

RESEARCH ARTICLE

# Evaluation of a pharmacy emergency response conference workshop

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## Abstract

**Background:** The importance of pharmacists' involvement in disasters is becoming increasingly recognised in the literature. The aim of this project was to determine the effectiveness of a disaster workshop in improving pharmacy staff's perceived capabilities to prevent, prepare for, respond to, and recover from disasters. **Methods:** A disaster workshop was provided at a pharmacy conference. The workshop incorporated an evolving emergency scenario in which participants worked through activities pertaining to the prevention, preparedness, response, and recovery cycle. The attendees were invited to complete a previously validated pre-post survey assessing their perceptions of their skills and capabilities in the components of disaster management. **Results:** The pre-post survey was completed by 31 attendees. After the workshop, participants' perceptions of their ability to prevent, respond, and recover from a disaster significantly improved ( $p = 0.004, 0.013, \text{ and } 0.013$  respectively). **Conclusion:** This study demonstrated that a conference disaster workshop can improve the understanding and perceived disaster capabilities of health-system pharmacy personnel.

## Introduction

The coronavirus disease 2019 (COVID-19) pandemic has made the need for a prepared and resilient pharmacy workforce visible. Pharmacists have been instrumental worldwide in the response and recovery from the pandemic (Visacri, Figueiredo, & Lima, 2021; Watson *et al.*, 2021). This has resulted in many pharmacy organisations and hospital departments developing and implementing protocols and frameworks to address the pandemic challenges and call for better integration of pharmacists into public health (Arain, Thalappambath, & Ghamdi, 2021). A survey of Jordanian pharmacists' preparedness and awareness showed that pharmacists were not included in information dissemination, and many relied on general media for their facts (Basheti *et al.*, 2021). Watson and authors also discovered that in the aftermath of disasters or emergencies, pharmacists

reported being unsure of their role or where to turn to for reliable information and support (Watson *et al.*, 2022).

Pharmacists provide essential services in disasters and emergencies to ensure the ongoing health of their community through their roles in information, public health, and medication management (Watson *et al.*, 2021). In recent years, the importance of pharmacists' involvement in disaster management and emergency response has become increasingly recognised in both general media (Toich, 2017; Haggan, 2020; Smith, 2020; Winkle & Cooke, 2020) and the literature (International Pharmaceutical Federation, 2006; Ford *et al.*, 2013; International Pharmaceutical Federation, 2016; Watson *et al.*, 2019). For example, in Australia, despite acknowledging the importance of pharmacists' roles in disasters and emergencies, there is little research on how to train and prepare the pharmacy workforce (pharmacists and pharmacy staff) for

disasters and emergencies (McCourt *et al.*, 2019). There is limited literature on how best to prepare the pharmacy workforce and limited opportunities for frontline staff to learn and train in disaster management and emergency preparedness (McCourt *et al.*, 2017a, 2017b). Research supports this assertion; identifying a resilient and prepared pharmacy workforce reduces the risk of staff shortages and complications during the emergency response (Burke *et al.*, 2011).

A table-top exercise (TTX) can educate and prepare groups to actively participate in disaster management and emergency response in a safe learning environment. They allow groups to workshop their plans and consider their decisions without an event's heightened pressure or stress. TTXs are acknowledged by the World Health Organisation (WHO) as a way of helping to develop, assess, and test the capabilities of emergency health systems and practitioners (World Health Organisation, 2017). Typically, disaster TTXs use a hypothetical simulated scenario and scripted 'interrupters' to make participants consider their response to an emerging situation through group discussion. This type of exercise facilitates open dialogue about an emergency. In 2019, a TTX was facilitated at a hospital pharmacy conference in Australia (Watson *et al.*, 2021). They identified that TTXs are great for large-scale impact on building a resilient pharmacy workforce and workshopping emergency or business continuity plans without simply reacting to an event (like the COVID-19 response) (Watson *et al.*, 2021). TTXs and disaster management activities are often targeted at executive and management-level health-system staff (Corrigan & Samrasinghe, 2012). While this is vital to a resilient workforce or health system, it usually leaves an unprepared frontline workforce, as institutional knowledge does not always filter down. This study aimed to evaluate the effectiveness of a disaster TTX workshop in improving health-system pharmacy staff's perceived capabilities to prevent, prepare, respond, and recover from disasters and emergencies.

## Methods

### **Study design and context**

This study utilised a pre-and post-survey design to evaluate the disaster TTX. The TTX and surveys were administered at the American Society of Health-System Pharmacists (ASHP) Summer Meeting in June 2022.

The ASHP is an organisation representing pharmacists and pharmacy staff (including technicians and students) who work in hospitals, health systems, ambulatory clinics, and other healthcare settings across the United States. The ASHP hosts several meetings, conferences, and speciality courses each year, encouraging participants to update their knowledge, network with colleagues, enhance their skills, and learn about health-system pharmacy issues, products, and technologies. The 2022 Summer meeting and exhibition was held in Phoenix, AZ, from June 11<sup>th</sup>-15<sup>th</sup>. Over 1,000 people attended the Summer meeting. The disaster workshop was held on the last half-day of the summer meeting and was one of three workshop options available to the attendees.

### **Participant recruitment**

Participants were attendees of the ASHP Summer meeting selected to attend the four-hour disaster workshop and completed the pre-and post-surveys. At the start of the workshop, participants were informed about the surveys and invited to ask questions if required. The surveys were voluntary and anonymous, with no personal identifying information being collected. This study obtained ethics approval from the University of Alberta health research ethics board (Pro00119184), and implied consent was obtained with completed paper surveys left on the tables for the researchers to collect at the end of the workshop. Participants completing the study online provided informed consent, having to read and agree to a consent form before accessing the survey.

### **Disaster workshop Design**

The workshop duration was four hours with a 20-minute networking break. It was structured into three components - an introduction to disaster and emergency pharmacy (30 minutes), a TTX (2 hours and 45 minutes), and a debrief session (45 minutes). The introduction provided an overview of the basics of disaster management and emergency preparedness as it relates to the pharmacy profession and included a discussion of recent COVID-19 pandemic pharmacy practice research. The TTX had an evolving scenario that participants worked through in small groups at their own pace. The TTX design was informed by the WHO guidelines (WHO, 2017; WHO, 2020) for conducting TTXs and previous workshops run by the facilitators (KW and EM) (Watson *et al.*, 2021). The networking break followed the TTX and concluded with a facilitated debrief session.

The fictional scenario began as the COVID pandemic was winding down and the state recovered from a recent wildfire. The scenario evolved into an extensive

storm system causing widespread flooding and landslides. While responding to the flooding, there was also an outbreak of an unknown infectious disease caused by the unclean flood water. Upon arrival at the workshop room, participants were divided into tables of three to six people. Participants were provided with paper copies of the participant workbook that included information on the scenario and one of two fictional hospital profiles used by the groups to work through the scenario. The two hospitals had unique challenges and strengths in managing a disaster. Additionally, each table had envelopes (interrupters) to be opened at specific time points during the scenario (e.g., after certain questions had been answered and plans made), which provided new challenges for the group to consider (Table I). There was no time limit placed on the participants completing sections, however, the facilitators did move groups along if they spent too much time on one area or question.

### Data collection analysis

The survey was available electronically using the secure electronic data capture web application Research electronic data capture (RedCap), and paper copies were available for those that preferred that option. The electronic copy had the participant information sheet on the first screen with an informed consent question before progressing to the survey questionnaire. The paper copies had the participant information sheet stapled as the first page. The pre-workshop survey was on one side of the page, and the post-workshop survey was on the other to ensure a direct comparison could be made (as no personal identifying information was collected). Informed consent was implied for the paper copies of the survey with the collection of completed questionnaires at the end of the workshop. Completed paper copies were inputted into the RedCap data capture software by a research assistant.

The survey contained seven demographic questions, seven preparedness skills questions (pre-and post), five capability and willingness questions (pre-and post), and seven questions evaluating the workshop (post-only). Most responses to questions were rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). There were also open-ended questions for participants to provide free-form feedback on the workshop and their recommendations for future exercises.

**Table I: Workshop overview**

Scenario outline
<p><b>1. Recovering from disaster (wildfire)</b></p> <ul style="list-style-type: none"> <li>The scenario starts with the recovery from a recent wildfire, participants are provided with challenges faced in responding to the wildfire event.</li> <li>Each team works through questions associated with recovery and lessons learned.</li> </ul>
<p><b>2. Large storm predictions and staffing challenges</b></p> <ul style="list-style-type: none"> <li>The scenario evolves with a large-scale storm prediction.</li> <li>Teams work through questions related to planning and preparing for the impact of the storm event.</li> <li>After the storm hits, participants work through questions associated with staffing challenges.</li> <li>Interrupter envelope one is opened. It outlines staffing consequences for the team depending on their actions to address staff challenges at the start of the scenario. For example, if the team took no action to address burnout and staff absences, then they would have fewer staff available during the storm event.</li> </ul>
<p><b>3. Logistics challenges and medicine supply</b></p> <ul style="list-style-type: none"> <li>The storm causes logistical and medication supply challenges</li> <li>Teams discuss options to address the storm's impact on their usual supply chain processes</li> <li>Interrupter envelope two is opened. It provides consequences for the supply of insulin medications depending on the team's earlier activities to strengthen supply chains and relationships with primary care clinics. For example, no insulin stock is available if they take no action.</li> </ul>
<p><b>4. Infectious disease outbreak and communication</b></p> <ul style="list-style-type: none"> <li>The scenario evolves with the breakout of an unknown infectious disease caused by stagnant and dirty floodwater.</li> <li>Interrupter envelope three is opened. It determines the severity of the impact of the infectious disease outbreak on the community based on the team's previous actions to address communication challenges within their community.</li> </ul>
<p><b>5. Recovery</b></p> <ul style="list-style-type: none"> <li>The scenario ends with flood waters receding.</li> <li>Teams discuss priorities for recovery from the storm and flooding that impacted their community and hospital.</li> </ul>
<p><b>6. Debrief</b></p> <ul style="list-style-type: none"> <li>Individual teams debrief together.</li> <li>Facilitators then bring together the whole group to debrief the entire exercise as a group and consolidate group learning.</li> </ul>

The data were exported and analysed using the Statistical Package for the Social Sciences (SPSS), version 28. Data was descriptively summarised depending on the type of data. For continuous variables, median (IQR) was used to describe non-normally distributed data, while mean (sd) was used for normally distributed data. For comparing across groups, categorical data were compared using Chi-square tests of independence (X<sup>2</sup>). Man-Whitney U tests, or Independent T-tests were used to compare continuous data across groups depending on the data's ability to meet test assumptions.

**Results**

**Participant characteristics**

There were 45-50 people who attended the beginning of the disaster workshop, and 40 people attended the entire workshop, with 31 completing both the pre-and post-workshop (response rate 77.5%). Forty people completed the pre-survey. However, as the workshop was held on the last half-day of the conference, many people had to leave halfway through during the network break to travel. Table II outlines the demographics of people who participated in the workshop.

**Table II: Demographics of participants**

Variable	N (%)
<b>Gender</b>	<b>40</b>
Woman, n (%)	26 (65%)
<b>Age (years), n %</b>	<b>38</b>
21-30 years	5 (13%)
31-40 years	12 (32%)
41-50 years	8 (21%)
51-60 years	6 (16%)
61-70 years	7 (18%)
<b>Years working in a pharmacy, median (IQR)</b>	<b>18.5 (10-29)</b>
<b>Position</b>	<b>39</b>
Staff pharmacist	7 (18%)
Director	11 (29%)
Manager	9 (23%)
Professor or assistant professor	3 (8%)
Pharmacy technician	1 (2%)
Specialist pharmacist	7 (18%)
Retired	1 (2%)
<b>State or Territory of practice, n (%)</b>	<b>40</b>
Multiple	1 (2%)
AK	1 (2%)
AZ	2 (5%)
CA	1 (2%)
DE	1 (2%)
IL	2 (5%)
ME	2 (5%)
MD	1 (2%)
MA	3 (8%)
MI	3 (8%)
NE	2 (5%)
NJ	2 (5%)
NC	4 (10%)
OK	1 (2%)
PA	1 (2%)
RI	2 (5%)

**Table II: Demographics of participants**

Variable	N (%)
TN	3 (8%)
TX	5 (12%)
U.S. Virgin Island	1 (2%)
WI	2 (5%)
<b>Practice location, n (%)</b>	<b>38</b>
Metropolitan	20 (53%)
Regional	11 (29%)
Rural	7 (18%)
<b>Previous involvement in emergency or disaster response at the place of practice?</b>	<b>39</b>
Yes, n (%)	27 (68%)

**Changes in perceptions pre- and post-workshop**

Pre- and post-workshop survey questions were used to determine changes in perception of skills and capabilities in understanding disaster management and prevention, preparedness, response, and recovery activities. The participants' perceived skills assessment showed a statistically significant improvement in their perception of their education, training, knowledge, and resources to effectively prepare and respond to disasters and emergencies (Table III).

**Table III: Perceived skills assessment**

Survey item	Pre score	Post score	p-value
I have the education and training to be prepared for and respond to a disaster	3.8 (1)	4.2 (0.8)	<b>0.012</b>
I have the clinical skills to be prepared for and respond to a disaster	3.6 (0.8)	3.8 (0.9)	0.087
I have the experience to be prepared for and respond to a disaster	3.4 (1.1)	3.8 (1.2)	0.066
I have the resources to be prepared for and respond to a disaster	3.5 (1.1)	4.1 (0.9)	<b>&lt;0.001</b>
I have the knowledge to be prepared for and respond to a disaster	3.6 (0.9)	4 (0.9)	<b>0.032</b>
I have the support to be prepared for and respond to a disaster	4.1 (0.9)	4 (0.9)	0.912
I have the non-technical skills to be prepared for and respond to a disaster	4.1 (0.7)	4.3 (0.7)	0.507

The participants were also asked to assess their capabilities in preventing/mitigating, preparing, responding, and recovering from disasters that might

affect their place of work. There was a statistically significant improvement in participants' perceived capabilities in preventing/mitigating, responding, and recovering from a disaster after attending the disaster workshop (Table IV). There was no significant change in the capability of preparing for a disaster or participants' willingness to work during a disaster. After completing the workshop, participants were asked if they would revise their initial assessment of their capabilities of undertaking disaster preparedness, response, and recovery activities for their place of work. The majority (87%) said they would revise their initial assessment of their capabilities.

**Workshop evaluation.**

Additionally, 26 participants provided feedback and evaluated the overall workshop. They all stated that the workshop and TTX were well-structured and organised, allowing them to test their response plans and systems (Table V). Of these participants, they all agreed that they felt better prepared for a health emergency and that the workshop helped them identify their strengths and gaps in understanding disaster management in relation to pharmacy practice. Some of the participants provided the following additional comments:

*"Great table-top exercise. It helped identify gaps hidden in plain sight" [P38]*

*"I feel that the exercise was very helpful and informative." [P23]*

*"I have a lot of experience that I didn't realize I had. I took away a couple of very important concepts. 1. "Hurricane orders" 2. Prepare for staffing" [P17]*

**Table IV: Perceived capability assessment**

Survey item	Pre score	Post score	p-value
I am capable of preventing or mitigating disasters that might affect my place of work	3.6 (1.1)	4.3 (0.8)	<b>0.004</b>
I am capable of preparing for disasters that might affect my place of work	4.3 (0.9)	4.6 (0.5)	0.197
I am capable of responding to disasters that might affect my place of work	4.3 (0.7)	4.7 (0.5)	<b>0.013</b>
I am capable of recovering from disasters that might affect my place of work	4.1 (0.9)	4.6 (0.5)	<b>0.013</b>
I am willing to work in disaster response and recover	4.6 (0.6)	4.8 (0.4)	0.059

**Table V: Workshop evaluation**

Survey item	Strongly disagree or disagree	Neutral	Agree or strongly agree
The exercise was well-structured and organised (n=26)	0 (0%)	0 (0%)	26 (100%)
The scenario was realistic (n=26)	0 (0%)	0 (0%)	26 (100%)
The overview before the exercise was useful and prepared me for the exercise (n=25)	0 (0%)	1 (4%)	24 (96%)
The exercise allowed us to test our response plans and systems (n=26)	0 (0%)	0 (0%)	26 (100%)
The exercise improved my understanding of my role and function during an emergency response (n=25)	0 (0%)	0 (0%)	25 (100%)
The exercise helped me to identify some strengths and gaps in my understanding of response systems, plans, and procedures (n=26)	0 (0%)	0 (0%)	26 (100%)
At the end of the exercise, I think we are better prepared for a health emergency (n=25)	0 (0%)	0 (0%)	25 (100%)

**Discussion**

This study demonstrated that a disaster TTX workshop can improve understanding of the role and function of pharmacists and pharmacy staff during a disaster or emergency. The participants who completed the workshop evaluation questions agreed that the workshop improved their understanding and helped them identify gaps in their knowledge. This disaster workshop significantly enhanced participants' perceptions of their capability to prevent, respond,

and recover from a disaster. The participants' perceived skills assessment showed a statistically significant improvement in their perception of their education, training, knowledge, and resources to prepare and respond to disasters and emergencies effectively.

This study did not significantly improve participants' perceived preparedness for disasters and emergencies, with 87% stating they would revise their initial assessment of their capabilities. The 2019 pharmacy conference disaster workshop study found a

similar result, with 82.9% of participants saying they would revise the initial pre-workshop survey ranking of their understanding of disaster management activities (Watson *et al.*, 2021). However, it is unclear in both studies, given the question's wording, in which direction they would revise their initial assessment. Future studies and workshop evaluations should be clearer to uncover this distinction. The literature has postulated several suggestions or reasons why perceived capabilities in preparedness do not change when the capabilities in preventing, responding, and recovering are significantly improved. Firstly, it could be that preparing for an unknown disaster is more challenging to envision than responding or recovering. This may be because responding and recovering may be seen as pharmacists simply adapting their everyday roles. (Watson *et al.*, 2021) Recent studies of pharmacists' roles during the COVID-19 pandemic support this notion as they have acknowledged that responding and recovering to disasters does not require new roles of pharmacists but applying their skills within a new context (Watson *et al.*, 2021; Safnuk *et al.*, 2022). Secondly, this workshop was designed as a preparedness activity and focused on the other three phases of the disaster management cycle - prevention/mitigation, response, and recovery. It could be the case that the participants, having just completed the workshop, may not have had time to reflect on their overall experience and preparedness but responded to this question about their capabilities specific to the elements of the TTX scenario presented during the workshop. Thirdly, this may be due to initial over-estimation of preparedness levels before the workshop begins, resulting in only small increases in perceived preparedness. This is supported by the fact that all participants agreed in the post-workshop survey that they were better prepared for a health emergency. Previous research has suggested that due to the complexity of disasters and a lack of understanding, participants in the pre-workshop surveys may initially overestimate their abilities in disaster management (Hannings *et al.*, 2016). Additionally, people could mis-assess their initial understandings or capabilities due to a lack of disaster education or knowledge (Watson *et al.*, 2021).

Compared to a previous TTX run at a conference in Australia in 2019, there were similar rates of disaster experience among participants (61%, 25/41 in Australia vs. 68%, 27/40 in America) (Watson *et al.*, 2021). This is surprising given that the Australian workshop was done in late 2019 before the COVID-19 pandemic was declared, and the ASHP workshop was run in 2022 – Two years after the pandemic was declared. It could be that some participants did not view the COVID-19 pandemic as a disaster or an

emergency, treating it as a separate health emergency from the natural disasters presented in the scenario. It was interesting to note the higher perceived capability pre-workshop to prevent, prepare, respond, and recover from a disaster among those who attended the American conference compared to the Australian conference. This could be due to several factors and may reflect differences in disaster management training and integration between countries in general or could result from the COVID-19 pandemic and several high-profile disasters in America leading to a better baseline understanding of disaster management in the American pharmacy workforce. Further research could explore the differences in knowledge of disaster management by the pharmacy profession across different countries.

The TTX did not require extensive resources like those required in large-scale simulations but was still perceived by participants as realistic and useful to improve understanding of roles in disasters, gaps, and strengths of their work systems, plans, and procedures. This demonstrates that TTX can be utilised as a low-resource education tool for disaster management. It also allows participants to reflect on their role and function in a disaster or emergency. The authors posit that while one TTX cannot adequately prepare the pharmacy workforce, it may start individuals and organisations thinking about their disaster preparedness and encourage them further to improve their individual and organisational preparedness for disasters. Additionally, this disaster workshop was explicitly designed to provide professional education to pharmacy staff attending the national ASHP 2022 summer meeting. Hospital pharmacists are collaborative healthcare professionals in nature. Future disaster training could include an interprofessional focus where health-system pharmacists can contribute their skills and capabilities identified in this disaster workshop and study to the broader healthcare system in which they operate.

### **Limitations**

There are several limitations to this study. Firstly, people elected to attend the workshop at the conference, which may have resulted in a bias of people participating who were interested in or had experience in disasters. This may have led to higher initial assessments of participants' capability and capacity. Secondly, the workshop was attended by only a small number of people. This can be attributed to the workshop being run on the last half-day of the conference, with many leaving after the first hour to make their travel connections to return home. Finally, as this was an educational disaster workshop, we could not assess individuals' preparedness or

response-ability. Therefore, we relied on their perceptions of their capacity and capability. Future research should investigate if these types of workshops improve real-life disaster preparedness or if changes to perceived preparedness from disaster workshops are sustained over time.

While participants had access to the pre-and post-survey at the beginning of the workshop, it is not believed that viewing the post-survey would impact results. Questions in the pre-and post-workshop survey were almost identical, and participants were required to complete the workshop before reflecting on their perceptions of the workshop.

## Conclusion

This study provides insight into the viability and effectiveness of a disaster workshop for health-system pharmacy staff. It improved participants' perceived capability to respond to and recover from a disaster. This research calls for further education and training opportunities for health-system pharmacy staff to become prepared for disasters globally.

## Conflict of interest

KEW and EMM were paid as consultants by the American Society of Health-System Pharmacists (ASHP) to provide the disaster workshop at the 2022 summer meeting. ASHP permitted the researchers to conduct this study within the conference workshop, but ASHP did not influence the study design, execution, interpretation, or publication of the results.

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## Authors contributions

KEW and EMM were involved in the conceptualisation, study design, and data collection. EMM performed the data analysis and wrote the first draft of the

manuscript. Both authors reviewed and edited the manuscript and approved the final manuscript.

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