

# COVID-19 Vaccination Clinic Experience: Reflections and Lessons Learned from a School of Pharmacy Perspective at a Health Sciences University

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**P**fizer-BioNTech published phase I/II clinical trial data for its COVID vaccine in August 2020 and received Emergency Use Authorization (EUA) from the U.S. Food and Drug Administration (FDA) on December 11, 2020.<sup>1,2</sup> On December 12, the Advisory Committee on Immunization Practices of the Centers for Disease Control (CDC) convened to issue interim guidance for the use of the Pfizer-BioNTech COVID-19 vaccine.<sup>3,4</sup>

As initial vaccine access focused on the healthcare workforce, those tasked with providing such vaccine access had to mobilize very quickly. Medical College of Wisconsin's (MCW's) COVID-19 vaccination clinic was created at a health science university as a workplace clinic with no existing clinic infrastructure. Preparatory meetings began on November 12, 2020 to plan for clinic workflow; storage and handling of vaccine shipments; recruitment of volunteers; development of training materials; and prioritization of vaccine recipients. The clinic opened on December 22, 2020, one day after receipt of the first shipment of vaccine. After the vaccination clinic opened, additional changes were made to clinic workflows based on feedback from volunteers. As interim CDC guidance developed, the clinic adjusted to operate using best practices per expert advice. An all-volunteer workforce, primarily from internal research, educational, and administration backgrounds, served as staff for the vaccine clinic.

The Pfizer-BioNTech COVID-19 vaccine storage, handling, and administration requirements created unique challenges for the operation of the clinic. Ultra-cold storage, temperature excursion

## Abstract

**Introduction:** The quick development cycle of COVID-19 vaccines led to the rapid implementation of workplace vaccine clinics with little guidance from experts on how to design and launch COVID-19 vaccine clinics.

**Objectives:** The primary objective of this project was to review strategies employed by the Medical College of Wisconsin's (MCW) COVID-19 vaccination clinic to provide recommendations for guidance on future vaccination clinics.

**Methods:** MCW opened a workplace clinic for COVID-19 vaccination shortly after the Pfizer-BioNTech COVID-19 vaccine received FDA Emergency Use Authorization on December 11, 2020. The clinic was led by faculty and staff from the School of Pharmacy and Office of Research. Few guidelines existed at the time to inform the design of the clinic. A team was assembled to implement the clinic, and tasks included patient outreach and scheduling, vaccinator and clinic workflow training, vaccine dose preparation, post-vaccination observation, and dose administration documentation. Semi-structured interviews were conducted with the clinic team leads to identify themes for improvement of the COVID-19 clinic. All volunteers were surveyed to provide input on the safety and efficiency of clinic.

**Results:** Common themes from team leaders include gratitude and burnout. Respondents contributed unique perspectives on areas of improvement. Most respondents to the all-volunteer survey found the clinic to be safe for patients and volunteers (94% and 93%, respectively). The clinic was perceived to be efficient, with 85% of respondents saying that patient workflow was very efficient. Literature was reviewed to identify best practice guidelines developed after the implementation of the MCW COVID-19 vaccination clinic.

**Conclusion:** Despite the theme of burnout, team leaders and volunteers reported gratitude for the opportunity to participate in a COVID-19 vaccination clinic. Given the quick development of COVID-19 vaccines and little guidance, experiences at our workplace clinic can be used to help frame future pandemic clinic responses.

monitoring, inventory management, and dose preparation posed unique challenges for clinic management. Initial limited supply of the vaccine required enhanced security protocols to transport vaccine from storage to clinic. Larger demand for COVID-19 vaccines and the rollout of priority groups caused increased demand for COVID-19 vaccines as well as increased stress for volunteer staff. Staff directed patients through the clinic and ensured patient safety during post-vaccination monitoring. Vaccine administration was required to be reported to the Wisconsin Immunization Registry (WIR) within 24 hours. The two-dose series necessitated scheduling follow-up appointments at appropriate intervals and inventory management for second doses.

Clinic workflows were developed for several different aspects of clinic operations, such as vaccine shipment receipt, storage, and distribution to clinic; patient scheduling; vaccine administration; documentation of administration in WIR; and patient monitoring. Due to initial high demand for vaccine and limited supply, a prioritization scheme was created to randomly select healthcare personnel from various hospital departments who were considered front-line healthcare workers. Staff checked in individuals for their appointments to confirm eligibility. Vaccine administrators followed EUA guidelines on reviewing the vaccine waiver with each individual, and then directed individuals to a post-immunization monitoring area once the vaccination was completed. Clinic space was structured to be COVID-19 compliant, placing adjacent vaccination stations 6 feet apart. Volunteers sanitized all surfaces contacted by the individual after each vaccine recipient exited the administration area. The vaccine waivers were used to manually input vaccination administration information into WIR.

A review of current guidelines from the American Society of Health-System Pharmacists (ASHP), Centers for Disease Control and Prevention (CDC), United States Pharmacopeia (USP), and Department of Health services (DHS) provides us with more robust guidance than was available at the time of initial vaccine deployment and clinic development.<sup>5-9</sup>

ASHP provides guidance on several topics: initial planning and development of

COVID-19 vaccination clinics; a readiness checklist for COVID-19 vaccination clinics; appropriate syringes and needles to maximize doses per vial; principles for vaccine distribution; allocations; mass immunization; optimization of COVID-19 vaccine preparation and safety; monographs for each vaccine by manufacturer; patient and physician information for each vaccine by manufacturer; and a table comparing the efficacy and candidacy of available COVID-19 vaccines by manufacturer.<sup>5,6</sup> Additionally, ASHP has links to CDC guidelines, manufacturer information on their vaccine, and the Vaccine Adverse Event Reporting System (VAERS).<sup>7,8</sup>

USP offers brief guidance regarding the handling, storage, and transportation of COVID-19 vaccines and issues minimal guidance on coverage of operational considerations in preparation of, and during, a COVID-19 clinic.<sup>7</sup> The CDC provides information about vaccine storage, handling, and preparation; temperature monitoring; inventory management; and staff training protocols. Additionally, the CDC vaccine toolkit contains template worksheets that clinicians may find useful for documentation.<sup>8</sup> DHS provides information pertinent to Wisconsin immunizers and patients, in the form of information on vaccines by brand and links to information on the EUA and FDA clinical trial data. Additionally, DHS provides helpful resources for patients regarding information about finding a vaccination appointment, expectations for vaccine appointments, expectations for patients after immunizations, and information for parents and guardians.

DHS also provides vaccine partner resources for community outreach.<sup>9</sup>

While most of the guidelines mentioned above were not available while clinic workflow was under development, it is also notable to recall previous pandemics in recent history. Just over a decade ago was the H1N1 pandemic. During this pandemic, there were also issues with vaccine distribution, production timelines, and medical supply shortages.<sup>10</sup> However, clinical practice guidelines are still slow to develop. The Infectious Diseases Society of America (IDSA) clinical practice guidelines on management of seasonal influenza were only just updated in 2018, while its previous publication on the topic was prior to the H1N1 outbreak in 2009.<sup>11</sup> Furthermore, COVID-19 is the third coronavirus that has seen rapid spread in the past two decades.<sup>12</sup> SARS emerged in Asia in 2003 and MERS became widespread in the Middle East in 2012.<sup>13</sup> Clinical practice guidelines remain largely unchanged to date, and similar practices are still being used to manage these conditions.<sup>14,15</sup> However, vaccine clinic protocols have not been developed in lieu of these outbreaks, as no licensed vaccines were available for human use for prevention of MERS or SARS.

To better prepare for future pandemics and to quickly organize vaccination clinics, it is imperative that we document our findings and clinical practices now so that, if needed, we can quickly organize vaccination clinics again in the future. Though general advice from the CDC and World Health Organization (WHO) exists, no reports currently exist from practicing workplace clinics that document the results or

**TABLE 1. Semi-structured Interview Questions**

| <i>Interview Questions</i>   |
|--|
| <b>What role did you perform in the clinic?</b><br><i>Describe your duties</i>   |
| <b>How did your role change over the course of the clinic?</b>   |
| <b>What allowed you to perform your duties more effectively?</b>   |
| <b>What detracted from your ability to perform your role?</b>  |
| <b>What improvements could have been made to improve the efficiency of the clinic?</b>   |
| <b>What changes would you find most beneficial?</b>  |
| <b>What experiences do you have working in previous vaccination clinics?</b><br><i>What differences did you notice between previous clinics and the MCW COVID-19 vaccination clinic?</i> |

procedures of COVID-19 vaccination clinic efforts.<sup>16-20</sup> Since COVID-19 vaccination clinic protocols are limited, the methods MCW used to successfully establish and run this clinic should be analyzed and documented so we can be prepared for future outbreaks.

## Methods

### Semi-structured Interviews

This study conducted targeted semi-structured interviews with team leaders from the MCW COVID-19 vaccination clinic. Investigators developed the interview questions so the interviewee could offer additional details about their clinic experience outside of the specific questions. Table 1 includes the questions asked during the interview. Interviews were conducted and recorded via an electronic teleconference platform, and then transcribed to identify common themes. All 10 team leaders were interviewed by a pharmacy student who was not part of clinic operations. The clinic operations team leadership consisted of three pharmacists, one nurse, one physician, two administrative associates, and three research support personnel who were all selected by executive leadership to manage the clinic.

### Quantitative Survey

A quantitative Likert-scale survey developed by the investigators was emailed to all volunteers who participated in the MCW COVID-19 vaccination clinic. Table 2 includes questions from the quantitative survey. A single email was sent to all 506 individuals who volunteered in the clinic. This study was reviewed and approved by the MCW IRB and informed consent was obtained from all participants.

## Results

### Semi-structured Interview Findings

Interviews with team leaders from the MCW COVID-19 clinic generally focused on perceived obstacles or improvements that were either present during the initial formation of the clinic or evolved as the clinic grew. Common statements about perceived obstacles were separated thematically into eight groups, and common statements about perceived improvements were separated into four groups. See Table 3 for the list of themes. Comments occasionally had multiple themes but were assigned based on their perceived primary focus. All interviews were captured in analysis by identifying themes with no

**TABLE 2. Quantitative Survey Questions**

|  |
|--|
| <p><b>1. Prioritize the following reminder options that are important to you (1=very important, 5=not important)</b></p> <ul style="list-style-type: none"> <li>b. Confirmation Email</li> <li>c. Confirmation Text message</li> <li>d. Outlook Calendar Reminder</li> <li>e. Option of cancelling appointment via email or text</li> <li>f. An appointment reminder sent 24 hours in advance</li> </ul>   |
| <p><b>2. The MCW COVID clinic was offered at convenient days and times.</b></p> <ul style="list-style-type: none"> <li>a. Yes/No</li> <li>b. No, please comment.</li> </ul>  |
| <p><b>3. An informational video, handout, email, or orientation session regarding my role and the clinic workflow would be beneficial to review prior to my clinic shift.</b></p> <ul style="list-style-type: none"> <li>a. Yes/No</li> <li>b. No, please comment</li> </ul>   |
| <p><b>4. Prior to the MCW COVID clinics, were you aware that pharmacists could vaccinate?</b></p> <ul style="list-style-type: none"> <li>a. Yes/no</li> </ul>  |
| <p><b>5. Prior to the MCW COVID clinics, were you aware that pharmacy students could vaccinate?</b></p> <ul style="list-style-type: none"> <li>a. Yes/no</li> </ul>  |
| <p><b>6. Prior to the MCW COVID clinics, were you aware that medical students could vaccinate?</b></p> <ul style="list-style-type: none"> <li>a. Yes/no</li> </ul>   |
| <p><b>7. Given your experience volunteering in MCW's COVID Clinic, how efficiently do you feel the workflow was established from a patient's perspective?</b></p> <ul style="list-style-type: none"> <li>a. 1-Not efficient 2-somewhat efficient 3-very efficient</li> </ul>   |
| <p><b>8. Given your experience volunteering in MCW's COVID Clinic, how efficiently do you feel the workflow was established for you?</b></p> <ul style="list-style-type: none"> <li>a. 1-Not efficient 2-somewhat efficient 3-very efficient</li> </ul>  |
| <p><b>9. Given your experience volunteering in MCW's COVID Clinic, how safe did you perceive the clinic experience was for each patient?</b></p> <ul style="list-style-type: none"> <li>a. 1-Not safe 2-somewhat safe 3-very safe</li> </ul>   |
| <p><b>10. Given your experience volunteering in MCW's COVID Clinic, how safe did you perceive the clinic experience was for each volunteer?</b></p> <ul style="list-style-type: none"> <li>a. 1-Not safe 2-somewhat safe 3-very safe</li> </ul>  |
| <p><b>11. Given your experience volunteering in MCW's COVID Clinic, how safe did you perceive the clinic experience was for yourself?</b></p> <ul style="list-style-type: none"> <li>a. 1-Not safe 2-somewhat safe 3-very safe</li> </ul>  |
| <p><b>12. Given your experience volunteering in MCW's COVID Clinic, do you feel you had a lasting impact on MCW and the surrounding community and the COVID-19 pandemic?</b></p> <ul style="list-style-type: none"> <li>a. Yes or No</li> </ul>  |
| <p><b>13. Provide any additional feedback you may have that could have improved the efficiency or safety during your clinic volunteer experience.</b></p>  |
| <p><b>1. Demographics:</b></p> <ul style="list-style-type: none"> <li>a. Approximately how many total hours did you volunteer in clinic?</li> <li>b. In what area did you provide volunteer time? <ul style="list-style-type: none"> <li>i. Check-in</li> <li>ii. Sanitizing between patients</li> <li>iii. Dose preparation</li> <li>iv. Vaccine administration <ul style="list-style-type: none"> <li>1. How many years of experience have you had vaccinating patients? <ul style="list-style-type: none"> <li>a. Less than 1 year</li> <li>b. 2-5 years</li> <li>c. 6-10 years</li> <li>d. 11-15+ years</li> <li>e. My primary licensure's responsibility does not include vaccinations on a routine basis</li> </ul> </li> <li>v. Vaccine administration supervisor <ul style="list-style-type: none"> <li>1. How many students do you feel comfortable supervising at one time slot? <ul style="list-style-type: none"> <li>a. 1</li> <li>b. 2-3</li> <li>c. 4-5</li> <li>d. 5 or more</li> </ul> </li> </ul> </li> <li>vi. Data entry</li> <li>vii. Post-immunization monitoring</li> <li>viii. Select all that apply</li> </ul> </li> <li>c. Are you an MCW employee? <ul style="list-style-type: none"> <li>i. Yes/ no</li> </ul> </li> <li>d. Are you an MCW student? <ul style="list-style-type: none"> <li>i. Yes/ No</li> </ul> </li> </ul> </li> </ul> |

**TABLE 3. Themes Identified from Semi-structured Interviews**

| <i>Obstacles</i>                          | <i>Perceived Improvements</i> |
|---|-------------------------------|
| Patient issues                            | Workflow improvements         |
| Burnout                                   | Tool development              |
| Data entry issues                         | Experiential improvements     |
| Initial clinic protocol creation          | Operational improvements      |
| Communication                             |                               |
| Clinic location                           |                               |
| Volunteer issues                          |                               |
| Miscellaneous comments unable to classify |                               |

rank order to the frequency of common statements.

**Patient issues** - Comments focused on patient efficiency issues identified a lack of predictability with patients. For example, patients would occasionally skip their appointment slot without notifying the clinic of the cancellation. Some patients made appointments within multiple systems to obtain the vaccine as quickly as possible. Prior to firm guidance from the CDC on the required time between doses, a few patients were scheduled earlier than the recommended interval. There were minor instances of patients leaving with vaccine administration paperwork, filling out paperwork incorrectly, or having their access to WIR locked, which slowed MCW’s submission of data to the WIR. As vaccine eligibility widened to the general public, more time was spent per patient on anxiety, health literacy, or simply to speak about gratitude. While these discussions are not inherently negative and are part of providing health care, they do add to the workload per patient.

**Burnout** - Statements focused on burnout primarily centered around volunteers who performed regular nonclinical duties in addition to clinic duties. Interviewees mentioned working much longer than their typical work week. Team leaders frequently arrived an hour before clinic and stayed over an hour after clinic ended. Additional comments mentioned the difficulty of maintaining the momentum of the clinic over time, feeling fatigue due to repetitive motions, missing meetings due to clinic duties, and not having adequate footwear to support

frequent walking or standing for long durations.

**Data entry issues** - The theme regarding data entry focused on the lack of electronic scanning ability and having to manually submit information to the WIR. The MCW clinic did not have access to an electronic health record (EHR) or badge or barcode scanning, as healthcare operations are normally carried out by the clinical partners. One such EHR submits information to the WIR automatically. Additionally, vaccine administration records for affiliated hospital staff and MCW employees were submitted to occupational health. However, there was no easy method to separate affiliated employees from other community patients, meaning this paperwork had to be accounted for manually.

**Initial clinic protocol creation** - Comments centered around initial clinic protocol creation mentioned the difficulty of applying to become a vaccination site. This is in part due to MCW’s complex organizational structure: the application to become an immunizing body had to be submitted under the correct unit. Additionally, there were decisions to be made about how and whether the clinic should proceed. For example, there was some deliberation about whether the health science university should operationalize its own clinic, or solely depend upon clinical partners. This deliberation may have slowed initial planning efforts.

**Communication** - Responses focused on communication largely noted the need for the immediate establishment of team lead positions upon creation of the clinic. One of the interviewees remarked that

formal roles were not established until early January. It could have been beneficial to have a formalized role for vaccination education. Certified vaccinating pharmacy students were initially invited to assist with immunizations. Medical students were also interested in assisting with vaccine administration; however, it was initially unclear who would lead the vaccination training for medical students. Formalized roles and training could correct this.

**Clinic location** - Statements surrounding clinic location noted the need for enhanced wayfinding and signage, especially once community members were invited for vaccinations, as these individuals were less familiar with the health sciences campus.

**Volunteer issues** - Statements about volunteer issues were the most varied in response. Volunteer no-shows were infrequent but created difficulty in accommodating the schedule. It was sometimes difficult to find an appropriate number of vaccinators for each shift.

**Miscellaneous comments unable to classify** - Miscellaneous comments about obstacles included some initial issues with available syringes, which were shipped with the vaccine product. Some of the needles provided had more dead space volume and caused some vials to only produce five doses while other needles allowed for six doses. Some early syringes were too small and made it difficult to remove large air bubbles from the syringe space. Having an independent source of syringes mitigated this issue.

**Workflow improvements** - Comments regarding workflow improvements discussed changes that were made to improve efficiency. Interviewees discussed alphabetizing and scanning WIR documents throughout the workday; matching doses with forms by the end of the workday; and preparing multiple batches of vaccines simultaneously. Interviewees described how having dedicated workspaces added to the efficiency of the clinic. Additionally, one interviewee noted that there was improvement in patient response rates when the MCW clinic switched from a lottery system to a voucher system for possible extra doses at the end of the day. Essentially, a limited number of patients could pick up a voucher at the start of the clinic day and return towards the end of the clinic day to

receive an available dose, if any remained. Additionally, this reduced the burden on volunteer staff who would otherwise need to reach out to potential vaccine recipients to avoid wasting doses.

**Tool development** - Most perceived improvements were related to tool development. Specifically, the development of a spreadsheet that allowed for scheduling appointments and tracking inventory helped improve end-of-day dose preparation management to reduce the number of remaining doses. This tool was also used to calculate the number of doses needed by the end of day based on the current schedule as well as how many doses would be needed for the following clinic day. The initial scheduling software allowed appointment registration and cancellation window to remain open up to two hours before the appointment time, which caused an excess of variability in patient count. Switching to a different scheduling software allowed for clinician staff to better understand patient demand for the day. Regarding the software utilized for volunteers to sign up for specific clinic shifts and roles, it was found that deleting previous signup dates on this software helped prospective volunteers navigate the program more easily.

**Operational improvements** - Common statements about operational improvements centered around using the flu clinic as a trial to create the initial operational protocols for the COVID-19 clinic; the ability to integrate students as vaccinators; and creating formal roles for necessary tasks at the clinic. Recent legislation allowed first-year pharmacy students to help in the COVID-19 clinic, expanding the number of available immunizers. Additionally, creating roles with redundancies, or an additional person assisting with the role, proved useful. As time went on, volunteer staff became more efficient at their tasks. As expected, repeat volunteers were desirable since they were already trained.

**Volunteer Survey**

Among the 213 respondents to the volunteer survey, 76% were MCW employees and 19% were MCW students. Volunteers primarily from the research and education missions of MCW comprised the largest group of clinic staff. Volunteer roles included check-in; sanitizing between patients; dose

preparation; vaccine administration; vaccine administration supervisor; data entry; and post-immunization monitoring. The largest group responding to the survey was vaccine administration (26%), followed by sanitizing between patients (23%). Forty percent of vaccinators had less than one year of experience administering vaccinations. Most vaccine administration supervisors (61%) preferred to supervise two to three students at one time. Prior to volunteering in clinic, 58% of volunteers were unaware that pharmacy students were able to vaccinate and 51% were unaware that medical students could vaccinate.

The vast majority of respondents found the clinic to be safe for patients and volunteers, 94% and 93% respectively. The clinic was perceived to be efficient with 85% responding that the workflow for patients was very efficient, and 77% indicating that volunteer workflow was very efficient.

Information from the volunteer survey supported some themes identified in the semi-structured interview. One potential tool for communication identified in the volunteers' survey was the addition of an informational handout to educate volunteers about their clinic workflow prior to their shift. This workflow training request was in addition to the required CDC education reviewed by all prior to volunteering. Seventy-five percent of respondents agreed that this form of communication would have been beneficial to review. One volunteer highlighted this need with the following statement: "I think having a handout for volunteers before they started their shift would have been helpful. I tried to volunteer at least once a week and when changes occurred in the way we were supposed to document, they were not always communicated." Difficulty balancing the appropriate number of staff required

for each clinic schedule was reinforced by comments from the volunteer survey. Several comments noted that several clinic days had over-staffed vaccinators resulting in vaccinators sitting idly without individuals to vaccinate. However, most respondents (94%) felt their time in clinic had a lasting impact on MCW and the surrounding community during the COVID-19 pandemic. One comment highlights the sentiment of several volunteers who responded to the survey: "I had a really positive experience volunteering at that clinic and honestly wish I could have given more time because it was a really rewarding experience. I witnessed so much positivity from the community. I didn't hear one bad thing! Kudos to everyone involved!"

**Discussion**

In this clinic, which was staffed mostly by internal volunteers with primarily research or education positions, most volunteers found working in the clinic to be a rewarding experience and were gratified by its lasting impact on the organization and the community. Despite the very rapid deployment, lack of external guidance for clinic operations, and initial concern on the part of the (initially unvaccinated) volunteer workforce, the clinic operations were widely perceived to be safe and efficient. Although a lead group was assembled early on, those leaders felt that earlier creation of specific leadership roles was an opportunity for improvement. Several factors led to stress for the volunteers and leaders, including unpredictability in patient attendance; the fact that some volunteers were not relieved from all other duties; and that, even when relieved of other responsibilities, managing this unusual operation required long hours. Survey respondents identified that additional communication, such

**TABLE 4. Key Lessons Learned from MCW's COVID-19 Clinic Experience**

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|--|
| Early identification and delineation of operational leadership roles.  |
| Development of a tool and workflow to efficiently schedule patients.   |
| Inventory management tool development.   |
| Process development to identify eligible persons who can receive extra doses at the end of the day.  |
| Development of a communication tool to describe clinic workflow for vaccinator volunteers with updates to this document to provide clear information on changes to workflow. |
| Efficient workflow for reporting administered doses to DHS.  |

as a handout or video describing clinic workflow, would have been beneficial prior to the start of their shifts. Improvements over time included the creation of more efficient scheduling and inventory management software, better processes for reporting vaccinations to the state's registry, and a better system for identifying eligible persons for receiving extra doses at the end of the day. These end-of-day activities were a crucial marker of success for our clinic, at a time when vaccine availability was limited, and a great emphasis was placed on not wasting any doses. With the processes implemented in our MCW clinic, we were fortunate to not waste any doses due to over-preparation at the end of the day. See Table 4 for key lessons learned from MCW's COVID-19 Clinic experience.

Many hospitals and healthcare organizations faced similar difficulties in the quick ramp-up to operationalizing COVID-19 vaccination clinics after the EUA approvals by the FDA. Our experience was slightly different than these settings because we did not have the underlying healthcare infrastructure to build from. Health systems had pool nursing staff who could be assigned to vaccination clinics and pharmacy departments who were able to prepare vaccine doses with qualified staff. Initial clinic staffing primarily came from the School of Pharmacy and Office of Research volunteers, and then expanded to include other research personnel and School of Medicine students and faculty. Affiliated clinical staff volunteered countless hours in clinic to administer vaccinations and monitor patients post-immunization. A true multidisciplinary effort created the volunteer workforce for the day-to-day operations of clinic. This report is the first to describe an evaluation of a COVID-19 clinic in this setting.

## Conclusion

It is likely that future clinics will encounter similar issues unless steps are taken to prevent their occurrence. We recommend that future clinic organizers reflect upon the obstacles observed during the MCW COVID-19 vaccination clinic and implement strategies to prevent or reduce their occurrence. Additionally, we recommend that improvements made during the MCW clinic receive recognition and implementation in future clinics. For organizations to show appreciation for the

volunteers' hard work, it is recommended that future clinics incorporate the findings of this study into their design in order to promote the best environment for their healthcare team and, subsequently, provide the best possible patient care experience.

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