## Health Research to Improve Health Equity for Latinos

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# **NIMHD Mission**

- NIMHD's mission is to lead scientific research that advances understanding of minority health and health disparities
- Supports research in minority health, as defined by racial/ethnic groups in U.S. Census
- Supports research to understand the causes of and reduce health disparities in specific populations
- Supports the training of a diverse scientific workforce as part of broad NIH mandate
- Translates and disseminates research information
- Fosters innovative collaborations and partnerships





# **Minority Health Definitions**

- Distinctive health characteristics and attributes of the minority racial and/or ethnic groups in the U.S.
- Social disadvantage and/or subject to discrimination as a common theme
- Separate issues: Minorities are also underrepresented in biomedical research and the scientific workforce







# **Health Disparity Populations**

Health disparity populations include racial/ethnic minorities, low SES, underserved rural residents, and/or others subject to discrimination who have poorer health outcomes often attributed to social disadvantage, which results in being underserved in the full spectrum of health care.







# **Health Disparities Definition**

- A health disparity is defined as a health difference that adversely affects disadvantaged populations, based on the categories of health outcomes
- Health disparities research is devoted to advancing scientific knowledge about the mechanisms that lead to disparities and how this knowledge is translated into interventions to reduce health disparities







# **Health Disparities Definition**

- A health disparity is defined as a health difference that adversely affects disadvantaged populations, based on one or more of the health outcomes
- Health disparities research is devoted to advancing scientific knowledge about the influence of health determinants and defining mechanisms and how this knowledge is translated into interventions to reduce health disparities







# **Health Disparity Outcomes**

Higher incidence and/or prevalence

Burden of disease measured by Disability-Adjusted Life Years (DALYS)

Premature and/or excessive mortality in areas where populations differ

Poorer health-related quality of life and/or daily functioning using standardized measures





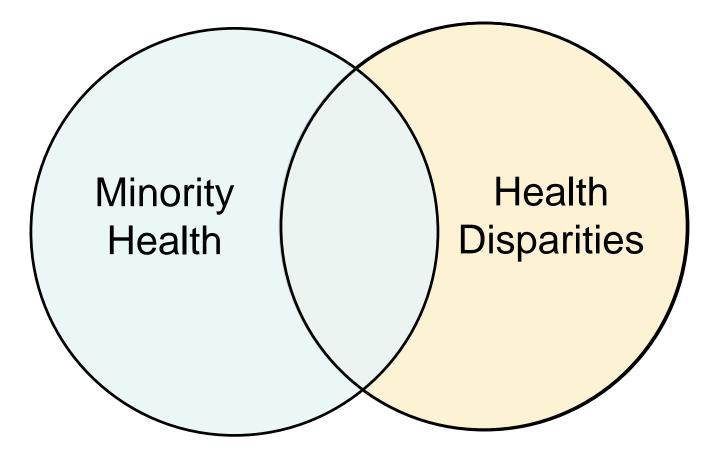
# **Health Disparity Risk Outcomes**

- Risks to Wellbeing: stress, lifestyle behaviors, racism, environmental conditions, low SES, LEP, violence
- **Biological/Epigenetic Risks:** Earlier age of onset, gene variant, metabolic differences, susceptibility, faster progression or greater severity
- Clinical Event Risks: that Adversely Impact Health: differential treatments, poor communication, adverse events to medications, falls
- Utilization of Care Risks: lack of access, use/abuse of appropriate services including screening, excess hospitalizations and high readmissions, primary care, emergency room visits, end of life/palliative care





### Minority Health and Health Disparities Research: Overlap and Uniqueness







## Minority Health and Health Disparities Research Framework

Fundamental Factors: Race/Ethnicity, Low Socioeconomic Status, Rural					
			Levels of I	nfluence	
Domains of Influence		Individual	Interpersonal	Community	Societal
Biological		Vulnerability Mechanisms	Caregiver-Child Interaction Family Microbiome	Infectious Disease Prevalence Herd Immunity	Sanitation Immunization Pathogen exposure
Behavioral e		Health Behaviors Coping Strategies Limited English	Family Function School/Work Function	Community Function	Welfare Immigration Language access
Physical C Environment S		Personal Environment	Household School Work	Community Environment, Resources	Government Education Housing
Sociocultural Environment		Sociodemographic Cultural Identify Discrimination	Networks Family/Peer Discrimination	Community Norms Discrimination	Societal Norms Structural Discrimination
Healthcare System		Access Congruent w/Patient	D/P Relationship Collaborative care	Availability Health Services	Quality of Care HC Policies
Health Outcomes		Individual Health	Family Health	Community Health	Population Health





# **2010 U.S. Census Questions**

• Ethnicity question preceding race question Is this person Spanish/Hispanic Latino?

### Race response options:

- White
- Black/African American
- American Indian or Alaska Native tribe
- Asian: Asian Indian, Korean, Chinese, Vietnamese, Japanese, Filipino, Other Asian
- Pacific Islander: Native Hawaiian, Guam, Chamorro or Other PI
- Mixed or more than one race





# **2010 US Census Latinos by Race**

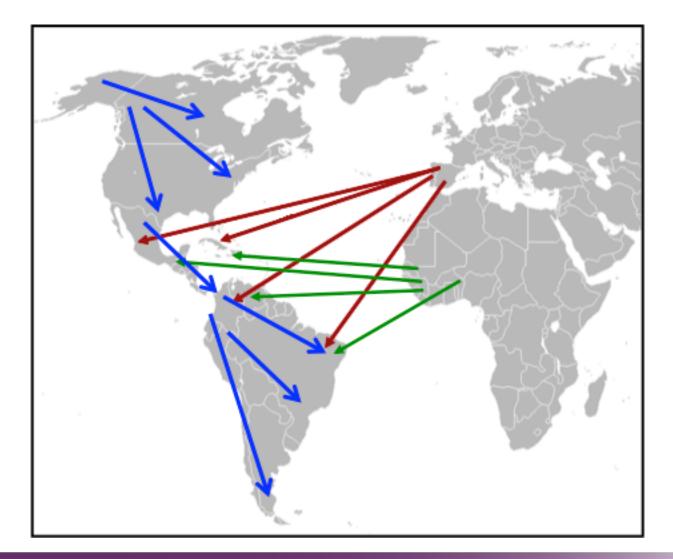
Race Category	Percent	National
White	53	76.2
Black	2.5	14.6
American Indian	1.4	0.9
Asian	0.4	5.6
Pacific Islander	0.1	0.2
Some Other Race	36.7	0.2
Mixed Race	6	2.3







# **Latin American Population Structure**







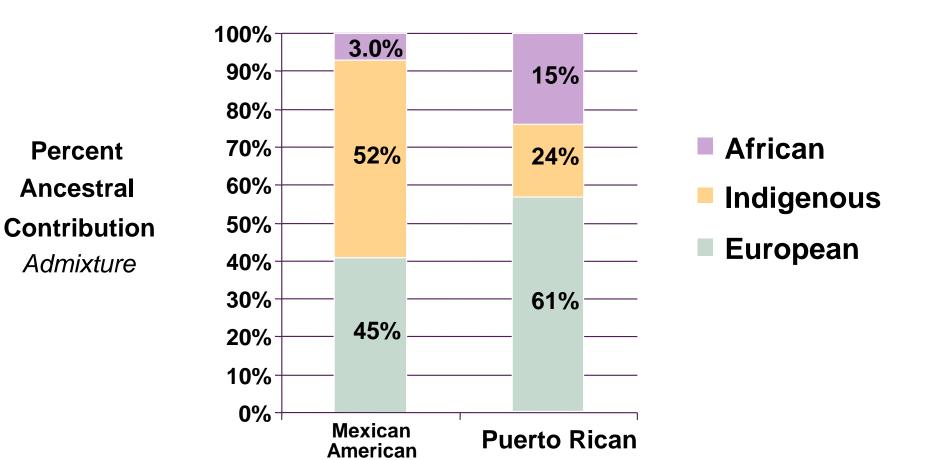
# **Latinos in the Americas**

- More similarities than differences despite 20 different national origins
- Mix of culture and themes unify
- Central role of Spanish language
- Racial mixture 500+ years of Europe, Indigenous peoples, Africa
- Shared heritage: Catholic Church, US dominance





# **Genetic Origins of 2 Latino Groups**







### Socio-demographic Characteristics, 2013 MMWR, May 5, 2015

Race/Ethnic	% < HS educ	% LEP	% < Poverty
Whites	8.3	1.6	11.1
Mexican	40.9	32.3	26.2
Puerto Rican	22.6	17.4	26.2
Cuban	21.0	39.6	20.0
Dominican	31.6	42.2	28.3
Central Am	44.9	48.7	23.3



# **Epidemiologic Paradox in Latinos**

- Outcomes are better than expected based on the known or standard predictive risk factors
- Low SES does not always translate to worse outcomes







# Life Expectancy at Birth

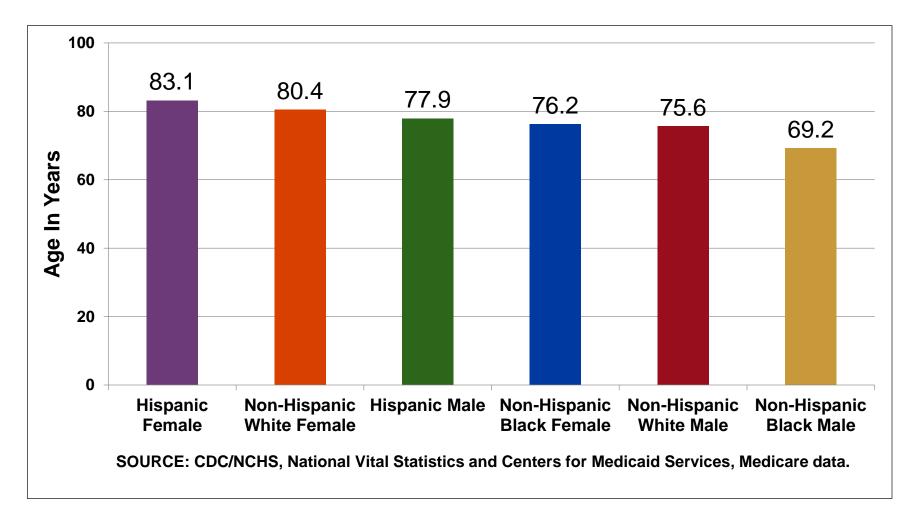


Figure 6. Life expectancy at birth, by Hispanic origin, race, and sex: United States, 2006





# Causes of Death, Latinos and Whites, rate/100,000, US 2013

Latinos	Rate	Whites	Rate
Heart Disease	129	Heart Disease	173
Cancer	122	Cancer	170
Stroke	32	Stroke	36
Diabetes	28	Diabetes	19
Alzheimer's	19	Alzheimer's	25
Renal Disease	12	<b>Renal Disease</b>	12
COPD plus	20	COPD plus	47
Injuries	28	Injuries	44





# Causes of Death by Latino National Origin, rate/100,000, US 2013

Mexicans	Rate	Puerto Ricans	Rate
Heart Disease	129	Heart Disease	172
Cancer	124	Cancer	141
Stroke	36	Stroke	33
Diabetes	34	Diabetes	34
Alzheimer's	20	Alzheimer's	22
Renal Disease	14	<b>Renal Disease</b>	13
COPD plus	18	COPD plus	27
Injuries	29	Injuries	33





# **Proposed Explanations of Paradox**

- Healthy immigrant effect: 40%
- Salmon hypothesis—return to die at home and deaths not recorded
- Misclassification of ethnicity in diagnosis and deaths
- Latinos classified as Whites in up to 30% of medical records
- Census undercounts (increase)





# Policy Strategies to Reduce Health Care Disparities

- Expand Access: Health insurance, place of care and primary clinician essential
- Public Health Consensus: Just do it!
- Coordination of Care: Systems, navigators, and target conditions
- Patient-Centered: PCMH, effective communication, cultural competence
- Performance measurement





### **U.S. Infant Mortality Rates, 2005 & 2013** (per 1000 live births, by race and Latino origin of mother)

% change Race/Ethnicity 2005 2013 All races 6.86 5.96 -13% White 5.06 -12% 5.76 11.11 Black 13.63 -18% AI/AN 8.06 7.61 -6% API 4.89 4.07 -17% 5.00 Latino 5.62 -11% Mexican 5.53 4.90 -11% Puerto Rican 8.30 5.93 -29% Cuban 4.42 3.02 -32% Other 4.68 4.30 -8%

NVSR, Vol. 64, No. 9, August 6, 2015





### Prevalence of Heart Disease, 2008 AHA, Circulation. 2012;125:e2-e220

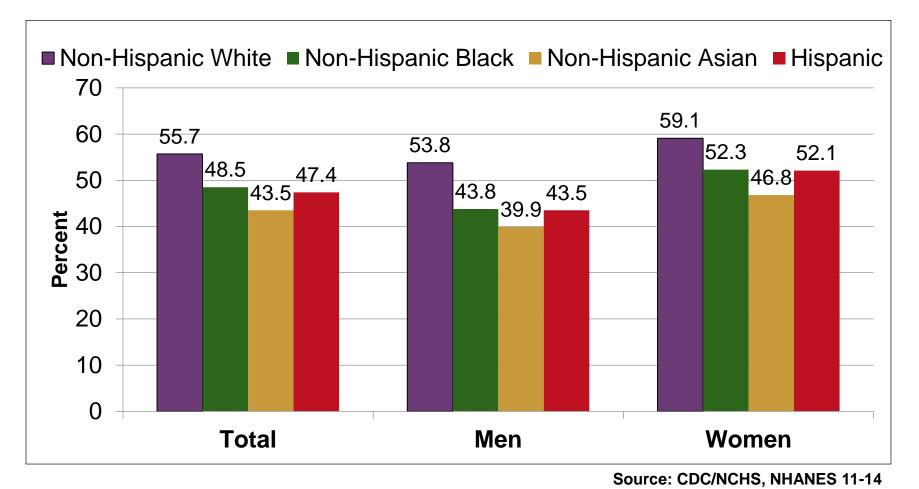
	Total CVD	CHD	Stroke
Latino men	30.7	6.3	2.0
women	30.9	5.6	2.7
Black men	44.8	7.9	4.5
women	47.3	7.6	4.4
White men	37.4	8.5	2.4
women	33.8	5.8	3.3





# **Health Disparities in Blood Pressure Control**

Prevalence of controlled hypertension among adults with hypertension, by sex and race and Latino origin: US 2011-2014







# CVD Risk Factors and Prevalence of Self-Reported CHD and Stroke by Level of Acculturation (Age and Sex Adjusted) in SOL

Characteristic	No RF	1 RF	2 RFs	≥3RFs	CHD	Stroke
Country of Birth						
Foreign	26.4 <sup>b</sup>	34.7	25.4 <sup>c</sup>	13.5 <sup>b</sup>	1.3 <sup>d</sup>	0.7 <sup>b</sup>
US	18.5	32.1	30.1	19.3	2.1	1.8
US Residence >10 years						
No	29.2 <sup>b</sup>	34.7	24.8	11.2 <sup>b</sup>	0.8 <sup>b</sup>	0.7
Yes	22.7	33.8	27.2	16.3	1.8	1.0
Language Preference						
Spanish	26.3 <sup>b</sup>	34.4	25.8	13.5 <sup>b</sup>	1.3 <sup>d</sup>	0.8 <sup>c</sup>
English	19.6	33.2	28.5	18.7	2.0	1.4

a Values were weighted for survey design and non-response. Prevalence by age group adjusted for sex and prevalence by sex adjusted for age. b p<.001; c p<0.01; d p<0.05 Daviglus ML, Talavera GA, et al. JAMA 2012; 308:1775-84





# Northern California Kaiser Hypertension Program

- Hypertension registry: 652,763 in 2009
- Treat by guidelines to goal <140/90; mostly used thiazide + ACE
- Compared to other groups NCQA metrics
- Increase from 43.6% to 80.4% controlled vs. 55.4% to 64.1% in comparison groups
- Registry, performance metrics, guidelines, open access MA visits for BP and combination pills

Jaffe MG, JAMA 2013; 310: 699-705





### Cancer Incidence by Site and Race/Ethnicity in Women, U.S. 2008 – 2012 (per 100,000 age-adjusted)

	African American	API	White	Latina
Breast	124.4	96.3	127.9	92.1
Lung	50.8	28.5	52.7	25.1
Colon	46.0	31.3	36.3	30.0
Uterus	22.5	19.3	25.2	20.0
Cervix	9.2	6.3	7.7	9.9





# **Genetic Ancestry and Breast CA**

- 106 ancestry markers genotyped in 440 cases and 597 controls
- Immigrants + less acculturated protects
- European ancestry associated with higher risk of breast CA: OR = 1.79
- After adjustment, association was attenuated to OR = 1.39 (1.06 - 2.11)

Fejerman L, Cancer Res 2008; 68:9723-28





# GWAS Association Study of Breast Cancer in Latinas:

~3000 Latina cases/8000 Latina controls

#### **Discovery analyses**

- Northern California Samples (SFBCS, NC-BCFR, GALA)
  Final count 977 cases and 722 controls (Total 1699)
- Southern California Samples (MEC)
  - Final count 520 cases and 2500 controls

Genotypes: ~7M Single Nucleotide Polymorphisms (SNPs)

### **Replication analyses (Targeted genotyping)**

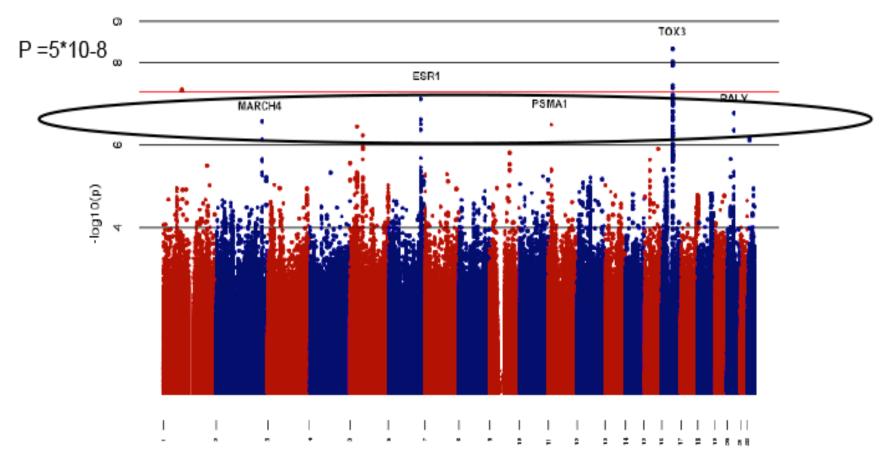
Mexico, COLUMBUS consortium, Women Health Initiative
 Final count 1700 cases and 5000

Fejerman L, et al. Nature Communications 2014; 20 Oct





## **Latinas GWAS Results**



Chromosome





# **Protective Variants on 6q25**

rs140068132/rs147157845	OR	95% CI	P-value	MAF
Discovery	0.60	0.49-0.72	3x10 <sup>-7</sup>	9%
Replication Mexicans	0.63	0.53-0.75	3x10 <sup>-7</sup>	15%
Replication COLUMBUS	0.54	0.41-0.71	1x10 <sup>-5</sup>	10%
Replication WHI	0.61	0.31-1.22	0.16	7%
Meta-Analysis all samples	0.60	0.53-0.67	9x10 <sup>-18</sup>	
	$\mathcal{P}$			

GG Homozygous women <u>2.8 fold reduction</u> of the odds of developing breast cancer







# Cancer Incidence by Site and Race/Ethnicity in Men, U.S. 2008 – 2012 (per 100,000 age-adjusted)

	African American	API	White	Latino
Prostate	214.5	74.0	130.4	114.7
Lung	90.9	49.0	70.3	37.9
Colon	61.2	42.2	47.8	43.3
Stomach	14.6	14.5	9.2	14.2
Liver	15.5	19.5	10.4	18.1

Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov)





# Cigarette Smoking Rates, Daily and Some Days, Study of Latinos, 2009

Kaplan RC, Am J Prev Med 2014; 46:496-506

National Origin	Men (6532) 16.9% / 9.9%	Women (9790) 10.7% / 5.8%
Cuban	26.2% / 4.9%	18.2% / 3.7%
Puerto Rican	27.0% / 9.0%	24.2% / 7.4%
Dominican	8.8% / 2.3%	7.5% / 4.3%
Mexican	10.3% / 15.5%	4.4% / 6.2%
Central Am	12.1% / 9.8%	5.0% / 3.3%





# **Cigarette Smoking in the U.S., 2014**

	Men	Women
White	19.3%	17.2%
Black	22.1%	13.7%
Latinos	14.8%	7.6%
AI/AN	25.6%	32.5%
Asian	14.5%	5.1%
Multiple race	33.4%	23.2%
Educational Level	Men	Women
High school graduate	24.7%	18.8%
Undergraduate degree	9.1%	6.9% National Health Interview Surv

National Health Interview Survey. MWWR-November 13, 2015. 64(44);1233-1240



# Why Differences in Lung Cancer?

- Prevalence of smoking–10-20 yr. lag
- Intensity of smoking Number of cigarettes per day
- Other environmental exposures asbestos, air pollution, radon, combustion products
- Genetic predispositions family history, specific genes





## Multiethnic Cohort Study: Lung Cancer by Smoking Intensity

- 183,813 African Americans, Japanese Americans, Latinos, Native Hawaiians, Whites; age 45 - 75, in California and Hawaii
- 1979 cases lung cancer, from SEER, 1993-2001; 1135 in men
- African Americans as referent group
- Stratify by smoking intensity
- Relative risk of lung cancer by race/ethnicity within smoking level

Haiman CA, et al. N Engl J Med. 2006;354(4):333-42





## Relative Risk of Lung Cancer by Ethnicity and Smoking Intensity

Cigs/d	Af Am	Hawaii	Latino	Japan	White
1-9	1.0	0.88	0.21	0.25	0.45
11-20	1.0	0.90	0.36	0.39	0.57
21-30	1.0	0.93	0.61	0.61	0.73
31+	1.0	0.95	0.79	0.75	0.82

Haiman CA, et al. N Engl J Med. 2006;354(4):333-42





# **Possible Explanations**

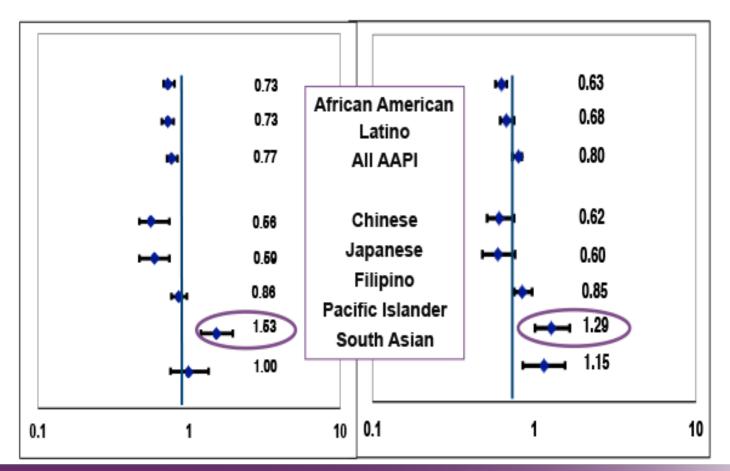
- Genetic factors linked to African ancestry
- Genetic-Environmental factors triggered by tobacco carcinogens
- Metabolism differences lead to greater intake of carcinogens despite similar CPD intensity
- Mentholated brands
- Smoking topography
- Protective factors for other groups





## Kaiser DM cohort: MI outcome At 10 yrs, Compared to Whites...

Age and sex-adjusted only Fully-adjusted model

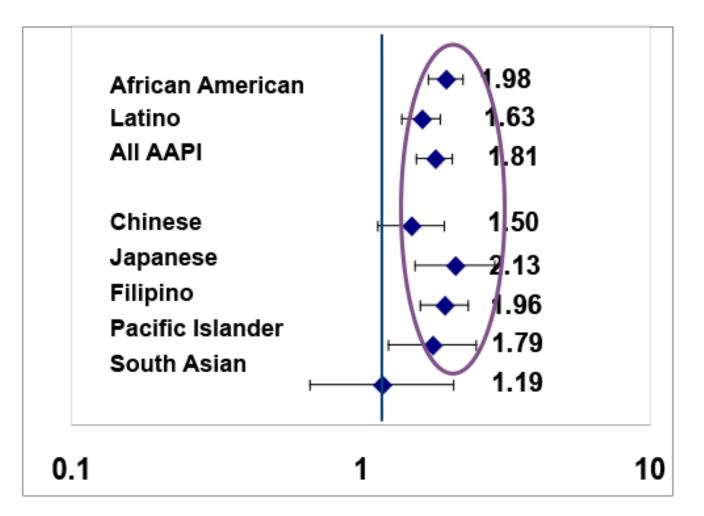




National Institute

# Kaiser DM cohort: ESRD at 10 y

Kanaya AM, et al. Diabetes Care, Feb 24, 2011, Online.





National Institute



# Immigrant generation and diabetes risk in an aging Mexican-origin population

- Sacramento Area Latino Study on Aging 1998-99: in home visits every 12–15 months for a total of 7 follow-up visits
- 60-101 years of age at baseline, N=1,789
- Generation, acculturation scale, language
- Diabetes prevalence increased by generation from 29% to 35% to 40%
- aOR= 2.0 (1.3-3.1) for 3rd generation





# Immigrant generation, Language, SES and diabetes risk, HEPESE, 1993-2005

- 3050 Mexican Am, 5 states, 65 y at baseline
- 58% women, 45% immigrants, 10% HS grad+, 78% Spanish survey, 42% Medicaid/No Insur
- 27.7% diabetes at baseline (all self-report), 27% BMI >30
- Incident Diabetes: Spanish/low SES/1st to 3rd generation: HR=1.76 (1.02-3.03)
- English/high SES/1st to 3rd generation: HR= 0.45 (0.22-0.91)





## Diabetes Care Management by Race/Ethnicity

#### (Adults over 18, Age-adjusted percentages, BRFSS)

Race or Ethnicity	2 or more HbA1c tests in 2010	Dilated Eye Exam in 2010	Foot Exam in 2010	Influenza Vaccination in 2010	Ever Taken Self- Management Class
White	68.9% (+/- 1.4)	63.6% (+/-1.3)	66.6% (+/- 1.4)	50.9% (+/- 0.9)	66.6% (+/-1.4)
Black	71.1% (+/- 2.2)	63.5% (+/-2.2)	73.8% (+/- 2.1)	47.7% (+/- 1.8)	73.8% (+/-2.1)
Latino	59.1% (+/- 3.1)	55.4% (+/-3.0)	55.7% (+/- 3.0)	39.3% (+/-1.7)	55.7% (+/-3.0)



Source: CDC/BRFSS



# Asthma in the US by Race and Latinos, 2014

	Current Asthma Prevalence	Lifetime Asthma Diagnosis	Asthma Deaths, 2003 (per 100,000)
White	7.7%	12.8%	1.1
Black	10.5%	15.7%	3.3
Latino	6.5%	10.9%	1.3
Puerto Rican	16.5%	23.9%	4.4
Mexican	5.0%	8.6%	0.8

CDC/NCHS, Health Data Interactive and National Health Interview Survey, 1997-2014 and CDC 2006. Health E-Stats. Asthma Prevalence, Health Care Use and Mortality: United States, 2003-05.







## Obesity in the U.S., 2011-2012 by race and ethnicity

	Age-adjusted rate Obese	Age-adjusted rate Obese & Overweight	Children (2-19) Obese	Children (2-19) Obese & Overweight
White	32.6%	67.2%	14.3%	28.5%
Black	47.8%	76.2%	20.2%	32.5%
Latino Puerto Rico Mexicans	42.5% 28.3% 42.4	77.9% 65.9%	22.4%	38.9%

CDC/NCHS, National Health and Nutrition Examination Survey, 2011-2012. and CDC/BRFSS, 2012





#### Prevalence of Colorectal Cancer Screening, 2010 in adults age 50-74

	Screened for CRC
White	66.3%
Black	65.0%
Asian/Pacific Islander	55.3%
AI/AN	55.1%
Latino	51.6%

Educational Level	Screened for CRC	
< High School	45.4%	
High School / GED	59.5%	
Some College / Tech	65.6%	
College Graduate	71.9%	

BRFSS. MMWR Supplements June 15, 2012 / 61(02);51-56





# **Breast Cancer Screening, 2008**

#### among women age 50-74

	Up-to-date on Mammography
White	81.4%
Black	82.1%
Asian and Pacific Islander	80.4%
AI/AN	70.4%
Latina	81.4%

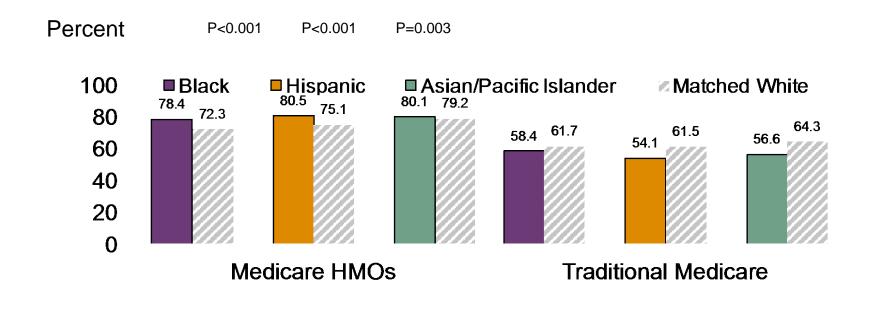
Education Level	Up-to-date on Mammography
< High School	72.6%
High School / GED	78.6%
Some College / Tech	81.1%
College Graduate	86.2%

BRFSS. MMWR July 9, 2010 / 59(26);813-816





## Use of Mammography by Race/Ethnicity, Women Ages 65-69, Medicare HMOs vs. Traditional Medicare, 2009



Ayanian, Landon, Zaslavsky & Newhouse, J Natl Cancer Inst 2013





# Limited English Proficiency in US

- 25 million in 2010 census representing an 80% growth in 20 years
- >100 languages other than English are spoken: Spanish in 62%
- Chinese>Tagalog>French>Vietnamese
- 5% of adults live in linguistically isolated households where no one > 5 years speaks English
- 20% speak a language other than English at home





## Limited English Proficiency and Health Outcomes

- LEP status is associated with less health information given to patient, harder access to care, longer waits
- Effect on clinical outcomes varies
- Shortage of clinicians who speak other languages: Language discordance is common
- Interpreters are often not available and infrequently used





# **English Language Proficiency**

- Measure by asking Census question
- Plus ask question on preference for language of health care
- LEP status patient with discordant MD trumps low health literacy in communication domains





# Language Concordance Matters

- Better glucose control
- Feel better with less pain, better health outlook, less symptoms
- Understand more of the physician instructions
- Better medication adherence
- Ask more questions, more patient centered care





## Limited English Proficiency is a Risk factor for Readmission

- Retrospective review of registry of 7023 hospitalized patients 2001-2003
- 8% Chinese, 4% Spanish, 4% Russian
- Similar LOS, cost, mortality
- LEP patients had higher adjusted odds of readmission: OR = 1.3 (1.0 1.7)
- Chinese and Spanish speaking LEP patients had increased odds (1.7 and 1.5) of readmission

Karliner L, et al. J Hosp Med 2010; 5: 276-282





## Medical School Enrollment and Graduates, and US Physicians, by Race/Ethnicity

	Medical School Enrollment (%) (2014)	Medical School Graduates (%) (2014)	US Physicians (%) (2013)
American Indian/Alaska Native	205 (<1%)	27 (<1%)	3,475 (<1%)
Asian	17,396 (20%)	3,701 (20%)	119,355 (12%)
African American	5,335 (6%)	1,052 (6%)	40,499 (4%)
Latino/Hispanic	3,444 (4%)	928 (5%)	43,685 (5%)
White	47,392 (56%)	10,458 (58%)	464,302 (48%)
Total*	85,260	18,078	956,523





# **Train a More Diverse Physician Work Force!**

- Practice in areas with fewer doctors and with higher percent minorities
- Provide care for more uninsured and Medicaid patients
- Cultural and linguistic competency
- Demographic reality social justice





## **Research Questions**

- Will health profile worsen with 2nd generation?
- How does acculturation affect health behaviors and outcomes?
- Standardized ascertainment
- Do we focus on differences by country of origin? Ancestry?





## **Connect With Us**









