Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
ADVANCES IN PHARMACY PRACTICE

Innovative partnership in Connecticut to expand health professional eligibility to administer COVID-19 vaccines

Cassandra R. Doyno *, Jill M. Fitzgerald, C. Michael White, Diana M. Sobieraj, Michael Zacchera

Background: On December 7, 2020, the Acting Commissioner of the Connecticut Department of Public Health (DPH) issued an executive order authorizing eligible health professionals to administer coronavirus disease (COVID-19) vaccines provided they complete a vaccination training program. The University of Connecticut (UConn) School of Pharmacy was approached to collaborate with DPH to create a certification program to meet the needs of this order.

Objectives: To use a unique, pharmacist-led practice model to increase the number of competent vaccinators to administer the COVID-19 vaccine and to reduce vaccine hesitancy with timely vaccine information.

Practice description: A didactic and in-person training program was developed, with an evaluation completed by a vaccination-certified pharmacist. In addition, faculty members, staff, and students developed short videos answering questions about COVID-19 vaccines.

Practice innovation: We are aware of no other such programs using pharmacists and student pharmacists as primary creators of training and certification of health professionals to administer the COVID-19 vaccine.

Evaluation methods: Success was gauged by the rapid increase in the number of eligible health professionals who completed the developed training program and became certified as COVID-19 vaccinators. When addressing vaccine hesitancy, success was defined by the number of videos created and the number of views and likes the videos received.

Results: As of April 30, 2021, 1,834 health professionals registered to administer the COVID-19 vaccine. A total of 1,195 (65%) participants completed the online training developed by pharmacists, and 872 participants (48%) attended pharmacist-led, in-person competencies. As of July 29, 2021, efforts resulted in 14,972 views and 257 “Likes” for 79 videos promoted through social media platforms.

Conclusion: A partnership between the Connecticut DPH and the UConn School of Pharmacy allowed the rapid increase in capacity to administer the COVID-19 vaccine to citizens of Connecticut. Patients are receptive to accessing health information that pharmacists create on social media.

© 2022 American Pharmacists Association®. Published by Elsevier Inc. All rights reserved.
Pharmacy Professional Development was identified as such and contacted to collaborate with DPH. The UConn School of Pharmacy has been providing a comprehensive vaccination training program to pharmacists since 2009. The traditional framework for pharmacist-based vaccination training included 23 hours of instruction specific to the 17 adult vaccines in the Adult Immunization Schedule and in-person training and assessment of pharmacist vaccination skills.

Findings:

- Collaboration between a school of pharmacy and department of public health allowed for adaptation and scaling of an existing vaccination training program to quickly meet goals for increasing eligible health professionals and the number of certified vaccinators for COVID-19 vaccine rollout.
- Departments of public health could leverage the pharmacist’s accessibility and standing in the community to address many pressing health crises. This successful program can serve as a model for community-based public health initiatives.
- Pharmacists/student pharmacists can influence hesitant people about vaccinations by going beyond their traditional practice role, explaining their value, and counteracting misinformation. People searching for reliable information are willing to access pharmacist and student pharmacist created content on social media.

The objectives of this program were to:

- Collaborate with the state of Connecticut DPH to leverage the knowledge, expertise, and capacity of UConn School of Pharmacy faculty and students.
- Rapidly increase the number of certified vaccinators by training health professionals who otherwise were ineligible to provide COVID-19 vaccines to humans in the state of Connecticut.
- Develop and implement a timely and informative social media campaign targeting vaccine hesitancy in multiple languages.

Practice description

Development of the vaccine certification program

In late November, discussions between DPH and DCP administration identified the UConn School of Pharmacy as the only provider of a vaccination training program for pharmacists in Connecticut. At that time, the Dean of the UConn School of Pharmacy was contacted to initiate discussions on how the school could provide this training to other health professionals identified in the governor’s executive order. These health professionals were selected because they have experience with handling and administering injections but did not have experience injecting vaccines into humans. This allowed the UConn School of Pharmacy faculty to focus their training on the missing elements needed to administer the COVID-19 vaccine. Originally, select presentations and modules were going to be used for the new training. As discussions went forward, it was determined that these professionals needed unique training from what the school had been providing to pharmacists. On January 7, 2021, the online COVID-19 vaccinator certification program was approved by the state DPH and made available to all eligible health professionals under the governor’s executive order. The DPH sent e-mails to this newly eligible group and set up a website to host the information with access to UConn Pharmacy and DPH developed programs. Sites for in-person training and assessment were procured by UConn and DPH staff to be spread out throughout the state, providing easy access to the live training and assessment. Based on their availability, participants were able to choose from training programs and in-person assessment created and led by either UConn pharmacy faculty or a DPH evaluator. UConn’s first live training and assessment was held on January 15, 2020.

To become a COVID-19 vaccinator in Connecticut, these health professionals needed to complete didactic and in-person training. The didactic component consisted of a 35-minute online recorded lecture, highlighting the basics of
intramuscular administration and then specifically discussing COVID-19 vaccine storage requirements and expiration considerations, vaccine preparation, and management of adverse reactions. The course provided additional downloadable resources such as fact sheets and frequently asked questions from the Centers for Disease Control and Prevention and each of the emergency use authorized vaccine’s manufacturers (Pfizer-BioNTech and Moderna). To demonstrate knowledge attainment, there was a 20-question, multiple-choice assessment in which participants were allotted 3 attempts to pass with a score of 70% or higher.

Once the health professionals passed the didactic assessment, they could access a list of available in-person training sessions and sign up for an available slot. The UConn School of Pharmacy offered these sessions on multiple days spanning January-April. Sessions were available multiple times during the day or evening in 9 different places geographically distributed throughout the state. The locations of the sessions were secured by partnering with firehouse/paramedic training facilities, schools of dentistry and dental hygiene training, and others. One or more faculty members who were registered pharmacists and certified to provide vaccinations led each in-person session. Student pharmacists certified as vaccinators supported faculty with an approximate 2:1 ratio of students to faculty and an approximate 3:1 ratio of participants to faculty.

Training sessions at each evaluation event lasted for approximately 30 minutes for 3 trainees per instructor and focused on techniques for reconstituting, drawing up, and administering the COVID-19 vaccine intramuscularly. Faculty used a competency checklist to verify that each participant was able to demonstrate complete competency with each of these steps, in addition to proper techniques for sterilization and disposal of sharps and other waste. These checklists were then uploaded to the DPH site to finalize the certification process, and then, the new COVID-19 vaccinators could register for statewide DPH vaccination clinics.

Addressing vaccine hesitancy

In December 2020, 3 faculty members, a staff member, and 14 students in the UConn School of Pharmacy committed to develop short YouTube videos answering common questions about COVID-19 vaccines. Faculty who were involved in the endeavor searched through media and social media to identify gaps in knowledge and created a list of topics they felt were critical to vaccine understanding. Subsequently, new topics were added on a rolling basis as new areas of misinformation were noted. Questions were identified by the faculty, and then, students selected a specific question to develop their answer and script. The draft script along with references used was reviewed by a faculty member through an iterative process with the student until a final approved script was established. Students recorded their video, starting with an introduction followed by their script. On faculty member review and approval, the students worked with the head of communications for the UConn School of Pharmacy and a student with expertise in YouTube video layout to record, edit, and upload the videos to the site, where a landing page4 for the process was created. Other students then translated the prepared scripts into 4 other languages (Spanish, Cantonese, Polish, Mandarin). These languages were chosen on the basis of a survey of student pharmacists asking who was fluent in any languages and if they would be willing to support our project by translating. In addition, we knew that Polish was a prominent language spoken in the state of Connecticut and were able to contact alumni to provide translation.

Practice innovations

Our pharmacist-led training program provided a unique pathway to increase the number of vaccination-certified health professionals of whom human vaccination would otherwise be outside their scope of practice. Our model of vaccination training in which pharmacists and student pharmacists trained other health professionals is a first of kind in the state of Connecticut. In addition, we are unaware of any such models nationally. The layered approach with didactic and then in-person training followed by individual assessment was reminiscent of the training provided to student pharmacists and pharmacists seeking vaccination certification. The exception was that this training program was scaled down considerably to focus solely on COVID-19 vaccine training. The scale of this endeavor and the partnership between the DPH, hosting sites of in-person training, and the UConn School of Pharmacy were also innovative.

Evaluation methods

Our program was successfully implemented to meet the demand and fill the needs set forth by a state executive order.1 Success was based on the rapid increase in the number of vaccinators eligible to administer the COVID-19 vaccine throughout the state. Pharmacists led the effort to train this diverse group of health professionals who would otherwise be ineligible to assist in human vaccine administration based on their scope of practice. These successes contributed integrally but indirectly to overall efforts to increase the total percentage of Connecticut’s vaccinated population compared with national trends. Demographic information included vaccinator volunteer preference by geographic location and the profession of newly certified COVID-19 vaccinators.

For the social media campaign targeting vaccine hesitancy, we described the number of topics addressed in the videos and for each video, the number of views, likes, and shares the videos received.

Results

Vaccine certification program

As of April 30, 2021, 1834 health professionals who were given an executive order to administer human vaccinations, registered to administer the COVID-19 vaccine. Of that total, 1195 (65%) participants completed the UConn School of Pharmacy’s online training, and 872 participants (48%) attended our in-person training, available from January 15 to April 30 (Figure 1A). The remaining participants completed online trainings developed by DPH and in-person sessions hosted by an evaluator from DPH.

EMTs (55%) were the largest group of health professionals to complete the program, followed by paramedics (15%), dentists (11%), dental hygienists (10%), veterinarians (8%), and
The largest populations of citizens in Connecticut are in the southwest and north central areas of the state and accounted for 70% of volunteer location preference (Figure 3). However, some of the newly certified vaccinators were available in each geographic region of the state.

Overall, pharmacist-faculty and students were involved in 59 total in-person competency evaluation events that took place 1 or more times in 9 total locations throughout the state of Connecticut from January 16 to April 30. Each evaluation event lasted an average of 3 hours and consisted of 1-2 pharmacists and 2-4 students per site (Table 1).

Overcoming vaccine hesitancy

We developed videos on 26 distinct COVID-19 vaccine topics. All videos were recorded in English, and several were then translated into Spanish, Mandarin, Cantonese, and Polish to total 79 produced videos. Of this total, 26 videos (33%) were created January 1-15, 36 (46%) were created January 16-31, 4 (5%) were created February 1-14, 9 (11%) were created March 1-15, and 3 (4%) were created March 16-31. One additional video (1%) was made and released since April 1. After the videos were uploaded to YouTube, the videos were shared using the UConn School of Pharmacy’s social media platforms (Twitter, Facebook, and Instagram) and by the faculty, student, and staff members who chose to do so on their personal social media accounts. Salient videos were sent to applicable university cultural centers, and an article was written for UConn Today, an online UConn student and alumni news site, about the endeavor for further dissemination in the community. Outreach efforts were successful with 14,972 views and 257 “Likes” for the videos as of July 29, 2021 (Table 2).

Practice implications

To optimally role out COVID-19 vaccination in the state of Connecticut, the DPH and the governor’s office wanted to employ an all hands-on-deck strategy. Health professionals who have experience providing injections, but not vaccinations in humans, were cross-trained to rapidly build capacity. DPH came to the UConn School of Pharmacy because they recognized the critical link that pharmacists provide in ensuring that patients in the state receive a host of vaccines and that pharmacists have the knowledge and experience to train others in proper administration technique. UConn School of Pharmacy was recognized as having an existing framework within our curriculum that could be adapted quickly to meet the specific need for vaccination training of this newly eligible group of health professionals. When we contacted locations around the state, including firehouse/paramedic training facilities, schools of dentistry and dental hygienist training, and others, they were excited to work with DPH and the UConn School of Pharmacy on this initiative. With strong support from the state and our partners, the pharmacy faculty created a targeted educational program. Along with student pharmacists, a group of vaccination-certified pharmacy faculty traversed the state and provided the in-person component of the training and certification process. We were able to identify so many willing health professionals to receive this training and certify them rapidly before the large influx of vaccine availability. This unique program model allowed the state of Connecticut to stay a step ahead of the supply, not a step behind. By April 30, 2021, 55% of Connecticut’s population has received at least 1 dose of a COVID-19 vaccine, and 35%
was fully vaccinated.\(^1\) Nationally, 44% of the population has received 1 dose, and 28% was fully vaccinated\(^1\) (Figure 1B). Connecticut is among the top state performers in COVID-19 vaccine rollout and ranks second in the percentage of the population being fully vaccinated.\(^1\)

Throughout the process of the program rollout, there were some barriers and challenges that our group faced. First, the pace as to which the program was rolled out had to meet the demands of the state’s phased vaccine rollout. This was challenging as there was little time to plan, so we quickly developed a “plan as we go” strategy for all certification events. This included developing an all-inclusive site through our university system that soon to be vaccinators were able to find all information regarding date, time, and location of events. Pharmacy faculty and vaccine trainees were able to sign up for these events and receive any related communication through this platform. In addition, owing to the rapid development of the program, faculty and student availability and scheduling to fill the needs of different geographic locations were at times challenging. Faculty resorted to locations that were closest to their home locations, which was relatively even throughout the state, given Connecticut’s smaller overall size. In the future, this could pose a problem with larger states. Finally, we recognized during the certification portion that another barrier was the strategy for dissemination and replenishment of training supplies. We started with a single central location for supplies but shortly identified this as a barrier as it required travel by faculty to a location that was in some cases not close to the event locations. This was mitigated by creating 3 carts of supplies that were fully stocked to meet the needs of the events. We then tried to extrapolate needs and determine a replenishment pathway that minimized travel around the state to get or drop off the carts. By the fourth round of certification events, we felt the process was able to meet the needs of each event.

Pharmacists and student pharmacists have been an incredible resource for the public health battle against COVID-19 in the United States. Pharmacists have adapted their skill set to the needs brought on by COVID-19, including vaccinating the public and facilitating COVID-19 testing.\(^4\) In addition, pharmacists have a duty to counter the COVID-19 infodemic by providing up-to-date and scientifically based information to consumers.\(^5\) Misinformation negatively affects the intent to vaccinate against COVID-19.\(^6\) Social media campaigns can provide resources for social media superseekers to share to their audience and provide credible sources of information to those otherwise dependent on social media to encourage browsing away to those sources.\(^7\) At the same time that vaccine conversations peaked in social media platforms (January 2021),\(^1\) we implemented our social media campaign to address vaccine hesitancy, which was accessed and shared by a number of consumers. All our videos provided sources so that viewers could navigate away to trustworthy resources.

We believe that disseminating our model in which a DPH partnered with pharmacists to tackle a major health crisis can allow creative thinking of how these natural partners could further work together. DPHs could leverage the pharmacist’s accessibility and standing in the community to address many pressing health crises.

Conclusions

A partnership between the Connecticut DPH and the UConn School of Pharmacy allowed the state of Connecticut to scale up its capacity rapidly to administer the COVID-19 vaccine to its citizens. Using an existing framework for vaccination training, a unique model was developed in which pharmacists led efforts to train eligible health professionals to be certified in the administration of human vaccinations. The program was successful and could be a model for other community-based public health initiatives in the future. Finally, pharmacists are respected members of the community, and patients are receptive to accessing the health information they create on social media. This is another way in which a pharmacist can affect public health and together suggest that pharmacists should be more directly and indirectly involved in enhancing public health initiatives.

### Table 1

| Month   | Total locations | Faculty/Staff involved | Students involved | Total certification events completed | Total certificates signed off by UConn faculty | Average ± SD time of events (h) |
|---------|-----------------|------------------------|-------------------|-------------------------------------|---------------------------------------------|---------------------------------|
| Total   | 9               | 73                     | 106               | 50                                  | 872                                         | 3.1 ± 1.3                      |
| January | 7               | 31                     | 52                | 20                                  | 504                                         | 3.3 ± 0.7                      |
| February| 7               | 28                     | 33                | 26                                  | 296                                         | 3.2 ± 1.8                      |
| March   | 3               | 10                     | 16                | 9                                   | 59                                          | 2.8 ± 0.4                      |
| April   | 4               | 4                      | 5                 | 4                                   | 13                                          | 2.4 ± 1.7                      |

Abbreviation used: UConn, University of Connecticut.

### Table 2

| Video characteristics | English | Cantonese | Mandarin | Spanish | Polish | Total |
|-----------------------|---------|-----------|----------|---------|--------|-------|
| Number of videos      | 26      | 18        | 18       | 13      | 4      | 79    |
| Video views           | 4369    | 3152      | 3902     | 2263    | 1266   | 14,972|
| Video likes           | 88      | 52        | 49       | 43      | 25     | 257   |

Abbreviation used: COVID-19, coronavirus disease.
References

1. Connecticut State Department of Public Health. Approved COVID-19 vaccination training programs: healthcare professionals identified in the Commissioner’s order of December 7, 2020. Available at: https://portal.ct.gov/DPH/Practitioner-Licensing-Investigations/PLIS/Approved-COVID-19-Vaccination-Training-Programs. Accessed May 11, 2021.

2. Centers for Disease Control and Prevention. Recommended adult immunization schedule for ages 19 years or older, United States 2021. Available at: https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf. Accessed August 2, 2021.

3. Latta M, Smith M, Mulrooney M, et al. University support in the feasibility of public health programs: CT WISEWOMAN medication therapy management (MTM) program. Oral presentation at: American Pharmacist Association Annual Meeting and Exposition, March 21, 2020; National Harbor, MD. [accepted; meeting cancelled due to Covid-19 pandemic].

4. Buckley T, Dalal M, Jensen M, et al. Connecticut million hearts learning collaborative: Creating community-clinical linkages to reduce disparities in hypertension identification and control. Poster presented at: Bringing Public Health and Primary Care Together: The Practical Playbook National Meeting. December 14, 2016; Bethesda, MD.

5. Kushner A, Buckley T, Salvo M, Sobieraj D. Impact of community pharmacist-provided medication therapy management services on the self-care and clinical outcomes of patients with diabetes and/or hypertension. Poster presented at: American Society of Health System Pharmacists Midyear Clinical Meeting. December 6, 2017; Orlando, FL.

6. Wang F, Alloyet PA, Vestergaard M, et al. Characteristics, co-morbidities, and tobacco cessation outcomes in an underserved community with and without diabetes and health disparities. Diabetes. 2021;70(suppl 1), S850-PUB.

7. Dinunno C, Buckley TE, Salvo M. Identifying the scope of drug therapy problems in community setting through comprehensive medication therapy management strategies. Poster presented at: American Pharmacists Association Annual Meeting, October 19, 2020; [accepted; meeting virtual due to Covid-19 pandemic].

8. Buckley TE, Salvo M, Rickles NM. Advancing pharmacist medication management through academic public/private partnerships. Poster presented at: American Association of Colleges of Pharmacy Annual Meeting. December 14, 2016; Bethesda, MD.

9. Whiting-Burgess K. UConn School of Pharmacy virtual tour. Available at: https://www.youtube.com/channel/UC3JlS108KN7jvxCWngDFYQ/playlists. Accessed April 23, 2021.

10. Burgess KW. Pharmacy students create COVID-19 vaccine information series in 5 languages. Available at: https://today.uconn.edu/2021/01/pharmacy-students-create-covid-19-information-series-in-5-languages/. Accessed April 23, 2021.

11. USA Facts. Connecticut coronavirus vaccination progress. Available at: https://usafacts.org/visualizations/covid-vaccine-tracker-states/. Accessed May 5, 2021.

12. USA Facts. US coronavirus vaccine tracker. Available at: https://usafacts.org/visualizations/covid-vaccine-tracker-states/. Accessed May 5, 2021.

13. Adams K. States ranked by percentage of population fully vaccinated: April 29. Available at: https://www.beckershospitalreview.com/public-health/states-ranked-by-percentage-of-population-vaccinated-march-15.html. Accessed April 29, 2021.

14. McCook A. Pharmacists get green light for COVID-19 testing. Pharmacy Times News. Available at: https://www.pharmacytimes.com/news/Operations-and-Management/Article/07-20/Pharmacists-Get-Green-Light-for-COVID-19-Testing/58877. Accessed May 6, 2021.

15. Erku DA, Belachew SA, Abraha S, et al. When fear and misinformation go viral: pharmacists’ role in deterring medication misinformation during the ‘info-demic’ surrounding COVID-19. Res Social Adm Pharm. 2021;17(1):1954–1963.

16. Loomba S, de Figueiredo A, Platek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA [published correction appears in Nat Hum Behav. 2021;5(3):407] [published correction appears in Nat Hum Behav. 2021;5(7):960]. Nat Hum Behav. 2021;5(3):337–348.

17. Chadwick A, Kaiser J, Vaccari C, et al. Online social endorsement and COVID-19 vaccine hesitancy in the United Kingdom. Soc Media Soc. 2021;7(2):1–17.

18. Saraykar T, Sekhar S. What social media is saying about the COVID-19 vaccine rollout. Available at: https://www.iqvia.com/blogs/2021/04/what-social-media-is-saying-about-the-covid-19-vaccine-rollout/. Accessed May 25, 2021.

Cassandra R. Doyono, PharmD, BCPS, BCCCP, Assistant Clinical Professor, Department of Pharmacy Practice, School of Pharmacy, University of Connecticut, Storrs, CT

Jill M. Fitzgerald, PharmD, Director, Experiential Learning and Continuing Professional Development; and Associate Clinical Professor, Department of Pharmacy Practice, School of Pharmacy, University of Connecticut, Storrs, CT

C. Michael White, PharmD, FCP, FCCP, Distinguished Professor and Chair, Department of Pharmacy Practice, School of Pharmacy, University of Connecticut, Storrs, CT

Diana M. Sobieraj, PharmD, FCCP, BCPS, Associate Professor, Department of Pharmacy Practice, School of Pharmacy, University of Connecticut, Storrs, CT

Michael Zachera, MA, NRP, Region 3 EMS Coordinator, Connecticut Department of Public Health, Office of Emergency Services Hartford, CT