



David Geffen
School of Medicine

UCLA Health

Tracking a “warning sign” for cognitive decline in the United States:

Racial/ethnic variation in self-reported memory problems among middle-aged and older adults in the National Health and Examination Survey (NHANES), 1999 to 2014



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Assistant Professor of Medicine in Residence
RCMAR Scholar 2017-2018
April 16, 2017



STROKE Prevention
Turning Research into Outreach, Knowledge and Education

Outline for Today

- Scholar Background
- 2017-2018 RCMAR Pilot Award
 - **Aim 1 final results**
 - Background
 - Methods
 - Results
 - Discussion- Limitations, Next Steps
 - *No conflicts of interest to disclose*



Scholar Background

- Assistant Professor, UCLA Department of Medicine
- Primary Care Physician and Health Services Researcher
 - Harvard College, Harvard Medical School
 - UCSF Internal Medicine Primary Care Program and Chief Resident
 - Robert Wood Johnson Clinical Scholar, UCLA 2009-2012

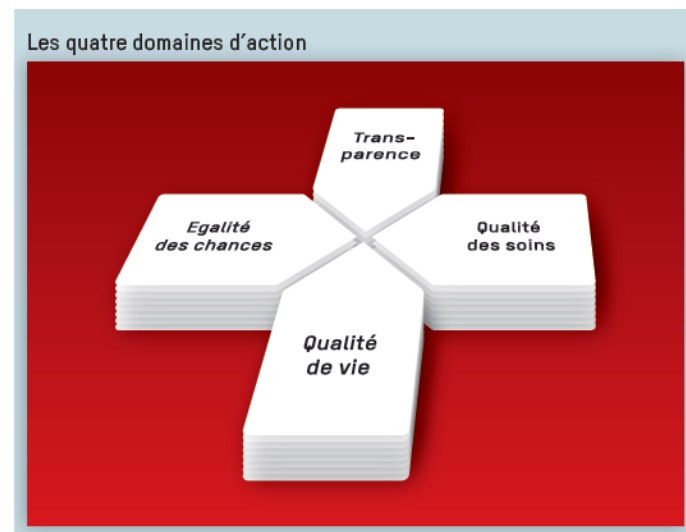
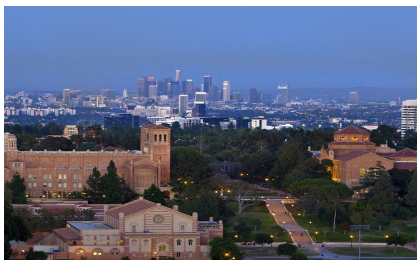


Scholar Background



- Swiss Hospitals for Equity Project, Switzerland
 - Research on immigrant health disparities during refugee crisis
 - Geneva University Hospital, Lausanne Institute of Social and Preventive Medicine

UCLA → Lake Geneva



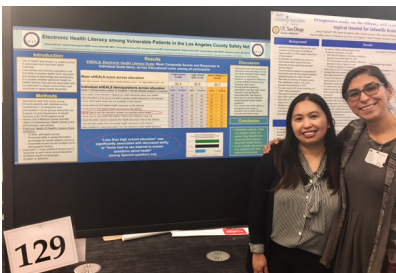
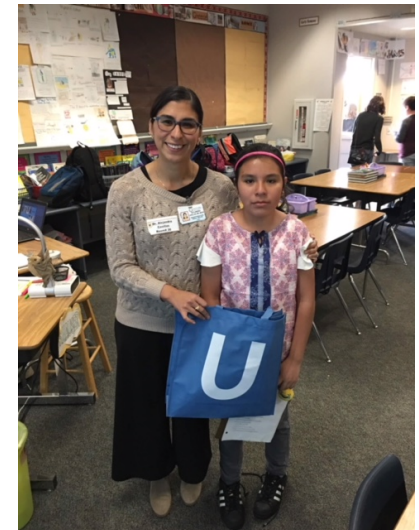
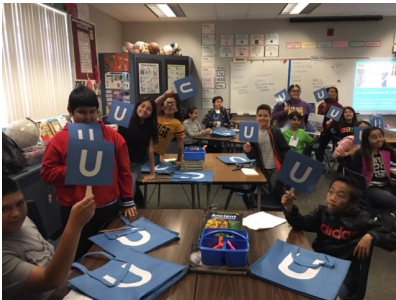
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Scholar Background

- Returned home *permanently* in August 2016, largely to be of service to my community again
 - Born in Los Angeles, daughter of Mexican immigrants



2017-2018 RCMAR Pilot Project Specific Aims

- 1) To estimate **trends in self-reported memory problems by race/ethnicity**, between 1999 and 2014, adjusting for demographic and clinical characteristics
- 2) To examine the **associations of nativity and acculturation** on memory problems among Latinos
- 3) To examine the **correlation between self-reported memory problems and neuro-cognitive testing**, and whether these associations differ by race/ethnicity



Background



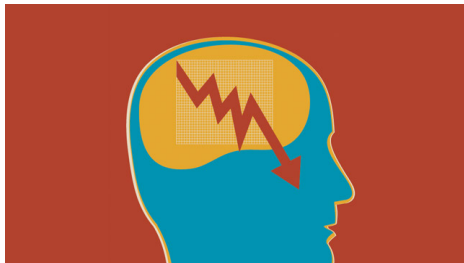
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The Impact of Cognitive Decline in the United States

- Cognitive decline increases risk for morbidity and early mortality ¹
- Alzheimer's disease and related dementias, alone, are estimated to be the third most expensive disease to treat in the country ²

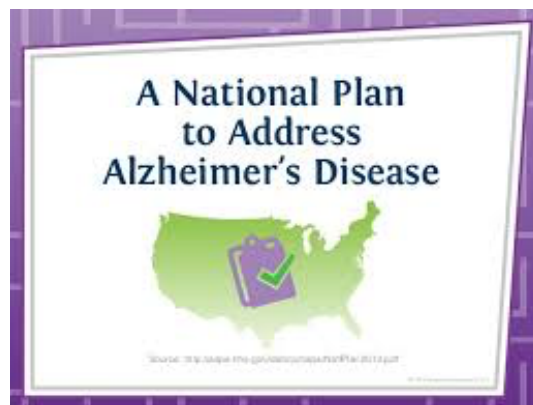


1. National Plan to address Alzheimer's Disease. <https://aspe.hhs.gov/national-plan-address-alzheimers-disease-2015-update>. Retrieved January 30, 2017.

2. https://www.cdc.gov/aging/pdf/cognitive_impairment/cogimp_poilicy_final.pdf

National Plan to Address Alzheimer's Disease

- In 2015, the US Department of Health and Human Services published the *National Plan to Address Alzheimer's Disease*, also calling for **“expanding data collection and surveillance efforts” to track the prevalence and impact of cognitive decline** ¹



1. National Plan to address Alzheimer's Disease. <https://aspe.hhs.gov/national-plan-address-alzheimers-disease-2015-update>. Retrieved January 30, 2017.



What is the cognitive health of middle-aged and older adults in the United States, and how is this changing over time?



What is the cognitive health of middle-aged and older adults in the United States, and how is this changing over time?

- Some population-level indicators exist, but only at sporadic intervals
- Most studies look at changes between two time points, inconsistent



What is the cognitive health of middle-aged and older adults in the United States, and how is this changing over time?

- Few studies examine population level changes of cognitive impairment over time, using nationally representative data
- Combine census data with community studies
 - Community studies of cognitive health are not nationally representative
 - Do not represent age groups and race/ethnicity



Cognitive impairment without dementia in 2002, Health and Retirement Study (HRS)

- In 2002, 5.4 million people were estimated to have cognitive impairment without dementia in the United States ¹
- ADAMS (Aging, Demographics, and Memory Study) drawn from the Health and Retirement Study (HRS)
- Prevalence estimated using a population-weighted sample of HRS respondents (over age 70)
 - 20% estimated to have cognitive impairment without dementia in this age group population

1. Plassman BL, Langa KM, Fisher GG, et al. Prevalence of Cognitive Impairment without Dementia in the United States. *Annals of internal medicine*. 2008;148(6):427-434.



Dementia from 2000 to 2012, Health and Retirement Study (HRS)

- The HRS found that dementia prevalence declined significantly from about 12% in 2000 to 9 % in 2012 ¹

Table 2. Cognitive Function, at Age 65 Years or Older, in the 2000 and 2012 Cohorts^a

Cognitive Function	No. (%) [95% CI]		
	2000 (n = 10 546)	2012 (n = 10 511)	
		Crude Rate ^b	Age- and Sex-Standardized Rate ^{b,c}
Normal	6966 (67.2) [65.8-68.6]	7114 (72.4) [71.1-73.6]	7114 (72.6) [71.1-73.6]
CIND	2293 (21.7) [20.1-22.3]	2224 (18.8) [17.8-19.9]	2224 (18.8) [17.8-19.9]
Dementia	1287 (11.6) [10.7-12.7]	1173 (8.8) [8.2-9.4]	1173 (8.6) [8.1-9.3]

Abbreviation: CIND, cognitive impairment–no dementia.

^a Values in parentheses are weighted percentages (95% CIs) derived using the HRS sampling weights to adjust for the complex design of the Health and Retirement Study.¹⁶

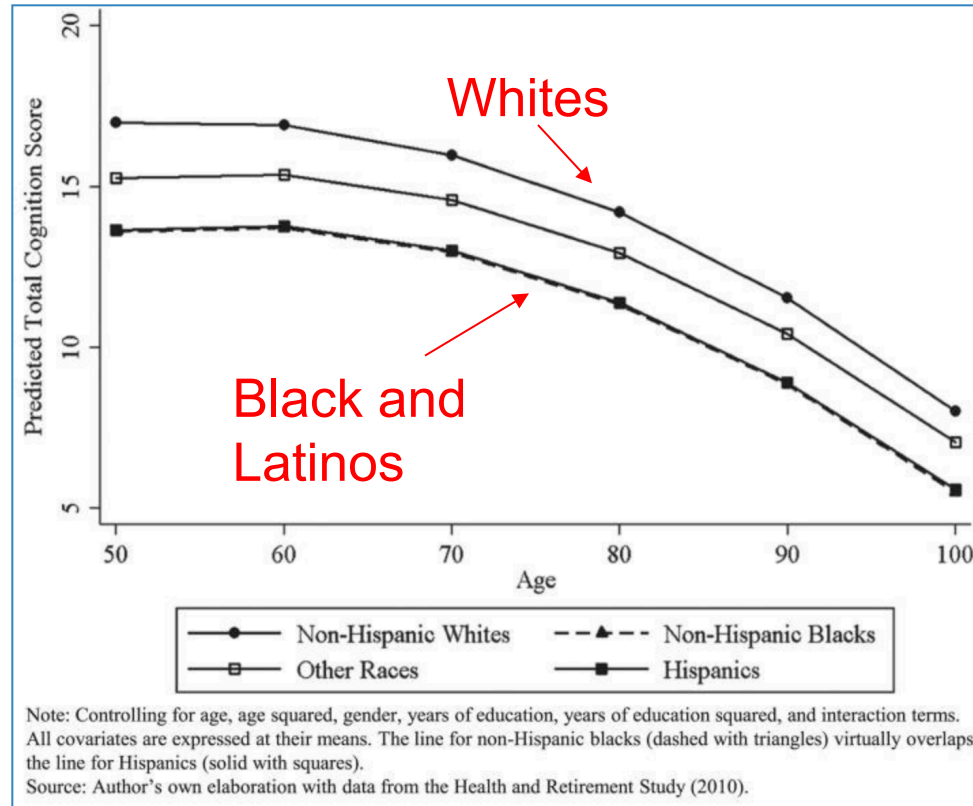
^b $P < .001$ for difference between 2000 and 2012.

^c The age- and sex-standardized weighted percentages, after direct standardization of the 2012 cohort to the 2000 cohort.

1. Langa KM, Larson EB, Crimmins EM, Faul JD, Levine DA, Kabeto MU, Weir DR. A Comparison of the Prevalence of Dementia in the United States in 2000 and 2012. *JAMA Intern Med.* 2017;177(1):51-58. doi:10.1001/jamainternmed.2016.6807



Cognition Scores by Race/Ethnicity in 2010, Health and Retirement Study (HRS)



Díaz-Venegas C, Downer B, Langa KM, Wong R. Racial and ethnic differences in cognitive function among older adults in the USA. International journal of geriatric psychiatry. 2016;31(9):1004-1012. doi:10.1002/gps.4410.



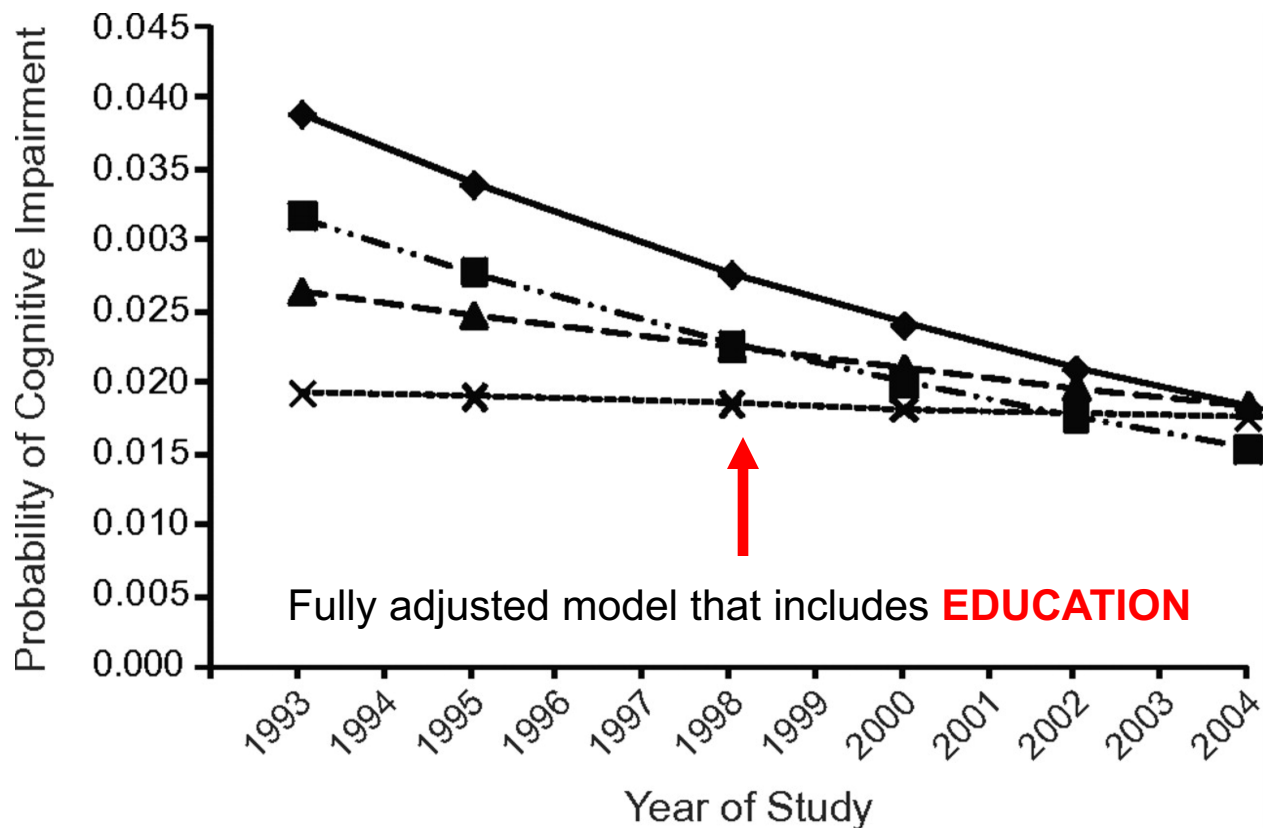
Cognition Score differences over 1993-2004, Health and Retirement Study (HRS)

- Six waves of the HRS evaluated differences in the Telephone Interview Cognitive Screen (TICS) between 1993 and 2004 ¹
 - One of the only studies to conduct *serial* and *longitudinal* assessment
 - Respondents interviewed in multiple examination cycles were included in analyses for every wave to which they contributed after age 70 years
 - A higher prevalence of cognitive impairment in non-Whites
 - Good news: The annual decline in prevalence of impaired cognition was 3.4%, with more significant declines for non-White populations
 - Hypothesis: Mechanism of decline related to better **EDUCATION**

1. Kristin M. Sheffield, M. Kristen Peek; Changes in the Prevalence of Cognitive Impairment Among Older Americans, 1993–2004: Overall Trends and Differences by Race/Ethnicity, *American Journal of Epidemiology*, Volume 174, Issue 3, 1 August 2011, 274–283.



Unadjusted & adjusted trends in the probability of cognitive impairment in older Americans, 1993–2004



The challenges of assessing cognitive decline at the population level

- Burden of impaired cognition at the population level is complex to assess, particularly for minority communities

1. Gonzalez H, Wassim T, Goukova N, Gallo LC, Penedo FJ, Davis SM, Lipton RB, Arguelles W, Choca JP, Catellier DJ, Mosley TH. Neurocognitive Function Among Middle-aged and Older Hispanic/Latinos: Results from the Hispanic Community Health Study/Study of Latinos. Archives of Clinical Neuropsychology 30 (2015): 68-77.



The challenges of assessing cognitive decline at the population level

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 - Serial measurement of cognition at the population level is complicated by the variety of cognitive outcomes

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The challenges of assessing cognitive decline at the population level

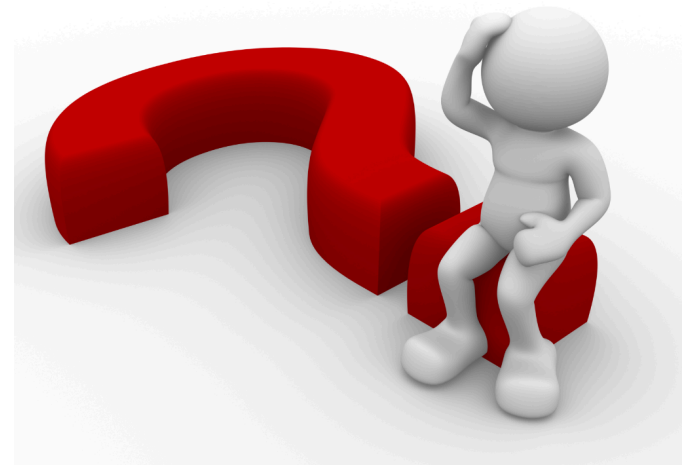
- Burden of impaired cognition at the population level is complex to assess, particularly for minority communities
 - Serial measurement of cognition at the population level is complicated by the variety of cognitive outcomes
 - Cultural differences, socioeconomic factors, and test administration may affect cognitive test outcomes ¹
 - Validity of conclusions from these studies about the actual burden of cognitive decline present in minority communities

1. Gonzalez H, Wassim T, Gouskova N, Gallo LC, Penedo FJ, Davis SM, Lipton RB, Arguelles W, Choca JP, Catellier DJ, Mosley TH. Neurocognitive Function Among Middle-aged and Older Hispanic/Latinos: Results from the Hispanic Community Health Study/Study of Latinos. Archives of Clinical Neuropsychology 30 (2015): 68-77.



The challenges of assessing cognitive decline at the population level

- No one metric captures the spectrum of decline that can range from mild impairment to decline that progresses to dementia...



Self-reported Memory Problems as another surveillance tool

- Memory problems often present in early cognitive decline *and* full-fledged cognitive disease
- Centers for Disease Control and Prevention (CDC): Memory problems are “**one of the first warning signs of cognitive decline**”¹
- May provide an efficient method for monitoring population-level trends and racial/ethnic disparities in cognitive health

1. MMWR. Self-Reported Increased Confusion or Memory Loss and Associated Functional Difficulties Among Adults Aged >60 years- 21 states, 2011.



Purpose of my 2017-2018 RCMAR study



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- Investigate **serial trends** in self-reported memory problems from 1999-2014
 - *repeated study of an “early” warning sign*

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 - *ethnically representative*



Purpose of my 2017-2018 RCMAR study

- Investigate **serial trends** in self-reported memory problems from 1999-2014
 - *repeated study of an “early” warning sign*
- In a **nationally-representative** sample
 - *ethnically representative*
- Of middle-aged **and** older adults
 - *younger and older aging adults*
 - *(2012 study of British civil servants)*

Methods





Methods: Data and Measures

- National Health and Nutrition Examination Survey (NAHNES), 1999-2014
- Participants
 - Adults 45 years and older
 - Self-reported as NH White, NH Black, or Latino/Hispanic





Methods: Data and Measures

- Outcome: **Self-Reported Memory Problems**
 - Are you limited in any way because of difficulty remembering or because you experienced periods of confusion?
 - Yes vs. No; Declined answer, “Don't know” counted as missing
- Predictors: **Race/Ethnicity**: NH White, NH Black, Latino/Hispanic
 - **Age group**: 45-64 years; 65+ years
 - **Time period**: Four 4-year intervals between 1999-2014





Methods: Analyses

- Generalized linear regression models with a logit function using SAS survey procedures, sample weights
 - Accounted for unequal probabilities of selection, oversampling and non-response
- Three main effects: *race/ethnicity, age group, time period*
 - Three 2-way interactions between the main effects
 - One 3-way interaction of the main effects
 - Demographic (gender, education, poverty) + clinical (DM, DL, HTN) covariates
 - Subgroup Analyses- *effects of high school education*



Results



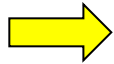
Demographic Characteristics NHANES 1999-2014 by Race/Ethnicity

NHANES PERIOD	1999-2002			2003-2006			2007-2010			2011-2014		
Total N	N = 4761			N = 4666			N = 6171			N = 4987		
Racial/Ethnic groups N (%)	NH White N = 2606 (55)	NH Black N = 882 (19)	Latinos N = 1256 (26)	NH White N = 2763 (59)	NH Black N = 960 (20)	Latinos N = 931 (20)	NH White N = 3256 (53)	NH Black N = 1227 (20)	Latinos N = 1677 (27)	NH White N = 2420 (49)	NH Black N = 1389 (28)	Latinos N = 1174 (24)
Male	47	43	45	48	44	47	48	44	48	47	45	47
Age Groups												
45-64	65	73	74	66	75	76	67	75	77	66	74	76
65+	35	27	26	34	26	24	33	25	23	34	26	24
Education												
< High School (HS)	18	43	56	14	32	51	15	31	53	11	24	50
= HS/GED	27	21	18	30	24	17	26	25	16	22	28	18
> HS	56	35	27	57	44	32	59	44	31	68	49	32
Income:Poverty Ratio												
0 – 1.0	7	20	23	5	16	23	6	17	22	8	24	24
1.1 – 3.0	28	36	43	32	43	42	30	40	41	30	36	39
≥ 3.0	56	31	23	58	37	30	57	33	22	57	31	25
Missing	9	13	11	5	4	6	7	10	15	5	9	12



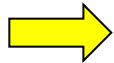
Latino participants were younger in all NHANES time periods

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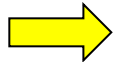
Latino participants were the least educated in all NHANES time periods

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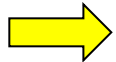
Latino participants had the highest rates of poverty in all NHANES time periods

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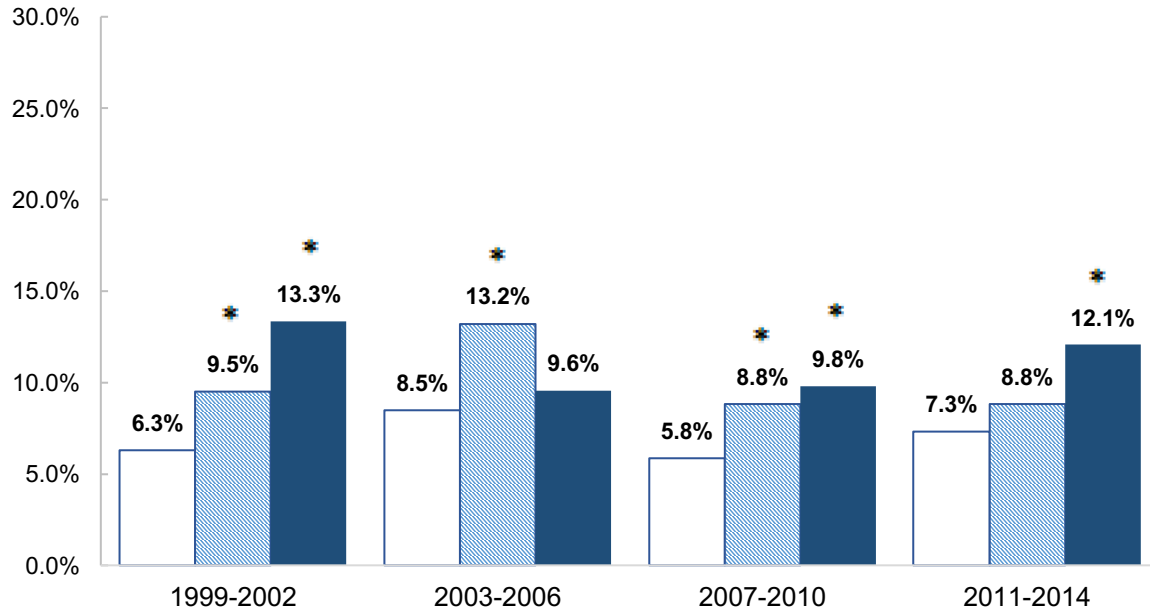


In 2011-2014, Blacks and Latino participants had comparable rates of poverty

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Self-reported memory problems by race/ethnicity, age 45 and over-- *Unadjusted*



Reference:  NH White  NH Black  Latino

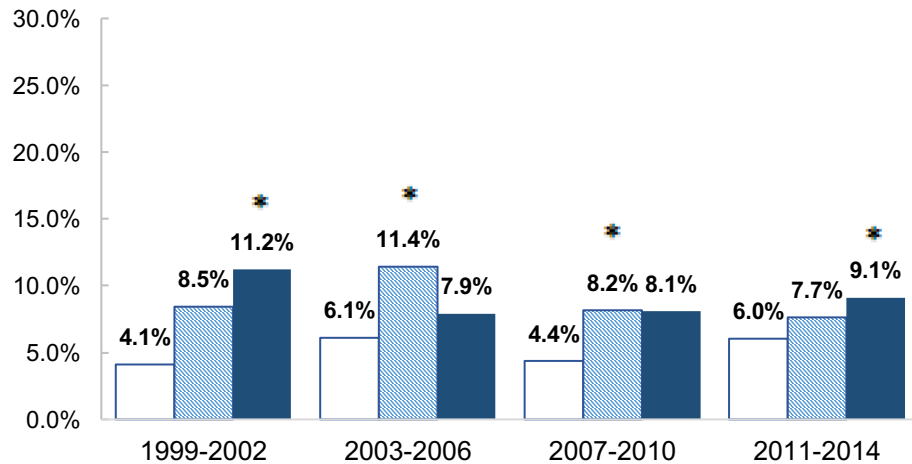
* $p \leq 0.05$

Memory problems were more common among Black and Latino groups than Whites, in multiple periods

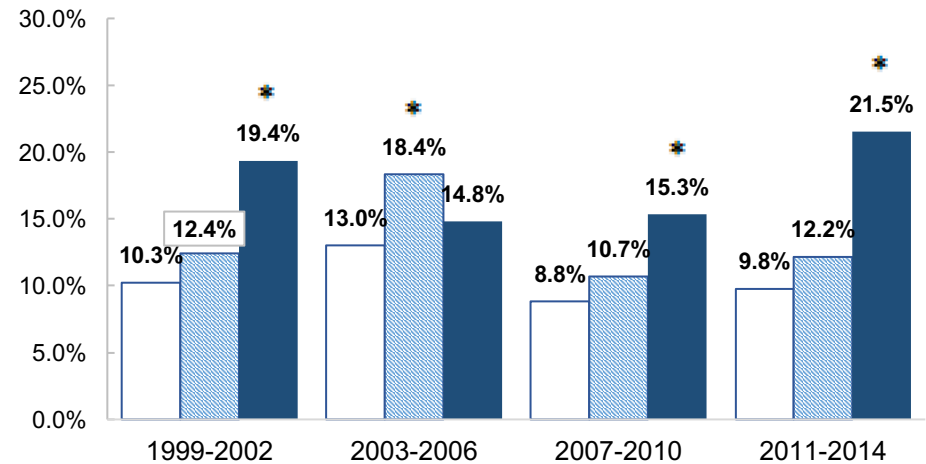


Self-reported memory problems were more prevalent among Non-White groups for middle-aged *and* older adults

Age 45 to 64-- Unadjusted



Age 65 and over-- Unadjusted



Reference:  NH White  NH Black  Latino

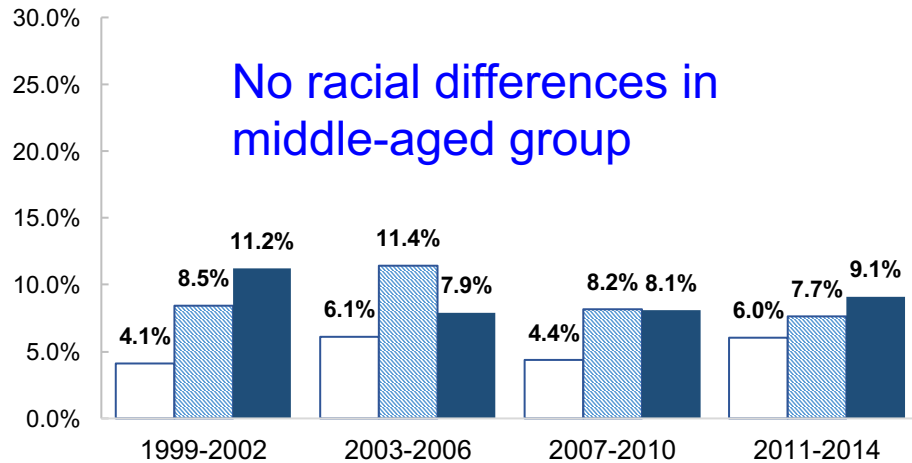
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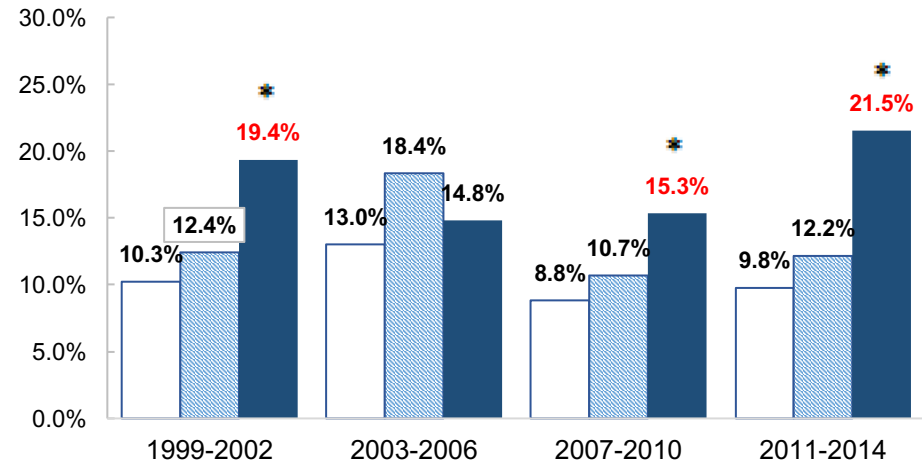
When **adjusted** for covariates,
disparities in memory problems were only observed
 for **older Latinos** (age 65 and over)

Age 45 to 64, Adjusted

No racial differences in middle-aged group



Age 65 and over, Adjusted



Reference: NH White NH Black Latino

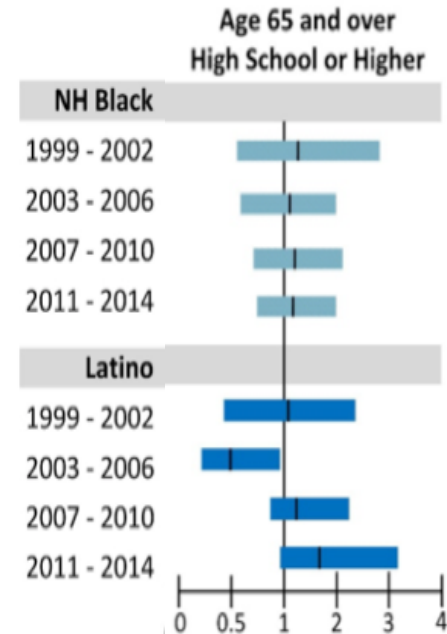
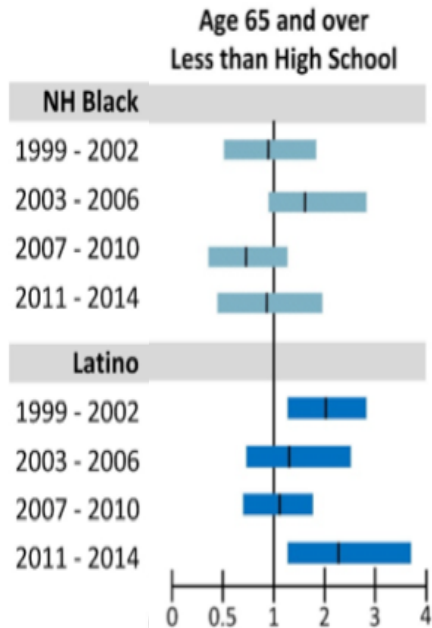
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Subgroup analyses– *high school education*

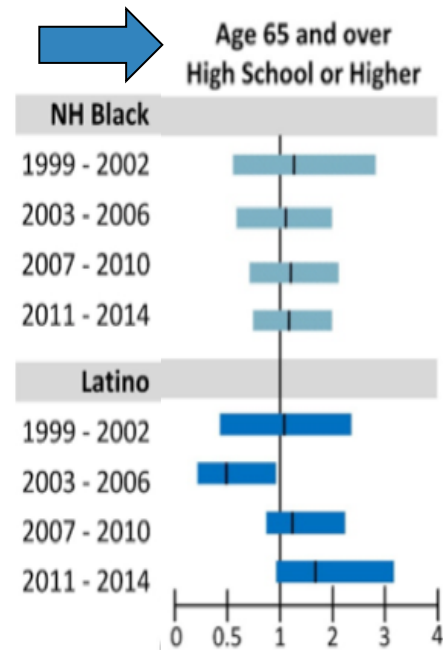
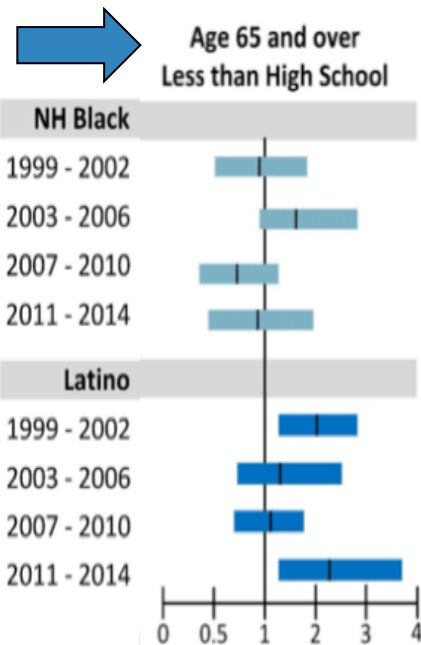
- Education → self-reported memory problems
 - Significant driver in racial/ethnic differences
- Examined adjusted racial/ethnic differences in memory problems among four age/education subgroups
 - 45-64 years
 - Less than high school
 - High school or greater
 - Over age 65 years
 - Less than high school
 - High school or greater

No racial differences in middle-aged subgroups

Odds Ratios for self-reported memory problems among older adults (age 65 and over), *adjusted*

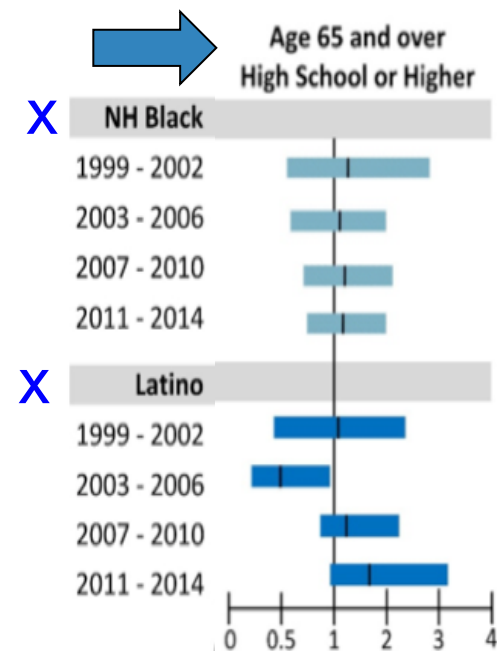
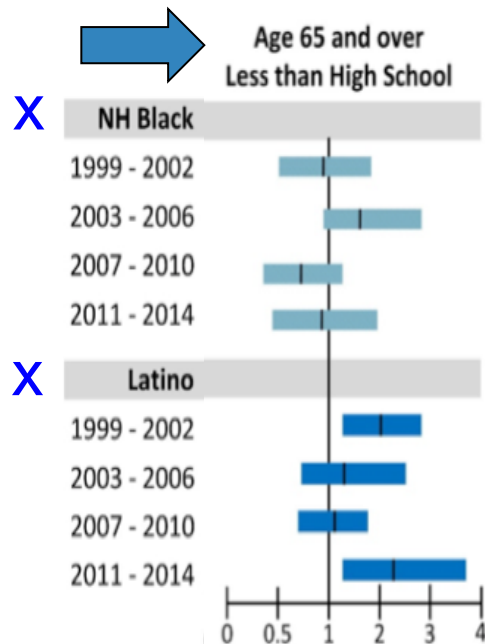


Odds Ratios for self-reported memory problems among older adults (age 65 and over), *adjusted*



➔ Stratified by education: < High School, >High School

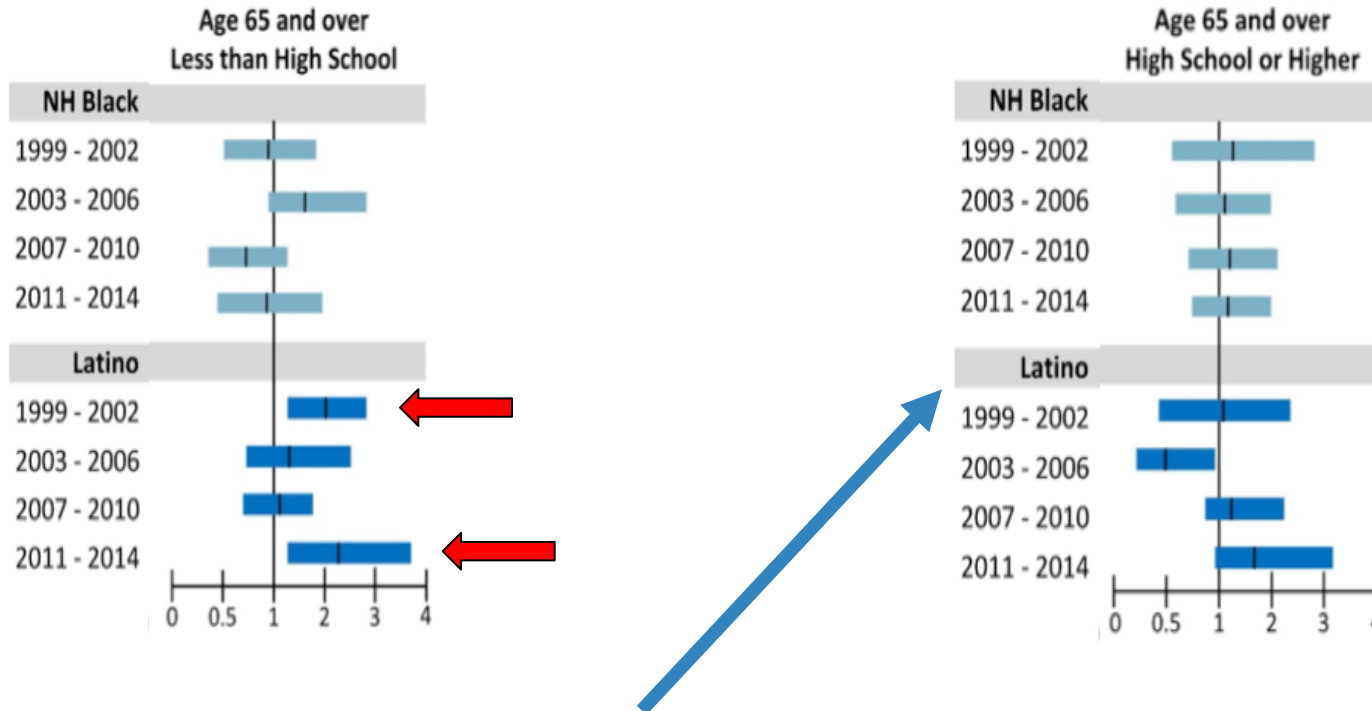
Odds Ratios for self-reported memory problems among older adults (age 65 and over), *adjusted*



➔ Stratified by education: < High School, >High School

X Black and Latino OR (*ref. older White group in corresponding time period*)

Older Latinos without a high school education had higher odds of memory problems (*ref.* White)



Older Latino high school graduates **did not** have higher odds of self-reported memory problems (*ref.* White)

Discussion



Conclusions

- From 1999-2014, self-reported memory problems, by middle-aged and older adults, were more prevalent among Non-Hispanic Black and Latino racial/ethnic groups than Non-Hispanic Whites
- Adjusted for covariates, disparities in higher prevalence of memory problems were only observed for older Latinos
 - Only older Latinos without a high school education had higher odds of memory problems
- We did *not* observe any statistically period differences in trends for self-reported memory problems between the four-year time periods from 1999-2014

Limitations

- Memory problems are self-reported, and are limited by recall bias and social desirability
- NHANES samples excludes patients with dementia who cannot participate in the questionnaire/exam
- Memory problems reported by participants may be attributed to other processes (i.e. depression, medications), and do not reflect a warning sign for degenerative cognitive function

Policy and Research Implications

- More efforts to educate patients about warning signs for decline
 - Even among middle-aged populations 45-64 years
 - Particularly among non-White communities
- Effects of education on self-reported memory problems in older Latinos may be related to acculturation, nativity, and language
(RCMAR Aim 2)
- More work is needed to understand the association between subjective symptoms (like memory problems) and cognitive impairment/risk (RCMAR Aim3)

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Thank you!
Questions?



Tracking a “warning sign” for cognitive decline in the United States:

Racial/ethnic variation in self-reported memory problems among middle-aged and older adults in the National Health and Examination Survey (NHANES), 1999 to 2014



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April 16, 2017



STROKE Prevention
Turning Research into Outreach, Knowledge and Education



David Geffen
School of Medicine

UCLA Health

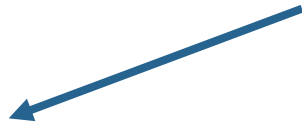
David Geffen School of Medicine



David Geffen
School of Medicine

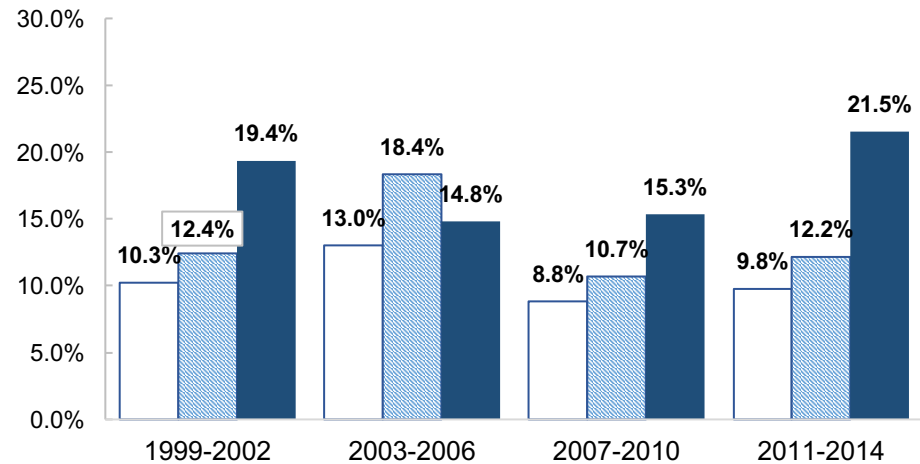
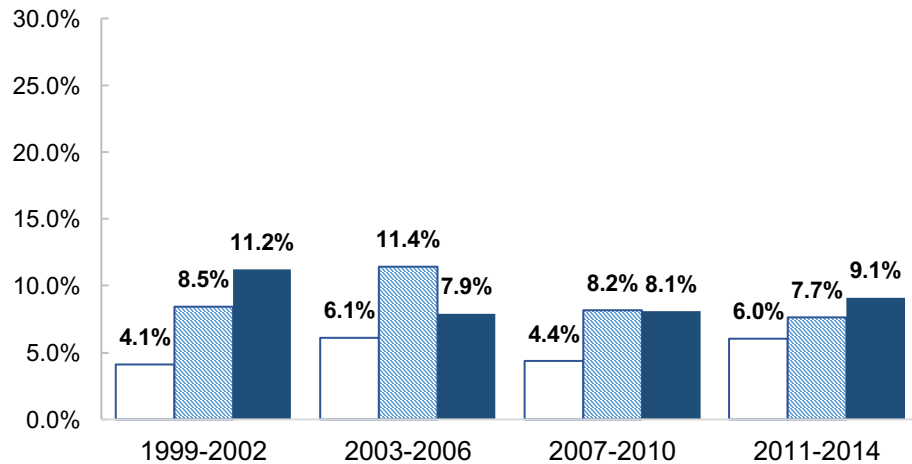
UCLA Health

Self-reported memory problems were observed even among middle-aged adults



Age 45 to 64-- Unadjusted

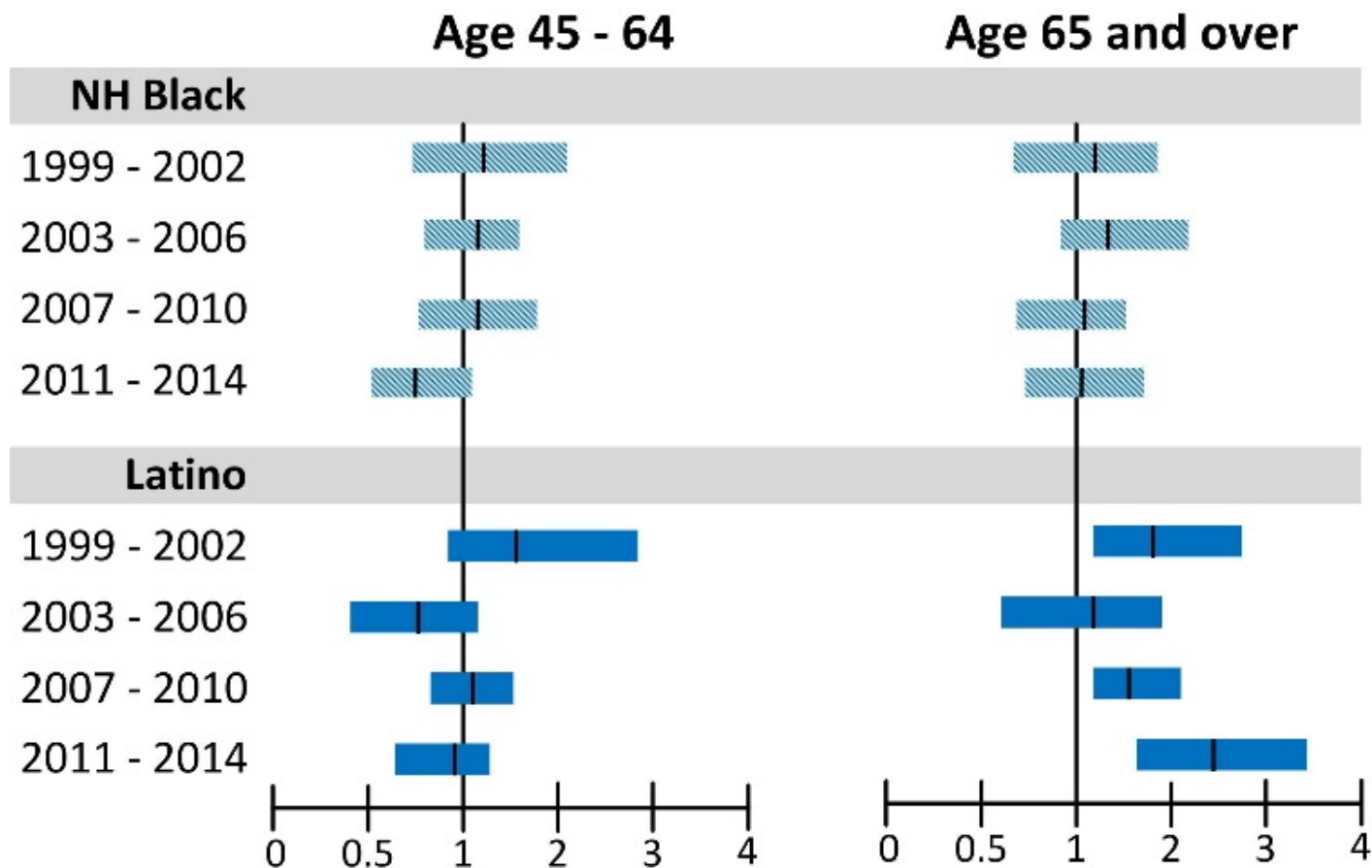
Age 65 and over-- Unadjusted



Reference:  NH White  NH Black  Latino

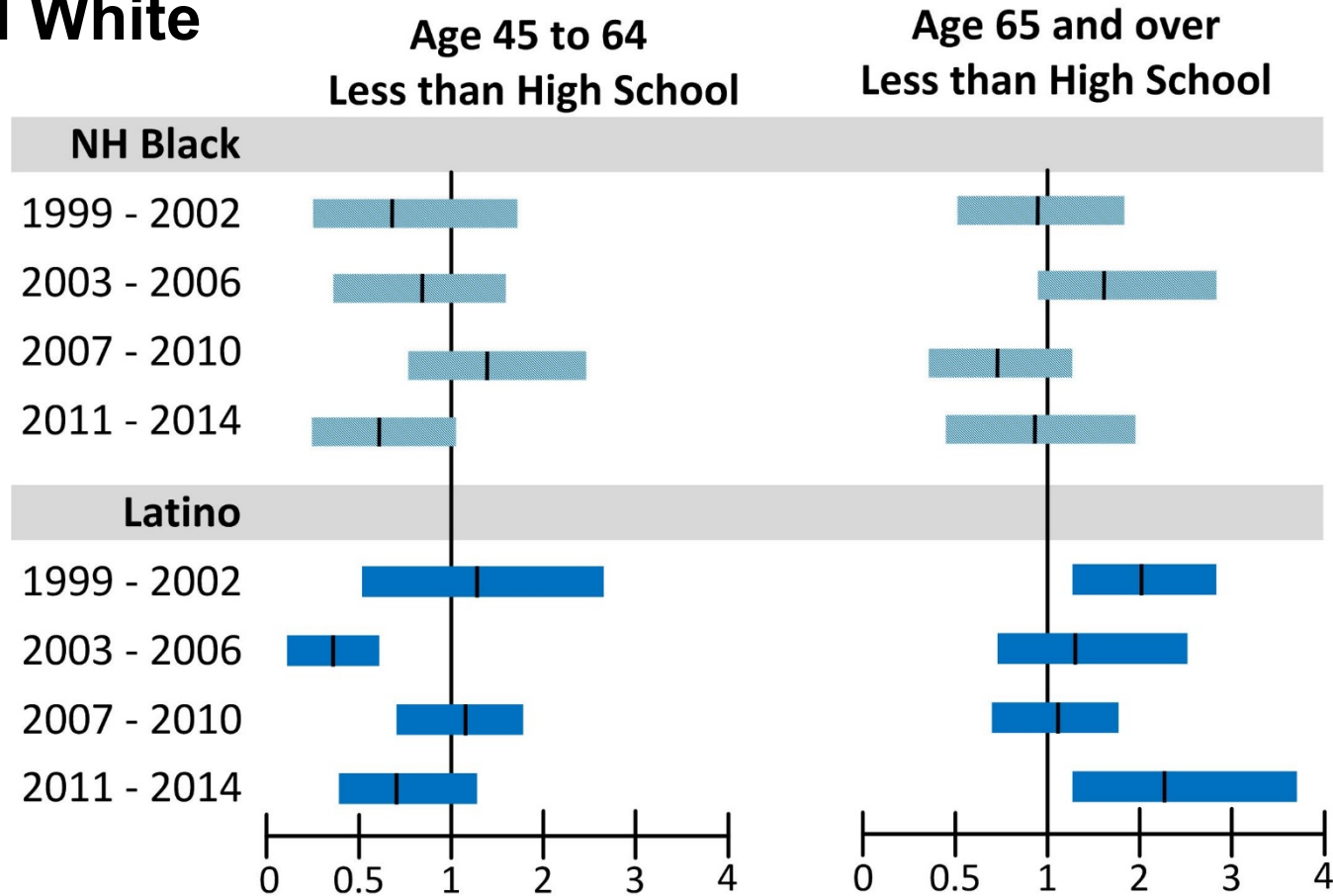
Race Differences

Reference Group: NH White



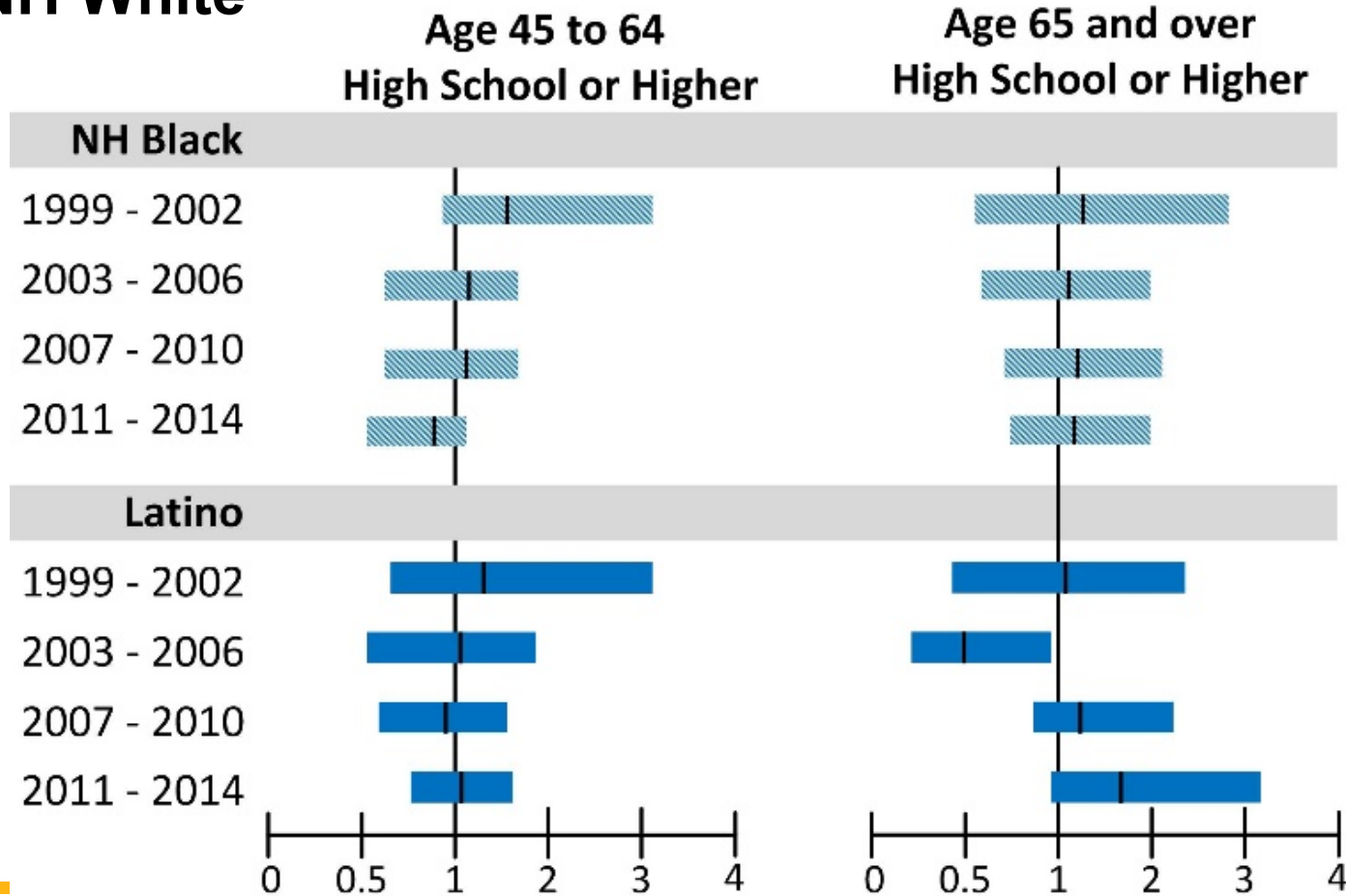
Race Differences

Reference Group: NH White



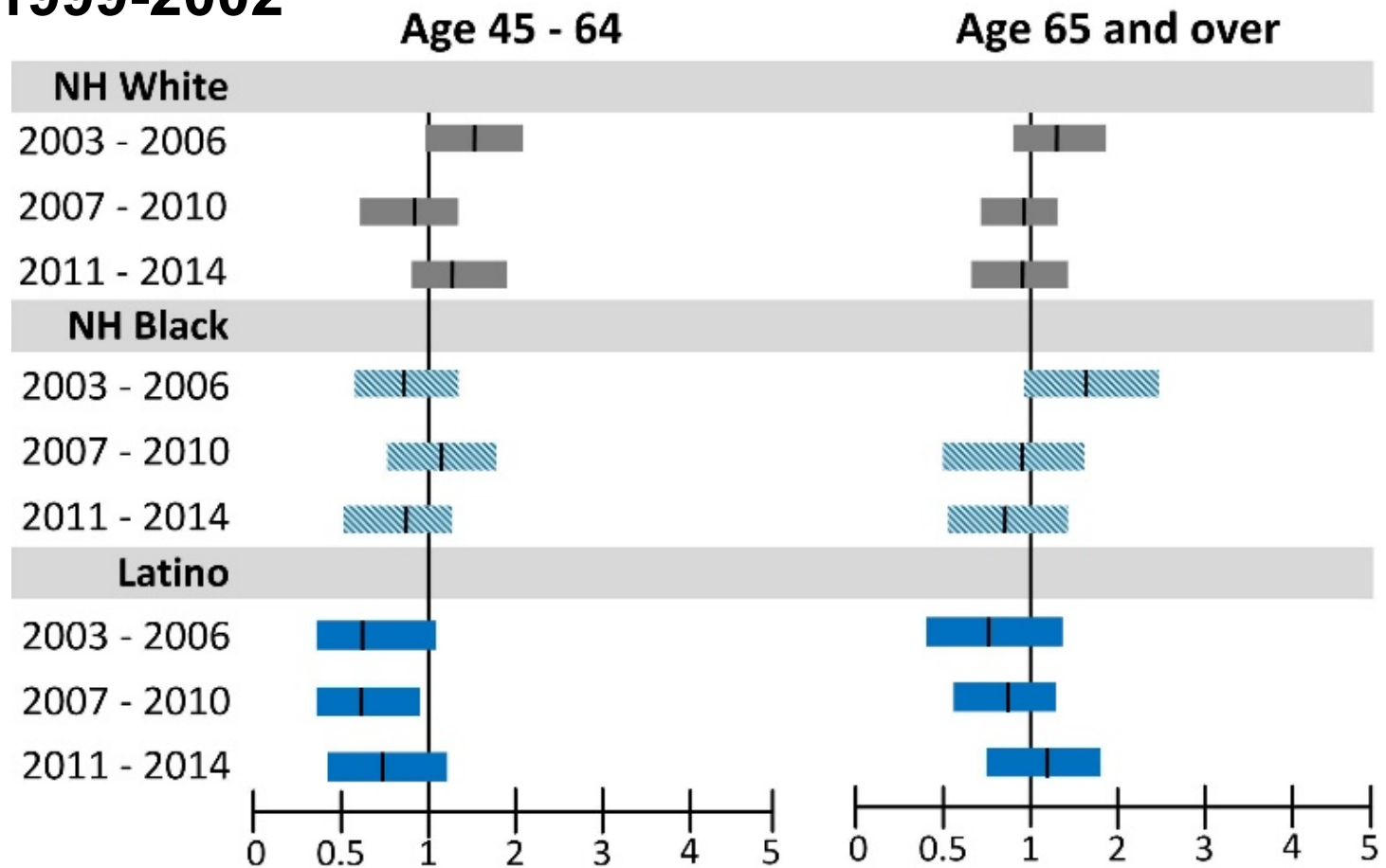
Race Differences

Reference Group: NH White



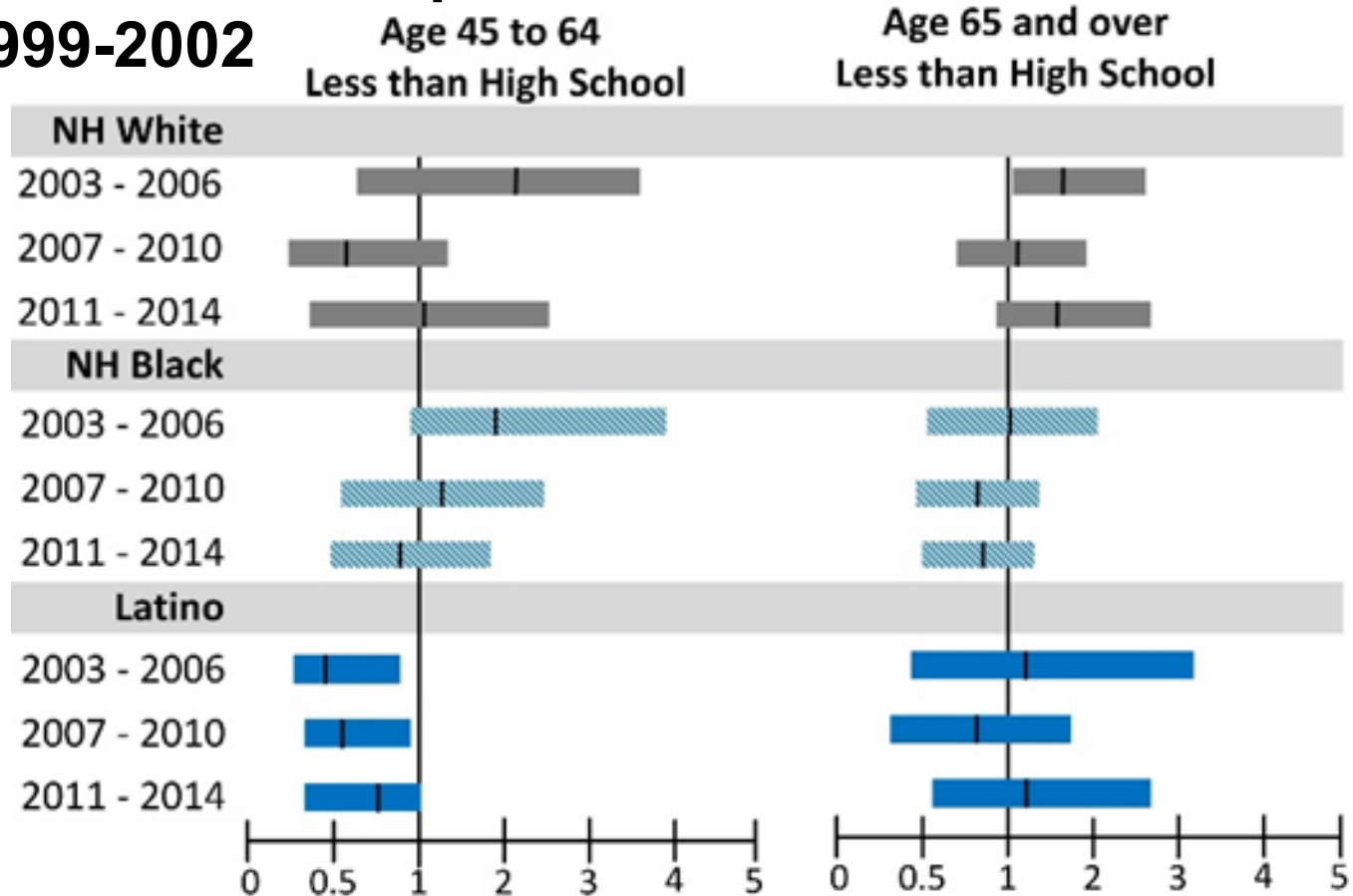
Cohort differences

Reference Group: 1999-2002



Cohort differences

Reference Group:
1999-2002



Cohort differences

Reference Group:

1999-2002

Age 45 to 64
High School or Higher

Age 65 and over
High School or Higher

