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## An Evaluation of COVID-19 Vaccination Rates of the Patients at the Kentucky Racing Health Services Center

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## Cover Page Footnote

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An Evaluation of COVID-19 Vaccination Rates of the Patients  
at the Kentucky Racing Health Services Center

By  
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Submitted in partial fulfillment of the requirements for Graduation *Summa Cum Laude*  
and  
for Graduation with Honors from the Departments of Biology and Latin American and Latino  
Studies

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### **Abstract**

COVID-19 vaccines have been widely available to the U.S. public since early 2021. However, vaccination rates still vary considerably across geographical areas and different populations. The objective of this study was to research overall vaccination rates against COVID-19 for Latinx patients at the Kentucky Racing Health Services Center (KRHSC). Vaccination and booster data was collected from June to December 2021 for all unique patients visiting the center. It was initially hypothesized that these rates of vaccination and booster doses for the KRHSC patients would be lower than the data reported by Kentucky and Jefferson County. After a retrospective review, the results conveyed that the KRHSC patients actually had higher percentages of vaccination when compared to published values by the state and Jefferson County. However, this did not hold true for booster vaccinations, as no patients at the KRHSC reported receiving additional doses against COVID-19. These results suggest that efforts are needed to encourage higher COVID-19 vaccinations and booster doses in patients at the KRHSC.

### **Lay Summary**

The COVID-19 pandemic has significantly impacted the health and well-being of people across the world. The rollout of vaccines to provide immunity from the virus causing this pandemic has differed based on geographical location and economic status. This study aimed to evaluate the rate of vaccination specifically for the Latinx patients coming to the Kentucky Racing Health Services Center (KRHSC), which provides primary care to backside racetrack workers at Churchill Downs. Patient records were evaluated and recorded to determine how many patients received any type of COVID-19 vaccine. The results demonstrated that more of the KRHSC patients were fully vaccinated when compared to people across Kentucky and in Jefferson County. However, fewer of these patients had received booster (or additional) doses.

**An Evaluation of COVID-19 Vaccination Rates of the Patients  
at the Kentucky Racing Health Services Center (KRHSC)**

The COVID-19 pandemic has put a large strain on medical facilities across the world. The coronavirus causing this disease, SARS-CoV-2, spreads quickly and efficiently between human hosts. It has been shown to cause severe health complications, such as pulmonary thromboembolisms, cardiac irregularities, kidney dysfunction, and cytokine storms by the immune system (Luigetti & Frisullo, 2020); however, it does not affect all demographic populations in the same way. In the United States (U.S.), people of color are disproportionately represented in mortality statistics while making up a slim fraction of the overall population (Rogers et al., 2020). Latinx (referring to those with Latin American heritage) patients are disproportionately represented in this manner, with a report stating that Latinx people made up approximately 33% of new COVID-19 cases, despite only comprising 18% of the U.S. population (American Medical Association, 2020). This statistic suggests that these vulnerable communities may not be getting adequate support from public health structures to prevent symptomatic infections.

The isolation created by lockdowns in the pandemic has also been shown to increase general stress levels and uncertainty in those living in the U.S. (Park et al., 2020). This may result in decreased levels of resilience and adherence to public health guidelines in the long run (Park et al., 2020). Higher levels of stress and mental health issues, coupled with increased sleep problems and alcohol use, have been observed in minority groups during the pandemic (MacCarthy et al., 2020). Further, marginalized subgroups within minority groups have felt even more ostracized from others and their partners during the strict lockdowns of the pandemic (Ruprecht et al., 2021). For example, Latinx sexual minority men and transgender women have

reported more interpersonal conflict with partners and other people in their lives due to the pandemic (MacCarthy et al., 2020). These secondary effects of the COVID-19 pandemic highlight why spread of this virus needs to be limited in the general population.

Approximately 68,000 people identify as Latinx in the city of Louisville, and Spanish is the most common language spoken in the city other than English (Data USA, 2019). The KRHSC specializes in providing essential care to racetrack workers who are members of this ethnic identity. The author of this thesis was connected to the KRHSC through the Latin American and Latino Studies (LALS) program at the University of Louisville (UofL). This thesis is an expansion of a research paper created for the LALS 400 course. As of February 2022, the author continues to work as an interpreter at the KRHSC.

### **Introduction**

The KRHSC is a nonprofit healthcare center funded by the Kentucky Racing Health and Welfare Fund (KRHWF). The KRHWF is a non-profit charitable organization that receives its funding from uncashed or escheated winning tickets at Kentucky's thoroughbred racetrack on an annual basis. Enabling legislation to fund this organization was passed by the Kentucky Legislature in 1978 and can be found in the Kentucky Revised Statutes 230.374, "Payments to Kentucky Racing Health and Welfare Fund" (Kentucky General Assembly, 1978). The KRHSC was established in 2005 as a partnership between the KRHWF and the UofL School of Nursing. The KRHSC assists individuals in the Kentucky thoroughbred racing industry working primarily on the backside at Churchill Downs. A large majority of these people are primarily non-English speaking Latinx immigrants of low socioeconomic status with minimal health literacy rates and no other means to access healthcare services. Patients only have a five-dollar co-pay for medications, so the KRHSC is an extremely essential option for workers on the racing tracks

who cannot afford other healthcare options. The primary focus of this community collaboration is to provide healthcare services to uninsured backside workers at Churchill Downs and their families. The KRHSC offers primary care, women's health checkups, and mental health services. UofL nurse practitioners, who are faculty members at the School of Nursing, provide healthcare services.

In 2020 alone, even in the midst of the COVID-19 pandemic, KRHSC provided care to 672 racetrack workers and gave over \$1.2 million worth of health and retirement benefits to patients (Kentucky Racing Health Services Center, 2020). In addition to providing healthcare services, the center has a teaching mission. The center works with various departments at UofL to coordinate student involvement in patient care. Students from many different disciplines and degree levels work at the center to simultaneously enhance their education and serve the community. The KRHSC incorporates teaching, research, and interprofessional practice into a unique care delivery model. University partners include students from the LALS program, UofL School of Nursing, and UofL School of Dentistry. These students offer medical and interpretation services as needed at the center (Kentucky Racing Health Services Center, 2020).

Three COVID-19 vaccines (Pfizer-BioNTech, Johnson & Johnson's Janssen, and Moderna-NIAID) have been widely available to the general U.S. public since early 2021. They have all been shown to be very effective in preventing transmission of COVID-19 to others and hospitalization of sick individuals (Wu et al., 2021). Additionally, booster vaccinations for all three-vaccine types became accessible in the U.S. around the end of September 2021 to help combat the surge of the Delta COVID-19 variant (LaFraniere & Weiland, 2021). The importance of booster vaccinations against COVID-19 was amplified towards the end of 2021, especially with the rise of the extremely contagious Omicron variant (Abbott, 2021). Clinical trials have

indicated that booster doses can enhance immune responses and neutralizing antibodies against COVID-19 (Spigelman, 2021). The efficacy of booster vaccinations is crucial, especially for patients that have other comorbidities or who are immunocompromised (Spigelman, 2021). The Centers for Disease Control and Prevention recommend that those eligible should get a booster shot at least five months after receiving the last dose of Pfizer-BioNTech or Moderna vaccinations or at least two months after receiving the Janssen vaccination (2022). Additionally, people can mix and match their booster shots, but the Pfizer-BioNTech and Moderna vaccinations are preferred as booster doses in most situations (Centers for Disease Control and Prevention, 2022).

Along with other medical facilities worldwide, the patients at the KRHSC were heavily impacted by the COVID-19 pandemic. Vaccine hesitancy among this Latinx population may have contributed to high infection incidence rates (Armstrong et al., 2007). Several barriers served as promoters of vaccine hesitancy in this population, the main one being language differences (Steinberg et al., 2016). Latinx patients often do not have many resources available for primary care due to a potential language barrier between patients and medical providers; without trained interpreters, this can often lead to negative health outcomes and higher levels of medical mistrust in this patient population (Steinberg et al., 2016).

There is also a lack of relevant data relating to Latinx patients in Kentucky's state COVID-19 vaccination records. The updated dashboard from the Kentucky Department of Public Health does not clearly highlight Latinx ethnic identity, as it is not indicated if people identifying as Latinx are included in the "White" or "Other" racial classification (2022). This research study could help introduce more statistics about the Latinx population in Kentucky so



that they are clearly included in vaccination demographics (Kentucky Department of Public Health, 2022).

Distrust was another barrier that contributed to vaccination hesitancy in the Latinx population. With regards to the physician-patient relationship, previous univariate and multivariate analyses have conveyed that minority patients with lower socioeconomic status reported higher levels of medical distrust overall (Armstrong et al., 2007). While this distrust tends to vary by geographic region and racial identification, Hispanic and Black patients have reported decreased trust in the U.S. healthcare system when compared to White patients (Armstrong et al., 2007). This may be due to racism present in the medical field, more for-profit care for private investors, and increased instances of abuse toward minority patients by healthcare providers (Armstrong et al., 2007). The COVID-19 pandemic has specifically demonstrated the presence of vaccine hesitancy in the general population, which appears to peak during increased incidence rates of infection (Pullan & Dey, 2021). The rates of reported medical distrust and vaccine hesitancy were central motivations for conducting this research study, as the patient population of interest is made up of those with Latinx and Hispanic identities. The researchers involved in this study kept this in mind while creating the proposed methodology.

To determine the rate of vaccination at the KRHSC, a research study was conducted with the primarily Latinx patient population. It was hypothesized that the rate of vaccination at the KRHSC was lower than the average percentage of vaccination in Jefferson County and the state of Kentucky. This was because the Latinx patient population at the KRHSC was thought to have a higher level of medical mistrust and vaccine hesitancy, as exemplified through previous studies (Armstrong et al., 2007; Pullan & Dey, 2021). It was also predicted that social media attitudes

and other agents of socialization may have contributed to increased vaccine hesitancy for patients, though these specific variables were not explicitly reviewed in this study.

### **Methodology**

The objective of this study was to analyze COVID-19 vaccination rates of the Latinx patients served at the KRHSC. Those participating in this research study were adult patients visiting the KRHSC for primary care services. Patients primarily belonged to the Latinx community, which includes immigrants from Mexico, Guatemala, Cuba, and Puerto Rico. Each patient upon initial triage was provided with a “Patient Health Questionnaire,” otherwise known as the PHQ-2. This was a screening for anhedonia, or the loss of pleasure from normal activities, and depression to determine whether the patient needs a psychiatric consult. Starting in early June 2021, while triaging and gathering the PHQ-2 data, a question asking patients if they had received the COVID-19 vaccination was added. If the patient responded “Yes,” they were then asked about the approximate month they were vaccinated, and which vaccine type they received. If they responded “No,” the patient was asked if they would like to receive the vaccine in the future. The responses patients had to the PHQ-2 and vaccination status were then recorded by the nurse practitioners on the patient’s Electronic Medical Record (EMR).

A retrospective review of vaccination rates from June to December 2021 was conducted as part of this study utilizing patient EMRs. The EMR used at the KRHSC is called Practice Fusion. Medical providers entered the vaccination status of each patient that came to the center into Practice Fusion under the preventive care section. All patient encounters and EMRs were captured in a report generated by the KRHSC director and project lead, Dedra Hayden, DNP, ANP, APRN-C. COVID-19 vaccination status, along with the date and type of vaccination (Pfizer, Johnson & Johnson, or Moderna), were recorded under each patient’s documented

summary. This vaccination data was collected during the triage process prior to each visit. All patient data was de-identified and confidential and all health information was protected. Simple descriptive statistics were used to analyze all collected data from the EMR and compare it to publicly available COVID-19 vaccination rates by the Jefferson County and Kentucky Departments of Public Health.

UofL Institutional Review Board (IRB) approval was obtained by the researchers involved in this study. Health Insurance Portability and Accountability Act (HIPAA) research training on working with human subjects was also required and completed for this research study before accessing data; however, patient informed consent was not required for this study, as no data was collected directly from patients at the KRHSC. A waiver of consent was utilized. The only data collected was de-identified data within the EMR. There was no risk, potential harm, or injury associated with the research that a reasonable person would likely consider significant in deciding whether or not to participate in the study. The concept of risk includes discomfort, burden, or inconvenience a subject may experience as a result of the research procedures. All data was collected electronically and stored on an encrypted computer owned by the KRHSC. This computer was password protected, maintained in a locked office, and turned off on a daily basis.

## **Results**

This retrospective review of medical records involved unique patients ( $N = 237$ ) who utilized the KRHSC between June and December 2021. The data collected for these patients included their vaccination status, the vaccine type they received (Pfizer, Moderna, or Johnson & Johnson), the total doses or boosters they had gotten, and the date of their last vaccination dose.

A sample of the data collection table is provided below, with ID numbers being used to refer to patients.

**Table 1**

*EMR Data Collection Sample, June to December 2021*

<b>Patient Number</b>	<b>Vaccination Status (y/n)</b>	<b>Vaccine Type (Pfizer, Moderna, J &amp; J)</b>	<b>Dose Number 1 (y/n)</b>	<b>Dose Number 2 (y/n)</b>	<b>Booster Shot (y/n)</b>	<b>Date of Last Dose</b>
122	Yes	J & J	Yes	N/A	No	Mar-21
123	Yes	J & J	Yes	N/A	No	Mar-21
124	No	N/A	No	No	No	N/A
125	Yes	J & J	Yes	N/A	No	Apr-21
126	No	N/A	No	No	No	N/A
127	Yes	Moderna	Yes	Yes	No	Apr-21
128	No	N/A	No	No	No	N/A

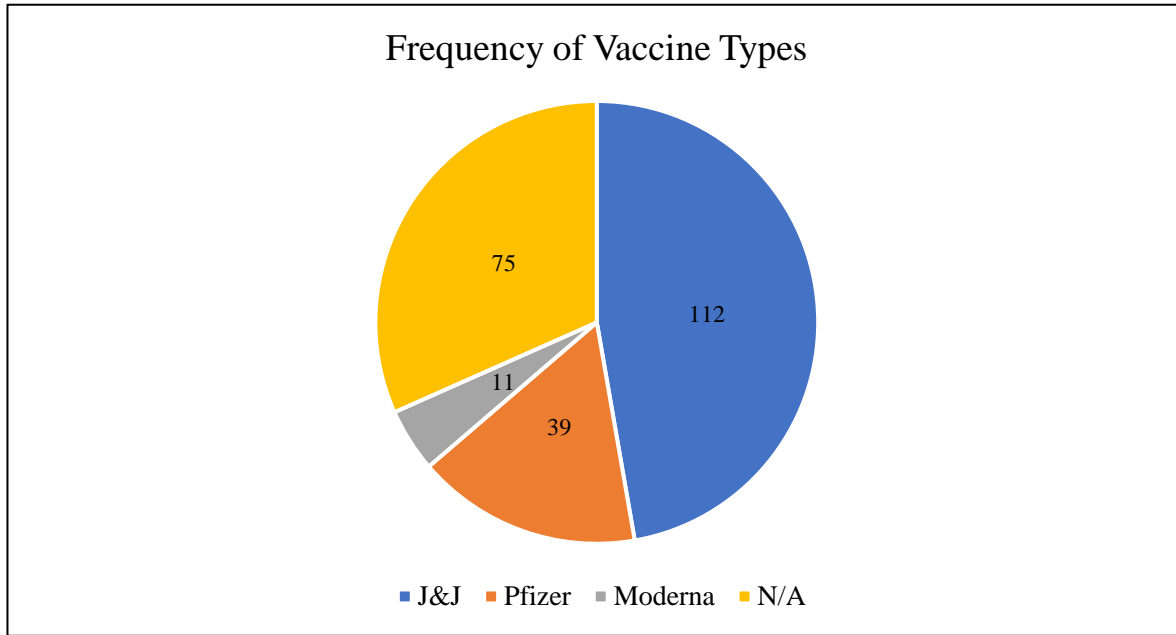
A substantial amount of the KRHSC patients ( $n = 75$ ) reported during the triage process that they had not received any type of COVID-19 vaccination. This constituted approximately one-third (31.6%) of the total sample, and the rest of the patients ( $n = 162$ ) evaluated during this time period were vaccinated (68.4%). Of those patients who were vaccinated against COVID-19, a large majority ( $n = 112$ ; 69.1%) received the vaccine developed by Johnson & Johnson, which only consists of one dose. However, some patients did report receiving both doses of the Pfizer ( $n = 39$ ; 24.1%) or the Moderna ( $n = 11$ ; 6.8%) COVID-19 vaccines. Quite surprisingly, none of the patients (0%) visiting the KRHSC between June and December 2021 reported receiving any

sort of booster dose. However, booster doses were not applicable for the entire sample, as some patients were not eligible at the time of review for boosters based on the date of their last COVID-19 vaccination.

Unique patient visits to the center each month were also recorded as part of this retrospective review. The month of June 2021 saw the highest patient volume ( $n = 96$ ), followed by November 2021 ( $n = 57$ ) and October 2021 ( $n = 42$ ). For each month, the percentage of those fully vaccinated varied. The highest full vaccination percentages based on monthly unique visits were observed for the months of June ( $n = 79$ ; 82.3%), October ( $n = 27$ ; 64.3%), July ( $n = 8$ ; 61.5%), and September ( $n = 6$ ; 60%), and the lowest vaccination percentages were seen in November ( $n = 32$ ; 56.1%), December ( $n = 5$ ; 55.6%), and August ( $n = 5$ ; 50%). The top four months during which patients at the KRHSC reported receiving their last dose were April 2021 ( $n = 66$ ), March 2021 ( $n = 45$ ), May 2021 ( $n = 17$ ), and July 2021 ( $n = 12$ ), which align with the vaccine rollouts of the U.S. Graphs 1 through 3 convey these results.

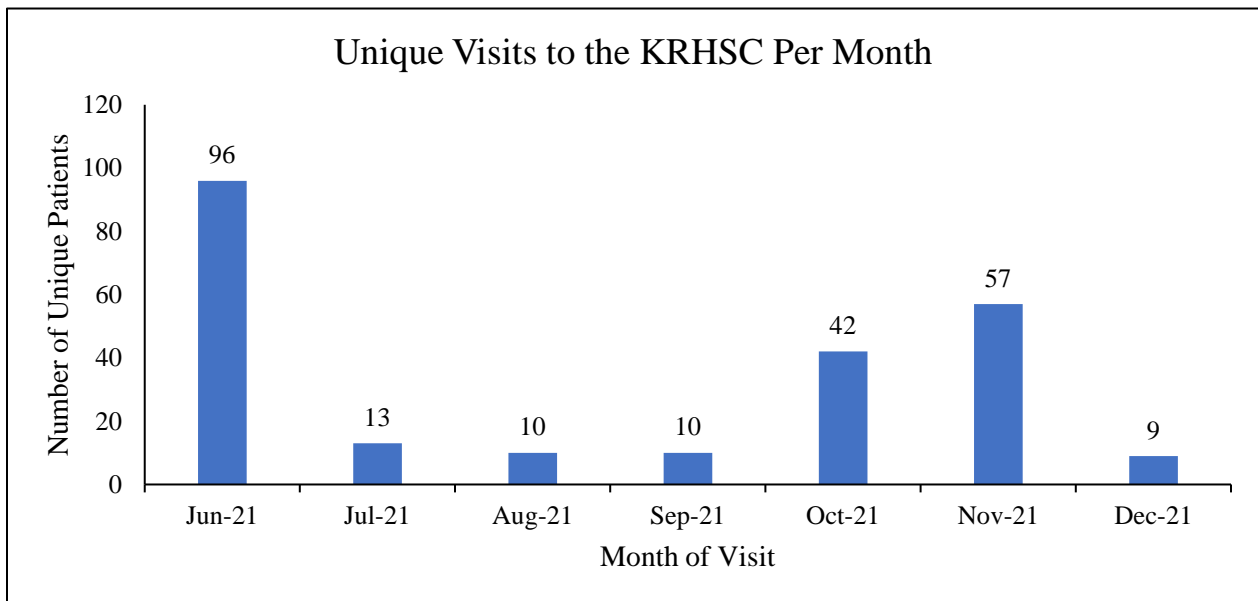
**Graph 1**

*Vaccine Type Breakdown for the KRHSC Patients, June to December 2021*



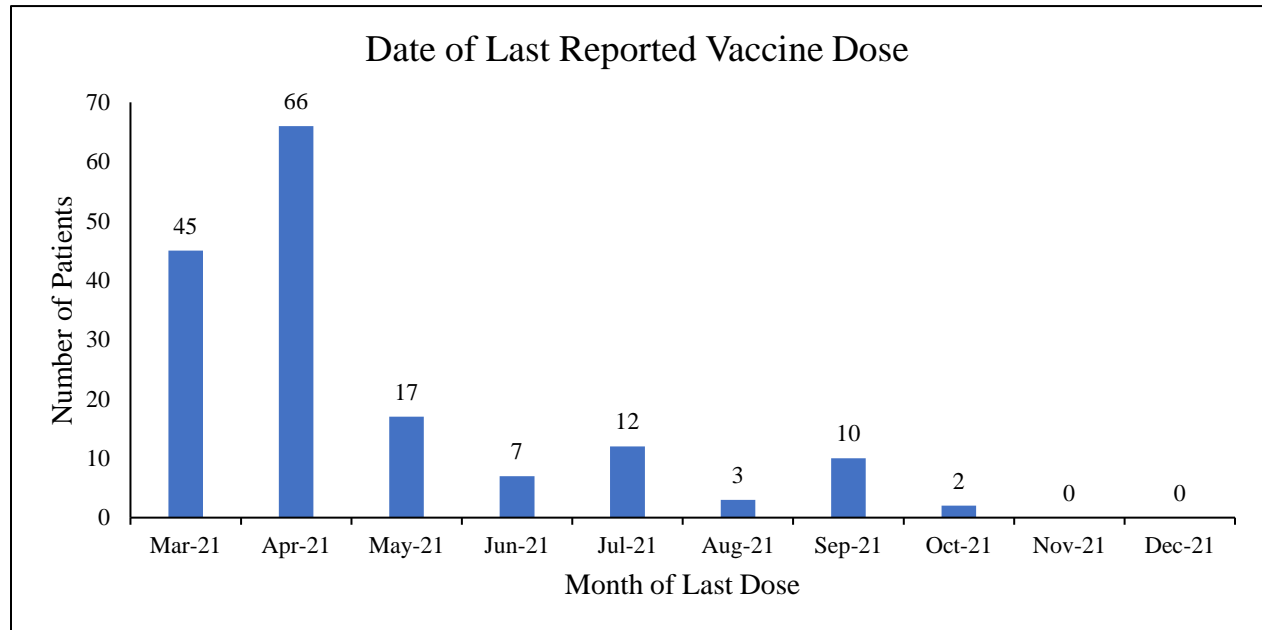
**Graph 2**

*Unique Patient Visits Per Month, June to December 2021*



**Graph 3**

*Reported Date of Last Dose for Sample Patients, June to December 2021*



One of the primary objectives of this research study was to compare the KRHSC vaccination rates with those published by Jefferson County and the state of Kentucky. According to the Kentucky Department of Public Health, as of February 2022, a majority of Kentucky residents 18 years of age and above (66%) are fully vaccinated against COVID-19. Out of those who have received a first dose in the state, a small fraction of the population ( $n = 203,549$ ; 7%) received the Johnson & Johnson vaccine, while many more received either the Moderna ( $n = 1,108,414$ ; 39%) or Pfizer ( $n = 1,558,989$ ; 54%) vaccines. Kentucky has a low recorded rate of booster doses (30%) for adults (Kentucky Department of Public Health, 2022). Specifically, Jefferson County has the third highest vaccination percentage (73%) in the state for at least one dose of any vaccine (Kentucky Department of Public Health, 2022). Additionally, a majority of residents in Jefferson County are fully vaccinated (64.6%), but fewer people have received

booster vaccinations (44.3%) against COVID-19 (Department of Public Health and Wellness, 2022).

### **Discussion**

The initial hypothesis for this research study was partially supported. The KRHSC had a higher fully vaccinated percentage (68.4%) from June to December 2021 than the reported percentage for Kentucky (66%) through February 2022. This value represents ages 18 and up, which was the same population studied at the KRHSC. This fully vaccinated data does not include boosters or additional doses. As of December 2021, zero patients at the KRHSC reported a booster dose compared to the rates for Kentucky (30%) or Jefferson County (44.3%) as designated on the dashboards. This data supported the hypothesis that the KRHSC's vaccination rate would be lower than the state of Kentucky as it relates to boosters. The center also did have an overall higher rate of full vaccination than Jefferson County (64.6%), which did not support the hypothesis.

### **Limitations**

This study did have some limitations. At the KRHSC, the high percentage of Johnson & Johnson COVID-19 vaccinations was most likely explained by a requirement by Churchill Downs, as reported to the KRHSC staff (Dr. Hayden and Dr. Krista Roach, MSN, APRN, FNP-C, WHNP-BC) from patients. In order for this population to continue to work, workers were required to be fully vaccinated. Several health fairs were held at the backside of Churchill Downs to promote vaccinations in March, April, and July 2021. Johnson & Johnson was the primary vaccine type used at these events. This may have been due to the fact that Johnson & Johnson's COVID-19 vaccination only requires one dose for full immunity, which could have lowered costs for Churchill Downs and decreased the amount of patients required to follow-up for a



second vaccine dose (in the case of Pfizer and Moderna), as many of the racetrack workers are mobile and leave the state for other racetracks throughout the year. Since none of the patients reported boosters as of December 2021, it is assumed that Churchill Downs is not requiring additional doses of COVID-19 vaccines for backside racetrack workers. As previously mentioned, booster vaccinations are essential for maintaining immunity, and each of the three main COVID-19 vaccination types have different schedules for when boosters can be administered. For example, for patients who received Johnson & Johnson's vaccine, a booster is recommended after at least 2 months (Centers for Disease Control and Prevention, 2022). The highest frequencies of COVID-19 vaccinations for patients in this study occurred in the months of the health fairs, and a large majority of these patients most likely require boosters based on the CDC's recommendations.

Another limitation in this retrospective study was the use of self-reported data from patients at the KRHSC. Since these patients were directly asked about their vaccination status, response bias may have been introduced and some of them may not have provided accurate answers to these questions. This could have occurred if the participants wanted to provide socially desirable responses (e.g., being vaccinated against COVID-19, even if they actually were not). Additionally, patient access to the KRHSC impacted monthly appointments. The lower rate of unique visits to the center during July and August may have been due to the KRHSC being closed, and the sudden drop in visits between November and December could have been caused by many of the racetrack workers leaving for the winter.

A major limitation of this study was a lack of access to archived vaccination records from the Kentucky Department of Public Health. On the publicly available dashboards for COVID-19 vaccination data, it is not currently possible to view vaccination data for previous months. This

may have led to some errors when comparing the results of this retrospective review to vaccination rates for the state and Jefferson County. While past vaccination records may be available in an online medium, they were not accessible to the author of this thesis.

A few patients reported why they did not want to receive any COVID-19 vaccine during the triage process. The most common response for this was that they were afraid of the side effects, as many of them had reported that family members or friends had long-term medical issues after being vaccinated. Another typical reason for being unvaccinated was uncertainty of the vaccines' contents and the unfounded belief that these vaccines might cause more harm than the actual COVID-19 infection. To assuage these fears, the nurse practitioners at the KRHSC instructed these patients in the benefits of vaccination and how the risk for mortality and negative side effects was actually higher for COVID-19 infection compared to any of the available vaccines. The KRHSC providers also responded to this by providing a vaccination campaign with a question and answer platform on Facebook Live that had over 2,000 views, as reported to the author of this thesis by Dr. Hayden and Dr. Roach of the KRHSC.

Future studies have been considered to expand on the sustainability of this retrospective review. Specifically, this research study could be continued by providing a questionnaire developed by Kumari et al. (2021) to Latinx patients at the KRHSC. This questionnaire contains detailed questions relating to patient attitudes about the COVID-19 vaccines. For example, one question of interest on this questionnaire is, "In the present era, there are multiple sources of information regarding a particular issue. How significantly have the following sources of information influenced your opinion regarding vaccination?" Responses options include, "News from National TV/Radio," "Government agencies," "Social media," "Discussion amongst friends and family," and "Healthcare provider." The questionnaire developed by Kumari et al. (2021)

has thirty-nine items in total and was originally developed for use in India during the surge in COVID-19 cases over summer 2021. This questionnaire has been validated through principal component analysis, with a Kaiser-Meyer-Olkin value of 0.826 (values above 0.5 demonstrate data that is suitable for factor analysis; Kumari et al., 2021). It is also reliable with a Cronbach's alpha value of 0.86 (Kumari et al., 2021). The authors of this paper have granted permission to use this questionnaire for other patient population, with proper acknowledgement.

For a future research study, this questionnaire could be translated into Spanish to allow Latinx patients at the KRHSC to answer the questions in their native language. The translation should be properly verified, and simple descriptive statistics should be used to analyze all collected data from the questionnaire. This questionnaire could easily be offered to patients following their scheduled appointment time and would be presented on an iPad via Google Forms.

This retrospective review was especially important because it focused entirely on Latinx patients. This patient population should feel supported by healthcare professionals, as this may help increase COVID-19 vaccination rates in the long run. Overall, this study addressed the stated objectives and demonstrates promising results about COVID-19 vaccination rates at the KRHSC. Further study will provide more insights about attitudes surrounding COVID-19 attitudes for patients at this center. The author of this thesis is looking forward to expanding the scope of this study.

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