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Student Pharmacists' Response to a Pandemic: Service-Learning through Contact Tracing

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Student Pharmacists' Response to a Pandemic: Service-Learning through Contact Tracing

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STUDENT PHARMACISTS' RESPONSE TO A PANDEMIC:

Service-Learning through Contact Tracing

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Antoinette Martin is a third-year professional student in the Purdue University College of Pharmacy. Her experiences at patient-care community events sparked an interest in public health initiatives. She has been involved with Alpha Phi Omega National Service Fraternity and Hugh O'Brian Youth Leadership Organization, which have influenced her passions in servant leadership, volunteerism, and patient education. Her career goal is to be an ambulatory care pharmacist in an urban health care setting.

William Harris is a third-year professional student in the Purdue University College of Pharmacy. His passion for aiding in the COVID-19 public health response stems from the desire to continue serving patients throughout the pandemic. Throughout his time as a COVID-19 contact tracer, he has strengthened an interest in epidemiology and infectious disease care. His ultimate career goal is to be an infectious diseases pharmacist working on an inpatient consult team.

INTRODUCTION

Since December 2019, the world has had its eyes on SARS-CoV-2 (COVID-19). An outbreak identified at the time as clusters of pneumonia cases originated in Wuhan, China, and quickly spread around the world, despite mitigation efforts of halting travel and closing borders.¹ The rapid, widespread nature of the COVID-19 virus demanded global attention, prompting meetings of the World Health Organization's (WHO) Emergency Committee (EC). On January 31, 2020, the EC prompted the WHO director-general to declare the SARS-CoV-2 outbreak a Public Health Emergency of International Concern (PHEIC). To date (March 1, 2021), there have

been 114,302,776 confirmed cases of COVID-19 globally and more than 2.5 million deaths attributed to this virus according to the Johns Hopkins University and Medicine Coronavirus Resource Center.²

By March 2020, it was evident that SARS-CoV-2 was going to be a significant public health concern for the United States. On March 10, 2020, Purdue University president Mitch Daniels announced that all in-person classes would be suspended for the foreseeable future, with transition to remote learning for the semester. Over the coming months, Purdue developed and implemented numerous health and safety strategies to welcome students back to campus for in-person learning in August

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2020. This initiative, called the Protect Purdue Plan, was led by a medical advisory team that prioritized the formation of the Protect Purdue Health Center (PPHC) in contract with One-to-One Health. The PPHC became the central location for information, testing, contact tracing, and case management for Purdue students, staff, faculty, and their dependents.

In an effort to aid with pandemic response, the Purdue University College of Pharmacy established a service-learning course, PHRM 490, aimed at exposing Doctor of Pharmacy (PharmD) students to public health concepts, entitled “Experiences in Public Health.” The course was formed in partnership with One-to-One Health to offer student pharmacists an opportunity to impact the health and well-being of their community. Students were able to apply communication skills gained through the pharmacy curriculum, hone self-reflection skills, and build cultural competence and an understanding of social determinants of health through contact tracing at the PPHC and COVID-19 public health discussions in class. Prior to course enrollment, students completed two certificate courses, Johns Hopkins University Bloomberg School of Public Health COVID-19 Contact Tracing and Purdue University Global PHS1010: COVID-19 Contact Tracing, in preparation for their service-learning. Students chose to take this elective course for a multitude of reasons, some being hands-on experience in public health, interest in epidemiology and infectious disease, a desire to serve the community, and for practice with patient interaction.

DESCRIPTION

Based on 2018 data, Purdue University employs more than 11,500 faculty and staff and has a total enrollment of 43,411 students.^{3,4} Much of Purdue’s student body lives in residence halls, Greek houses, or co-op houses. With a densely populated campus of social and active young adults and older, at-risk faculty and staff, Purdue’s campus was a prime setting for a potential COVID-19 outbreak. To mitigate this spread, Purdue implemented the PPHC, which provided services such as contact tracing, COVID-19 testing, and an information hotline. Contact tracing is a proven public health measure utilized to control the spread of infectious diseases by identifying and isolating potential active cases. With access to trained health care professionals operating through a centralized organization, the Purdue community was equipped to manage many aspects of their health and safety amid this pandemic. The PPHC hotline, available 7 days a week, is a resource community members utilize for testing, quarantine, and isolation guidance as well as other needs

on an individual basis. During their busiest weeks, the hotline handled upward of 1,200 calls per day.

Contact tracing involves interviewing people who have lab-confirmed COVID-19 diagnoses to mitigate the spread of the virus through determination of the patient’s isolation periods, previous community exposures, and close contacts. Through early identification of people who have been exposed to SARS-CoV-2, contact tracers inform and provide them with instructions for safe quarantine practices and schedule follow-ups with case managers. Modeling data has shown that rapid implementation of quarantine and isolation protocols and easy access to accurate testing and tracing could decrease community transmission by nearly half.^{5,6} Guided by prior infectious disease control protocols, the PPHC was quick to hire contact tracers and case managers to implement a testing and tracing headquarters of their own, much akin to many county health departments.

In order to aid the PPHC pandemic response with their efforts, the students of PHRM 490: Experiences in Public Health were onboarded in October 2020. They attended two training sessions on-site to learn the responsibilities and workflow of the PPHC. They each received a laptop, headset, and computer mouse, and were encouraged to have access to pen and paper while taking calls (Figure 1). After completing the training, each student volunteered four hours per week divided into one or two



Figure 1. The standard setup for the student contact tracers included a One-to-One Health–issued laptop, a wireless mouse, a headset with microphone, a pen, and paper.

shifts for a total of six weeks. They initially completed on-site calls until they achieved comfort and then transitioned to working from home. PHRM 490 met biweekly for 1.5–2 hours for check-ins and student-led topic discussions. The topic discussions were extremely beneficial to the students' growth as contact tracers.

COMMUNITY IMPACT

According to the Protect Purdue COVID-19 Dashboard, from August 2020 to December 2020 Purdue University administered 92,427 tests, identifying 3,934 positive results (4.26% positivity rate). Each of these positive cases has been followed up for contact tracing purposes through the PPHC.⁷ With high demand for COVID-19 information and need for easy access to testing and tracing, One-to-One Health was extremely receptive to the student pharmacists' service-learning endeavor to assist with contact tracing. One-to-One Health trained them with a detailed, fast-paced onboarding process. The students became key members of the One-to-One Health team where they performed contact tracings, scheduled tests, and answered various COVID hotline questions.

Based on the students' experiences, a contact tracing assignment was completed within 24 hours after a case manager notified a patient of their positive test results and required isolation period and would take between 15 and 25 minutes. Case managers differ from contact tracers in that case managers are licensed health care professionals trained in symptom management and quarantine and isolation protocols. They monitored patients and enacted 10-day isolations for positive cases and up to 14-day quarantines for close contacts. Patients that fall under the case manager's jurisdiction are any Purdue student, staff member, or faculty member and their dependents. Case managers and contact tracers worked closely as a team to identify and communicate with positive patient cases and close contacts of the patient throughout the Purdue community.

When assigned a positive patient case to contact trace, the student pharmacists would first look in the patient's medical chart for background information such as date of positive test, symptoms, living situation, and personal information such as race, ethnicity, and date of birth. This information would be entered into the Indiana State Department of Health contact tracing form (Figure 2). They then called the patient, confirming the information in the chart and gathering details on their recent travel and work history, exposure to aggregate living facilities, and close contacts. A close contact was

defined as anyone within six feet of a lab-confirmed COVID-19 positive case for greater than 10–15 minutes during their infectious period without masks. A patient was classified as infectious, or able to spread COVID-19, 2 days prior to their symptom onset (or positive test if asymptomatic) and up to 10 days after, hence the 10-day isolation.^{8,9} After getting background information on the patient's close contacts, it is then the responsibility of the tracer to notify close contacts of their exposure and provide education on quarantine protocols. Contact tracers would use an electronic health record system to assign the close contacts to a case manager who ensured adequate quarantine living conditions, monitored for symptoms, and provided follow-up testing scheduling.

In addition to contact tracing, the student pharmacists monitored the PPHC COVID-19 hotline, taking calls from Purdue community members. They received questions on potential exposure, test scheduling, quarantine and isolation protocols, and guidance on going home. Student pharmacists used their communication skills to gather information from callers, such as symptoms and possible exposures to determine their need for quarantine and follow-up from a case manager. At times, the conversations with callers could be challenging, especially when speaking with parents of students in quarantine or isolation. As a majority of the patients are over the age of 18 (with the exception of children of students, staff, or faculty), staff members were legally required to protect health information according to the Health Insurance Portability and Accountability Act (1996) (HIPAA). This frustrated worried parents at times, but the student pharmacists were praised for using a calm demeanor and polite verbiage to defuse the situation. To this end, at the completion of the service-learning course, five of the students were hired to continue their work as contact tracers.

Since the student pharmacists' participation was a smaller portion of the much larger PPHC team, it is difficult to precisely quantify their specific impact on COVID-19 spread within the Purdue community. The 10 student pharmacists spent a combined 209 hours in service to One-to-One Health as contact tracers during their six-week volunteering period. They answered 431 calls on the hotline, scheduled 345 COVID-19 tests, contact traced 48 positive cases of COVID-19, and called each patient's close contacts. It is important to note that through every implemented effort, the PPHC has been instrumental at maintaining in-person learning for all of the 2020–2021 academic year. The student

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COVID-19 Case Investigation Form

Investigation Information:

Patient Name (Last, First): _____ County of Residence: _____

State PUI/specimen authorization number (if known): _____

Interviewer Name (Last, First): _____ Organization: _____

Interviewer Telephone: _____ Interviewer e-mail: _____

Interview date (MM/DD/YYYY): _____

Patient Demographics:

Date of birth (MM/DD/YYYY): _____ Age: _____ Age units (yr/mo/day): _____

Sex: Male Female Unknown Other

Ethnicity: Hispanic/Latino Non-Hispanic/Latino Not specified

Race (check all that apply):

Asian Black White American Indian/Alaska Native

Native Hawaiian/Other Pacific Islander Unknown Other, specify: _____

Patient Symptoms and Outcomes:

Did the patient have any symptoms during their illness? Yes No Unknown

Symptom onset date (MM/DD/YYYY): _____

Date of symptom resolution (MM/DD/YYYY): _____

Still symptomatic Unknown symptom status Symptoms resolved, unknown date

During this illness, did the patient experience any of the following symptoms?

Fever >100.4 F (38C) Subjective fever (felt feverish) Chills Muscle aches

Runny nose Sore throat Cough Shortness of breath

Nausea or vomiting Headache Abdominal pain

Diarrhea (≥ 3 loose/looser than normal stools/24hr period) Other, specify: _____

Was the patient hospitalized for this illness? Yes No Unknown

Admission date 1 (MM/DD/YYYY): _____

Discharge date 1 (MM/DD/YYYY) (leave blank if currently hospitalized): _____

Hospital(s): _____

Was the patient admitted to an intensive care unit (ICU)? Yes No Unknown

Figure 2. This is the Indiana State Department of Health form the student contact tracers filled out for each positive case they were assigned. It is seven pages in length and concludes with two pages for close contacts to be listed.

pharmacists qualitatively reflected on their success with new call experience, each shift worked, and through group discussion in their bi-weekly classes. They noticed improvement in comfort levels when answering calls, efficiency in contact traces, and abilities to help

fellow students with work-related questions. With ever-changing guidelines and emerging information about COVID-19, the students were continually developing new question responses and task competencies.

While this public health experience was overall a great success and learning opportunity, it is worth noting the challenges faced by the student pharmacists. Technology was the hardest hurdle to overcome throughout the semester for the student pharmacists. There were many challenges with certain computer programs refusing to run properly, crashing, or taking extensive amounts of time to start up. While frustrating, this aspect of the job was handled through multiple routes of troubleshooting and was something that had to be anticipated and calmly dealt with.

There were also challenges with the work itself. At times, patients could be guarded when disclosing their recent travel and exposure history to a contact tracer. Perhaps the patients viewed revealing their close contacts as shameful or were worried about the repercussions of discussing their actions with the tracers. The student pharmacists reassured patients that the contact tracing process was not used to reprimand those who test positive and their case reports would be confidentially maintained within the medical record at Purdue and with the state Department of Health. Anecdotally, the PPHC staff felt that students seemed more comfortable discussing histories with other students after knowing they were similar in age. However, sometimes patients or callers would change their stories of exposure history as they figured out which situations would require isolation or quarantine to avoid having to complete either of those protocols. In response, student pharmacists would have to frame and ask targeted, prying questions to obtain more detailed information. Finally, it was challenging at times to speak directly to a positive patient's close contacts, and the student pharmacists would have to leave voice messages and emails requesting a returned phone call.

The evolving nature of the COVID-19 pandemic prompted One-to-One Health and the PPHC to continually update protocols and processes as new information frequently emerged. The PPHC onboarded more case managers and contact tracers to meet increasing demand, opened access for Purdue University community members to use a health-portal app to schedule tests without using the COVID-19 hotline and view results, set up a Purdue University Student Health services pop-up clinic at the testing site for those with negative tests but alternative ailments, and monitored emergence of new strains of SARS-CoV-2. This opportunity to help the Purdue community never would have been possible without the mentorship and vision of the servant-minded professors who started this course.

STUDENT IMPACT

As the student pharmacists enrolled in PHRM 490: Experiences in Public Health offered relief to the Purdue community, the experience returned benefits to them as well. Those who participated were given ample opportunity for personal and professional growth toward their respective goals. Students reported enrolling in this course to gain hands-on patient care experience, learn about rapidly evolving health care situations, gain exposure to public health initiatives, and provide assistance in the fight to slow COVID-19 transmission within the Purdue University community. Each of these goals were met through active participation in the service-learning contact tracing and peer-led topic discussions offered in the course. This interconnected relationship can be seen in Figure 3. The course goals can be translated to the future careers of the student pharmacists as their roles evolve within the profession of pharmacy and they become leaders in providing transformative, patient-centered care.

In preparation for their service-learning opportunity with the PPHC, students earned contact tracing certifications through Johns Hopkins Bloomberg School of Public Health and Purdue University Global. The courses focused on building critical skills and concepts such as active listening, motivational interviewing, and ethics while also teaching enrollees the basics of contact tracing, epidemiology, and public health. These courses took approximately 12 hours to complete. Additionally, the students drew from prior coursework in classes such as Professional Programs Labs, Introduction to Patient-Centered Care, Public Health, Population Health Management, and Collaborative Leadership: Interpersonal Skills. These courses provided a knowledge foundation in skills and topics similar to that of the COVID-19 contact tracing courses, such as motivational interviewing, active listening, guideline interpretation and application, and intercultural awareness. These courses provided baseline knowledge that aided in their success with contact tracing and fueled a passion for public health aid.

Notably, many of the competencies developed in Experiences in Public Health are mirrored in clinical pharmacy practice. Pharmacists have an evolving role in health care that expands well beyond that of the traditional dispensing pharmacist. In their expanded roles, some pharmacists may function as mid-level practitioners, see patients under collaborative practice agreements, participate in multidisciplinary care teams, dose medications, and provide education to patients and providers

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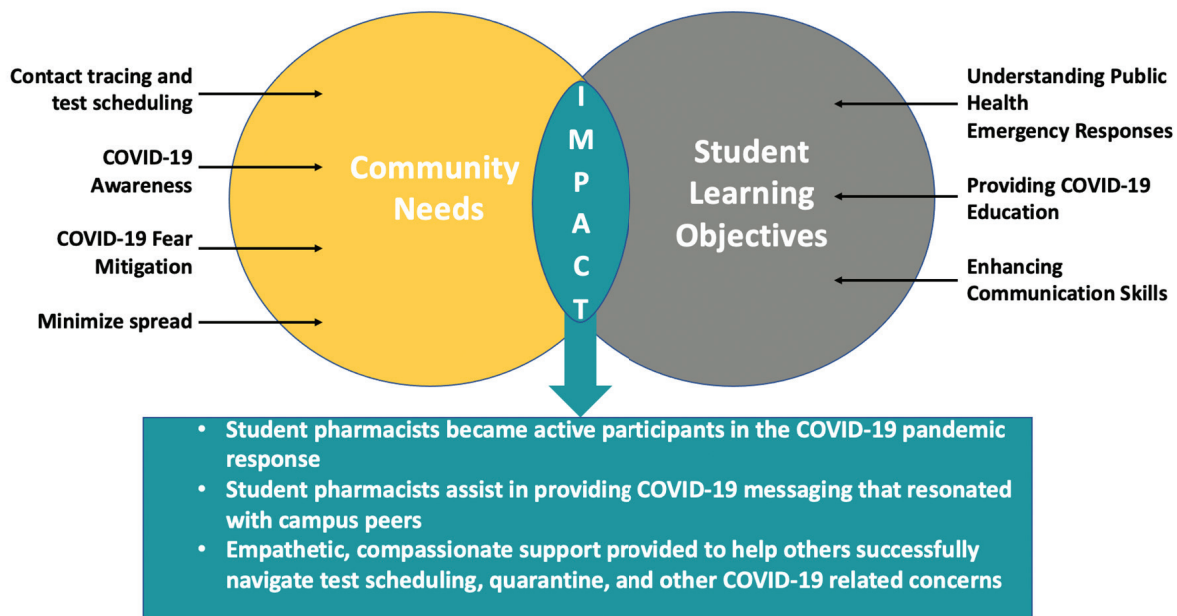


Figure 3: This figure highlights the connection between the community needs and how the student pharmacist's skills meet those needs and impact the community.

regarding pharmacotherapy. The 10 future pharmacists enrolled in this course were able to practice skills that would translate to these activities through contact tracing of positive COVID-19 cases, triaging COVID-19 health questions on the PPHC Hotline, and by working with the community and other health care professionals to mitigate the spread of SARS-CoV-2. Student pharmacists gained proficiency in the above mentioned skills as well as patient-friendly communication, drafting progress notes to providers, and working as part of an interdisciplinary health care team. The service-learning portion of this course allowed students to increase their comfort levels in a broad range of patient encounters, improve their clinical decision-making skills, and contribute to maintaining the health of their community.

Additionally, the student pharmacists partaking in this service-learning opportunity have gained exposure to a telehealth-like care setting, which could play a large role in the future of primary care delivery. Telehealth is a broad term used to describe the conducting of virtual health care appointments or checkups by a primary care provider. Finally, participants were able to improve upon their time management skills, as they balanced four hours of contact tracing weekly with their full-time professional school schedules. All of these invaluable skills will translate well to the student pharmacists' future careers.

In addition to the skill-based benefits, students also developed knowledge of the SARS-CoV-2 pandemic,

public health initiatives, population health management, and health care administration. Direct exposure to these situations, supplemented by the contact tracing training courses, have prepared the student pharmacists to excel in these areas. Furthermore, the didactic course portion of Experiences in Public Health also bolstered student competency on topics related to COVID-19 and public health. Discussions included subjects such as the financial burdens of COVID-19, health disparities in underserved communities, ethics of vaccine distribution, reinfection and "long-haulers," and more. Peer-led topic discussions are beneficial to students and professors alike, as they offer environments of low-stakes learning, expand listeners' knowledge on relevant health topics, provide opportunities for students to gain teaching experience, and prepare future professionals for a career of teaching and educating others.¹⁰ In the postcourse survey, students responded that leading topic discussions and learning from other students was extremely beneficial to their growth as future medical professionals and current contact tracers. One student pharmacist noted that they were able to use the information learned during these discussions to help educate their friends, family, and peers on the rapidly evolving situation, thereby increasing their reach of care beyond the setting of Purdue University.

The class-based portion of Experiences in Public Health also focused on reflective learning. Reflective practice in the learning process or in health care is a valuable way to

recognize your strengths and weaknesses, learn from your past successes and failures, and improve as a student or practitioner.¹¹ There are numerous ways to go about reflecting, but the core of the process should involve the “what, where, and who” of the situation, how you felt about it, why it went as it did, what you would change about your actions if presented with the situation again, and how this will change the way you practice. This process was accomplished in two different formats during the course: reflective writing and weekly check-ins. During weeks off from class, students would reflect on their previous 8 hours of contact tracing based on instructor-created written prompts. An example of a prompt may be, “What was one thing that challenged you during your time tracing this week? How can you improve upon it next time?” This caused students to participate in the reflective process, apply it to their situation, and ultimately, determine how they can improve their work as contact tracers or student pharmacists. In the weeks that class met, a similar structure would occur verbally. Each student would answer a similar prompt, which would allow other students to learn from their peers' experiences.

As expected for a new opportunity during a pandemic, the student pharmacists faced many challenges when starting with One-to-One Health at the PPHC in the fall of 2020. They were the first group of students to work with One-to-One Health in this capacity. This presented difficulties within the onboarding process, leading to differing levels and styles of training received. The students were able to work together to overcome this by creating a shared document for tips, training notes, and procedures. This collaboration ensured that each student was able to succeed in accomplishing the goals for the service-learning course. Additional issues arose with technology and workload during shifts. During the peak of the semester, the PPHC Hotline was receiving over 1,200 calls per day, of which they typically answered and managed 92–99% successfully. This meant that for the contact tracers and call center employees, the calls turned over in rapid succession, increasing the demand on the students.

For many students, this was their first time conducting virtual health care visits. Communication over the phone was found to be very different than in person, presenting challenges to add to the stress of the new and rapidly evolving situation. Student pharmacists reported that it was more difficult for them to connect with patients in the virtual setting than in-person. The class worked together to strategize solutions to difficult problems they faced such as dealing with technological glitches, having

difficult conversations, and learning how to handle unique situations so the students would be equipped to learn and grow. Finally, a major challenge faced by all was the rapid release of new information regarding SARS-CoV-2, COVID-19 patient care, and university guidelines. As contact tracers, the students were required to stay up-to-date and have a deep working knowledge of the pandemic and the Protect Purdue Plan to ensure that the information coming from the PPHC was consistent and accurate. This was facilitated through topic discussions, weekly meetings with the PPHC supervisor, and high levels of collaboration between contact tracers, case managers, and the Purdue community. All of these challenges culminated in a considerable positive impact on the student pharmacists.

Each student was surveyed upon completion of the course, and unanimously they reported more confidence entering the next phase of their pharmacy training. Students also reported that this service-learning opportunity had a marked impact on their future. Students cited enhanced comfort during tough patient encounters through exposure to real and difficult clinical situations as starting points for their future careers. In the short term, 5 of the 10 students in the inaugural class obtained part-time employment with One-to-One Health as contact tracers. These student pharmacists work 8–15 hours per week for the PPHC performing the same duties as they did during the course. One inaugural student is obtaining teaching experience as the teaching assistant for the second semester of Experiences in Public Health, in which there are 11 new student pharmacists enrolled. Upon graduation, this experience has further solidified one student's intentions to obtain their master's degree in public health and to work with underrepresented patients. For another student, working closely with the pandemic sparked their desire to work in infectious diseases pharmacy. These experiences have offered many other insights into what enrollees want to prioritize in their careers, whether it be patient interaction, epidemiology, public health, or other related focuses.

CONCLUSION

The Experiences in Public Health course provided student pharmacists with a unique opportunity to engage in service-learning through active participation in combating a public health emergency. The communication skills necessary for contact tracing and interacting with other health care professionals at the PPHC made the student pharmacists ideal candidates for this sector of the pandemic response. Through

active class participation, the student pharmacists practiced and improved numerous professional skills, which has the potential to positively impact their future studies, clinical rotation experiences, and other professional endeavors. Key takeaways such as enhanced patient counseling skills and clinical decision making built upon competencies learned in the Doctor of Pharmacy curriculum.

Throughout this experience, One-to-One Health was very receptive to the help of the student pharmacists. One-to-One was communicative, open to questions, and quick to offer assistance. The reciprocity of this relationship could be enhanced through student participation at the COVID-19 testing center and future vaccination clinics. This would challenge the students to utilize in-person patient care skills, maintain their vaccination administration skills, and increase interprofessional health care competencies. With the help of the student pharmacists, One-to-One Health and the PPHC would likely experience enhanced efficiency and productivity at the clinics. A final way to improve the relationship would be to utilize past students to train current students of the course, which would reduce the workload on One-to-One Health and give the pharmacy students teaching and training experience. Using this model, service learning can be utilized to mutually benefit communities and students in future public health crises.

When COVID-19 subsides, Experiences in Public Health can be modified to be relevant to other public health concerns such as influenza or prescription drug misuse. Students can continue working in public health while at Purdue by continuing to work with Protect Purdue or through participating in internships with the Tippecanoe County Health Department. Fourth-year pharmacy students have the ability to participate in public health rotations in areas such as vaccination clinics, global health, smoking cessation, and government health departments. Within the field of pharmacy, public health involvement can take different forms such as participation in health fairs, vaccination clinics, and other initiatives that improve the health of their communities.

We wrote this article to highlight the contributions of the course coordinators and student pharmacists who enrolled in PHRM 490: Experiences in Public Health, as well as the mutual benefit that was derived from this partnership. We hope to provide a model for future endeavors in which students can become involved in public health responses and other service-learning opportunities. This article should also provide our readers with an inside look at contact tracing in a densely populated community as well as how they can become involved.

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