

Diabetes Prevalence and Monitoring by Urbanization

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Background

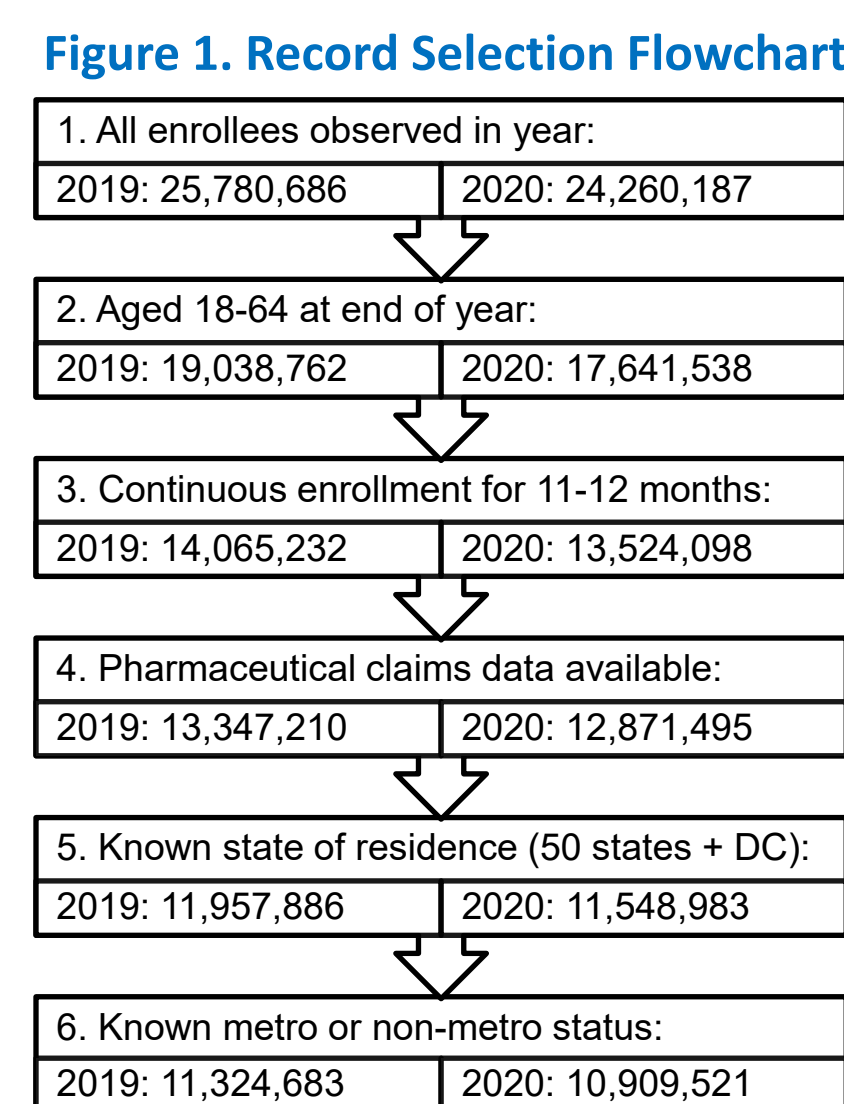
Rural and nonmetropolitan (nonmetro) areas have higher rates of mortality from diabetes compared to metropolitan (metro) areas and this can vary between regions in the United States.^{1,2} Rural communities may have limited access to routine screening and preventative health care, such as annual hemoglobin A1c (HbA1c) screening. Preventative healthcare can reduce the risk of developing some forms of diabetes, while routine screening after the onset of diabetes can reduce the risk of severe morbidity and mortality. We hypothesize that residents of nonmetro areas will have a higher prevalence of diabetes and lower rates of HbA1c screening in diabetics, compared to residents of metro areas.

Objective

To examine the prevalence of diabetes and the quality of HbA1c monitoring in a national sample of commercially-insured residents of metropolitan (metro) and nonmetro areas.

Data Source

IBM MarketScan Commercial Claims and Encounters data. The data source spans from 2009 to 2019 and includes preliminary data from 2020. Records were restricted based on data availability. Healthcare Effectiveness Data and Information Set (HEDIS) specifications were used to identify eligible enrollees (Figure 1).



Dependent Variables

HEDIS definitions for comprehensive diabetes care were adapted to create adjusted, uncertified, unaudited HEDIS rates. We examined the prevalence of diabetes (any type) among all eligible enrollees as well as the rate of HbA1c testing among enrollees with diabetes.

Independent Variables

Enrollee residence information was used to determine the level of urbanization (metro or nonmetro) and US region. Enrollment information was also used to determine age and sex.

Analysis

Chi-square tests and multivariate logistic regression analyses were conducted to test for potential metro vs nonmetro differences in diabetes prevalence and the rate of HbA1c screening among those with diabetes. Age, sex, and region were included as covariates.

Descriptive Findings

We observed associations between each of the demographic variables and the proportion of enrollees living in metro versus nonmetro areas (Table 1) for both 2019 and 2020*. The unadjusted prevalence of diabetes (Figure 2) was higher in nonmetro areas. The unadjusted proportion of diabetic enrollees receiving HbA1c testing (Figure 3) was lower in nonmetro areas in 2019 but not 2020*.

Table 1. Sample Demographics

	2019			2020*		
	Metro N	Nonmetro N (%)	p-value	Metro N	Nonmetro N (%)	p-value
Total	10,172,785	1,151,898 (10.17%)		9,736,879	1,172,642 (10.75%)	
Diabetes			< 0.001			< 0.001
No	9,530,659	1,060,845 (10.02%)		9,141,069	1,080,502 (10.57%)	
Yes	642,126	91,053 (12.42%)		595,810	92,140 (13.39%)	
Region			< 0.001			< 0.001
Midwest	2,173,809	400,043 (15.54%)		2,158,647	422,733 (16.38%)	
Northeast	1,899,438	133,944 (6.59%)		1,664,846	126,481 (7.06%)	
South	4,304,467	524,981 (10.87%)		4,036,216	526,396 (11.54%)	
West	1,795,071	92,930 (4.92%)		1,877,170	97,032 (4.91%)	
Sex			< 0.001			< 0.001
Male	5,221,631	578,259 (9.97%)		5,006,010	590,518 (10.55%)	
Female	4,951,154	573,639 (10.38%)		4,730,869	582,124 (10.96%)	
Age			< 0.001			< 0.001
18 to 34	3,366,178	365,841 (9.8%)		3,259,795	379,120 (10.42%)	
35 to 44	2,138,551	214,570 (9.12%)		2,080,065	223,001 (9.68%)	
45 to 54	2,316,815	260,958 (10.12%)		2,175,222	262,698 (10.78%)	
55 to 64	2,351,241	310,529 (11.67%)		2,221,797	307,823 (12.17%)	

Figure 2. Prevalence (%) of Diabetes Among Enrollees

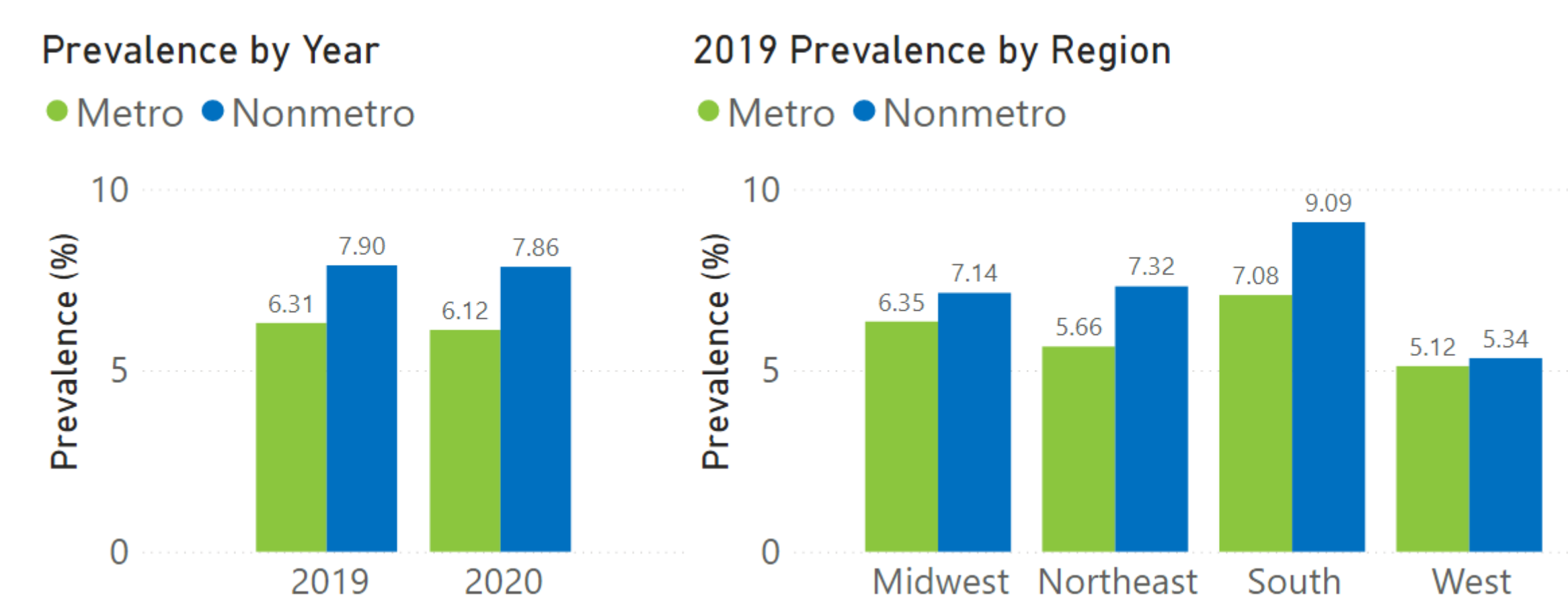
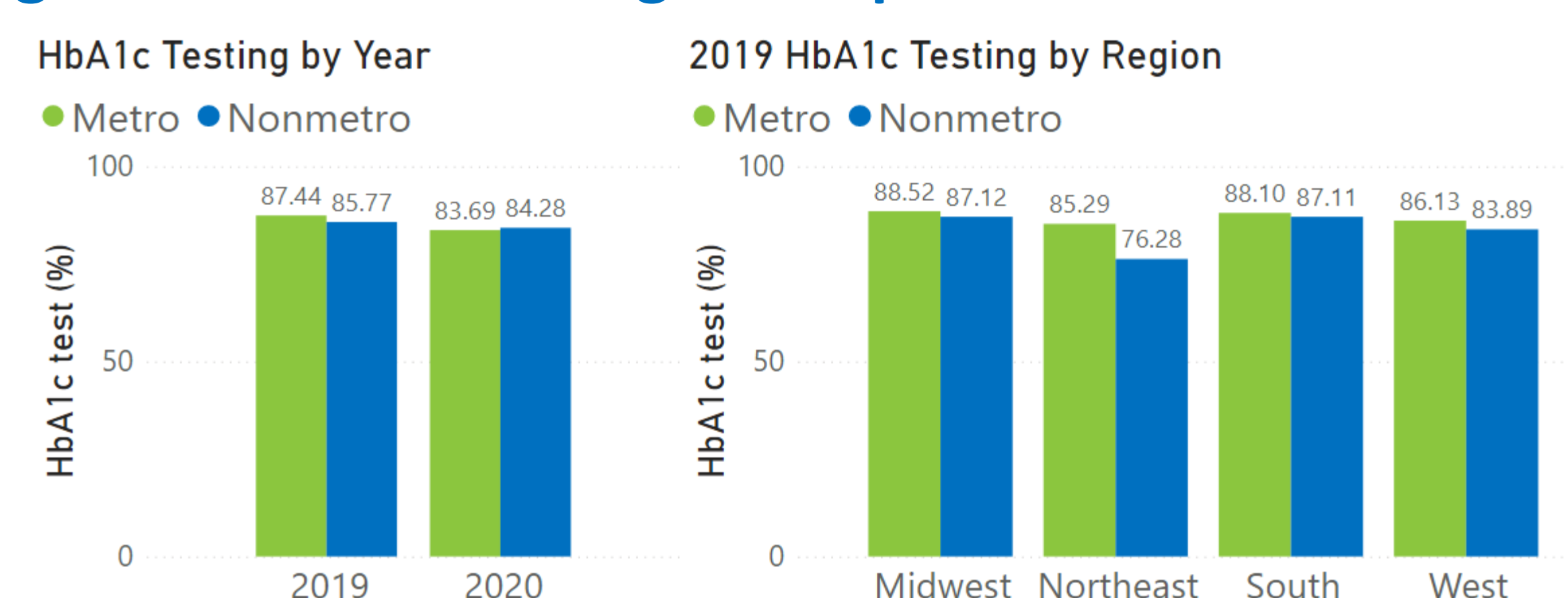


Figure 3. HbA1c Testing in People with Diabetes



*Data from 2020 are still considered preliminary at this time.

Multivariate Logistic Regression Findings

Enrollees living in nonmetro areas had increased odds of diabetes, compared to enrollees living in metro areas, even after adjusting for potential covariates (aOR 1.17, 1.16-1.17). In contrast, nonmetro enrollees with diabetes had lower odds of receiving an HbA1c screening test in 2019 compared to metro enrollees with diabetes (aOR 0.82, 0.81-0.84).

Table 2. 2019 Multivariate Logistic Results (ps <0.001)

	Diabetes		HbA1c Testing	
	OR	95% CI	OR	95% CI
Unadjusted Model				
Nonmetro (ref = Metro)	1.28	(1.27 - 1.28)	0.87	(0.85 - 0.88)
Fully Adjusted Model				
Nonmetro (ref = Metro)	1.17	(1.16 - 1.17)	0.82	(0.81 - 0.84)
Age (ref = 55-64)				
18-34	0.07	(0.07 - 0.07)	0.50	(0.49 - 0.51)
35-44	0.25	(0.25 - 0.25)	0.64	(0.63 - 0.65)
45-54	0.58	(0.57 - 0.58)	0.86	(0.85 - 0.87)
Female (ref = Male)	1.34	(1.33 - 1.34)	1.08	(1.07 - 1.1)
Region (ref = West)				
Midwest	1.20	(1.19 - 1.21)	1.24	(1.21 - 1.27)
Northeast	1.07	(1.06 - 1.08)	0.87	(0.85 - 0.89)
South	1.43	(1.42 - 1.44)	1.21	(1.18 - 1.23)

Conclusions and Implications

Residents of rural areas were more likely to have been diagnosed with diabetes, but less likely to receive annual HbA1c screening in 2019. Poor HbA1c management contributes to the risk for diabetes-related complications³ and so disparities in screening could contribute to greater impacts of diabetes in rural communities.^{1,2} Interestingly, the difference between metro and nonmetro screening rates was smaller in the Midwest and South, regions with the highest prevalence of diabetes.

Limitations

This study does not address the need for research focused on prevention and management of type 2 diabetes.⁴ In addition, the data for 2020 are not yet finalized and so we could not examine changes from 2019 to 2020. Although living in a nonmetro area was associated with a 13.4% reduction in the relative odds of HbA1c testing, compared to those in metro areas, this was associated with only a 1.7-point change in the percent receiving testing.

References

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