Disparities in Obesity Prevalence Among Asian and Pacific Islander Americans

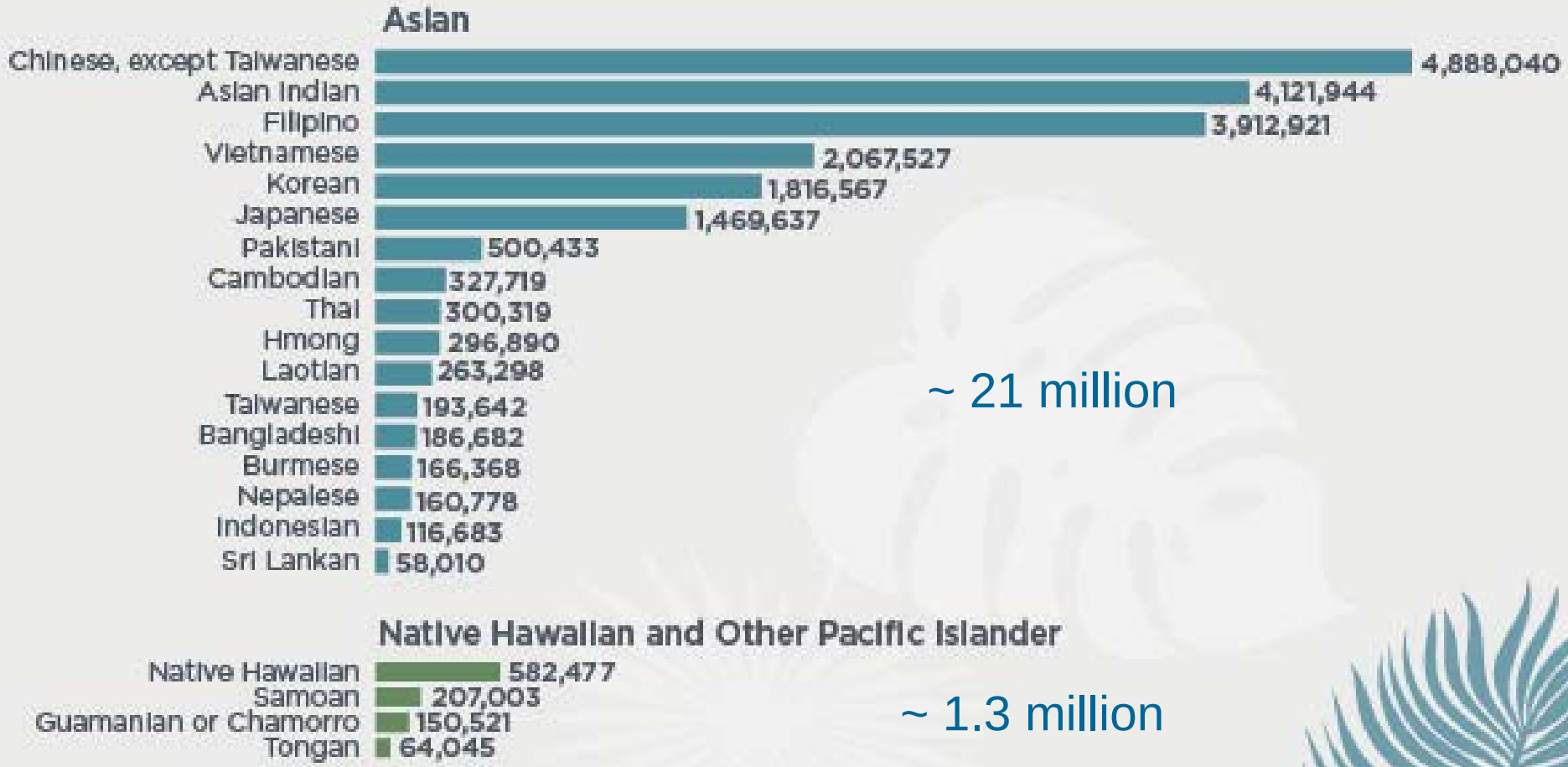
A Health Equity Approach to Obesity Efforts: A Workshop

April 1, 2019

National Academy of Medicine

Maria Rosario (Happy) Araneta, PhD, MPH
Professor of Epidemiology
University of California San Diego

Asian and Pacific Islander Population in the United States

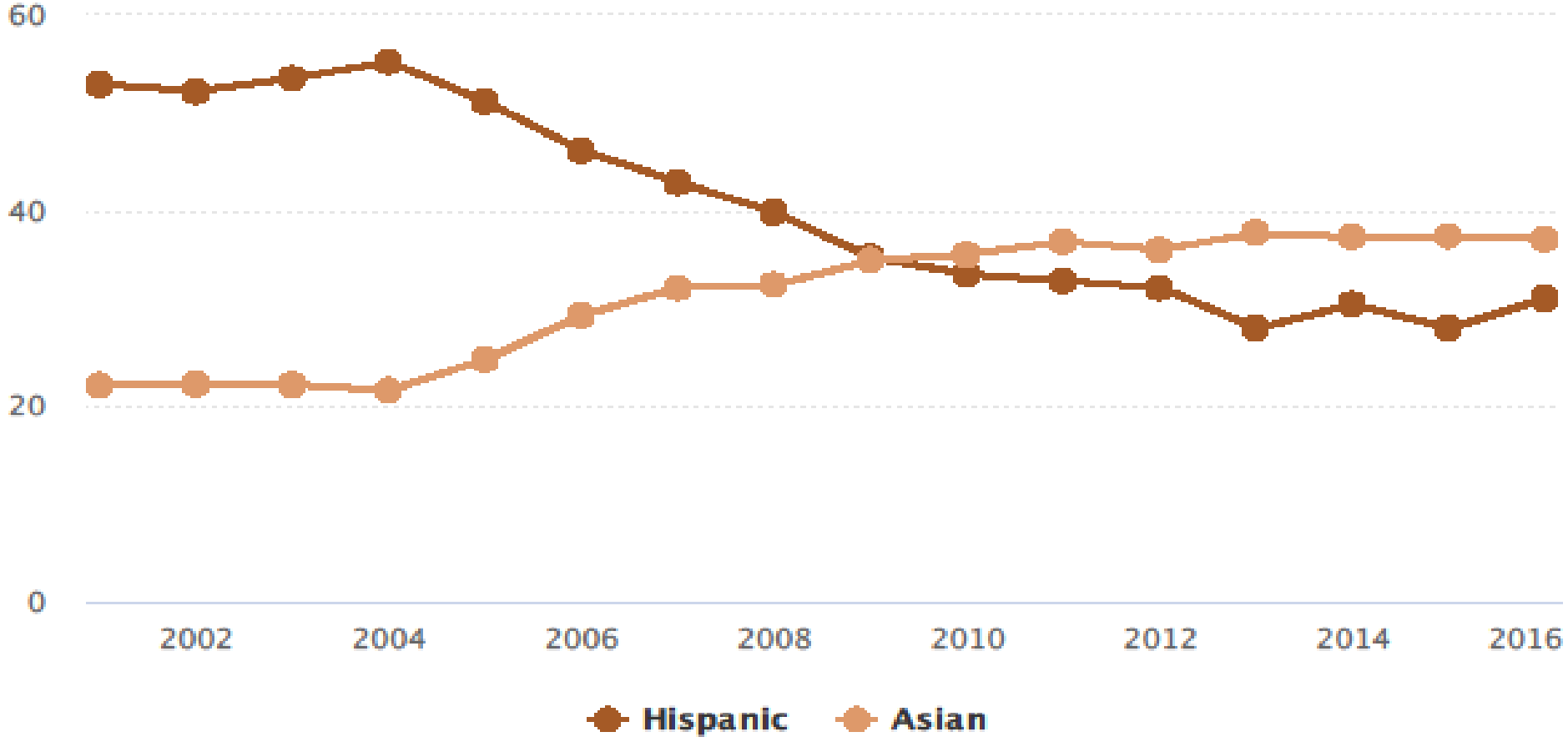


~ 21 million

~ 1.3 million

Among new arrivals, Asians outnumber Hispanics

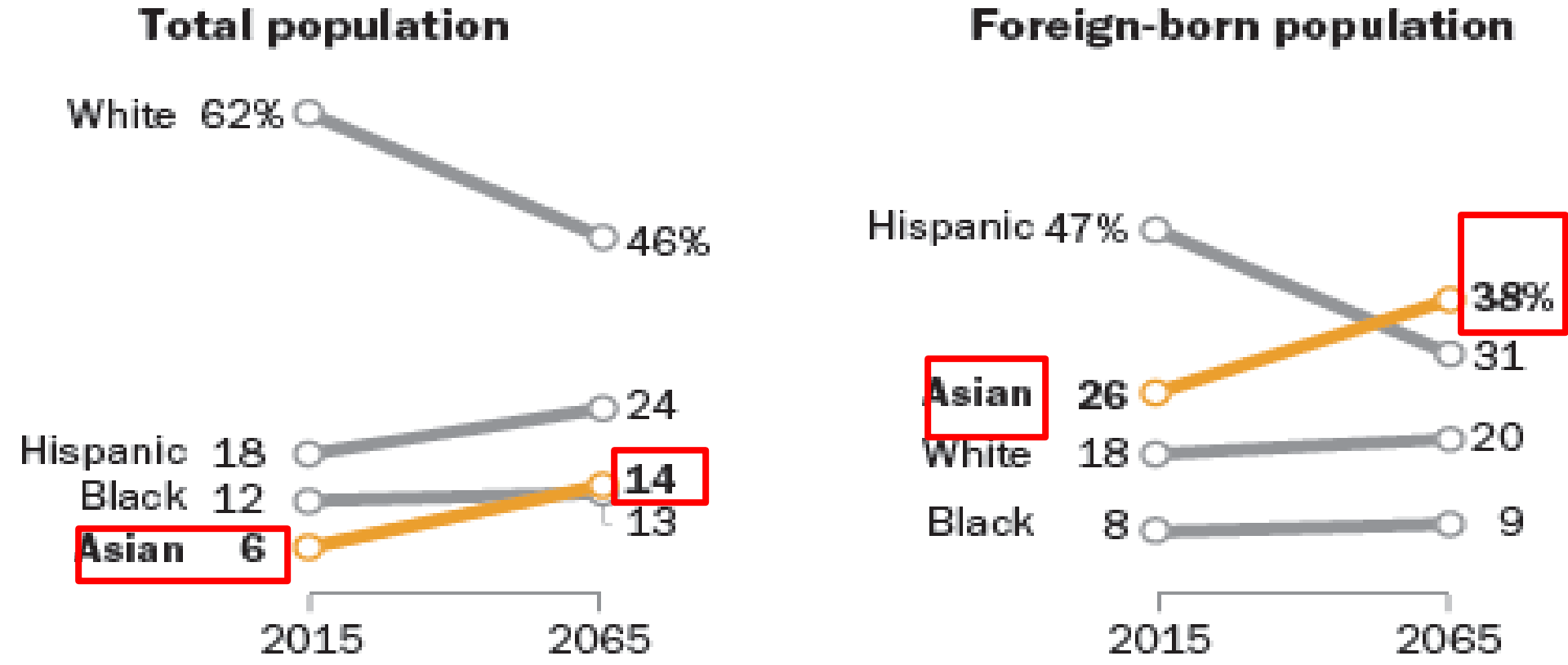
% of immigrants arriving in the U.S. in each year who are ...



Note: Figures for 2001 to 2005 are based on the household population and do not include arrivals residing in group quarters. 2016 percentages represent only arrivals between Jan. 1 and April 1, 2016. Percentages reflect only immigrants who are residing in the U.S. as of April 1, 2016. Race and ethnicity based on self-reports. Asians include only single-race non-Hispanics. Hispanics are of any race.
Source: Pew Research Center tabulations of 2001-2016 American Community Surveys (IPUMS).

PEW RESEARCH CENTER

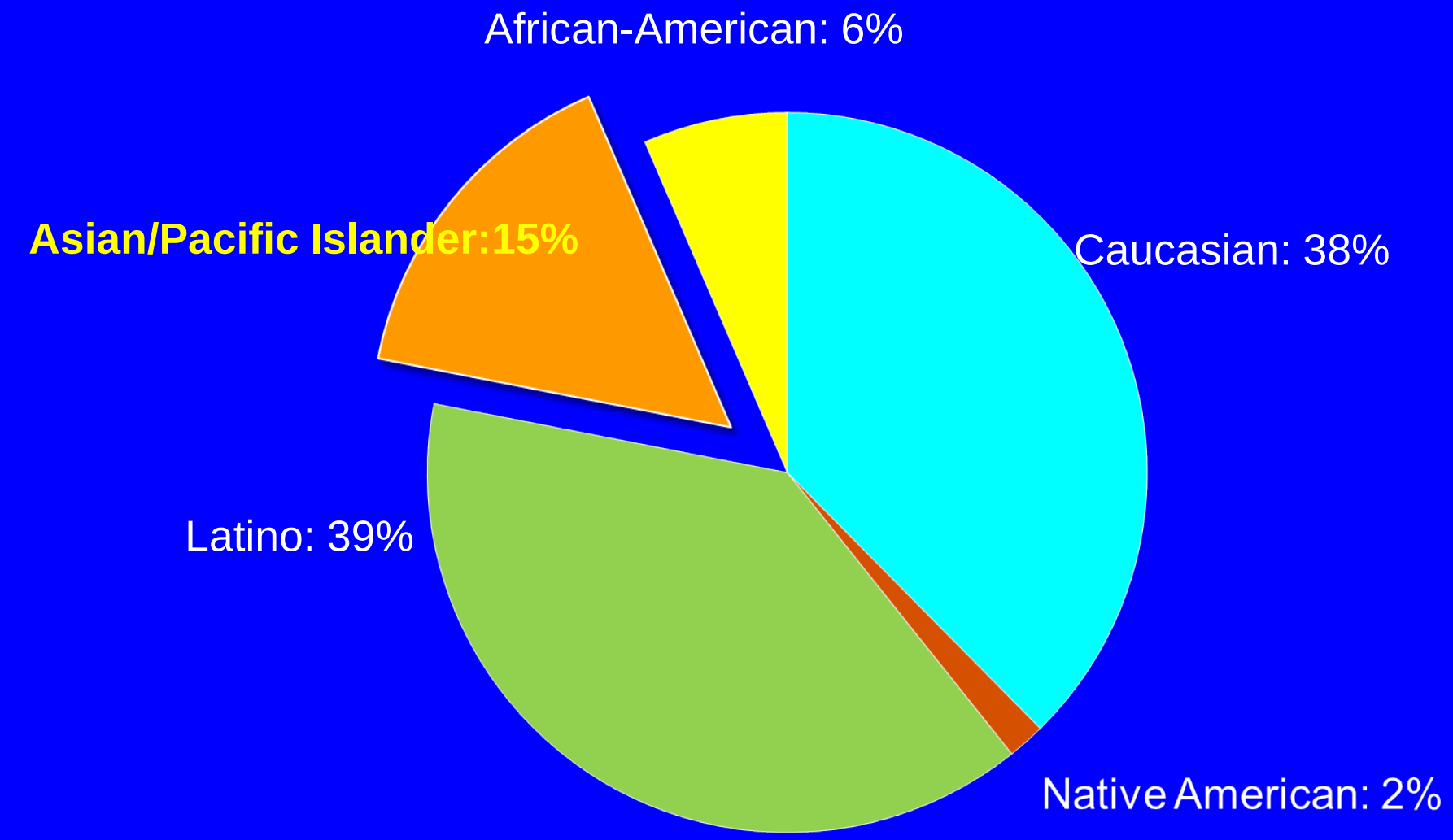
By 2065, No Racial or Ethnic Group Will Be a Majority



Note: Whites, blacks and Asians include only single-race non-Hispanics. Asians include Pacific Islanders. Hispanics are of any race. Other races included in totals but not shown.
Source: Pew Research Center projections

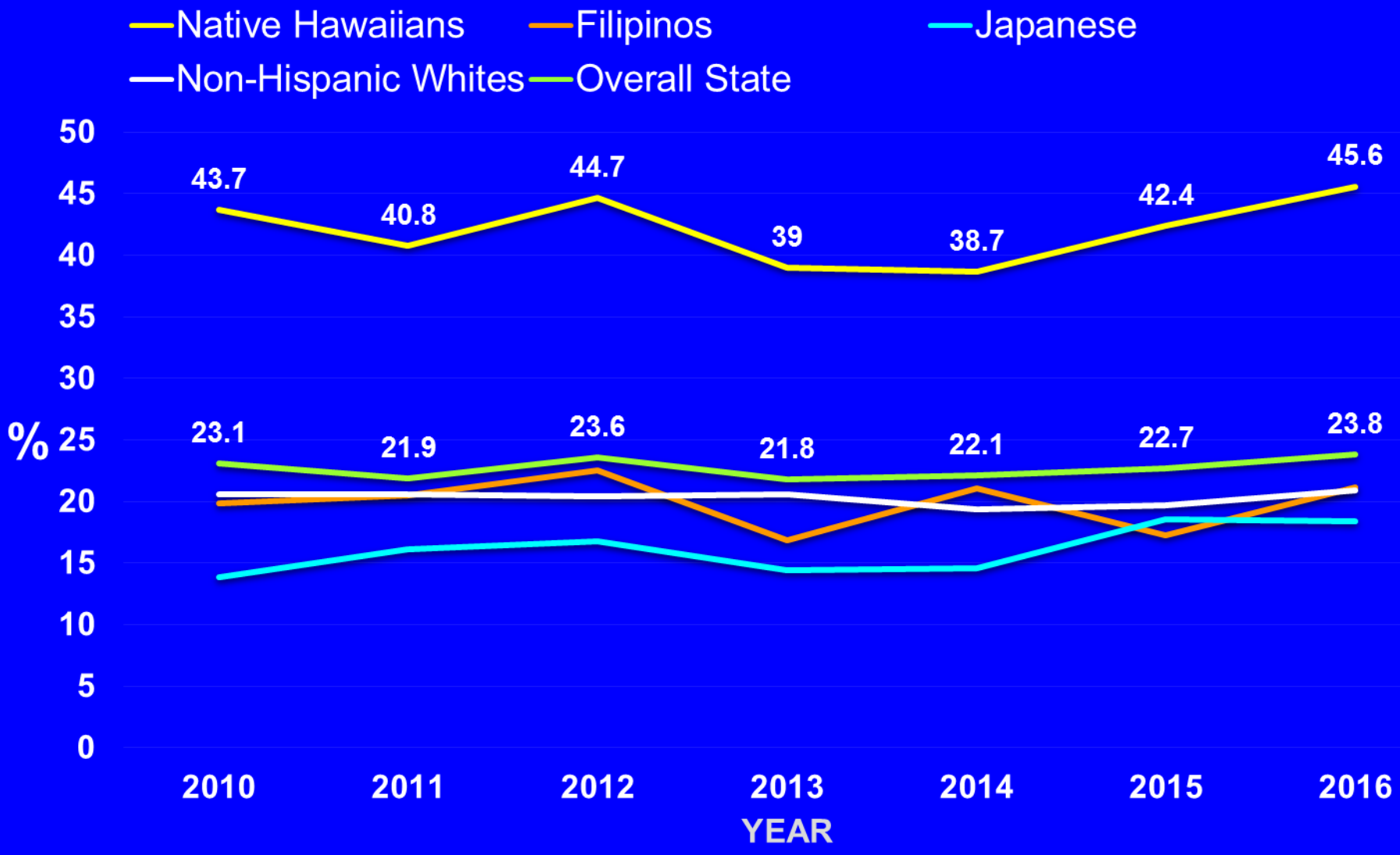
PEW RESEARCH CENTER

California census, 2016, by Race/ethnicity



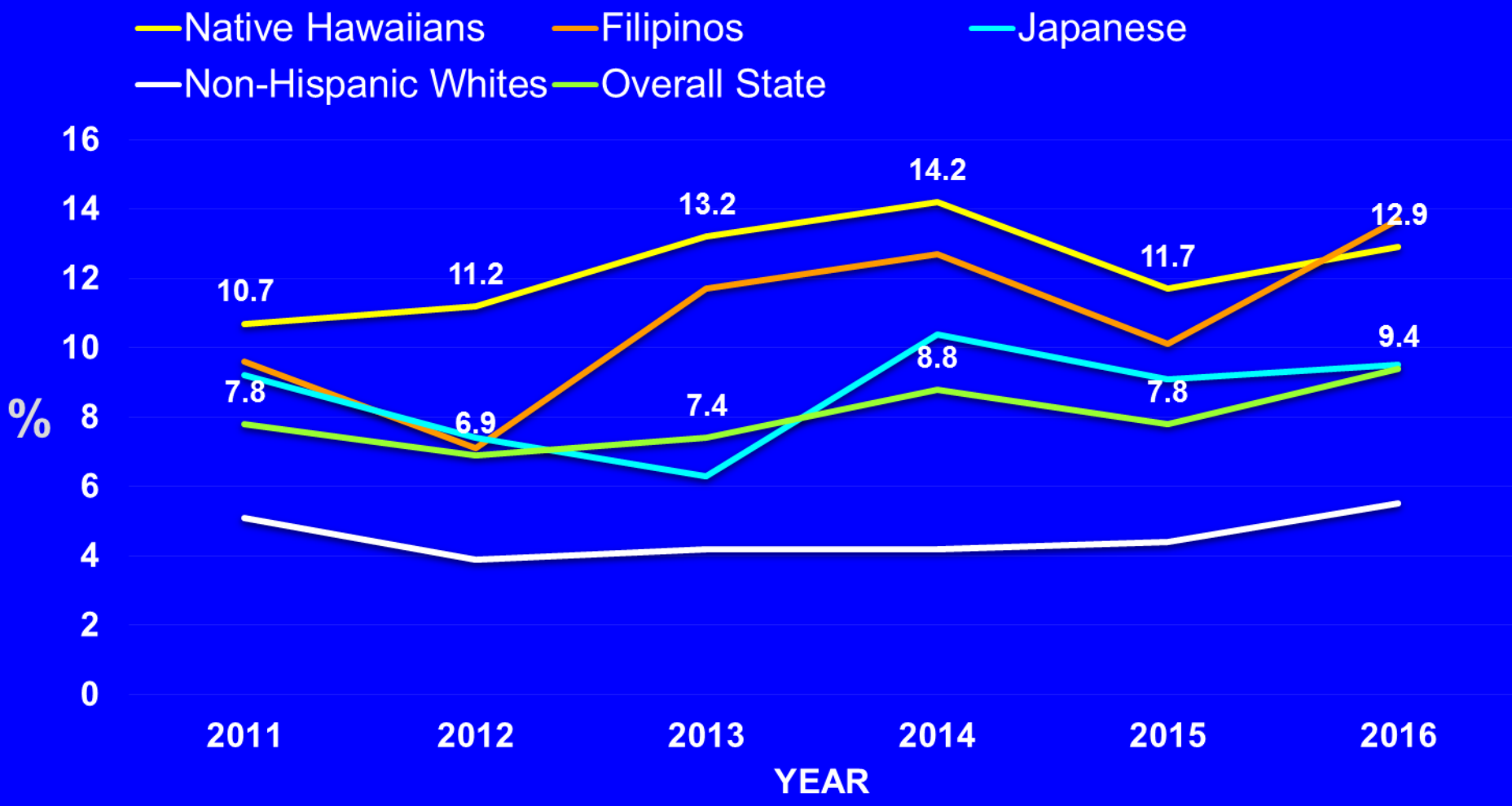
http://www.census.gov/quickfacts/CA

7-Year Obesity Trend of Selected Ethnic Groups in Hawai‘i



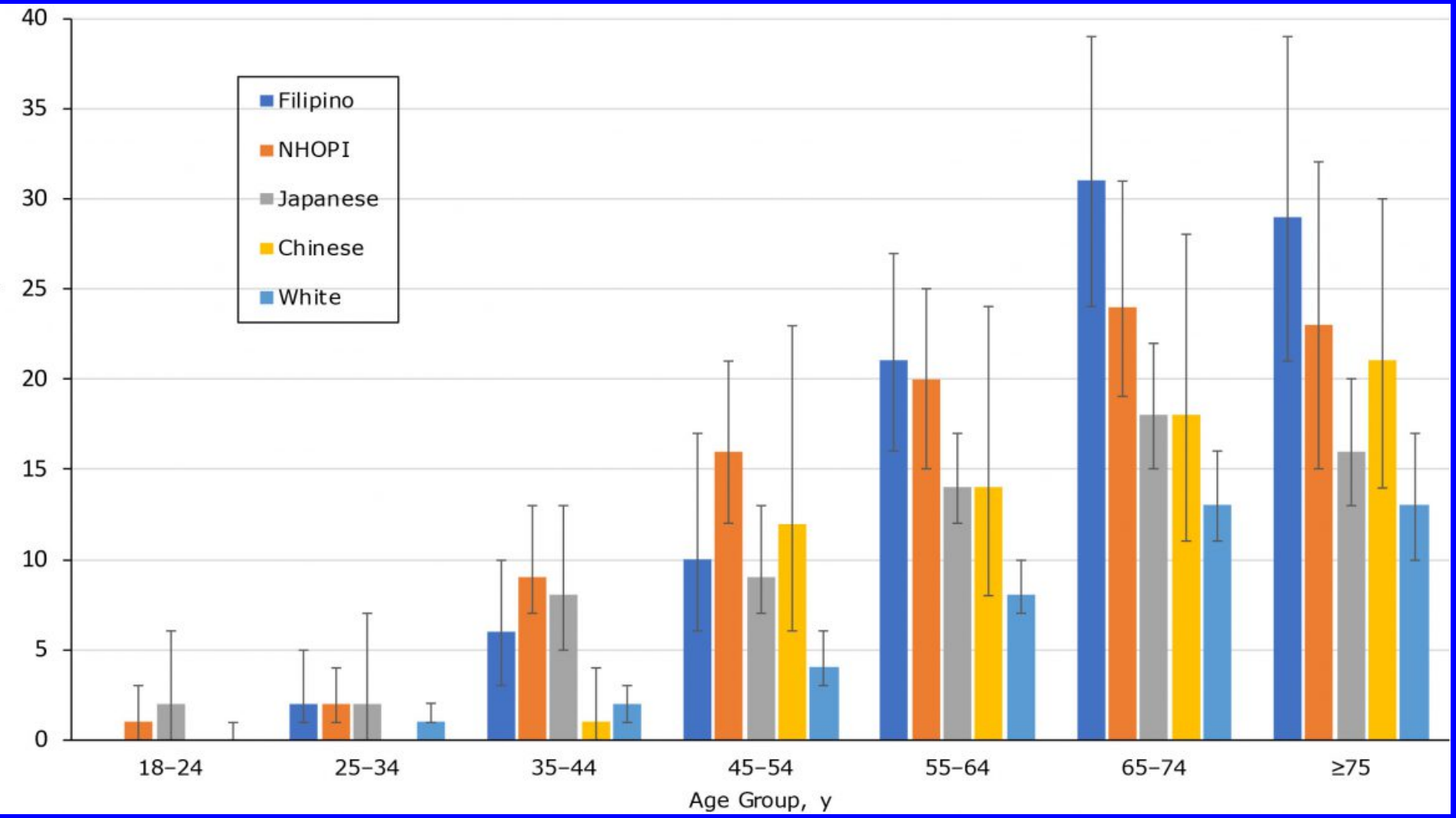
Source: Hawaii's Behavioral Risk Factor Surveillance System (BRFSS)

Age-Adjusted 7-Year Diabetes Trend of Selected Ethnic Groups in Hawai‘i



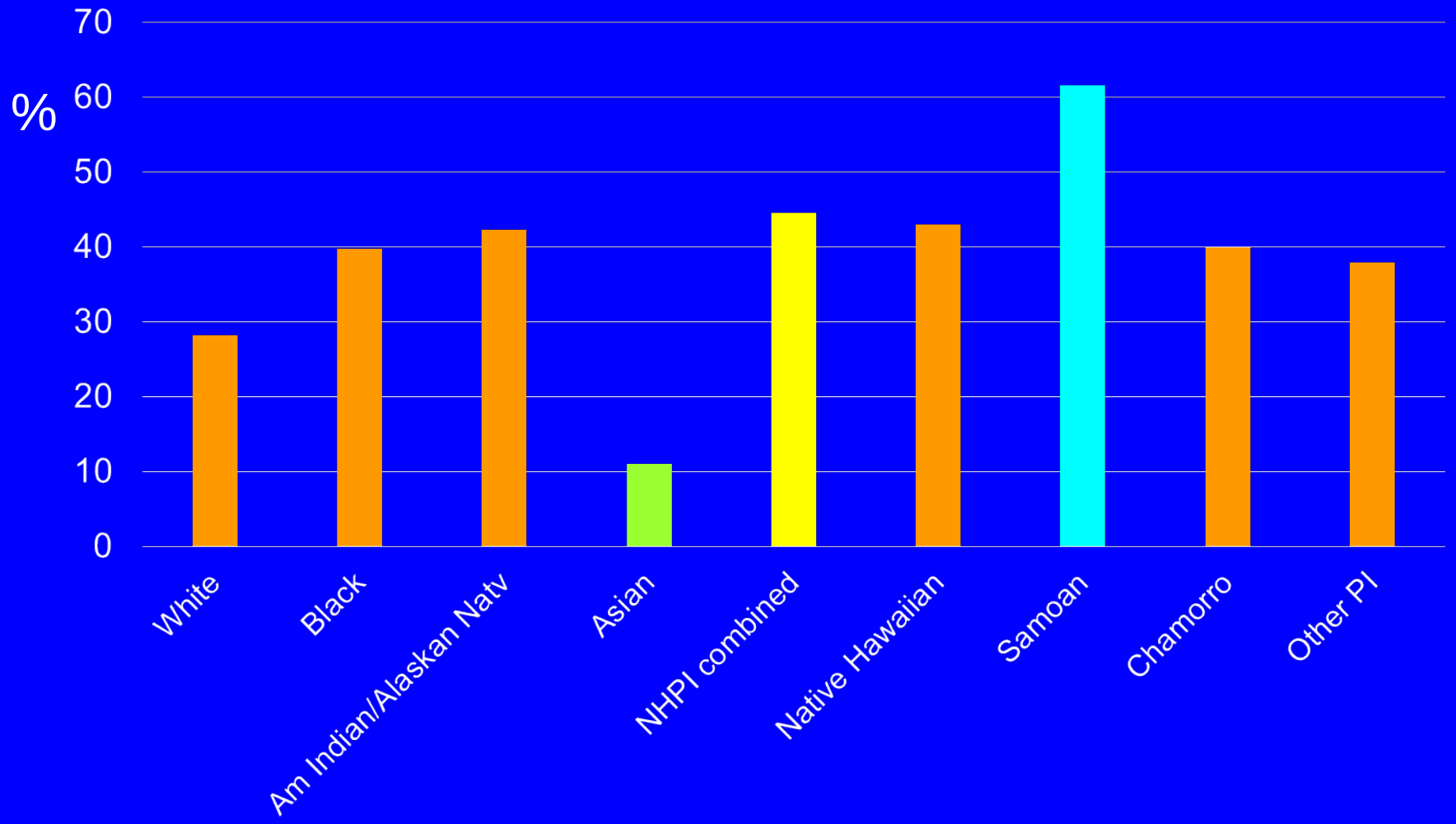
Source: Hawaii's Behavioral Risk Factor Surveillance System (BRFSS)

Diabetes prevalence by age and race ethnicity, Hawai'i Behavioral Risk Factor Surveillance System, 2011, 2013, 2015 (N = 18,200)



Uchima O, et al. *Prev Chron Dis 2019:16;E22*

Age adjusted Obesity Prevalence among Adults (>=18 years), Single Race, US 2014



Native Hawaiian and Pacific Islander National Health Interview Survey, 2014

:www.cdc.gov/nchs/data/series/sr_03/sr03_040.pdf

nature genetics

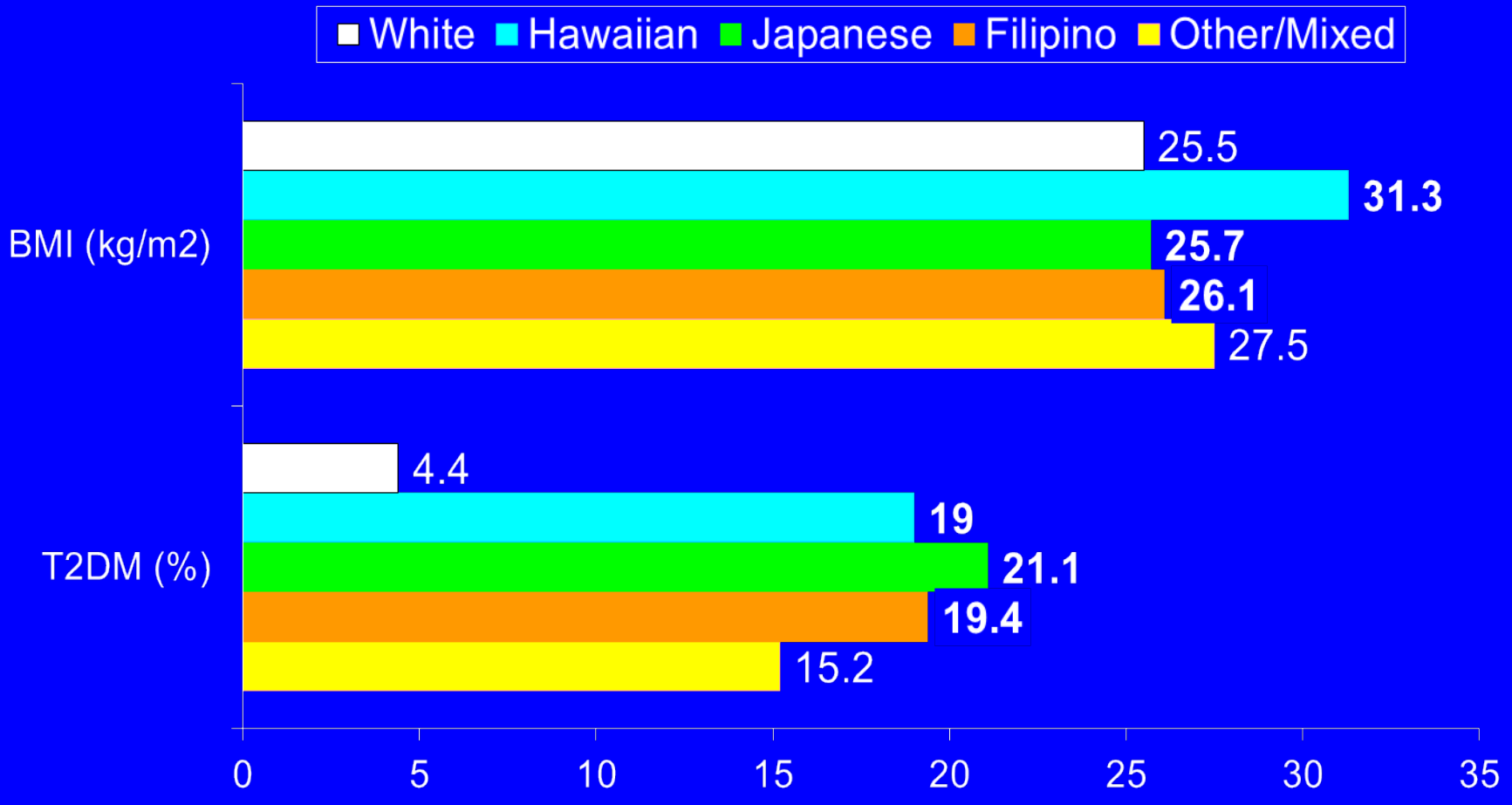
Letter | Published: 25 July 2016

A thrifty variant in *CREBRF* strongly influences body mass index in Samoans

Ryan L Minster, Nicola L Hawley, Chi-Ting Su, Guangyun Sun, Erin E Kershaw, Hong Cheng, Olive D Buhule, Jerome Lin, Muagututi'a Sefuiva Reupena, Satupa'itea Viali, John Tuitele, Take Naseri, Zsolt Urban, Ranjan Deka, Daniel E Weeks & Stephen T McGarvey

Nature Genetics **48**, 1049–1054 (2016) | Download Citation

BMI and Type 2 Diabetes* by ethnicity, North Kohala, Hawaii, 1997-2000



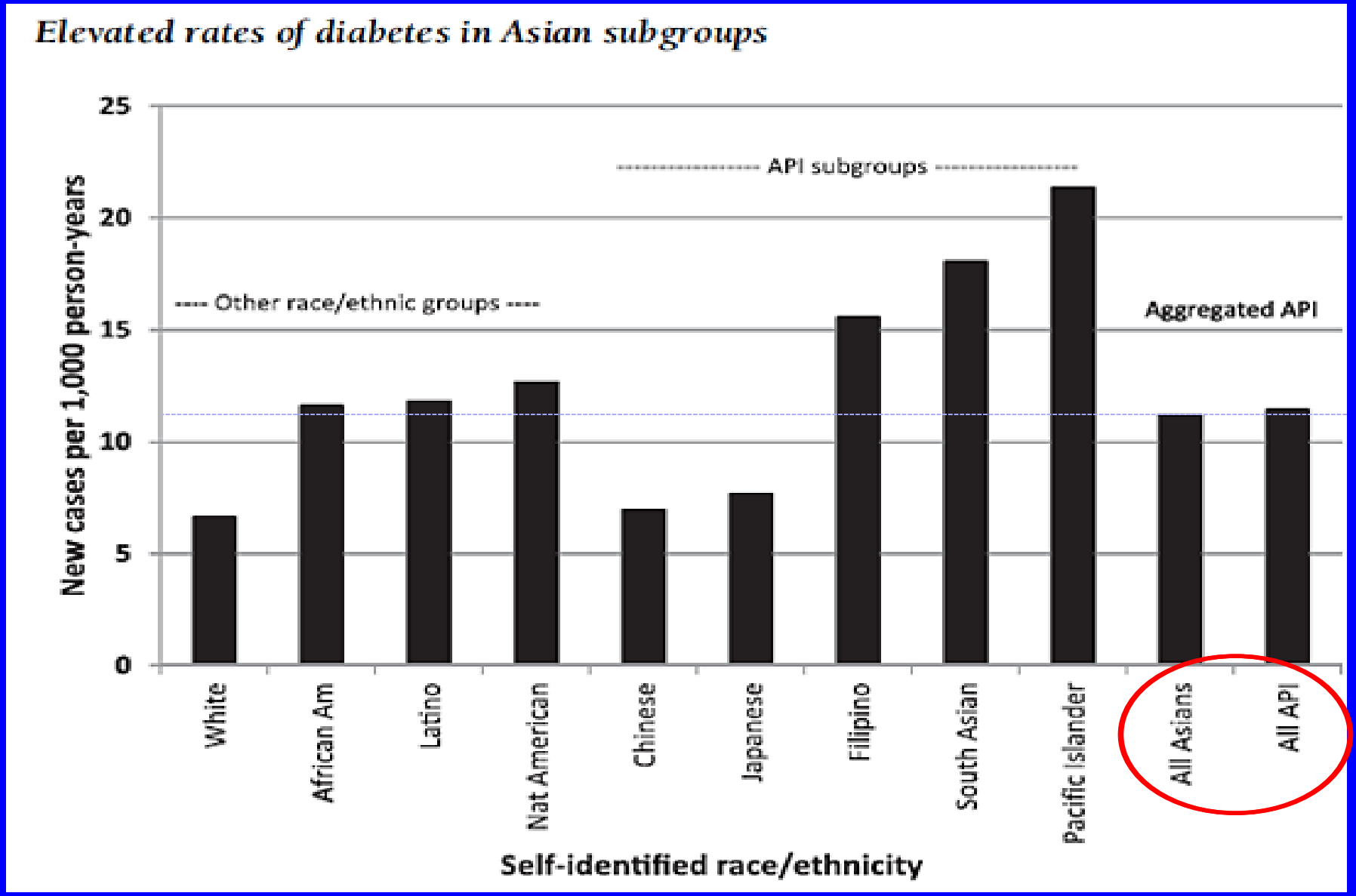
* *WHO 1999 criteria, 2 hour oral glucose tolerance test*
Grandinetti A et al Ethn Dis 2007;17:250-255

Prevalence of type 2 diabetes among 2.1 million adults, Northern California Kaiser Hospitals in 2010

Race /Ethnicity	Prevalence (%)
Pacific Islander	**18.3**
Filipino	**16.1**
South Asian	**15.9**
Latino	14.0
African American	13.7
Native American	13.4
Southeast Asian	*10.5*
Japanese	*10.3*
Vietnamese	*9.9*
Korean	*9.9*
Chinese	*8.2*
White	7.3

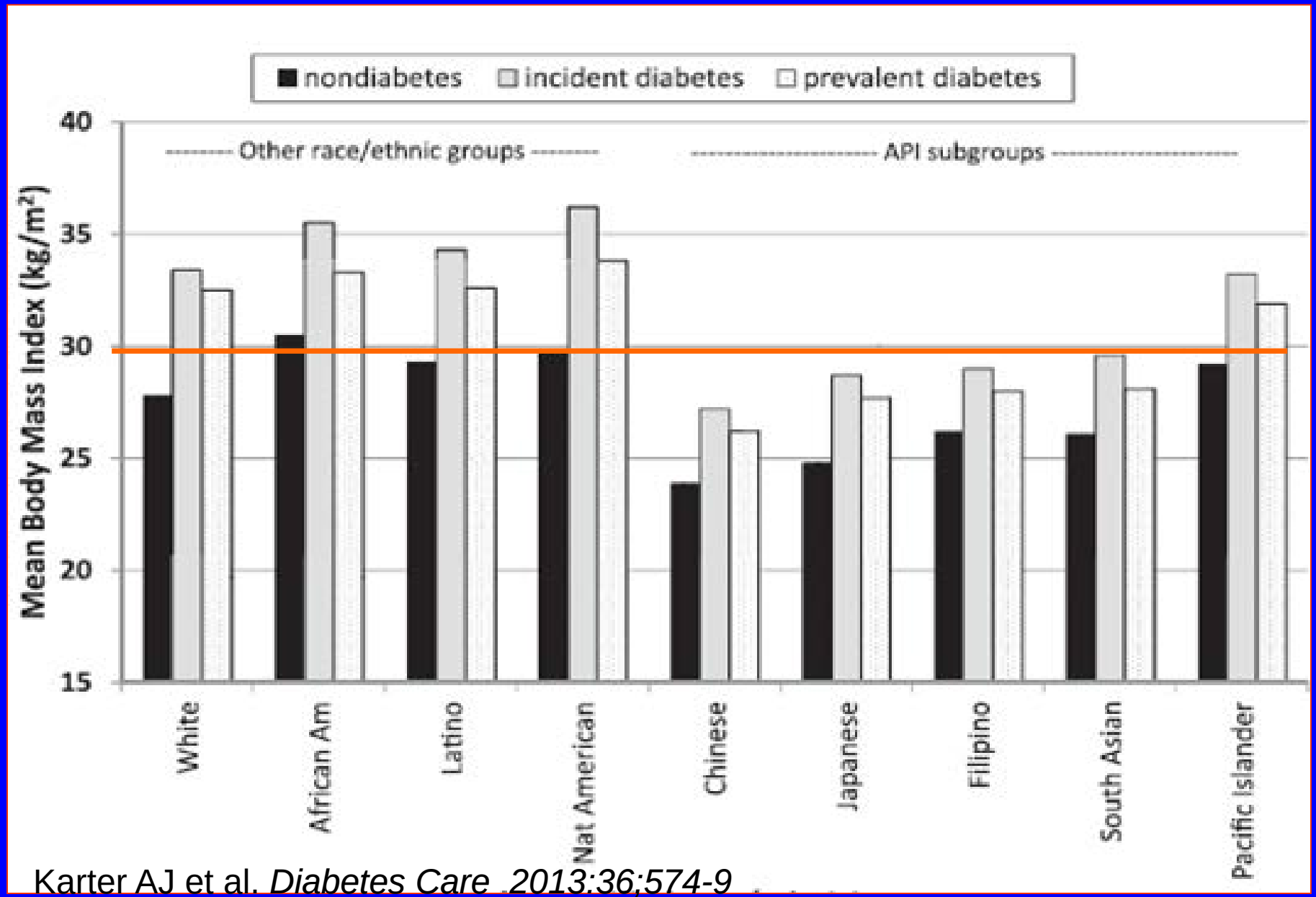
Karter AJ et al; D*iabetes Care 2013: 36;574-9*

Standardized Diabetes Incidence (per 1,000 Person-years), Kaiser Permanente Northern California, 2010



Karter AJ et al. *Diabetes Care 2013:36;574-9*

BMI among 1,704,363,adult members, by race and diabetes status, Kaiser Permanente Northern California, 2010



Karter AJ et al. *Diabetes Care* 2013;36;574-9

American Diabetes Association Revised Screening Guidelines, Effective January 2015

Diabetes Care Volume 38, January 2015

BMI Cut Points to Identify At-Risk Asian Americans for Type 2 Diabetes Screening

William C. Hsu,[1] Maria Rosario G. Araneta,[2] Alka M. Kanaya,[3] Jane L. Chiang,[4] and Wilfred Fujimoto[5]

Diabetes Care 2015;38:1–9 | DOI: 10.2337/dc14-2391

ASIAN AMERICAN POPULATION

According to the U.S. Census Bureau, an Asian is a person with origins from the Far East (China, Japan, Korea, and Mongolia), Southeast Asia (Cambodia, Malaysia, the Philippine Islands, Thailand, Vietnam, Indonesia, Singapore, Laos, etc.), or the In-

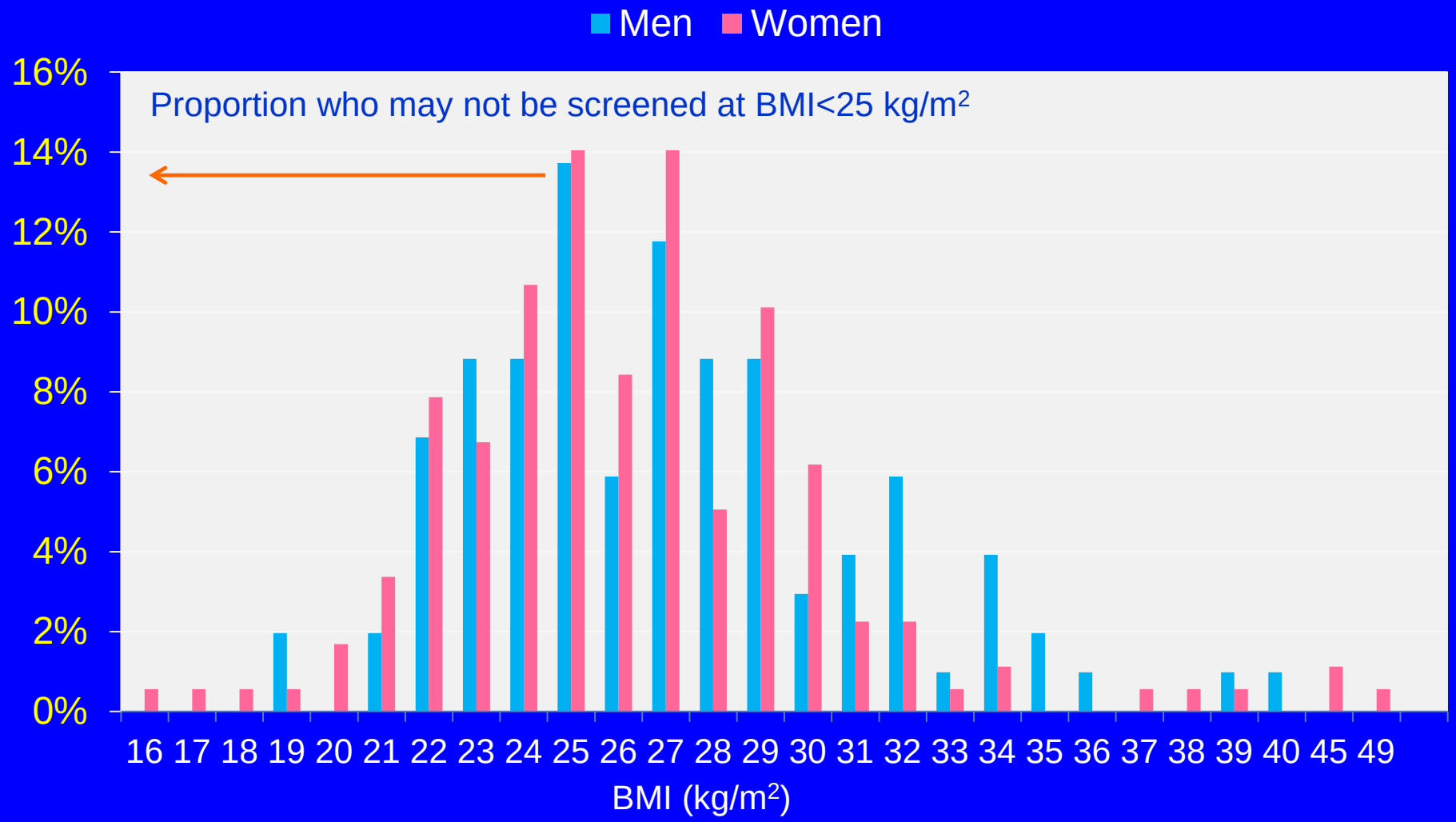
Methods: Study Population

Data from population/community based clinical studies among Asian Americans with oral glucose tolerance test (OGTT) measures

- Mediators of Atherosclerosis among South Asians Living in America (MASALA) Study in San Francisco, CA and Chicago, IL
- North Kohala Study on the island of Hawai'I
- Seattle Japanese Diabetes Community Study in Seattle, WA
- UCSD Filipino Health Study in San Diego, CA

Araneta, Kanaya, Hsu et al *Diabetes Care* 2015;38(5):814-20

Percent distribution of Asian-Americans with newly diagnosed diabetes, by BMI at diagnosis



37% of women and 21% of men with diabetes had BMI<25 kg/m^2

Araneta, Kanaya, Hsu et al *Diabetes Care* 2015;38(5):814-20

Screening Asian-Americans at BMI>= 23 kg/m^2

- Among 21 million Asian-Americans

~ 1.7 million (>=45 years) have diabetes:

~ 510,000 are undiagnosed

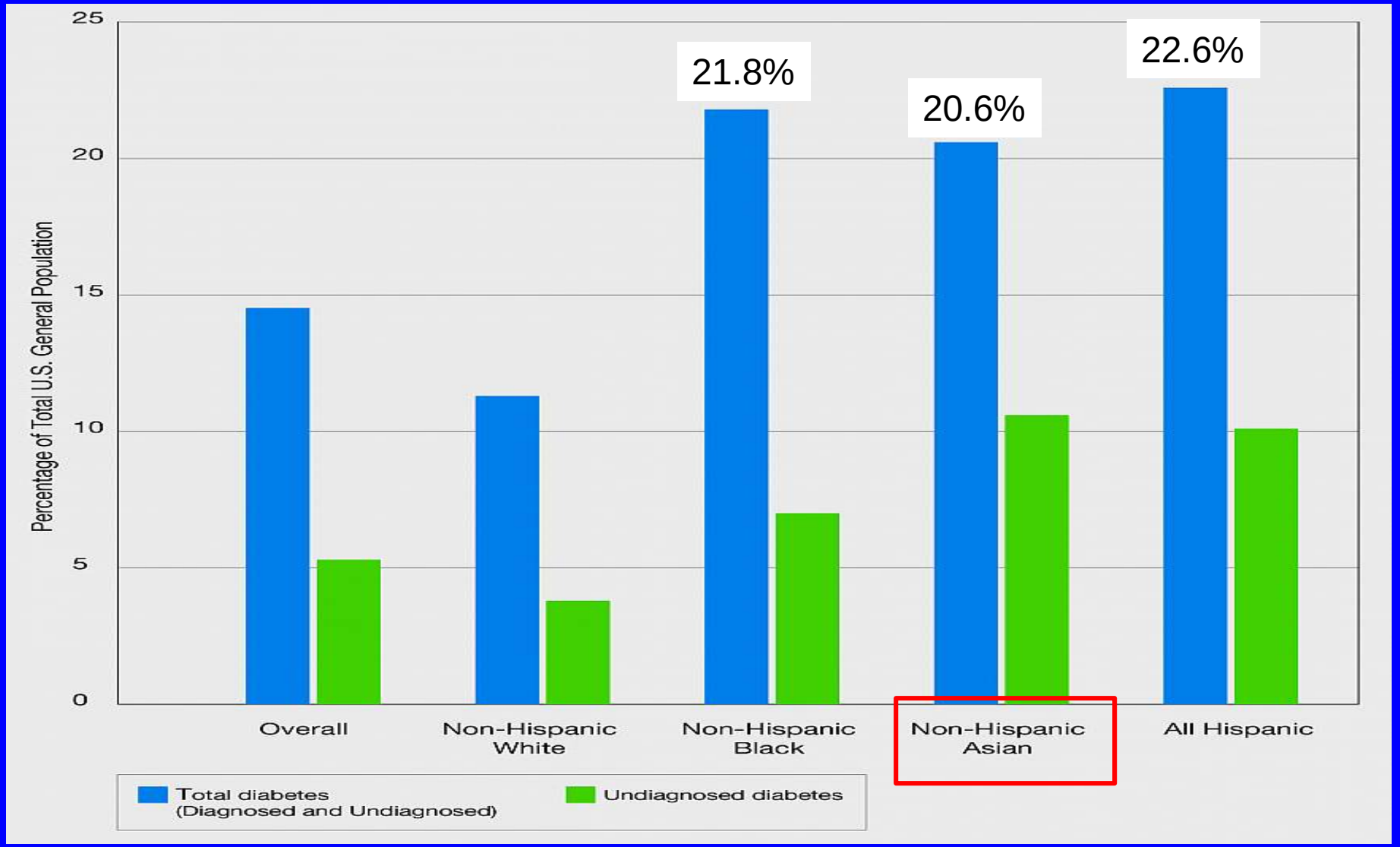
- 300,000 could be identified with Screen @ 23
- But ~ 210,000 with BMI: <=22.9 kg/m^2 might remain undiagnosed or diagnosis will be delayed

AANHPI DC

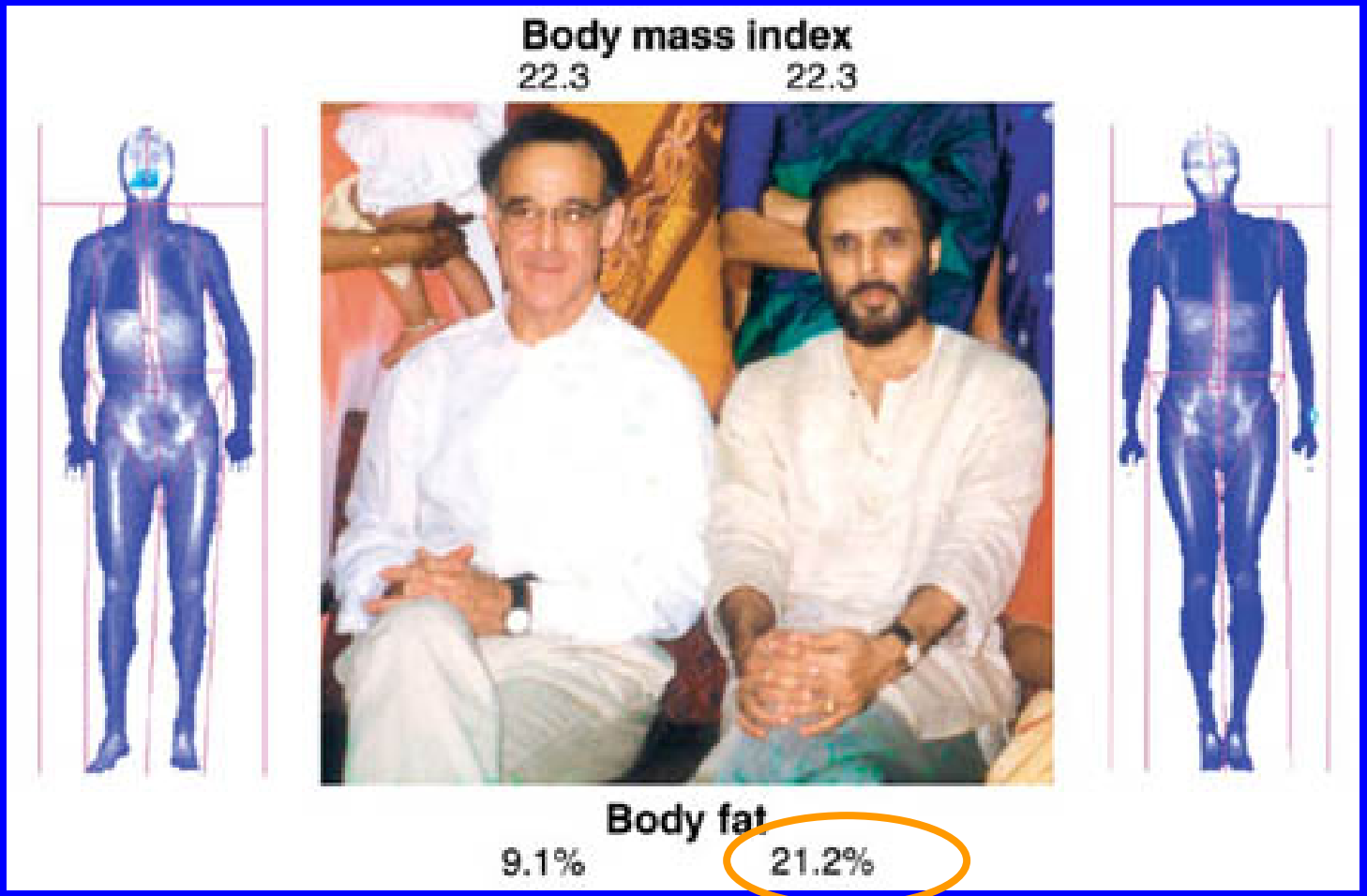
THE ASIAN AMERICAN NATIVE HAWAI'IAN & PACIFIC ISLANDERS DIABETES COALITION

SCREEN AT 23

Asian Americans have the highest prevalence of undiagnosed diabetes (51%), NHANES, 2011-2012



- Menke , JAMA 2015;314:1021-9



JS Yudkin and CS Yajnik, Lancet 2004; 363:157-63

Ethnic differences in visceral adipose tissue (VAT), in women ages >=55 years, without cardiovascular disease

	Caucasian (n=196)	Filipina (n=181)	African-American (n=193)
BMI (kg/m^2)	26.0	25.5	**29.7***
Waist girth (cm)	80.7	81.9	**88.1***
Truncal fat (% DXA)	30.5	31.4	**33.6***
Body fat (%, DXA)	27.3	28.2	**39.6***
Diabetes† (%)	5.8	**32.1***	12.1

* p<0.05, †1999 WHO criteria

Araneta MRG and Barrett-Connor E. *Obes Res* 2005:13;1458-65

Visceral adipose tissue by computed tomography
African American vs Filipina women

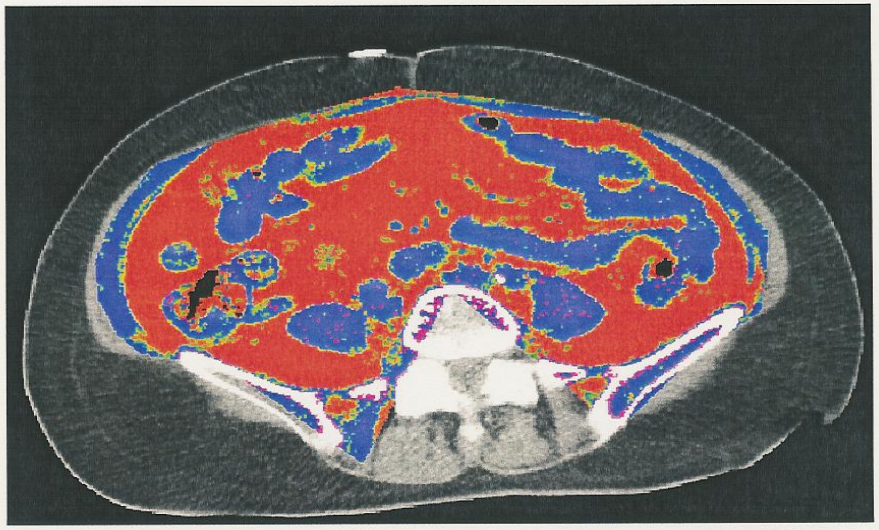
SUBJECT CODE: HASAAW092
AGE: 62
SEX: F
WEIGHT (LBS): 160
SUBJECT INITIALS: PC
DATE OF EXAM: 02/06/2002
VISCERAL FAT (CM3): 25.4
SUBCUTANEOUS FAT (CM3): 221.4
RATIO VF/SF: 0.13

African-American

BMI=25 kg/m^2,
Height: 5'7", Weight: 160 lbs
VAT: **25.4 cm^3**

SUBJECT CODE: FIRBOO215
AGE: 69
SEX: F
WEIGHT (LBS): 115
SUBJECT INITIALS: RM
DATE OF EXAM: 12/11/2001
VISCERAL FAT (CM3): 84
SUBCUTANEOUS FAT (CM3): 125
RATIO VF/SF: 67

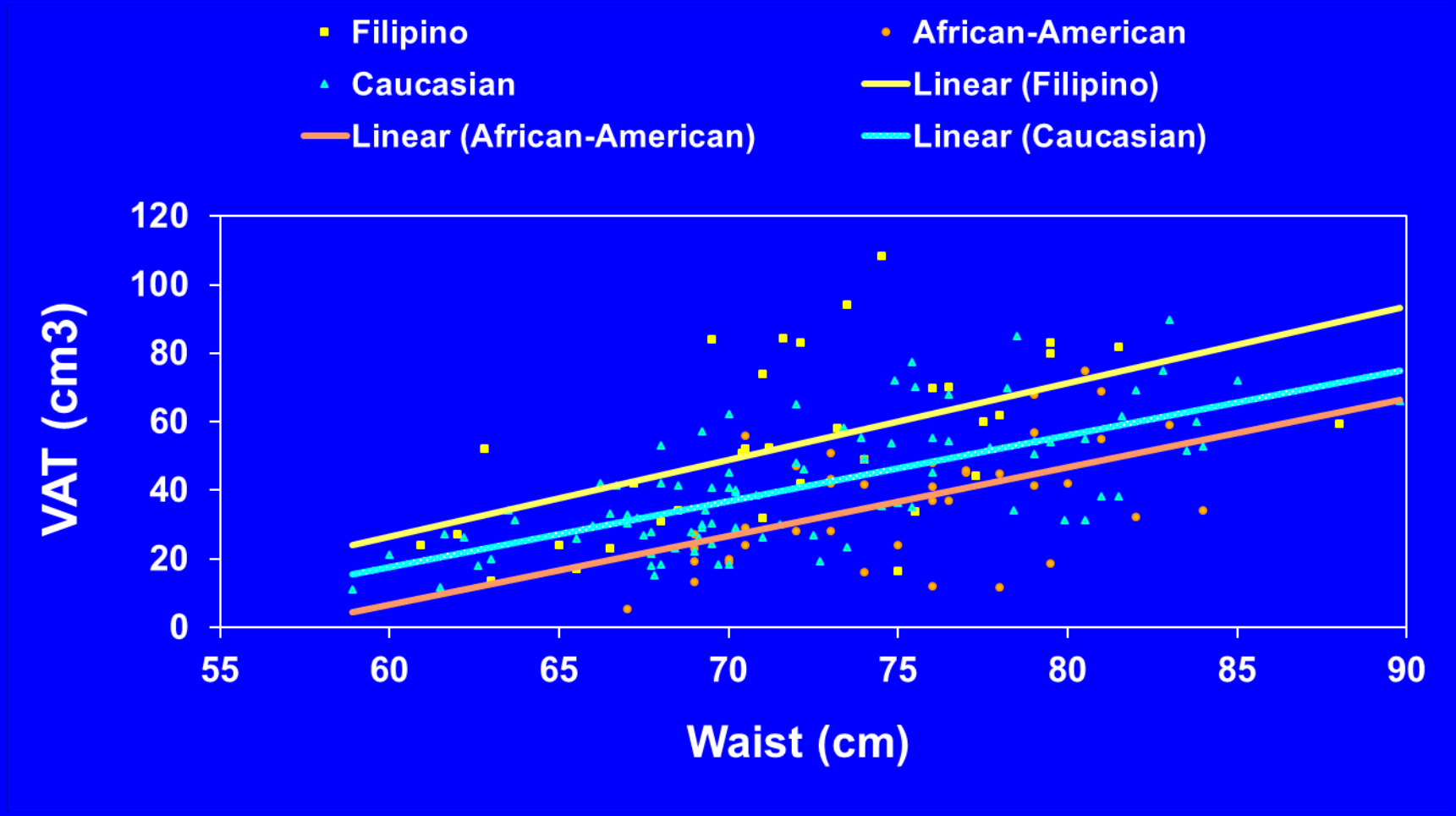
Filipina



BMI=20 kg/m^2
Height: 5'4", Weight: 115 lbs
VAT: **84.0** cm^3

Araneta et al. Obes Res 2005:13;1458-65

Visceral adipose tissue by waist girth in women with normal* BMI, by ethnicity, ages 55-86



*Normal BMI: Filipino: <23 kg/m^2; African-American, Caucasian: <25 kg/m^2

Araneta, Barrett-Connor. Obes Res 2005:13;1458-65

VAT among women with **normal waist circumference**: Filipinas <80 cm; Caucasians & African-Americans <88 cm

	Caucasian	Filipina	African-American
VAT (cm^3)	50.9†	54.8*	43.8
Type 2 diabetes (%)	3.3	23.3*‡	10.4

*p <0.05 Caucasian vs Filipino, † p<0.05 Caucasian vs African-American, ‡ p<0.05 African-American vs Filipino

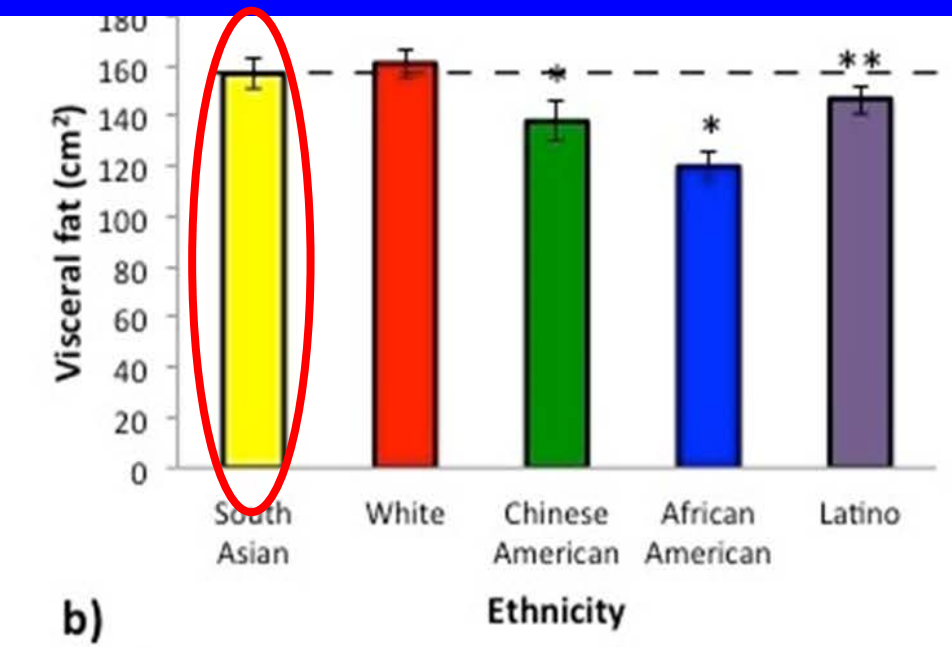
Araneta MRG and Barrett-Connor E. Obes Res 2005:13;1458-65

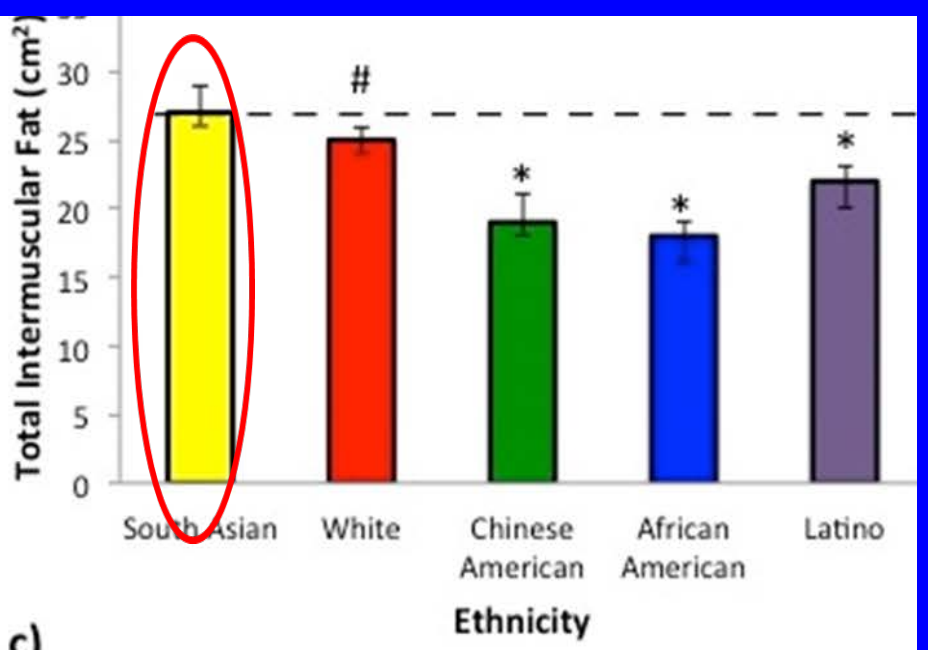
Regional fat distribution, among 55-80 year old women without known CVD

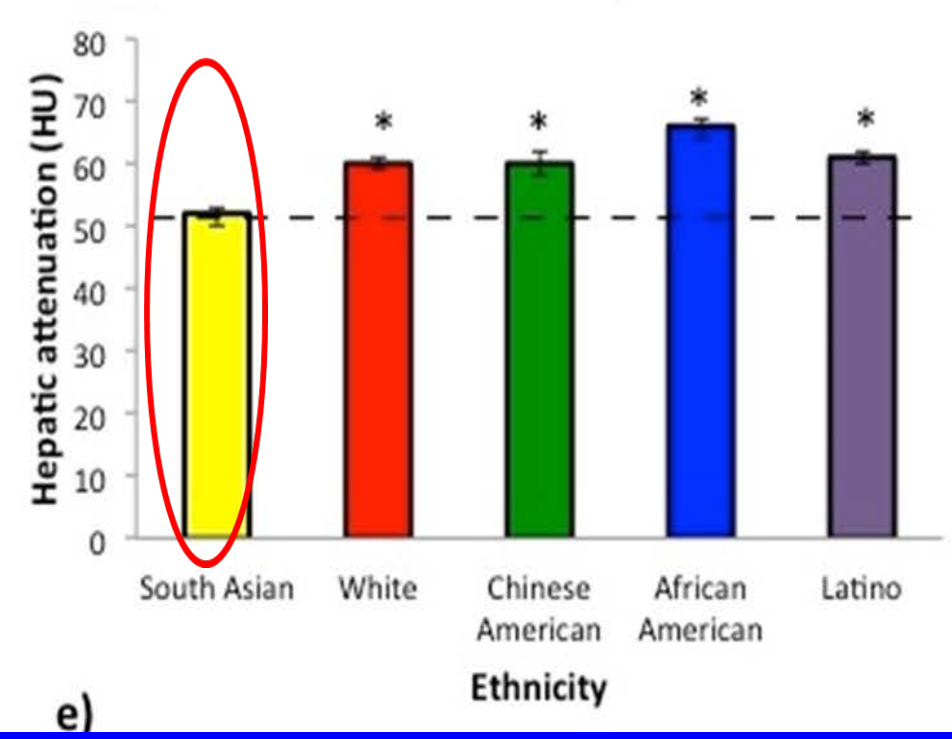
	White n=158	Filipina n=117	African-American n=149
Intermuscular fat (cm^2)	24.2	21.5	23.4
Pericardial fat (cm^2)	144	**191***	123
Intrathoracic fat (cm^2)	47	46	29
muscles:		*% fat*	
Oblique	13.7	15.2	14.0
Paraspinal	**22.3*†**	17.1	19.3
Psoas	**10.5†**	9.4	8.2
Rectus abdominis	25.6	**35.4*‡**	26.7

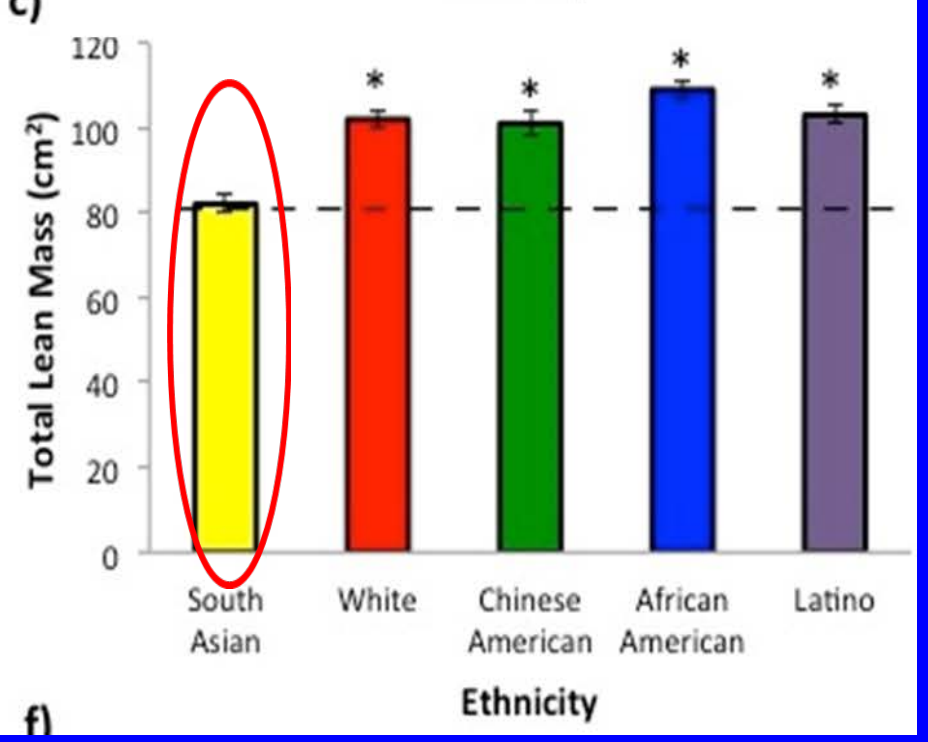
*p <0.05 Caucasian vs Filipino, † p<0.05 Caucasian vs African-American, ‡ p<0.05 African-American vs Filipino

Larsen, Allison, Kang Med Sci Sports Exercise 2014; 426:520-528


Visceral fat (cm²)
0
20
40
60
80
100
120
140
160
180
South Asian
White
Chinese American
African American
Latino
Ethnicity
b)


Total Intermuscular Fat (cm²)
0
5
10
15
20
25
30
#
South Asian
White
Chinese American
African American
Latino
Ethnicity
c)


Hepatic attenuation (HU)
0
10
20
30
40
50
60
70
80
South Asian
White
Chinese American
African American
Latino
Ethnicity
e)


Total Lean Mass (cm²)
0
20
40
60
80
100
120
South Asian
White
Chinese American
African American
Latino
Ethnicity
f)

JCEM ONLINE

Brief Report—Endocrine Research

The Association Between Abdominal Muscle and Type II Diabetes Across Weight Categories in Diverse Post-Menopausal Women

Britta A. Larsen, Matthew A. Allison, Gail A. Laughlin, Maria Rosario G. Araneta, Elizabeth Barrett-Connor, Wilma J. Wooten, Sarah D. Saad, and Christina L. Wassel

Department of Family and Preventive Medicine (B.A.L., M.A.A., G.A.L., M.R.G., E.B-C., W.J.W., S.D.S.), University of California, San Diego, La Jolla, California 92093; and Department of Epidemiology (C.L.W.), University of Pittsburgh, Pittsburgh, Pennsylvania 15260

Abdominal muscle is inversely associated with T2D independent of VAT, particularly among women with BMI <25 kg/m2

Larsen et al. J Clin Endocrinol Metab 2015; 100(1):E105-9

Annals of Internal Medicine

ORIGINAL RESEARCH

Cardiometabolic Abnormalities Among Normal-Weight Persons From Five Racial/Ethnic Groups in the United States

A Cross-sectional Analysis of Two Cohort Studies

Unjali P. Gujral, PhD; Eric Vittinghoff, PhD; Morgana Mongraw-Chaffin, PhD; Dhananjay Vaidya, PhD; Namratha R. Kandula, MD, MPH; Matthew Allison, MD, MPH; Jeffrey Carr, MD; Kiang Liu, PhD; K.M. Venkat Narayan, MD; and Alka M. Kanaya, MD

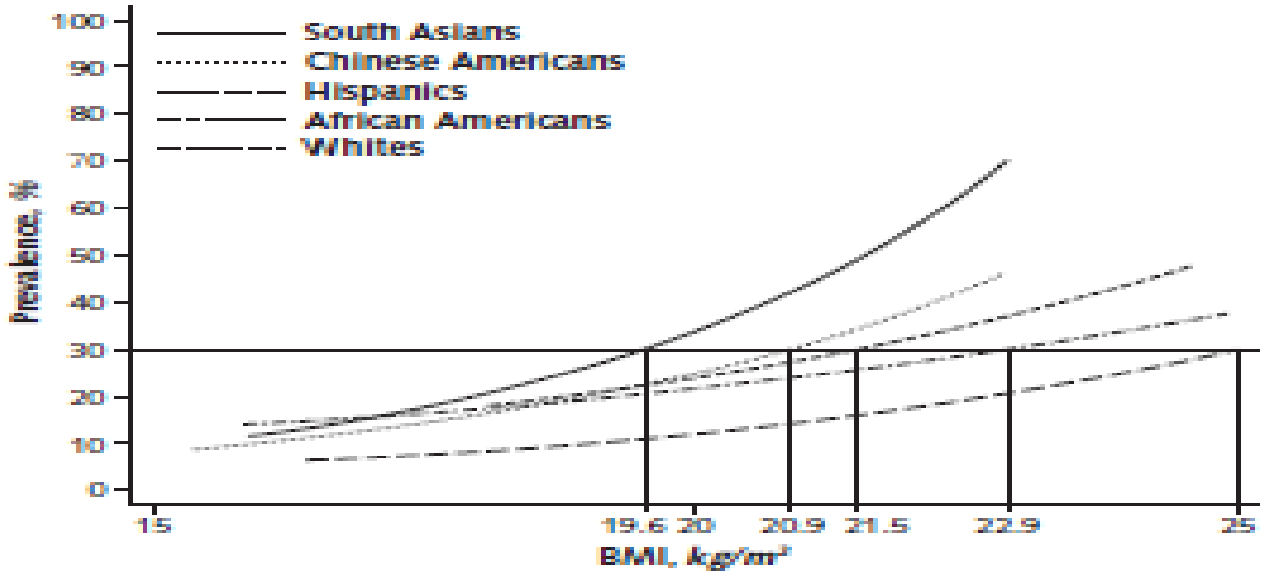
Prevalence of metabolic abnormality but normal weight (MAN)

1/3 of all normal weight adults had MAN

Whites:	**21%**	Blacks:	**31%**
Hispanics:	**39%**		
Chinese:	**32%**	South Asians:	**40%**

- Gujral, Ann Intern Med 2017; April 3

Figure 2. Race/ethnicity-specific BMI values associated with MAN compared with whites with a BMI of 25 kg/m^2.



For the equivalent number of cardiometabolic abnormalities at BMI=25 kg/m^2 in Whites, corresponding BMI values are:

Blacks: **22.3** kg/m^2

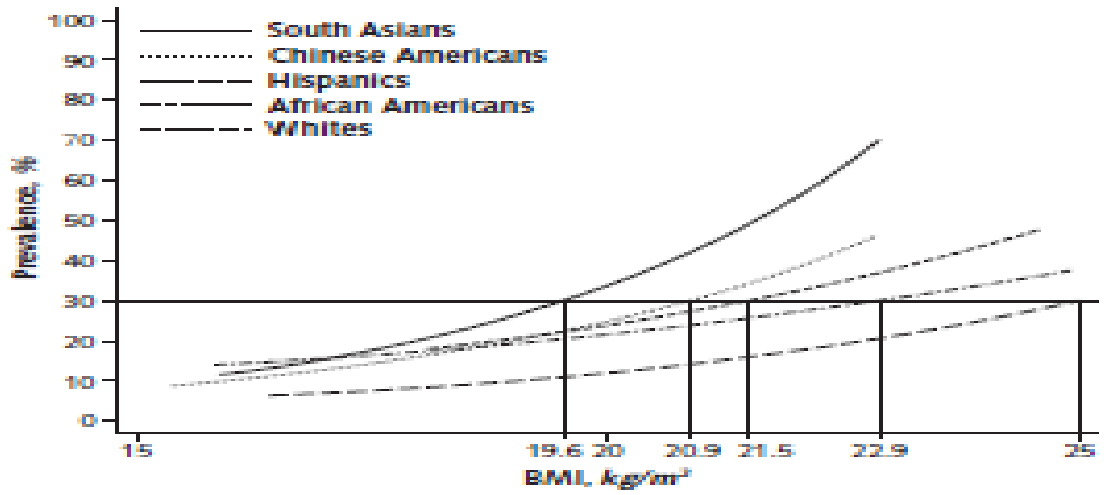
Hispanics: **21.5** kg/m^2

Chinese: **20.5** kg/m^2

South Asians: **18.9** kg/m^2

- Gujral, Ann Intern Med 2017; April 3

Figure 2. Race/ethnicity-specific BMI values associated with MAN compared with whites with a BMI of 25 kg/m^2.



For the equivalent number of cardiometabolic abnormalities at BMI=30 kg/m^2 in Whites, corresponding BMI values are:

Blacks: **29.9** kg/m^2

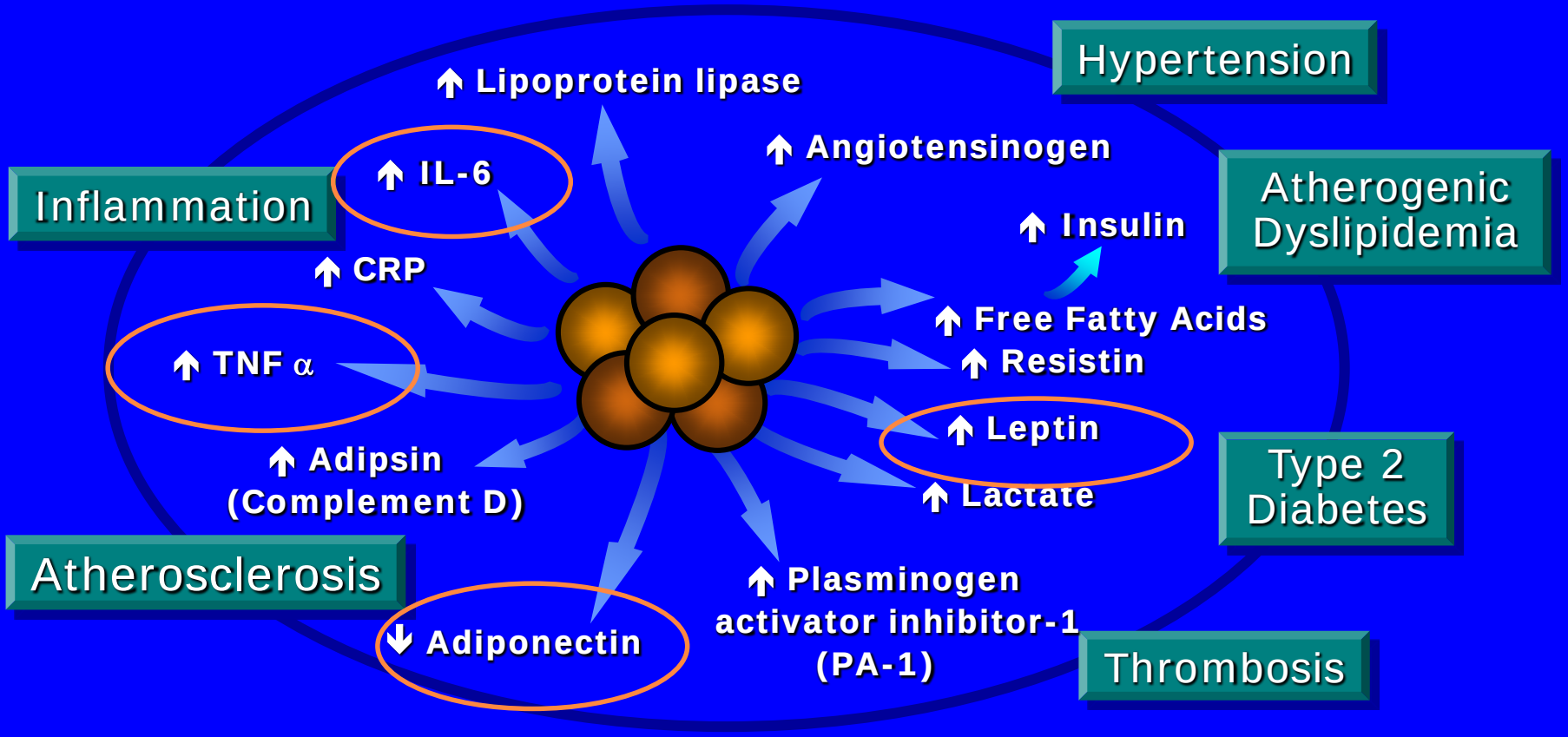
Hispanics: **27.0** kg/m^2

Chinese: **24.5** kg/m^2

South Asians: **23.3** kg/m^2

- Gujral, Ann Intern Med 2017; April 3

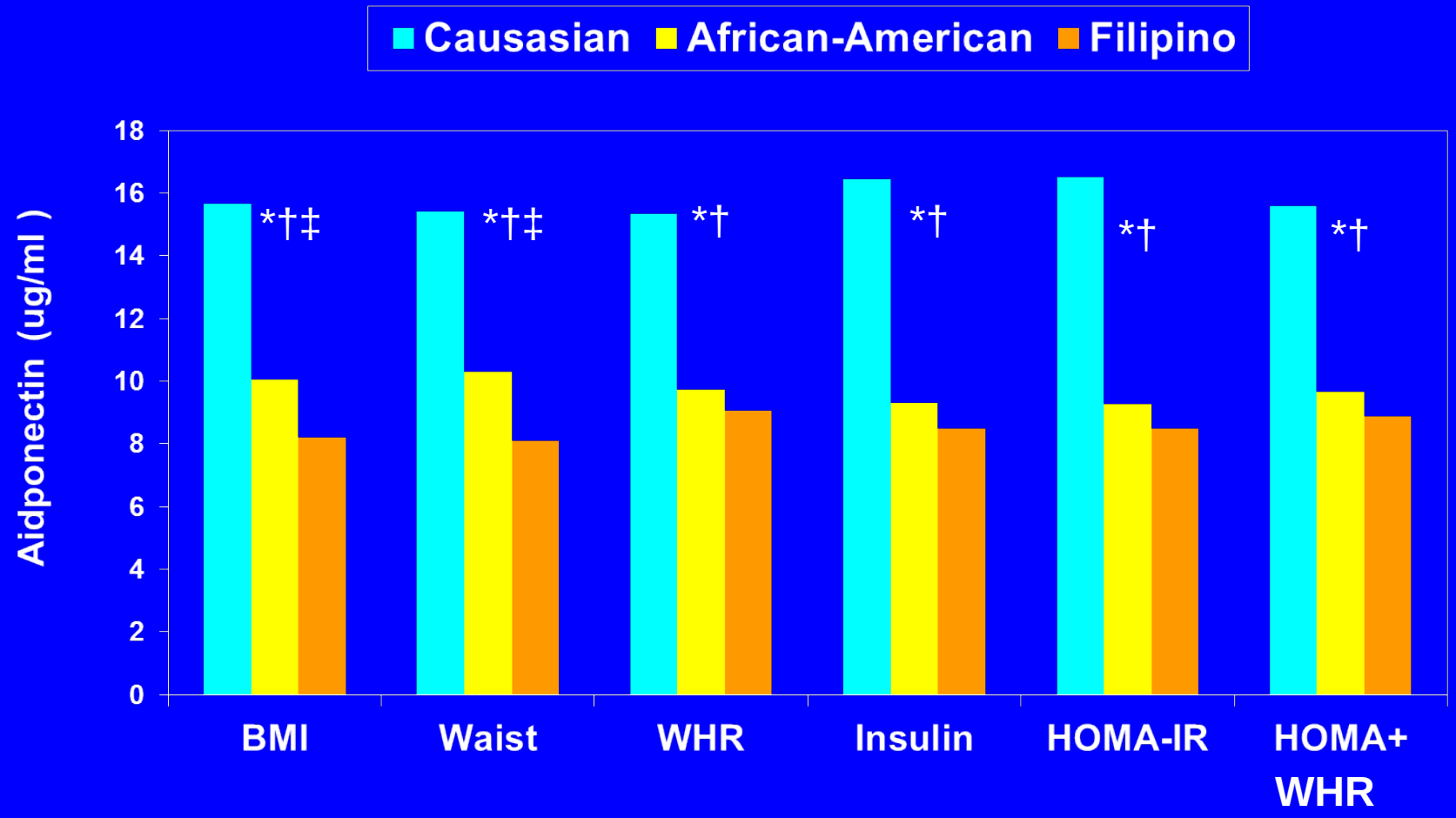
Adipose Tissue Is an Endocrine Organ:
Its Function in Health and Disease



CRP = C-reactive protein; IL-6 = interleukin-6; TNFα = tumor necrosis factor-alpha

Reprinted in adapted form from Trayhurn P, Wood IS. *Br J Nutr.* 2004;92:347–355, with permission of Cambridge University Press. | Eckel RH, et al. *Lancet.* 2005;365:1415–1428. | Lyon CJ, et al. *Endocrinology.* 2003;144:2195–2200.

Adiponectin concentration in normoglycemic women, ages 40-86



*p <0.05 Filipino vs Caucasian, † p<0.05 African-American vs Caucasian, ‡ p<0.05 African-American vs Filipino

Adiponectin levels were **lowest** in normoglycemic Filipinas and African-Americans

Araneta, Barrett-Connor. *Obesity* 2007:15;2454-62

Maraming Salamat!

To our study participants, and

Elizabeth Barrett-Connor MD
Deborah Wingard PhD
Mary Lou Carrion-Peterson RN
Maggie Wong
Patricia Miller
Noralinda Kamantigue, RN
Nancy Thielen RN
Luzana Sechler
Gabriela Reno
Mark Stephens

NIH / NIDDK *R01 31801, R03 60575, NCMHD* P60 MD00220
NHLBI R21HL089622, NCCDHP 1U58DP005618-01
American Heart Association *0070088Y*, Amgen