Motivations and Barriers to Vaccination during Covid-19

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Research Purpose

- This research seeks to answer the following question: Are age, political beliefs, and prior flu shot associated with the intention to get the COVID-19 vaccine for adults in the United States?

Data Description

- Data were collected in October 2020 through a Google Survey disseminated on social media
- Survey questions were chosen by evaluating existing literature (Rasul and Ahmed 2023; Ruiz and Bell 2021; Albrecht 2022)
- After removing observations missing data on the 4 relevant variables, 4 variables and 511 observations will be examined for this project
- The codebook can be downloaded from this link

Variable Measurement

Outcome:

- Intention to get the COVID-19 vaccine (categorical): Yes, No, Don't Know/Not Sure

Predictors:

- Political beliefs (categorical): Very Liberal, Somewhat Liberal, Mixed, Somewhat Conservative, Very Conservative
- Flu shot in the past 12 months (categorical); Yes, No
- Age in years (continuous)

Participant Characteristics

Characteristics of 511 Participants in a Covid-19 Vaccination Survey, 2022.

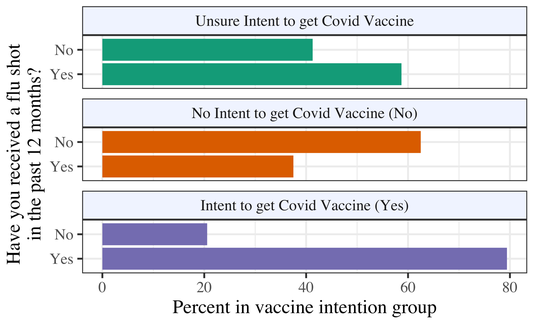
	Overall (N=511)
vaccine.intention	
Unsure Intent to get Covid Vaccine	172 (33.7%)
No Intent to get Covid Vaccine (No)	96 (18.8%)
Intent to get Covid Vaccine (Yes)	243 (47.6%)
Flu shot in the past 12 months	
Yes	330 (64.6%)
No	181 (35.4%)
Political beliefs	
Very Conservative	18 (3.5%)
Somewhat Conservative	93 (18.2%)
Mixed	87 (17.0%)
Somewhat Liberal	117 (22.9%)
Very Liberal	165 (32.3%)
Prefer not to answer	31 (6.1%)
Age in years (median, IQR)	26.0, 25.0

- Nearly half of participants intended to get the covid vaccine (47.5%; n = 242)
- Most survey participants had received a flu shot in the past year (64.6%; n = 330)
- Most participants were somewhat or very liberal (55.3%; n = 282)
- The median age of participants was 26 years old (IQR = 25)

Vaccine Intention and Flu Shot History

- Figure 1 shows a higher percentage of people who intend to get the COVID-19 vaccine have had the flu shot and the opposite is true for those not intending to get the COVID-19 vaccine
  - Of those who intend to get the COVID-19 vaccine, 79.3% of them had a flu shot in the last year and 20.7% did not have a flu shot
  - Of those who do not intend to get the COVID-19 vaccine, only 37.5% of them had a recent flu shot and 62.5% did not have a flu shot

Figure 1: Vaccine Intention & Flu Shot History (2022; n = 511)

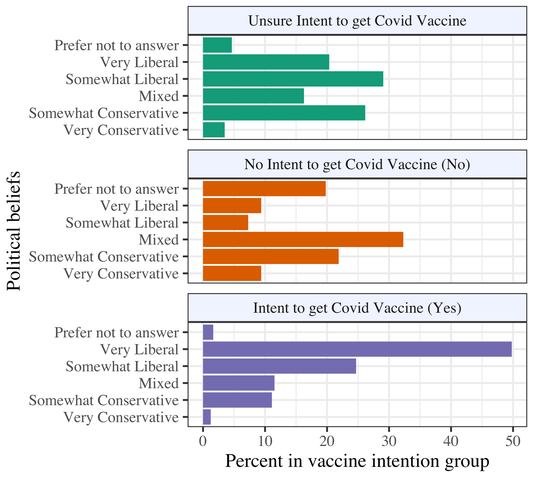


- Flu shot history and vaccine intention are both categorical so I used chi-squared to determine whether they were statistically significantly associated
  - All chi-squared assumptions were met including independent observations, both variables were nominal or ordinal, and more than 80% of expected values were greater than 5
- There is a statistically significant association between vaccine intention and flu shot history ($\chi^2 = 56.35$; $p < .05$)
- Standardized residuals showed which groups were driving the statistically significant result
  - Significantly **fewer than expected** people who had a flu shot did not intend to take the COVID-19 vaccine (std res = -3.30) and **more than expected** who had a flu shot intended to take the vaccine (std res = 2.87)
  - Significantly **more than expected** people with no flu shot did not intend to take the COVID-19 vaccine (std res = 4.44) and **fewer than expected** with no flu shot intended to take the vaccine (std res = -3.87)

Vaccine Intention and Political Beliefs

- Figure 2 suggests that political beliefs may be associated with intention to get the COVID-19 vaccine
  - Of those who intend to get the COVID-19 vaccine, 50% were very liberal and 24.8% were somewhat liberal
  - Of those who do not intend to get the COVID-19 vaccine, 32.3% were politically mixed and 21.9% were somewhat conservative

Figure 2: Vaccine Intention & Political Beliefs (2022; n = 511)

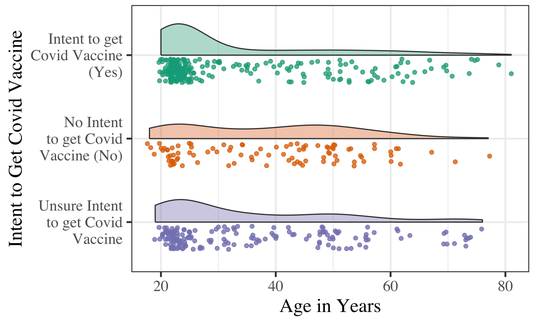


- Political beliefs and vaccine intention are both categorical so I used chi-squared to determine whether they were statistically significantly associated
  - All chi-squared assumptions were met including independent observations, both variables were nominal or ordinal, and more than 80% of expected values are greater than 5
- I found a statistically significant association between vaccine intention and political beliefs ($\chi^2 = 142.55$; $p < .05$).
- Standardized residuals showed which groups were driving the statistically significant result
  - Significantly **more very liberal people than expected were intending to take the COVID-19 vaccine** (std res = 4.83) while **significantly fewer than expected** who preferred not to answer, were politically mixed, or were somewhat conservative were intending to take the vaccine (std res < -2)
  - Significantly **more than expected** people who preferred not to answer, were politically mixed, or were very conservative were not intending to take the COVID-19 vaccine (std res > 2) while **significantly fewer than expected** who were very liberal or somewhat liberal were intending to not take the vaccine (std res < -2)

Vaccine Intention and Age

- The median age is highest in the "No" vaccine intention group (median = 39.5, IQR = 23.8–50.0) and lowest in the "Yes" vaccine intention group (median = 24.0, IQR = 22.0–41.8)
- The large difference suggests that age is likely associated with vaccine intention and that there are more older participants who do not intend to get the COVID-19 vaccine

Figure 3: Vaccine Intention & Age in Years (2022; n = 511)



- The ANOVA assumption of normal distribution within groups was not met with the distribution of age being very right skewed in the group who intended to get the COVID-19 vaccine
- Age is continuous and vaccine intention is categorical with 3 categories so I used the Kruskal-Wallis test to test whether the distribution of ranked age was the same across vaccine intention groups
- There was a statistically significant difference in age distribution across the vaccine intention groups (KW $\chi^2 = 11.63$; $p = .003$)
- A post-hoc Dunn's test can determine which groups are statistically significantly different from each other
  - The mean age of the group with no intention to vaccinate for COVID-19 was statistically significantly higher (diff = 3.35 years) compared to the group that intended to vaccinate for COVID-19 ($p = .001$)

Summary and Recommendations

Age, having a recent flu vaccine, and political beliefs were all statistically significantly associated with intent to get a COVID-19 vaccination. Consistent with prior studies, I found that people who had a flu vaccination in the last year, had more liberal political beliefs, and were younger were more likely to intend to get the COVID-19 vaccine (Rasul and Ahmed 2023; Ruiz and Bell 2021; Albrecht 2022).

Increasing the uptake of flu vaccination and developing health communication campaigns that reach older and more conservative audiences could both increase the uptake of COVID-19 vaccination.

References

Albrecht, Don. 2022. "Vaccination, Politics and COVID-19 Impacts." *BMC Public Health* 22 (1). https://doi.org/10.1186/s12889-021-12432-x.

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Ruiz, Jeanette B., and Robert A. Bell. 2021. "Predictors of Intention to Vaccinate Against COVID-19: Results of a Nationwide Survey." *Vaccine* 39 (7): 1080–86. https://doi.org/10.1016/j.vaccine.2021.01.010.