

Research Report Template
Rhys Axon, Ph.D. Updated 20 November 2020

PROJECT TITLE & AUTHORS

Project Title:	Challenges and Limitations of the COVID-19 Vaccine Distribution In Arizona Federally Qualified Health Centers	
Project advisor name & email:	Dr. Elizabeth Hall-Lipsy	ehall@pharmacy.arizona.edu
Student name & email:	Patrick Maloney	pjmaloney@pharmacy.arizona.edu
Student name & email:	Brandon Boucher	bjboucher@pharmacy.arizona.edu

PROPOSAL CHECKLIST

Completed (Y)	Checklist item
Y	Project title is clear and concise.
Y	Names and emails for project advisor(s) and up to five students per group are provided.
Y	Problem statement states general issues under consideration.
Y	Literature review contains at least four reviews (at least one review uses a similar method to the proposed project), is sufficient to develop a sound reason to conduct the project, and clearly leads to the purpose statement.
Y	Purpose statement is clearly stated.
Y	Up to three specific aims with corresponding hypotheses are clearly stated.

Y	Methods is written in future tense and includes appropriate and clear: study design, subject/data selection, human subjects, sample size, instruments, variables (independent, dependent, descriptive/demographic), data collection procedures, data storage/access procedures, project assumptions and limitations, and planned data analysis.
Y	Planned data analysis is appropriate and addresses the hypotheses.
Y	Timeline for project completion is provided and is reasonable.
Y	Budget describes all applicable costs even if they will not actually be paid (e.g., personnel time, cost of lab equipment, photocopying charge).
Y	Reference list is complete and contains appropriate references, and reference style is applied correctly and consistently.
Y	Appendix A (Literature Search Strategy), Appendix B (Type of IRB Approval Required), Appendix C (Data Collection Forms/Data Dictionary), and any additional appendices (as necessary) are provided on a new page at the end of the proposal.
Y	Proposal and IRB (if required) submitted to D2L and project advisor(s).
Y	Template structure is maintained and all required sections are included. Red text instructions/examples are removed. Proposal is written in Times New Roman 12-point font and does not exceed 10 single-spaced pages (excluding appendices). Proposal has been spell-checked and grammar-checked.

ABSTRACT

The rollout of COVID-19 vaccines was a massive undertaking for Arizona's healthcare providers. Clinics all over the state were tasked with ordering, storing, distributing, and administering the vaccines to protect Arizonans against the COVID-19 virus. Safety net clinics in particular were integral for getting the vaccine to the most vulnerable members of the population, both in urban and rural areas. Challenges faced by these clinics need to be quantified in order for effective support to be given in the future.

Specific Aims

1. To compare and contrast the identified challenges and opportunities described by FQHC clinics during the COVID-19 vaccine roll out in early 2021.
2. To make recommendations for future best practices in the event of another global pandemic.

INTRODUCTION

The COVID-19 vaccine roll out in Arizona has been plagued with challenges. Insufficient and inconsistent supply, confusing eligibility criteria, rigid storage requirements, and the short amount of time between vaccine preparation and expiration are just a few challenges distributors have grappled with. As eligibility expands, healthcare clinics will face unexpected limitations and barriers that will need to be evaluated and resolved. Some of the more rural health centers encounter population-based limitations that some of the more populated healthcare clinics do not normally experience. For example, Cochise county received 1,100 doses one week but had to reserve 1,000 of them for 2nd doses. This left Cochise county with just 100 doses until the next shipment.¹ Another article from Texas reported that 10% of their rural hospitals had not received any vaccines as of January 14th. Some hospitals had difficulty obtaining the Pfizer vaccine because the order minimum of the Pfizer vaccine is 975 doses.² Federally qualified health centers (FQHC) provide care to underserved areas, which are funded by the Health Resources and Services Administration (HRSA) Health Center Program.³ In Arizona, the HRSA Health Center Program has helped fund 23 different community health centers but only 14 have administrative pharmacists that can help keep track of the obstacles their rural communities experience as our mission to vaccinate the public progresses.⁴ The objective of this research proposal is to evaluate and compare the limitations/barriers and effective vaccine strategies pharmacists have come across in safety net clinics in Arizona.

The significance of our study is to characterize and describe the challenges of state based vaccine distribution versus direct distribution to clinics to better inform and guide existing and future vaccine efforts. Arizona's rural communities are home to more than 350,000 people and almost 60 million Americans live in rural communities nationwide.^{5,6} The clinics serving Arizona's rural population are a part of the COVID-19 vaccination efforts and they experience a different set of problems than urban health centers. Understanding what barriers Arizona's rural clinics face while rolling out COVID-19 vaccines will help improve the allocation of resources and assistance. There may be some relevance to other rural parts of the United States because a lack of healthcare to underserved areas does not only reside within the boundaries of Arizona but throughout the nation as well.

A key strategy to eradicating the COVID-19 virus is to vaccinate everyone who does not have a contraindication for the vaccine, but this is easier said than done because of the gap in knowledge between the limitations and barriers one FQHC may face versus another. A compilation of situational struggles and effective strategies can streamline communication and detailed information between clinics who deal with similar populations and geographical locations. According to the Kaiser Family Foundation, Arizona ranks 6th with ~118,000 COVID-19 cases per one million people, as of May 2021.⁷ This statistic is a sign that the people of Arizona are not following the mask and social distancing protocols as well as other states. A project that compiles the vaccination challenges and strategies among safety net clinics would not only benefit the underserved areas but also the state as a whole.

METHODS

Design

This descriptive, cross-sectional study will use data obtained from telephonic interviews and electronic surveys.

Subjects

To be eligible for this study, the community health centers must be a member of the Arizona Alliance Community Health Centers (AACHC). This is Arizona's branch of the Primary Care Association and every state must have one. The purpose of these associations is to expand healthcare and advocate for medically underserved and uninsured populations. Of these health centers, the interviewees will consist of the healthcare professionals that will be managing the COVID-19 vaccine administration program.

Measures

Data will be collected using a questionnaire and a semi-structured interview. The guide is separated into 4 sections; general, challenges, effective strategies, and future recommendations and has a total of 24 items. The general section questions are about the participants' roles at their respective clinics. It will also include Likert scale questions about vaccinations for the underserved, vaccinations for rural communities, and any support from the state and/or the federal government for the vaccine rollout. Questions about effective strategies, challenges, and future recommendations will be asked as open ended interview questions for the thematic analysis. This guide was developed with input from the experience of the principal investigator. One participant will be used to test the instrument. See Appendix C for the survey and the interview guide.

Data Collection

Recruitment will be done by gathering the safety net clinics that belong to AACHC from the AACHC website. After, we will ask who the clinic will allow to participate and set up a phone interview. The consent script will be read to each member of the AACHC during a telephone call. Upon receiving consent, we will read the questionnaire and conduct the semi-structured interview. See Appendix C for the questionnaire. Responses will be read back to the participant for clarity and correctness. Interviews will not be recorded due to the possibility of discouraging the participant to answer freely. Both co-investigators will present during the interviews and transcribing will be delegated to one person. We will clarify with the participant what we have written down so any important adjustments can be made.

Data Analysis

The rollout of the COVID-19 vaccine will create similar challenges between safety net clinics in Arizona, however identifying and collecting this data may generate new and efficacious support strategies based on the themes of the challenges. To distinguish and compare the common themes, we will:

1. Review the written transcriptions and identify codes within the responses.
2. Discuss the codes with the principal investigator and co-investigators for thematic organization.

3. Categorize themes and calculate the number of participants that fall in each theme.
4. Compare the demographic data using a Chi-squared test to demonstrate the differences in population-based factors between rural and urban healthcare clinics. Statistical analysis will be done using Qualtrics.

RESULTS

The five themes we found in our responses are the lack of public health communication channels, vaccine hesitancy and misinformation, workflow and staffing difficulty, ineffective state distribution and management, and problems with inventory and the storage of vaccines. The first theme, a lack of public health communication channels, was decided on due to clinics using their own social media to reach out to the community. A few of our respondents utilized social media as their main tool of disseminating information to community members about when the vaccines would be available and to whom, and to answer questions from their community. This proved to be effective for the clinics, but it demonstrates that local, state, and federal public health communication could be improved upon. Public health communication is present at each level of government but many Arizonans turned to their local clinics to receive information.

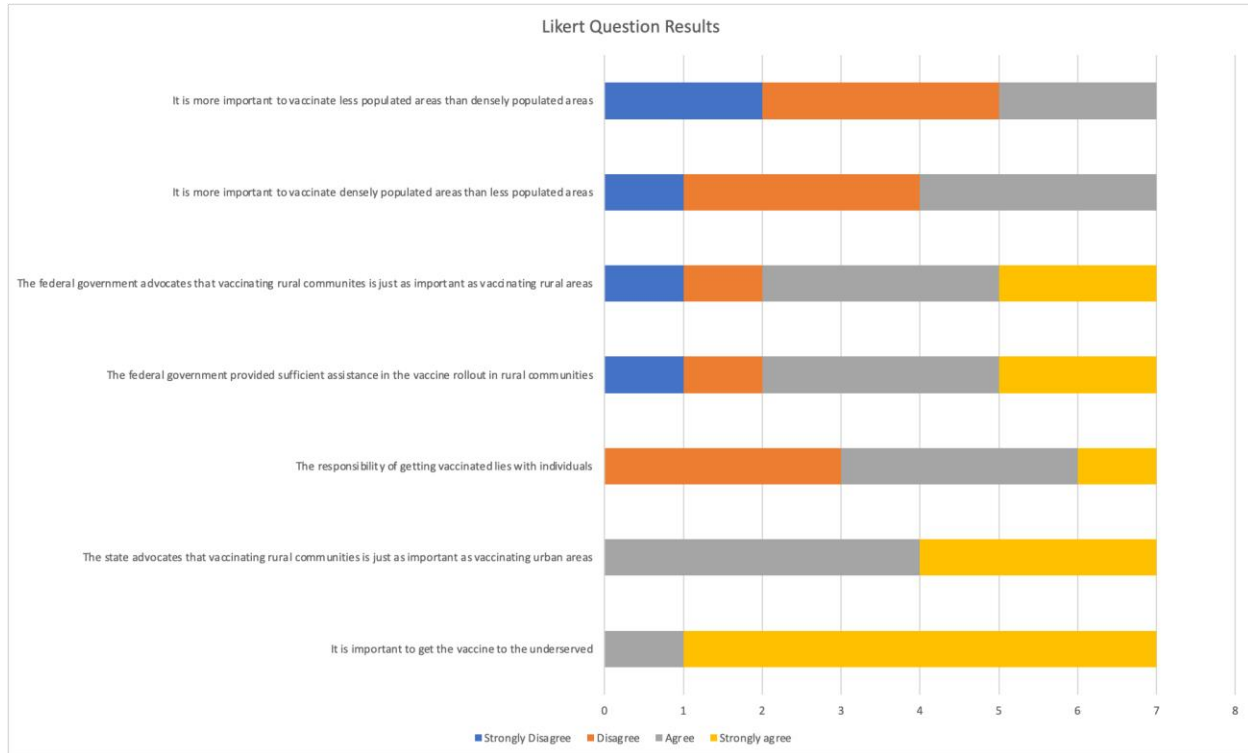
The second theme of vaccine hesitancy and misinformation is somewhat related to the lack of public health communication channels. Vaccine misinformation is widely available and spreads quickly. Misinformation has the ability to overshadow official public health messages as well as factual scientific information. This translates to more vaccine hesitancy in communities, which proved to be a problem across Arizona. The clinics used their social media to combat the misinformation and subsequently vaccine hesitancy. While this did reach members of the community who trusted their local practitioners, widespread misinformation is hard to combat as a single safety-net clinic.

The third theme, workflow and staffing difficulty, was mentioned in nearly every response for both rural and urban clinics. The difference in how rural clinics dealt with workflow and staffing issues is that they relied on multiple health professions to get their communities vaccinated. In addition, rural clinics reached out to clinics in other rural communities to share tips and best practices. This was integral in improving their workflow to efficiently vaccinate members of their communities. Training webinars from the state and vaccine manufacturers was also helpful for planning the vaccination events. Staffing issues seemed to resolve for urban clinics possibly because of the number of potential workers and volunteers to help with the vaccination efforts. Rural clinics did not seem to get staffing issues resolved and focused on improving workflow efficiency.

The fourth theme, ineffective state distribution and management, was decided based on the state vaccine website not always functioning. Because of this, clinics reported needing more manpower to perform the administrative work which took away from their ability to vaccinate. It was also difficult for a few clinics to order vaccines before the federal government provided them to FQHCs. Any positive comments on vaccine distribution were in reference to HRSA how the organization made the vaccines more accessible.

The last theme, problems with inventory and storage of vaccines, was in part due to obtaining the necessary equipment to keep the vaccines cold. Before the storage requirements were changed, vaccines from Moderna and Pfizer had to be kept at temperatures lower than -100°F. One clinic had to keep frozen water bottles in their coolers to ensure that the vaccines

stayed cold. The number of vaccines clinics had to order also proved to be a problem because of the high quantity that was required for every order. Smaller clinics in rural areas did not need such large order sizes. Additionally, the rural clinics had a difficult time with wasting vaccines because of their short expiration times after reconstitution. One clinic mentioned that they wasted more Moderna vaccines than Pfizer vaccines due to the 4-dose difference between the two manufacturers.



The answers to the Likert-scale questions were varied except for the importance of vaccinating underserved populations. Five out of six clinics strongly agreed with the importance of getting vaccines to the underserved. As for the importance of vaccinating urban and rural areas, most clinics did not think one area was more important than the other. Most clinics thought that the federal government provided sufficient assistance to vaccinate rural communities with just a few who disagreed.

DISCUSSION

While a majority of responses were from rural healthcare clinics, the more common struggles seen were combating misinformation, vaccine hesitancy among the public, staffing, and reporting of the vaccine through the Arizona State Immunization Information System (ASIIS). Many of the rural FQHCs experienced trouble ordering larger quantities of the vaccine, distributing the vaccine to patients in rural areas, and finding the staff to administer the vaccine. On the other hand, the only urban clinic response described having issues with storing, minimizing waste, and reporting of the vaccine, which is expected because the urban clinics will receive more stock and have a better opportunity to fill staff positions. The struggles of urban FQHCs were fairly general and anticipated with a clinic in a more densely populated area; however, rural clinics needed to address more basic matters, such as staffing and ordering enough of the vaccine. One of the reasons why vaccine hesitancy and fighting vaccine misinformation was profoundly repeated throughout the responses of the rural clinics is because

they understand they are responsible for vaccinating a large portion of their cities/counties. Urban FQHCs are only focused on their patients since they understand that there are several other clinics in the area administering vaccines to their community.

The strategies used to both educate healthcare employees about the COVID-19 vaccine and administer the vaccines to the general public were similar among the urban and rural FQHCs. Most of the clinics had mentioned using previous workflow strategies, specifically the drive-thru vaccine clinics, to create an organized flow of patients, minimize patient contact, and vaccinate as many patients as possible. One strategy that the urban clinic shared with 3 of the rural clinics was attending webinars and reaching out the county and the vaccine manufacturers (i.e. Pfizer, Moderna, and J&J) for information on the vaccine and strategies on how to conduct a mass vaccination event. Other rural clinics reported contacting neighboring clinics for information and advice on their attempts to vaccinate their community. FQHCs in rural areas have a sense of comradery and unification behind the shared goal of vaccinating their community, which is one of the reasons why this strategy was taken advantage of from rural clinics.

This survey was formulated to compare and contrast the challenges and strategies of rural and urban clinics and to assess what these community clinics need to be better prepared in the event of another global pandemic. A few of the most needed resources from rural clinics were additional staffing and vaccine availability, however this would be anticipated from clinics in less populated areas. The only clinic that did not provide an answer to this question was the urban clinic.

Presently, few studies have been published about the COVID-19 vaccine rollout and challenges that practitioners face. The Canadian Medical Association interviewed 1,561 doctors in Canada about the COVID-19 vaccine rollout. While no specifics were provided about survey questions, some of their concerns seem to be different from those of the Arizona clinics. While around half of the respondents said their provincial and state governments did a great job of public health communication and were happy with the federal government's financial support. Over 90% of respondents said that vaccine supply had been their main concern with the rollout.⁸ In Arizona clinics, rural areas had a difficult time securing vaccines in the beginning but was solved with more federal support. The study from Canada did not mention staffing issues or vaccine hesitancy from the public.⁸ Comparing the results of two surveys from different geographical locations demonstrates the uniqueness of Arizona's COVID-19 vaccine rollout challenges.

With a 26% response rate, there were several limitations to this study that may have had an effect on the number of surveys received. First off, the target population was too specific, which created some barriers when attempting to contact vaccine coordinators. A few of the barriers with this limited target population were finding the participants able to answer the survey questions and obtaining the correct contact information. Oftentimes when vaccine coordinators were contacted, the voicemails and emails were never returned. In regards to the survey, the program used to record the answers of the participants' responses would visually cut off after a certain number of characters; this resulted in missing details and shorter responses from some of the answers recorded. The most important limitation was that only one of the six participants was from an urban clinic; therefore, the responses from the urban clinic must be generalized for all urban clinics to be able to compare and contrast with the responses from the rural clinics. This limitation is making an assumption that the strategies and challenges were consistent among all urban clinics, which may or may not be accurate. The generalization of all

urban clinics from one response should be taken account for when assessing the results of this study.

CONCLUSION

Most of the challenges experienced during the COVID-19 vaccine rollout between urban and rural Federally Qualified Health Centers in Arizona were different. Many of the rural clinics came across issues with ordering the vaccines, administering the vaccines to the public in rural areas, and finding the staff, whereas the urban clinic reported trouble with storing, minimizing waste, and reporting. There were several similarities seen between the rural and urban clinics when it came to strategies used for the vaccine rollout, which included using previous vaccine workflows and attending webinars and training sessions held by the state and vaccine manufacturers.

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TABLES AND FIGURES

Each table is placed on a separate page following the references. Tables and figures should stand alone; that is, the reader should be able to understand what the table or figure is about without having to refer to the text. Be sure to define any acronyms and describe the measurement scale if you are reporting findings from questionnaires or something similar. See example research report. Do not include the tables and figures in the page count.

APPENDICES

Each appendix should start on a new page. Data collection forms or data dictionary. Do not include the appendices in the page count.