Improving Colorectal Cancer Screening in South Asian Americans

A Mixed Methods Study with a CBPR framework

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State of colorectal cancer screening

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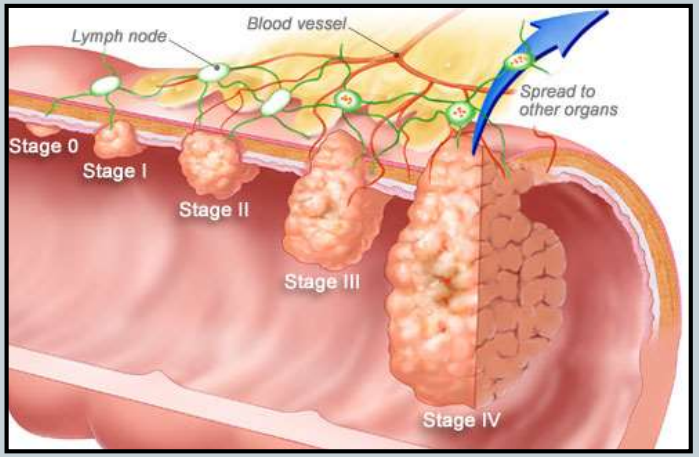
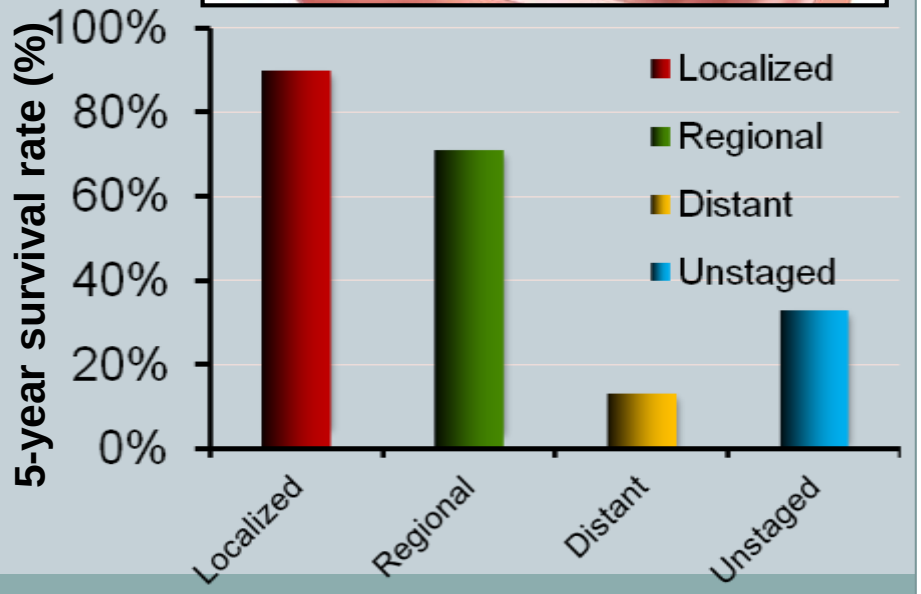
Why CRC screening works

- Affects men and women of all races, lifetime risk of 5% (1 in 20 people)
- Most colon cancers arise in preexisting colonic polyps
- Has a long natural history
- Identification and early removal of precursor lesions (polyps) prevents colon cancer



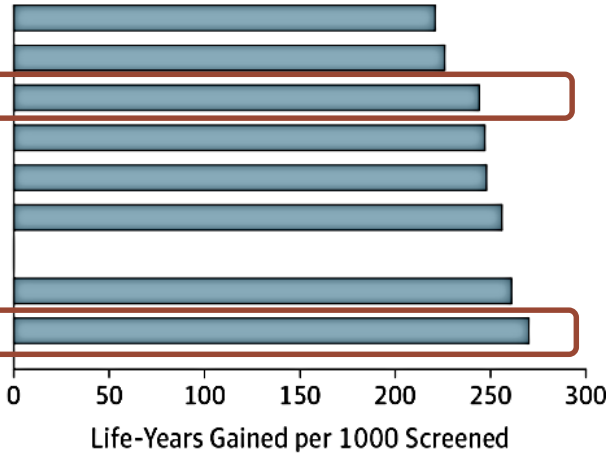


Adapted from Surveillance, Epidemiology, and End Results (SEER) Program

USPSTF Recommendations

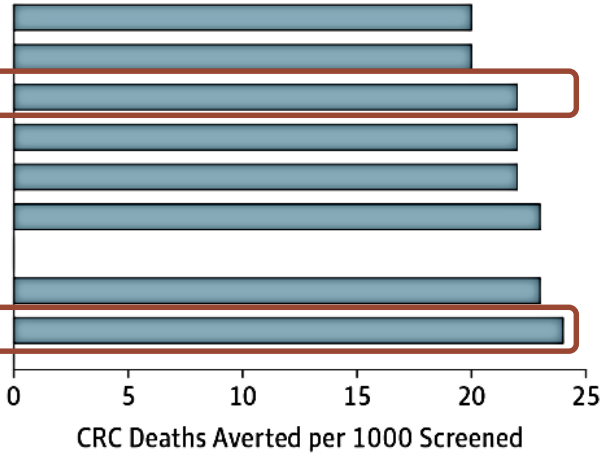
A **Benefit:** Life-years gained per 1000 individuals screened

Screening Method and Frequency	Model Estimates, Life-Years Gained per 1000 Screened: Middle	Low	High
Flexible sigmoidoscopy every 5 y	221	181	227
FIT-DNA every 3 y	226	215	250
FIT every year[a]	244	231	260
HSgFOBT every year	247	232	261
CT colonography every 5 y[b]	248	226	265
Flexible sigmoidoscopy every 10 y plus FIT every year[a]	256	246	270
FIT-DNA every year	261	246	271
Colonoscopy every 10 y[a]	270	248	275



B **Benefit:** Colorectal cancer deaths averted per 1000 individuals screened

Screening Method and Frequency	Model Estimates, CRC Deaths Averted per 1000 Screened: Middle	Low	High
Flexible sigmoidoscopy every 5 y	20	17	21
FIT-DNA every 3 y	20	19	22
FIT every year[a]	22	20	23
HSgFOBT every year	22	20	23
CT colonography every 5 y[b]	22	20	24
Flexible sigmoidoscopy every 10 y plus FIT every year[a]	23	22	24
FIT-DNA every year	23	22	24
Colonoscopy every 10 y[a]	24	22	24

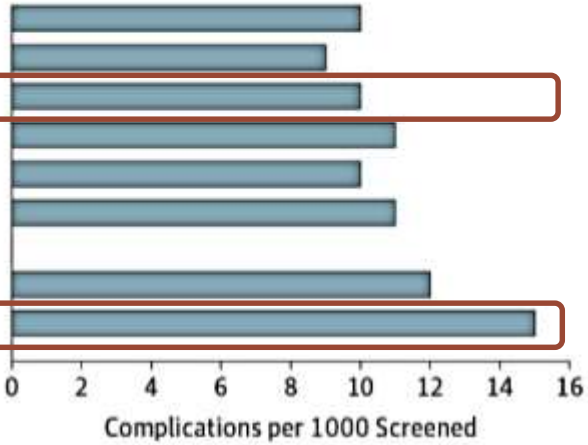


Bibbins-Domingo, K., et al. (2016). JAMA

USPSTF Recommendations

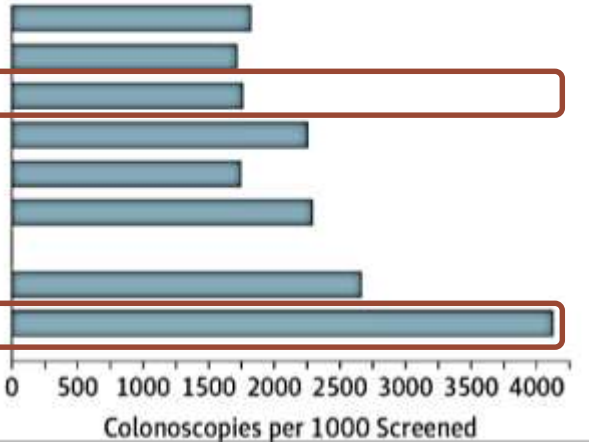
C Harms: Complications (gastrointestinal and cardiovascular events) of colorectal cancer screening and follow-up testing per 1000 individuals screened[c]

Screening Method and Frequency	Model Estimates, Complications per 1000 Screened: Middle	Low	High
Flexible sigmoidoscopy every 5 y	10	9	12
FIT-DNA every 3 y	9	9	10
FIT every year[a]	10	10	11
HSgFOBT every year	11	11	11
CT colonography every 5 y[b]	10	10	11
Flexible sigmoidoscopy every 10 y plus FIT every year[a]	11	11	12
FIT-DNA every year	12	12	13
Colonoscopy every 10 y[a]	15	14	15



D Burden: Lifetime No. of colonoscopies per 1000 individuals screened

Screening Method and Frequency	Model Estimates, Lifetime Colonoscopies per 1000 Screened: Middle	Low	High
Flexible sigmoidoscopy every 5 y	1820	1493	2287
FIT-DNA every 3 y	1714	1701	1827
FIT every year[a]	1757	1739	1899
HSgFOBT every year	2253	2230	2287
CT colonography every 5 y[b]	1743	1654	1927
Flexible sigmoidoscopy every 10 y plus FIT every year[a]	2289	2248	2490
FIT-DNA every year	2662	2601	2729
Colonoscopy every 10 y[a]	4049	4007	4101



Bibbins-Domingo, K., et al. (2016). JAMA

State of CRC Screening

- Screening landscape dominated by colonoscopy & FIT/FOBT (>95%)
- All tests are effective, importance of adherence
  - Fecal immunochemical test (FIT) $ 22
  - Colonoscopy $900
  - Less common – sigmoidoscopy, CT colonography, stool DNA+FIT
- Adherence higher in immigrant groups when offered non-invasive screening tests

National Health Interview Survey; Shapiro J et al. CEBP, 2012; Inadomi et al. JAMA IM, 2012

Why study South Asians?

- Dramatic growth of South Asian populations in California
  - Largest group of South Asians in California is Asian Indian (nearly 600K)
  - Most rapidly increasing population in California
    - Bangladeshi increased by 157% over 10 years
- Colorectal cancer incidence not decreasing among South Asian males, increasing among South Asian females
  - Contrast to declining incidence and mortality trends in other major racial/ethnic groups

Giddings BH, Cancer Causes & Control, 2012; Gomez SL, JNCI 2013; CDC, MMWR, 2012

State of CRC Screening in South Asians

- CRC screening in South Asians reported to be lower at 41% (as low as 21% in some surveys)
- Less acculturated, lower income, or more recent migrants may have lower use of CRC screening
  - Medical mistrust may also impact screening
- South Asians appear less educated about CRC
- Major limitations in current literature
  - Data based on community-based samples
  - Data do not reflect diversity of South Asian community

Lee HY, Ethn Health, 2011; Glenn BA, J Comm Health, 2009; Menon U, Cancer Nursing, 2014

Objectives

- Public Health Impact:
  - To understand the knowledge, attitudes and behaviors of South Asian immigrants related to CRC screening
  - To design more effective and more culturally and linguistically appropriate interventions that lead to greater adherence to CRC screening guidelines

Ultimately to reduce death from CRC

Aim 1: Project Qualitative Aims

Susan L Ivey, MD, MHSA; Winston Tseng, PhD

Conduct a CBPR, mixed methods study to better understand patient attitudes and knowledge, acceptability of CRC screening modalities, barriers and facilitators to screening and relationship to delayed detection, access and use of health services, and health information seeking. Aim 1:

- Convened an Advisory Board of providers, community members, patient
  - Reviewed focus group questions; gathered input on outreach
  - Reviewed analysis plan
- Conducted 10 KI interviews with local community members on CAB to:
  - Understand contextual and system-level factors
  - Assess interventions, strategies, messages; add 4 KI interviews with religious leaders
- Conducted 8 focus groups among South Asian men and women (4 Asian Indian and 4 Bangladeshi groups) to assess:
  - Perception/awareness of CRC risks and screening, CRC screening facilitators, communication barriers and strategies

Improving Colorectal Cancer Screening in South Asian Americans

Quantitative Results for Analysis of Statewide Behavioral Risk Factor and Cancer Registry Data

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Cancer Prevention Institute of California

Aim 2: Project Quantitative Aim

Applied traditional regression and novel classification techniques to **identify subgroups at highest risks of low adherence to CRC screening and late stage diagnosis**

- Guidance from Advisory Board on key factors
- Identify high-risk populations with low adherence to CRC screening guidelines
  - California Health Interview Survey data
- Assessed patterns of advanced stage CRC
  - California Cancer Registry data

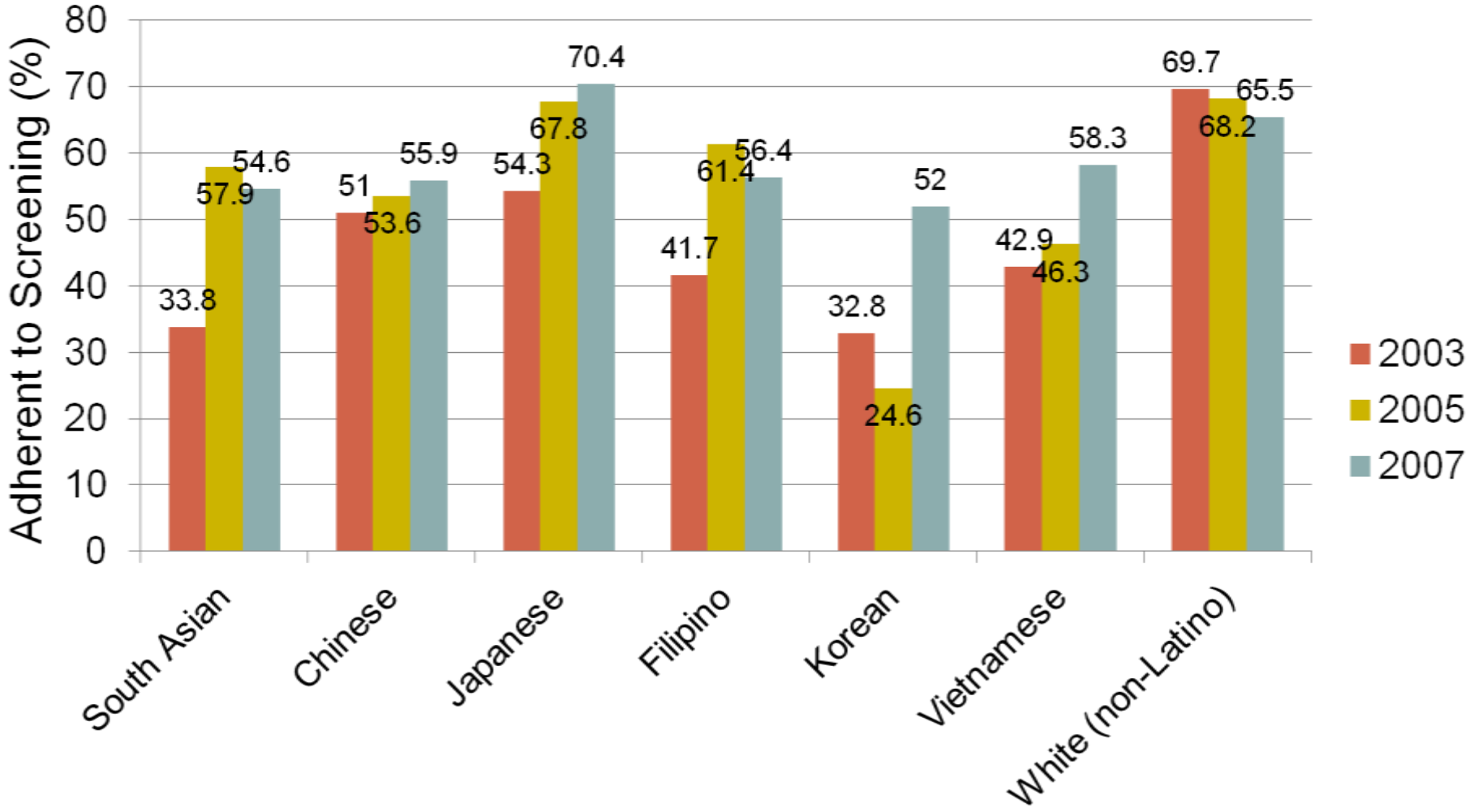
Patterns of CRC screening in South Asians

- To identify high-risk populations with low adherence to current CRC screening guidelines:
  - Used California Health Interview Survey (CHIS) data
  - Focused on health care utilization, insurance coverage, use of other types of preventive services, length of US residence, limited English proficiency, and health literacy

California Health Interview Survey (CHIS)

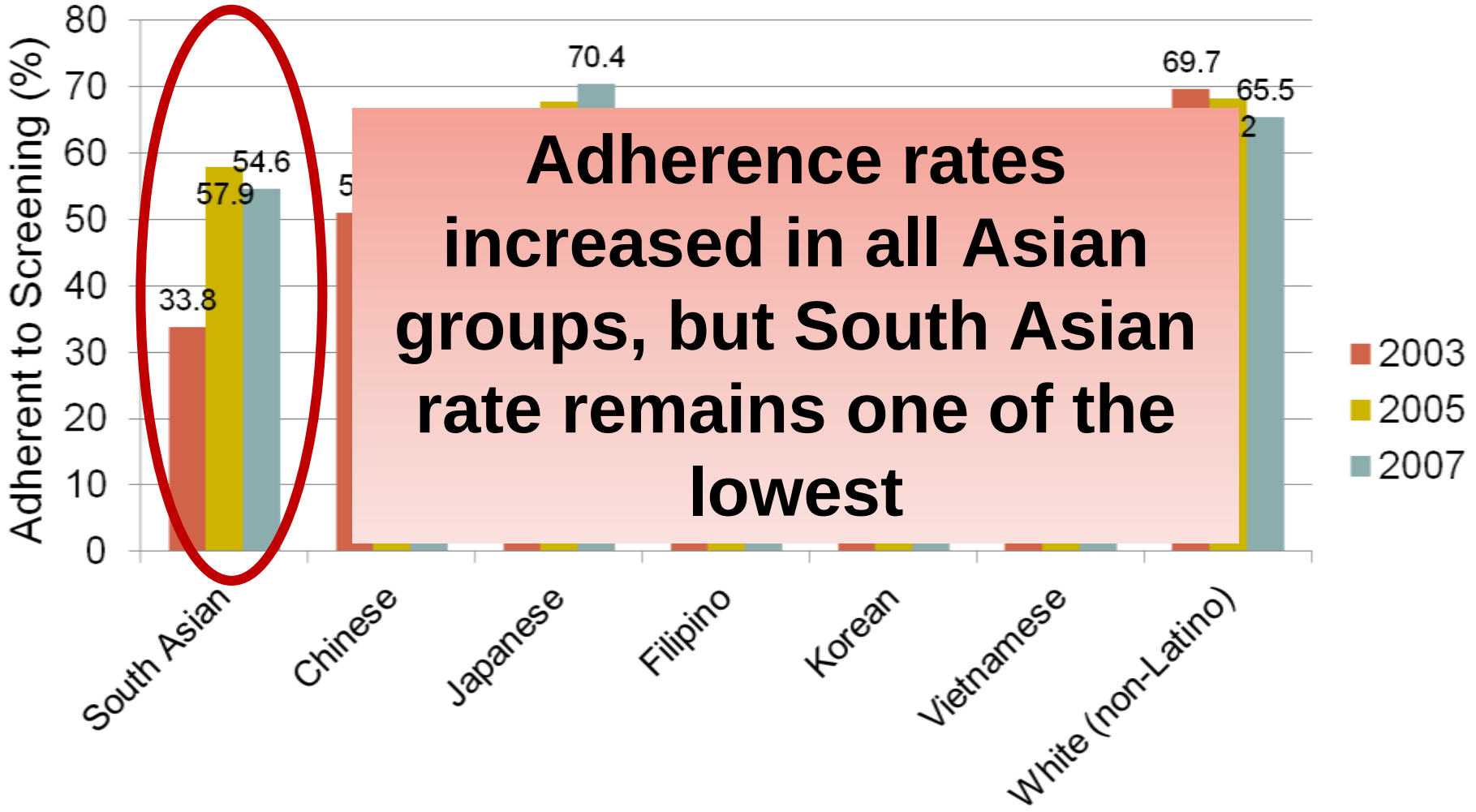
- A random-dial telephone survey on a wide range of health topics
  - 40,000 adult participants
  - Representative of California's diverse population
- Total N=459 South Asians age 50+ (2001-2009)
  - N=2053 age 18+
  - South Asians are defined as including Asian Indian, Pakistani, Bangladeshi, Nepalese, Sri Lankans, and Other South Asians
- Variables available for assessment
  - Age, gender, race/ethnicity
  - Socioeconomic status, insurance
  - Marital status, immigration (% life in the US), English proficiency
  - Use of preventive services, health status, body mass index, physical activity

Adherence* with CRC screening in South Asians



*Adherent=FOBT annually, flexible sigmoidoscopy every 5 years, double-contrast barium enema every 5 years, colonoscopy every 10 years

Adherence* with CRC screening in South Asians



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Non-adherence to CRC screening guidelines using multivariable model

Characteristic	% non-adherence (N=236)	Association with non-adherence	
	Weighted %	Adjusted OR*	(95% CI)
Percent of life lived in US			
0-20%	65.06	1.00	
21-40%	56.78	1.04	(0.38- 2.82)
41-60%	41.51	0.49	(0.21- 1.16)
61-80%	30.61	0.41	(0.15- 1.15)
81%+	27.67	0.32	(0.06- 1.62)
Unknown (2001 data)	51.73	0.26	(0.01- 7.84)
P-trend[3]			***0.02***
Language used at home			
English	37.18	1.00	
Non-English, 1 only	66.50	**2.95**	**(1.05- 8.29)**
English + other	48.82	1.74	(0.86- 3.49)
BMI (Asian cut points)			
Underweight/Normal (<23)	56.45	1.00	
Overweight (23-<27.5)	48.40	0.64	(0.33- 1.27)
Obese (27.5+)	38.24	**0.39**	**(0.16- 0.95)**
P-trend[5]			***0.04***
Had flu shot in past 12 months			
Yes	33.01	1.00	
No	62.24	**2.75**	**(1.50- 5.04)**
Unknown	55.82	5.35	(0.16- 180.07)

*Model also adjusted for age, gender, insurance, high blood pressure, heart disease, and # of times visited doctor

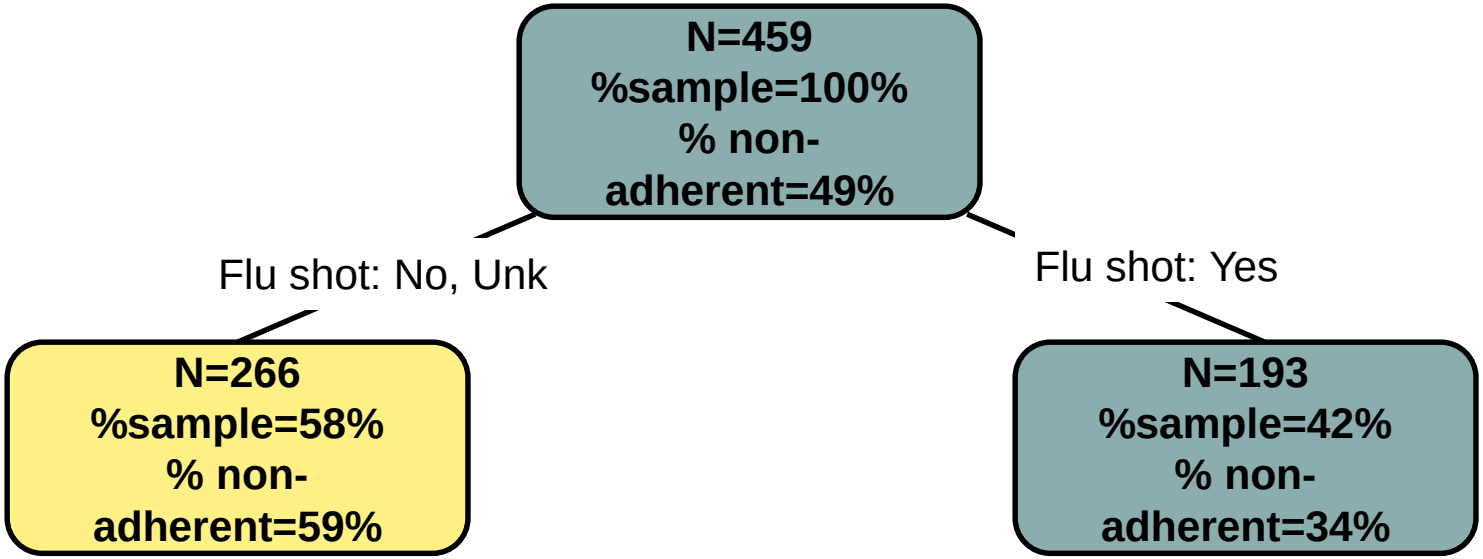
Recursive Partitioning: an agnostic classification technique for identifying high-risk subgroups

Less likely to be non-adherent

More likely to be non-adherent

N (sample size of this group)
%sample (among total sample, N/459)
% non-adherent(among this group, number of not up-to-date/N)

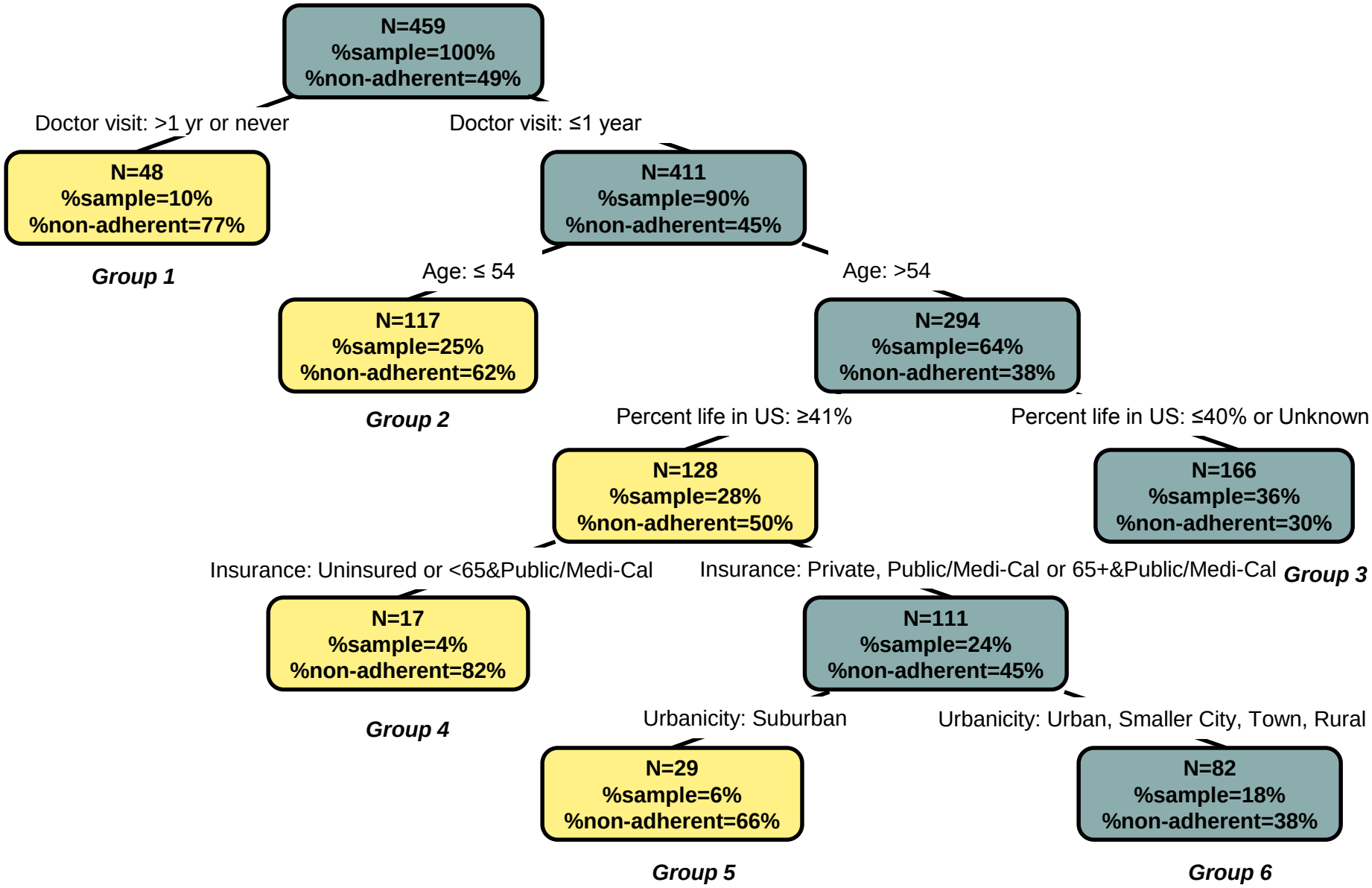
Tree 1: Flu shot strongly linked to CRC screening



Weighted distribution of non-adherence by recursive partitioning group

Had flu shot?	Total N	Non-adherence (N=236)		
		N	Weighted %	(95% CI)
Yes	193	65	33.01	(24.79 - 41.24)
No or Unk	266	158	61.12	(52.40 - 69.83)

Tree 2: Other than flu shot, additional high-risk subgroups were identified, especially Group 1 & Group 4



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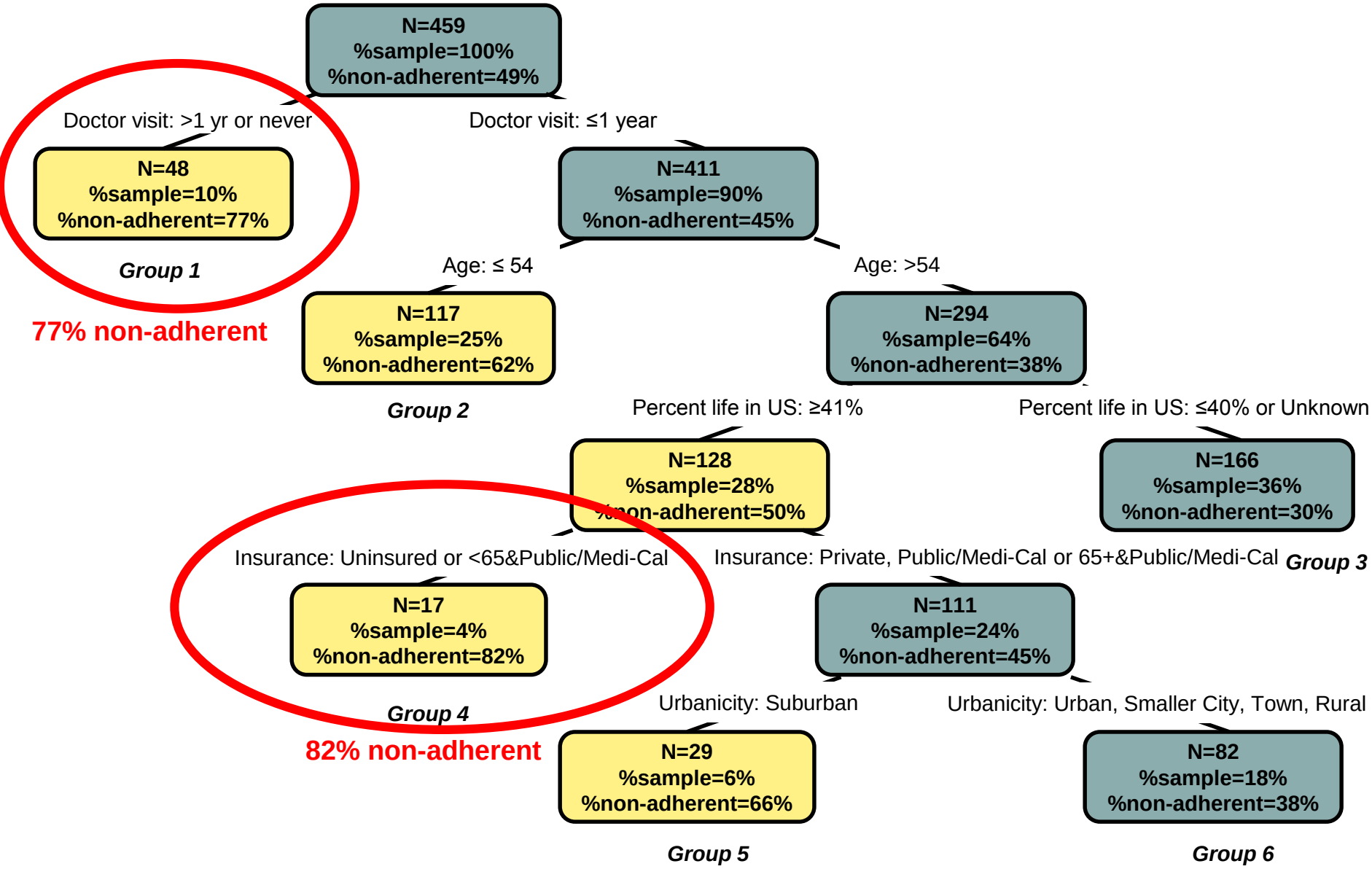


Tree 2: Weighted distribution of non-adherence by partitioning group

Recursive Partitioning Group	Total N	Not up-to-date (N=236)		
		N	Weighted %	(95% CI)
Group 1	48	37	70.05	(50.63 - 89.48)
Group 2	117	73	62.19	(50.61 - 73.76)
Group 3	166	49	30.46	(21.61 - 39.31)
Group 4	17	14	89.88	(74.05 - 100.00)
Group 5	29	19	62.85	(40.58 - 85.11)
Group 6	82	31	35.60	(22.68 - 48.52)

Group 1: Doctor visit >1 year or never
Group 2: Doctor visit <= 1 year & Age <=54
Group 3: Doctor visit <= 1 year & Age >=55 & Percent life in US<=40% or Unknown
Group 4: Doctor visit <= 1 year & Age >=55 & Percent life in US>=41% & Insurance/Age = Uninsured or <65&Public/Medi-Cal
Group 5: Doctor visit <= 1 year & Age >=55 & Percent life in US>=41% & Insurance/Age = Private, Public/Medicate or 65+&Public/Medi-Cal & Urbanicity=Suburban
Group 6: Doctor visit <= 1 year & Age >=55 & Percent life in US>=41% & Insurance/Age = Private, Public/Medic-Cal or 65+&Public/Medi-Cal & Urbanicity = Urban, Smaller City, Town or Rural

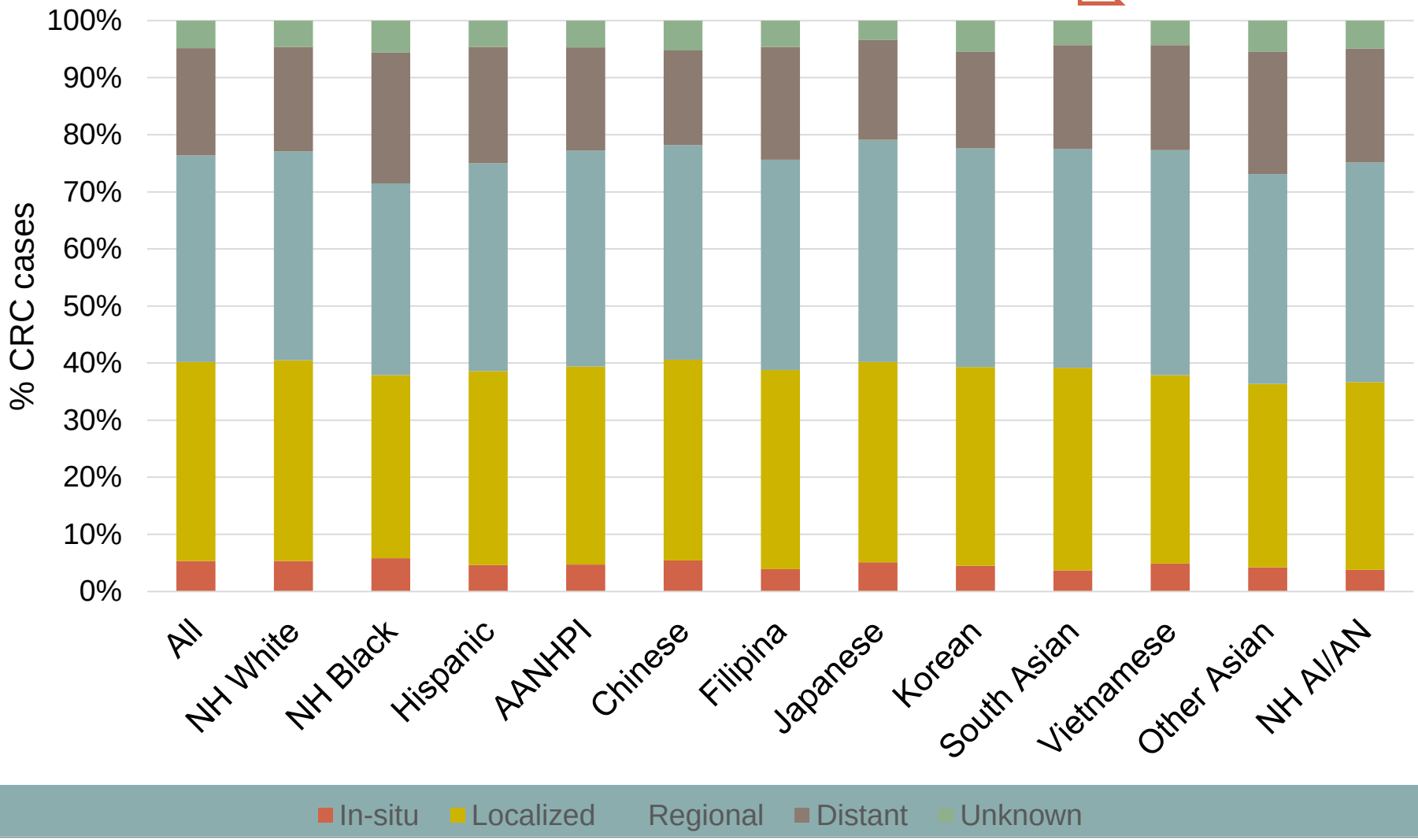
Key findings from CHIS analyses

- 51% of South Asian adults in California, 50 years and older, were adherent to CRC screening for 2001-2009.
- Factors associated with **adherence**:
  - Being obese (BMI 27.5+), relative to BMI<23
- Factors associated with **non-adherence**:
  - Lower percent life lived in the US (2.6x less adherent)
  - Speaking only non-English at home (3x less adherent)
  - Did not have a flu shot in past 12 months (nearly 3x less adherent)
- High-risk subgroups identified by recursive partitioning:
  - No recent doctor's visits
  - Recent doctor's visit, age >=55, not recent immigrant, uninsured or public insurance

Aim 2: Colorectal cancer stage at diagnosis

- Assessed stage at diagnosis (early v. late) among CRC patients:
  - Used California Cancer Registry data
  - Focused on patient sociodemographic, hospital, and neighborhood characteristics

CRC stage at diagnosis by race/ethnicity, California, 1988-2012



California Cancer Registry (CCR) Variables

- Patient sociodemographic characteristics
  - Age at diagnosis
  - Sex
  - Marital status
  - Race/ethnicity
  - Nativity
  - Health insurance
- Neighborhood (block group)
  - Socioeconomic status
  - Ethnic enclave (Asian, Hispanic)
- Year of diagnosis
- Registry reporting region
- Reporting hospital type
  - NCI designated cancer center
  - ACOS Teaching Program
  - ACOS Comprehensive Community Cancer Program
  - ACOS Community Cancer Program

Multivariable associations with late stage at diagnosis for South Asians in California, 1988-2012

	OR	95% CI	
Age at diagnosis (ref = 60-69)			
50-59	**1.62**	**1.11**	**2.35**
60-69	1.00		
70-79	1.00	0.68	1.45
80+	1.30	0.84	2.01
p-trend	0.78	0.44	1.40
Sex (ref = male)			
Female	1.14	0.87	1.50
Marital status (ref = married)			
Single	**2.43**	**1.40**	**4.21**
Separated/Divorced/Widowed	1.36	0.92	2.03
Unknown	0.70	0.37	1.32
Nativity (ref = US-born)			
Foreign-born	**2.42**	**1.64**	**3.58**
Health insurance (ref = private)			
Not insured, self-pay	0.87	0.39	1.98
Public	1.04	0.73	1.49
Medicare	1.06	0.64	1.75
Unknown	0.83	0.46	1.48

- Younger (age<60) patients 62% more likely to be diagnosed at late stage
- Single patients >2x more likely than married to be diagnosed at late stage
- Foreign-born >2x more likely than US-born to be diagnosed at late stage

OR = odds ratio (adjusted)
CI = confidence interval

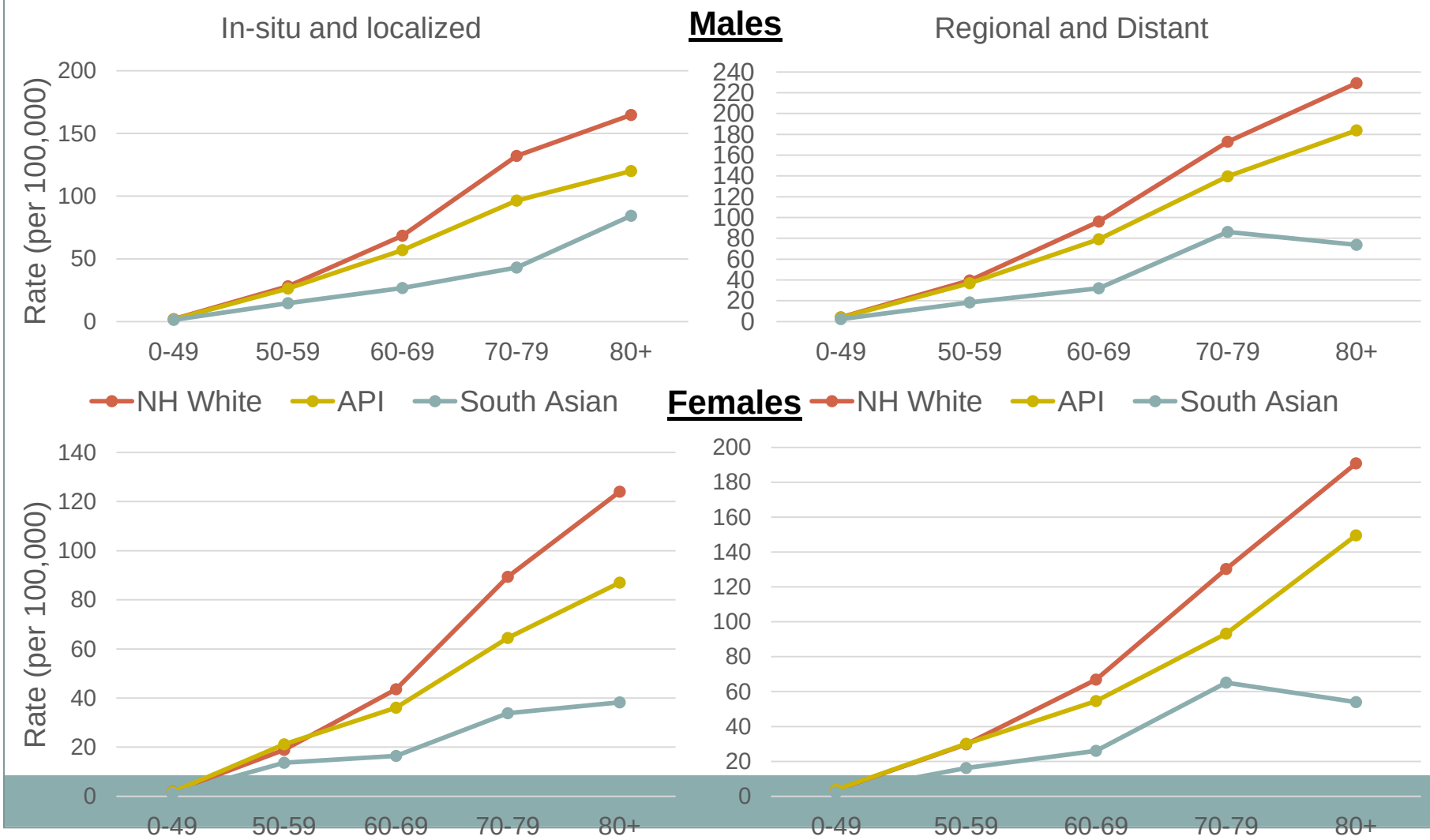
Multivariable associations with late stage at diagnosis for South Asians in California, 1988-2012

	OR	95% CI	
Neighborhood SES (ref = Q5 – high SES)			
Quintile 1- low SES	0.86	0.52	1.43
Quintile 2	0.82	0.54	1.25
Quintile 3	1.15	0.79	1.67
Quintile 4	1.08	0.77	1.52
p-trend			0.52
Ethnic Enclave (ref = Q1 – low enclave)			
Quintile 2	1.25	0.66	2.38
Quintile 3	1.39	0.75	2.60
Quintile 4	1.28	0.70	2.31
Quintile 5 - high enclave	0.86	0.48	1.53
Unknown	0.41	0.04	3.95
p-trend			0.06
Reporting hospital type: NCI-Designated Cancer Center (ref = no)			
Yes	1.20	0.73	1.96
Year of Diagnosis (continuous)	0.98	0.96	1.01

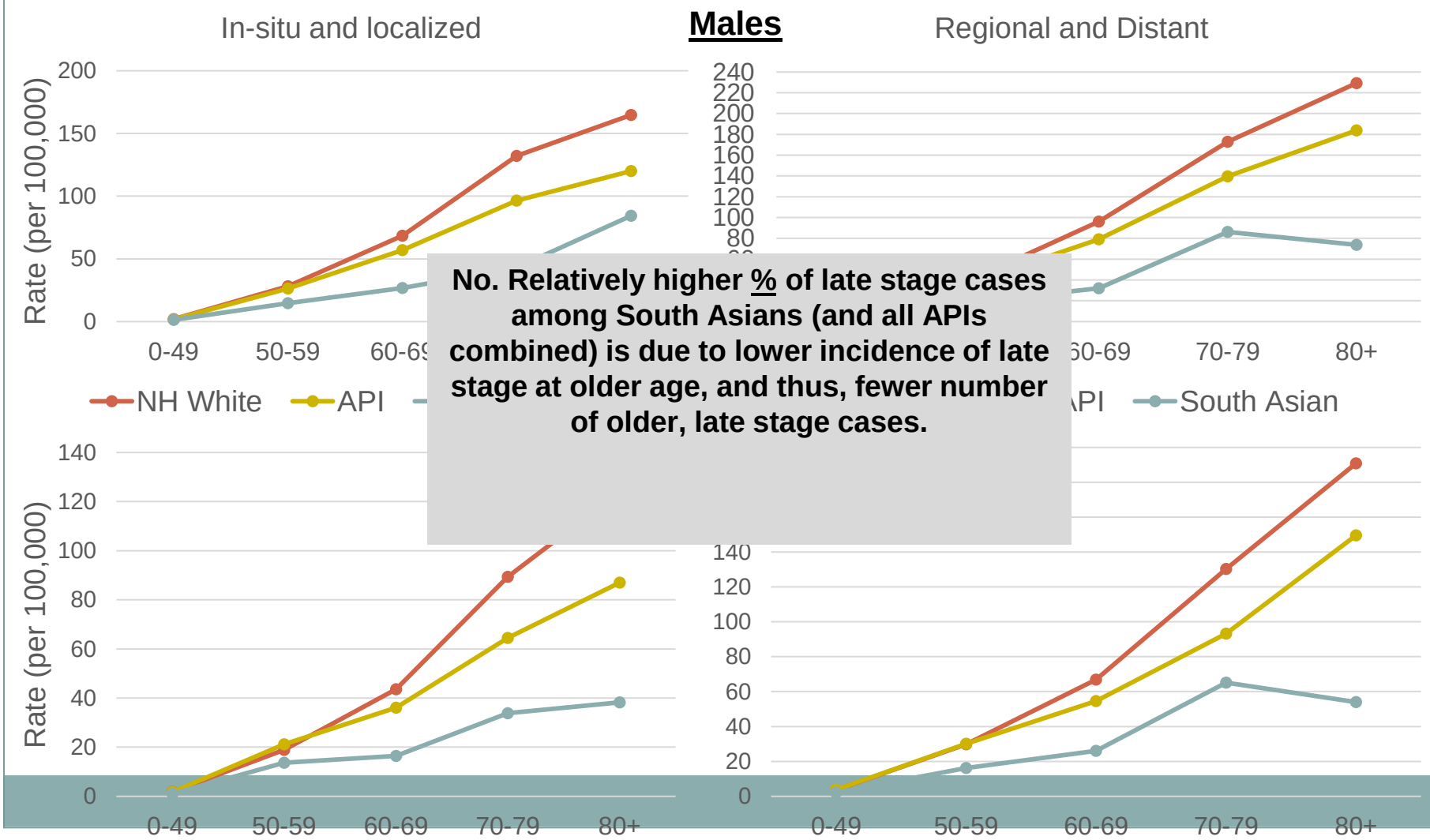
- No associations with neighborhood and hospital factors, nor year of diagnosis

OR = odds ratio (adjusted)
CI = confidence interval

Is late stage CRC incidence higher among South Asians?



Is late stage CRC incidence higher among South Asians?



Key findings from CCR analysis

- 57% of South Asian adults in California, 50 years and older, were diagnosed with late stage (regional + distant) disease, comparable to other racial/ethnic groups.

- Factors associated with **late stage disease**:
  - Age < 60
  - Single marital status
  - Foreign-born

- High-risk subgroup identified by recursive partitioning:
  - Foreign-born

Aim 3: Health Communication and Outreach

- **Places** for information and outreach
  - Community-based organizations
  - Faith-based organizations
- Preferred **languages**
  - Both **native language and English** are needed
  - Should **reach underserved language groups**
- **Types** of outreach
  - Provide **health education classes** or **group discussions**
  - Host a booth at **community events**
  - Organize **speaker presentations**; participants will attend
  - People go to physicians/community/family/friends for information
- Key messages for outreach – consider other media
  - **Verbal messages perceived as more effective** than written messages

Next Steps in CBPR process

- Design materials and test usability with community members (In Progress: Summer – fall 2016)
- Create slide deck for physician-led outreach to community organizations (4 planned for fall 2016)
- Discuss with community partners additional outreach strategies (e.g., social media, digital storytelling, “champions”, etc.)

Community Advisory Board

- Amit Agarwal, M.B.A.
  - Principal, Deloitte;
    Patient representative
- Raisa Sultana
  - General Secretary
    Bay Area Bangladeshi Association
- Pragati Grover, M.S.W.
  - Executive Director
    India Community Center
- Alka Kanaya, M.D.
  - Professor, UCSF
    Department of Medicine
- Suhaila Khan, M.D., Ph.D.
  - Director of Research,
    National Council of Asian Pacific Islander Physicians
- Mary Modayil, Ph.D., M.S.P.H.
  - Epidemiologist
    Alberta Health Services
- Latha Palaniappan, M.D., M.Sc.
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    Stanford University
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    Division of Gastroenterology
- Ronesh Sinha, M.D.
  - PRANA Initiative
    Palo Alto Medical Foundation

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  - Winston Tseng, Ph.D.
- Cancer Prevention Institute of California
  - Scarlett Lin Gomez, Ph.D., M.P.H. (Co-PI)
  - Salma Shariff-Marco, Ph.D., M.P.H.
  - Juan Yang, Ph.D., M.P.H.
- Consultant:
  - Arnab Mukherjea, Dr.P.H., M.P.H.

Thanks for listening!

Contact us for additional information on the project

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