

Racial Disparities in Amputation Rates for the Treatment of Peripheral Artery Disease (PAD) Using the Healthcare Cost and Utilization Project (HCUP) Database

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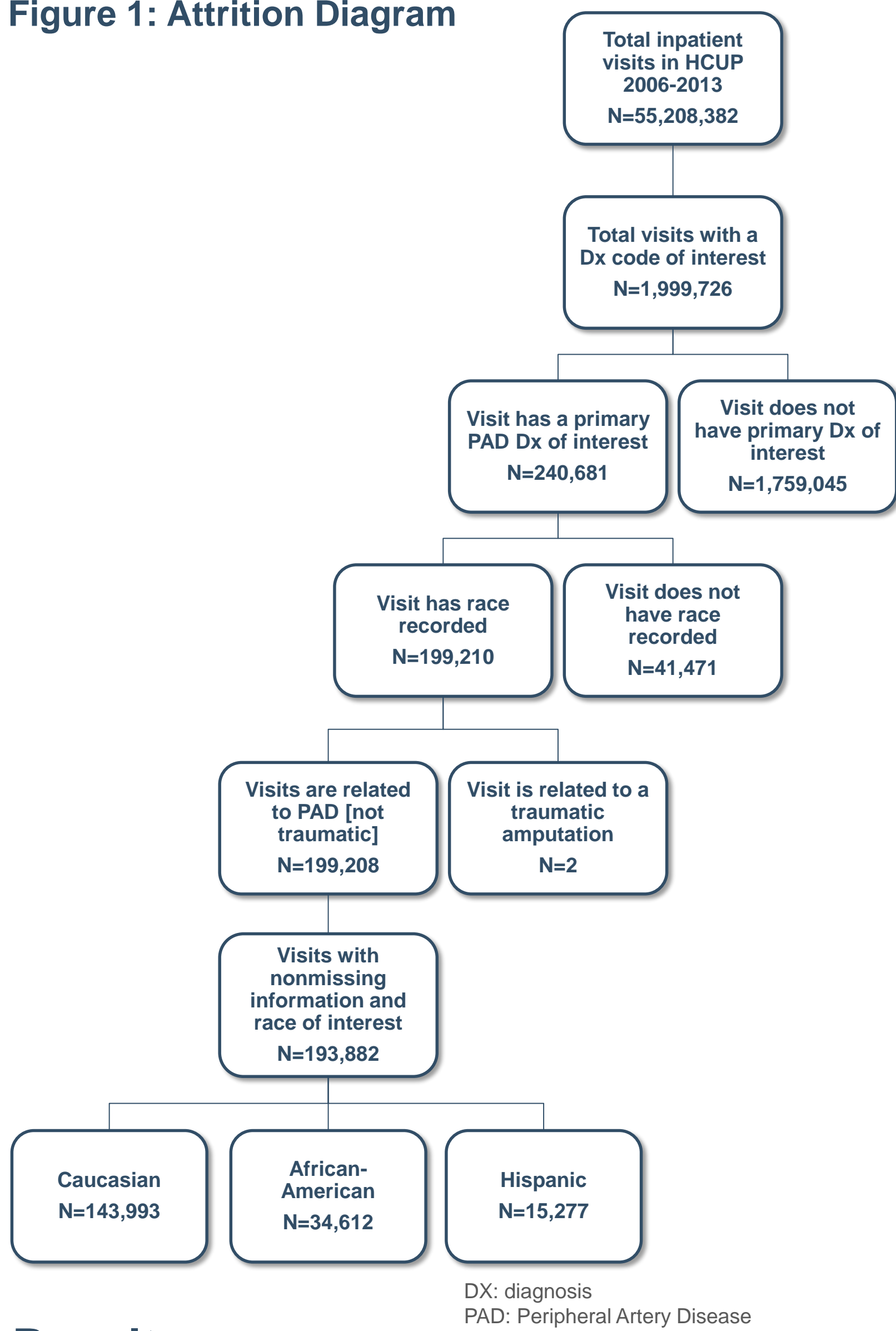
Objectives:

- While studies have documented racial and ethnic disparities in amputation rates for patients with peripheral artery disease (PAD), the importance of specific factors have not been quantified.
- This research seeks to provide amputation rates for African American and Hispanic patients in comparison to Caucasians and quantifies how much of the difference in rates reflects observable versus unexplained factors.

Methods:

- This study used the nationally-representative Healthcare Cost and Utilization Program (HCUP) inpatient database from 2006-2013 for patients with a primary diagnosis of PAD.
- Primary outcomes of interest for this analysis were amputation and revascularization.
- Amputation rates were calculated for any amputation [any part of the leg or foot] or lower leg amputation [below the knee, ankle, foot or toe].
- Revascularization included any of the following procedures: peripheral artery bypass graft, peripheral artery angioplasty, peripheral artery stenting or atherectomy.
- There are three patient cohorts of interest for this analysis: Caucasians, African-Americans and Hispanics.
- Logistic regression models were estimated to identify the determinants of amputation and/or revascularization rates.
- All models were adjusted for patient demographics, income strata, comorbidities, risk factors and hospital characteristics.
- The Blinder-Oaxaca decomposition method was employed to ascertain and quantify the factors that contribute to the racial/ethnic disparities.

Figure 1: Attrition Diagram



Results:

- Caucasians are generally older, wealthier, had milder disease and a lower mortality risk than either African-Americans or Hispanics. (Table 1)
- PAD risk factors are shown for each cohort in Figure 2.
- Univariate results show differences in amputation and revascularization rates by race. (Figure 3)
- Multivariable results revealed that African-Americans are about twice as likely to be amputated as are Caucasians. (Table 2)
- Multivariable results revealed that Hispanics are 50-75% more likely to be amputated as are Caucasians. (Table 3)
- Observed factors in the models collectively account for 51% to 55% of the disparities for African-Americans and 64% to 69% for Hispanics. (Table 2 and 3)

Table 1: Patient Demographics and Risk of Severity and Mortality by Race

	Caucasian	African-American	Hispanic
Total Visits	143,993	34,612	15,277
Age, years mean (std. dev)	70.3 (11.79)	67.8 (12.20)	69.6 (11.59)
Gender, male %	58.6	49.6	56.3
Type of Health Insurance %			
Commercial	19.5	14.9	14.3
Medicare	71.7	69.4	68.5
Medicaid	5.0	11.0	12.3
Other/Unknown	3.8	4.7	4.9
Median Household Income Quartile %			
0-25%	26.0	54.1	45.7
25-50%	27.6	21.0	21.6
50-75%	23.9	14.0	18.5
75-100%	20.5	8.7	11.1
Missing	1.9	2.2	3.1
APR DRG Mortality %			
Minor	41.6	32.7	33.6
Moderate	38.2	40.0	41.7
Major	16.1	22.7	20.1
Extreme	4.0	4.6	4.6
APR DRG Severity %			
Minor	27.8	20.4	21.5
Moderate	40.9	37.0	39.9
Major	25.3	33.9	31.4
Extreme	6.0	8.8	7.2

APR DRG: All Patient Refined Diagnosis Related Groups; AHRQ: Agency for Healthcare Research and Quality.

Figure 2: PAD Risk Factors by Race

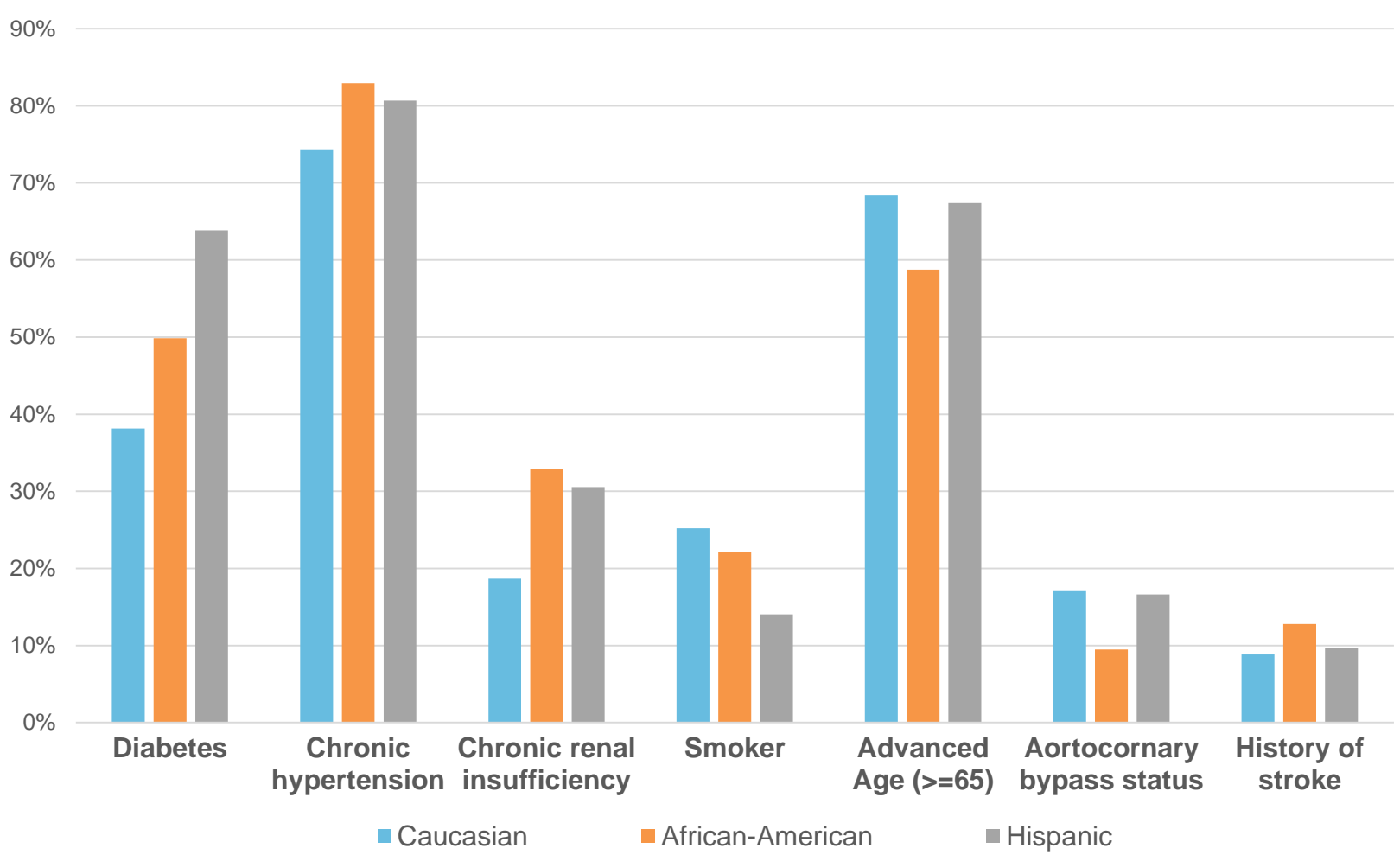


Figure 3: Amputation Outcomes by Race

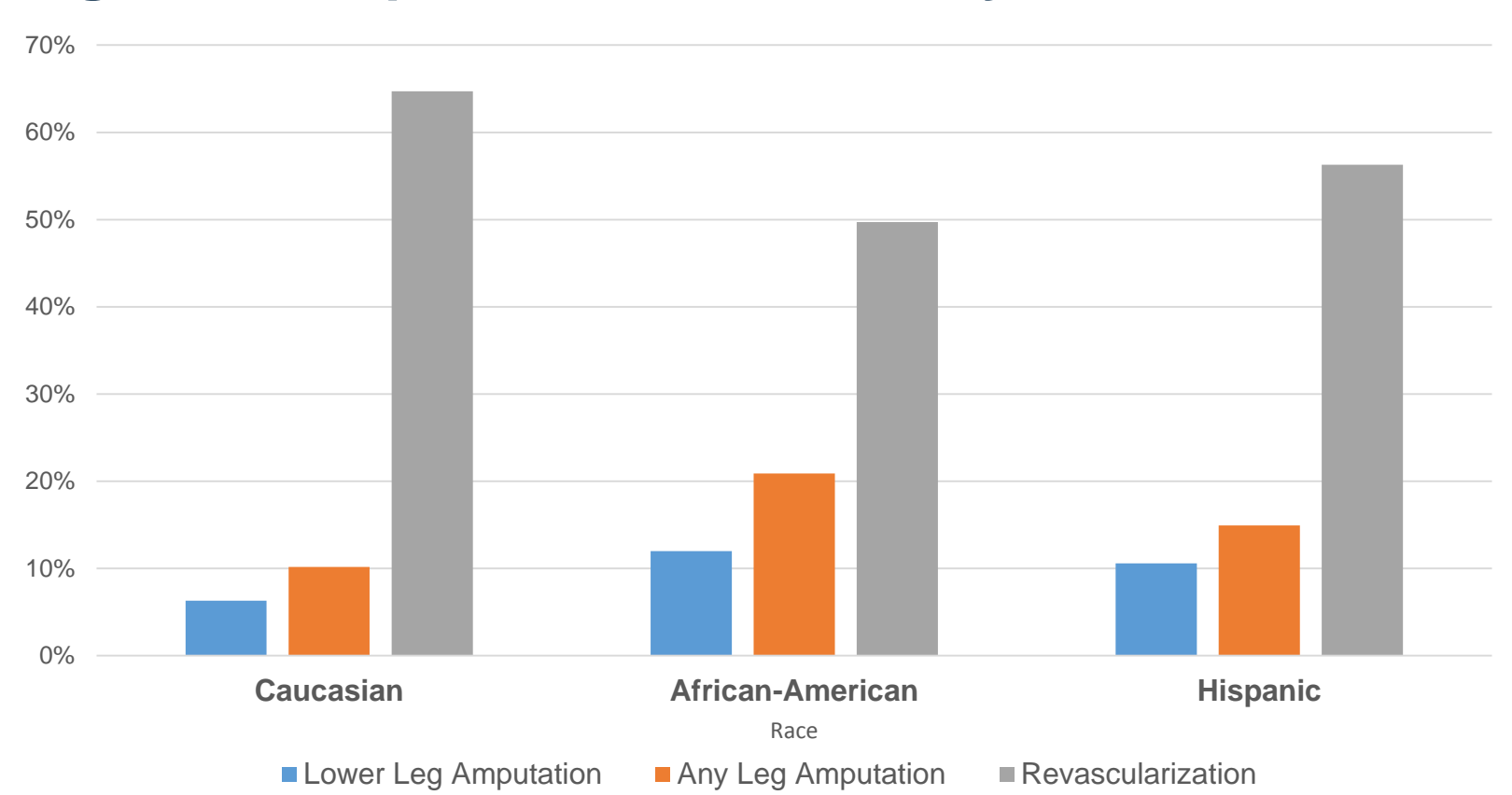


Table 2: Decomposition Results: Caucasian vs. African-American

	Any Leg Amputation	Lower Leg Amputation	Any Amputation vs Revascularization	Lower Leg Amputation vs Revascularization
Predicted probability (African-American)	0.28	0.20	0.30	0.20
Predicted probability (Caucasian)	0.14	0.10	0.14	0.09
Difference	0.13	0.10	0.16	0.11
Total explained (%)	50.98	55.13	54.34	55.22

Table 3: Decomposition Results: Caucasian vs. Hispanic

	Any Leg Amputation	Lower Leg Amputation	Any Amputation vs Revascularization	Lower Leg Amputation vs Revascularization
Predicted probability (Hispanics)	0.21	0.17	0.21	0.16
Predicted probability (Caucasian)	0.14	0.10	0.14	0.09
Difference	0.06	0.06	0.07	0.07
Total explained (%)	69.47	68.06	67.55	63.74

Conclusion:

- Racial and ethnic disparities in amputation rates are substantial, African-Americans are about twice as likely to be amputated as are Caucasians and Hispanics are 50-75% more likely to be amputated as are Caucasians. As the population ages and comorbidities rise, these disparities may accelerate unless access among minorities improves.

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