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## “Vital in today’s time”: Evaluation of a disaster table-top exercise for pharmacists and pharmacy staff

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## ABSTRACT

**Background:** While the importance of pharmacists’ involvement in disaster management is becoming increasingly recognised in the literature, there remains little research on methods for preparing pharmacists and pharmacy staff for disasters.

**Objective(s):** To investigate the use of a table-top disaster exercise to improve disaster awareness and preparedness for pharmacists and pharmacy staff attending The Society of Hospital Pharmacists of Australia (SHPA) Medicine Management conference 2019.

**Methods:** A table-top disaster exercise was developed by the research team and presented as a workshop at the SHPA’s annual conference in 2019. The workshop presented attendees with the hypothetical ‘Cyclone Oma’ that was tracking across the fictional state of ‘New Cardiff’. Each workshop table was assigned a different hospital and was required to respond to Cyclone Oma as the scenario evolved. Workshop attendees were invited to complete a pre- and post-survey assessing their perceptions of disaster management and preparedness for pharmacists and pharmacy staff.

**Results:** The pre- and post-workshop survey was completed by 41 out of the 47 attendees. Participants’ assessments of their understanding of disaster management activities increased after attending the workshop ( $p < 0.001$ ). Most participants felt the workshop improved their understanding of their role in a disaster (87.8%, 36/41) and allowed them to identify their strengths and weaknesses in disaster management (90.2%, 37/41). The workshop was well received with 92.7% (38/41) of participants stating they would like further continuing professional development opportunities in disaster management.

**Conclusions:** This is the first disaster table-top exercise in Australia targeted specifically at the pharmacy workforce to be conducted and evaluated. The exercise improved understanding of disaster management and was well received by the participants. This research calls for further education and training opportunities in disaster management targeted at the pharmacy workforce.

### Introduction

Pharmacists provide essential services in disasters and ensure the ongoing health of their community through the supply of essential medications, devices, and services. In recent years, the importance of pharmacists’ involvement in disaster management and response has become increasingly recognised in both general media<sup>1–4</sup> and the literature.<sup>5,6</sup> Despite the acknowledgment of the importance of pharmacists’ roles in disasters and emergencies, there is no research on how to best

train and prepare the pharmacy workforce (pharmacists and pharmacy staff) for disasters. The majority of research focuses on training exercises for pharmacy students only, and most of these studies take place in the United States (US).<sup>7,8</sup> While preparing pharmacy students for disasters as part of their pharmacy degree is an important step forward in integration of pharmacists into disaster management, it is only one aspect of a prepared pharmacy workforce. It is also important to consider that by only targeting pharmacy students, the established pharmacy workforce is missed in being prepared for disasters. For pharmacists and pharmacy

*Abbreviations:* SHPA, The Society of Hospital Pharmacists of Australia; TTX, table-top exercise; US, United States.

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staff (such as pharmacy technicians, interns, and students) to respond effectively in a disaster it is important that everyone is prepared for a disaster or emergency. Unfortunately, reviews in the Australian context demonstrated that there were few opportunities for pharmacy students, technicians, or pharmacists to prepare themselves for disasters.<sup>9,10</sup> Research has identified that in order to prevent significant staff shortages and complications during disasters, it is important that front-line staff are well-equipped and prepared to respond to a disaster or emergency.<sup>11</sup>

Disaster table-top exercises (TTX) are one way of preparing groups for a disaster. A TTX uses a hypothetical simulated scenario, together with scripted 'interrupters', to make participants consider their response to a disaster. This type of exercise facilitates open discussion about an emergency in a stress-free environment. While this type of disaster exercise may be time intensive to create and plan, it does not require the excessive physical or financial resources required to run other types of exercise (such as full-scale simulations). TTXs are acknowledged by the World Health Organisation as a way of helping to develop, assess, and test capabilities of emergency health systems and practitioners.<sup>12</sup> However, disaster TTX and other emergency preparedness activities are typically targeted at executive and management level staff rather than frontline clinicians. A recent survey of Australian health staff found that executive and management staff had higher levels of disaster preparedness knowledge than frontline health professionals.<sup>13</sup> It can perhaps be hypothesised that this increase in disaster knowledge of executive and management staff compared to front-line workers could be attributed to availability of disaster and emergency preparedness activities. This research study addresses the current existing gaps in the literature of disaster and emergency preparedness activities and the utilisation and evaluation of a TTX for the pharmacy workforce (pharmacists and pharmacy staff). The aim of this study was to evaluate the effectiveness of a novel workshop design on pharmacy staff's perceived disaster and emergency preparedness.

## Methods

### Study design and participant recruitment

This research utilised a quantitative survey design pre- and post-study to evaluate the disaster workshop. This study sought to determine the effectiveness of a continuing professional development (CPD) disaster TTX workshop in preparing pharmacists and pharmacy staff for disasters. An all-hazard approach to disaster management was used to develop a scenario for the TTX based on a cyclone affecting different regions of Australia. The all-hazard approach to disaster management recognises that while the types of disasters may vary, they impact systems in similar ways. Therefore, preparing for any type of disaster will assist with planning and response to another type of disaster.<sup>14,15</sup> While this scenario was based on a cyclone, there were other themes discussed as the scenario unfolded such as flooding, storm surges, pandemic/infectious disease outbreak, staffing, chronic diseases, vulnerable populations, and resource sharing.

Participants were delegates of the 45th National Conference of the Society of Hospital Pharmacists of Australia (SHPA) - Medicines Management 2019 (MM2019) workshop session held on the Gold Coast, Queensland Australia on the November 16, 2019. Delegates elected which 2-h workshop they wished to attend and those that chose to attend the disaster workshop were invited to participate in the survey. Paper surveys were placed with the workshop material at each place-setting and were collected once all the delegates had left, meaning there was no consequence or pressure placed on the participants during the workshop. The survey was anonymous, as no personal identifying data was collected. This study obtained ethics approval from Queensland University of Technology Human Research Ethics Committee - approval number 1900000880. There were 47 delegates who attended the disaster workshop.

### Table-top exercise (TTX) design

The TTX design followed the World Health Organisation (WHO) guidelines and toolkit.<sup>12,16</sup> This TTX included an evolving scenario booklet, participant workbook with questions for each stage of the scenario, and a PowerPoint presentation. The PowerPoint presentation provided background at the beginning of the workshop on the TTX and the evolving scenario. The TTX was tailored and specific for pharmacy staff working in a hospital setting. The presentation provided at the beginning of the workshop included an outline of disaster health, types of vulnerable populations in disasters, and the learning objectives for the registered pharmacists' CPD records.

### Scenario overview

A fictional evolving scenario was developed based on Tropical Cyclone Oma. Upon arriving in the workshop room, participants were divided into tables of 4–6 people and given one of four hospital profiles developed for the scenario. These hospitals were located within the fictional state of New Cardiff (which was based on the Australian state of Queensland). The rationale for using a fictional cyclone, state, and hospital profiles was to stretch the participants' thinking and prevent them from basing their opinions and understanding on their current hospital facility, current personnel levels, and resources. By using fictional hospitals, participants from different areas of Australia and different hospital settings could work together in the disaster TTX. To make the TTX as realistic as possible, Cyclone Oma was based on previous cyclone events that have affected Australian communities. The hospital profiles were also developed to be as realistic as possible to the employment context of hospital pharmacists and pharmacy staff. There were four hospital profiles developed for the scenario that covered the breadth of hospitals in which participants were employed (Table 1). They included metropolitan, rural, and regional hospital profiles as well as public and private facilities.

### Evolving scenarios

The workshop was broken up into two main activities. After participants were seated in their groups and familiarised with the format of the workshop, the first activity began. This activity was designed to provide background understanding of the fictional land of 'New Cardiff' and the hospital profile assigned to the table. During the first activity, participants were asked to consider their hospital profile and identify the risks to the pharmacy department as well as prevention or risk mitigation strategies that could be employed. They were asked to identify key elements of a disaster management plan for their hospital's pharmacy department. Workshop facilitators (EM, KW, JW) were available to assist and guide discussions of each table. This activity took 15 min served as a 'warm up' for the scenario.

The second activity was the evolving scenario of Tropical Cyclone Oma and lasted for 1 h and 15 min. Each workshop group (e.g. each hospital site) was given four envelopes labelled part one to part four. Each envelope contained information on the evolving disaster scenario and questions about what the groups response would be to the information provided. The evolving scenario was unique to each hospital site, so the disaster impact at one hospital may differ completely to that at another site. Each table began with envelope one and worked through the challenges and questions (see Appendix A for example of evolving scenarios for one hospital site). When the table felt they were ready, or when prompted by the workshop facilitators, they could then open the next envelope. This process continued until all envelopes had been opened and resolved. The envelopes were designed to go through the phases of disaster management, prevention, preparedness, response, and recovery. One envelope also contained an unexpected situation (a disruptor) which the table had to resolve. This unexpected situation was given to each hospital table at various times throughout the scenario to

**Table 1**  
Hospital profiles developed for the disaster TTX workshop.

Hospital name	Hospital information	Population information	Pharmacy department information
Coleville Public Hospital. Located in Coleville in tropical North New Cardiff approximately 2,000km from the capital city.	500 bed regional hospital. Provides outreach services (such as opioid replacement therapy) to five primary health services located between 50 and 300km away from main hospital.	Hospital services a large proportion of Aboriginal and Torres Strait Islander population as well as regional and rural patient groups.	40 pharmacists and 15 pharmacy technicians work at Coleville. They provide support for primary health services in terms of staff and stock.
St Peters Private Hospital. Located in Stonetown in Central New Cardiff approximately 600km from the capital city.	200 bed regional hospital. Shares resources with small rural Yapoon Public Hospital that is 30km away and accessible by one road only.	Hospital services older population and has active alcohol and drug rehabilitation facility onsite	6 pharmacists and 3 pharmacy technicians work at St Peters. 7 pharmacists and 4 pharmacy technicians work at nearby Yapoon Hospital.
Cunningham Public Hospital. Located in Cunningham approximately 40km from the capital city.	350 bed metropolitan public hospital located on the outskirts of the capital city	Large outpatient cancer services and renal dialysis unit	25 pharmacists and 10 pharmacy technicians work at Cunningham.
Royal Queen Victoria Hospital. Located in Princeton, the capital city of New Cardiff.	1000 bed public tertiary hospital located in the centre of the capital city	Full suite of tertiary services	150 pharmacists, 80 pharmacy technicians

increase the authenticity of the scenario and the need to make decisions without all the information. There were also different outcomes based on a table/hospital's decisions. For example, if in the preparation phase the hospital decided to arrange support for staff who had childcare responsibilities and reassured staff that their role was essential, they would have more pharmacy staff available for the next envelope. This allowed participants to see consequences for some of their actions which then affected their ability to respond to the developing situation.

#### Data collection instrument and data analysis

Workshop participants were provided with a double-sided paper-based survey on their group table, with the pre-workshop survey on the front and the post-workshop survey on the back. This allowed for pre and post-responses to be matched. The delegates were invited to participate in the pre-workshop and post-workshop survey and time to complete these activities was allocated into the workshop run sheet. The survey was anonymous, collecting no personal identifying information, and their confidentiality was maintained by the workshop coordinators and research team having no knowledge of who completed surveys and who opted not to participate.

The pre-workshop survey contained 12 questions (five demographic questions and seven Likert scale questions). The demographic questions asked the participant their primary pharmacy role, state/territory of practice, years of practice, whether they had experienced a disaster at their practice before, and location of practice - rural, regional, or metropolitan. Participants were then given seven Likert style questions, asking them to rate their opinions on their capability to prepare, respond, and recover from a disaster, and to rate how important they believed it was for pharmacy staff to engage in activities to prepare,

respond, and recover from disasters. The post-workshop survey contained 13 Likert scale questions and re-evaluated the participants ranking of their capabilities and importance of disaster activities. The post-workshop survey also asked the fundamental questions 'After completing this workshop, I would revise my initial understanding of disaster management activities' and 'I would like more CPD opportunities to learn about the pharmacy workforce in disaster preparedness, response and recovery'. An open-ended question at the end of the survey invited participants to provide general comments on the exercise or make recommendations for future exercises. The survey developed was based on a validated pre-post workshop that evaluated the use of a disaster TTX run by two of the researchers at Queensland University of Technology (KW and EM) and on the WHO guidance for evaluation of a TTX.<sup>16</sup> Cronbach's alpha for the final survey was 0.958 indicating excellent internal consistency. Deleting any survey items would not have further improved Cronbach alpha score.

The paper surveys were manually entered into a database and exported to SPSS Version 25 Software. The data was analysed using both univariate and bivariate analyses. Frequencies were reported and Likert scales were analysed using Mann-Whitney *U* test and Kruskal-Wallis test depending on the data ability to meet the assumption criteria.

## Results

### Demographics and participant context

The conference committee scanned 47 delegates into the workshop, and 41 delegates participated in the pre-workshop and post-workshop survey yielding a response rate of 87%. There were 10 tables of between 4 and 6 people in the workshop. Of the 41 respondents, the majority (61%, 25/41) had not previously experienced a disaster at their place of practice. Table 2 outlines the work context of individuals such as their primary role at their primary place of work, their years of experience, the State or Territory in which they practice, and their primary practice locality.

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

Pre- and post-workshop survey questions were used to determine changes in perception of capability and to determine if the workshop affected understanding of disaster management, preparedness, response, and recovery activities. In the post-workshop survey most participants agreed or strongly agreed the workshop increased their perceived capability to prepare for a disaster (87.8%, 36/41), respond to a disaster (82.9%, 34/41), and recover from a disaster (87.8%, 36/41).

A Mann-Whitney *U* test demonstrated a statistically significant difference in participants' perceptions of their understanding of disaster management activities for pharmacy staff before and after the workshop (Table 3). There was no statistically significant difference between participants' responses to any survey items depending on their years of experience, state/territory, or the location of their workplace. However, there was a statistically significant difference between those with disaster experience and those without disaster experience in pre-workshop assessments of understanding of disaster management activities and the capability of each individual pharmacist to respond and recover from a disaster (Table 4). Interestingly, previous experience did not influence the participant's perceived capability of preparing for a disaster at their workplace. There was no difference in those with experience and those without in any other survey items.

### Post-workshop perceptions

Most participants (87.8%, 36/41) believed the workshop exercise improved their understanding of their role and function during a disaster or emergency response. Overwhelmingly, 90.2% (37/41) of the participants believed the exercise helped them to identify their strengths

**Table 2**  
Participant demographics.

Primary Role	Percentage (n)
Private Hospital Pharmacist	2.4% (1/41)
Public Hospital Pharmacist	36.6% (15/41)
Pharmacy Technician	14.6% (6/41)
Pharmacy Intern/Student	7.3% (3/41)
Team Leader	2.4% (1/41)
Director of Pharmacy/Assistant Director of Pharmacy	26.8% (11/41)
Other (pharmacy support services, Queensland ambulance service, procurement, and not provided)	9.8% (4/41)
<b>Years of experience in pharmacy</b>	
1–5 years	19.5% (8/41)
6–10 years	24.4% (10/41)
11–20 years	26.8% (11/41)
21+ years	29.3% (12/41)
<b>State/Territory of practice</b>	
Queensland	29.3% (12/41)
New South Wales	26.8% (11/41)
Victoria	19.5% (8/41)
South Australia	9.8% (4/41)
Australian Capital Territory	4.9% (2/41)
Tasmania	4.9% (2/41)
Western Australia	2.4% (1/41)
Northern Territory	2.4% (1/41)
<b>Primary Practice locality</b>	
Metropolitan	75% (30/40)
Regional	17.5% (7/40)
Rural	7.5% (3/40)

**Table 3**  
Differences in participant pre- and post-workshop survey responses.

Survey item	Survey scores, Median (IQR)		
	Pre-workshop	Post-workshop	<i>p</i> -value
I have an understanding of disaster management activities for pharmacy staff	3 (2–4)	4 (4–5)	<b>&lt;</b>
I believe disaster preparedness activities are important for pharmacy staff	5 (4.5–5)	5 (5–5)	0.589
I believe disaster response activities are important for pharmacy staff	5 (4.5–5)	5 (5–5)	0.454
I believe disaster recovery activities are important for pharmacy staff	5 (4–5)	5 (5–5)	0.301

Values in boldface type are statistically significant. N = 41 for all survey items.

as well as any gaps in their understanding of disaster, preparedness, response, and recovery. Most of the participants (38/41, 92.7%) also requested more CPD opportunities to learn about the pharmacy workforce and their roles and responsibilities in disaster preparedness, response, and recovery.

In the post-workshop survey, 82.9% (34/41) agreed or strongly agreed that they would revise their initial understanding of disaster management activities that they completed on the pre-workshop survey. There was no difference in revised understanding of disaster management activities between those with and without disaster experience ( $p = 0.075$ ). Most of the participants (85.4%, 35/41) also stated they would revise their initial assessment of their capabilities in undertaking disaster preparedness, response, and recovery activities in their place of work. Again, there was no difference in revised capabilities in a disaster between those with and without disaster experience ( $p = 0.132$ ).

**Table 4**  
Difference between participants that had previous disaster experience and those that did not on their perceptions of their capabilities in the pre-workshop survey.

Pre-workshop survey item	Survey scores, Median (IQR)		
	No disaster experience	Disaster experience	<i>p</i> -value
I have an understanding of disaster management activities for pharmacy staff*	2(2–3)	3.5 (3–4)	<b>0.013</b>
I believe I am capable of preparing for a disaster that might affect my place of work*	3(2–3.75)	3(3–4)	0.071
I believe I am capable of responding for a disaster that might affect my place of work <sup>#</sup>	3(2–3)	4(3–4)	<b>0.004</b>
I believe I am capable of recovering from a disaster that might affect my place of work <sup>#</sup>	3(2.23–4)	4(3.25–4)	<b>0.023</b>

Values in boldface type are statistically significant. \* denotes  $n = 41$  for survey items, <sup>#</sup> denotes  $n = 40$  for survey items.

## Discussion

This study demonstrated that a disaster TTX workshop can improve understanding of role and function for pharmacists and pharmacy staff during a disaster. Almost all participants agreed that the workshop improved their understanding of their role and function during a disaster or emergency. The overwhelming majority also agreed that the TTX helped them to identify strengths and gaps in their understanding of disaster preparedness, response, and recovery. With one participant stating “*I haven't had any experience or training in disasters. I think it is a gap and should be included in staff education/training.*” So, while the workshop was able to act as an educational tool about disaster management, it also allowed participants to reflect on their role and function in a disaster and provided the opportunity for them to review areas they needed to improve on.

A significant increase in participants' understanding of disaster management activities was seen between the pre- and post-workshop evaluation. While those with previous disaster experience had higher baseline understandings of disaster management activities, in the post-workshop survey there was no difference in understanding between those with and without disaster experience. These results are interesting because they indicate that even those who have not previously been involved in a disaster could obtain improved understanding of disasters by their involvement in a TTX.

Most participants felt the workshop improved their capability to prepare, respond, and recover from a disaster. Those with previous disaster experience had higher pre-workshop assessments of their capability to respond and recover from a disaster. It was interesting that in the pre-workshop survey those with experience did not differ significantly in their assessment of their capability to prepare for a disaster compared to those who did not have experience. It could be that preparing for the unknown of a disaster is harder to substantiate than responding or recovering. For example, in responding and recovering pharmacy staff would likely be mostly utilising skills they are highly trained in and roles they are familiar with in a more austere environment. However, preparing may require more unfamiliar tasks such as writing a plan, moving work environments, or sandbagging. The tasks required to prepare may be unclear if the disaster type is uncertain or the severity unknown. It could also be that those with disaster experience did not have the opportunity to prepare for the events that they encountered, thereby making them uncertain of their capability to prepare. These factors, while poorly investigated in the literature, may explain why no difference in preparedness capability existed between those with and without disaster experience.

It was interesting to note that while there were some differences in responses to survey items between those with and without disaster

experience, there were no differences in responses when grouped by place of work, years of experience, role at work, and location of work. However, this could be due to the limited sample size and requires further investigation. Research on other health professionals in disasters indicates that all these factors may impact on preparedness and disaster knowledge.<sup>13,17,18</sup> It could be that because of the lack of education and training opportunities for pharmacists in the disaster management space that these factors are unlikely to affect perceptions of disaster knowledge, capabilities, or understanding. Unlike our doctor and nurse colleagues who have a wealth of education and training aimed at disaster management, the pharmacy workforce does not. This means it does not matter how long you work for, where you work, or in what role, as a pharmacist or pharmacy technician you will still be unlikely to have targeted education or training in disaster management.<sup>10</sup>

Previous research has posited that due to the complexity of disasters and a lack of understanding, participants in pre-workshop surveys may initially overestimate their abilities in disaster management.<sup>7</sup> In this study most participants (85.4%) in the post-workshop survey stated that they would revise their initial assessment of their capabilities in undertaking disaster preparedness, response, and recovery activities in their place of work. However, there was no difference in responses between those with and without disaster experience, indicating that experience did not influence an individual's assessment of their capabilities. Given the time constraints of this TTX this concept could not be fully explored. It could be that people mis-assess their initial understandings or capabilities due to lack of disaster education, or knowledge. This should be a consideration for those running and assessing disaster TTX and needs to be further explored in future research to determine how it may impact the reliability of pre-survey assessments of an individual's capabilities and understanding.

When training and preparing for a disaster, it is essential to include all pharmacy staff. For pharmacists to work to the best of their abilities and within their full scope in a disaster, they require the support of pharmacy technicians and assistants. This research provides an initial understanding of the benefits of a disaster TTX in the Australian context for pharmacy staff and demonstrates the acceptability of this type of training for the pharmacy workforce.

The results suggest that there is a good appetite among the tertiary pharmacy workforce for disaster focused CPD opportunities with almost all participants agreeing that they would like more CPD opportunities to learn about disaster preparedness, response, and recovery. In addition to this, almost all participants felt that disaster preparedness, response, and recovery activities were important for pharmacy staff. This indicates that pharmacy staff would like more CPD opportunities and that they feel disaster management is an important and worthwhile topic.

The importance of disaster training was summarised nicely by one participant who stated training was "very vital in today's times." When this TTX was being conducted it was the beginning of the 2019–2020 bushfire season in Australia which saw widespread devastation across many communities in Australia. The extinguishing of these fires was quickly followed by the rise of the COVID-19 pandemic. These two events in quick succession have resulted in pharmacy staff across Australia being under pressure or feeling the effects of disasters for several long months. Before these events, there was poor accessibility to training for pharmacy staff to prepare themselves for disasters.<sup>10</sup> It will be interesting to see how this will change given the recent events in Australia.

It should be noted that there is potential that the results presented here may be skewed because participants had to nominate to attend the workshop. It is likely those who did attend had an interest in or felt the topic was important. However, this still provides support for CPD providers and professional pharmacy organisations to consider developing disaster training and education for pharmacy staff. It should be noted that while the development of the TTX was somewhat time intensive, once developed the exercise was not financially expensive to conduct.

## Lessons learnt

To improve this TTX for future workshops, we would review the material provided to the participants and condense the information required to be understood at the beginning of the workshop. Some of the participants were allocated to a hospital profile that was different from their usual work settings. As one participant put it "There were lots of different workbooks, bits of info, which made it hard to follow. The envelopes were great but perhaps the workbook and background info could be streamlined." In future, we would give the documents to participants to review and become familiar with before the workshop. We attempted to reduce the printing required by making the participant workbook available electronically, but many did not find this useful compared to paper. The other aspect of the TTX we would tweak for future workshops was with four different hospital profiles, the participants only became familiar with their allocated hospital and did not get to experience the other profiles during the workshop. This could be overcome with longer debriefing time for the different tables to discuss their approach and challenges. The prevention phase of the disaster management cycle was not included as the workshop was only 3 h in duration and it began with the scenario unfolding. We suggest future workshops begin with prevention before the disaster scenario unfolds to include this element of the disaster cycle, as prevention steps and activities are generally required to be implemented in peace times. Something that worked well with this TTX was allowing the tables to progress through their scenario at their own pace with the envelopes. The challenge with this was the time constraints of the workshop and getting the slower progressing tables to move on to the next envelope.

The authors would like to acknowledge the importance of interprofessional practice in disasters. Disasters are complex, and there is not one health profession that can manage all the issues that arise. Disasters affect health in unpredictable ways and, therefore, a diverse range of skills, experiences, and ideas are required in all phases of disaster management.<sup>14,15</sup> An interprofessional approach to disaster training and response is required to allow health professionals to contribute positively during times of health crisis and ensure patients are receiving the best and most efficient care. This study and workshop were limited to the audience in attendance at the SHPA MM19 conference. Australian pharmacists have previously not been given opportunities of obtaining skills and knowledge in terms of disaster management and are typically excluded from disaster preparedness activities. Hospital pharmacists are collaborative healthcare professionals by their very nature and anecdotally were missing the disaster management skills and knowledge to integrate into their collaborative practice. Future research is required to further explore these disaster TTX within the pharmacy industry as well as the broader healthcare sector.

## Limitations

The participants included in this study were a convenience sample and may not represent the wider pharmacy perspective in Australia. The fact the participants self-elected to enrol in the SHPA MM19 conference disaster workshop might favour this study's results as they might have special interest or a greater understanding of the importance of disaster management. Also, all the participants were from the hospital pharmacy sector based on the delegates that attend the SHPA MM19 conference. Thus, the inclusion of interprofessional education and collaborative practices with other healthcare providers was not possible within the context and requirements of the conference workshop.

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 pre- and post-were almost identical and participants would have been required to complete the workshop before reflecting on their perceptions of the workshop. This survey was not formally validated; however, the content was based on a previously validated survey designed by two of the researchers (KW and

EM) to evaluate a disaster tabletop exercise run for students at QUT and followed the WHO guidance on evaluating TTX.<sup>16</sup> Another limitation was time, the TTX workshop was provided during a conference timeslot and went for only 3 h. The debriefing session had stimulated some excellent conversation and discussion that was unfortunately cut short as some participants needed to leave towards the end of the workshop to get to the next conference sessions.

## Conclusion

This work provides insight into the viability and effectiveness of a disaster TTX for pharmacy staff. The workshop was well received by participants and provided improvements in disaster understanding and capabilities. While the TTX was time intensive to develop, it was not financially expensive to run and could provide a cheap intervention targeted at improving pharmacy staff's disaster management abilities. This work is the first of its kind to target a TTX for all pharmacy staff. This inclusive approach is important for disaster management as it is not one profession that manages the complexity of a disaster and its aftermath. This research calls for further education and training opportunities for pharmacy staff to become prepared for disasters globally.

## CRedit authorship contribution statement

**Kaitlyn E. Watson:** Conceptualization, Methodology, Formal analysis, Resources, Writing - original draft, Writing - review & editing. **Jason J. Waddell:** Conceptualization, Methodology, Resources, Writing - review & editing. **Elizabeth M. McCourt:** Conceptualization, Methodology, Formal analysis, Resources, Writing - original draft, Writing - review & editing.

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## Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.sapharm.2020.07.009>.

## References

- Toich L. Pharmacists play critical role after natural disasters. Accessed <https://www.pharmacytimes.com/news/pharmacists-play-critical-role-after-natural-disasters>; 2017. Accessed March 30, 2020.
- Winkle A, Cooke J. *Roles for Pharmacists in Disasters*. Australian Pharmacist; 2020.
- Smith J. COVID-19: Skip Doc, See Pharmacist for Renewals: B.C. Pharmacists Authorized to Issue Prescription Renewals and Emergency Refills. 2020. *Victoria News*.
- Haggan M. The public are looking to pharmacy to stand up in this crisis. *Aust J Pharm: Aust J Pharm*; 2020. [https://ajp.com.au/news/the-public-are-looking-to-pharmacy-to-stand-up-in-this-crisis/?utm\\_source=AJP+Daily&utm\\_campaign=2b22723f22787-EMAIL\\_CAMPAIGN\\_22020\\_22703\\_22725\\_22705\\_22758&utm\\_medium=email&utm\\_term=.22720\\_cce22729c58212-22722b22723f22787-110163121](https://ajp.com.au/news/the-public-are-looking-to-pharmacy-to-stand-up-in-this-crisis/?utm_source=AJP+Daily&utm_campaign=2b22723f22787-EMAIL_CAMPAIGN_22020_22703_22725_22705_22758&utm_medium=email&utm_term=.22720_cce22729c58212-22722b22723f22787-110163121).
- Watson KE, Singleton JA, Tippett V, Nissen LM. Defining pharmacists' roles in disasters: a Delphi study. *PLoS One*. 2019;14(12), e0227132.
- Ford H, Dallas CE, Harris C. Examining roles pharmacists assume in disasters: a content analytic approach. *Disaster Med Public Health Prep*. 2013;7:563–572, 06.
- Hannings AN, von Waldner T, McEwen DW, White CA. Assessment of emergency preparedness modules in introductory pharmacy practice experiences. *Am J Pharmaceut Educ*. 2016;80(2), 23-23.
- Pate A, Bratberg JP, Robertson C, Smith G. Evaluation of a tabletop emergency preparedness exercise for pharmacy students. *Am J Pharmaceut Educ*. 2016;80(3):50.
- McCourt E, Nissen L, Tippett VC, Singleton J. Does Australian pharmacy curricula prepare students to play a role in disasters? *Prehospital Disaster Med*. 2017;32(S1). S161-S161.
- McCourt E, Nissen L, Tippett VC, Singleton J. Does Australian continuing professional development activities prepare pharmacists to play a role in disasters? *Prehospital Disaster Med*. 2017;32(S1). S161-S161.
- Burke RV, Goodhue CJ, Chokshi NK, Upperman JS. Factors associated with willingness to respond to a disaster: a study of healthcare workers in a tertiary setting. *Prehospital Disaster Med*. 2011;26(4):244–250.
- World Health Organisation. *WHO Simulation Exercise Manual*. Geneva: World Health Organisation; 2017. Licence: CC BY-NC-SA 3.0 IGO.
- Corrigan E, Samrasinghe I. Disaster preparedness in an Australian urban trauma center: staff knowledge and perceptions. *Prehospital Disaster Med*. 2012;27(5): 432–438.
- World Health Organization Regional Office for Europe. Disaster preparedness and response: Policy. Accessed 4/11/2018 <http://www.euro.who.int/en/health-topics/emergencies/disaster-preparedness-and-response/policy>; 2018.
- World Health Organisation. Action plan to improve public health preparedness and response in the WHO European Region 2018–2023. In: *Regional Office of Europe*. Copenhagen, Denmark: World Health Organisation; 2019.
- World Health Organisation. WHO simulation exercise toolbox: table top exercise (TTX). *Strengthening Health Security Implementing Int Health Regulations*; 2005, 2020 <https://www.who.int/ihr/publications/exercise-toolbox/en/index1.html>. Accessed March 20, 2019. Accessed.
- Crane JS, McCluskey JD, Johnson GT, Harbison RD. Assessment of community healthcare providers ability and willingness to respond to emergencies resulting from bioterrorist attacks. *J Emergencies, Trauma, Shock*. 2010;3(1):13–20.
- Lim GH, Lim BL, Vasu A. Survey of factors affecting health care workers' perception towards institutional and individual disaster preparedness. *Prehospital Disaster Med*. 2013;28(4):353–358.