

Cardiovascular Risk in US Urban Hispanic Populations: Regional Data From Community Outreach Programs

Sean D. Candrilli¹, EunMee Lee², Simon S.K. Tang², Stanley Bassin³, Heather J. Laird⁴, Stewart S. Levy⁴, Nathan D. Wong³

Corresponding author: EunMee Lee (email: LeeE@pfizer.com)

¹RTI Health Solutions, Research Triangle Park, NC; ²Pfizer Inc, New York, NY; ³Heart Disease Prevention Program, Department of Medicine, UC Irvine, Irvine, CA; ⁴Impact Health, King of Prussia, PA

ABSTRACT

Background: The US Hispanic population represents the fastest-growing and largest minority group; however, the potential differences in cardiovascular risk among Hispanics of different origin (Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture) are unknown. The concentration of Hispanics of different origin varies according to the US geographic region.
Methods: Hispanic Community Outreach Programs were conducted in 4 urban communities (Miami, New York [NY], Los Angeles [LA], Houston) during 2004–2006. We examined the burden of conventional cardiovascular risk factors (RF), diabetes (DM), and coronary heart disease (CHD) in Hispanic adults. Estimated 10-year Framingham CHD risk was calculated among those without CHD or DM.
Results: Risk factor burden and 10-year CHD risk in Hispanics by geographic region are shown in the table. Approximately half to two-thirds had at least two risk factors or DM/CHD. There was greater variation between regions in those at intermediate (10%–20%) risk (15.6% in Miami versus 5.5% in NY) or with DM/CHD (26% in NY versus 7.5% in Houston). Similar risk burden observed in LA and Houston may reflect their similarly predominant Mexican populations.

	Miami (n = 372)	NY (n = 254)	LA (n = 4037)	Houston (n = 625)
Mean age, years	55.7 (c, e, f)	49.7 (a, b, c)	47.3 (b, d, f)	45.4 (a, d, e)
% female	65.1 (c)	75.2 (a, b, c)	60.0 (b, d)	65.0 (a, d)
0–1 RF*, %	32.0 (c, e, f)	39.8 (a, b, c)	47.6 (b, f)	49.8 (a, e)
2–3 RF*, %	38.2 (c)	27.6 (a, b, c)	36.1 (b)	37.1 (a)
≥4 RF*, %	10.8 (e, f)	6.7	6.2 (f)	5.6 (e)
DM or CHD, %	19.1 (c, e, f)	26.0 (a, b, c)	10.0 (b, d, f)	7.5 (a, d, e)
Mean ten-year CHD risk, %**	5.8 (c, e, f)	3.6 (c)	4.4 (f)	4.2 (e)
10-Year CHD risk <10%, %	61.3 (e, f)	66.1 (a, b)	75.0 (b, f)	77.1 (a, e)
10-Year CHD risk 10–20%, %	15.6 (c)	5.5 (a, b, c)	12.1 (b)	12.5 (a)
10-Year CHD risk >20% or DM or CHD, %	23.1 (e, f)	28.3 (a, b)	12.9 (b, f)	10.4 (a, e)

Statistically significant differences ($P < 0.05$) are indicated for comparisons between (a) NY and Houston, (b) NY and LA, (c) NY and Miami, (d) Houston and LA, (e) Houston and Miami, and (f) LA and Miami
 *RF = conventional risk factors in those without DM or CHD; age (male ≥ 45 years or female ≥ 55 years); current smoker; hypertension ($\geq 140/90$ mm Hg, or on antihypertensive medication); total cholesterol ≥ 240 mg/dL or on cholesterol medication; low high-density lipoprotein cholesterol < 40 mg/dL; family history of early CHD
 **Mean 10-year CHD risk (%) for those without DM or CHD

Conclusion: A substantial number had ≥ 1 RF, but the variation in DM/CHD and estimated CHD risk among Hispanics from different US geographic regions warrants further investigation among Hispanic subpopulations into the reasons for these differences and their implications on healthcare delivery.

BACKGROUND

- The US Census Bureau estimates that Hispanics/Latinos represent the fastest-growing and largest minority group in the United States (US).^{1,2}
- In the US, 64% of people of Hispanic origin are of Mexican background, and "another approximately 10% are of Puerto Rican background, with about 3% each of Cuban, Salvadoran, and Dominican origins. The remainder are of some other Central American, South American, or other Hispanic or Latino origins."³
- The concentration of Hispanics of different origin varies according to US geographic regions. "Roughly half of the nation's Dominicans live in New York City, with about half of the nation's Cubans residing in Miami-Dade County, FL."⁴
- The potential differences in cardiovascular (CV) risk among Hispanics of different ancestry are unknown.

STUDY OBJECTIVES

- To assess the burden of conventional CV risk factors, diabetes mellitus (DM), and coronary heart disease (CHD) in a population of Hispanics residing in different geographic areas in the US, and to assess the 10-year Framingham global risk of CHD (among those without CHD or DM).

METHODS

Study Populations

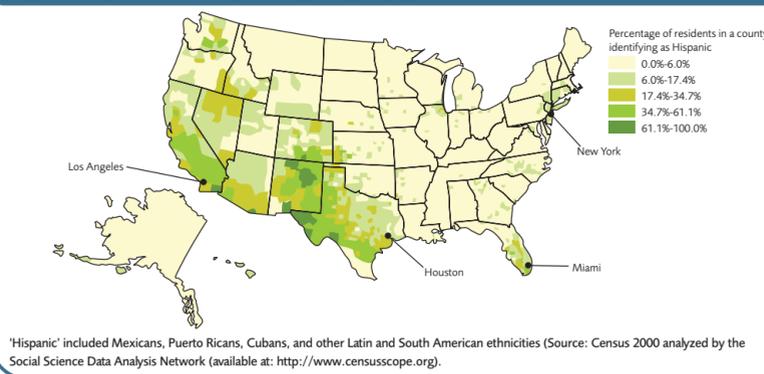
- In partnership with various organizations such as local chapters of the American Heart Association, retailers (Albertson's, Navaros), hospitals, and local Young Men's Christian Association (YMCA), Pfizer Inc. conducted numerous health screening events in 4 US communities with high-density Hispanic populations (Figure 1): Miami, New York (NY), Los Angeles (LA), and Houston. These events were developed to help bridge the healthcare disparity gap between those in the local Hispanic communities and others by increasing CV risk awareness and empowering patients and doctors to take action.
- Participants were recruited via advertisements in the media, websites, community calendars and local flyers, and the screening events were held at various venues: 1) "Non-healthcare facility" = church, community centers (e.g., YMCA), retail stores (e.g., grocery store), and festivals; or 2) "Healthcare facility" = outside of outpatient hospitals/clinics, physician offices, and hospitals (e.g., parking lots).

REFERENCES 1. US Census Bureau. Table 5: Cumulative estimates of the components of population change by race and Hispanic or Latino origin for the United States: April 1, 2000 to July 1, 2005 (NC-EST2005-05). May 10, 2006. Available at: <http://www.census.gov/>. 2. US Census Bureau. Table 3: Annual estimates of the population by sex, race and Hispanic or Latino origin for the United States: April 1, 2000 to July 1, 2005 (NC-EST2005-03). May 10, 2006. Available at: <http://www.census.gov/>. 3. American Heart Association. Heart Disease and Stroke Statistics – 2007 Update. *Circulation* 2007;115:69-171. 4. US Census Bureau. Source: AmericanFactFinder. September 13, 2006. Available at: <http://www.census.gov/>. 5. Wong ND, Pio JR, Franklin SS, et al. *Am J Cardiol* 2003;91:1421-6. 6. Wilson PW, D'Agostino RB, Levy D, et al. *Circulation* 1998;97:1837-47.

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- No incentives were provided to participants; a report of their CV risk factor measurements and counseling to seek further medical attention, if needed, were provided.
- Retrospective cross-sectional analyses of the data from 5288 Hispanic persons participating in health screening events between 2004–2006 in Miami, NY, LA and Houston were conducted.
- Blood pressure (BP) measurements were collected utilizing OMRON Automatic Monitors[®]; total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), and glucose were measured with Cholestech LDX[®] instruments. Single measurements for BP, cholesterol, and glucose were obtained.
- CHD: Self-report of heart disease or previous heart attack.
- Medical history to determine presence of CHD, current smoking status, family history of early CHD was based on participants' self-report on a written questionnaire, which was administered in both English and Spanish.
- Participants with measured fasting glucose level ≥ 126 mg/dL (≥ 200 mg/dL if non-fasting), or currently taking medications for DM (self-reported) were considered to have DM.
- T- and Chi-square tests were used, as appropriate, to check for statistical differences in parameter estimates.

Figure 1. Map of US with overlay of density of Hispanic populations



Definition of Risk Factors

- Men ≥ 45 years or women ≥ 55 years.
- Current smoker.
- Hypertension: BP $\geq 140/90$ mm Hg or on antihypertensive medication.
- TC ≥ 240 mg/dL or on cholesterol medication.
- HDL-C < 40 mg/dL.
- Family history of early CHD: heart attack in father or brother before age 55 years, or before age 65 years in mother or sister.

Risk Assessment

- Framingham Risk Score (FRS): 10-year risk of CHD was calculated in Hispanics without CHD or DM, using Framingham algorithms.^{5,6}
- For the FRS calculation, measures of age, gender, TC and HDL-C, systolic BP, use of antihypertensive medication, and current smoking status were used.

RESULTS

Overall Baseline Demographics

- The mean (SD) age for the overall Hispanic population (N = 5288) was 47.8 (13.9) years, with women comprising 61.6% of this population (for a breakdown by geographic region see Table 1).
- There were 46.4% (95% CI: 45.1, 47.8) with 0–1 risk factor (RF), 36.0% (95% CI: 34.7, 37.3) with 2–3 RF, and 6.5% (95% CI: 5.8, 7.2) with ≥ 4 RF (Figure 2).
- There were 11.1% (95% CI: 10.3, 12.0) of participants with CHD or DM (Figure 2).

Framingham Risk Estimates

- Among those participants without CHD or DM (n = 4700), the mean (SD) 10-year FRS were: 4.45 (6.33) for the overall study sample; 5.80 (6.84), 3.59 (5.61), 4.42 (6.30), and 4.21 (6.41) for the populations based in Miami, NY, LA, and Houston, respectively (Figure 3).
- The proportion of Hispanics with low- (<10%), intermediate- (10%–20%), and high- (>20% or CHD or DM) 10-year Framingham risk of CHD by geographic region is shown in Figure 4.
- The highest proportion of Hispanics at low risk (FRS <10%) was found in Houston (Figure 4).
- The highest likelihood of being at high risk (FRS $\geq 20\%$ or with CHD or DM) was found in NY and Miami, which persisted after taking into account the venue type, health insurance, age, and gender (Figure 4, Table 2). In addition, DM was significantly more likely among Hispanics in NY and less likely among Hispanics in Houston, and DM and/or CHD was significantly more likely among Hispanics both in Miami and NY. Female gender was associated with a lesser likelihood, and with increasing age a greater likelihood of ≥ 4 risk factors, DM, DM and/or CHD, or $\geq 20\%$ risk (Table 2).

Table 1. Baseline demographics by geographic community

	Miami (n = 372)	New York (n = 254)	Los Angeles (n = 4037)	Houston (n = 625)
Mean age (SD), years	55.7 (11.5) ^{c,e,f}	49.7 (15.3) ^{a,b,c}	47.3 (13.7) ^{b,d,f}	45.4 (14.4) ^{a,d,e}
Female, %	65.1 ^c	75.2 ^{a,b,c}	60.0 ^{b,d}	65.0 ^{a,d}
Mean TC (SD), mg/dL	201.7 (41.7) ^{c,f}	182.7 (40.6) ^{a,b,c}	196.8 (43.0) ^{b,d,f}	202.7 (42.7) ^{a,d}
Mean HDL-C (SD), mg/dL	43.7 (13.77)	44.4 (13.26)	43.0 (12.65) ^d	44.4 (13.58) ^d
Smokers (%)	13.4 ^f	18.5 ^{a,b}	8.8 ^{b,f}	10.9 ^a
Mean systolic BP (SD), mm Hg	123.0 (16.4) ^{e,f}	125.3 (19.3) ^{a,b}	129.6 (19.7) ^{b,f}	130.5 (19.4) ^{a,e}
Mean diastolic BP (SD), mm Hg	77.4 (10.2) ^{c,e}	74.5 (10.2) ^{a,b,c}	77.8 (11.4) ^{b,d}	78.9 (10.9) ^{a,d,e}
0–1 RF* (%)	32.0 ^{c,e,f}	39.8 ^{a,b,c}	47.6 ^{b,f}	49.8 ^{a,e}
2–3 RF* (%)	38.2 ^c	27.6 ^{a,b,c}	36.1 ^b	37.1 ^a
≥4 RF* (%)	10.8 ^{e,f}	6.7	6.2 ^f	5.6 ^e
DM or CHD (%)	19.1 ^{c,e,f}	26.0 ^{a,b,c}	10.0 ^{b,d,f}	7.5 ^{a,d,e}

Statistically significant differences ($P < 0.05$) are indicated for comparisons between (a) NY and Houston, (b) NY and LA, (c) NY and Miami, (d) Houston and LA, (e) Houston and Miami and (f) LA and Miami
 *Conventional risk factors in those without DM or CHD
 SD, standard deviation; TC, total cholesterol; HDL-C, high-density lipoprotein cholesterol; BP, blood pressure; RF, risk factor; DM, diabetes mellitus; CHD, coronary heart disease; NY, New York; LA, Los Angeles

Figure 2. Baseline demographics of study participants by number of risk factors (RF) or diabetes mellitus (DM) or coronary heart disease (CHD) status

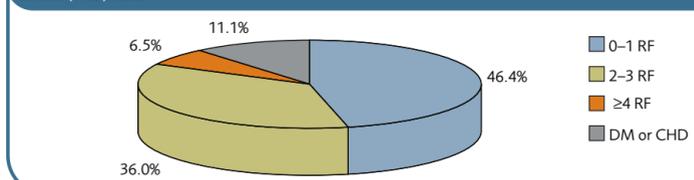
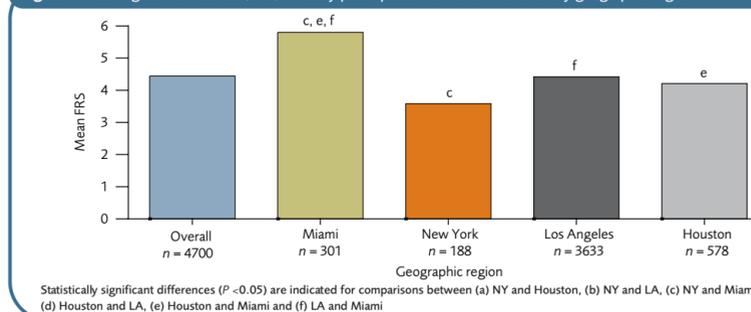


Figure 3. Framingham risk scores (FRS) of study participants without DM or CHD by geographic region



- Greater variation was observed between the 4 communities in those at intermediate risk (FRS 10%–20%). These differences were not statistically significant with the exception of NY, which was significantly lower than LA (odds ratio [OR] 0.518; $P = 0.0407$) in a multivariate logistic regression analysis.

LIMITATIONS

- Framingham risk algorithm is based on a Caucasian population, and may actually overestimate risk in Hispanic and other populations, given the well-known ethnic differences in CHD risk.
- Ten-year Framingham risk algorithms may be an underestimate of actual lifetime risk of CHD.
- Framingham algorithm may underestimate risk since it does not take into account other risk factors such as obesity, other lipid abnormalities (e.g., triglycerides), hyperglycemia, or glucose intolerance, some of which are particularly prevalent in Hispanic adults and may explain some of our findings.
- Data are based on single measurements of BP, TC, HDL-C, and glucose, and do not take into account variability in these measures.
- LDL-C data were only available for a subset of participants and were therefore not used for this analysis; inclusion of LDL-C measurements may have improved the precision of the risk estimates.

Figure 4. Ten-year Framingham risk for different communities

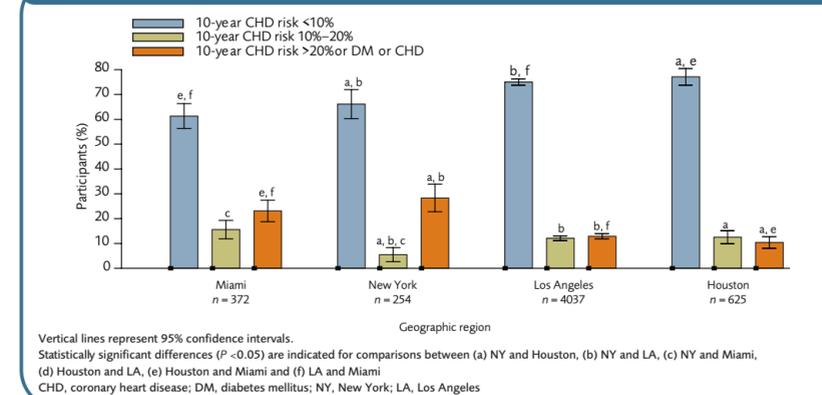


Table 2. Multivariate logistic regression analyses (n = 4175[†])

Parameter	≥4 Risk Factors (Odds Ratio [95% CI])	DM Only (Odds Ratio [95% CI])	CHD and/or DM (Odds Ratio [95% CI])	10-Year FRS >20% or CHD or DM (Odds Ratio [95% CI])
Community (vs. Los Angeles):				
Miami	1.19 (0.79–1.80)	0.80 (0.54–1.19)	1.55 (1.11–2.17)*	1.52 (1.10–2.08)*
New York	1.08 (0.62–1.88)	2.20 (1.51–3.21) [†]	3.17 (2.23–4.50) [†]	2.77 (1.95–3.93) [†]
Houston	0.95 (0.64–1.40)	0.55 (0.37–0.82) [‡]	0.87 (0.62–1.23)	0.92 (0.68–1.25)
Women (vs. Men)	0.41 (0.32–0.52) [†]	0.80 (0.65–1.00)*	0.75 (0.61–0.92)**	0.52 (0.43–0.63) [†]
Health insurance: (vs. no health insurance)	0.80 (0.59–1.08)	1.09 (0.84–1.41)	1.19 (0.93–1.51)	1.19 (0.95–1.49)
Non-healthcare facility (vs. healthcare facility)	1.08 (0.72–1.63)	0.86 (0.60–1.23)	0.82 (0.59–1.14)	1.07 (0.78–1.47)
Age (continuous)	1.07 (1.06–1.08) [†]	1.05 (1.04–1.06) [†]	1.05 (1.04–1.06) [†]	1.07 (1.07–1.08) [†]

* $P < 0.05$; ** $P < 0.01$; [†] $P < 0.005$; [‡] $P < 0.0001$
[†]Logistic regression analyses included 4175 participants as venue information was not available for all participants (Houston [n = 39] and Los Angeles [n = 1074] were excluded). Due to lack of variation in the dependent variable (i.e., small number of observations with CHD), logistic regression models to predict the probability of having only CHD were inestimable
 CHD, coronary heart disease; DM, diabetes mellitus; FRS, Framingham risk score

- All participants included in this analysis were of Hispanic origin, but their specific ancestry was not recorded.
- While the relationships described in the regression analyses are informative, caution should be used when drawing conclusions, as association does not imply causality.

DISCUSSION/CONCLUSIONS

- In these urban Hispanic populations who received health screening services, approximately half to two-thirds of participants had ≥ 2 conventional CV risk factors, DM, or CHD.
- After adjusting for type of venue, health insurance, age, and gender, Miami and NY had a greater likelihood of having 10-year CHD risk $\geq 20\%$ or CHD or DM compared with LA. Participants from Miami and NY also had significantly greater likelihood of having DM and/or CHD, while New York participants also had significantly more DM, which may be the driving component for these participants being in the highest risk category.
- As expected, increasing age was associated with a greater likelihood and female gender a lesser likelihood of multiple CV risk factors and 10-year risk of CHD $\geq 20\%$, DM, CHD, or DM and/or CHD.
- Variation in the proportion of US Hispanics with DM or CHD, and differences in estimated CHD risk in Hispanic populations of different geographic origin (and thus possibly different ancestry) warrant further investigation.

DISCLOSURE

This study was supported by Pfizer Inc.

Authors' financial disclosure information:

Stan Bassin – Nothing to disclose; Sean Candrilli – Consultant, Pfizer Inc; EunMee Lee – Employee, Pfizer Inc; Heather Laird – Consultant, Pfizer Inc; Stewart Levy – Consultant, Pfizer Inc; Simon Tang – Employee, Pfizer Inc; Nathan Wong – Grant support (significant) from Pfizer Inc; and Merck; Speaker's bureau (modest) from Takeda, Pfizer Inc, and Sanofi-Aventis.