Differences in COVID-19 Vaccine Administration in Indiana Counties by Race and Ethnicity

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Background

Health disparities between racial and ethnic groups in the United States are responsible for unequal distributions of disease and healthcare access. With the novel coronavirus and our current efforts to increase immunization, it is important to examine disparities in vaccine administration. The purpose of this analysis is to describe differences of COVID-19 vaccine administration in racial and ethnic groups. The information presented here may provide evidence for implementation of health programs aimed at reducing these differences.

Methods

Vaccine administration data by county and racial/ethnic groups was obtained on April 19, 2021 from public datasets provided by the Indiana Data Hub. The variables representing populations receiving their first dose of the COVID-19 vaccine was used to count vaccine administration. Single dose COVID-19 vaccines were not accounted for in this analysis. County population counts by race and ethnicity were obtained on April 19, 2021 from public datasets provided by STATS Indiana. The latest population data that could be accessed at the time of analysis was for the year 2019. The racial and ethnic groups used from the vaccine data were Asian, black, white, Hispanic, and non-Hispanic. Information for Native Americans, Pacific Islanders, and persons belonging to two or more races was not provided. All 92 Indiana counties were examined.

SAS 9.4 was used to analyze the data. Multiple new variables were created to make the comparisons of interest. First the demographic counts were divided by each county's total population to determine the proportional makeup of each demographic category. Then a similar method was used to determine vaccine administration proportions by each demographic category. Finally, the difference of vaccine administration proportion to total population proportion (VDIF) was calculated. A positive VDIF represents vaccine administration proportion exceeding population proportion, while a negative VDIF represents vaccine administration proportion failing to meet population proportion. Simple linear regression was used to describe the relationship between each demographic's VDIF and the respective population proportion. VDIF was also compared between demographic groups to examine disparity.

Table 1: Indiana mean population proportions and vaccine administration.

Demographic	Population proportions			Vaccine administration[a]	
	Mean (%)	SD (%)		Mean (%)	SD (%)
Asian	1.24	1.66		1.19	1.7
Black	3.07	4.62		1.75	2.89
Native American / Alaskan	0.41	0.16		-	-
Hawaiian / Pacific Islander	0.06	0.04		-	-
Two or more	1.56	0.58		-	-

White	93.66	5.89	90.87	5.17
Hispanic	4.34	3.74	2.18	2.15
Non-Hispanic	95.66	3.74	91.08	3.78

[a]Proportion of total first doses given.

Results

VDIF as a function of population proportion is displayed in Figure 1. The mean Asian VDIF was -0.05% (SD = 0.50%). There was no association between Asian population proportion and VDIF (R^2 = .0059, p = .4686). The county with the largest Asian population proportion, Tippecanoe County, had an Asian VDIF of 1.88% (Figure 2). The mean black VDIF was -1.45% (SD = 1.95%). There was a strong, negative relationship between black population proportion and VDIF (R^2 = .9287, p < .0001). Marion County, with the largest black population proportion and a black VDIF of -11.11%, had the largest black-white VDIF disparity of 17.09% (Figure 3). The mean Hispanic VDIF was -2.15% (SD = 1.78%). There was a strong, negative relationship with Hispanic population proportion and VDIF (R^2 = .8791, p < .0001). Clinton county, with the third highest Hispanic population and a Hispanic VDIF of -8.97%, had the largest Hispanic-non-Hispanic VDIF disparity of 12.81% (Figure 4). The mean white VDIF was -2.79% (SD = 2.27%). Martin County, with the largest white population proportion, had a white VDIF of -1.3%. There was a weak, negative association between white population proportion and VDIF (R^2 = .2408, p < .0001). The mean non-Hispanic VDIF was -4.59% (SD = 2.89%). There was a weak, negative relationship between non-Hispanic population proportion VDIF (R^2 = .1395, p < .001).
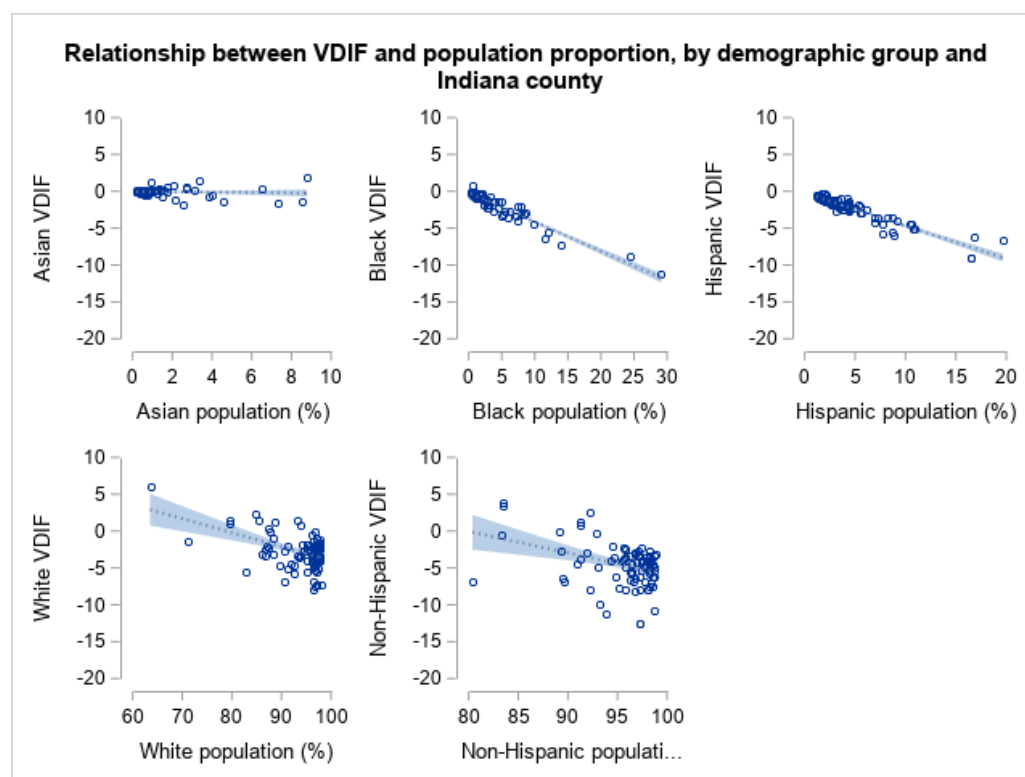
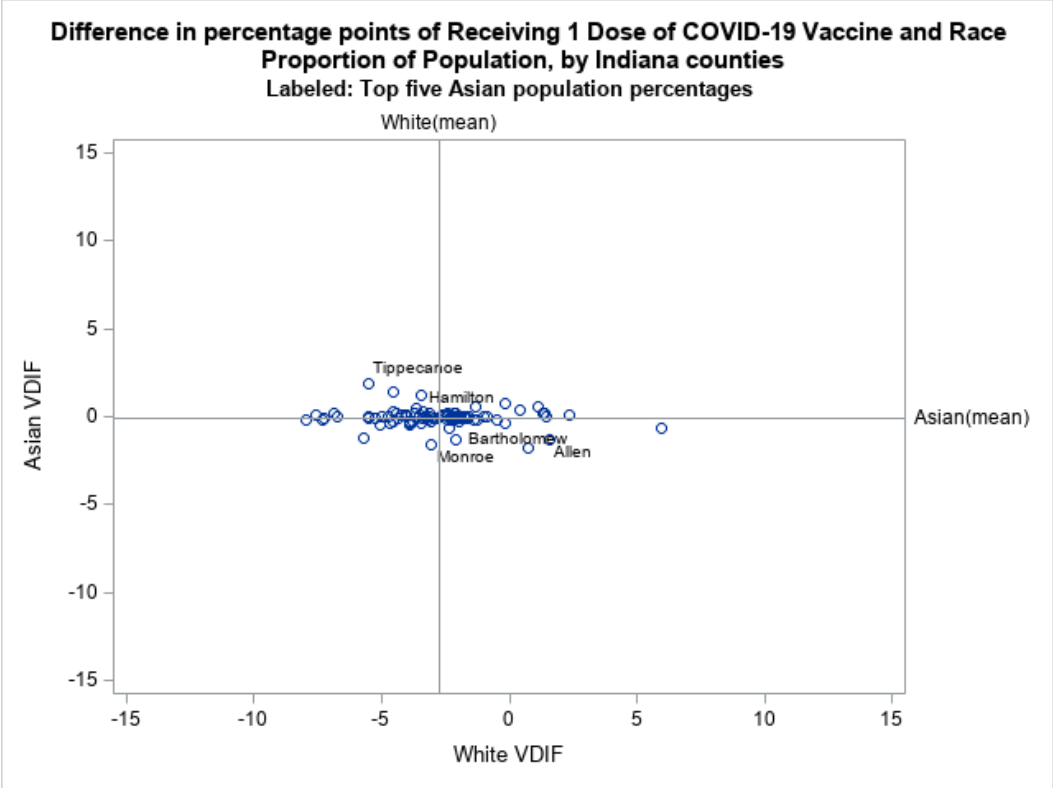**Figure 1:** *Comparing vaccine administration difference from population proportion (VDIF) to population proportion.*

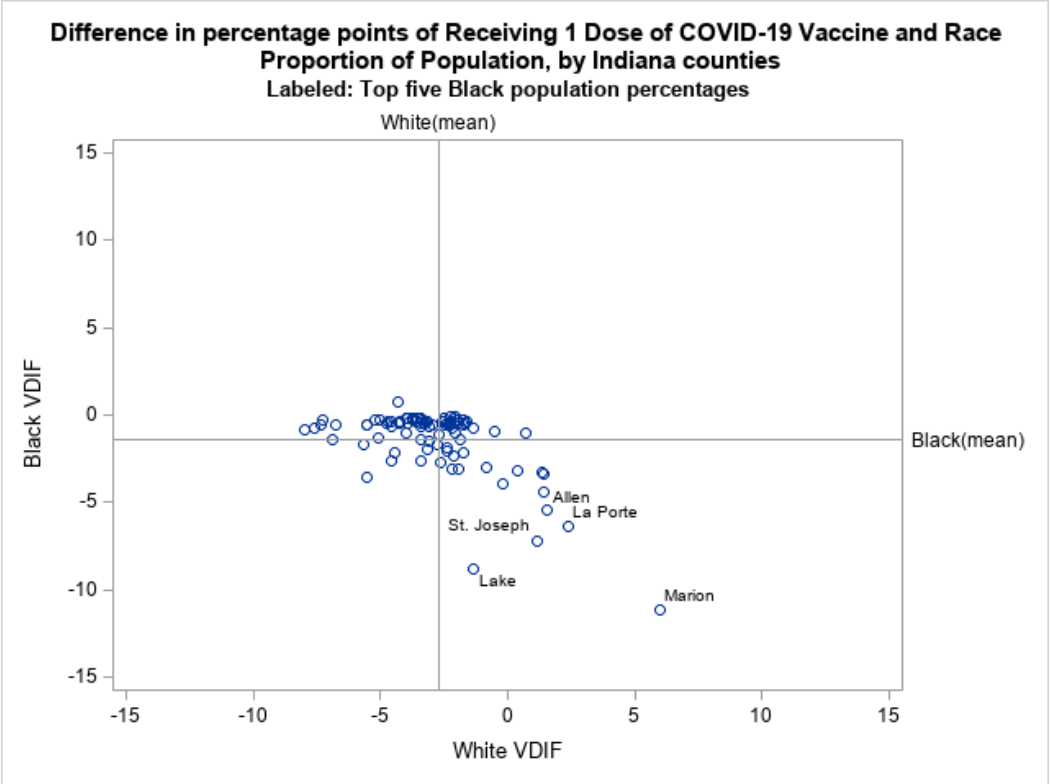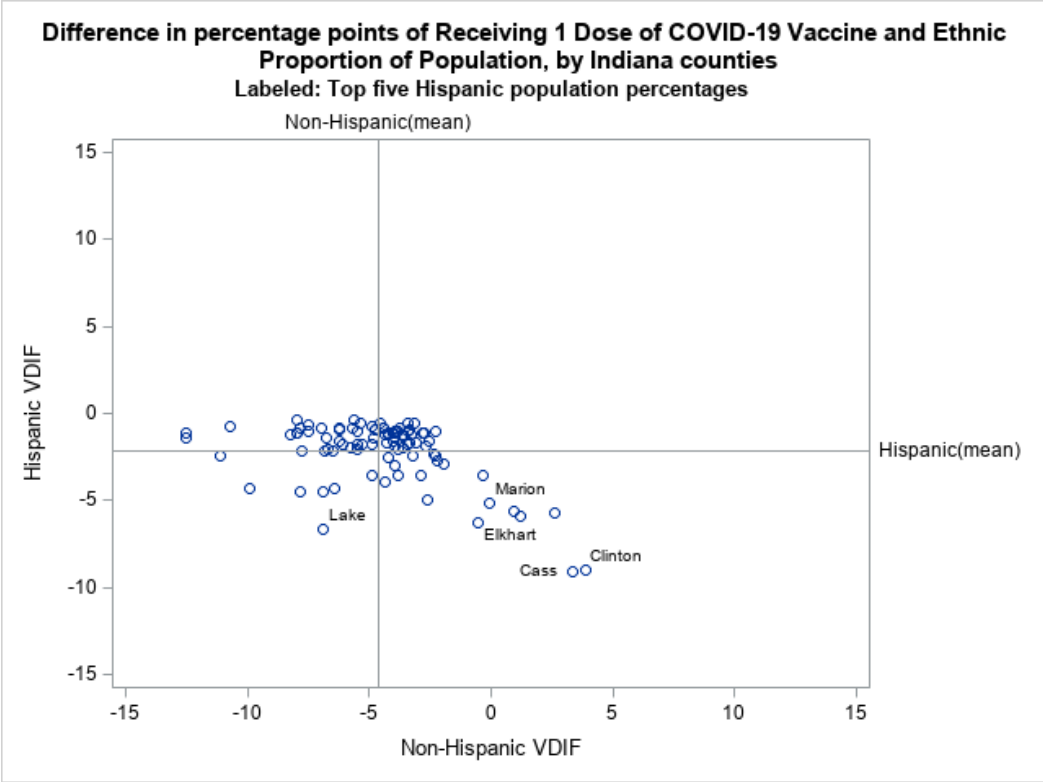**Figure 2:** *Examining the relationship between Asian VDIF and White VDIF by county.*

Figure 3: *Examining the relationship between Black VDIF and White VDIF by county.*

Figure 4: *Examining the relationship between Hispanic VDIF and non-Hispanic VDIF by county.*