The Effect of Expanded Pharmacist Prescriptive Authority on COVID-19 Vaccine Rates

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Abstract

Background: Recent legislatures have granted expanded prescriptive authority to pharmacists with a collaborative practice agreement with a physician. This authority could include prescribing tobacco cessation products, birth controls, and antivirals for COVID-19. Although closely associated with providing preventative measures for COVID-19 in the forms of testing and vaccinations, the relationship between pharmacist prescriptive power and rate of COVID-19 vaccination remains unexplored. The objective of the study is to determine the association between pharmacist prescriptive authority and the rate of COVID-19 vaccinations between neighboring counties along state lines of states with differing laws on this prescriptive power. *Methods*: States with expanded pharmacist prescriptive authority include: New Mexico, Oregon, Idaho, Florida, California, North Carolina, Montana, New York, Iowa, Massachusetts, and Ohio. Counties are selected if the center of the county is within 30 miles from a state border that divides a state with expanded pharmacist prescriptive authority from a state without. Monthly vaccination data from January 2021 to December 2021 was acquired from the Centers for Disease Control and Prevention and linear regression was performed and state-border-pair fixed effects was used as a control. *Results*: The estimated effect of expanded prescriptive authority is an increase of five percentage points in the share of the adult population that completed the initial COVID-19 vaccine series. *Conclusion*: The relationship between pharmacist prescriptive authority and increased COVID-19 vaccination rates is statistically significant. The results showed that allowing pharmacist to have prescriptive powers could potentially aid in reducing vaccine hesitancy for future pandemics.

Keywords: Pharmacist, Prescriptive Authority, Vaccine Rates

Background

Pharmacists are one of the most readily accessible healthcare providers in the U.S with more than 96% of the U.S population living within 10 miles of a pharmacy.[1] Pharmacists can work in different settings from direct patient care to administration. Clinical pharmacists offer unique service in providing carefully crafted personalized care plans for patients with complex medical history and offering therapeutic feedback and options to physicians during daily patient rounds. Clinical pharmacists are crucial to providing patient monitoring for high-risk medications such as vancomycin and warfarin. Administrative pharmacists not only work with pharmacy staff members but also coordinate with hospital administration, engineering, and contractors to ensure that operations within the institution meet regulatory guidelines.

Pharmacists have become an important part of the healthcare team because their roles have been expanded beyond medication dispensing and distribution. In some states, pharmacists have limited prescriptive authority with a collaborative practice agreement with a physician. Because of this role expansion, pharmacists can offer additional services for patients including managing high risk medications such as warfarin and adjusting medication regimen for chronic conditions such as diabetes and heart failure. During the COVID-19 pandemic, pharmacists played an integral role in providing preventative care by providing testing, administering vaccinations, and even prescribing nirmatrelvir-ritonavir for eligible patients.

Vaccine hesitancy remains a barrier to full population protection against highly infectious diseases. Reasons for COVID-19 vaccination refusal range from personal factors (religiosity, gender, education…etc.) to safety concerns of a rushed vaccine and perceived severity of the infection[4]. The U.S is among countries with the lowest vaccine acceptance rate (56.9%). [2,3] Given the prevalence of COVID-19 vaccine hesitancy, healthcare workers should employ education strategies to reduce the burden of the pandemic.

Efforts to lessen the global impact of the COVID-19 pandemic rely largely on preventative measures and an examination of the role of pharmacists in providing such measures is warranted. States with expanded pharmacist prescriptive authority like California and Idaho showed a higher rate of COVID-19 vaccinations and studies have shown that both community and inpatient pharmacists play an integral role in combating this global pandemic.[4,5] Pharmacist prescriptive authority could potentially increase vaccination acceptance rates either by making vaccines more accessible or by reducing vaccine hesitancy by empowering patients who visit the pharmacy regularly.

The aim of the paper is to determine the association between expanded pharmacist prescriptive authority and rate of COVID-19 vaccination in neighboring counties along state lines

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between states with differing laws on pharmacist prescribing powers.

Methods

Comparing the vaccination rates between states that have and do not have expanded pharmacist prescriptive authority would not be sufficient to show that expanded pharmacist prescriptive authority causes changes in vaccination rates. The logic is that states differ from each other- culturally, demographically, economically, and geographically. When states have different outcomes, it is hard to know what factor or factors account for such a difference. While incorporation of control variables into a regression model could work if researchers could be certain that they had identified all relevant factors that affect vaccination rates, that is a bold assumption. Instead this paper relies on the intuition that states may differ from their neighbors- but the difference from counties that are on both sides of a state border should be minimal. Oregon is much different than California- but the California counties that border Oregon are probably similar to the Oregon counties that border California. However, since these counties are in different states they experience different laws- including laws that grant or prohibit expanded pharmacist prescriptive authority. Therefore, this study use linear regression to estimate the effect on county COVID-19 vaccination rates of the presence of laws that allow expanded pharmacist prescriptive authority.

This approach has been used to estimate the causal effect of a wide variety of phenomena. For example, Kelly uses this technique to compare election results between neighboring counties and shows that presidential primaries hurt party's performances in counties of states that experienced divisive presidential primaries relative to their neighboring counties that did not experience such primaries[6]. MacDonald, Klick, and Grunwald use this technique to study the effects of private police forces on crime.[7] Rischard et al. use this to estimate the effects of school districts on housing prices.[8] This research design is not novel but its application to pharmacist regulation is.

While regression models are often based on the hope that researchers can identify and control for potentially confounding covariates, this method relies on the assumption that nearby counties divided by a state border are generally similar. As such use of this methodology, generally controls for the geographic location of the counties (that is what state border divides them) but does not always include other covariates as statistical controls. Our linear regression model follows this logic by including state-border-pair fixed effects as a control, but does not include other covariates.

The independent variable of interest is whether a state has expanded pharmacist prescriptive authority, the legal ability of pharmacists to prescribe treatments for a wide variety of conditions, between the more common and limited practice of allowing pharmacists to allow prescribe a small number of drugs such as naloxone and hormonal birth control. Evans (2022) provides a categorization of states that have expanded pharmacist prescriptive authority and those that have not. States with expanded prescribed authority according to Evans are New Mexico, Oregon, Idaho, Florida, California, North Carolina, Montana, New York, Iowa, Massachusetts, and Ohio.[9]

Importantly, these states are not just geographically dispersed but they are politically diverse. They include several states that are relatively politically liberal such (New Mexico, Oregon, New York, California) and several that are relatively politically conservative (Idaho, Montana, Iowa). While these states share the practice of allowing pharmacists relatively greater autonomy, they should not generally have similar healthcare policies relative to the country as a whole. This means that if these states have higher or lower vaccination rates, it cannot be attributed to these states being generally more liberal or more conservative than the United States as a whole.

The dependent variable is the share of the county population, aged 18 or older, that completed their COVID-19 primary vaccine series by the start of the month. The effect size is estimated for each month from February of 2021 to December of 2021. This data was obtained from the Centers for Disease Control and includes county-level vaccination rates by date and age.

A county is selected if the center of the county is within 30 miles from a state border that divides a state with expanded pharmacist prescriptive authority from a state without expanded pharmacist prescriptive authority. This means that an individual county could be counted as multiple observations. For example, Litchfield County, CT, appears twice- once representing a county near the CT-NY border and once representing a county near the CT-MA border. There are 581 county observations. Data on county proximity to state borders comes from Holmes (1998).[10]

Results and Discussion

Throughout 2021, the vaccination rates of the adult population of the counties in our study increased dramatically. This trend in shown in **Figure 1**.

Substantial variation in county vaccination rates remained by December of 2021. **Table 1** presents descriptive statistics for vaccination rates of counties in our study for the final month of 2021.

The effects of expanded pharmacists' prescriptive authority by month in 2021 are presented in **Table 2**.

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The effect of expanded pharmacist prescriptive authority becomes significant in March and remains highly significant for the rest of 2021. The absolute effect size of expanded pharmacist prescriptive authority rises from a one percentage point higher COVID-19 vaccination rate in March to a greater than five percentage point higher vaccination rate in May, and the effect remains higher than five percentage points for the rest of 2021.

If greater autonomy for pharmacists leads to higher vaccination rates, and it appears it does, it could happen by causing people to get vaccinated more quickly, by encouraging people to get vaccinated who otherwise would not, or through a combination of these two effects. The estimated effect of expanded pharmacist prescriptive authority is largely consistent from May of 2021 to December of 2021. This suggests that greater pharmacist autonomy is not simply speeding up the rate at which vaccination is sought but is influencing individuals' decision to seek out vaccination.

What is noteworthy is that these policies were implemented in most cases well before COVID-19 and were not intended as vaccine specific policies, but rather as policies that generally expanded pharmacist autonomy and allowed pharmacists to provide a greater range of services to patients. Yet, we find statistically significantly evidence that these policies benefited vaccination rates. These results suggest that scope-of-practice laws should be evaluated in a holistic sense and laws that govern pharmacist scope-of-practice may have broader impacts on how patients interact with the healthcare system.

Conclusion

The results indicate statistical significance between pharmacist expanded prescriptive authority and increased COVID-19 vaccination rates. The observed effect is unlikely due to confounding variables. One limitation to this study is that if policies that expand pharmacist autonomy are correlated with other healthcare policies, the association between vaccination rates and pharmacist autonomy could be spurious. This cannot be ruled out. However, given the political and geographic diversity of states with expanded prescriptive authority the existence of other common policies that influence vaccination rates seem unlikely. This positive association could indicate an important role of pharmacists in providing preventative measures by not only being part of a healthcare team but also a trusted member of the community they serve in. Healthcare reform allowing pharmacists more autonomy could be beneficial for combating future pandemics. Future research should elucidate whether this association is still significant for booster doses of the COVID-19 vaccine.

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Figure 1. Mean Adult Vaccination Rate By Month In Included Counties

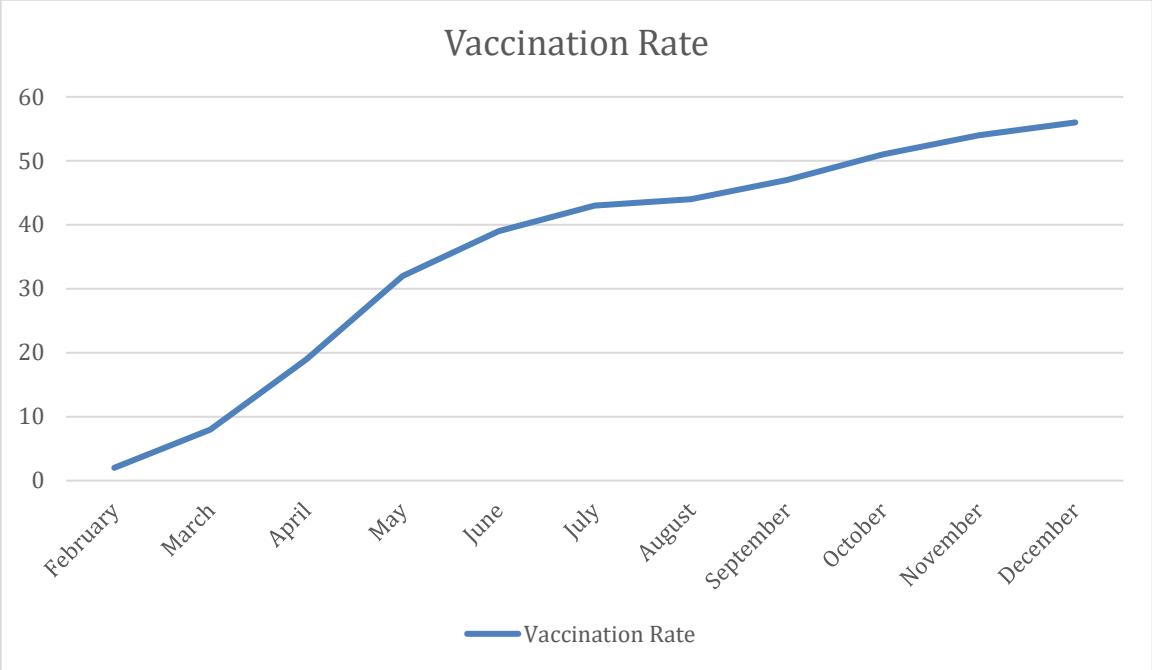

Table 1. Vaccination Rates of Included Counties (December 2021)

Number of Counties	532
Mean Vaccination Rate	56%
Standard Deviation	16%
25 percentile	49%
75 percentile	65%

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Table 2. Effect of Expanded Pharmacist Prescriptive Authority By State on Percentage of Population Vaccinated Against COVID-19

Month	Effect Size (Coefficient)	SE	p-value
February	0.05	0.09	0.5935
March	1.03	0.30	0.0008
April	2.94	0.50	<0.0001
May	5.21	0.72	<0.0001
June	5.48	0.84	<0.0001
July	5.57	0.88	<0.0001
August	5.4	0.91	<0.0001
September	5.03	0.93	<0.0001
October	5.44	0.93	<0.0001
November	5.66	0.92	<0.0001
December	5.74	0.94	<0.0001

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