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PUBLIC HEALTH EDUCATION ARTICLE

Implementation of Outbreak: A Population-Based Interprofessional Exercise

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ABSTRACT

In 2016, the Interprofessional Education Collaborative (IPEC) competencies expanded to include the health care needs of populations in addition to patients, and the Council on Education for Public Health (CEPH) added a required interprofessional education (IPE) competency for accredited public health programs. Addressing population health issues requires collaboration between public health and other health professionals, but most IPE education materials focus on patient care rather than population health. This manuscript describes a population-based virtual IPE experience for public health and health professions students.

In 2021, a total of 95 medical, pharmacy, public health, and clinical mental health counseling students participated in a virtual, infectious disease outbreak experience. Question prompts highlighted a joint response team's role in maximizing outcomes while ensuring equity, emphasizing the 2016 IPEC competencies.

Jefferson Teamwork Observation Guide (JTOG) results indicated that most participants believed their teams achieved the 14 IPEC competency-based items for interprofessional teamwork. Despite the challenges of hosting this activity in a virtual environment, students found it valuable to their learning.

Population health crises introduce unique challenges and uncertainties for health care providers. Establishing interprofessional relationships before a crisis prepares professionals to work with other disciplines. Future emphasis should be placed on facilitator onboarding, technology support, and the students' understanding of their roles and expectations.

Keywords: Population health; Interprofessional; Emergency preparedness; Outbreak; Virtual

INTRODUCTION

In 2016, the Interprofessional Education Collaborative (IPEC) competencies expanded to include the health care needs of populations in addition to patients, and the Council on Education for Public Health (CEPH) added a required interprofessional education competency for accredited public health programs.[1,2]

However, the majority of published interprofessional education (IPE) literature and educational materials still focus on direct patient care teams. Health care professionals who play a vital role in maintaining community wellness during health crises are often not included in strategic planning. Additionally, public health and medicine students do not traditionally receive training in how to work with one another during public health crises until they have entered practice.

These opportunities and challenges prompted the creation of a population-based simulated disease outbreak experience. Faculty from 3 Ohio universities collaborated to develop an IPE experience centered around the formation of a joint response to a local outbreak of novel influenza. The event included graduate public health, medical, pharmacy, and clinical mental health students. In

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contrast to other outbreak experiences used in health professions education,[3,4] the objective of this experience was to highlight the joint response team's role in maximizing population health outcomes.

This experience was first delivered in person in 2019. The COVID-19 pandemic necessitated the change to a virtual format. Coordination of learning materials, participants, and faculty required a virtual meeting platform (VMP) to deliver an IPE experience. Most universities use learning management systems (LMS) that do not typically allow access to individuals outside of a single institution. However, the team recognized that the use of commercially-available and off-the-shelf VMPs such as Zoom may overcome inter-institutional access barriers, allowing for more diversity and geographic separation beyond any single academic institution or community partner. The purpose of this manuscript is to describe the adaptation of an in-person, population health-based IPE experience for health professions students into a synchronous virtual format.

Program Development and Delivery

Event Development

A 6-person faculty development team spent approximately 40 hours in team meetings over 9 months to develop the exercise for the initial 2019 implementation. The team spent approximately 40 additional hours adapting the exercise for the 2021 VMP delivery. No collaborating university allocated development or implementation funds. An evening start time was chosen to allow for student participation across programs and facilitator availability.

The Wright State University institutional review board (IRB) reviewed and determined that the project was exempt from IRB review on March 28, 2019, in accordance with federally defined categories of exempt review per 45 CFR 46.104 and Wright State University IRB policies. The determination was for 36 months.

Case Structure

Time 1 (T1) content was intended to simulate the initial presentation of an outbreak in West Central Ohio, which provided public health students with a population-based emerging infectious disease (EID) problem. Time 2 (T2) and Time 3 (T3) contrasted intraprofessional and interprofessional communications while addressing clinical and population health considerations during a progressing outbreak (Figure 1). Select components of the Federal Emergency Management Agency (FEMA) Homeland Security Exercise and Evaluation Program (HSEEP) drove our curriculum design. The HSEEP emphasizes a flexible curriculum and evaluation process for discussion formats through full-scale exercises. Faculty utilized established professional relationships with local public health authorities to refine scenario realism. Students received question prompts at specified intervals during each time period. Prompts required each team of students to address evolving challenges introduced during the case. Mock news broadcasts and social media injects introduce realism and a sense of urgency to drive engagement throughout the activity. Previous years' experience highlighted the need for responding to equity issues during an outbreak. In 2021, a local public health professional specializing in health equity joined the team to enhance the focus on this area.

Event Design and Logistics

Students participated in the event based on their enrollment in classes taught by faculty team members (Table 1). Master of public health (MPH) students received preliminary case information (T1) a week before the event and developed a case definition and epidemic curve in addition to conducting descriptive analyses. Students were informed that they would be sharing this information in their role as the leaders of each joint response team. Students received discipline-specific training in advance of the activity from subject-matter experts. The content of this training varied based on each profession's programmatic requirements. Students received an overview of IPEC competencies at the beginning of the session via a short PowerPoint presentation

The interprofessional event (T2 and T3) used the Zoom platform. Faculty created 2 separate virtual meetings (Session A and Session B) for student transition between phases of the activity. In the first phase of the event (T2), students began in Session A where they were briefed about event expectations. They separated into virtual breakout rooms with other members of their disciplines where

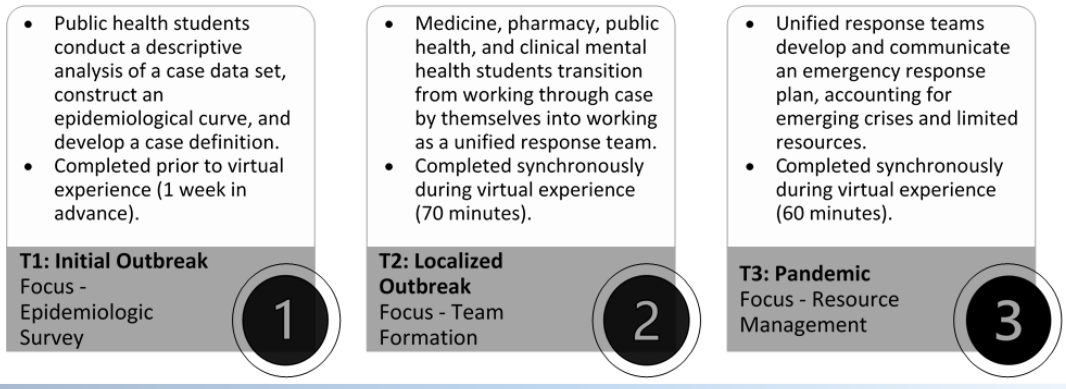

Figure 1. Interprofessional Education (IPE) Outbreak Scenario Progression

Table 1. IPE Outbreak Event Demographics

Profession	Student Attendance Requirement by Program	Students (n = 95)	Facilitators (n = 17)
Medicine[a]	Voluntary[b]	16.8% (16)	23.5% (4)
Pharmacy[c]	Required	46.3% (44)	23.5% (4)
Public health[d]	Required	24.2% (23)	41.2% (7)[e,f]
Clinical mental health[g]	Required	12.6% (12)	11.8% (2)

[a] Second professional year doctor of medicine students.
[b] Medical students were not required to attend but received credit toward a programmatic interprofessional education requirement if they did.
[c] Third professional year doctor of pharmacy students.
[d] Master of public health students.
[e] Public health professionals (medical director, health commissioner, epidemiologist, emergency response; n = 5).
[f] Public health faculty (n = 2).
[g] Master of science in education clinical mental health counseling students.

they worked through a series of prompts about symptomatic patients presenting to medical facilities. Intraprofessional teams discussed and formulated discipline-specific approaches to the localized outbreak. Students were then prompted to join Session B at a designated period where they were randomized into interprofessional joint response teams. Students were provided with a description of their role on this team that was unique to their discipline. The transition from intraprofessional to interprofessional teams was intended to contrast the difference in perspectives among disciplines.

Links to a shared Google Drive were provided via the Zoom chat function, allowing a designated event controller to dynamically release content to participants throughout the activity. Mock social media posts and news broadcasts were released at designated times to increase urgency and influence team discussion. Team discussions and debriefing topics differed between T2 and T3 based on the progression of the scenario. For example, T2 focused heavily on patient triage and prevention whereas T3 focused on scarce resource management and effective community-level education.

Event Demographics

A total of 95 students were randomized into 12 teams, with each team having 1 to 3 representatives from each profession (Table 1). These teams were supervised by 17 facilitators, with each team being assigned a minimum of 1 facilitator.

Assessment

Participants used the Jefferson Teamwork Observation Guide (JTOG) to assess teams' dynamics as they relate to collaborative practice.[5] The JTOG is a 14-item, validated interprofessional collaborative practice tool developed by the Jefferson Center for Interprofessional Practice & Education to assess participant behavior in interprofessional teams. The instrument is aligned to IPEC competencies and leadership.[5,6] Frequencies and percentages were calculated using IBM, SPSS Statistics 29 software, and tables were created using Microsoft Excel. The Wright State University IRB determined that the project was exempt from review. The MPH students were required to complete reflections following the IPE. These reflections provided qualitative feedback.

Program Evaluation

The HSEEP program utilizes an established process that provides feedback for improvement through an after-action report (AAR). Faculty implemented the HSEEP AAR process in 2021 to provide an iterative program evaluation and improvement process.

Outcomes

Jefferson Teamwork Observation Guide (JTOG)

Jefferson Teamwork Observation Guide (JTOG) results indicated that 80% to 90% of respondents (n = 80) agreed or strongly agreed that their teams achieved 13 of the 14 IPEC competency-based items for interprofessional teamwork. While the competency ratings for Values, Teamwork, and Leadership were high, faculty observed that the areas of Communication and Roles had some disagreement regarding student team achievement.

Implementation Issues

The Zoom platform's breakout room capacity restrictions affected the ability to seamlessly move participants from intraprofessional to interprofessional discussions. As a result, participants had to log off and back onto the platform into separate sessions. Facilitation quality also varied. Student reflections indicated that some facilitators were not as skilled as others were, either dominating the conversation or not providing meaningful input.

PUBLIC HEALTH IMPLICATIONS

Lessons Learned

Converting an in-person interprofessional learning experience into a virtual setting presents unique challenges. Following the implementation of this virtual outbreak experience, AARs generated by facilitators and MPH students highlighted these major challenges: facilitator and participant preparation, and technology and communication.

First, the level of individual preparation for the event varied significantly among both facilitators and student participants. Facilitators received a facilitator guide and an onboarding slideshow a week in advance of the event. Most facilitators were volunteers and had practice or public health responsibilities, which reduced

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their discretionary time to prepare. In contrast, faculty facilitators involved with planning had more intimate knowledge of the activity. Some health professions students may have been less likely to participate if the activity was optional rather than a graded course requirement. This outcome was difficult to avoid given the specific programmatic needs of the participating institutions. One AAR noted that "the wide variance in facilitator and fellow student preparedness (was) evident." Students also commented that their sense of engagement was better when facilitators integrated their professional experience into discussions and when there was at least 1 student participant designated to organize information and who was inclusive of peer perspectives.

Second, adopting new technology introduced challenges in facilitating communication. Similar technology-facilitated synchronous approaches in other simulations faced comparable challenges during this time.[7] The use of Zoom breakout rooms alleviated the need for physical space to conduct the experience. However, this platform limited the ability to assign students to more than 1 breakout group, requiring the use of multiple Zoom meeting rooms to deliver the experience as intended. Dedicated exercise controllers were needed to manage Zoom breakout rooms effectively. Some students were unfamiliar with this platform, slowing the transition between each Zoom meeting.

Productive interprofessional collaboration on the teams was dependent on effective communication. Student feedback noted that roles and expectations were unclear for some. Participants should receive predetermined roles and expectations in advance of the experience to allow each person to know their areas of responsibility, action, and concern. In addition, students found the virtual environment challenging for communication. Most teams reported that once the conversations began, the flow of the conversation was effective.

Improvements

The AAR identified several recommendations for improvement. First, the faculty developed an online, free, publicly available toolkit (including instructor and facilitator guides, facilitator training materials, and case content) for others to implement similar activities. The toolkit now incorporates lessons learned from prior iterations. The toolkit is available upon request and authors are available for consultation. The facilitator guide now has a companion abbreviated guide for rapid reference at the event. Recorded training sessions are now available for extended access to orientation materials on YouTube.

Despite the increased adoption and experience with technology such as Zoom for synchronous instruction, the challenge of technology is likely to remain.[8] However, future iterations will incorporate more robust participant preparation materials to address issues with both activity content and VMP training.

While hosting this activity in a virtual environment was challenging, students found it valuable to their learning. One student shared, "…(having) this interprofessional experience during the time of an actual pandemic showed myself and a lot of people from my team the reality of health care services and why interprofessional communication is so important." As public health emergencies have illustrated, there is a need to broaden our understanding of what IPE may mean for population health. Interprofessional teams need expansion beyond frontline clinicians to better address social determinants of health and outbreak-specific issues. Challenges and team structures will always change, but exposing students to IPEC competencies through various IPE opportunities, including population health, may better equip them to navigate future outbreaks.

Importance in Current Environment

Establishing interprofessional relationships before a crisis strikes prepares professionals to work and communicate effectively with other disciplines. The lack of interagency and interdisciplinary relationships can hinder emergency response efforts and lead to delays in recovery. In this event, the public health, medical, pharmacy, and mental health participants had the opportunity to develop a common language that facilitated professional interdisciplinary communication. Reinforcing IPEC competencies promotes future collaborative considerations and actions among all health care professionals.

Additionally, the experience engaged participants in problem-solving strategies in a dynamic scenario. The ability to weigh a large amount of complex information and make decisions in a rapidly changing environment is critical to the success of emergency response in maintaining population health. Students commented that it was difficult to begin a conversation when they did not know the other players. One student shared, "...there was probably a learning curve to the process that took some time to overcome." Student opportunities for interprofessional engagement facilitate familiarity and help shorten the learning curve.

Although this may have been the first time clinical and public health professional students found themselves in a population-based scenario, this IPE provided a foundation for rapid interprofessional cooperation in future scenarios that challenge population health. The fact that this IPE was successfully redeployed in a virtual format demonstrates that there is room for distributing other interprofessional learning activities in a similar manner. This improved access may enhance the ability to train clinical and public health professionals by overcoming interinstitutional and geographic access barriers.

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Author Contribution

Sara Paton, Sheri Gladish, Zachary Jenkins, and Sabrina Neeley made substantial contributions to the conception or design of the work and the acquisition, analysis, or interpretation of data for the work; drafted the work and reviewed it critically for important intellectual content; provided final approval of the version to be published; and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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