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ABSTRACT

Context: Research and policy studies alike have enumerated population and community health benefits of system integration between medical, public health, and social entities. The emergence of the COVID-19 pandemic revealed the necessity of a well-trained and adequately staffed public health and medical workforce in order to process SARS-CoV-2 cases and prevent subsequent transmission. Higher education systems, in particular, represented defined populations of exposure and transmission. Opportunities existed for collaboration and task sharing between institutions of higher education and local public health departments to limit spread and impacts.

Program: This article describes the Pandemic Response Officer (PRO) program at Cornell University, a team of staff and students created during the intensity of the pandemic to benefit the Tompkins County and Cornell University communities.

Implementation: The PRO program was formed in January 2021, with an original team of 8 individuals, working iteratively to investigate and support employee cases and exposures. Implementation was motivated by Cornell University's dual responsibility as a large employer that also possessed SARS-CoV-2 test results of employees. PROs loaded case information into a shared HIPPA-compliant electronic record that collected information for case notification, case investigation, isolation support, contact tracing, contact notification, and quarantine support. Over time, the PROs grew to a team of 25, gaining responsibilities as university and public health systems shared roles to maximize resources.

Evaluation: From January 1 to December 31, 2021, PROs managed 773 employee and 2943 student cases. During the Omicron surge (November 28-December 31, 2021), PROs saved the public health department an estimated 2797 hours of effort, equating to more than 10 professionals working full-time, evenings and weekends, to process cases and contacts during this interval.

Discussion: By integrating efforts between a university and public health agency, this intervention minimized SARS-CoV-2 transmission via expedient case support and alleviated strain on public health systems by expanding the public health workforce.

KEY WORDS: collaboration, COVID-19, organizational innovation, primary health care, public health, social determinants of health

As highly social working and living environments, institutions of higher education (IHEs) were sites of concern for extensive SARS-CoV-2 transmission.[1-3] As IHEs announced plans to reopen in fall of 2020, campus protocols were required to ensure compliance with public health recommendations for isolation and quarantine. As students and staff returned to residential campuses to live and work, university campuses created defined populations in which prevention strategies and community efforts were essential to limit viral transmission that could impact learning and the workforce.[1-3] To remain open, universities needed to collaborate with local public health agencies to apply best practice and mandated policies, support case investigation, and care for people diagnosed with COVID-19.[4] However, because of chronic underfunding, many health departments were understaffed and had limited ability to notify and investigate all SARS-CoV-2–positive cases.[4]

Methods

Cornell University (25 582 students, 10 446 employees) developed and implemented the Pandemic Response Officer (PRO) intervention, in partnership with the Tompkins County Health Department (TCHD) in New York State's Tompkins County (population: 105 162).[5] Our intervention extended select county-level public health responsibilities to trained university staff, expanding the workforce available to meet COVID-19 prevention and response needs. University staff with expertise in public health and occupational medicine built a team of PROs, which took on pandemic-related responsibilities assigned by the county.

From the outset of the pandemic, Cornell University managed the university required SARS-CoV-2 testing program for students and employees, including registering individuals, and sampling and testing specimens; sample results were disseminated in partnership with the local health system. In-house management of these processes allowed for rapid results and the potential to quickly "break the chain of transmission." Given Cornell's in-house expertise in public health, occupational medicine, environmental health, and student health, a collaborative prevention and treatment model was designed out of a motivation to streamline Cornell's dual responsibility as a large employer committed to workplace wellness and one that possessed test results of COVID-19–positive employees.

Until December 2020, Cornell had only 274 COVID-19 cases detected through its mandatory surveillance program (199 student cases, 75 employee cases).[6] In that time, Cornell's student health and occupational health programs supported TCHD in university-based case investigations, as needed. As cases began to rise nationally in December 2020, Tompkins County also saw a rise in cases (25 student cases, 116 employee cases), which strained the county COVID-19 response capacity (Figure). Cornell and TCHD began planning for more strategic shared support, motivated by a need to collaborate in order to release timely test results to employees, decreasing inadvertent workplace exposures due to delays in notification.

The PRO program emerged out of a need to address 2 main goals in line with maximizing county and campus well-being: (1) to minimize COVID-19 cases and limit academic and employment disruption within the Cornell community via expedient case and contact support, and (2) to alleviate strain on TCHD by expanding public health workforce resources.

The intervention was active January to December 2021, first serving employees only and then serving both students and employees. The intervention evolved through 2 key phases: (1) supporting workplace safety, which as a start-up process, provided a bridge between occupational medicine at Cornell and TCHD as we developed protocols and systems with staff volunteers; and (2) supporting student health and campus public health, which is when additional public health student volunteers were recruited as PROs when the fall 2021 semester began and as workflow integration efforts were realized through the Omicron surge.

During this time, the PRO program grew from an initial team of 8 staff volunteers to a cadre of 25 staff and student team members. Initial responsibilities for PROs included case notification, case investigation, isolation support, contact tracing, contact notification, and quarantine support.

Supporting workplace safety

In January 2021, Cornell built the team of PROs to help expedite case investigation with university employees. TCHD worked with Cornell to define PRO responsibilities, ensure training and supervision, and define university-county communications processes. PRO duties initially included case support, case investigation, and workplace exposure investigation, with aims to (a) support newly diagnosed employees in understanding next steps, (b) connect employees to paid leave and health care resources, and (c) quickly identify workplace exposures and contacts so that areas could be disinfected, as well as close and proximal contacts notified and tested for SARS-CoV-2. Over time, PROs also took on rapid case notification and
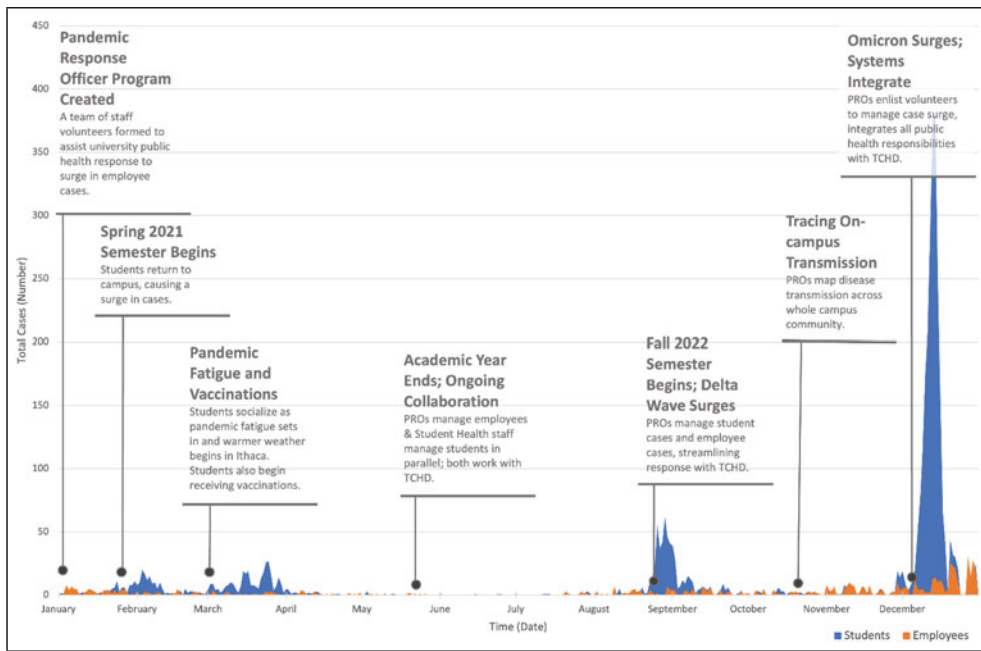
FIGURE Timeline of the Pandemic Response Officer Program, With Corresponding COVID-19 Pandemic Case Trends at Cornell University, January-December 2021
Abbreviations: PRO, Pandemic Response Officer; TCHD, Tompkins County Health Department. This figure is available in color online (www.JPHMP.com).

contact tracing responsibilities; in most cases, TCHD also completed a thorough case investigation with all diagnosed COVID-19 cases during this time. TCHD leadership and staff were involved in the initial training and follow-up meetings to ensure streamlined and consistency of guidelines and information reporting.

A standardized interview and data collection tool was built into REDCap,[7] the same system used to manage positive cases identified via surveillance testing. Cornell employees with public health or customer service backgrounds were recruited to serve as PROs (n = 8). PROs were trained by public and occupational health leads to be HIPAA-compliant, knowledgeable in case investigation and contact tracing and proficient in motivational interviewing and note-taking. PROs were trained using the overall framework of a peer counseling model,[8] empowering trained employees to conduct compassionate and relatable interviews to their peers to enhance engagement and maintain trust in the system. Training manuals were developed by Cornell and TCHD leaders together (see Supplemental Digital Content Appendix 1, available at http://links.lww.com/JPHMP/B136) using resources from the Centers for Disease Control and Prevention (CDC) that existed at the time[9] and the Johns Hopkins Contact Tracing Course.[10] PROs flexed paid work time to serve, signing up for shifts between the hours of 7 AM and 10 PM, allowing case notification to happen outside of normal health

department work hours, reducing the risk of cases coming to campus the next day. PRO workflow was managed through REDCap.

Employee cases were assigned to PROs for telephone interviews. PRO interviews ensured understanding of test results, isolation requirements, and available resources (see Supplemental Digital Content Appendix 1, available at http://links.lww.com/JPHMP/B136). The interview then elicited workplace close contact information and potential workplace exposures. The interview was not designed to collect non–university-affiliated close contacts, but PROs were trained to report on contacts outside of the workplace during the interview if they were mentioned. These close and proximal contacts were recorded through the REDCap system and reported to TCHD to complete the official public health case investigation via a direct phone call. Following the interview, automated messages summarizing isolation rules and workplace policies were sent to the case and to human resources (HR) to alert of leave. Environmental Health and Safety teams were notified if workplace cleaning was needed, and HR informed close contacts about possible exposure.

Although data from REDCap were not sent directly to TCHD reporting systems, data were shared between the university and the health department using existing built systems. As the Cornell COVID-19 Testing Lab released results, they were concurrently sent

to New York State's Electronic Clinical Laboratory Reporting System (ECLRS)[11] (from which TCHD was alerted to a case), to the local testing results portal (where individuals could access their results), and to REDCap, allowing for immediate response to notify cases and begin case investigation. Data collected by PROs were reported to TCHD using official sign-out processes in the form of integrated daily staff meetings that included membership from Cornell and TCHD working together; this helped TCHD prioritize its own case investigation processes.

Supporting student health and campus public health

From spring 2020, Cornell's student health system also worked in partnership with TCHD to manage every Cornell student COVID-19 case, providing isolation housing, quarantine testing, medical rounds in isolation/quarantine units, and medical management of severe or worsening symptoms. During the fall 2020-spring 2021 academic year, student cases were low enough in number (n = 812; mean = 3 cases per day; range, 0-27) that Cornell nurses and TCHD public health leads managed all cases in tandem. However, when students returned to campus in August 2021, mandatory arrival testing and weekly surveillance identified 426 cases in 2 weeks, overwhelming the system (Figure).[12]

With support from TCHD, Cornell quickly expanded the PRO program to support student cases (see Supplemental Digital Content Appendix 2, available at http://links.lww.com/JPHMP/B136), particularly during hours not covered by TCHD staff and when many results were expected. Defined duties included case notification, case investigation, contact tracing, contact notification, and student support, with aims to break the chain of transmission by quickly (*a*) supporting safe and complete isolation, (*b*) identifying and notifying close contacts, and (*c*) encouraging supplemental COVID-19 testing with exposed groups (eg, teams, groups, housemates).[13]

PRO shifts extended hours of the local public health department response after TCHD's daily office hours ended at 5 PM. This allowed for immediate notification of SARS-CoV-2 test results when most of the reporting occurred in the evening hours and facilitated engagement of the campus student and employee population when they were most likely available to connect about their contacts and potential exposures. In most cases, TCHD also completed a thorough case investigation with all diagnosed COVID-19 cases in the following days using standard public health protocol.

Cornell graduate public health students (n = 25) were recruited and trained to be HIPAA-compliant, knowledgeable in case investigation and contact tracing and proficient in motivational interviewing and note-taking; this was achieved, in part, through mandatory completion of the Johns Hopkins Contact Tracing Training, Cornell University HIPPA training, and review of the PRO standard operating procedures (see Supplemental Digital Content Appendices 1 and 2, available at http://links.lww.com/JPHMP/B136). Student PROs signed up for paid weekly shifts. Following each student case interview, automated messages were sent to the case to review isolation procedures and academic support through REDCap. Close contacts were sent automated messages about possible exposure and recommended actions, also through REDCap. For student cases in congregate housing, PROs coordinated case placement into isolation housing, inclusive of transportation, food, and academic accommodations, to prevent community spread.

Results

Cornell University was able to provide comprehensive support to the community, preserving TCHD capacity to support all other county residents. From January 1 to December 31, 2021, PROs managed 773 employee and 2943 student cases, including a total of 2705 (326 employee and 2370 student) cases just during the Omicron period (November 28-December 31, 2021).

PROs endeavored to contact cases within 1 hour of their test result being released (7 AM-10 PM) to support immediate isolation. Cases who did not pick up the first call were called multiple times and received automated text messages (via REDCap) to ask them to pick up the phone. PROs also endeavored to create a trusting space during the case investigation process, where close contacts or high transmission risk activities could be shared. This helped support active outreach to help close and proximal contacts engage in supplemental testing, and/or quarantine (where indicated), and to alert TCHD to priority areas to focus their case investigation, and/or public health risk communications efforts to limit early transmission. During the Omicron period, when public health resources were strained, PROs managed key public health responsibilities, including outreach and isolation support for Cornell students, saving TCHD and estimated 2797 hours of effort (Table). This equates to more than 10 professionals working full-time, evenings and weekends, to process these cases and contacts during this interval, allowing them to allocate their efforts to all non-Cornell student cases in the county. TCHD retained responsibility for isolation

TABLE

Specific Employee and Student Health Response Tasks for the PRO Program at Cornell University, With Corresponding Key Public Health Responsibilities

Responsibilities	Employee Health Tasks	Student Health Tasks
Case notification	Calls to employees testing positive	Calls to students testing positive
	Answering immediate questions re: COVID status	Conducting health assessment for symptoms
	Ensuring employee has access to medical care	Assuming medical care of the student
	Ensuring pandemic workplace absence is communicated to human resources	Ensuring pandemic workplace absence is communicated to human resources if student is an employee
Case investigation	Exploring potential routes of exposure in the workplace	Exploring potential routes of exposure in the classroom, residence halls, social settings, and student life
Isolation support	Ensuring employee has access to a safe isolation location	Arranging isolation housing, food delivery, and academic accommodations for the student
Contact tracing	Identifying close and proximal contacts in the workplace	Identifying close and proximal contacts in the classroom, residence halls, social settings, and student life
Contact notification	Calls to employees and students identified as close and proximal contacts	Calls to employees and students identified as close and proximal contacts
	Ensuring pandemic workplace absence is communicated to human resources	Ensuring pandemic workplace absence is communicated to human resources if the student is an employee
	Ensuring employee has access to medical care	
		Conducting health assessment for symptoms
Quarantine support	Ensuring employee has access to a safe quarantine location	Arranging quarantine housing, food delivery, academic accommodations, and testing schedule

and quarantine notice and release and still endeavored to contact all cases in subsequent days and weeks.

The partnership between Cornell and TCHD expanded the capacity of the county's public health workforce. Successful working relationships between frontline staff members at Cornell and TCHD, along with shared systems and collaboration, ensured core COVID-19 public health services were available to all. As needs emerged and as contexts shifted—including the introduction of the Omicron variant—this working relationship transformed into an integrated system that ensured a strong and continuous public health response. For example, in December 2021, the PRO team rapidly added 30 volunteers to support the Omicron surge, streamlined data collection, further improving response time and efficiency by expansion of both person-power and evening coverage and by maintaining responsibility for cases, as authorized by TCHD.[12]

Discussion

The efficient and streamlined workflow of the PROs also facilitated high-level policy and decision making at Cornell and TCHD. Cornell's surveillance program utilized an alert system for campus operations and closures, in which Green, Yellow, Orange, or Red colors signaled different levels of stringency for academic and social gatherings.[6] Each time a change to operations was considered, the data and information collected from the PROs were instrumental in determining the most appropriate course of action. The speed of case investigation and contact tracing combined with public health expertise led to several identified hot spots, outbreaks, and locations with high risk of exposure on campus, allowing for specific intervention, supplemental testing,[13] education, and support to be directed to vulnerable populations.

In January 2022, following updated CDC and NYSDOH (New York State Department of Health) guidance, TCHD issued a Press Release announcing a suspension in requirements for contact tracing, refocusing the local public health effort on vaccination and educational outreach.[14] By this time, REDCap, as well as TCHD's public health surveillance system, CommCare, had been configured to process immediate and automated notifications to cases. With the shift in strategic focus, and need for person-power for COVID-related education at Cornell University, the PROs' responsibilities shifted from completing formal case investigations and contact tracing to being standby volunteers for the Ezra Hotline, Cornell's COVID-19 advice phone line.

In 2022, when attention shifted to monkeypox transmission, the PROs were considered as a well-trained and deployable workforce. While the impact to campuses for monkeypox was not as significant as that for COVID-19, PROs were part of preparedness planning for the future.

Conclusion

The COVID-19 pandemic created an opportunity to reenvision roles in cross-sector collaboration to achieve public health system integration.[15,16] By taking on the public health responsibilities for a defined population, PROs were able to preserve TCHD's case investigation and public health response capacity for the county's more vulnerable populations. As a result of engaged professionals within both Cornell University and TCHD, a cross-sector partnership was established to facilitate the sharing of response roles. This partnership reduced redundancy of work effort, resulting in efficient, rapid case investigation which resulted in decreased transmission rates due to limited exposure of new cases. Regular communication between Cornell and TCHD ensured alignment of policies, approaches, and sharing of best practices. What this collaboration lacked in data systems integration was accounted for in the integration of workflows, systems, and processes built on a foundation of strong and trusting working relationships among leadership and frontline staff. This program may be unique, due, in part, to the relationship that developed between Cornell University and TCHD, and serves as an example of how cross-sector partnerships can compensate for the incompatibility of medical and public health surveillance systems to achieve substantial benefit.

Furthermore, each of the 25 PRO team members are now trained and experienced professionals who are equipped to go into the workforce of medical, public health, and social settings with an eye for public health skills, processes, and protocols. The PROs, many who were involved in the early entrepreneurial birth of this program, now know what it takes to build integrated systems and are now also inspired to look for opportunities for institutional collaboration in their future professional roles, whether that be at Cornell, Tompkins County, or elsewhere. As public health systems are building back, we should draw on lessons from the COVID-19 pandemic to integrate roles of IHEs and public health departments to improve health outcomes for the larger community and to inspire the future public health workforce.[17]

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Implications for Policy & Practice

■ A program developed during the intensity of the COVID-19 pandemic utilizing existing relationships between a public health entity and an IHE proved to expedite case support and alleviated strain on the local public health department.

■ Recommendations for system integration of primary care, public health, and social entities have existed for some time, yet practical implementation can be challenging. One success story created motivation for change from a necessity to release timely positive SARS-CoV-2 results to community members before potential opportunities for transmission arose.

■ Inclusion of staff and student volunteers into public health processes created capacity for the understaffed and overstretched public health workforce, empowering professionals who are trained and committed to public health efforts in the future.

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