Journal of Student-Run Clinics
Descriptive Report

A Novel Solution to a Novel Pandemic

Inside Rowan University School of Osteopathic Medicine's Student Driven COVID-19 Vaccination Center

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Published: November 16, 2023

Abstract

This paper provides an outline for how Rowan University School of Osteopathic Medicine (RowanSOM) established a student-run coronavirus disease 2019 (COVID-19) vaccination clinic. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), referred to as COVID-19, has ravaged the nation since January of 2020. One of the largest issues during the first months of the vaccine rollout was vaccine distribution to the qualified public. RowanSOM sought to address this obstacle in New Jersey (NJ) by implementing the state's first medical student-led COVID-19 vaccination clinic. Through the establishment of a supply chain, vaccination area, vaccine storage area, and registration center, the medical school created a straightforward format for "mega sites", interested medical schools and pop-up sites to follow to implement their own clinics to help to end the fight against COVID-19. RowanSOM closely collaborated with the NJ Department of Health, which has been fundamental in the implementation of the State's vaccination plan through the creation and execution of this student-run vaccination clinic.

Introduction

The coronavirus disease 2019 (COVID-19) virus spread rapidly through the United States, resulting in over one million deaths nationally, with thirty-four thousand deaths specifically in New Jersey (NJ).[1] One original plan of ending the pandemic was through herd immunity; early estimations suggested that nearly 70% of the population needed to be inoculated for this to be reached.[2] Domestically, three vaccines were developed and granted Emergency Use Authorization (EUA) and the United States Food and Drug Administration (FDA) approval. Eventually the booster doses were also released. This pandemic highlighted the shortage of qualified healthcare personnel and emphasized the need to develop infrastructure to meet the public demand required to end this pandemic[3] and to be ready for the next one.

Initially, there were several barriers to adequate vaccination rates, including insufficient doses of the vaccine, lack of vaccination sites, and general vaccine hesitancy.[4-6] In early 2021, the demand for the vaccine outweighed the resources and capacity of state vaccination sites. This article describes the creation of a medical school vaccine distribution center in which medical students comprise a critical source of volunteers to staff the site. Through the initial rollout of the COVID-19 vaccinations, Rowan University School of Osteopathic Medicine (RowanSOM) was the only medical school in New Jersey and one of three in the country to allow medical students to play an integral role in inoculating the public. The project delivered 55,000 vaccines in a span of 6 months, averaging roughly over 300 per day, utilizing mainly student volunteers. At its peak, students were inoculating 1,000 patients/day. Additionally, the clinic had a supply utilization rate of 98%, which was the highest of all sites in New Jersey. Both the total doses administered, and the

high utilization rate greatly helped to combat the unequal vaccine supply and demand in New Jersey. Additionally, the site was successfully assimilated into the academic curriculum for third- and fourth-year medical students.

This article describes how RowanSOM operated the vaccination center with a medical student team to improve the availability of the COVID-19 vaccine. By outlining methods of student involvement, patient registration, and scheduling/credentialing, RowanSOM hopes to provide a roadmap for other medical schools and their students or pop-up sites if the need for mass vaccination sites should arise again.

Summary

Location

Choice of location of the vaccination center was critical to ensure easy access and patient/staff safety. RowanSOM's Academic Center was selected as the vaccination site to allow for adequate social-distancing among participants and minimize disruption of normal campus traffic patterns. This building is easily accessed from major highways and has ample parking and facilities to accommodate a large volume of patients. The proximity to interstate roads improved accessibility for patients as well as vaccine vial resupply.

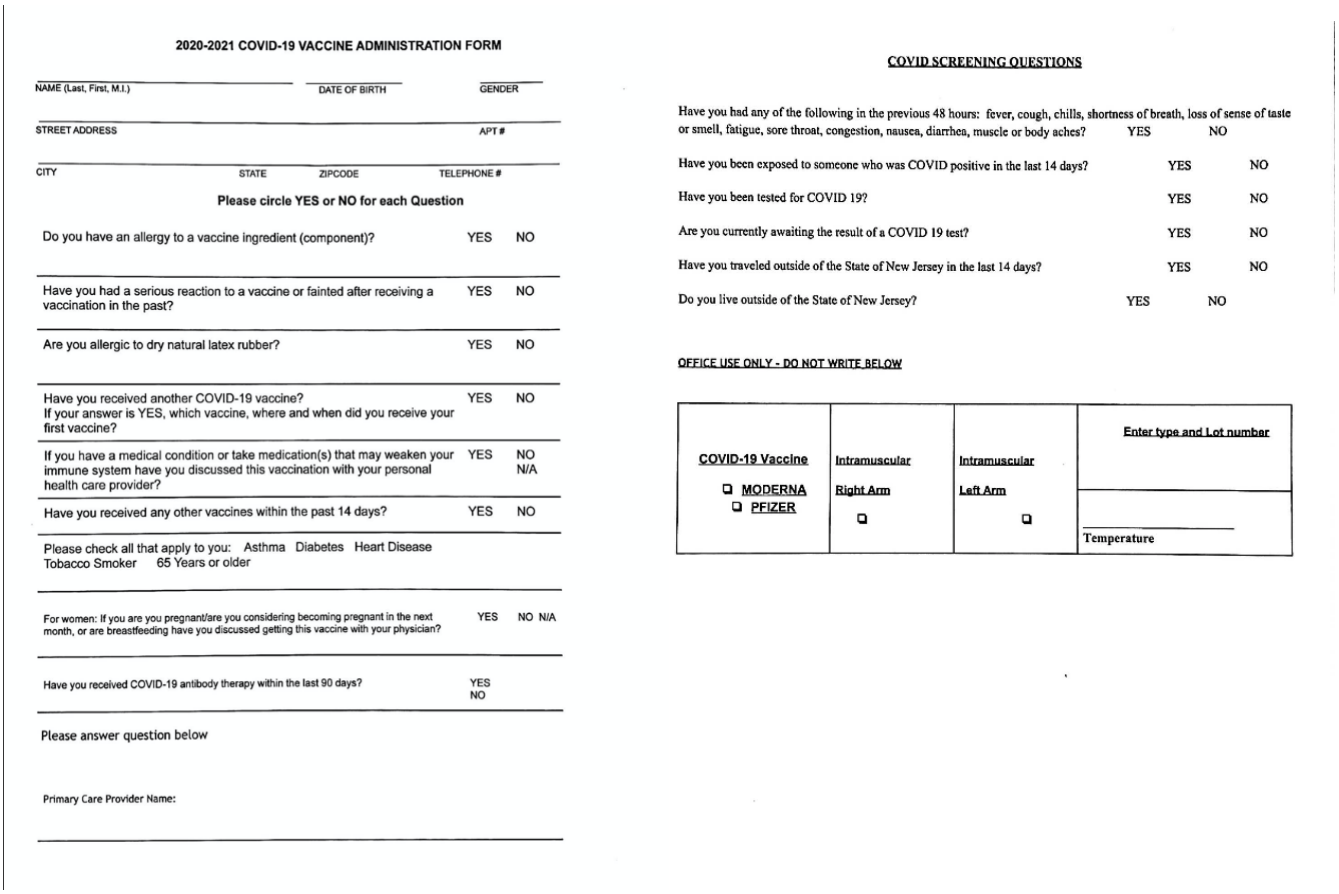
Any vaccination clinic must be able to maintain and store the vaccine vials until reconstitution and distribution. Our center was initially selected to distribute Comirnaty, which requires cold storage of -70°C. An unexpected pivot by the NJ Department of Health led to RowanSOM distributing the Moderna vaccine, which does not require ultra-cold storage. This allowed the use of refrigeration units for vaccine storage in a separate building. Separation of vaccine storage from the distribution center was necessary for security, but the buildings were close enough for quick retrieval of vaccine vials, eliminating the need for multiple vials to be removed from storage at one time, which prevented potential waste.

To protect both the vaccination clinic staff and patients, the RowanSOM Academic Center's ventilation system was upgraded with higher rated air filters to reduce potential of viral particles circulating in the air. The vaccination center operated during peak COVID-19 transmission periods in 2021, thus it was crucial that the vaccination site was not a nidus for an outbreak. The air filters were upgraded from the minimum efficiency

Figure 1. Overview of vehicle and patient traffic flow into the clinic.

Patients were instructed to park in a designated lot. Adjacent parking lots could function as overflow parking.
NJ: New Jersey.

Figure 2. COVID-19 screening and vaccine administration forms



2020-2021 COVID-19 VACCINE ADMINISTRATION FORM

NAME (Last, First, M.I.) DATE OF BIRTH GENDER

STREET ADDRESS APT #

CITY STATE ZIPCODE TELEPHONE #

Please circle YES or NO for each Question

Do you have an allergy to a vaccine ingredient (component)?	YES NO
Have you had a serious reaction to a vaccine or fainted after receiving a vaccination in the past?	YES NO
Are you allergic to dry natural latex rubber?	YES NO
Have you received another COVID-19 vaccine? If your answer is YES, which vaccine, where and when did you receive your first vaccine?	YES NO
If you have a medical condition or take medication(s) that may weaken your immune system have you discussed this vaccination with your personal health care provider?	YES NO N/A
Have you received any other vaccines within the past 14 days?	YES NO
Please check all that apply to you: Asthma Diabetes Heart Disease Tobacco Smoker 65 Years or older	
For women: If you are you pregnant/are you considering becoming pregnant in the next month, or are breastfeeding have you discussed getting this vaccine with your physician?	YES NO N/A
Have you received COVID-19 antibody therapy within the last 90 days?	YES NO

Please answer question below

Primary Care Provider Name:

COVID SCREENING QUESTIONS

Have you had any of the following in the previous 48 hours: fever, cough, chills, shortness of breath, loss of sense of taste or smell, fatigue, sore throat, congestion, nausea, diarrhea, muscle or body aches?	YES NO
Have you been exposed to someone who was COVID positive in the last 14 days?	YES NO
Have you been tested for COVID 19?	YES NO
Are you currently awaiting the result of a COVID 19 test?	YES NO
Have you traveled outside of the State of New Jersey in the last 14 days?	YES NO
Do you live outside of the State of New Jersey?	YES NO

OFFICE USE ONLY - DO NOT WRITE BELOW

COVID-19 Vaccine	Intramuscular	Intramuscular	Enter type and Lot number
❑ MODERNA ❑ PFIZER	Right Arm ❑	Left Arm ❑	Temperature

COVID-19: coronavirus disease 2019.

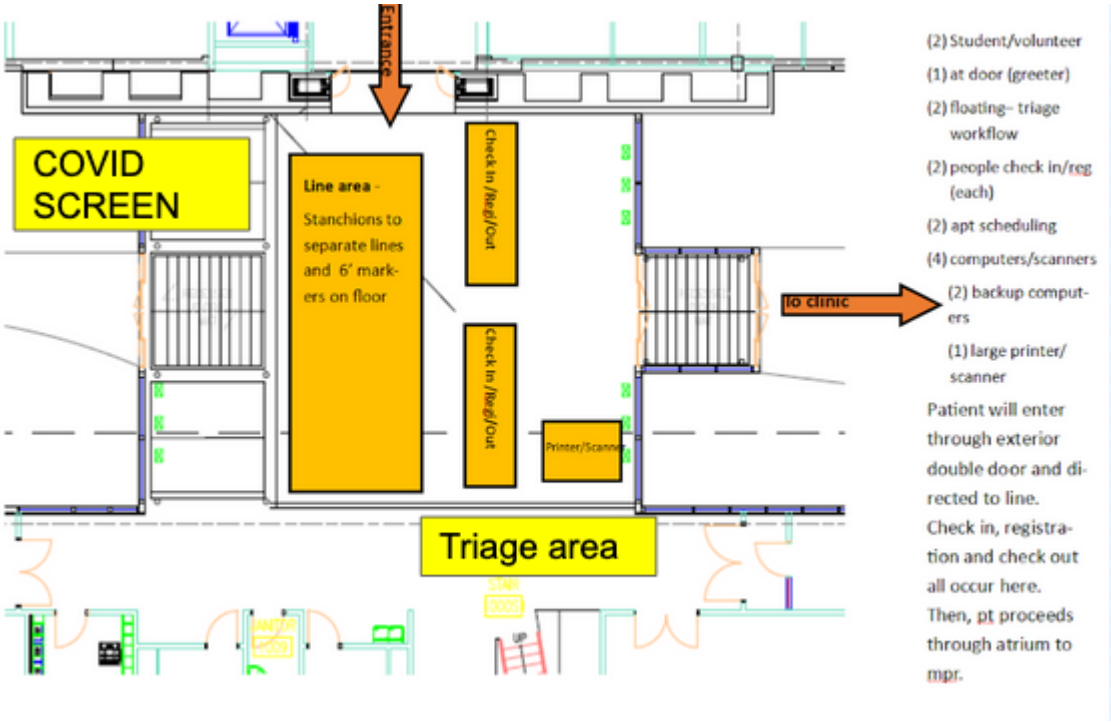
reporting value (MERV)-8 to MERV-13, which stops transmission of small particulates and infected respiratory droplets. The Student Run COVID-19 Ventilation Task Force explored the possibility of adding adjunctive heating, ventilation, and air cooling (HVAC) decontamination equipment, but the system in place was unable to accept further modification.

RowanSOM Clinic Layout

Patients parked in a designated lot and followed signage directing them into large tents outside the vaccination center (Figure 1). Due to the inclement weather in New Jersey, these large tents were built with adequate ventilation and heating to shelter those waiting in line. Within the tents, each patient stood at six-foot intervals while medical students or community volunteers provided them with COVID-19 screening and vaccine administration forms to complete (Figure 2). The COVID-19 screening form contained questions intended to identify individuals that may have an active COVID-19 infection, which would disqualify them from receiving the vaccination on the date of their appointment. The vaccine administration form contained demographic information and evaluated for potential allergies or health problems that would increase the patient's risk for an adverse vaccination reaction. This form also requested the patient's consent to a period of monitoring immediately after vaccine administration and addition to New Jersey's state vaccination registry. Patients then proceeded from the tents into the Academic Center, where their temperatures were checked, and they were sent to a registration line.

There were 10 registration stations operated by RowanSOM students, community volunteers, and medical assistants (Figure 3). Encounter sheets were printed for each patient at the

Figure 3. Screening and registration area



apt: appointment; COVID: coronavirus disease; mpr: multi-purpose room; pt: patient; reg: registration.

registration station. These sheets contained the patient's demographic information for this encounter. Registrars initialed these encounter forms to verify that the patient had been checked as "arrived" in the electronic medical record, initiating a chain of volunteers that ensured complete documentation for each visit.

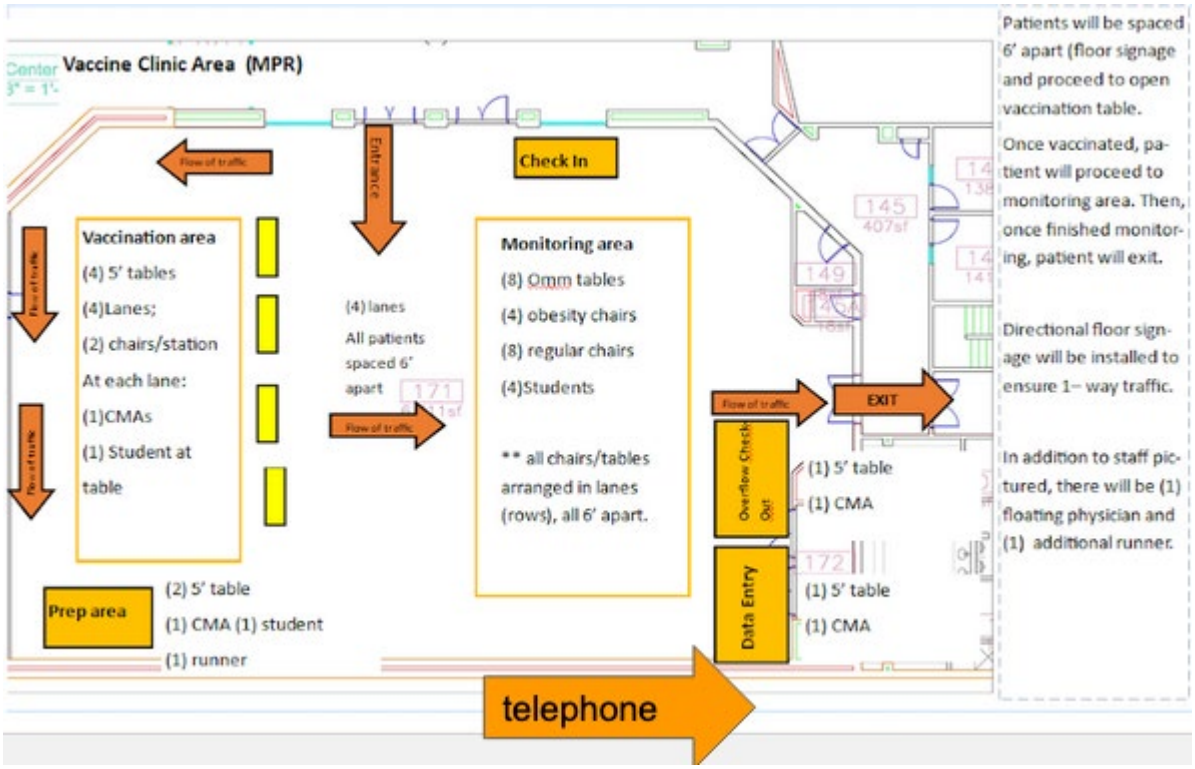
After registration, patients formed two lines, with patients continuing to be spaced six feet apart to maintain social distancing protocols. Here, volunteers verified that patient documents were complete and initiated the encounter sheets, continuing the chain of documentation. They also helped direct patients from station to station through the building.

Patients were then sent to one of four vaccination tables, each with the capacity to administer vaccines to two patients at a time (Figure 4). Medical students, nursing students, and volunteering physicians administered the COVID-19 vaccine. Meanwhile at a side table, RowanSOM Science Center staff constituted the doses from vials and prepped the syringes. Both messenger ribonucleic acid (mRNA) vaccines are fragile, such that if the vials were to be shaken, they would be useless. It was key that staff were trained to be extremely careful with the vaccine doses. Additional volunteers functioned as "runners" who walked two vaccines at a time from the prep table to the vaccination tables. For security purposes, a limited number of vials were brought in from the storage area at any given time.

Patient documents were given to data entry staff, who entered patient information into the electronic medical record and initialed the encounter form, completing the documentation chain. Following injection, patients were given a timer and a Center of Disease Control vaccination card, then were seated in the observation area where students, physicians, and emergency medical services (EMS) monitored the patients for any adverse reactions. Patients were instructed to wait either 15 or 30 minutes depending on previous vaccine allergies, before they were guided to an exit leading back to the parking lot. This flow of patient traffic limited interaction and aggregation of patients.

After all vaccines were administered and accounted for, volunteers prepared for the next day of operations. Supplies were restocked and screening forms prepared. Registrars reviewed the appointment list and identified patients that

Figure 4. Vaccine administration and post-injection monitoring areas



CMA: Certified Medical Assistant; MPR: multi-purpose room; Omm: osteopathic manipulative medicine.

did not arrive for their appointments. Environmental service workers sanitized the clinic, ensuring that chairs and tables were fully wiped down, sharps containers were emptied, and supplies were restocked. They applied an electrostatic spray approved to kill the COVID-19 virus to all surfaces of the clinic.

Student Leadership Structure

The primary student leadership of the clinic consisted of three co-chairpersons. They acted as administrative leads for the volunteer pool as well as liaisons to the physician management team and school administration. Additionally, there were three sub-groups that worked under the student co-chairpersons to help the clinic function day to day. These subgroups labeled the On-Site Staffing Team, Off-Site Team, and Site Leads are described below.

First, the On-Site Staffing team was responsible for recruiting, credentialing, and scheduling student volunteers. This sub-team was composed of 3 students. They interfaced with the school to get volunteers. At the start of the endeavor, they sent out a school-wide email detailing the responsibilities of volunteers and instructions on how to become credentialed. Also, every two weeks the On-Site Staffing Team distributed the sign-up form for students to schedule themselves to volunteer. They then organized the final schedule, that listed which students were assigned to each position each day. Additionally, in order to ensure accreditation for volunteer time, the On-Site Staffing Team communicated with a separate school organization called the Translating Osteopathic Understanding into Community Health (TOUCH) Hour Coordinator to verify volunteer time. In summary, this team oversaw and coordinated all three of these responsibilities, which are described in more detail below in the "Volunteer Recruitment," "Credentialing," and "Scheduling" sections.

Next, the Off-Site Team was responsible for patient appointment scheduling, also composed of 3 students. They created a website for patients to self-schedule appointments, input personal health information, and upload insurance information. This team oversaw all of the patient registrations and led the Student Schedulers and Student Schedule Checkers. This responsibility is

described in great detail below in the "Patient Registration" section.

Finally, every day at the clinic there were one or two in-person Student Site Leads. They managed the on-site student volunteers for a given clinic day. The Site Leads ensured student volunteers knew how to complete their responsibilities and answered any questions. Additionally, they were the primary contact should any problem arise. The Site Leads worked with the attending physician to solve any issues.

Volunteer Recruitment

The staffing pool for the clinic consisted of medical student volunteers, medical students assigned to the clinic as part of clinical clerkships, nursing students, undergraduates, and community volunteers. Approximately 500 medical students across all class years volunteered and signed up via an online recruitment survey sent out via a mass email. Vaccine clinic participation was integrated into the clinical curriculum for the Geriatrics, Family Medicine, Obstetrics and Gynecology, Pediatrics, and Psychiatry clerkships. To account for time lost from in-person clerkships and to meet Commission of Osteopathic College Accreditation (COCA) requirements, students from clerkships were placed in positions where they would receive equivalent patient-facing clinical experience such as vaccinator, data entry, and monitoring.

Students had numerous incentives to work. Serving on the front line of helping ease the burden of the pandemic provided valuable experience and served to supplement their non-clinical or clinical education. Outside of that, the hours could be submitted into "Translating Osteopathic Understanding into Community Health (TOUCH) hours. At the end of the academic year, recognitions and awards are given to students who volunteered a minimum number of hours and are commonly added on students' resumes and residency applications. The On-Site Staffing team communicated the volunteer schedule with a TOUCH representative, someone separate from the clinic, to ensure correct accreditation of volunteer hours.

Credentialing

To ensure uniform credentialing, the standards for student volunteer participation mirrored those of clinical rotations, including the Health Insurance Portability and Accountability Act (HIPAA), bloodborne pathogens, and personal protective equipment (PPE) donning/doffing. Specific to this clinic, all students completed the Centers for Disease Control and Prevention (CDC)–issued COVID-19 Vaccine Training. Students in pre-clinical years became certified to give vaccines via an injection training course. All students were required to have their first injection monitored by a resident or attending physician. Upon completion of required training, students submitted physician-signed proficiency forms electronically to both the managing physician and On-Site Staffing Team. The On-Site Staffing Team collected all the forms and created a public-facing tracker allowing students to view their credentialing status. Additional training for the patient scheduling system was provided to students working in patient registration.

Scheduling

The daily schedule for the clinic consisted of approximately sixty student volunteers. Volunteer hours for the clinic were 8:00am to 5:00pm, allotting one hour for orientation/set-up prior to patient arrival and one hour to clean at the end of the day. Initially, the schedule was broken into three 3-hour shifts; however, to minimize disruption to clinic operations, the student co-chairpersons decided to minimize shift changes and use two 4.5-hour shifts.

Clinic volunteer scheduling occurred in two-week blocks to account for varying class schedules. Two weeks prior to a schedule release, an electronic availability survey was distributed to the volunteers via a mass email from the On-Site Staffing Team; students were given 10 days to respond. The student schedule was composed by the On-Site Staffing Team, who assigned students to roles based on their level of training. Roles included front door greeters, screeners, and registration "check-in" workers. Students were also assigned to initiate encounter sheets while directing patients through the building from station to station. Lastly, students could be assigned as an injector, runner, or data entry staff. Once finished, the schedule was sent out with the subsequent block's availability survey. Volunteer

cancellations were managed using an electronic form. Students were encouraged to cancel their shifts with at least 48 hours' notice or find another student to fill their position.

Additional volunteers were recruited from Rowan University undergraduate programs and Rowan Medicine staff. Also affiliate allied health colleges, including nursing schools, and the general community were used to fill gaps when clinic volume exceeded student availability. All recruitment was done via word-of-mouth. Regarding community volunteers, once they showed up to help at the clinic their contact information was saved, and the On-Site Staffing team communicated with them as needed. There were no incentives to help volunteer, except a moral drive to help contribute to the pandemic firsthand. Average weekly participation in the clinic was approximately 1,200 hours total. RowanSOM students have exceeded 17,000 collective volunteer hours in the vaccination clinic.

Funding

It is important to note that there was no upfront funding or manpower support from the state or federal government for this project. Moreover, during the planning phases of the clinic, there were no grants or other start-up funding sources available for a project this timely or on this scale. However, "Mega-sites" in NJ, received assistance from the state via manpower from the National Guard and more robust volunteer pool from the NJ Medical Reserve Corps. The initial financial outlay was through the parent organization, Rowan University, with eventual reimbursement (regardless of insurance status) for that cost through the federal government. This novel and student driven COVID-19 vaccination clinic relied on the buy-in, coordination and expertise of academic faculty and the infrastructure of the university.

Patient Registration

Online Registration

A clinic website was established for patients to self-schedule appointments and submit insurance and personal health information. Appointments were made for two business days in advance. Every day at around 4:00PM, the Off-Site Team emailed the Student Schedulers their patient assignment, which consisted of about 20 patients depending on the day. Student Schedulers transferred patient data from the website into the electronic medical record. These students had from 4:00 PM until 12:00 PM the following day to input their allocation of appointments. Student volunteers committed to being Student Schedulers for one to two set days per week. For example, Student A was a scheduler every Monday and Wednesday. Each day of the week had about 12 student schedulers. The Off-site team led virtual training sessions, where they taught Student Schedulers how to navigate the clinic website and electronic medical record (EMR) system.

Also, there was a different sub-team of Student Schedule Checkers. Similarly, each Student Schedule Checker was assigned by the Off-Site Team to verify that appointments were scheduled at the right time and date. They would correct any incorrect data. They had from 12PM, when the Student Schedulers work was due, until 12AM to complete their work. When finished, they notified the Off-Site team. Each day of the week had about 6 student checkers.

This work from home set up allowed for adequate participation of volunteers, as students were not conflicted between their studies and volunteering.

Limitations

The RowanSOM COVID-19 vaccination clinic ran into some barriers during the 6 months of operations. Chief amongst these was the ability to keep such a large-scale operation adequately staffed. Due to the student-run nature of the clinic, student testing schedules, practical exams, and clinical rotations often limited the availability of medical students available to deliver the vaccines. As a result, the clinic recruited nursing students and their professors by including this experience into their clinical rotations. This addition of volunteers was often employed as a stop-gap measure to ensure numbers remained adequate.

Additionally, another limitation of the clinic was the size of the building utilized. Due to the set-up of the operation, there was often a line extending outside of the building. Many extra

registration stations were added to help expedite the vaccination process. Also, outdoor tents were set up to keep patients sheltered from the winter and spring elements.

Additional Projects

The vaccination clinic has been a facet of RowanSOM's continued mission to support underserved populations. RowanSOM's COVID-19 vaccination clinic partnered with the Rowan Integrated Special Needs (RISN) Center, south New Jersey's first primary care practice dedicated to serving the needs of individuals with physical, intellectual, or developmental disabilities, to provide vaccination access to these patients and their caregivers. Together, the clinic and the RISN Center team worked with the New Jersey state government to open appointments to eligible persons. Two special weekend half-day clinics were held to serve the special needs community via appointments managed by the RISN Center.

Volunteers were given special instruction from the RISN physicians on how to best collaborate and treat patients with disabilities. The clinic made special accommodations for this underserved group by bringing in additional support personnel, therapy dogs, and special tools to assist with communication and anxiety reduction. These patients were brought into the clinic in an expedited process to minimize overstimulation and stress. Patient face sheets were pre-printed and charts were pre-established. Individuals who required treatment in a quiet, less populated area were provided injections in their cars.

To better serve the surrounding communities, vaccination center staff worked directly with community leaders to ensure equal access to care. This goal was met through coordinating buses for patients from local communities through church groups, as well as setting up pop-up clinics to vaccinate people where they live and work. Two such examples were a large clinic held at Rowan University's Glassboro campus, where 2,000 doses were administered to the local community, particularly undergraduates, and a series of mobile clinics throughout south New Jersey which vaccinated individuals suffering from homelessness and victims of domestic violence.

Conclusion

This article describes how the RowanSOM COVID-19 Vaccination Clinic was organized and executed, detailing the enlistment of medical student volunteers to lead and staff vaccine centers. This hopes to serve as proof of concept for clinics to launch and operate new vaccine sites to combat outbreaks on this magnitude. It also shows how impactful medical student volunteers are in fighting these communicable diseases, and clearly lines out roles these students can fill. Furthermore, the RowanSOM clinic shows that a relatively small organization with a dedicated volunteer pool can achieve astonishing numbers. It serves as a proof of concept, that when students come together with a pilot project, and work together with the greater student body and community, they can make a huge impact on a large-scale issue. This paper will hopefully motivate more students to identify public health issues and launch enterprises to tackle those concerns. May the RowanSOM clinic be one of many student-run clinics to positively change the community.

Acknowledgements

We would like to thank Ms. Christine Beswick and her operations team for allowing us to utilize their diagrams for this article, and for their daily and tireless efforts enabling the success of Operation: Save Lives.

Disclosures

The authors have no conflicts of interest to disclose.

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