Healthcare Access and Demographic Predictors of Hypertension and Diabetes: A County-Level Comparison of Maryland and Massachusetts

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Background

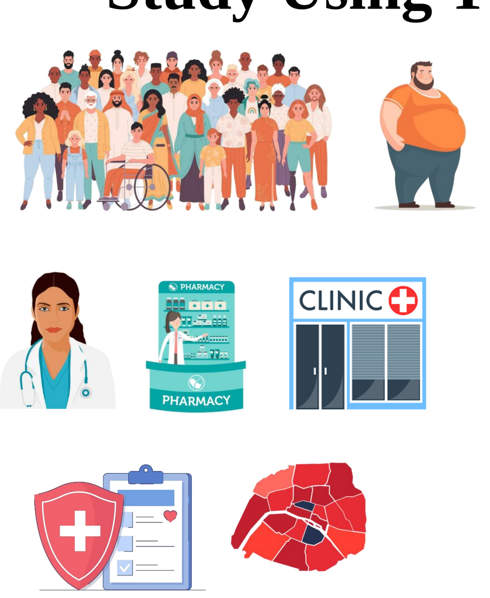
Hypertension and diabetes are two of the most common chronic conditions in the U.S., contributing heavily to preventable death and rising healthcare costs. While clinical risk factors are well established, less is known about how local structural conditions—such as healthcare access, insurance coverage, and demographic composition—contribute to regional disparities in disease burden. This study compares Massachusetts (MA) and Maryland (MD)—two states with relatively strong healthcare systems but distinct social and demographic profiles—to explore the population-level predictors of these diseases.

Objectives

1. To compare county-level rates of hypertension and diabetes across MA and MD.
2. To examine whether access to care, health insurance coverage, and structural vulnerability are associated with disease prevalence.
3. To explore how these associations differ across states with contrasting demographic and social conditions.

Methods

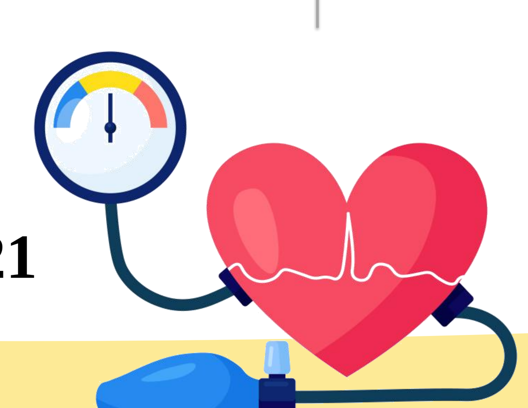
Cross-Sectional Ecological County-Level Study Using The PolicyMap Database



- % of older adults, gender, race, ethnicity, and obesity
- Rate of primary care physicians, pharmacies, and community health centers
- % of all people with health insurance coverage
- Social vulnerability index (SVI)

MD MA

Crude percentage of diagnosed people with diabetes and hypertension among adults in 2021



Results

Table 1. Comparing demographics, access, and outcome variables between Maryland and Massachusetts.

Variable	MA-Mean (SD)	MD-Mean (SD)	p-value*
Diabetes Crude Prevalence (%)	9.52 (1.24)	11.78 (1.55)	**<.0001**
Hypertension Crude Prevalence (%)	29.79 (3.20)	37.03 (3.62)	**<.0001**
Age >=65 years old (%)	19.78 (5.13)	18.46 (4.5)	0.41
Black Population (%)	6.01 (4.57)	20.31 (16.47)	**0.0004**
Hispanic/Latino (%)	11.14 (8.01)	7.61 (4.83)	0.1519
Female (%)	51.12 (0.89)	50.70 (1.71)	0.3292
Obesity Crude Prevalence (%)	28.28 (3.29)	36.49 (4.76)	**<.0001**
Health Insurance Coverage (%)	96.98 (1.26)	94.84 (1.74)	**0.0003**
Rate of pharmacy (per 100,000 people)	13.72 (2.93)	15.16 (6.06)	0.3318
Rate of Primary Care Physicians (per 1000 people)	1.003 (0.53)	0.71 (0.43)	0.078
SVI Score	38.57 (23.68)	41.12 (28.43)	0.78
Community Health Centers (per 1000 people)	0.04 (0.03)	0.06 (0.1)	0.3113

*p-value was calculated by t-test, and significance level was considered <0.05. Abbreviations: MA: Massachusetts; MD: Maryland; SVI: Social vulnerability index.

Negative Association

Rate of Pharmacy (per 1000 people) (-0.003 ± 0.02; p=0.88)

Health Insurance Coverage (proportion) (-5.74 ± 6.47; p=0.38)

Rate of Community Health Center (per 1000 people) (-0.57 ± 1.24; p=0.64)

Positive Association (Statistically significant)

Age>= 65 years old (proportion) (14.09 ± 2.46)

Obesity (proportion) (23.40 ± 2.88)

SVI Score (0.016 ± 0.0049)

Negative Association

Rate of Community Health Center (per 1000 people) (-2.04 ± 4.25; p=0.63)

Rate of Pharmacy (per 1000 people) (-0.04 ± 0.073; p=0.53)

Health Insurance Coverage (proportion) (-35.34 ± 22.03; p=0.12)

SVI Score (-0.0012 ± 0.016;p=0.95)

Positive Association (Statistically significant)

Age>= 65 years old (proportion) (37.58 ± 8.37)

Obesity (proportion) (71.56 ± 9.80)

Age and SVI showed significantly stronger associations with diabetes in MA compared to MD.

Age was significantly associated with hypertension in both states, with MA having a slightly stronger association.

Multivariable linear regression models were used to assess associations between predictors and outcomes Results are reported as parameter estimates (β) with standard errors (SE), and p-values were used to determine statistical significance, with α set at 0.05.

Conclusion

This study demonstrated that county-level predictors of chronic disease vary not only in magnitude but also in their contextual significance across states. While obesity and age emerged as consistent predictors of both hypertension and diabetes, interaction models revealed that the strength of these associations differed by state. Specifically, the influence of age and social vulnerability on diabetes prevalence was significantly greater in Massachusetts than in Maryland. These findings underscore the importance of incorporating geographic and structural context into population health analyses and caution against assuming uniform effects of risk factors across diverse regions.

Policy Implications

Public health strategies should address both behavioral risk factors and structural conditions. While age and obesity were consistent predictors, negative trends in pharmacy and clinic density suggest a potential protective role that warrants further investigation. The interaction between access and demographic characteristics indicates that expanding services alone is not enough—interventions must be tailored to local population needs. Future efforts should also focus on developing more precise metrics for measuring healthcare access and coverage to better inform targeted, equitable health policies.

Bibliography

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