

# Lab 4

Jefferson Ratliff

Math 241, Week 4

```
# Put all necessary libraries here  
library(tidyverse)
```

## Problem 1: COVID survey - interpretation

Part of the graphs complexity stems from the wide variety of different demographic data points as well as 6 survey questions all pertaining to confidence in the COVID Vaccines. The goal of the survey and graph is to collect and communicate public attitudes towards the COVID-19 Vaccine.

They ask 6 questions:

- 1) Based on my understanding, I believe the Vaccine is Safe?
- 2) Getting the vaccine will make me feel safer at work?
- 3) I am concerned about the safety and side effects of the vaccine
- 4) I am confident in the scientific vetting process for the new COVID vaccine?
- 5) I trust the information that I have received about the vaccine?
- 6) I will recommend the vaccine to my family, friends, and community.

These question were asked with consideration for 7 variables:

- 1) age
- 2) gender
- 3) race
- 4) ethnicity
- 5) Profession
- 6) Had COVID vaccine
- 7) Had flu vaccine

The results of the responses are mapped out across each demograohic variable and ranked on a 1-5 scale depending on confidence/agreement to the answer.

One of the aspects that I found the most suprising about the graph and the data that it represents is how wide the mean values are for each question among the vaccinated demographic variable showing a wide varerity of answers for those who were surveyed outlining the wide aray of reasons that indivisuals chose to get the vaccine. The narrow and high range on the questions pertaining to trust in the vaccine and the broader scientific information involving the vaccine demonstrate an overall very strong belief in the vaccines amongst the public particularly amongst those who are vaccinated for the flu and middle aged people.

## Problem 2: COVID survey - reconstruct

Step 1:

```
library(readr) covid_survey <- read_csv("/Users/jeffersonratliff/Documents/GitHub/math241/data/covid-survey.csv")
```

```
covid_survey <- covid_survey %>% filter(if_all(everything(), ~ !is.na(.)))
```

Step 2:

```
covid_survey <- covid_survey %>% mutate(exp_already_vax = recode(exp_already_vax, "0" = "No", "1" = "Yes")) covid_survey <- covid_survey %>% mutate(exp_flu_vax = recode(exp_flu_vax, "0" = "No", "1" = "Yes")) covid_survey <- covid_survey %>% mutate(exp_profession = recode(exp_profession, "0" = "Medical", "1" = "Nursing")) covid_survey <- covid_survey %>% mutate(exp_gender = recode(exp_gender, "0" = "Male", "1" = "Female", "3" = "Non-binary third gender", "4" = "Prefer not to say")) covid_survey <- covid_survey %>% mutate(exp_race = recode(exp_race, "1" = "American Indian/Alaskan Native", "2" = "Asian", "3" = "Black/African American", "4" = "Native Hawaiian/Other Pacific Islander", "5" = "White")) covid_survey <- covid_survey %>% mutate(exp_ethnicity = recode(exp_ethnicity, "1" = "Hispanic/Latino", "2" = "Non-Hispanic/Non-Latino")) covid_survey <- covid_survey %>% mutate(exp_age_bin = recode(exp_age_bin, "0" = "<20", "20" = "21-25", "25" = "26-30", "30" = ">30"))
```

```
print(dim(covid_survey))
```

Step 3:

```
covid_survey_longer <- covid_survey %>% pivot_longer(cols = starts_with("exp_"), names_to = "explanatory", values_to = "explanatory_value") %>% filter(!is.na(explanatory_value)) %>% pivot_longer(cols = starts_with("resp_"), names_to = "response", values_to = "response_value")
```

step 4:

```
covid_survey_summary_stats_by_group <- covid_survey %>% group_by(explanatory, explanatory_value, response) %>% summarise(mean = mean(response_value), low = quantile(response_value, 0.1), high = quantile(response_value, 0.9))
```

```
print(covid_survey_summary_stats_by_group)
```

Step 5:

```
covid_survey_summary_stats_all <- covid_survey %>% group_by(response) %>% summarise(mean = mean(response_value), low = quantile(response_value, 0.1), high = quantile(response_value, 0.9), explanatory = "All", explanatory_value = "")
```

```
print(covid_survey_summary_stats_all)
```

```
covid_survey_summary_stats <- bind_rows(covid_survey_summary_stats_all, covid_survey_summary_stats_by_group)
```

```
print(covid_survey_summary_stats)
```

The Visualization:

```
ggplot(covid_survey, aes(x = age, y = mean, fill = response)) + geom_bar(stat = "identity", position = "dodge") + geom_errorbar(aes(ymin = low, ymax = high), position = position_dodge(0.9), width = 0.25) + labs(title = "Confidence in the Vaccine Safety by Age Group", x = "Age Group", y = "Mean Value") + theme_minimal() + facet_wrap(~explanatory, scales = "free_y")
```