**Key Takeaways/Policy Implications**

- **Understanding flu vaccination deficit rates can help target COVID-19 vaccine distribution**
- **Flu vaccination deficit rates vary significantly across states, which are taking a leading role in COVID-19 vaccine distribution**
- **This research identifies priority COVID-19 vaccination areas within each state, defined as those with higher rates of potential flu vaccination deficits, lower primary care and public health capacity, and higher percentages of high-need populations**

Annual vaccination rates for influenza and pneumonia vary significantly across the U.S., with some areas having much higher rates than others.[1] Further, a lack of public health infrastructure and barriers related to social determinants of health limit the capacity of some areas to effectively vaccinate their populations.[2-3] Stakeholders need to identify areas that may have higher rates of COVID-19 vaccine-hesitancy or refusal, areas that may lack capacity for large-scale vaccine distribution, and areas that have the most at-risk populations for COVID-19 hospitalizations and mortality. The purpose of this research is to explore the geographic variation of flu vaccine deficits across the U.S. and identify priority areas within each state for expanding COVID-19 vaccination efforts, with Virginia and Florida as examples.

Data & Methods

Using data from the Behavioral Risk Factor Surveillance System, we created county-level vaccination deficit rates by subtracting influenza immunization rates from rates of COVID-19 vaccinations necessary to achieve herd immunity (70% of the population).[4] Next, we used the Community PPE (**P**rimary Care, **P**ublic Health, Health **E**quity) index, which combines data on primary care workforce, public health capacity, and levels of social deprivation, to identify counties with low capacity and high need.[5] For each state, we identified priority counties as those in the top 25th percentile of the influenza vaccine deficit and the bottom 25th percentile for Community PPE. Demographics,[6] underlying health conditions,[4] and COVID-19 case and death rates were also explored in priority counties.[7]

Figure 1: Vaccine Deficit by County

% Vaccine Deficit
- 14.8 – 28.3
- 28.4 – 31.7
- 31.8 – 34.8
- 34.9 – 53.6
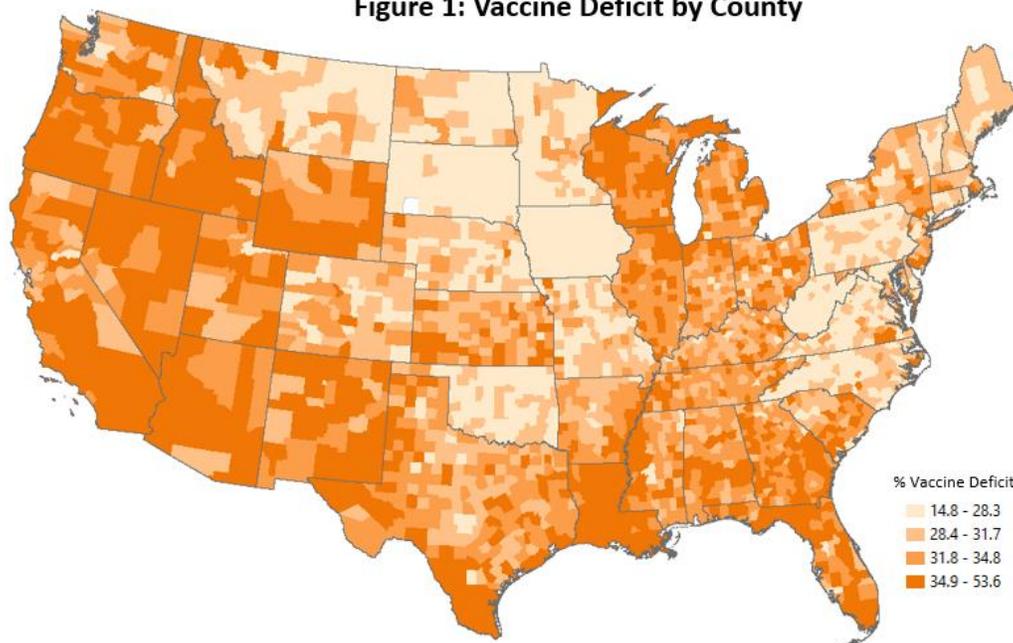
Results

Figure 1 shows that counties with the highest rates of flu vaccine deficits are located throughout the U.S., with clusters of high-deficit counties in the southern and western U.S. and the Great Lakes region. In general, the northern Midwest (North Dakota, South Dakota, Iowa, Minnesota), mid-Atlantic (Pennsylvania, Maryland, West Virginia, Virginia), New England, Missouri, and Oklahoma have the lowest flu vaccine deficit rates.
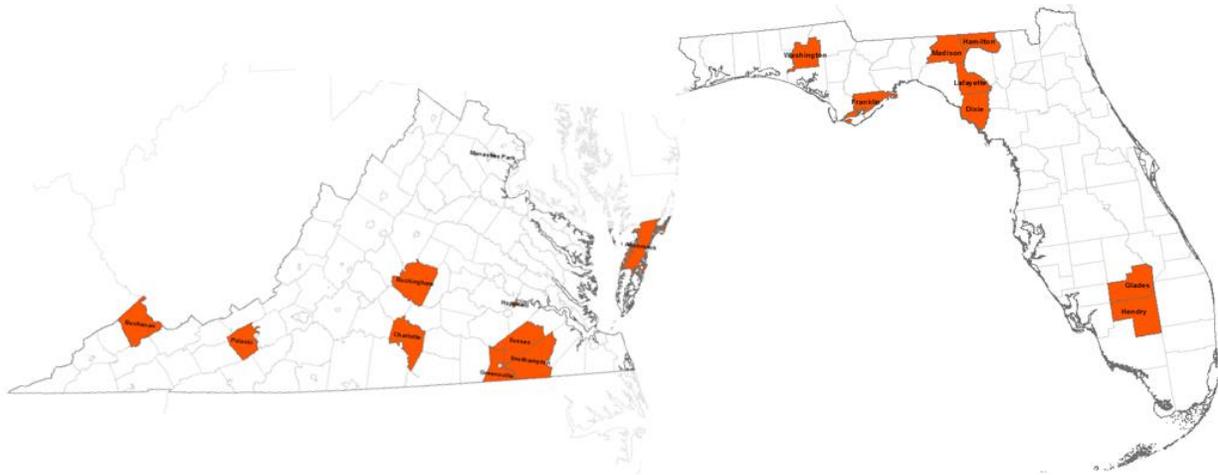

Figure 2: Priority Counties (Virginia & Florida)

Figure 2 displays priority counties in Virginia and Florida, which are counties in the bottom quartile for PPE (public health and primary care capacity) and top quartile for flu vaccination deficits within each state. Virginia has ten priority counties located mostly in the southern areas of the state, while Florida has eight priority counties. In both states, priority counties have smaller populations, are more likely to have large non-white or Hispanic populations, have higher rates of obesity and high blood pressure, and higher COVID-19 case and death rates. Priority counties in Virginia have higher rates of diabetes, which has been identified as a key risk factor for COVID-19 hospitalization and mortality. However, priority counties in Florida have slightly lower rates of obesity. Interestingly, priority counties in both states have much younger populations. These differences across states, shown in Table 1, and state responsibility for vaccine distribution efforts, highlight the need to explore data within each state.

Table 1: Characteristics of Priority Counties in Virginia (VA) and Florida (FL)

	VA Priority Counties	VA Non-Priority Counties	FL Priority Counties	FL Non-Priority Counties
# of Counties	10	123	8	59
Total Population (Average)	19,812	66,794	18,950	361,460
% Black	30.7	17.7	19.0	13.9
% Non-White	36.0	24.2	24.4	20.4
% Hispanic	6.9	5.2	14.5	14.0
% Age 65 or older	17.8	18.6	18.8	21.6
% Obesity	37.7	33.9	36.3	32.8
% Diabetes	12.9	10.9	11.1	11.3
% High Blood Pressure	35.7	32.0	37.1	32.8
COVID-19 Case Rate per 100K	5,601	4,323	8,656	6,154
COVID-19 Death Rate per 100K	99.4	74.5	118.0	114.6

Conclusions

It is possible that large parts of the U.S. may be unable to achieve herd immunity due to reluctance or unwillingness to receive the vaccine and the lack of public health and primary care infrastructure to carry out large-scale vaccine distribution. Further, many of these areas have the highest need for vaccinations based on risk factors for poor COVID-19 outcomes such as hospitalization and mortality, highlighting the need to focus vaccine distribution on priority areas. This research demonstrates a data-driven approach for targeting specific counties within each state that addresses vaccine access or hesitancy, public health and primary care capacity, and potential need based on levels of social deprivation.

To explore priority areas in your state, visit https://maps.healthlandscape.org/VaccinationDeficitExplorer.

References

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