PAD Patterns and Associated Healthcare Costs Among Adults with Diabetes in Border and Non-Border Counties in Texas

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BACKGROUND

- Individuals with diabetes are at higher risk of developing peripheral arterial disease (PAD). PAD is a clinical indicator of systemic atherosclerosis and is a surrogate marker for coronary and cerebrovascular disease (CVD).

Peripheral Artery Disease
Obstructed blood flow in peripheral tissues or extremities

Atherosclerotic Plaque
Narrowed artery
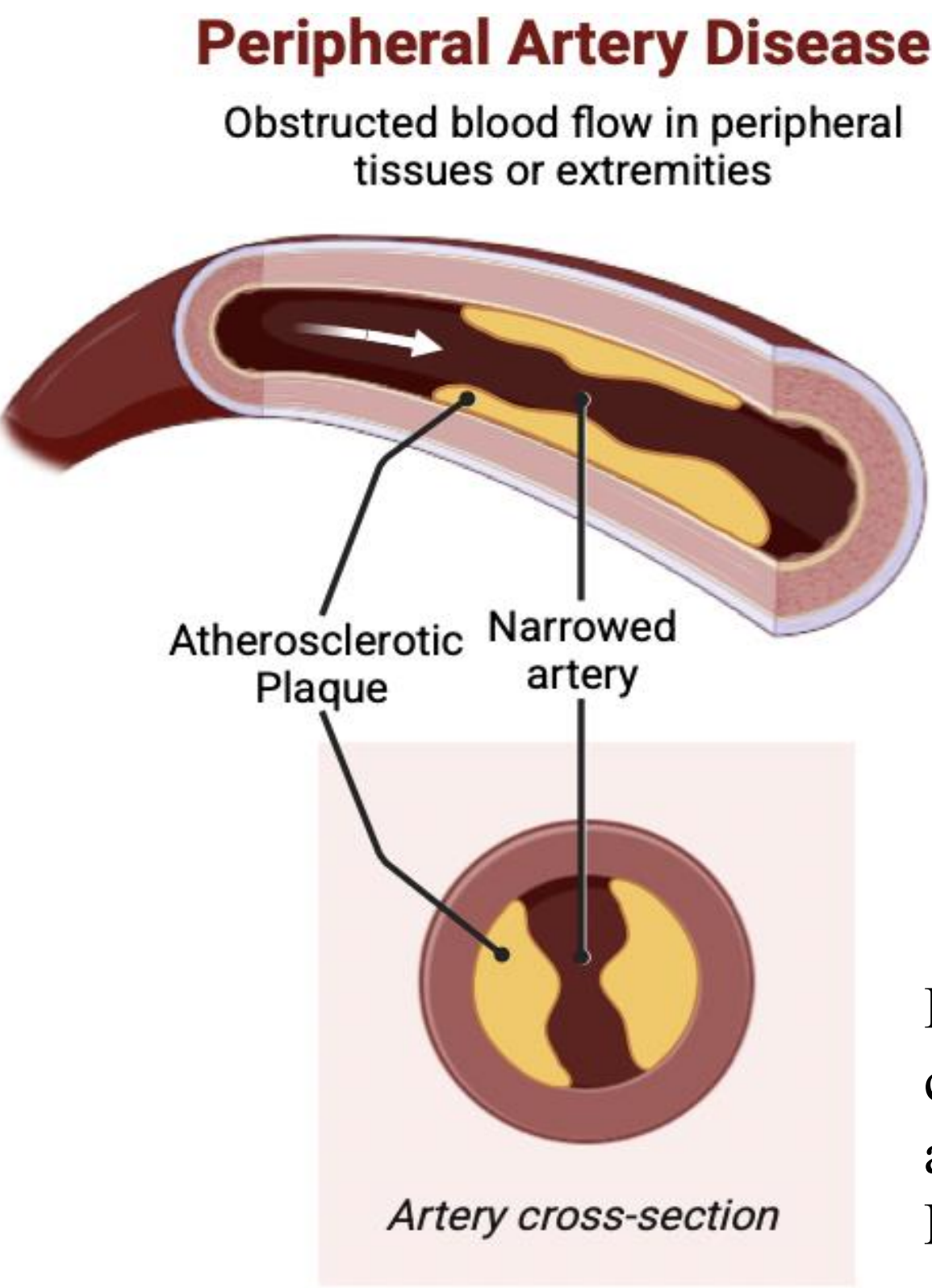
Artery cross-section

Figure 1. Peripheral artery disease is a clinical indicator of systemic atherosclerosis, defined by an Ankle Brachial Index (ABI) greater than 0.7.

- PAD is widely prevalent in the United States, affecting **~20 million Americans** over the age of 40. Annual expenditures for PAD are estimated between $84 and $380 billion, and people with PAD experience an annual healthcare expenditure **of greater than $7000 more** than those without PAD.

- Racial and ethnic **minority populations bear a disproportionately high burden of PAD** and diabetes-related complications. Among minorities, amputation is 4-8 times higher than in non-minority patients.

- In Texas, nonmedical drivers of health and language barriers negatively influence health outcomes among Hispanic populations living along the Texas-Mexico border.

- These overlapping disadvantages **place Hispanic communities at heightened risk of economic hardship** resulting in worse health outcomes.

OBJECTIVE

This study seeks to assess differences in rates of PAD and health care costs, between border/non-border regions in Texas, in people with diabetes.

METHODS

- Using a 10% random sample of the 2021-22 Texas Inpatient Hospital Discharge Data, diabetes related discharges were identified using ICD-10 codes.
- 224,755 diabetes-related discharges; 37,448 (16.7%) had diagnosis of PAD.
- Logistic and linear regression analyses were performed on (n=74,896) with equal numbers of diabetes patients with and without PAD.
- Cost analyses evaluated differences in diabetes-related PAD treatment charges between border and non-border regions.

RESULTS

Feature	Category	Non-Border	Border	p-value
Gender	Female	x		*
	Male		x	
Race/Ethnicity	Hispanic		x	
	Non-Hispanic Asian or Pacific Islander	x		
	Non-Hispanic Black	x		***
	Non-Hispanic White	x		
	Non-Hispanic Other	x		
Age Group	>75		x	* (Mann-Whitney)
Insurance Type	Medicaid		x	
	Medicare	x		
	Private Insurance		x	***
	Uninsured	x		
	VA/CHAMPUS		x	
Rural Status	Non-Rural		x	
	Partially Rural	x		***
	Rural		x	
Health Professional Shortage Area Status (HPSA)	Designated		x	***
	Withdrawn	x		
Comorbid Conditions	0		x	
	1		x	***
	2	x		
	3+		x	

Figure 2. Comparison of Demographic and Clinical Features Between Border and Non-Border Groups.
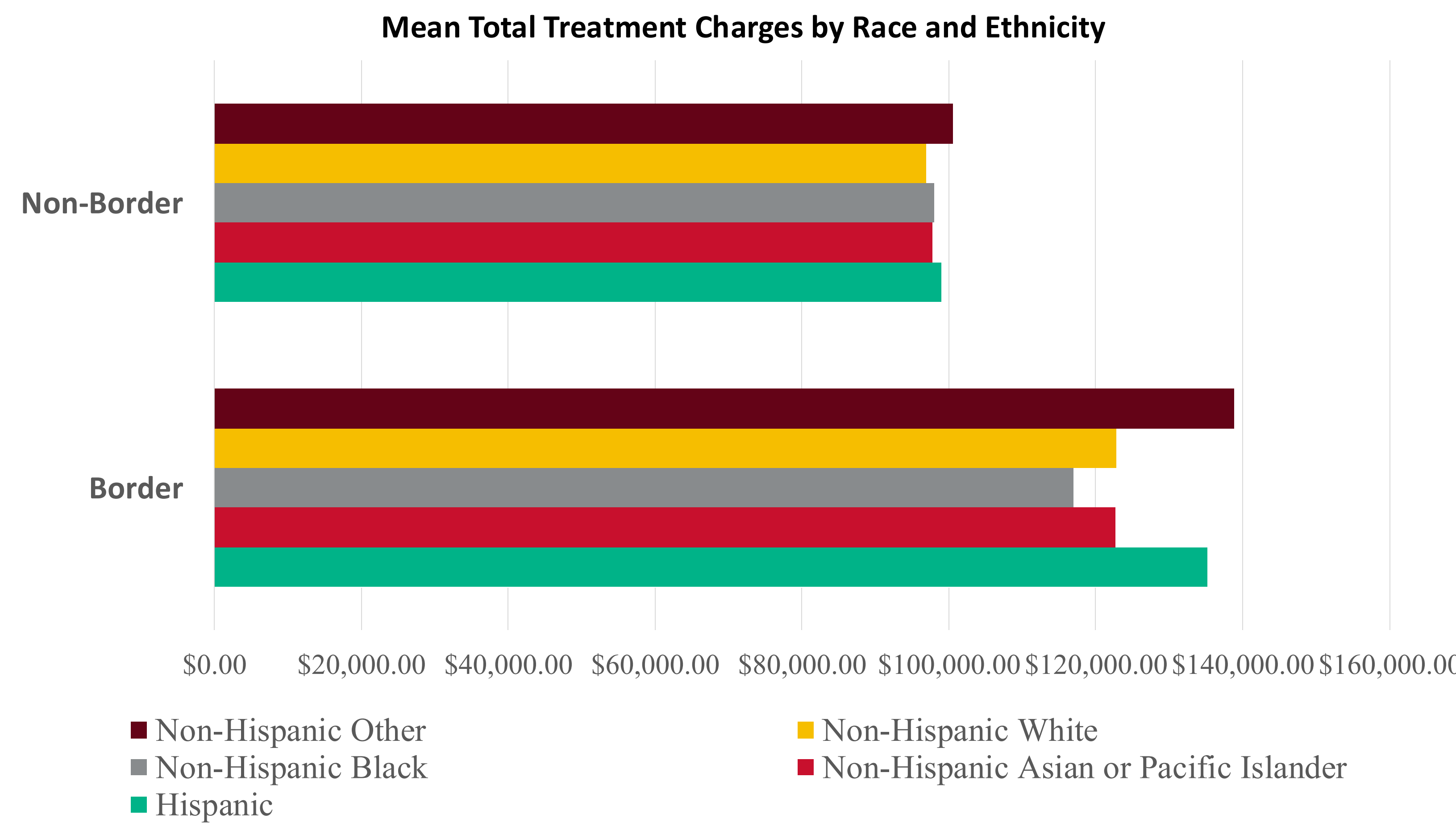* p < 0.05 | ** p < 0.01 | *** p < 0.001

Mean Total Treatment Charges by Race and Ethnicity

Non-Border

Border

$0.00 $20,000.00 $40,000.00 $60,000.00 $80,000.00 $100,000.00 $120,000.00 $140,000.00 $160,000.00

■ Non-Hispanic Other
■ Non-Hispanic Black
■ Non-Hispanic White
■ Non-Hispanic Asian or Pacific Islander
■ Hispanic

Figure 3. Mean Total Treatment Charges by Race and Ethnicity (Border and Non-Border Areas) for Diabetes Records.

Age	Female Sex	Race/Ethnicity	HPSA Status	Rural Status	Border Residence	# Comorbid Conditions	Obesity	Insurance Type
25-29		Hispanic	Designated	Partially Rural	Border	1	BMI>30	Medicare
30-34		Non-Hispanic Asian/Pacific Islander		Rural		2		Uninsured
35-39		Non-Hispanic Black				3		VA/CHAMPUS
40-44		Non-Hispanic Other						
50-54		Non-Hispanic White						
60-64								
65-69								
70+								

Not Predictors of Diabetes and PAD: Medicaid Usage, Rural Status, Primary Physician Rate

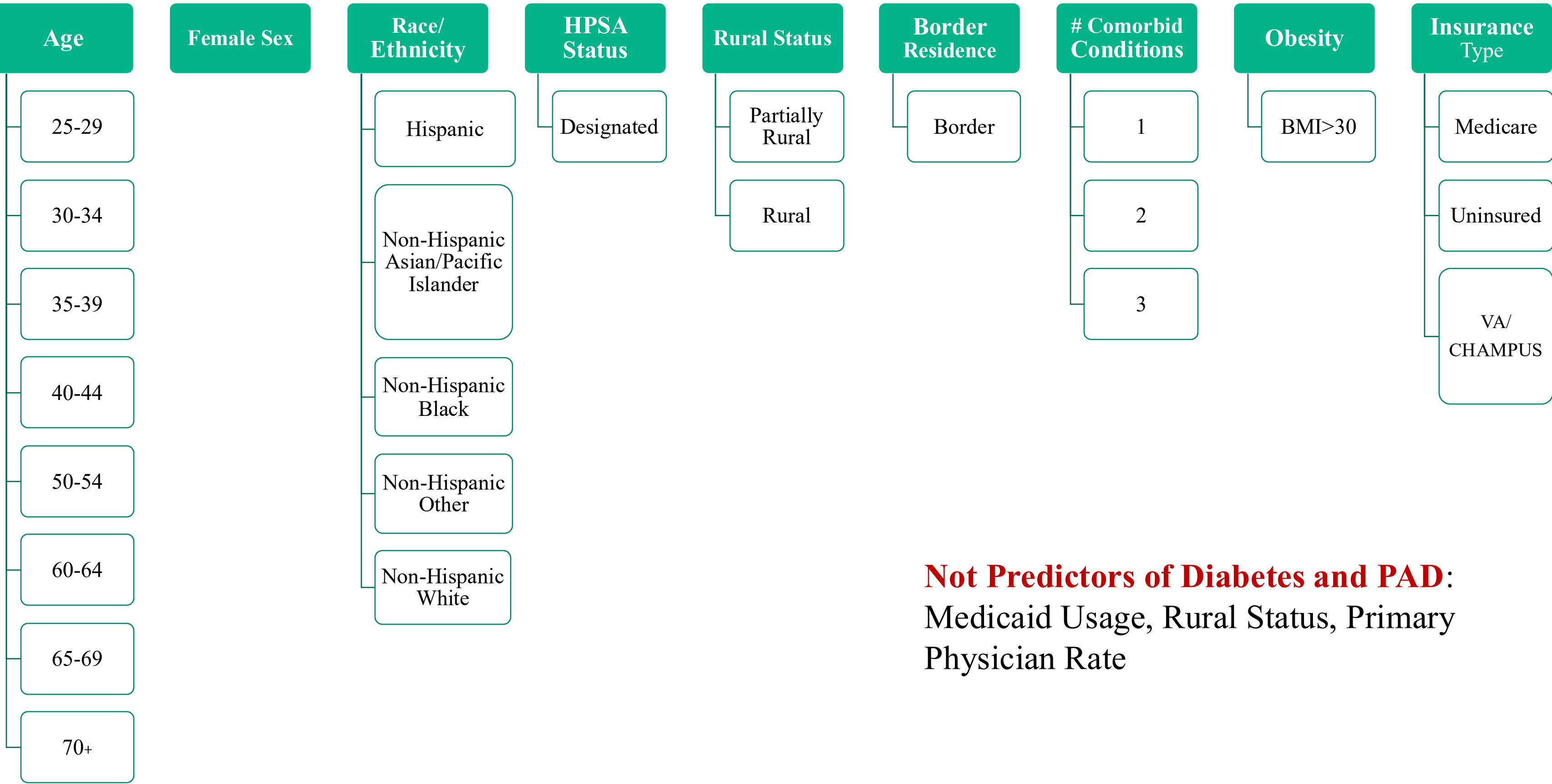Figure 4. Results of the logistic regression model, showing predictors and non-predictors of diagnosis for Diabetes and PAD, listed by category.

RESULTS CONTINUED

Predictors

- Female Sex
- Age: 30-84
- Insurance Type
  - Medicaid
  - Uninsured
  - VA/CHAMPUS
- Health Professional Shortage Area
  - Designated
- Rural Status
  - Partially Rural
  - Rural
- Border Residence
- PAD Diagnosis
- Comorbid Conditions < 3
  - 0
  - 1
  - 2

Not Predictors

- Racial/Ethnic Group
  - Hispanic
  - Non-Hispanic Asian or Pacific Islander
  - Non-Hispanic Black
  - Non-Hispanic Other
- Insurance Type
  - Medicare
- Age
  - 25-29
  - 90+
- Rate of Primary Care Physicians

Figure 5. Linear Regression Results for positive and negative Predictors of Diabetes PAD total charges.

Legend: Text Color
Green: Increased Treatment Cost
Red: Decreased Treatment Cost
Black: Not a Predictor

CONCLUSIONS

- Border regions had higher proportions of Hispanic individuals and residents from HPSA-designated areas and incurred consistently higher mean treatment charges across all racial/ethnic groups.
- Hispanic ethnicity, Medicare coverage, border residence, and older age, particularly 60–64 years, were associated with higher odds of PAD
- PAD diagnosis and border residence were significant predictors of increased total charges.
- **Major Conclusion:** Elevated costs and disease burden in border regions, especially among Hispanic populations, highlight the need for targeted healthcare strategies, early diagnosis and treatment to improve PAD outcomes.

ACKNOWLEDGEMENTS

REFERENCES

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