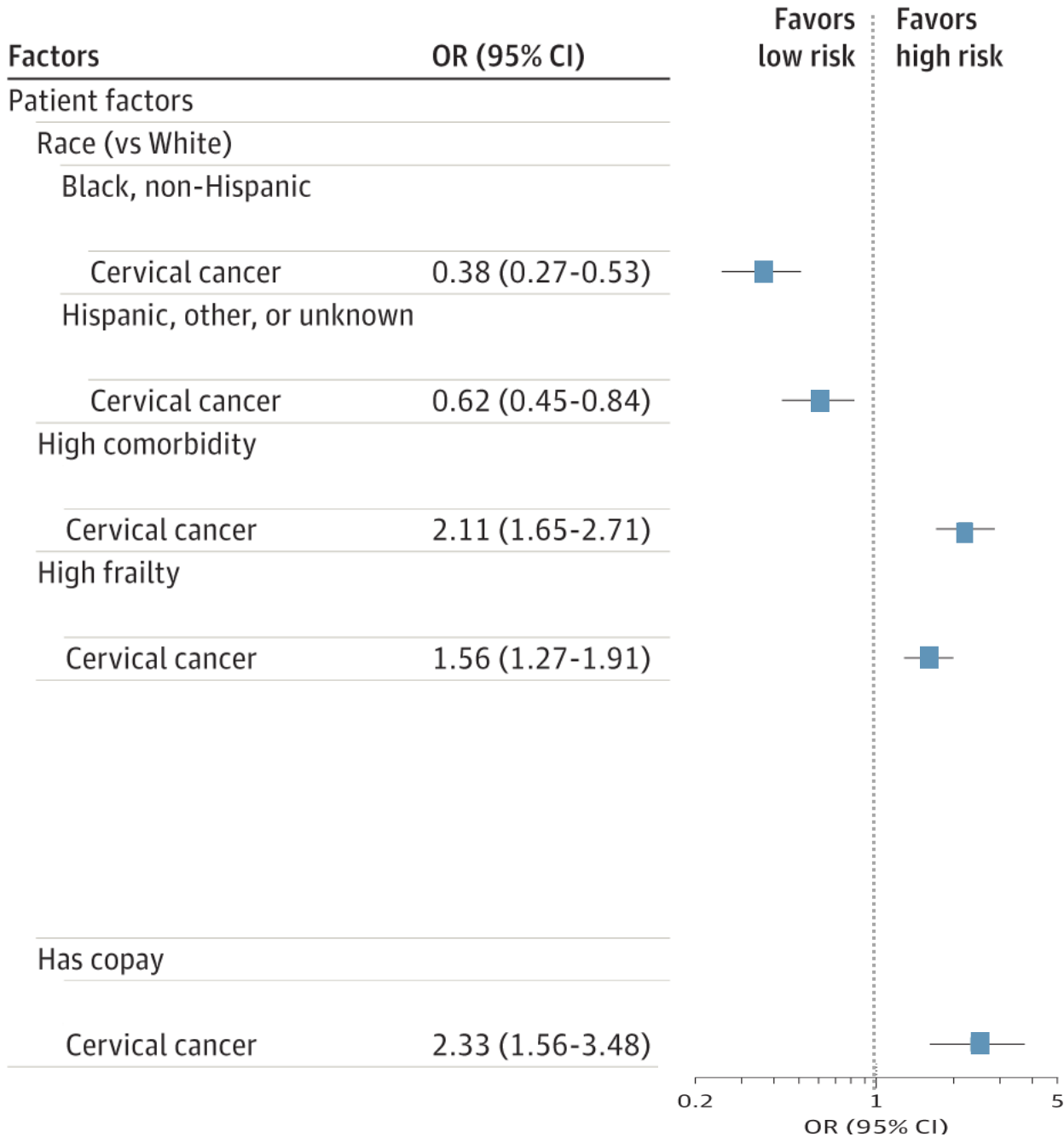
- Higher comorbidity
- Greater frailty
- Higher income/service connection (have a copay)

Not significant: Race, % HS diploma, median household income





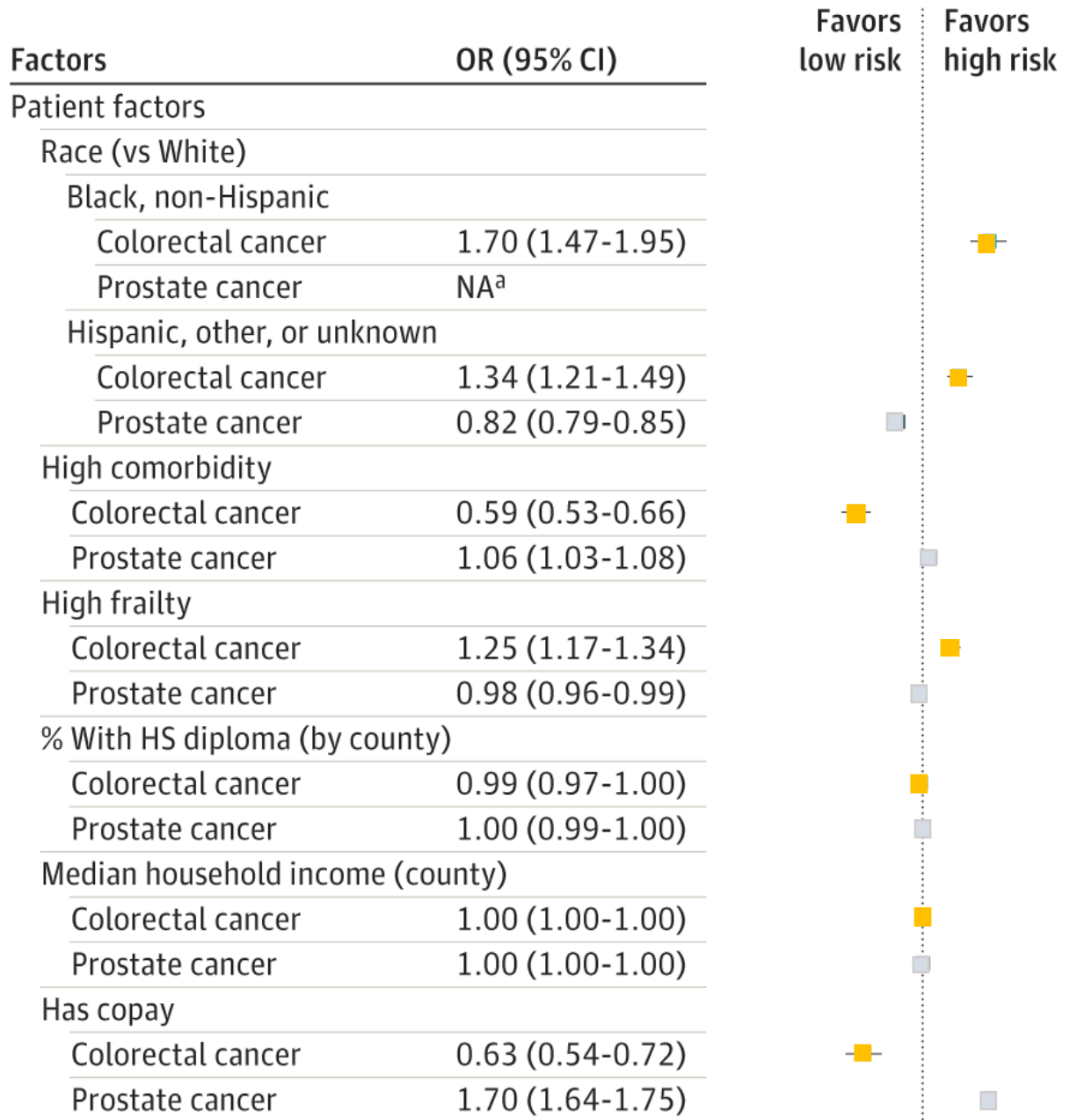
# Cervical Cancer



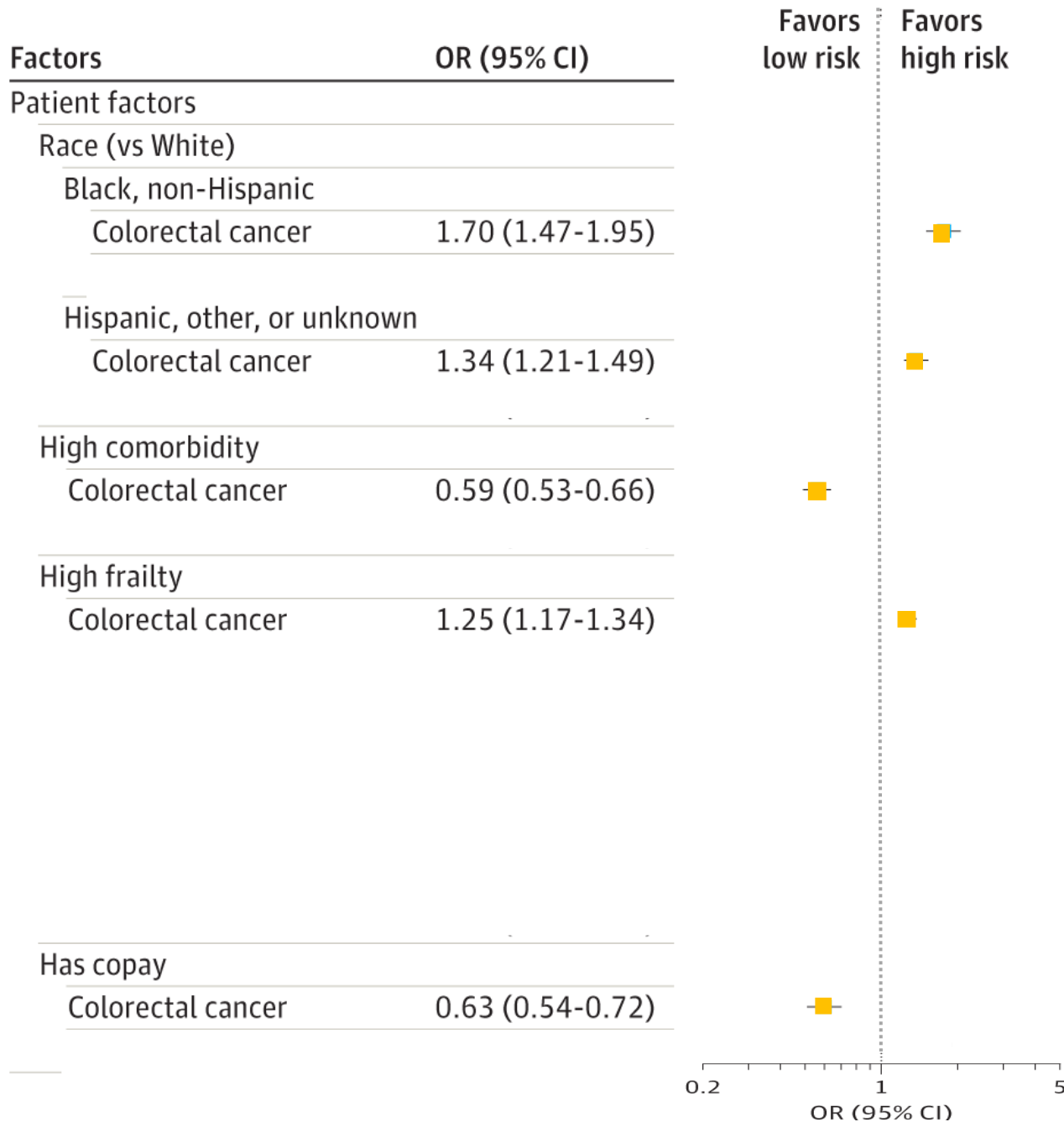
**Less likely** to receive low-value cervical cancer test, if screened:

- Black, non-Hispanic or Hispanic/other/unknown race and ethnicity
- Lower comorbidity
- Lower frailty
- Lower income/service connection (no copay)

Not significant: % HS diploma, median household income



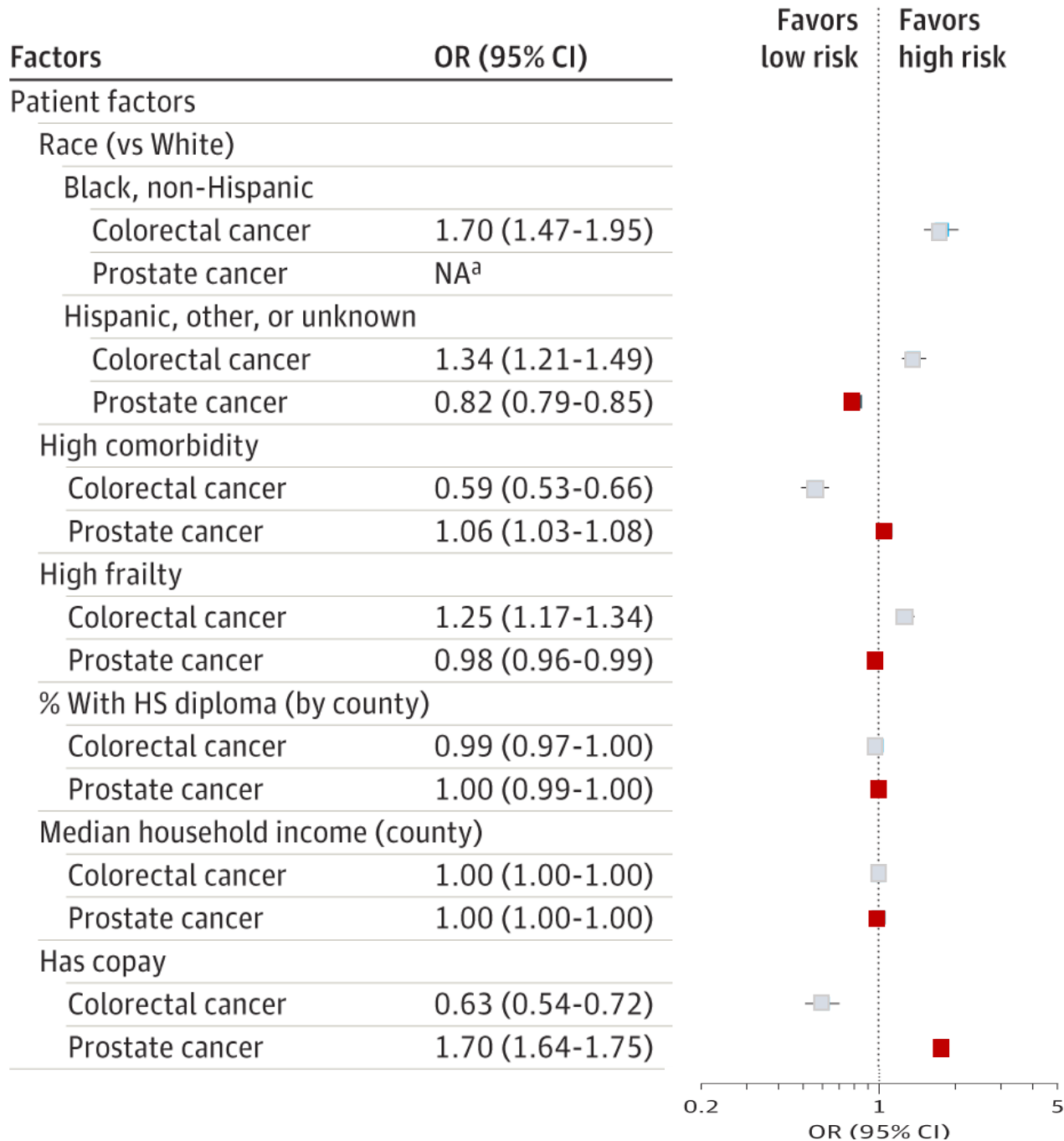
## Colorectal cancer



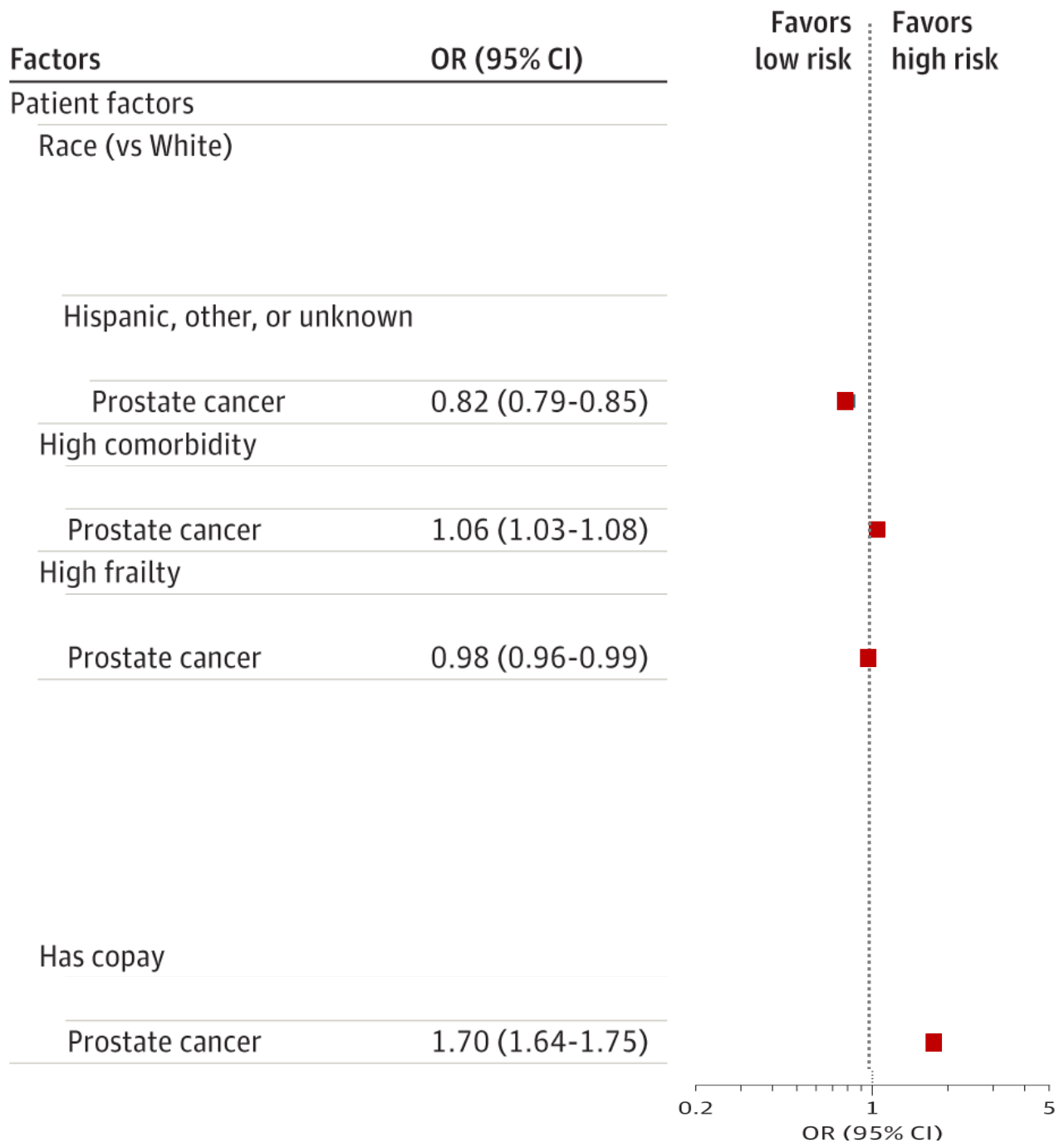
**Less likely** to receive low-value colorectal cancer test, if screened:

- White, non-Hispanic
- Higher comorbidity
- Lower frailty
- Higher income/service connection (have copay)

Not significant: % with HS diploma, median household income



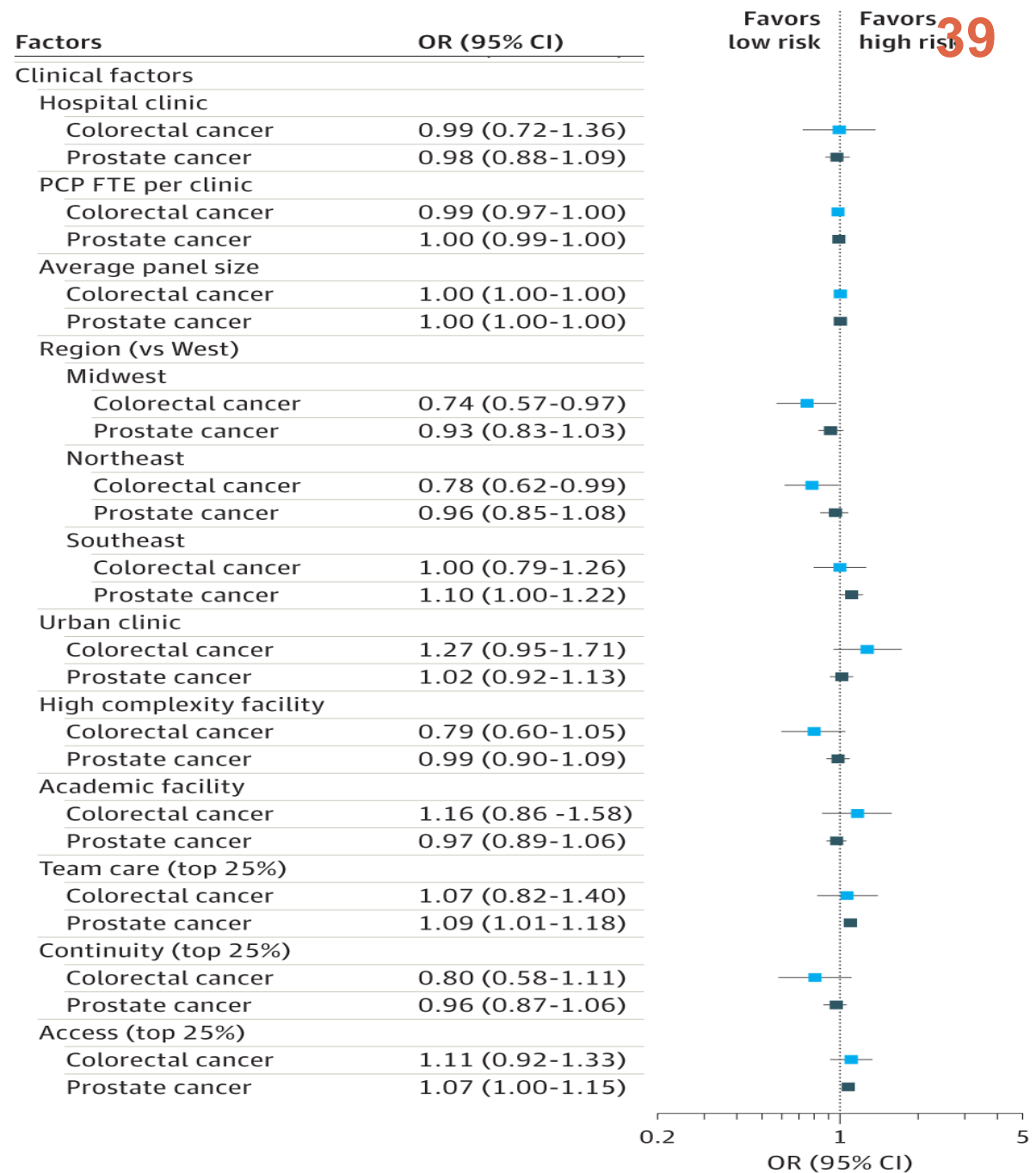
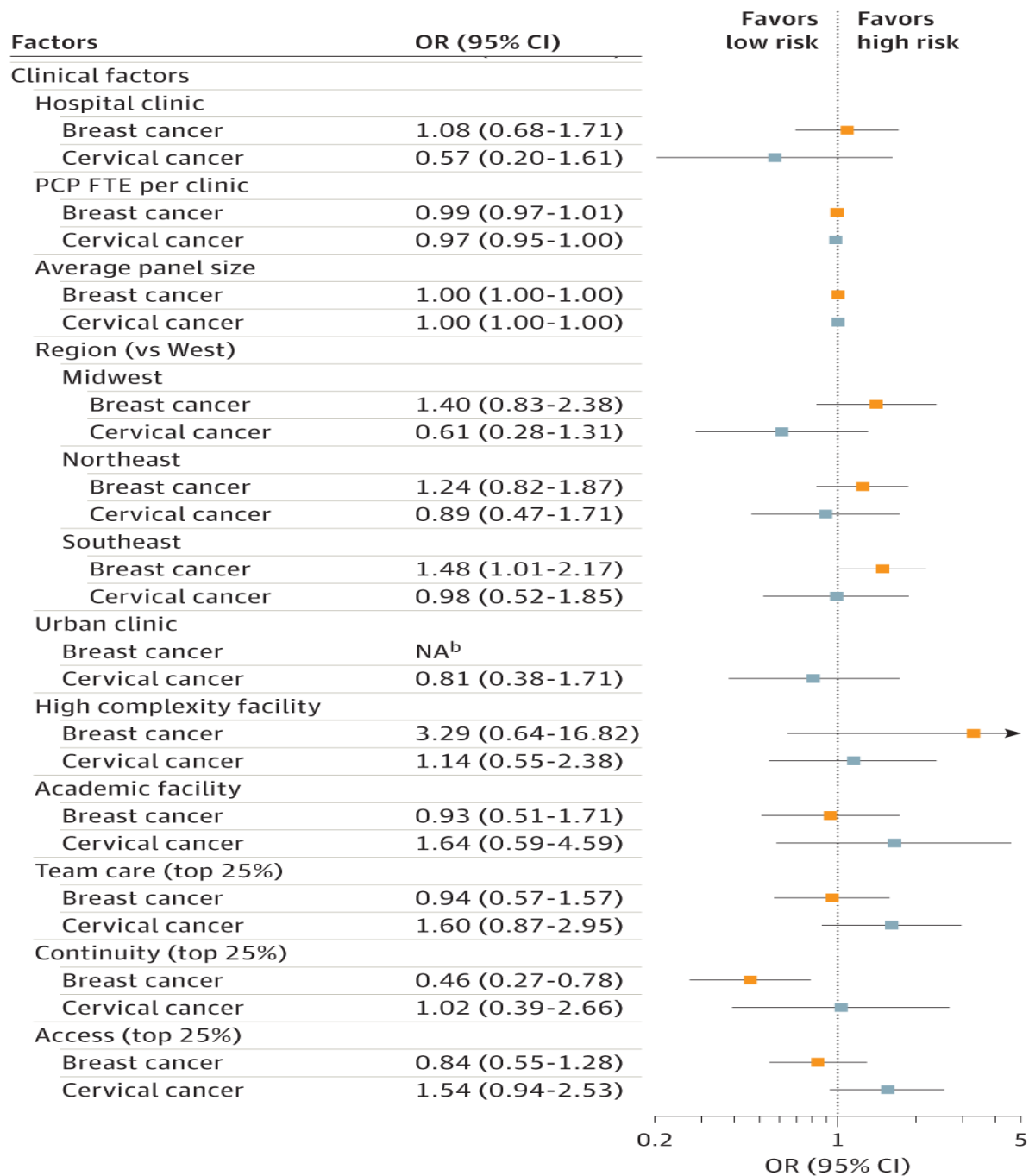
# Prostate Cancer



**Less likely** to receive low-value prostate cancer test, if screened:

- Hispanic/other/unknown (vs White, non-Hispanic)
- Lower comorbidity
- Higher frailty
- Lower income/service connection (no copay)

Not significant: % HS diploma, median household income



## Remaining Findings Not Significant, Except:

- Continuity: Breast cancer OR 0.46 (0.27-0.78)
- Team based care: Prostate cancer OR 1.09 (1.01-1.18)



# Summary

- Patient characteristics most associated
  - No one factor emerged for all cancers
- Clinician, facility, organizational factors minimally influential
  - Organizational factors
    - ? Continuity and breast cancer
    - ? Team-based care and prostate cancer

# Summary

## More likely to receive low-value test

- Breast and CRC: lower comorbidity, frailty, and income and/or SC disability (copay)
  - CRC: non-White or Hispanic
- Cervical and prostate: White/non-Hispanic, higher comorbidity, income/SC disability (copay)
  - Cervical: more frail
  - Prostate: less frail

# Discussion: General overview

- Rare low-value cervical, CRC, breast cancer screenings overall
  - Few Women Veterans, demographics of Women Veterans younger
  - Capture VHA data only – miss community care data, Medicare?
- Important: Race and ethnicity, illness burden, and copay status
  - Parity better in VHA – less historic disadvantaged groups underscreened
  - Reliance on VHA more in racial/ethnic minority, less favorable SES, fewer comorbidity
  - Frequency of being seen – comorbidity may = opportunity for screening?

Screening mechanism key

# Discussion: Breast, Cervical, CRC

## *Who is getting low-value test*

- **Breast:**

- Off-site mammography harder in sicker women?

*Breast: lower comorbidity, frailty, and income and/or SC disability (copay)*

- **Cervical:**

- More clinic attendance in those who are more ill??

*Cervical: White/non-Hispanic, higher comorbidity and frailty, income/SC disability (copay)*

- **CRC:**

- Algorithmic protocols may screen VHA reliant patients more?

*CRC: non-White/Hispanic, lower comorbidity, frailty, and income and/or SC disability (copay)*

# Discussion: Prostate Cancer

- Overall decline since 2012 (when made USPSTF Grade D)
- High rates corroborated in other studies
  - O'Neil et al. 30% of screenings are low value
  - Radomski et al. 18% of VHA men > 75y (eligible population, though, not just among screened patients)

# Discussion: Prostate Cancer

- PSA = intensity of health care receipt<sup>1</sup>
  - More care concentrated in White, non-Hispanic, greater income
- Decision fatigue and “defaults”<sup>2</sup>
  - May depend on what providers think is the default setting
- Clinical inertia, patient demand<sup>3</sup>
  - Request, level of worry most influential ages 40-70<sup>4</sup>
- PSA test easy to obtain as blood test

*Prostate: White/non-Hispanic, higher comorbidity, less frailty, income/SC disability (copay)*

# Prostate cancer and Agent Orange exposure in the VHA

- Known carcinogen for prostate cancer
- 233,314 Vietnam-era Veterans with exposure status known
- Exposure OR, 0.95 [95% CI, 0.92-0.99]

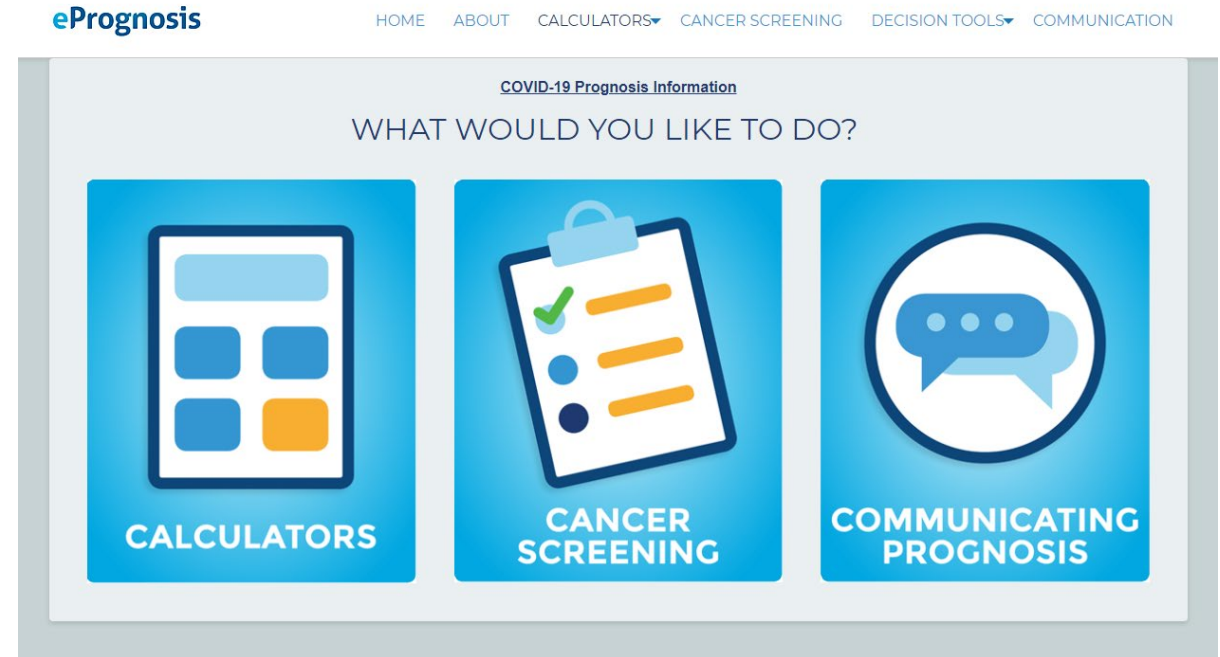
# Limitations

- Tests among SCREENED patients, not eligible
- VHA data – miss community care referrals?
- Generalizability
- Encounter time, patient request, individual attitudes not captured



# Take-Aways & Future Work for Clinicians

- Physician recommendation matters
- Consider individualizing screening recommendations
  - Useful tools:  
<https://eprognosis.ucsf.edu/>
- PSA tests offers little benefit, may have harms



# Take-Aways & Future Work for Research & Policy-Makers

- Standardizing definitions important
- Patient characteristics strongest predictors
- PSA tests high-yield by volume

# Acknowledgements & Funding

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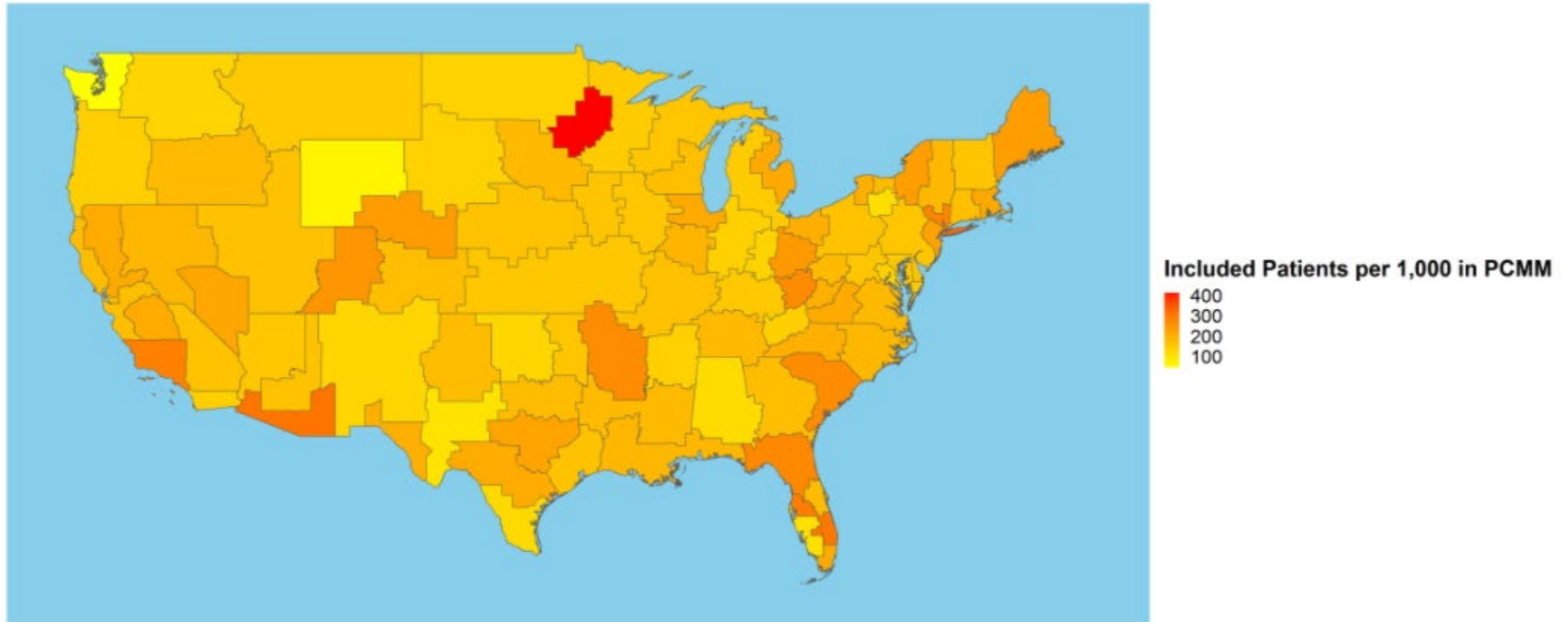
Funding agencies had no role in the study's design, conduct, or reporting.

We thank Eve Kerr, MD, MPH, Sameer Saini, MD, MS, and Thomas Radomski, MD, MS for their assistance with this work.

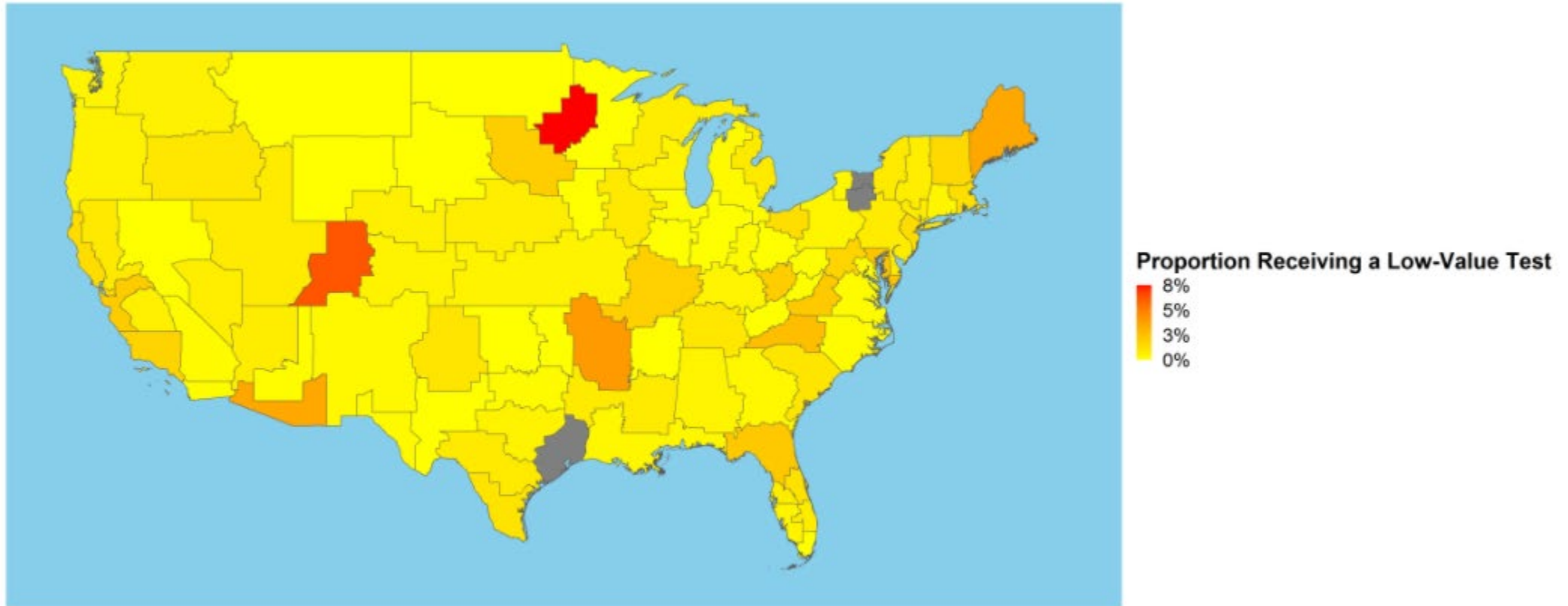
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- SUPPLEMENTAL CONTENT

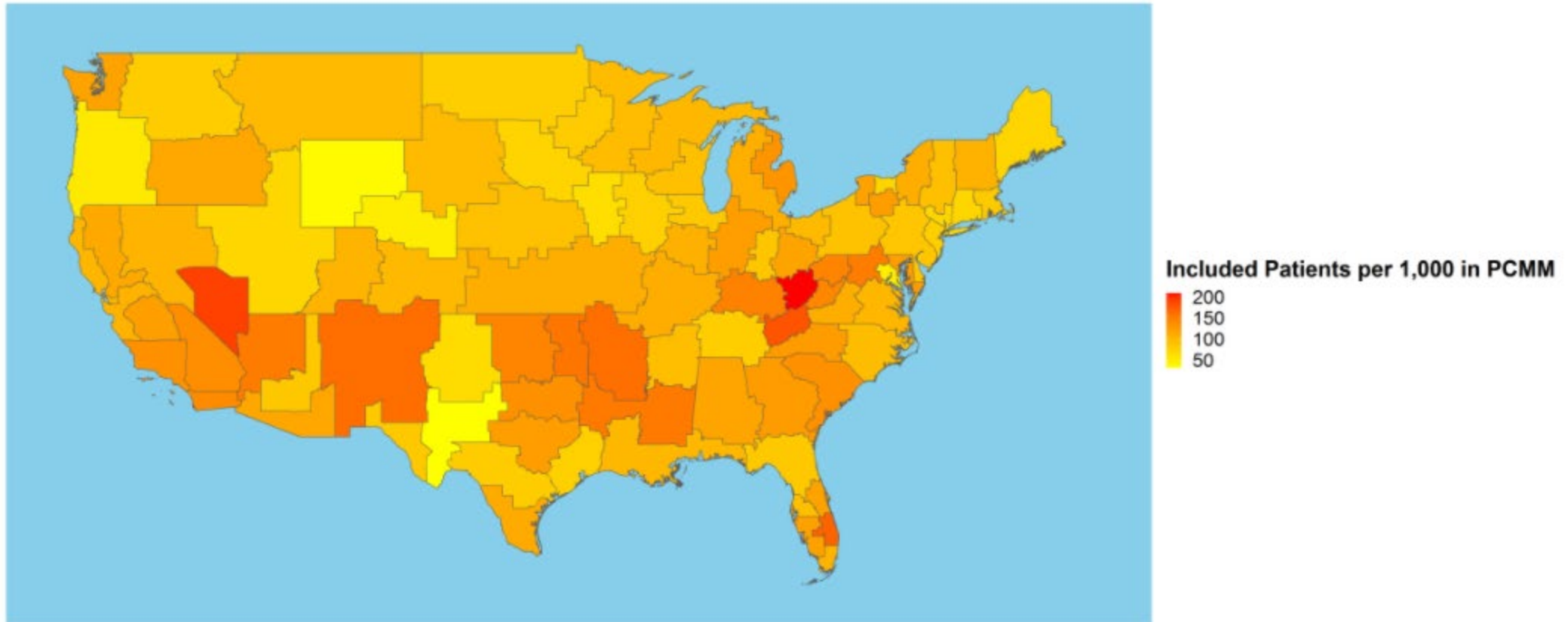
# Women Screened for Cervical Cancer (Per 1,000 Women/PCMM in 2017)



# Low-Value Cervical Cancer Tests Among Those Screened

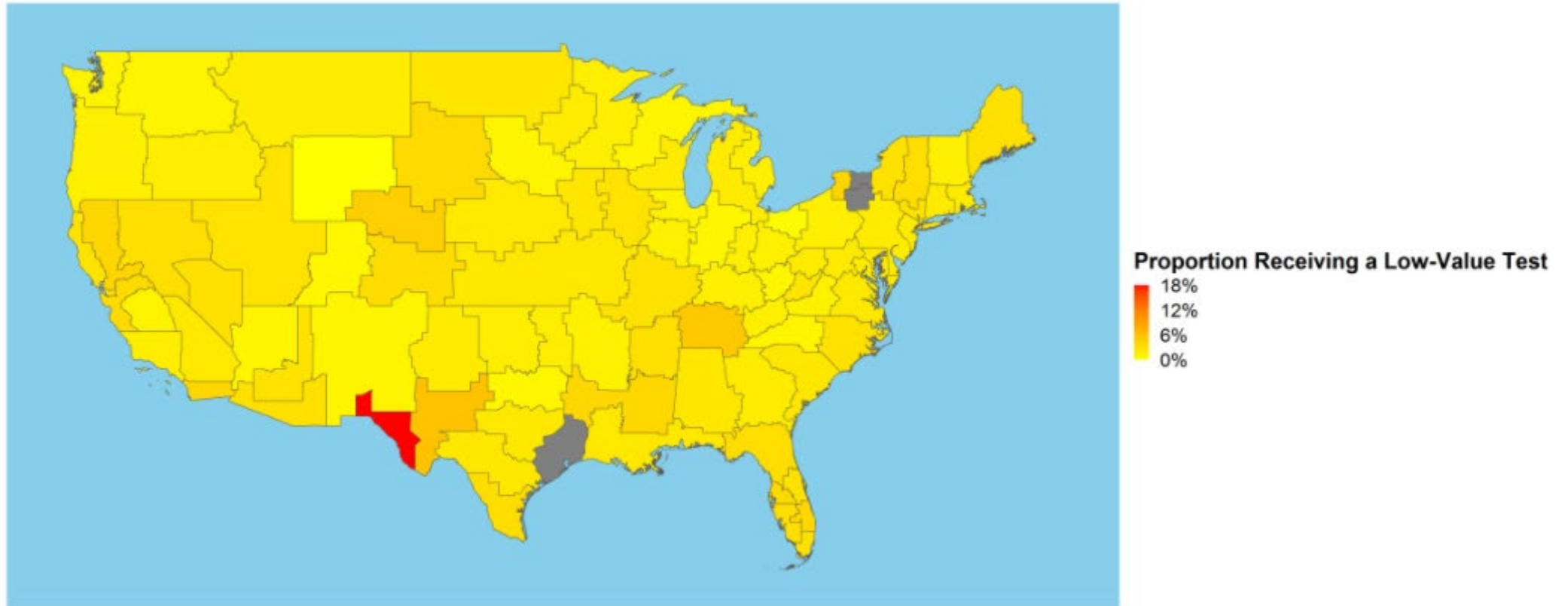


# Patients Screened for Colon Cancer (Per 1,000 Patients/PCMM in 2017)





# Low-Value Colon Cancer Tests Among Those Screened





# Low-Value Prostate Cancer Tests Among Those Screened

