

Master of Public Health

Integrated Learning Experience

“COVID-19 vaccine hesitancy in Riley County, Kansas”

by

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MASTER OF PUBLIC HEALTH

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Abstract

My applied practical experience dealt with the complex and challenging issue of COVID-19 vaccine hesitancy within Riley County, Kansas. Through my APE I was able to gain experience working with the Riley County Health Department by attending testing and vaccination events and helping to organize hundreds of patient files. My experience resulted in the creation of several social media outreach posts, three blog entries, and a vaccine hesitancy survey. Members of the Riley County Health Department and I distributed a survey to local Riley County employers to gain views and opinions regarding the COVID-19 vaccine. Survey results determined that individuals who chose not to be vaccinated believed the vaccine to be unsafe, ineffective, and unnecessary. Moreover, the majority of unvaccinated individuals reported that there was no acceptable incentive for vaccination.

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Chapter 1 – Introduction to Vaccine Hesitancy

Vaccine hesitancy refers to the “delay in acceptance or refusal of vaccines despite availability of vaccine services” (1). Hesitancy can arise due to several factors and is personal to the individual holding those beliefs. However, a recent decline in vaccination rates is reported to be “threatening the historical achievements made in reducing the burden of infectious diseases, which have plagued humanity for centuries” by the World Health Organization (WHO) (2). Addressing vaccine hesitancy is vital to preventing infectious disease and unnecessary hospitalization and death within communities. The COVID-19 pandemic has only heightened society’s need to address vaccine hesitancy. Despite millions of cases and deaths worldwide (3), public health officials are still struggling to promote vaccination.

Several factors can result in vaccine hesitancy, including misinformation and mistrust. Identifying which factors are prevalent within a community or a specified population could aid public health officials in approaching the challenge of hesitancy and promoting vaccination. As explained in my applied practical experience (APE) document, I undertook a field experience involving the exploration of vaccine hesitancy in Riley County, Kansas. Working with my preceptor, Renee Lucas, I was able to gain experiential insight into this societal challenge.

Riley County is located in the northeast portion of Kansas and is home to over 72,000 individuals (4). Much like the rest of the US, Riley County has experienced several waves of COVID-19 infections, including the winters of 2020-2021 and 2021-2022 having some of the highest daily cases (5). A diverse group of businesses are located in Riley County and employ a large portion of the vaccine-eligible population. Moreover, segments of the Riley County workforce were anticipated to be “vaccine hesitant.” Targeting their beliefs and opinions regarding COVID-19 vaccination was deemed crucial in order to increase vaccination rates within the county.

The Roots of Vaccine Hesitancy

The idea that a less harmful exposure to a pathogen may protect an individual from serious morbidity or mortality from a disease has been explored by pioneering scientists for

centuries. The earliest evidence of inoculation, then called variolation, occurred in ancient China around 1000 CE whereby scabs from individuals affected by smallpox were crushed and inhaled (6). Seven centuries later, Dr. Edward Jenner took this concept and applied it in a more sophisticated manner by inoculating individuals with the less-severe cowpox, making Dr. Jenner the so-called father of vaccines (6).

Since these successes in preventing serious illness, vaccine development has become a common practice in the modern world, preventing deadly childhood diseases and becoming a crucial tool in containing disease outbreaks. However, with success comes challenges. Even with the deadly smallpox pandemic, there were individuals who saw mandatory vaccination as an affront to their civil liberties. As a result, the Anti-Vaccination Society of America was created in 1871 (7). Since then, the safety and efficacy of vaccines have been questioned with every new development.

Factors Leading to Hesitancy

Misinformation

Several factors have amplified the growing hesitancy surrounding vaccines in the last century. Misinformation regarding safe vaccinations has played a large role in the anti-vaccine movement. In 1998, Dr. Andrew Wakefield published a discredited study showing a link between the measles, mumps, and rubella (MMR) vaccine and autism. The study, originally published in the *Lancet*, was subsequently retracted and Dr. Wakefield was charged with medical fraud (8). However, a significant majority of individuals supportive of the anti-vaccination movement still point to this study as justification for declining vaccines. The US and Europe have since seen a reemergence of measles (9), a disease once thought to be well on its way towards eradication.

Communication, whether scientific or lay, has become increasingly easy and fast-paced with social media tools. Information and opinions can be posted and shared globally, without the requirement of scientific accuracy. Misinformation shared by individuals on social media sites has had an impact on the public's vaccine education and hesitancy. One study found that

YouTube videos claiming to provide vaccine information have an average of 62,000 views, with some videos reaching over 6 million individuals (10). This study also found that 65% of these videos discouraged the use of vaccines. The degree to which vaccine information provided by social media sites is believed depends heavily on pre-conceived opinions by the viewer. A study conducted on 400 individuals with differing opinions on the influenza vaccine revealed that many viewers altered their interpretation of the online content they were provided based on their previous beliefs concerning the vaccine (11). Therefore, education level as well as religious, ethical, and political beliefs may impact how social media influences an individual's vaccine beliefs and hesitancy.

Other popular culture influences like celebrity figures have had an impact on misinformation and public perception of vaccination. In November 2021, Aaron Rodgers, the quarterback for the Green Bay Packers, announced he had chosen not to be vaccinated for COVID-19 despite NFL requirements (12). Furthermore, Rodgers shared that he was taking ivermectin (a treatment not recommended by the Food and Drug Administration) as a preventative measure for COVID-19 (13).

Demographic Factors

Identifying which demographic categories are at an increased risk of avoiding vaccination, where their hesitancy derives from, and how to approach this challenge is important to the issue of vaccine hesitancy. A national survey exploring willingness to vaccinate found that individuals most likely to receive a vaccination were generally young white males with higher education and income levels. In contrast, those who reported that they were least likely to receive a potential vaccine were generally older black women with lower education and income levels (14).

Race is indeed an influential and complex demographic factor at work in vaccine hesitancy; issues of race can influence an individual's trust of the healthcare and public health systems. Trust for medical professionals, public health agencies, pharmaceutical companies, and both local and federal governments is required to feel comfortable receiving a vaccination (15). Black Americans have some of the highest reported rates of medical mistrust due to a

history of suffering injustices and inequities which have led to higher rates of hypertension, diabetes, and obesity (16). Moreover, historical instances of medical malpractice and abuse are still influencing trust among minorities. An example of such abuse is the Tuskegee Syphilis Study, originally named the Tuskegee Study of Untreated Syphilis in the Negro Male, wherein 399 impoverished African American males infected with syphilis were examined by the US Public Health Service and the Centers for Disease Control (CDC) from 1932 to 1972. Participants were deceptively told they were receiving free medical care and were not informed of their syphilis status or treated for their infection (17). These types of events have inevitably led to higher levels of distrust among the Black community and continue to influence hesitancy towards vaccinations amid the COVID-19 pandemic. Despite being at an increased risk for contracting and suffering severe disease from COVID-19 (18), a recent study by the Pew Research Center showed that while 74% of White and Hispanic Americans look favorably at a vaccine, only 54% of Black Americans reported willingness to vaccinate (19).

Immigrants are also more likely to express medical mistrust and vaccine hesitancy. Migrants are more inclined to use traditional or religious alternatives, display a lack confidence in vaccines, and struggle with access due to increased barriers (20). A major contributing factor to migrants' vaccine hesitancy is social exclusion, which has also led to mistrust of government and, therefore, increased barriers to health services (20).

COVID-19 Vaccine Safety and Efficacy

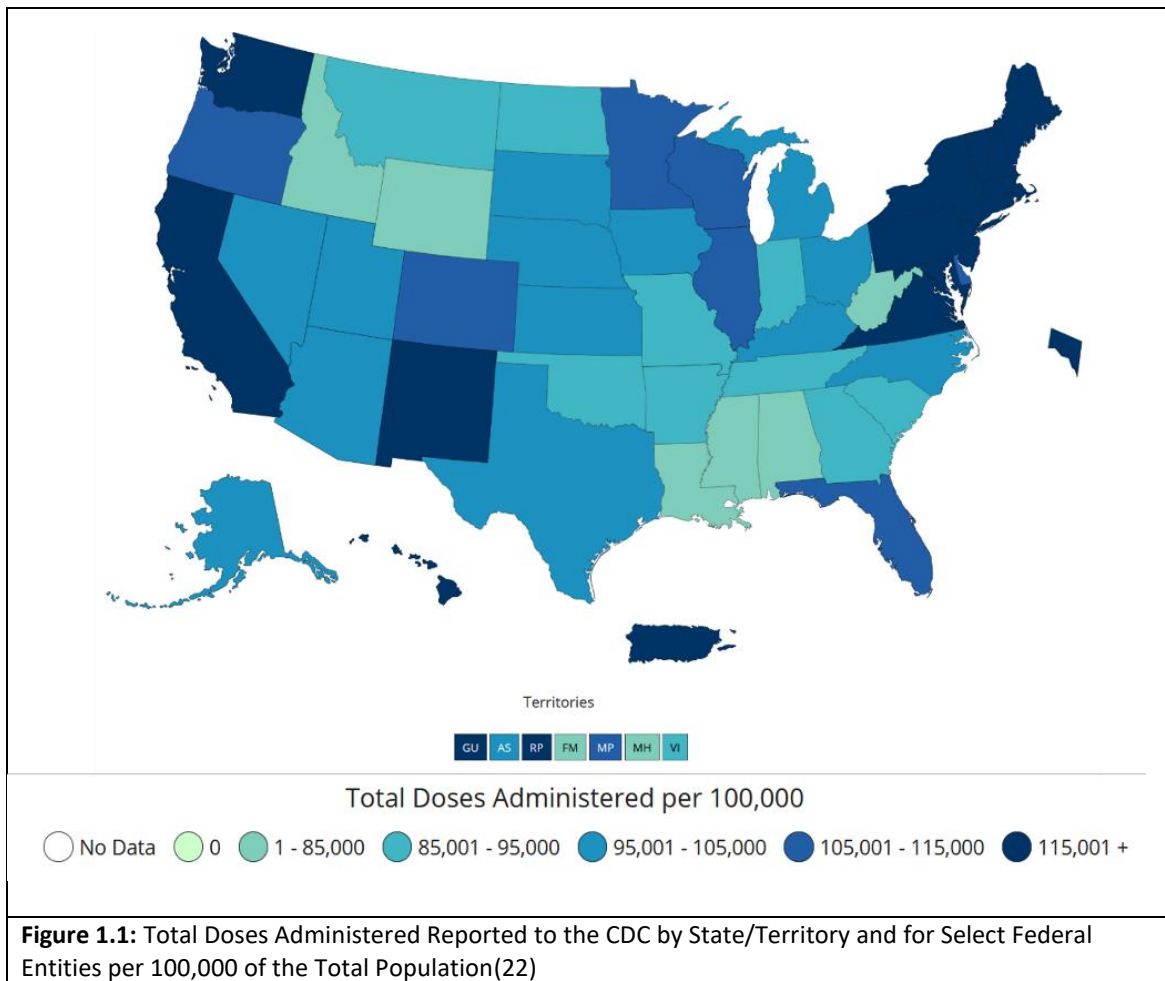
The first case of COVID-19 in the US was recorded on January 21, 2020 (21). Since then, over 78 million Americans have been infected with the virus, and over 945,000 have died as a result (22). As a consequence of the widespread illness and mortality, several COVID-19 vaccines were approved for use by the Food and Drug Administration (FDA): Pfizer-BioNTech (December 11, 2020), Moderna (December 18, 2020), and Janssen (February 27, 2021). All three vaccines have high rates of efficacy and safety, with adverse effects being minimal and short-lasting. Table 1.1 (next page) summarizes this data.

Table 1.1 Efficacy and Adverse Effects of COVID-19 Vaccinations

Vaccine	Number of Doses	Trial Type (Number of Participants)	Efficacy Rate	Adverse Reactions - Timeline	Adverse Reactions – Clinical Signs	Life-threatening Adverse Reactions
Pfizer-BioNTech	2-3 weeks apart	Phase II/III (43,000)	95.0%	1 Day	Fatigue Headache Muscle pain Chills Nausea	Vaccine Recipients: 0.6% Placebo Recipients: 0.5%
Moderna	2-4 weeks apart	Phase III (30,000)	94.1%	2-3 Days	Injection site pain Fatigue Muscle pain Nausea Fever	Vaccine Recipients: 1.0% Placebo Recipients: 1.0%
Janssen (Johnson & Johnson)	1	Phase III (40,000)	74.4% (US)	1-2 Days	Injection site pain Headache Fatigue Muscle aches Fever	Vaccine Recipients: 0.4% Placebo Recipients: 0.4%
Vaccine data provided by the FDA (23–25) Adverse effects provided by the CDC (23–25)						

Current COVID-19 Vaccination Rates in the US

As of October 2021, 55.9% of the US population were fully vaccinated (22). However, vaccination rates differ across states and demographics. Massachusetts, Connecticut, and Vermont have some of the highest rates of vaccination while Alabama, Mississippi, and Idaho have some of the lowest. A map provided by the CDC ranking states by vaccination status shows that states in the south are most struggling with vaccine uptake. Figure 1.1 (below) portrays this reality.



The CDC also provides information based on the Social Vulnerability Index (SVI), which is defined as populations that at a higher risk of during public health emergencies due to minority status, poor housing, low access to transportation, and other socioeconomic factors. Many counties reporting low vaccination uptake have a high SVI and are often in the south (26). Information based on race and ethnicity shows that white individuals show the highest rates of vaccination, followed by Hispanics and Latinos. The lowest vaccination rates are among American Indian and Alaskan Natives, Asians, and Black individuals (22).

Contrary to vaccine hesitancy is the idea of vaccine confidence, which is defined as the “trust in the vaccine, trust in the vaccinator or other health professional, and trust in those who make the decisions about vaccine provision” (27). The CDC collects vaccine confidence information on a weekly basis to determine trends based on demographics and individuals’

intent to vaccinate. Data shows that the intent to vaccinate correlates with age, metropolitan status, income level, and whether or not an individual has health insurance. Those least likely to report that they intend to vaccinate tend to be younger, live in rural areas, are impoverished, and do not have health insurance (22).

COVID-19 and Vaccination Rates in Riley County

The Kansas Department of Health and Environment (KDHE) conducted a study with local focus groups to determine hesitancy factors. A substantial percentage of participants reported that they did not trust the vaccine (49%) and that they did not believe it was either safe (59%) or effective (39%) (28). Additionally, 22% of individuals believed that side effects from the vaccine would interfere with their daily lives.

As of October 2021, Riley County had a total of 7,871 cases and 58 deaths due to COVID-19 (29). According to CDC data, 24,763 individuals or 33.4% of the total eligible population has been fully vaccinated against COVID-19. Vaccination rates are similar between the adolescent (ages 12-17) and adult (ages 18-64) age groups, with a total of 37.8% and 37.2% of those individuals reporting full vaccination, respectively. However, 84% of individuals aged 65 or older have been fully vaccinated against COVID-19 (22). Kansas State University is the largest employer in Riley County, employing over 6,000 residents (30). Moreover, Kansas State University also enrolls over 20,000 students each year (31). Although Kansas State University has a large influence on COVID-19 rates in Riley County, the university reported a collective vaccination rate of 72% as of July 2021 (32).

Vaccination has been proven to reduce the likelihood of hospitalization and death from COVID-19 (33). The Virginia Department of Health compared hospitalization and death rates of vaccinated and unvaccinated individuals. Data showed that overall, only 0.5% of fully vaccinated individuals were infected with COVID-19. Furthermore, only 0.021% of fully vaccinated individuals have been hospitalized and only 0.005% have died because of COVID-19 (33).

Riley County continues to have low vaccination rates despite ongoing COVID-19 cases. According to the Mayo Clinic, and as of October 2021, the US rate for fully vaccinated individuals is 55.9%, and the rate for Kansas is 51.2%. However, only about a third of Riley County residents have been fully vaccinated. Public health practitioners should focus on specific populations within the county and identify reasons and beliefs surrounding vaccine hesitancy.

Studies have been conducted on vaccine hesitancy in healthcare workers and specified races and socioeconomic levels. Providing views and beliefs among a variety of business employees may provide insight to public health officials who seek to increase the vaccination rate within the county and design incentive programs for the community. Public health agencies exist to educate, promote, and assist with wellness initiatives in their communities. Collecting community-members' opinions regarding vaccinations and COVID-19 will better inform education and policy making within the county.

Chapter 2 – Learning Objectives and Survey Methodology and Results

My Applied Practical Experience (APE) was conducted at the Riley County Health Department (RCHD) under the direction of the Emergency Response Coordinator, Renee Lucas. My primary project involved creating a survey tool that evaluates vaccine hesitancy among various businesses in the Manhattan, Kansas area. In addition, I also attended COVID-19 outreach and vaccination events, assisted with COVID-19 testing, and organized patient files.

During my APE, I created several products for my portfolio, including blog posts detailing my experience with RCHD, social media posts used for outreach and advertising, and a survey instrument to gather feedback on vaccine hesitancy. These products are summarized in table 1.1 on page 6 in my APE document and attached to the appendix of this ILE document.

Due to the COVID-19 outbreak, my APE came at a time when knowledge of, and assistance with, infectious disease was evident. The RCHD conducts COVID-19 testing and vaccination for their own residents along with residents of some neighboring counties. My APE began at a time when the positivity rate in Riley County was relatively low, thus making vaccination the primary focus of the department. RCHD sought to understand why individuals were not seeking vaccination and what factors contributed to their hesitancy. In an effort to explore vaccine hesitancy, my APE involved the design and interpretation of a survey for the health department.

Learning Objectives

My APE included a variety of learning objectives, which I will reflect on in this ILE document. Overall, I had the opportunity to execute and learn from the following activity objectives:

- Prepare appropriate and meaningful surveys for a culturally diverse group of respondents
- Analyze survey responses in a way that creates evidence-based observations and suggestions
- Learn to coordinate and plan vaccination events in a mobile setting

- Create outreach materials that increase turn-out to vaccination events
- Improve skills in communication and cultural competence

During my APE, I explored the following questions, which I further reflect on in this ILE document:

- What factors are contributing to COVID-19 vaccine hesitancy in employees in Riley County?
- What potential circumstances could encourage vaccination in these hesitant individuals?
- What reasons have employees chosen to vaccinate?

Methods

A survey developed by the Riley County Health Department (RCHD) was distributed to employers in the region. Due to a low initial response rate, RCHD expanded its list of employers to include local academic institutions. Survey data was analyzed using both quantitative and qualitative techniques.

Participants and Recruitment

A focus group consisting of Riley County's Health Department Director, Emergency Response Coordinator, Health Educator, and student interns was created to determine potential employers/respondents, project execution, and survey development. Employers were selected for recruitment based on the number of employees the company reported. RCHD sought to send the survey to the largest employers within Riley and neighboring Pottawatomie counties, omitting Kansas State University. The initial list of potential employers included five companies.¹ RCHD developed an incentive to increase participation, including a \$100 Visa gift card to a single respondent, and providing breakfast or lunch to the company with the highest percentage of participants. Student interns placed phone calls to Human Resource managers at each company explaining the purpose of the survey, anonymity, and the incentive program.

¹ To preserve confidentiality, the names of these firms are not provided in this document.

Of the initial companies selected, only one company expressed interest in receiving and completing the survey. Non-participating companies provided several reasons for their decision, including worries over privacy despite anonymity, having established COVID-19 programs already in place, and a general lack of interest. Due to the small number of participating companies, RCHD expanded its reach to other types of companies including construction, local area school districts, and local area colleges. An additional four entities agreed to send the survey to their employees. Employees were asked to voluntarily complete the survey, despite vaccination status. No exclusion criteria were used.

Survey

The survey consisted of 16 questions, including multiple choice, open-ended items, and scaled or rated items. It also included a series of optional demographic questions. The survey was developed by the RCHD focus group and supervised by the Health Educator. Survey questions about hesitancy factors were designed based on feedback given to health department officials and concerns heard throughout the community. The instrument was developed using Alchemer, a survey creation tool frequently utilized by RCHD. The survey was distributed to Human Resource managers of participating companies using an anonymous link. Human Resource managers then distributed the survey to their employees via email.

Qualitative Analysis

Numerical data was collected using a combination of multiple-choice items and items measured on a Likert scale (e.g., 1 = Strongly Disagree to 5 = Strongly Agree). Multiple choice and scaled or rated items were analyzed by calculating frequencies, or counts, and corresponding percentages. Data was also analyzed using cross-tabulation, a method of analysis which examines the relationship between multiple variables. This method of analysis was used to examine any potential correlations between respondents' demographic details and their reasons to avoid vaccination.

Data collected through open-ended survey items was analyzed by reviewing responses and identifying themes using the constant comparative method. This method allowed

responses to be coded into multiple themes as applicable. Moreover, themes were assigned a numerical value that represented the incidence of that theme being encountered in the data.

Results

A total of 81 individuals responded to the survey. Survey respondents consisted of individuals from Organization A ($n=23$), Organization B ($n=30$), Organization C ($n=13$), Organization D ($n=12$), and Organization E ($n=3$). Interestingly, the majority of respondents were vaccinated.

Table 2.1: Overall vaccination status of surveyed Riley County individuals

Vaccination Status	Frequency	Percent
Vaccinated	63	77.8%
Not Vaccinated	18	22.2%

Factors Leading to Vaccination

Vaccinated respondents were asked to provide reasons for why they chose to be vaccinated. Employees reported a variety of reasons for vaccination; however, a majority of the feedback centered around the idea of protection from the COVID-19 virus. Table 2.2 provides a description of common themes that were observed regarding protection from the pandemic, while Table 2.3 provides verbatim responses related to individual themes.

Table 2.2: Identified themes representing protective reasons to vaccinate for COVID-19

Theme	Frequency
To protect others (e.g., family members, community)	25
To protect themselves (general)	16
To prevent serious illness, death	13
Due to immunocompromising/health conditions	8
To mitigate the spread of COVID-19/increase herd immunity	8
Personal/moral responsibility	5
Due to occupational risk (e.g., healthcare worker, teacher)	3

Table 2.3: Examples of verbatim responses for selected themes

Theme	Verbatim Responses
To protect others (e.g., family members, community)	<i>"I have an elderly mother, a disabled husband and a pregnant (at that time) daughter."</i>

	<i>There was no way I could live with myself if I passed COVID on to them so it was an easy choice!"</i> <i>"My personal health and wellbeing as well as the health and wellbeing of my family, friends and community."</i> <i>"It seemed like a no-brainer to help protect my family, students, coworkers, and community."</i>
To protect themselves (general)	<i>"To protect myself and others."</i> <i>"To keep myself and my family as safe as possible."</i>
To prevent serious illness, death	<i>"I don't want to get sick or die."</i> <i>"A safe, effective way to stop the spread and protect others who can't get vaccinated from a deadly disease."</i> <i>"I believe in science and I had COVID-19. I would rather not get it again, but if I do I believe my symptoms will not be as bad."</i>
Due to immunocompromising/health conditions	<i>"I trust the vaccine process. I also have an immune compromised child."</i> <i>"I am a single mom with asthma and a young child at home. I need to keep myself and my daughter as safe as possible during this pandemic."</i>
To mitigate the spread of COVID-19/increase herd immunity	<i>"Because I believe it is part of a multi-faceted defense system to stop the spread of COVID-19, and to keep myself and those around me safe."</i> <i>"Several reasons; I wanted to help progress to herd immunity, wanted to stay healthy and keep my family and friends healthy."</i>
Personal/moral responsibility	<i>"Thing to do."</i> <i>"It was the right thing to do for the pandemic!"</i>

Due to occupational risk (e.g., healthcare worker, teacher)	<i>"I have asthma and am an educator. I have always received the influenza vaccination to help protect me and considered the covid vaccine as the same."</i> <i>"Protect myself, my community, my family and my patients."</i>
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Respondents also provided reasons related to other challenges of the COVID-19 pandemic. Table 2.4 provides a description of common themes observed, while Table 2.5 provides verbatim responses related to individual themes.

Table 2.4: Identified themes representing other reasons to vaccinate for COVID-19

Theme	Frequency
Trust in vaccinations, science, experts	12
Desire to return to 'normalcy' (e.g., stop wearing masks, travel, attend events)	10
Availability (e.g., access, free to receive)	3
Due to outside pressure (e.g., coworkers, family, work regulations)	3

Table 2.5: Examples of verbatim responses for additional themes

Theme	Verbatim Responses
Trust in vaccinations, science, experts	<i>"I trust the science and healthcare officials that recommended I got it."</i> <i>"I felt the benefit of being vaccinated outweighed the possible side effects. I have not had adverse reactions to any vaccinations before. I trust the science behind the vaccines developed."</i> <i>"Many reasons: I believe in science and medicine; I know how useful and necessary vaccines are and I want to feel safe during this pandemic."</i>
Desire to return to 'normalcy' (e.g., stop wearing masks, travel, attend events)	<i>"It's the smart thing to do. I'm ready to carry on with a more normal life and the only way to get there is for everyone to get vaccinated."</i>

	<i>"I wanted to protect myself and others! And to start eating out, going to concerts, and enjoying life again!"</i>
Availability (e.g., access, free to receive)	<i>"It was available and seemed to be the best option for me."</i> <i>"Because it was available and free."</i>
Due to outside pressure (e.g., coworkers, family, work regulations)	<i>"The rest of my coworkers were getting it and I did not want to be "that" person."</i> <i>"I wouldn't have but my girlfriend said she wanted everyone in the house to have one..."</i>

Non-Vaccination Reasons, Barriers, Incentives

Respondents who reported that they were not vaccinated were asked to rate a series of statements on a five-point Likert scale from 1=Strongly Disagree to 5=Strongly Agree. Non-vaccinated individuals mostly agreed the vaccine came out too fast, that they didn't need it, and that it was unsafe. Respondents least agreed that they could not get time off to receive the vaccine; that is, respondents had little issue finding time to receive the vaccine.

Table 2.6: Beliefs regarding the COVID-19 vaccine

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A
I have not received the COVID-19 vaccine due to medical reasons.	3 (16.7%)	3 (16.7%)	4 (22.2%)	2 (11.1%)	3 (16.7%)	3 (16.7%)
I do not believe the COVID-19 vaccine is safe.	1 (5.6%)	1 (5.6%)	6 (33.3%)	2 (11.1%)	7 (38.9%)	1 (5.6%)
I believe the COVID-19 vaccine was released too fast.	-	1 (5.6%)	4 (22.2%)	2 (11.1%)	10 (55.6%)	1 (5.6%)
I am concerned about infertility.	2 (11.1%)	2 (11.1%)	5 (27.8%)	1 (5.6%)	4 (22.2%)	4 (22.2%)
I do not need the vaccine.	1 (5.6%)	-	5 (27.8%)	4 (38.9%)	7 (38.9%)	1 (5.6%)
I believe the COVID-19 vaccine is not effective.	1 (5.6%)	1 (5.6%)	7 (38.9%)	4 (22.2%)	4 (22.2%)	1 (5.6%)
I cannot get time off to receive the COVID-19 vaccine.	8 (44.4%)	4 (22.2%)	4 (22.2%)	-	-	2 (11.1%)

An additional statement, “I do not need the vaccine because I previously had a COVID-19 infection,” was offered to respondents to select. Four respondents (22.2%) reported that this statement applied to them. Additionally, three respondents reported that their reason was not listed and wrote-in an explanation; these are provided in Table 2.6b.

Table 2.6b: Written-in additional reasons for vaccine hesitancy

Response
<i>Fear of needles.</i>
<i>Feel like I'm healthy enough if I get the virus.</i>
<i>To me it's just another case of the flu and I haven't gotten a flu vaccine in over 7 years so why start now.</i>

Unvaccinated individuals were also asked to identify any barriers they experienced related to receiving the COVID-19 vaccine. Most respondents reported that their personal belief system was a contributor to their decision. Respondents were given the opportunity to write-in other general barriers to vaccination; their responses appear in Table 2.7b.

Table 2.7a: Barriers regarding the COVID-19 vaccine

Barrier	Frequency	Percent
Personal belief system	10	55.6%
Other	8	44.4%
Transportation	1	5.6%
Time	-	-
Money	-	-

Table 2.7b: Written-in additional barriers for vaccination

Response
<i>Concerns over adverse medical reaction.</i>
<i>Don't feel I need it.</i>
<i>Health concerns.</i>
<i>Health.</i>
<i>I don't want it.</i>
<i>No Barriers - just not wanting to receive the vaccine. Fear of needles.</i>
<i>Side effects of the vaccine. Don't want to get something that they aren't even sure when you'll need a booster.</i>

Unvaccinated respondents were asked what incentives would encourage them to receive the COVID-19 vaccine; the majority reported “Nothing.” Respondents also reported that a one-dose vaccine vs. two, a cash incentive, time off, and easier access may incentivize them to vaccinate. Respondents were given the opportunity to write-in other proposed incentives and Table 2.8b summarizes these.

Table 2.8a: Incentives to receive the COVID-19 vaccine

Incentive	Frequency	Percent
Nothing	10	55.6%
Other	3	16.7%
Cash incentive	2	11.1%
One dose vs. two	2	11.1%
Time off	1	5.6%
Access	1	5.6%

Table 2.8b: Written-in additional incentives to receive the vaccine

Response
<i>40,000 dollars.</i>
<i>Further research and studies.</i>
<i>If I could be guaranteed that it will not affect my heart.</i>

Demographics

The majority of survey respondents were white and female; however, age varied within the response group. Table 2.9 details the demographics of the response group.

Table 2.9: Response group demographics

Demographic	Frequency	Percent
Gender		
Male	28	35.0%
Transgender Male	-	-
Female	49	61.3%
Transgender Female	1	1.3%
Gender Variant/Non-Conforming	-	-
Other	1	1.3%
Prefer not to answer	1	1.3%
Age		
18-24	6	7.5%
25-34	21	26.3%
35-44	16	20.0%
45-54	17	21.3%
55-64	13	16.3%
65-74	6	7.5%
75+	-	-
Prefer not to answer	1	1.3%
Race		
Asian	-	-
Native Hawaiian or Other Pacific Islander	-	-
Black/African-American	3	3.7%
White	70	86.4%
Hispanic/Latino	4	4.9%
American Indian/Alaskan Native	-	-
Prefer not to answer	3	3.7%
Other	2	2.5%

Responses indicated that, of the females who completed the survey, 18.4% reported to be unvaccinated. Similarly, 21.4% of male respondents reported non-vaccination. Data shows that older age groups were the most likely to be vaccinated; see Table 2.10. Due to the sample size overwhelmingly identifying as white, correlations between vaccination status and race could not be determined.

Table 2.10: Frequency of individuals vaccinated by age

Age Group	# Vaccinated (%)	# Non-Vaccinated (%)
18-24	3 (50.0%)	3 (50.0%)
25-34	15 (71.4%)	6 (28.6%)
35-44	14 (87.5%)	2 (12.5%)
45-54	12 (70.6%)	5 (29.4%)
55-64	12 (92.3%)	1 (7.7%)
65-74	6 (100%)	-

Chapter 3 - Discussion of Survey Results, Scholarly Reflection, and Relevance of Coursework

This chapter reflects on the results of my survey. As indicated below, I was able to gain insight into the sociology of a public health crisis and response. More generally, I was able to integrate previous coursework taken as part of my MPH degree; this chapter also considers the relevance of principles and skills learned and acquired in those courses. This chapter ends with a summary of the competencies I have acquired through the MPH program.

Overall, the majority of survey respondents were vaccinated. These individuals most frequently reported wanting to protect themselves and others against the COVID-19 virus as their main incentive to vaccinate. However, qualitative responses also showed that a trust in the vaccination process and healthcare experts is a significant factor when considering vaccination. Individuals also frequently mentioned a desire to return to a “normal” way of life. These factors could be promoted as positive outcomes of vaccination by public health officials and may reach a broader audience who are not concerned with the health effects of COVID-19. To a lesser extent, respondents reported that availability and the low or absent cost of the vaccine were contributing factors in their choice to receive vaccination. Although access is important to any public health initiative, this factor seems to have less of an influence on an individual’s decision to get the vaccine.

Of the individuals who reported that they were not vaccinated, many agreed that they believed the vaccine came out too quickly, that they didn’t need it, and that it is unsafe. These factors should be addressed by healthcare providers and public health officials during education initiatives. Most beliefs held by unvaccinated individuals centered around the idea of safety and health. Overall, lack of access, money, transportation, or time off were not contributing factors in their choice not to be vaccinated. Furthermore, most unvaccinated individuals reported that nothing would incentivize them to receive the vaccine. Although some respondents reported that a cash incentive or time off might encourage them to be vaccinated, the majority had already made a final decision. This may help shape public health vaccination initiatives. Although incentive programs can be useful for some of the population, such efforts

may not be efficient in light of the whole picture; spending time and financial resources on educational materials that promote the safety and efficacy of the vaccine may be more meaningful and impactful.

There were few correlations between respondent demographics and vaccination decisions. Male and female respondents had similar vaccination rates. However, an increase in respondent age pointed to a greater likelihood of receiving the vaccine. This is likely because COVID-19 has greater health effects on older individuals (34). Vaccination rates among different races was unable to be properly analyzed due to the overwhelmingly uniform response pool, as 70 of the respondents (86.4%) identified as white. This was a limitation of the survey and its analysis, as having a more diverse group of respondents may have led to more meaningful data.

Other limitations of the study include the survey process. Although survey distribution has cost and time advantages, it also can lead to low and selective participation bias (35). The companies and organizations selected by RCHD represent hundreds of employees in the Riley County area; however, the response rate was overwhelmingly low. During initial planning of the survey distribution, several organizations expressed reluctance due to privacy concerns. This may have had a significant impact on response rate. Moreover, a low percentage (22.2%) of the respondents represented unvaccinated individuals. This limited the survey feedback and the power of the analysis. Vaccinated individuals were more likely to respond to the survey and offer meaningful qualitative feedback. Future vaccine hesitancy studies conducted by public health entities should stress anonymity and privacy protections during initial contact. These limitations taught me interesting realities about public health survey management.

The COVID-19 pandemic has been highly politicized and a conspicuous “polarizing issue” among the general U.S. population (36). This political reality may have led to a reluctance among some to participate in the survey and report their vaccination status to a public health office, despite assured anonymity. Clearly, a consistent decline of trust in the public health system has contributed to the politicization problem (37). In order to gain valuable insight into the populations’ views on vaccines, public health, and specific infectious diseases, public health practitioners need to nurture trust with the general population.

During my academic career, I took several courses which prepared me for this APE. The first course I took, *Social and Behavioral Bases of Public Health*, informed me on the social, economic, and behavioral factors that influence an individual's health and beliefs regarding the public health system. I took several courses, including *Introduction to Epidemiology* and *Fundamental Methods of Biostatistics*, that taught me how to use and apply quantitative data to public health issues. Another informative course, *Administration of Health Organizations*, helped me to understand the complexities of the U.S. healthcare system and the difficulties individuals face while paying for treatment, obtaining insurance, and navigating healthcare bureaucracy. Finally, lessons from the course *Multidisciplinary Thought and Presentation* allowed me to organize my thoughts and findings to make them accessible to an audience.

Table 3.1 Summary of MPH Foundational Competencies

Number and Competency		Description
2	Select quantitative and qualitative data collection methods appropriate for a given public health context	I assisted RCHD with identifying survey items that were appropriate for recipients. We determined that asking mostly quantitative questions would result in a higher response rate. We also created several scaled items (on a scale of 1-5: 1=Strongly Disagree, 5=Strongly Agree) that would allow us to gain insight into the community's beliefs regarding vaccination. Finally, we included an optional demographic section to be cautious of anonymity.
3	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	After receiving data from the survey, I used SPSS software to analyze the quantitative responses. I recorded frequencies of responses and analyzed the mean and standard deviation of scaled items. Furthermore, I analyzed responses using cross-tabulation to examine the relationship between multiple variables. Finally, I used the constant comparative method to identify themes within qualitative responses.
7	Assess population needs, assets and capacities that affect communities' health	My first blog post examined the needs of the Manhattan community and offered insights on policies and practices that had been implemented.

14	Advocate for political, social or economic policies and programs that will improve health in diverse populations	In my third blog post I focused on the implications of the COVID-19 delta variant and how it has affected the Manhattan community. I also described the importance of local health departments and their impact on individuals who may not have health insurance or the financial means to pay for testing and vaccination. Throughout my experience I advocated for underrepresented populations while working with RADxUP and expressed my passion for public health policies that reach all individuals in a community.
19	Communicate audience-appropriate public health content, both in writing and through oral presentation	I developed several social media posts that were used by RCHD to advertise COVID-19 testing events. Creating something that was both visually stimulating and informational was important for outreach and turnout to these events.
20	Describe the importance of cultural competence in communicating public health content	My second blog post explained possible reasons behind low turnout to vaccination events and discussed the possible implications of targeting cultural events like Juneteenth.

Table 3.2 MPH Foundational Competencies and Course Taught In

22 Public Health Foundational Competencies Course Mapping	MPH 701	MPH 720	MPH 754	MPH 802	MPH 818
Evidence-based Approaches to Public Health					
1. Apply epidemiological methods to the breadth of settings and situations in public health practice	x		x		
2. Select quantitative and qualitative data collection methods appropriate for a given public health context	x	x	x		
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	x	x	x		
4. Interpret results of data analysis for public health research, policy or practice	x		x		
Public Health and Health Care Systems					
5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings		x			

22 Public Health Foundational Competencies Course Mapping	MPH 701	MPH 720	MPH 754	MPH 802	MPH 818
6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels					x
Planning and Management to Promote Health					
7. Assess population needs, assets and capacities that affect communities' health		x		x	
8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs					x
9. Design a population-based policy, program, project or intervention			x		
10. Explain basic principles and tools of budget and resource management		x	x		
11. Select methods to evaluate public health programs	x	x	x		
Policy in Public Health					
12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence		x	x	x	
13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes		x		x	
14. Advocate for political, social or economic policies and programs that will improve health in diverse populations		x			x
15. Evaluate policies for their impact on public health and health equity		x		x	
Leadership					
16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making		x			x
17. Apply negotiation and mediation skills to address organizational or community challenges		x			
Communication					
18. Select communication strategies for different audiences and sectors	DMP 815, FNDH 880 or KIN 796				
19. Communicate audience-appropriate public health content, both in writing and through oral presentation	DMP 815, FNDH 880 or KIN 796				
20. Describe the importance of cultural competence in communicating public health content		x			x
Interprofessional Practice					
21. Perform effectively on interprofessional teams		x			x

22 Public Health Foundational Competencies Course Mapping	MPH 701	MPH 720	MPH 754	MPH 802	MPH 818
Systems Thinking					
22. Apply systems thinking tools to a public health issue			x	x	

Table 3.3 Summary of MPH Emphasis Area Competencies

MPH Emphasis Area: Infectious Disease and Zoonoses		
Number and Competency		Description
1	Pathogens/pathogenic mechanisms	Evaluate modes of disease causation of infectious agents.
2	Host response to pathogens/immunology	Investigate the host immune response to infection.
3	Environmental/ecological influences	Examine the influence of environmental and ecological forces on infectious diseases.
4	Disease surveillance	Analyze disease risk factors and select appropriate surveillance.
5	Disease vectors	Investigate the role of vectors, toxic plants and other toxins in infectious disease.

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Appendices

Attached is the IRB approval and my survey instrument.