

Association between County-Level Medical Risk Factors and COVID-19 Vaccination Rates

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Introduction

- Public health officials have been focused on ensuring equitable distribution and uptake of the COVID-19 vaccine.
- Individuals with non-communicable diseases (NCD) were prioritized for COVID-19 vaccination given their higher risk for developing severe COVID-19 illness; however, priority groups based on the population burden of these conditions have not been a focus.

Study Aim

- To evaluate county-level COVID-19 vaccine disparities via county-level Risk Health Index (RHI) and its five subindices: hypertension, diabetes, obesity, COPD, and heart disease

Study Design

- Ecological study evaluating county-level data on COVID-19 vaccine rates based on the county-level RHI and prevalence of hypertension, diabetes, obesity, COPD, and heart disease.
- Data were obtained using the PolicyMap tool for Washington D.C., Delaware, Maryland, and Virginia.
- Fully vaccinated (i.e., having received both doses of a two-dose vaccination series or a single dose of a one-dose series) populations were considered for the COVID-19 vaccine rates.
- Counties were divided to different levels of RHI; very low (1) (i.e. low NCD burden) to very high (7) (i.e. high NCD burden).
- Continuous outcomes for each comorbidity indicator were transformed into categorical outcomes and classified as “low” (below the 25th percentile of overall distribution of counties), “high” (above the 75th percentile), and “medium” (all other counties)(Table 1).
- All statistical analysis were performed with SAS version 9.4 (SAS Institute, Cary,NC).

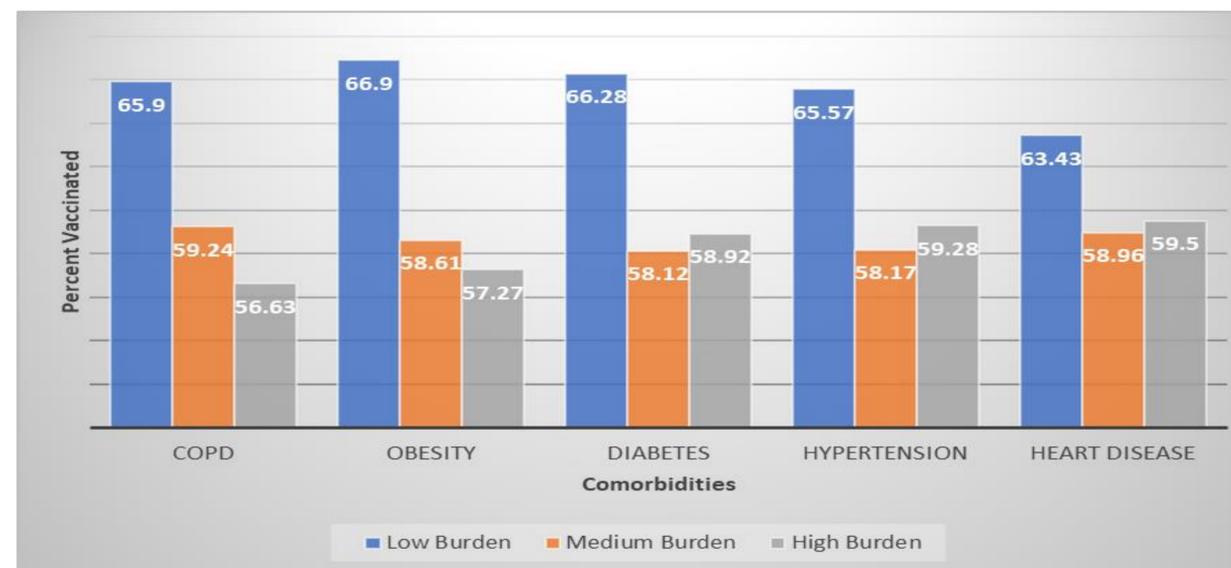
Principal Findings

- Among 160 counties included in this study, the observed average county vaccination rate weighted by population was 60.19% as of November 12, 2021 (before Omicron surge).
- A consistent and statistically significant negative trend with increasing RHI was observed, where counties with the lowest RHI (1) had the highest vaccination rates while counties with the highest RHI (6) had the lowest vaccination rates (72.03 vs 57.9, $p < 0.001$).
- A statistically significant negative trend in vaccination rates was found across 4 of the 5 RHI subindices: COPD, obesity, diabetes, and hypertension (Table 1).

Table 1. Average Vaccination Rates Across Counties by Key Medical Risk Factors (n = 160 counties) – December 14, 2020- November 12, 2021.

	Prevalence of Medical Condition	Percent of Population Vaccinated	Test for trend (P-value)
COVID-19 RHI	1 (very low)	72.03	-
	2 (low)	66.1	
	3 (below average)	62.04	
	4 (average)	-	
	5 (above average)	56.1	
	6 (high)	57.9	
	7 (very high)	-	
COPD	Low (<6.8%)	65.9	- (<.0001)
	Medium (6.8-8.9%)	59.24	
	High (>8.9%)	56.63	
Obesity	Low (<31.7%)	66.9	-
	Medium (31.7-34.7%)	58.61	
	High (>34.7%)	57.27	
Heart Disease	Low (<3.8%)	63.43	- (<.0001)
	Medium (3.8-5%)	58.96	
	High (>5%)	59.50	
Diabetes	Low (<10.5%)	66.28	- (0.08)
	Medium (10.5-12.7%)	58.12	
	High (>12.7%)	58.92	
Hypertension	Low (<32%)	65.57	- (0.0028)
	Medium (32-37.1%)	58.17	
	High (>37.1%)	59.28	

Figure 1. Percent of Population Vaccinated Across 160 Counties According to Tertiles of Each Comorbidity



Conclusions

- Disparities in vaccinations among counties with higher rates of common comorbidities, such as COPD, obesity, diabetes, and hypertension exist, which contradicts early efforts that prioritized vaccinations for individuals with these comorbidities (Figure 1).
- These inequities can be addressed through advanced preparedness, planning, and prioritizing vaccination campaigns for counties or populations at higher health risk of severe COVID-19.

Policy/Practice Implications

- Continued evaluation of COVID-19 vaccination and county-level characteristics is necessary in order to ensure equitable and efficient administration of COVID-19 vaccination across the United States.
- This study provides further evidence of population-level inequities based on comorbidities in COVID-19 vaccination efforts to date, and our findings can be used to help direct continued outreach and vaccination efforts going forward.

References

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