Link to presentation: <https://mediaspace.umn.edu/media/t/1_6gvtvkpn>

Link to visualization app: [TEAM\_24\_app](https://xcss1104.shinyapps.io/TEAM_24_app/)

Link to code and detailed analysis: [TEAM\_24\_github\_Repository](https://github.com/happyChenXu/2021Health_Data_Competetion_Team_24)

As the COVID-19 2-dose vaccines are relatively new, we aimed to explore disparities in vaccination rates across Minnesota counties. One of the four main guiding principles of the Minnesota Vaccine Allocation Advisory group is to mitigate health inequities, and a purpose of this project was to evaluate the progress of vaccine allocation thus far. As policy allowed individuals over the age of 65 to receive the vaccine earlier than many other populations, we used age as a predictor of percent vaccinated. We also examined the concept of herd immunity. Many infectious diseases have been successfully controlled using herd immunity: measles required 95% and polio required 80% of the population to be vaccinated to enable herd immunity. There are no set percentages at this time for herd immunity against COVID-19, but some experts have estimated about 70-90%.With our data, we assumed that COVID-19 would require 90% of the population to be vaccinated to form a herd immunity. We chose 90% in order to have our results be more conservative. We chose 34 random counties in Minnesota and they need about 65% of the population on average to be vaccinated (in addition to those who are already vaccinated) in order to achieve herd immunity.

Additionally, because the indigenous community is a key community in Minnesota, we explored whether counties with a higher indigenous population or reservation would have different vaccine rates than other counties. Studies have shown that this population may have a general mistrust of the US healthcare system and may instead favor other forms of medicine. We believe that the high rate of indigenous vaccinations in the first weeks of 2021 could stem from indigenous individuals living on reservations receiving the vaccination. In later weeks, as the rate of vaccination among indigenous individuals decreased, we hypothesized that this represented the difficulties indigenous individuals living in Minneapolis faced in receiving the vaccination. Ultimately, cultural values and preferences must be taken into account when trying to improve the vaccination rate in Minnesota’s indigenous population.

For our analysis, we utilized R software to examine relationships between our main variables (county, population of adults 65 and over, indigenous population, whether the county contained a reservation, percent receiving at least one vaccine dose). Although no relationship was statistically significant using a linear model, we did find interesting patterns and relationships. For example, MN counties with higher percentages of adults over 65 tended to have higher vaccination rates. We also found White Americans showed a significantly lower vaccination rate than expected. Counties with more COVID cases and higher mortality rates tended to have a higher vaccination rate.

As a final point, we should consider if we will ever reach experts-suggested herd immunity threshold, since not everyone is willing to get vaccinated. Also, with virus mutations, it is possible that future policy may be revised. Finally, it is crucial to assess how we can provide vaccines in an effective and culturally sensitive manner to members of indigenous groups living in Minneapolis.