The Effect of the COVID-19 Pandemic on Influenza Vaccination Rates in the United States

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Abstract

Past research has shown that the influenza vaccination has decreased the likelihood of hospitalization within patients that test positive for COVID-19 (Conlon et al., 2021). Thus, maintaning high influenza vaccination rates is essential to decreasing the severity of COVID-19 cases. The goal of this study is to determine how influenza vaccination rates within the United States have changed due to the pandemic by comparing proportions of those vaccinated before the pandemic, defined as 2018-2019 to those during the pandemic, defined as 2020-2021, and comparing during the pandemic to proportions after the pandemic defined as 2021-2022. In order to account for possible factors that influence influenza vaccination coverage, the analysis was performed on three groups: by age, race, and the general population. Results showed that there is statistically significant evidence in favor of a difference in proportions before, and after the COVID-19 pandemic for the various age groups and the general population. There is no statistically significant evidence of a difference in proportions for the racial groups.

Keywords

Influenza Vaccine, Vaccine Hesitancy, COVID-19, Two Sample Z-Test

1 Introduction

2 Data

Data was collected from the Centers for Disease Control and Prevention website. The CDC analyzes data yearly from two telephone surveys, "the National Immunization Survey-Flu (NIS-Flu) and the Behavioral Risk Factor Surveillance System (BRFSS), to estimate flu vaccination coverage for the U.S. population during the flu season. The NIS-Flu is a national random-digit-dialed cellular telephone survey of households. The BRFSS is a state-based

random-digit-dialed cellular and landline telephone survey which collects information on a variety of health conditions and risk behaviors from one randomly selected adult greater than 18 years in a household. The BRFSS includes survey questions asking whether the respondent had received a flu vaccination in the past 12 months, and if so, in which month and year. Responses to the flu vaccination status questions were not verified by medical records. Respondents who did not have either a yes or no response to the flu vaccination status question were excluded from the analysis.Flu vaccination coverage estimates from both surveys were calculated using Kaplan-Meier survival analysis using month of reported flu vaccination to determine cumulative flu vaccination coverage." (CDC, 2021).

The data collected included age, region, season, vaccination type, and race/ethnicity. However, this study was only interested in the seasonal influenza vaccination, the United States, years 2019-2020, 2020-2021, and 2021-2022, the age groups defined as ≥ 6 months, 6 months-17 years, 18-49 years, 50-64 years, and ≥ 65 years of age, and the racial groups defined as white, black, hispanic, and other.

The proporitions of those vaccinated corresponding to the variables of interest were extracted from the dataset on the CDC website and recorded in the tables below. These propotions are important because they allowed for the two sample z test analysis to determine if the vaccination rates differed over time among these groups.

Table 1: Influenza Vaccination Rates by Year in the United States

	2019-2020	2020-2021	2021-2022
Proportion	.518	.521	.514

Table 2: Influenza Vaccination Rates by Year and Race in the United States

	2019-2020	2020-2021	2021-2022
White	.548	.564	.546
Black	.456	.427	.514
Hispanic	.466	.449	.45
Other	.518	.521	.525

Table 3: Influenza Vaccination Rates by Year and Age in the United States

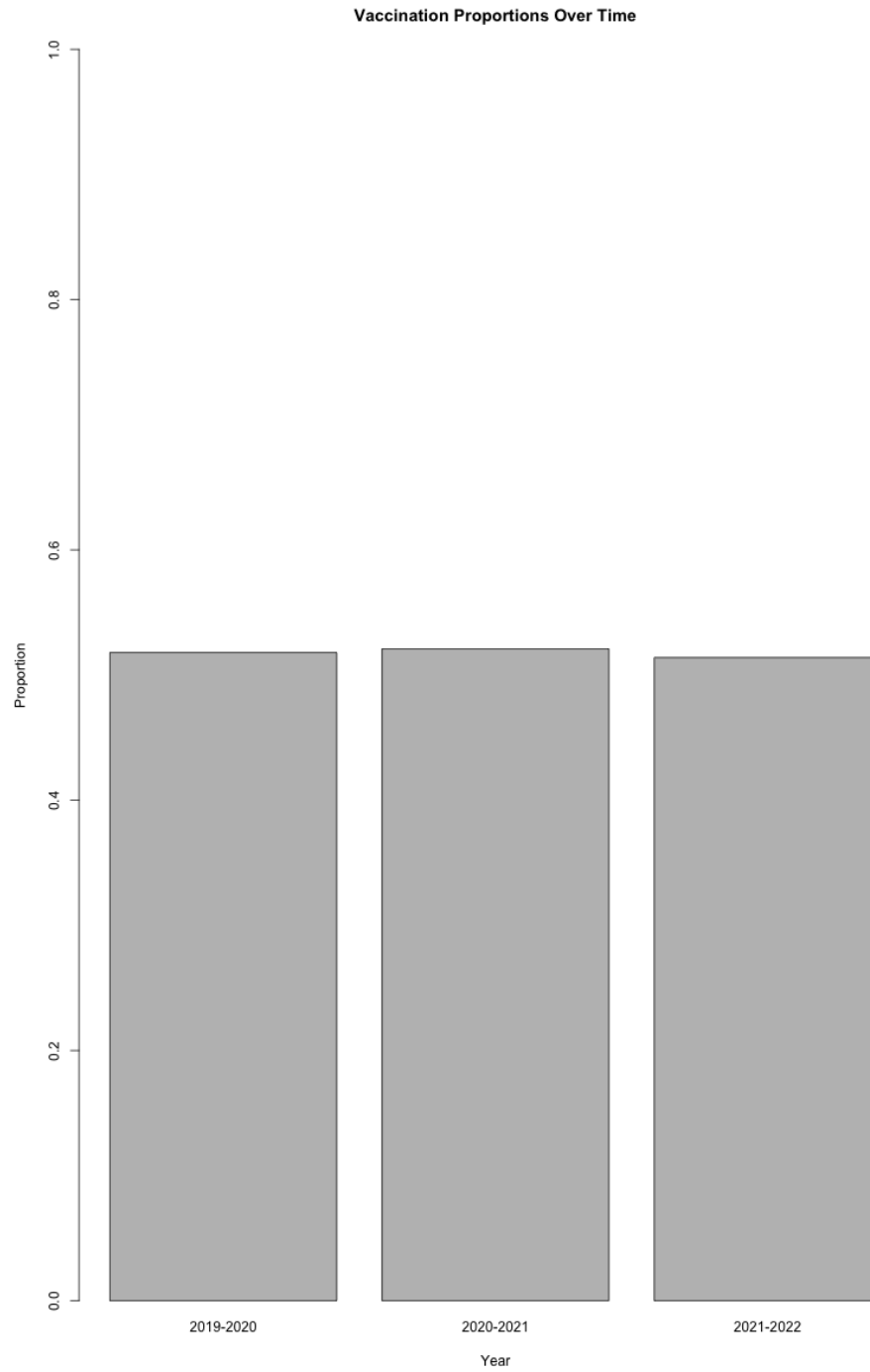|	2019-2020	2020-2021	2021-2022
≥ 6 Months-17 years	.637	.586	.578
18-49 years	.384	.377	.371
50-64 years	.506	.542	.524
≥ 65 years	.698	.752	.739

Figure 1: Influenza Vaccination Proportions of Those $\geq$ 6 Months Old From 2019-2022.
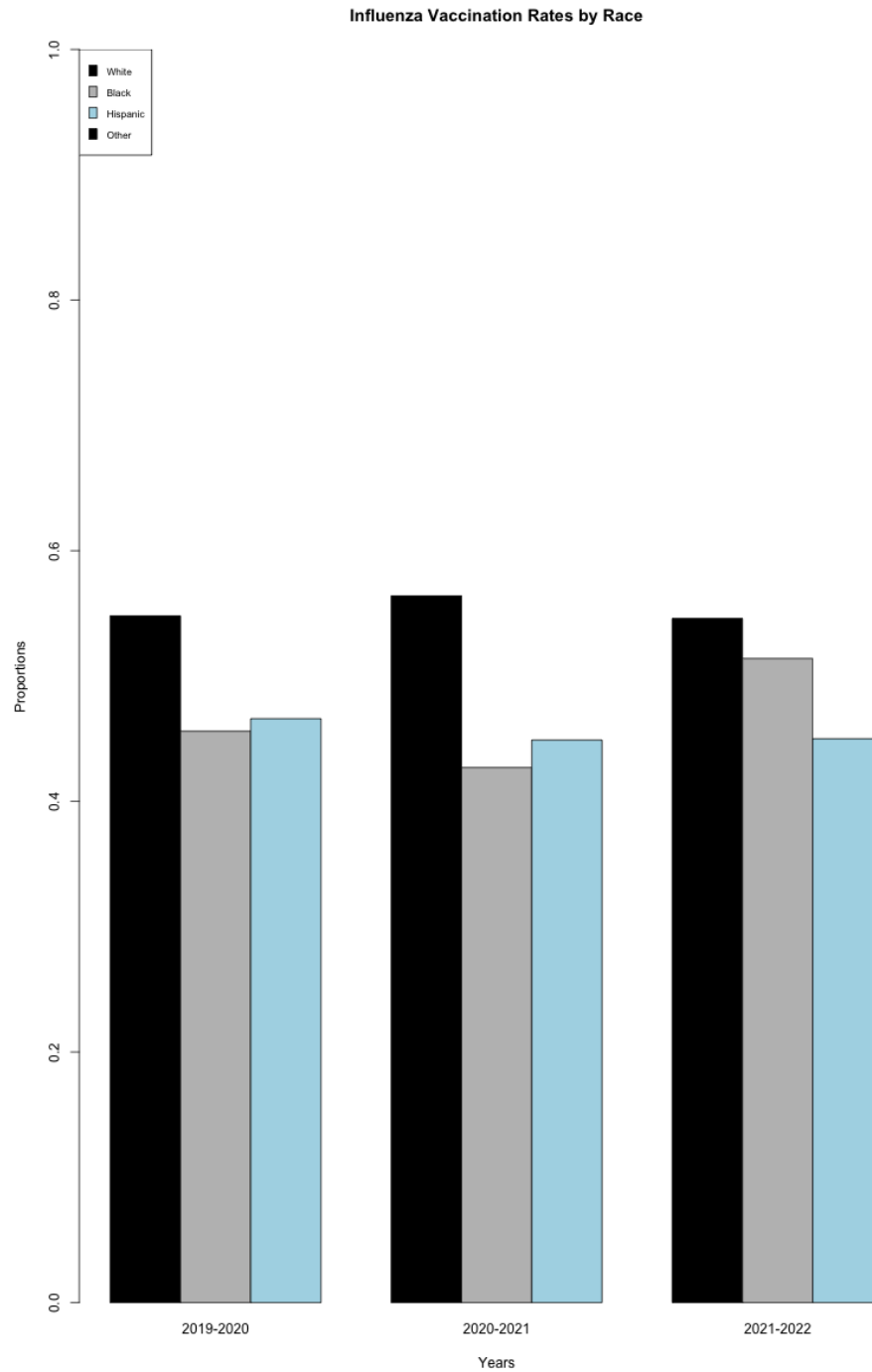
Figure 2: Influenza Vaccination Proportions by Race in 2019-2022.

3 Methods

4 Results

5 Discussion

References

CDC (2021, Oct). Flu vaccination coverage, united states, 2020–21 influenza season.

Conlon, A., C. Ashur, L. Washer, K. A. Eagle, and M. A. H. Bowman (2021). Impact of the influenza vaccine on covid-19 infection rates and severity. *American Journal of Infection Control 49*(6), 694–700.