

Rapid Mobilization of Medical Student Volunteers to Administer Vaccines During the COVID-19 Pandemic

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ABSTRACT: In December 2020, the first COVID-19 vaccines were approved for emergency use by the U.S. Food and Drug Administration, and vaccination efforts rapidly launched across the country. Concurrently, New York City experienced an increase in COVID-19 hospitalizations. This created an immediate need to inoculate frontline workers in a strained health system that lacked sufficient personnel to meet the demand. In response, New York State permitted medical students with appropriate clinical experience to administer vaccinations. Albert Einstein College of Medicine students rapidly stepped in to administer vaccines and serve as clinic navigators.

Student leaders at Einstein collaborated with Montefiore Medical Center to rapidly implement a student vaccination initiative. Medical students underwent virtual and on-site training regarding COVID-19 vaccines and their administration. In January 2021, students began to staff vaccine clinics across the Bronx. By July 2021, 291 out of 830 eligible medical and Medical Scientist Training Program (MSTP) students (35.1%) had volunteered >2400 h. Of the 291 volunteers, 77 (26.5%) worked as vaccinators and administered approximately 2929 COVID-19 vaccines from January to May 2021.

We demonstrate success using the concept of Entrustable Professional Activities (EPAs) in the context of training medical students in a specific clinical skill. Our framework resulted in the administration of approximately 2929 COVID-19 vaccines from January to May 2021. The authors believe that this framework can be implemented at peer institutions to alleviate the burden on hospital systems and outpatient clinics vaccinating their communities against COVID-19, or to meet future clinical needs.

KEYWORDS: MeSH terms: medical education, Entrustable Professional Activities (EPAs), medical students, vaccines, COVID-19

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Introduction

The swift development of COVID-19 vaccines, approved by Emergency Use Authorization in December 2020, was met with myriad logistical challenges that led to less than 1/3 of all delivered vaccines being administered within December.^{1,2} There were massive quantities of several vaccines but no system in place to receive, store, and administer the vaccines to patients safely. In New York City, academic medical centers created vaccine clinics that were staffed primarily by redeployed nurses, many of whom had already faced months of overtime on COVID-19 wards. To accelerate vaccine distribution, New York State (NYS) issued an executive order in January 2021 expanding the pool of medical staff eligible to administer vaccines.³ Medical students with at least one year of clinical experience prior to or during medical school could then join the vaccination effort to accelerate vaccine distribution. In March 2020, Albert Einstein College of Medicine's preclinical curriculum went remote, and all clerkship activities were paused. During

this time, a student-led COVID-19 Volunteer Response Team was created to address needs identified by students and the medical school administration within our affiliated medical center and the community.⁴⁻⁶ Volunteer roles filled by medical students during the pandemic included providing childcare and producing and distributing Personal Protective Equipment (PPE). By May 2020, these volunteer opportunities waned as in-person clinical activities for third and fourth-year students were reinstated. Of note, Einstein was one of the earliest among medical schools in the NY area to allow third-year students to begin clerkship activities and permit select fourth-year students to provide care for hospitalized COVID patients. Several medical schools have published on students filling volunteer roles such as those described above, however, student involvement in COVID-19 vaccine clinics has not yet been reported in the literature. Our student response team was eager to pivot into COVID-19 vaccine administration in partnership with our clinical affiliate, Montefiore Health System. In this report, we describe how medical students can be effectively used in the rapid deployment of vaccinations to help to alleviate the burden on health systems in times of high healthcare utilization, such as during a pandemic, in the future.

*The authors have informed the journal that they agree that both Taneisha Sinclair and Brett Bell completed the intellectual and other work typical of the first author.



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Methods

Development of Student Volunteer Vaccination Program

On December 30, 2020, student leaders sent an email to Einstein medical students requesting volunteers for the vaccination effort. Over eighty students initially responded indicating a willingness to serve. Students promptly began virtual didactic training, and staffing vaccine clinics on Jan 7, 2021, receiving on-site instruction on the technical aspects of patient flow, vaccine administration, and post-vaccination patient monitoring.

Volunteer Roles and Responsibilities

Clinic volunteers were assigned as either vaccinators or navigators. Vaccinators administered the vaccine and documented the encounter in the electronic medical record. Navigators assisted with patient check-in and clinic flow. They also counseled patients about vaccine eligibility, contraindications, and side effects. A New York State executive order required that students have one year of clinical experience in order to administer COVID-19 vaccines.³ The specific clinical experience required was not definitively outlined within this order which allowed medical schools to dictate how students met the eligibility criteria. The leadership at Albert Einstein Medical School in collaboration with Montefiore hospital leadership further defined the eligibility criteria as students who had either completed their third year of medical school or had served for at least a year as a nurse, Emergency Medical Technician (EMT), or in another clinical role prior to starting medical school that met approval by school leadership. Based on these criteria, most vaccinators were fourth-year medical students, whereas preclinical students predominately served as navigators.

Volunteer Safety

Safety was at the forefront of planning conversations with medical school and hospital leadership. All student volunteers were provided with personal protective equipment that met rigorous infection control guidelines. Additionally, the medical school offered all volunteers a COVID-19 vaccine dose before their first clinic shift as they met state eligibility guidelines. These steps were critical to protecting volunteers who would work in clinics serving hundreds to thousands of patients receiving vaccines each day.

Just-In-Time Training

The traditional medical school curriculum incorporates a system of graduated responsibility for clinical care, starting with learning fundamentals in the classroom, applying and practicing skills with standardized patients and simulation, and then engaging in patient care in the clinical setting. We developed a just-in-time training program that accelerated this typical model by focusing on one specific competency,

where students receive quick training for deliberate action. There were two key components. First, both vaccinators and clinic navigators attended a virtual didactic seminar conducted via web conferencing to cover foundational information on COVID-19 vaccines, their administration, and potential side effects. The seminar also trained volunteers to identify and initiate emergency protocols for signs of vaccine adverse reactions, including anaphylaxis. The virtual training was conducted synchronously for initial volunteers and was recorded for asynchronous training for future volunteers. All vaccinators were required to complete the NYS Vaccination Online Training through the New York State Department of Health (NYSDOH). Modules included background on COVID-19 vaccines, vaccine administration, storage, and handling. Upon completion, student leadership scheduled vaccinators for a training shift. At this shift, volunteers received on-site instruction on screening patients, preparing vaccine vials, administering an intramuscular shot, and documentation. A registered nurse or previously trained medical student oversaw the training to ensure standards outlined on a Vaccine Administration Skills Checklist were met (Supplemental Table 1).⁷ This checklist ensured consistent training was provided to volunteers despite clinic and staff heterogeneity. After reviewing each student's qualifications and training, the Senior Associate Dean for Medical Education attested to the completion of each student's training. Students were then allowed to vaccinate patients independently for subsequent shifts. Total training for vaccinators spanned 2.5 h of didactic training and 1 to 2 h of supervised vaccination training. Navigators required only 1.5 h of didactic training (insert Figure 1).

Implementation of the Student Volunteer Vaccination Program at Multiple Clinics

Student leadership collaborated with health system officials representing three hospitals and two outpatient practices to implement this initiative. Our role included representing student volunteers and co-developing plans to deploy medical students appropriately and educationally. We evaluated the role of a medical student volunteer force considering clinic hours of operation, size, layout, and expected patient volume, and transportation. In consultation with medical directors of the vaccine clinics, we decided to first implement the program at a hospital-based clinic within walking distance of our campus to encourage student participation. Student leaders performed an on-site assessment of the facility and met with staff to discuss student training and logistics. We determined that volunteers would best serve in 4-h shifts between 6 am and 10 pm, seven days a week. This schedule provided flexibility for the academic obligations of the volunteers. Volunteers self-scheduled via a Google Spreadsheet, which had daily allotments of two vaccinators and two navigators per shift. On January 7, 2021, one week after the initial

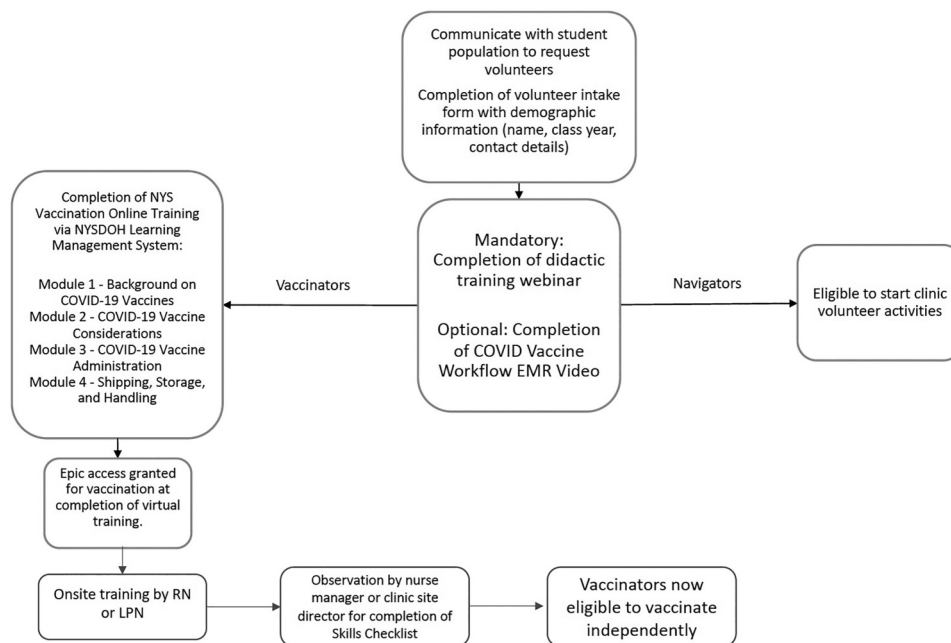


Figure 1. Albert Einstein College of Medicine COVID-19 vaccination program volunteer training requirements and workflow.

request for volunteers, students staffed the Einstein Weiler Hospital vaccine clinic. As demand for vaccinations increased, the health system sought to expand student volunteer coverage at other clinics. These additional clinics were evaluated similarly to initial implementation - student leadership visited each site and collaboratively discussed plans with hospital and medical school administrative representatives. Student site leaders were delegated to each clinic to expedite communication with site staff and manage the scheduling of volunteers. Site leaders were critical in monitoring operations within the clinics and eliciting feedback via email and in-person interviews with volunteers and vaccine staff for quality improvement.

Development of a Vaccination Elective for Fourth Year Medical Students. Recognizing the ongoing need for vaccinations, we worked with medical school administration to provide fourth-year curricular elective credit for students participating in the initiative. Training and scheduling were performed similarly to our volunteer program with a minimum time commitment of forty hours per volunteer. To meet educational objectives, students were required to complete reflective writing assignments which were evaluated by faculty. Additionally, to evaluate the elective and improve subsequent iterations, we facilitated one-hour virtual debriefs at the end of each elective block to discuss student experiences.

Results

Outcomes of Student Volunteer Vaccination Program

The goals of our volunteer vaccination program included quick and efficient training and mobilization of volunteers to

Table 1. Number of volunteer positions filled by participants in the COVID-19 vaccine initiative, broken down by class year, Albert Einstein College of Medicine, January 7-February 19, 2021.

Academic Standing	^a Preclinical year students	^b Clinical Year students
Total number of Clinic Navigators	137	77
Total number of Clinic vaccinators	18	59
Total Number of Volunteers	155	136

^aPreclinical students = First- and second-year medical students.

^bClinical Year students = Third- and fourth-year medical students as well as MD or MSTP equivalent on a research year.

supplement clinical operations and provide an educational experience for medical students. Given medical students' existing clinical and scientific knowledge base, we were uniquely poised to augment mass vaccination efforts during the COVID-19 pandemic. We developed a just-in-time training program to build on this knowledge. Our format was successful both in providing students the knowledge necessary to counsel patients receiving vaccines as well as the skills necessary to administer vaccines.

Medical Students as a Supplement to Vaccine Clinic Operations

291 Einstein students (39.8% of the total student population) volunteered and were deemed eligible to serve as navigators or vaccinators (Table 1). This included 155 preclinical students and 136 clinical students. Seventy-seven students (26.5%) served as clinic vaccinators. Clinical year students comprised a

significant proportion of the vaccinating staff at a site, while pre-clinical students were only 23.4% ($n = 18$) of student vaccinators. A shift sign-up spreadsheet was used to track the number of clinic hours volunteered to assess the impact of our volunteers on clinic operations. Einstein students logged over 1200 h as vaccinators and navigators over 6 weeks, helping to ease the burden on nursing staff who faced months of redeployment and overtime amidst COVID-19 patient surges.

Evaluation of 'Just-in-Time' Training Model

In-person practical training honed students' technical skills for intramuscular vaccine administration. To evaluate the efficacy of the just-in-time training model, we assessed the number of volunteers who passed their Vaccine Administration Skills Checklist evaluation on their first attempt. All medical student volunteers completed their Vaccine Administration Skills Checklist on their first attempt when evaluated by clinic managers. This didactic and practical training followed by volunteering provided students with an educational opportunity centered around service.

Vaccination Elective

Recognizing the educational benefits the volunteer program provided, we developed a fourth-year curricular elective to provide a formal educational opportunity for students supporting community vaccination efforts. Thirty elective students volunteered an additional 1200 h from February to June 2021. All elective students participated in a debrief session. Elective students reported educational benefits including learning intramuscular injection, practicing communication skills while counseling patients about vaccines, and interprofessional education.

Volunteer Impact

As the health system built up its capacity for vaccine administration, there was a declining need for massive medical student service and therefore in July 2021, we paused our volunteer vaccination program to develop alternative plans. From January to May 2021, students administered approximately 2929 COVID-19 vaccines. Within the first month of this program, we maintained a consistent number of volunteer vaccinators. However, over the six-week period, the number of volunteers steadily decreased, with the steepest decline seen for clinic navigators (insert Figure 2).

Discussion

Medical students may be effectively mobilized to fulfill important clinical roles during public health emergencies. We employed the concept of Entrustable Professional Activities in our training program to ensure competency in vaccine administration.⁸ Administration of a COVID-19 vaccine requires competency across multiple domains (ie patient care, medical knowledge, communication skills, professionalism,

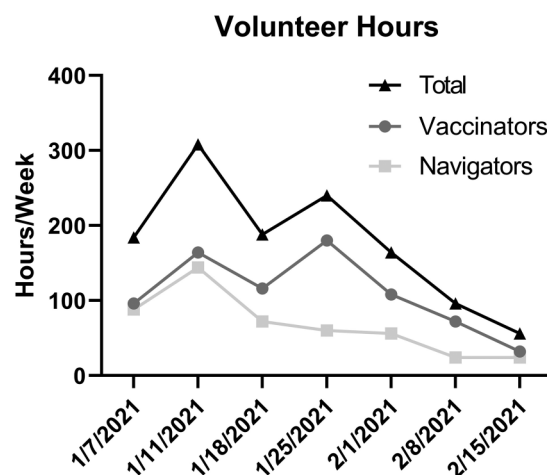


Figure 2. Volunteer hours per week from January 7, 2021, to February 19, 2021, represented for Vaccinators, Navigators, or the combined total hours.

interprofessional collaboration, etc) To ensure students met standards in these domains and were therefore ready to be entrusted with independent vaccination, we utilized a rigorous training checklist that required one-on-one training and supervision by a nurse or peer medical student. This allowed flexibility for students of varying skill levels to progress through training at their own pace. Some students required only a few demonstrations by their trainer followed by a few observed encounters prior to entrustment, while others spent a full two hours with their trainer learning the process. Each trainee medical student had to complete 36 competency-based tasks with their trainer and then had to rate themselves as either “needs to improve” or “meets expectation.” The trainer would then rate the student using the same scale. If all tasks were rated as “meets expectation” by the trainer then the checklist was signed and forwarded to the Senior Associate Dean for Medical Education for co-signature and the student was judged as capable of vaccinating with limited supervision. If a student did not meet these criteria during their training or believed they needed improvement, they would have the opportunity for additional training and remediation (including a second observation) to meet standards prior to entrustment. Nurses and peer medical student trainers were not specifically trained on entrustment, though it was required that they were previously entrusted to administer COVID-19 vaccines unsupervised. Nurses and peer student trainers could decline to teach if they did not feel comfortable training and evaluating students. The checklist ensured standardization of training across multiple clinical sites which would have otherwise been difficult to coordinate due to the speed at which the vaccination program was operating. Similarly, we initially attempted to have the student trained by one nurse or medical student and then evaluated by a second observer (such as a nurse manager at the clinic) to ensure a rigorous standard was upheld. However, due to staffing constraints, there frequently was not an

opportunity for a second observation without impeding clinic flow. Our experience here serves to suggest that medical students may both be entrusted with clinical tasks independently and may also serve as effective teachers.

Student feedback from the volunteer program and elective course consistently reported that the vaccination program positively impacted their medical education. A common theme was that students enjoyed the opportunity to learn and practice the procedure of intramuscular injection. There are often limited opportunities in medical school curricula for safe skills practice, so this unique experience served as a mechanism to promote procedural learning which students appreciated. Students further reported that they had ample opportunity to practice and improve their communication skills by counseling patients and their families regarding vaccination, skills which we believe will translate well to future practice across specialties. We further recommend designing volunteer programs for medical students with attention to the educational benefits and opportunities for students in addition to the benefit to the community.

One challenge which we encountered was an inability to meet the demand for vaccinators due to the limited number of medical students eligible for this position. State regulation permitted only fourth-year students with few exceptions, immediately limiting eligible volunteers. Several northeastern states including New Jersey, Connecticut, Massachusetts, and Pennsylvania permitted all medical students to vaccinate with varying degrees of supervision, making New York State regulation among the more restrictive we identified.^{9–12} We believe that we would have had more success in meeting clinical demand for vaccinators with less restrictive regulations allowing medical students of all years to vaccinate. Given the trends of volunteer hours observed, we note that both our vaccinators and navigators reached the same initial peak in volunteer hours, yet navigator hours dropped. We hypothesize that this was because the navigator role was less well defined while the vaccinator role directly supported clinical operations and was, therefore, more educational, and personally rewarding for volunteers, though this requires further study. We note that if state regulation expanded eligibility to all clinical year students, this would allow for an increased workforce to assist with the rapid administration of vaccines. We propose that medical schools be given more latitude by state regulators to implement similar programs which utilize medical students to their fullest extent.

Conclusion

Based on our experience with a volunteer vaccination program and elective over seven months, medical students can be utilized to fulfill important clinical roles safely and effectively during times of emergency. We propose a framework centered on open communication between stakeholders across the medical school, health system, and student leadership to meet clinical needs. Medical students may be successfully trained by combination didactic and practical training followed by evaluation and then entrusted to competently perform clinical skills with

indirect supervision. This framework may be utilized to address future situations in which demand for clinical services exceeds the capacity of the medical system.

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Conflict of Interest Statement

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

Not applicable, because this article does not contain any studies with human or animal subjects.

Informed Consent

Not applicable, because this article does not contain any studies with human or animal subjects.

Trial Registration

Not applicable, because this article does not contain any clinical trials.

Supplemental material

Supplemental material for this article is available online.

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