



UNIVERSITY *of*
TASMANIA

Workplace support and disaster preparedness for health professionals and hospital support staff in three Australian hospitals.

How can managers best facilitate and support disaster preparedness for the hospital workforce?

by

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Dedication

Dedicated to all of the health professionals and support staff who have prepared for, assisted and continue during global disasters, including during the COVID-19 pandemic.

Dedicated also to those affected by disasters some of whom are also health professionals and health support staff.

Statements and Declarations

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This thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by another person except where due acknowledgement is made in the text of the thesis, nor does the thesis contain any material that infringes copyright.

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Statement of Ethical Conduct

The research associated with this thesis abides by the international and Australian codes on human and animal experimentation, the guidelines by the Australian Government's Office of the Gene Technology Regulator and the rulings of the Safety, Ethics and Institutional Biosafety Committees of the University. University of Tasmania Social Sciences HREC (H0015774), The Practice Development and Research Council at Case 1 (Project R 58), NSW Health Lead HREC multi-site ethics approval for Case 2 and 3 (LNR/18/SVH/228).

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Abbreviations

ABC	Australian Broadcasting Corporation
ACHS	Australian Council on Healthcare Standards
AHPA	Allied Health Professionals Australia
AIDR	Australian Institute for Disaster Resilience
AHPRA	Australian Health Practitioner Regulation Agency
Australia	Commonwealth of Australia
CEMSA	California Emergency Medical Services Authority
CT scan	Computerised tomography scanner
IFRC	International Federation of the Red Cross and Red Crescent Societies
MCI	Mass Casualty Incident
Medical Board	Medical Board of Australia
MIMMS Course	Major incident medical management support course
MRI	Medical resonance imaging
NHMRC	National Health and Medical Research Council
NSW	New South Wales (State in Australia).
NSW Health	NSW Ministry of Health
Nursing and Midwifery Board	Nursing and Midwifery Board of Australia
PPE	Personal protective equipment
UNDRR	United Nations Office for Disaster Risk Reduction

WADEM	World Association of Disaster and Emergency Medicine
WHO	World Health Organisation
X-ray	X Radiation or Rontgen radiation

Glossary

Allied Health Professionals: No universally accepted definition. Professions not part of medical, nursing or dentistry. University qualified, member of professional association and may be regulated by AHPRA. Autonomous, evidence-based practitioners providing direct patient care in area of expertise. Examples are dietitian, pharmacist, physiotherapist, social worker, podiatrist, radiographer or speech pathologist (AHPA 2021; AHPRA 2021).

Bio-preparedness course: One day classroom-based course covering biohazards and pandemics run internally at Case 3.

Commonwealth of Australia: Referring to the Federal Government or country of Australia.

Disaster preparation: the cycle of training, rehearsing, evaluating, reviewing for disasters (CEMSA 2014).

Emergo Train System: a simulation system used for disaster preparation or training. Owned by Ostergotland local government in Sweden. The system uses scenarios, magnets as hospital staff, patients and equipment to simulate disasters. NSW Health is accredited and holds the license to conduct Emergo Train exercises (Emergo Train System 2021).

Enrolled nurse: provides nursing care under the direct or indirect supervision of a registered nurse. They have completed the education preparation, and are competent under the Health Practitioner Regulation National Law (Nursing and Midwifery Board 2021)

High fidelity exercise: typically, these are simulations which are as close as possible to reality. They may use actors, high fidelity manikins and multiple agencies (CEMSA 2014; Lewis, Strachan & Smith 2012)

Major incident medical management support (MIMMS) courses: Courses offered in Australia, developed from the United Kingdom MIMMS courses covering major medical incident management in the community or hospital settings. Courses feature lectures, tabletop exercises and simulations. Courses run from one to three days (Australasia MIMMS 2021).

Medical practitioner: In Australia, a person can use the title medical practitioner if they are registered as a medical practitioner by the Medical Board of Australia. They can also be a medical specialist if they are registered in a recognised specialty. Only specialties approved by the Council of Australian Governments are considered medical specialties (Medical Board 2021).

New South Wales: State in Australia where this research took place.

Participants: In the present study, refers to health professionals or hospital support staff taking part in an interview or focus group for which they have consented for

Registered nurse: A person who has completed the education, is competent to practice, under the Health Practitioner Regulation National Law as a registered nurse in Australia (Nursing and Midwifery Board 2021).

Tabletop exercise: A scenario-driven exercise that conducted through verbal descriptions and application of a plan. Individuals and teams describe their roles and responsibilities through a presented scenario. Focus is on testing the knowledge or a plan, collaboration and teamwork decision-in a specified scenario (CEMSA 2014).

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Abstract

Health professionals and hospital support staff have a critical obligation to prepare their response and provide health care, to minimise morbidity and mortality resulting from disasters.

Despite an increased focus on disaster preparedness research in the last two decades, there is still much to learn about how health professionals and hospital support staff can best prepare for disasters. Previously published studies focussed on a single convenience sample of nurses or medical practitioners and show that all methods of preparation lead to improved outcomes. However, there is a paucity of research that explores preferences for and the most effective methods of disaster preparedness. Studies that extend to include allied health professionals and hospital support staff participants find that these individuals also benefit from disaster preparedness education. Published research currently demonstrates that many health professionals are not adequately prepared for disasters and indicate a reticence to attend work during disasters. The lack of understanding of the preferred methods of disaster preparedness is particularly relevant to participants other than medical and nursing professionals, because few studies have included allied health professionals or hospital support staff as participants.

This research explored how members of the hospital workforce believe they can best be supported by hospital management to prepare for disasters. A critical component of disaster preparation is how to facilitate attendance at work and provision of care or services during disasters. Participants were purposively selected based on their role or experience in disaster preparation or response. The study employed an interpretivist paradigm to explore the participants' perspectives about which methods of disaster preparedness are most effective and preferred. Case study design was used to examine the knowledge gap concerning the most effective method of disaster preparedness. Three case hospitals located in the Greater Sydney area, were selected due to their role in preparing and responding to disasters, their different funding models and geographical locations. The case study design enabled the comparison of differences and similarities across the settings and the impact on workforce perspectives. For each case, six allied health professionals, two medical practitioners and two registered nurses participated in a semi-structured interview; and up to ten support staff participated in focus groups at each case hospital (a total of 55 participants). An interview and focus group question and discussion guide were developed, based on the findings from the literature review and input from local disaster managers. Interview and focus groups data were broadly categorised into four knowledge categories: 1. Methods, content and resources of preparedness, 2. Duration and

frequency, 3. Likelihood to participate in disasters, 4. Learnings from actual disasters and other information. These data were then descriptively coded to outline the views of each participant. The Multiple Case Study Analysis framework by Stake (2006) was used to guide the data analysis, including thematic analysis, comparing the data between cases and identification of the findings.

The four key findings were: 1. In recognition of their essential roles during disaster responses, allied health professionals and hospital support staff must be included in disaster planning and disaster plans. 2. Factors that increase the decision to be absent from work include: whether the disaster is considered to be dangerous, when there is little understanding of their responsibilities, or when they believe the hospital's preparation is not adequate. Understanding roles and responsibilities is a positive influence likely to support attendance at work, even when a disaster could be perceived as dangerous. 3. The preferred and most effective method of disaster preparedness is practical learning, combined with other methods of preparation. Online learning as the major (or only) mode of disaster preparation was unpopular. 4. Inadequate resources dedicated to disaster preparedness at hospitals, limits the ability of managers to support staff to prepare for and deliver care during disasters. Available resources affect the method, duration and who is included in disaster preparation at the hospital.

This study found there is a need for disaster preparedness in hospitals to be reviewed. It is critical to evaluate the extent to which allied health and hospital support staff are included, or feel included in disaster planning, alongside medical practitioners and nurses. Additionally, allied health professionals and hospital support staff should be included as participants in disaster planning and preparation research. These two actions will close the existing gap in disaster preparation knowledge. To maximise attendance at work, measures need to be taken so staff understand their disaster roles. It is important health professionals and hospital support staff comprehend their contribution to a disaster response and know the hospital has an effective plan incorporating their roles for specific disasters. The disaster plan, policies and resources should also promote staff protection and safety. Site or occupation specific differences exist, and disaster planning must include strategies to understand what information and resources are needed by the workforce and how this should be provided. Practical disaster preparation is essential for all staff. This preparation can be supported by other forms of learning, although, online learning in isolation should not be used to deliver most of the learning to staff. Resources are required to ensure all staff can participate in practical and other disaster preparedness, so that this is not substituted by more cost-effective methods, particularly online learning. Staff need to believe the hospital has adequate resources, including educational preparation or

training, staff, plans and equipment to safely work during disasters and to provide care, preserving life in the community. The key findings of this research contribute to the evidence that, health professionals and hospital support staff must be supported to undertake effective methods of disaster preparedness, so the hospital workforce are prepared to meet the needs of the community during disasters.

Chapter 1 Introduction

1.1 Introduction

Fundamental for an effective health system response to internal incidents and external disasters is to have a hospital workforce who have completed disaster preparedness and are ready to operationalise disaster plans and care (Baack & Alfred 2013; Melnikov, Itzhaki & Kagan 2014; Tebruegge et al. 2010). It is important to understand the impact of disasters and how health professionals and hospital support staff should most effectively prepare for disasters, to minimise the morbidity, mortality and the impact of disasters on health infrastructure (UNDRR 2015). It is also necessary to use health resources prudently given the limits of healthcare funding and rising healthcare costs (Amberson, Wells & Gossman 2020). Critical to disaster preparation is knowing the perceptions, opinions and arguments of health professionals and hospital support staff regarding how they believe that they or their colleagues can most effectively prepare for disasters. Provision of services during a disaster can be quite different than during usual operational periods in hospitals. Essential to effective preparation is for health professionals and support staff to attend work and provide care or services during any disaster. This chapter is divided into seven sections and will introduce the overall thesis.

- Section 1.2 Background. Provides a background to the impact of the global of disasters and why it is important that health professionals and hospital support staff effectively prepare. Some key disasters and terms referred to in this research have been defined.
- Section 1.3 Statement of the Problem. Discusses and explains the problem including the global factors that highlight the need for this research. This section includes an examination of the Sendai Framework, Australian legislation or policy and other rationales for needing disaster preparedness research.
- Section 1.4 Rationale and Research Significance. It is important to understand why health professionals and support staff need to prepare and why it is important to comprehend the best methods of preparation. This section introduces why this research is required. The need to understand the diverse range of health professionals and support staff and how they can best prepare for disasters is explained. Disaster preparedness and the use of resources is also considered during times of increasing healthcare costs.

- Section 1.5 Research Question. Discusses the research question, objectives and why they are critical for the preparation for disasters. How can hospital managers best support health professionals and support staff to prepare for disasters? This section includes understanding the preferences or needs of the health professionals and support staff to assist them to prepare within a hospital context.
- Section 1.6 Research design and methodology. Explanations why a qualitative case study approach was used to respond to the research question. This section also provides a context about the researcher.
- Section 1.7 Structure of the Thesis. Provides an overview of the structure of the thesis chapter by chapter.

1.2 Background

To preserve human life during and following disasters, health professionals and hospital support staff have a responsibility to respond to disasters (Abatemarco et al. 2007; Baack & Alfred 2013; Thorne et al. 2004). Health professionals and hospital support staff require appropriate preparation for disasters to maximise the effectiveness of this response, including their willingness or ability to attend work during times of disaster (Arbon et al. 2013; Baack & Alfred 2013; Burke et al. 2011; Fung, Loke & Lai 2008; Gershon et al. 2009; Melnikov, Itzhaki & Kagan 2014; Qureshi et al. 2004; Tebruegge et al. 2010; Thorne et al. 2004).

Climate change, political or economic instability and terrorism are likely to further increase the prevalence of disasters in low to middle income countries (LMIC) and high-income nations (UNDRR 2015). As an example, the impacts of climate change increases the disaster risks related to extreme heat, fire, drought, food security and reduced biodiversity, which in turn increases the spread of disease. Climate change related displacement of people increases risks of conflict and economic impact (UNDRR 2015; WADEM 2017). The world was reportedly overdue for a major pandemic at the time of data collection for this research and now in 2021, the world continues to manage the Corona virus SARS-2 (COVID-19) pandemic (Al Khalaileh, Bond & Alasad 2012; Tebruegge et al. 2010; Thorne et al. 2004; UNDRR 2015).

1.3 Statement of the Problem

According to United Nations data, during the period 2005 to 2015 disasters had a significant impact on the world's population (UNDRR 2015). Over 700 thousand people have been killed, over 1.4 million people have been injured and 23 million have lost their homes. The total economic value of the impact of disasters during this period is estimated to be 1.3 trillion dollars

globally. Many disasters are increasing in intensity and frequency, exacerbated by climate change. In order to reduce morbidity and mortality resulting from disasters it is important that health workers (and others) undertake disaster preparedness (UNDRR 2015).

1.3.1 Definitions

This research used, the definition from the United Nations Office for Disaster Risk Reduction which *defined disasters as “A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. Annotations: The effect of the disaster can be immediate and localised but is often widespread and could last for a long period of time. The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighbouring jurisdictions, or those at the national or international levels”*(UNDRR 2021, para 1-2).

Disasters can create a mass casualty event or increase in community members presenting to hospitals in need of health care. Examples include earthquakes, floods, tsunamis, terrorism and pandemic influenzas or infectious disease outbreaks (Adams 2013; Adams, Canclini & Frable 2015; Bartley, Fisher & Stella 2007; CEMSA 2014; Lane et al. 2014; Moore et al. 2006; Nyamathi et al. 2010; Olness et al. 2005; Olson et al. 2010; Pesiridis et al. 2015; Qureshi et al. 2005; Yang et al. 2010).

This research is also investigating preparation for internal hospital incidents. Internal incidents are those that occur or impact within the hospital and pose a threat to the safety of patients, staff and visitors within facilities. The incidents affect the hospital equipment or staff's ability to provide healthcare services and require a coordinated response. Past examples have included hospital power failures, floods, loss of medical gases, and hospital fires (CEMSA 2014; NSW Health 2013; Private Health Facilities Regulation 2017 (NSW)).

Internal hospital incidents and disasters can overlap. For example, an earthquake which would be defined as a disaster and result in increased casualties presenting to the hospital, may also cause an internal incident for a hospital in the form of a power failure. An external power grid failure can cause an internal incident at a hospital. The hospital may also lose power to some or all of its areas affecting services. An internal incident at one major healthcare facility, including a loss of medical gases, water, or power or an internal fire that requires patient evacuations, could be considered a disaster for other health services. Other hospitals and ambulance services may

be required to assist with transport and care of multiple unexpected patients from the facility experiencing the internal incident (CEMSA 2014; NSW Health 2013; Private Health Facilities Regulation 2017 (NSW)). Table 1.1 provides some examples of disasters and incidents which are referred to frequently in the literature, or by participants in data collection for this research. Compared to internal incidents, disasters more commonly appear in the published research literature. Therefore, less is generally known about the frequency of internal incidents and how they are managed.

Table 1.1 Exemplar Incidents and Disasters referred to in Previous Research or by Participants

Dates	Name	details
1980s to present	Acquired Immunodeficiency Syndrome (AIDS) / Human Immunodeficiency Virus epidemic (HIV)	Outbreak of AIDS / HIV in the 1980s spreading globally. Infections increased rapidly from 1985 to 2000 to 28 million people. Global incidence peaked in 1997 with 3.3 million new infections. From 2005 to 2015 infections were around 2.5 million per year or 38 million people living with HIV. Effective treatments became available in the late 1990s (Wang et al. 2016).
2001	Terrorist attacks World Trade Centre, New York, USA	Hijacked planes were used to fly into the World Trade Centre, New York. 2753 fatalities. Many including first responders continue with ongoing health implications (Smith & Burkle Jr 2019).
2002	Bali bombings 2002	12 October 2002 killed 202 people and a further 500 injured. Suicide bombing and car bomb detonated near or in Kuta night clubs (Morley & Leslie 2007).
2002-2003	SARS mini pandemic (SARS-CoV)	Epidemic caused by severe acute respiratory syndrome (SARS) coronavirus. 774 deaths. 8096 likely cases. Within 11 weeks spread to 27 countries (Cherry 2004).
2003	Waterfall Rail Accident (NSW)	Train derailment. 7 fatalities and multiple injuries (Hocking 2006).
2004	Earthquake & Tsunami Indian Ocean	Killed 230000 people. Affected 15 countries including Indonesia, Sri Lanka, India and Thailand. Significant damage to buildings, sea ports and houses (Suppasri et al. 2012).
2009	H1N1 (Swine flu)	Global spread of infections, 17700 deaths. Fatality rate less than 0.05% (Writing Committee of the WHO Consultation on Clinical Aspects of Pandemic Influenza 2010).
30 March 2009	Sydney Power Failure, Internal backup hospital generator failure	Backup generator failure affecting major public and private hospitals. Loss of power to wards and intensive care units in public hospital and private hospitals, Reported in Sydney news (Rubinsztein-Dunlop 2009).

6 May 2009	Western Sydney and Central and South West regional NSW power failure 36 hours	More than 100 hospitals in the State of NSW lost power for up to 36 hours. Medical imaging and pathology results disrupted, and main computer server failed during the power outage. Reported in Sydney news. (Benson 2009)
2010	Earthquake in Haiti	Three million people affected. 222750 deaths, 1 /4 of population housed in temporary shelters. Response by many countries and non-government organisations (Levie, Burke & Lannon 2017; Van Berlaer et al. 2017).
2011	Christ Church earthquake	70 people rescued from collapsed building, zero mortality, injuries, international response. 1/3 City centre buildings damaged (Dolan et al. 2011).
2011	Quakers Hill Nursing Home fire	A registered nurse, set fire to the nursing home, killing 11 elderly residents. 88 evacuations Some transfers to hospitals, including burns patients (NSW Fire and Rescue 2011; Starr 2015).
2014	Lindt Cafe siege Sydney	Treated as a terrorist attack during the siege. Eighteen victims held hostage. Two deaths plus the gunman (Scott 2020).
2014 to 2016	Ebola virus disease outbreak West Africa	Largest outbreak since Ebola virus was discovered 1976. Average fatalities 50%. Virus spread across land borders and beyond to Spain and the USA. International medical and logistical response (WHO 2021).
2015	Parramatta shooting	A 15-year-old boy shot a police accountant at NSW police headquarters in Parramatta. Conviction for terrorism offences in 2018 (McLinden & Barclay 2018).

The definition of health professionals and hospital support staff is also broad for this study. In keeping with the research question and objectives is limited to those individuals that are employed or engaged by hospitals. Health professionals working in hospitals include the professions of nursing, medicine, dentistry, pharmacy, other allied health professionals, hospital scientists and other occupations which are commonly considered to be health professionals who work in hospitals (AHPA 2021; AHPRA 2021; Tebruegge et al. 2010). Hospital support staff are defined as the non-health professional staff who work in hospitals, including cleaners, security guards, orderlies, nursing assistants, food services assistants, cooks, chaplains, clerical staff, accountants, human resources or payroll staff and other staff commonly considered hospital support staff (Tebruegge et al. 2010; Thorne et al. 2004).

1.3.2 Disaster Regulation or Governance

International Governance

Recognising the significance of disasters and the responsibility that health workers have during disasters. The Sendai Framework for Disaster Risk Reduction 2015-2030, adopted at the third United Nations World Conference, determined the following four priorities: 1) Healthcare workers recognise disaster risks; 2) Strengthening disaster governance to manage risk; 3) Investing in disaster risk and resilience; and 4) Enhancing disaster preparedness for effective response. Priorities 3 and 4 make specific references to the healthcare workforce (UNDRR 2015). The Sendai Framework includes advocating for enhancing the resilience of national health systems, including developing the capacity of healthcare workers and providing training in the field of disaster medicine. The Healthcare workforce is one of few disciplines mentioned specifically, which is recognition of the importance of healthcare workers in preparing for disasters. Staff working within healthcare facilities have responsibilities to provide care for vulnerable patients during the internal and external disasters (UNDRR 2015).

National regulation

The Commonwealth of Australia is a federation of six states and includes mainland and offshore territories. This research was conducted in the state of New South Wales (NSW). Outlined in the Australian Constitution, Section 119 during disasters, the state governments are responsible for disaster preparedness and the safety of individuals within the states. The Federal Government is limited to a coordination role and can provide additional resources at the request of the executive of the State. The Federal Government holds other powers within The Constitution, including for international affairs when foreign nations provide disaster resources and in circumstances where a State Government effectively ceases to exist due to the impact of a disaster (AIDR 2019; Eburn, Moore & Gissing 2019).

Within the state of NSW, there is a disaster framework known as the NSW State Emergency Management Plan (EMPlan). This plan includes the NSW Health Plan which provides disaster guidelines for NSW hospitals. The plan requires that staff be provided with education, training, and exercises to assist prepare for disasters (NSW Health 2013). Additional state-based legislation is in place to govern private hospitals. The Private Health Facilities Act NSW (2007) and Private Health Facilities Regulation NSW (2017), require that disaster planning be in place, including the procedures to be followed in the event of a disaster. Legislation, government plans or policies require preparation for disasters for those working within health services. Legislation

and policies may lack specific detail regarding how health professionals and hospital support staff should prepare for disasters. The legislation and policies discussed in this section do provide an additional rationale for this research to identify how staff can effectively prepare for disasters (NSW Health 2013; Private Health Facilities Act 2007 (NSW); Private Health Facilities Regulation 2017 (NSW)).

Each state within Australia has its own state-based disaster legislation and guidance with links displayed in the Table 1.2. Whilst the Constitutional responsibility for the management of territories remains with the Federal Government, self-governance has been granted to the Australian Capital Territory and Northern Territory. The relevant Territory legislation is also included in Table 1.2 (Eburn, Moore & Gissing 2019).

Table 1.2 Australian State and Territory Disaster Governance Links

State	Disaster guidance website
Australian Capital Territory	Legislation ACT Emergency Services Agency Emergency arrangements ACT Emergency Services Agency
Northern Territory	Legislation Database (nt.gov.au) Emergency and safety - NT.GOV.AU
NSW	Resilience NSW – EMPlan https://www.emergency.nsw.gov.au/ https://www.emergency.nsw.gov.au/Documents/publications/20181207-NSW-state-emergency-management-plan.pdf
Queensland	Queensland State Disaster Management Plan https://www.disaster.qld.gov.au/cdmp/Documents/Queensland-State-Disaster-Management-Plan.pdf
South Australia	State Emergency Management Plan https://www.dpc.sa.gov.au/responsibilities/security-and-emergency-management/state-emergency-management-plan
Tasmania	Tasmanian Emergency Management https://www.ses.tas.gov.au/emergency-management-2/
Victoria	Emergency Management Manual Victoria https://www.emv.vic.gov.au/sites/default/files/embridge_cache/emshare/original/public/2020/07/d7/306220fac/EMMV-Title.pdf
Western Australia	State Emergency Management Framework https://www.semc.wa.gov.au/emergency-management

(AIDR 2019).

Specific guidance for health professionals in Australia in relation to their disaster preparation requirements is not comprehensive. Within the codes of practice for medical practitioners, nurses, and allied health professionals there is no mention of the need to prepare for disasters (Medical Board 2020). For nurses and midwives there is a position statement which recognises that nurses and midwives may be required during national disasters (Nursing and Midwifery Board 2016).

In summary, internationally and within Australia there is a regulatory framework to require or recommend that health professionals and hospital support staff should be undertaking disaster preparedness. Whilst this recommendation does not comprehensively outline what preparation should occur for health professionals and hospital support staff, it does require health professionals and hospital support staff undertake disaster preparation. Additionally, societal expectations argue that hospital staff have a responsibility to provide care during disasters and to do this effectively and safely, they should undertake disaster response (Baack & Alfred 2013; Melnikov, Itzhaki & Kagan 2014; Nursing and Midwifery Board 2016; Tebruegge et al. 2010). As there are limited specific or mandated requirements to identify the type of disaster preparation to be undertaken for health professionals and support staff, this lack of direction is an argument for evidence-based practice to know the most effective methods of disaster preparation.

1.3.3 Hospital Resources and Evidenced Based Practice

There are increasing financial pressures on healthcare systems internationally and in Australia (Armstrong et al. 2007; Forero et al. 2020; Jack, Stephen & Lisa 1996). These pressures are compounded by increasing healthcare costs and funding shortfalls (Armstrong et al. 2007; Forero et al. 2020; Jack, Stephen & Lisa 1996). These financial challenges make it imperative that the time and resources invested in disaster preparation with health professionals and support staff should be efficient and effective. The research undertaken for this study responds to this imperative by identifying ways to maximise the efficient use of resources. These resources include health professional and hospital support staff time, and the associated costs to facilitate staff preparedness for disasters. The findings from this research will enable hospital managers, health professionals and hospital support staff to focus their resources on disaster preparation which has been demonstrated to be most effective.

1.4 Rationale and Research Significance

It is imperative to have health services and in particular a hospital workforce prepared for internal and external disasters. A workforce prepared for disasters, enables them to safely provide care which provides the best outcomes for consumers or members of the community requiring healthcare during times of disasters (Baack & Alfred 2013; Melnikov, Itzhaki & Kagan 2014; Tebruegge et al. 2010). Globally, disasters have occurred frequently. Individual hospitals, health professionals or hospital support staff are affected by disasters less frequently, although as the occurrence of disasters is unpredictable, it is important to have the best practice disaster preparation available. Health professionals and hospital support staff must be able to meet healthcare needs during when the need for health services may surge (UNDRR 2015).

It was important to investigate the range of health professionals and health support staff who are responsible for disaster preparation and response to obtain a full understanding of disaster preparedness needs. It was essential to know what constitutes the most effective methods of preparation, so that the workforce can be equipped to work during disaster situations (Abatemarco et al. 2007; Baack & Alfred 2013; Thorne et al. 2004; UNDRR 2015).

Health professionals and hospital support staff have also been disproportionately affected, in terms of their own safety, by certain disasters, particularly infectious disease pandemics (Morganstein et al. 2017). Safety and the knowledge, skills and resources to stay safe are a major factor in disaster preparedness that cannot be separated from the ability of the workforce the effectively respond and provide care during disasters. It is essential how to keep health professionals and hospital support staff safe is investigated (Morganstein et al. 2017).

The United Nations Sendai Framework for Disaster Risk Reduction provides further backing to the importance of this research as it describes the need for research to focus on the preparation and education for disasters (UNDRR 2015). Preparation for disasters is both an individual and organisational responsibility. Much of the preparation for hospital-based health professionals and hospital support staff may be facilitated by hospitals, including the funding or resources, policies, guidelines and workers that are involved in health service management and delivery. Data evidencing preferred and effective disaster preparedness, are beneficial in guiding health professionals and hospital support staff, as well as those that support their disaster preparation. Hospital managers and the external organisations that may be engaged by individuals or hospitals to develop staff, including universities, colleges and others with an interest in disaster

preparation or education, also need to know what is most effective in terms of disaster education (Abatemarco et al. 2007; Baack & Alfred 2013; Thorne et al. 2004; UNDRR 2015).

Identification and understanding of the factors that promote or discourage health professionals and hospital support staff regarding attendance at work during disasters is critical. Research indicates that medical and nursing professionals may not be able or willing to attend work during disasters (Abatemarco et al., 2007; Arbon, 2013; Baack & Alfred, 2013; Baez et al., 2005; Collander et al., 2008; Fung et al., 2008; Hawley et al., 2007; McKibbin, 2011; Melnikov et al., 2014; Nasrabadi et al., 2007; Qureshi et al., 2004; Thorne et al., 2004; Worrall, 2012; Yang et al., 2010). This research will collect data to understand how health professionals and hospital support staff can be supported to attend work during disasters.

Within the Australian healthcare system there are cost pressures related to an increasing cost of health services and funding that does not always match (Forero et al. 2020; Jack, Stephen & Lisa 1996). It is essential to identify effective methods of preparation for health professionals and support staff, so that, health income, or funding is used wisely. Understanding the most effective methods of disaster preparedness, the research will guide hospital management and staff where they should invest their resources into disasters preparedness to enable workforce preparedness.

1.5 Research Question

The question which the research answers is:

How can hospital managers best facilitate health professionals and hospital support staff to prepare for internal and external disasters?

The research question explores the thoughts and beliefs of experienced health professionals and hospital support staff. This research question will be addressed through the following research objectives that aim to identify:

- The most effective disaster preparedness methods for health professionals and hospital support staff.
- The factors or approaches that hospital managers and individual health workers can undertake or provide, to support or facilitate attendance at work during disasters.

By focusing broadly on hospital-based workers including both professional and support staff, it recognises that health professionals are supported by many professionals and other staff that

are essential for the delivery of healthcare. Some staff may not identify as health professionals, and they are still essential for care or for providing other services that support care.

By considering the question within the context of “how can hospital managers best facilitate”, whilst the hospital management take a large amount of responsibility for the disaster preparation, it also recognises that health workers, governments as well as educational institutions, are involved in preparing professionals and hospital support staff for disasters. Preparation is being undertaken internally within hospitals and other preparation can be undertaken externally in wider community exercises, university or college courses or even through individual study.

1.6 Research Design and Overview

Prior to undertaking the research, within the researcher’s hospital (Case 1) a range of methods of disaster preparedness were undertaken by health professionals and support staff. These included the introduction of in-service education, disaster exercises, online learning and the development of emergency plans. Whilst tested internally, the disaster preparation strategies were not fully evaluated other than the requirements of hospital accreditation, legislation, or other regulatory requirements (ACHS 2010; Private Health Facilities Act 2007 (NSW); Private Health Facilities Regulation 2017 (NSW)).

A qualitative approach using case study methodology was selected to facilitate exploration of the research objectives. Purposive sampling was used to invite participants with experience in either preparing for or participating during disasters. Letters, emails, or scripted phone calls were made to managers or directors requesting that they invite employees to participate if they met the inclusion criteria. Information sheets and consent forms were provided to both managers or directors and participants (Appendices B and C). Managers or directors were advised that two registered nurses, two medical practitioners, six allied health professionals and ten hospital support staff with disaster experience or disaster preparation experience would be selected to participate in the study .

All interviews and focus groups were conducted by the researcher in confidential locations, audio recorded and transcribed. The data from the three cases were coded, thematically analysed and findings were identified using the descriptive method coding described Belotto (2018) and the framework and tools described in Stake’s (2005), Multiple Case Study Analysis. These methods explored the views of participants and complexity of the situation at each case as it allowed for differences and similarities to be explored about a subject area where little is

known. As well as providing learnings about how health professionals and support staff can best prepare for disaster. From this study, it was anticipated that the learnings will also provide a foundation for further exploration and research perhaps with a larger cohort of participants, from even more diverse occupational groups and practice settings using qualitative or quantitative methods (Harrison & Mills, 2016; Kumar, 2011; Thomas, 2011; Stake, 2005).

Three sites were selected for the study, as they had all been previously involved in responding to internal incidents or external disasters. Case 1 was a large comprehensive acute care Sydney private hospital. This hospital had recently responded to internal incidents, including a power and generator failure (Table 1.1), an internal fire and had a supporting function for the co-located public hospital during a Sydney Lindt Café terrorist attack (Table 1.1). Case 2 is a major eastern Sydney public teaching hospital and is co-located with the Case 1. The Case 2 is the closest trauma hospital to the Sydney central business district. The hospital has responded to internal incidents and external disasters. These responses have included mass gathering events, the Sydney Lindt Café terrorist attack (Table 1.1), pandemic influenza outbreaks and internal incidents including floods, fires, and power failures (Table 1.1). Case 3 was selected as it was a major western Sydney public teaching and trauma hospital. This hospital is geographically isolated from other major adult hospitals and closely located to the Parramatta central business district (Sydney's second central business district) which hosts the head offices of NSW State government departments and some national or multinational business headquarters. The hospital has responded to incidents including a terrorist attack at the NSW Police Headquarters (Table 1.1), victims from a nursing home fire (Table 1.1) and the hospital was the state receiving centre for pandemic disasters outbreaks including sudden acute respiratory syndrome (SARS), H1N1 (swine flu), and Ebola virus disease (Table 1.1). The hospital has also experienced internal incidents including a power failure (Table 1.1). All three facilities have disaster plans, committees and educational preparedness programs in place.

The context of the researcher is important, given that the researcher is the instrument of the data collection process in qualitative research. Understanding of disaster preparedness methods and either affirming or indicating neutrality when listening to answers, this could potentially influence participant responses. The researcher aimed to be neutral during interviews or focus groups, to reduce the potential for data collection bias (Smith & Noble 2014). On occasions support or encouragement, a nod or signal of support, was provided to a nervous interviewee. The potential for bias was minimised and participants were informed by the researcher that there were no incorrect responses and that all opinions were valid to encourage participants to

express their views (Pezalla, Pettigrew & Miller-Day 2012; Smith & Noble 2014). The researcher had no interest in obtaining a specific outcome that could have created any bias. Any deliberate bias would also be unethical (Kumar 2011). The researcher is a registered nurse and was employed at a major private hospital in Sydney (Case 1) as a nurse manager and as the hospital's disaster manager at the time of data collection. The researcher holds undergraduate qualifications in nursing and post graduate qualifications in acute care nursing, health services management and human resources management. Prior to undertaking this research, the researcher had more than twenty years' experience in a range of nursing specialities, including acute and critical care at public and private facilities in Australia and the United Kingdom. As a registered nurse and disaster manager he was responsible for designing and participating in a range of disaster preparedness activities. These educational activities included online learning, lectures, practical exercises, conferences, workshops, self-learning, participation in committees and undertaking post graduate studies in disaster preparedness.

Full ethical consideration was given to the study, including considering risks, confidentiality, data storage, informed consent, participant withdrawal and feedback following data analysis. Ethics and or governance approval was obtained by University of Tasmania (UTAS) Social sciences human research ethics committee (HREC) (H0015774), and the research council or HREC for Case 1 (Project R 58), Case 2 and 3 (LNR/18/SVH/228) and local governance approval Case 3 (LNRSSA/19/WMEAD/5).

1.7 Structure of Thesis

The thesis is comprised of eight chapters. The following section provides a brief synopsis of each chapters:

- Chapter 2 is an integrative literature review completed prior to commencing the research. This review included both qualitative and quantitative primary research identified through a keyword search of the major journal databases. The literature review was conducted in 2015. A version of the literature review has been published. See Appendix A (Gowing et al. 2017). The chapter includes additional relevant research reviewed between 2015 and March 2021. Recent publications include evaluations of preparedness in relation to COVID-19. Additionally, research related to learning theories are included.
- Chapter 3 details the research design and methodology, including ethical considerations. A qualitative design was chosen. Interviews and focus groups were used to collect in

depth data at the three sites. The chapter explains how data were thematically analysed, coded and then findings were developed using the structures of Stake's Case study method.

- Chapter 4 presents Case 1, an eastern Sydney private hospital. The participants included ten health professionals and nine hospital support staff. This case was the only private hospital included in the study. The results and analysis are outlined and analysed under the following headings describing preferred disaster preparation: participants, preferred duration and frequency, preferred methods and resources, preferred content, attendance at work during disasters, lessons learnt from actual disaster experiences and other observations or themes which emerged.
- Chapter 5 presents Case 2, an eastern Sydney public hospital. This case included ten health professionals and seven support staff. The results and analysis are outlined under the following headings describing preferred disaster preparation: participants, preferred duration and frequency, preferred methods and resources, preferred content, attendance at work during disasters, lessons learnt from actual disaster experiences and other observations or themes which emerged.
- Chapter 6 presents Case 3, a western Sydney public hospital. This site included 10 health professionals and eight support staff. The site is geographically isolated from other major adult hospitals. The results and analysis are outlined under the following headings describing preferred disaster preparation: participants, preferred duration and frequency, preferred methods and resources, preferred content, attendance at work during disasters, lessons learnt from actual disaster experiences and other observations or themes which emerged.
- Chapter 7 provides interpretation and discussion of the data across the three case studies. The interpretation of the data draws upon the analysis presented in the preceding chapters with discussion in the context of the previous research. The framework and tools developed by Stake (2005) were used to group themes together and to identify the key findings. The chapter reveals 4 key findings and outlines recommendations for implementation in practice.
- Chapter 8 is the conclusion, and it provides a synthesis of the key findings. It includes a section on the limitations of this study and suggested areas of future work and final reflections. It discusses the contributions this research adds to the broader healthcare emergency or disaster management discipline. The findings of this research will assist disaster and other managers in hospitals and others that support the hospital workforce

development, to facilitate effective disaster preparedness with health professionals and hospital support staff, and ultimately benefit the community.

Chapter 2 Integrative Literature Review.

2.1 Introduction

Health professionals and health support staff have a responsibility to respond to disasters and understanding how best to prepare, may facilitate both better preparedness and additional research to address gaps (Abatemarco et al. 2007; Baack & Alfred 2013; Thorne et al. 2004). This integrative literature review includes both qualitative and quantitative research. The definition and scope of disasters for the purpose of this literature review is broad. Disasters refer to incidents or emergencies that occur having an impact on the health of the community, both within home nations and also abroad. This can include internal incidents affecting health services or external disasters impacting the need for health care including, infectious disease pandemics or mass casualty incidents (Bartley, Fisher & Stella 2007; Nyamathi et al. 2010; Olson et al. 2010; Yang et al. 2010). The definition of health professionals and support staff is also broad. Health professionals include the professions of nursing, medicine, dentistry, pharmacy, other allied health professionals, paramedical or emergency medical technicians (EMTs), public health workers, hospital scientists and other occupations which are commonly considered to be health professionals. Support staff will be defined as the non-health professional staff who work in health care services, including cleaners, security guards, orderlies, nursing assistants, food services assistants, cooks, chaplains, clerical staff and other staff commonly considered health support staff (Tebruegge et al. 2010; Thorne et al. 2004). The aim of this review is the development of new knowledge which can be used by health services and disaster planners to better prepare health professionals and support staff for disasters.

This literature review has been published a peer reviewed journal, Pre-Hospital and Disaster Medicine and appears as Appendix A.

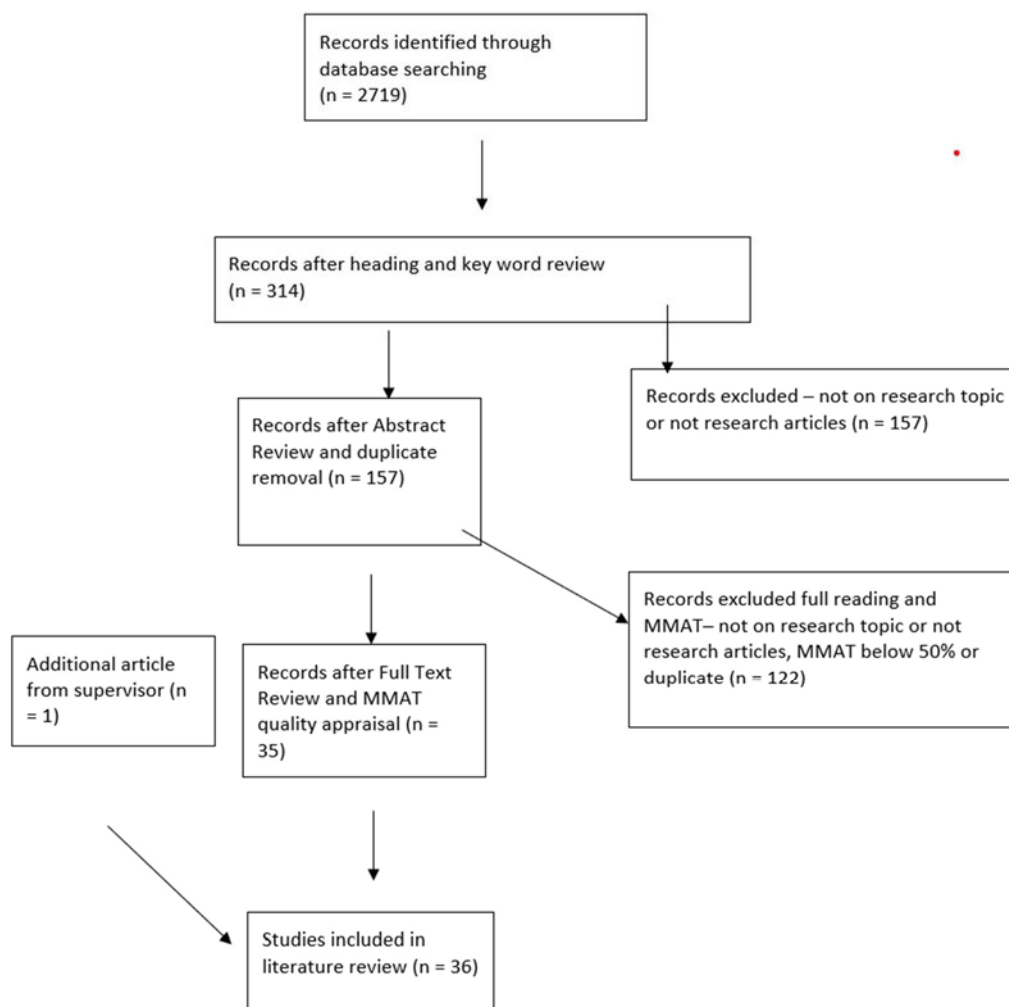
- Section 2.2 Method. Describes the literature review method.
- Section 2.3 Results. Describes the results of the literature review.
- Section 2.4 Discussion. This is the discussion and is a synthesis of the findings of the literature reviewed.
- Section 2.5 Conclusion. Concludes the integrated literature review.
- Section 2.6 Additional Relevant Research. This section includes research on learning theories and broader and recent research.

- Section 2.7 Literature Review Chapter Conclusion provides a summary for both the literature review and additional relevant research presented in this chapter.

2.2 Method

An integrative literature review protocol was developed, and validation was achieved with a hospital librarian. To identify previous research, a keyword search using the University of Tasmania Library, databases was conducted. The databases searched were Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medline database via OVID, JBI Connect (Johana Briggs Institute), Cochrane database, ERIC (Educational Resource Information Centre) and ProQuest Social Sciences Journals. The initial search was conducted in February 2015. Based on title and keywords articles were transferred to Endnote. Combining the articles selected from the above searches (based on title, keyword, and abstract review) resulted in a total of 157 articles after duplicates removed (see Figure 2.1 Consort diagram & Table 2.1).

Figure 2.1 Integrated Literature Review Consort Diagram



Between February and April 2015 these articles were read in full to decide final inclusion in the literature review based on relevance of research to literature review questions. The articles were discarded if they were not primary research articles, not on the topic, or if they evaluated the preparedness of hospital plans, as opposed to health professionals. Research articles were quality appraised using the mixed method appraisal tool (MMAT). The MMAT has been developed to appraise qualitative, quantitative, or mixed method studies (Pace et al. 2012). The research team determined that research articles would need to achieve a MMAT score of 50% to be included in the literature review. This provided a balance of including quality research and having adequate volume to allow a broad exploration of themes and methods identified in existing research.

Review and data extraction, including an analysis of the main themes, research methods and findings was undertaken for 34 articles.

Table 2.1 Literature Search February 2015 to April 2015.

Database	Cumulative Index of Nursing and Allied Health (CINAHL)
Search Terms	Disaster Planning or Disaster Preparedness or disaster training or disaster professional development and evaluation or outcomes of education and health professionals or nurses or medical or doctors or allied health or hospital staff
Limitations	Published after January 1 st , 1980, English language, Research
Findings	206 articles were identified in database
Heading and Key word review	132 articles selected for abstract review
Abstract review	73 articles were selected for full reading and quality appraisal
Database	Medline via Ovid
Search Terms	Disaster Planning or Disaster Preparedness or disaster training or disaster professional development and evaluation or outcomes of education and health professionals or nurses or medical or doctors or allied health or hospital staff or ancillary staff
Limitations	Published after January 1 st , 1980, English language, human subjects
Findings	317 articles identified in database

Heading and Key word review	135 articles selected for abstract review
Abstract review	66 articles were selected for full reading and quality appraisal
Database	JBI Connect (Johanna Briggs Institute)
Search Terms	Disaster
Limitations	Nil
Findings	4 articles were identified in database
Heading and Key word review	2 articles selected for abstract review
Abstract review	2 articles were selected for full reading and quality appraisal
Database	Cochrane Database
Search Terms	Disaster
Limitations	Nil
Findings	157
Heading and Key word review	19 articles selected for abstract review
Abstract review	9 articles were selected for full reading and quality appraisal
Database	ERIC Via ProQuest (Educational Resource Information Centre)
Search Terms	Disaster Planning or Disaster Preparedness or disaster training or disaster professional development and evaluation or outcomes of education and health professionals or nurses or medical or doctors or allied health or hospital staff or ancillary staff
Limitations	Published after January 1 st , 1980, English language, human subjects
Findings	20
Heading and Key word review	1 article selected for abstract review
Abstract review	1 article was selected for full reading and quality appraisal
Database	ProQuest Social Sciences Journals

Search Terms	Disaster Planning or Disaster Preparedness or disaster training or disaster professional development and evaluation or outcomes of education and health professionals or nurses or medical or doctors or allied health or hospital staff or ancillary staff
Limitations	Published after January 1 st , 2009, review, literature review, data, reference document, peer review, English language
Findings	2019
Heading and Key word review	25 articles selected for abstract review
Abstract review	6 articles were selected for full reading and quality appraisal
Studies from all databases for full reading and quality appraisal (After duplicates removed)	157
Total after articles removed based on relevance to topic * Or if Quality appraisal (MMAT Score less than 50%) **	35 included in literature review, plus 1 research article recommended by supervisor = 36

*Not research articles, not focused on preparation of health professionals or support staff

** 50% MMAT score determined after consultation with supervisors / Integrative review.

2.3 Results

Thirty-six articles were selected to be included in the literature review. Of the 36 articles 16 were rated at 50%, 15 were rated at 75% and 5 were rated at 100%. Of the 36 primary research articles, 28 were quantitative, eight were qualitative and there were no mixed method studies. There is a lack of overall quality of research investigating preparation of health professionals and support staff for disasters. Table 2.2 shows the quality appraised scores of the literature included in the review.

Table 2.2 Quality Appraised Scores of Research included in the Literature Review

Mixed Method appraisal score (Score is a percentage)	Number of research articles
• 50%	16
• 75%	15
• 100%	5

Only two of the quantitative research evaluating disaster preparedness interventions, were randomised controlled trials (RCT) (Andreatta et al. 2010; Nyamathi et al. 2010). The RCT conducted by Andreatta et al., (2010) was small study of 14 Emergency residents. The RCT conducted by Nyamathi et al., (2010) although larger, included participants were selected from one university. Whilst in both RCTs, groups were randomised into a control or intervention group, the results are not generalizable due to the potential bias created by the small sample size or the selection of participants from only one university) (Andreatta et al. 2010; Nyamathi et al. 2010).

Most quantitative studies evaluating disaster preparation were pre and post-test studies or post-test studies, using a convenience sample and a single cohort. These studies generally demonstrate that any intervention improves perceived disaster preparedness, knowledge or intended behaviour in disasters exercises or post-tests. The weakness of these studies is that they involve a single non-randomly selected sample, and the interventions cannot be compared to other interventions for effectiveness. Therefore, the results cannot be generalizable due to the non-random selection and single group design. The interventions cannot be validated as they were not compared to a control group (Abatemarco et al. 2007; Baez et al. 2005; Bartley, Fisher & Stella 2007; Chiu, Polivka & Stanley 2012; Collander et al. 2008; Gershon et al. 2009; Glow et al. 2013; Olson et al. 2010; Pryor et al. 2006; Qureshi et al. 2004; Reznick et al. 2003; Robison 2002; Subbarao et al. 2006; Thomas 2008; Thorne et al. 2004; Wetta-Hall et al. 2007; Worrall 2012).

Other quantitative studies were surveys or tests which evaluated the health professionals or support staff's attitudes, knowledge, perceived knowledge or intended behaviours towards disasters. The studies were generally non-randomised convenience samples, so it is necessary to use caution applying these learnings to disaster preparedness at other sites (Al Khalaileh, Bond &

Alasad 2012; Baack & Alfred 2013; Burke et al. 2011; Fung, Loke & Lai 2008; McKibbin 2010; Melnikov, Itzhaki & Kagan 2014; Tebruegge et al. 2010).

Eight of the research articles included in the literature review are qualitative articles. Three were questionnaires or surveys, three were interviews and two involved focus groups. Whilst the themes identified in these studies will be outlined later, a strength of these studies were that they were able to identify data on the preparedness needs of health professionals, including those that had participated in disasters or from those considered to be experts (Ablah et al. 2008; Djalali et al. 2014; Hawley et al. 2007; Nasrabadi et al. 2007; Pitts et al. 2009; Wetta-Hall et al. 2006; Willems et al. 2013; Yang et al. 2010). Table 2.3 summarises the methodology and methods used in studies included in the review.

Table 2.3 Methodology and Methods used in Included Research Studies

Methodology and Methods	Number of Studies
Quantitative	28
Randomised Control Trial (RCT)	2
Pre-post-test (Single group or non-randomised)	13
Post-test (single group or non-randomised)	3
Survey / questionnaire (no intervention)	10
Qualitative	8
Survey	3
Interviews	3
Focus groups	2

Whilst the quality of the primary research could be improved through better design, important key themes have been extracted. First, there is evidence that health professionals and support staff are underprepared for disasters. This evidence is from studies that both question preparedness of staff and also those pre and post-test studies that indicate at pre-test that staff have low perceived or actual knowledge regarding disasters (Abatemarco et al. 2007; Arbon et al. 2013; Baack & Alfred 2013; Baez et al. 2005; Collander et al. 2008; Fung, Loke & Lai 2008;

Hawley et al. 2007; McKibbin 2010; Melnikov, Itzhaki & Kagan 2014; Nasrabadi et al. 2007; Qureshi et al. 2004; Thorne et al. 2004; Worrall 2012; Yang et al. 2010).

The content and methods of disaster preparedness have also been extracted from research studies. The content of disaster preparedness programs has been evaluated in regards to the knowledge or skills health professionals believe they need, either in anticipation for or following disasters. Broadly, some studies identified that both disaster clinical and technical skills combined with structural disaster knowledge, are important (Bartley, Fisher & Stella 2007; Collander et al. 2008; Pryor et al. 2006; Thorne et al. 2004; Wetta-Hall et al. 2006). Some studies focused on only clinical or technical disaster preparedness (Fung, Loke & Lai 2008; Wetta-Hall et al. 2007; Willems et al. 2013; Yang et al. 2010). Additionally, some studies identified that content could be based on national or international competencies (Ablah et al. 2008; Chiu, Polivka & Stanley 2012; Djalali et al. 2014; Qureshi et al. 2004; Willems et al. 2013). The methods include online learning, didactic, self-learning, disaster exercises or blended learning involving more than one method of teaching or learning. All of the methods of preparation led to an improvement in perceived disaster preparedness, disaster knowledge or attitudes (Abatemarco et al. 2007; Andreatta et al. 2010; Baack & Alfred 2013; Baez et al. 2005; Bartley, Fisher & Stella 2007; Chiu, Polivka & Stanley 2012; Collander et al. 2008; Fung, Loke & Lai 2008; Gershon et al. 2009; Glow et al. 2013; Hawley et al. 2007; Nyamathi et al. 2010; Olson et al. 2010; Pryor et al. 2006; Qureshi et al. 2004; Reznick et al. 2003; Subbarao et al. 2006; Thomas 2008; Thorne et al. 2004; Worrall 2012).

To measure knowledge or disaster preparedness studies predominantly used surveys or interview guides which were developed by the researchers. Two pre-developed tools were used and repeated in the quantitative research, to measure preparedness or perceived preparedness for disasters. One tool, the “Emergency Preparedness Information Questionnaire” (EPIQ) focused on the measurement of perceived preparedness of nurses for disasters (Baack & Alfred 2013; McKibbin 2010; Worrall 2012). A second tool, the “Simple triage and rapid treatment System” (START), focused specifically on measuring performance during disaster triage for health professionals (Andreatta et al. 2010; Baez et al. 2005).

Primary research articles also measured attendance at work during disasters or perceived willingness to attend work for health professionals and support staff. The factors influencing this can vary and are outlined in section 2.4.3. This is important to consider as research indicates that significant numbers of staff may not attend work during disasters, which will influence the capacity of health systems to effectively manage disasters (Abatemarco et al. 2007; Arbon et al.

2013; Baack & Alfred 2013; Burke et al. 2011; Fung, Loke & Lai 2008; Gershon et al. 2009; Melnikov, Itzhaki & Kagan 2014; Qureshi et al. 2004; Tebruegge et al. 2010; Thorne et al. 2004).

2.4 Discussion

The discussion will describe and discuss the findings of the reviewed research studies. The key findings within the published literature has been analysed in terms of health professionals and support staff preparedness, the content of disaster preparation, methods of disaster preparation, tools or methods to test knowledge and the willingness for health professionals and support staff to work during disasters.

2.4.1 Health Professional and Support Staff Preparedness

For health professionals and support staff to be able to respond to disasters effectively, it is essential that they have the knowledge and skills to respond effectively (Arbon et al. 2013; Baack & Alfred 2013; Burke et al. 2011; Fung, Loke & Lai 2008; Gershon et al. 2009; Melnikov, Itzhaki & Kagan 2014; Qureshi et al. 2004; Tebruegge et al. 2010; Thorne et al. 2004). Research studies indicate that health professionals and support staff may not be adequately prepared for disasters. Studies often cite an increased focus on disaster preparedness following the terrorist attacks of September 11, 2001, so this under-preparedness may be despite an increased focus in recent years. Most research conducted has evaluated nursing, medical, public health or ambulance staff, so there is less known about other health professionals and support staff preparedness or disaster knowledge (Abatemarco et al. 2007; Al Khalaileh, Bond & Alasad 2012; Baack & Alfred 2013; Baez et al. 2005; Collander et al. 2008; Fung, Loke & Lai 2008; Hawley et al. 2007; McKibbin 2010; Melnikov, Itzhaki & Kagan 2014; Nasrabadi et al. 2007; Qureshi et al. 2004; Thorne et al. 2004; Worrall 2012; Yang et al. 2010; Zhiheng et al. 2012).

The level of preparedness or perceived level of preparedness for health professionals and support staff also varies depending on the type of disaster as responses needed for various types of disasters can be different. Several surveys of nursing and medical staff in the United States of America (USA), Jordan, China, Hong Kong and Israel indicate that perceptions of preparedness can be low for disasters in general or health professionals and support staff can feel less prepared for one type or with some aspects of disaster management (Al Khalaileh, Bond & Alasad 2012; Baack & Alfred 2013; Collander et al. 2008; Fung, Loke & Lai 2008; McKibbin 2010; Melnikov, Itzhaki & Kagan 2014; Thorne et al. 2004; Worrall 2012; Zhiheng et al. 2012). Three studies which all used the emergency preparedness information questionnaire (EPIQ) designed

to evaluate perceived preparedness among nurses among a range of disaster situations, identified that whilst preparedness was generally low, nurses felt less prepared for biological disasters and quarantine procedures (Baack & Alfred 2013; McKibbin 2010; Worrall 2012).

The perceived or actual knowledge or skills required for disasters may be inadequate, even for tasks which may be considered routine during normal care. EMTs felt unprepared to use a respiratory mask during a bioterrorism exercise and physicians, and nurses were unable to accurately triage trauma patients using the START system during exercises. These skills will be required during usual practice, and it is critical that health professionals and support staff also are prepared to use these skills in the disaster situation, when the outcomes of not being prepared may be more significant (Abatemarco et al. 2007; Baez et al. 2005).

The skills needed to care for patients in the disaster situation can be different to routine settings, including registered nurses who may be used to working in emergency environments, (Nasrabadi et al. 2007; Yang et al. 2010). During care in remote locations following earthquakes, registered nurses can feel overwhelmed and underprepared to provide the care required. Following earthquakes, the injuries can be beyond the scope of normal emergency nursing care. Narbada et.al., (2007) identified that Iranian nurses felt they had a lack of knowledge in every situation they confronted, including victims with multiple fractures, prioritising the many life-threatening situations and the lack of equipment in the field. Yang et al (2010) also identified that the nurses were not used to working with minimal equipment (Nasrabadi et al. 2007; Yang et al. 2010).

Beyond the standard physical care and technical skills, being prepared for the psychological effects on the community of disasters is important (Hawley et al. 2007; Thorne et al. 2004; Yang et al. 2010). During disasters it may be necessary to work outside normal practice areas and with disciplines and specialists that one does not normally work with. Health professionals and support staff should also be prepared for the psychological aspects of disasters (Hawley et al., 2007, Yang et al., 2010). One study of multidisciplinary public health professionals reported that 57% had no preparation with regard to mental health emergencies (Hawley et al. 2007).

Generally, when preparing for disasters staff may focus on the skills required to undertake the technical or clinical tasks or focus on their understanding of disaster communication structures or networks. It is important that staff are also prepared to care for themselves and their families during disasters. In one study of support or ancillary staff, the main concern even following training was how to tell their family members that they would be involved in providing disaster care (Thorne et al. 2004). Staff may need to walk for hours, carrying equipment to get to the

disaster zone and then sleep-in tents, use improvised bathroom facilities, and eat food from ration packs. Physical fitness and preparation in disaster scenarios would likely improve performance in these situations (Willems et al. 2013; Yang et al. 2010).

The literature published to date, indicates that, despite an increased focus on disaster preparedness in recent times, health professionals and support staff could improve their preparedness for the safety of our community and the health care workers. There is a need to evaluate the preparedness of health professionals and support staff to determine their level of preparedness for disasters of various types. It is vital to understand the preparedness of all health care disciplines, which may be required to provide disaster care (Abatemarco et al. 2007; Fung, Loke & Lai 2008; Thorne et al. 2004).

2.4.2 Disaster Content

Disaster education programs outlined and evaluated in the research literature can be broadly divided into programs which are based on established competencies (Ablah et al. 2008; Chiu, Polivka & Stanley 2012; Djalali et al. 2014; Qureshi et al. 2004; Worrall 2012), programs which cover clinical or technical knowledge (Abatemarco et al. 2007; Baez et al. 2005; Wetta-Hall et al. 2007) and programs which cover clinical or technical knowledge and disaster structural knowledge (Ablah et al., 2008; Bartley et al., 2007; Chiu et al., 2012; Collander et al., 2008; Glow et al., 2013; Pryor et al., 2006; Qureshi et al., 2004; Reznick et al., 2003; Thomas, 2008; Thorne et al., 2004; Wetta-Hall et al., 2006; Worrall, 2012). An additional area of content, which has not been evaluated in the quantitative research literature evaluating disaster courses, is that of non-clinical and non-technical skills or abilities that can enhance the performance of health professionals during disasters. These skills could be described as the human skills, including resilience, teamwork, physical fitness that enable health professionals to work well in disasters (Willems et al., 2013; Yang et al., 2010)

Established Competencies.

The benefit of providing training or education to health professionals with content which is based on national or international standards or competencies are outlined in three quantitative studies (Chiu et al., 2012; Qureshi et al., 2004; Worrall, 2012) and two qualitative studies (Ablah et al., 2008; Djalali et al., 2014).

Training programs based on national standards or competencies to prepare staff can have benefits for both the community and health professionals and support staff. The community needs to be aware that they are safe to receive care from health professionals or facilities at all

times, including during disasters (Djalali et al., 2014). Health professionals also benefit when they have defined standards to learn and work from. If a different level of care is to be provided during times of disaster, then it will protect both the health professional (and the community) if this level of care is advocated as part of training or preparation based on national standards or competencies (Chiu et al., 2012; Djalali et al., 2014; Qureshi et al., 2004).

A useful example to highlight this is the example of triaging patients during pandemics or mass casualty disasters. If patients with a usually serious medical condition, are given a lower triage priority during disasters, as it is in the interests of the whole community to ration health care, then it is best that this is based on a national competency rather than the individual clinical opinion of individuals or institutions. In studies based in community health centres, an education program based on disaster nursing competencies from the Centres for Disease Control, lead to an improvement in post-test knowledge of public health nurses. This improved knowledge based on recognised standards can assist safeguard both the community and the nurses (Chiu et al., 2012; Qureshi et al., 2004). To further enhance the care which can be provided during disasters it is important that standards can be modified for local practice if it further improves. For example, in educational focus groups conducted in New York Community health centres, certain standards were omitted, and others were further expanded to meet local care needs (Ablah et al., 2008).

Whilst it may be acceptable to modify national standards to enhance care, it is important that these standards are not disregarded during disaster situations. A study which sent open ended survey questions to world disaster experts highlighted some practices in Haiti (and other international disasters), including national teams, charities or non-government organisations that were poorly prepared and operating below accepted clinical practice. Some teams did not have appropriate equipment or personnel to carry out the tasks they said they could do. It was noted that the Haiti community did not know which hospitals or teams they could trust as some teams were not sterilising equipment between uses (Djalali et al., 2014). It is important that during times of disaster that health professionals and support staff are prepared for and perform to national or international standards.

Clinical and Technical Skills

To assist individual patients during disasters, health professionals and support staff need the clinical skills to provide care to patients (Abatemarco et al., 2007; Baez et al., 2005; Wetta-Hall et al., 2007). There are also many pre and post-test quantitative single cohort studies which

suggest training programs provide useful information for health professionals related to clinical or technical skills.

Triage is an example of a clinical skill which is important during mass casualty disasters, where multiple patients will simultaneously need treatment. Being able to effectively triage patients means that the greatest number of patients will receive lifesaving treatment within the time frame required by each disease or condition (Baez et al., 2005). Training programs designed to improve disaster triage for nursing, EMT or medical residents significantly improved triage accuracy in post-test or virtual reality simulated exercises in three studies (Andreatta et al. 2010; Baez et al. 2005; Robison 2002). Triage and other clinical skills, including hydration and pain management were improved by 30% in a post-test following disaster burns care education (Wetta-Hall et al., 2007). Whilst there is no research demonstrating improved performance in real disasters, if clinicians applied the learnings to a real disaster lives would be saved.

A second example of a clinical skill which would be essential to reduce mortality and morbidity during bioterrorism or a pandemic is wearing of masks and other personal protective equipment (PPE) by paramedics and emergency medical technicians (EMTs). Following the respective educational programs designed to provide information on when to wear PPE, paramedics and EMTs scored significantly higher in post-test studies evaluating decisions on when and how to wear masks. Both studies also demonstrated an improvement on the intention of the health care workers to report to work (Abatemarco et al., 2007; Gershon et al., 2009). If these results were translated to a real-life disaster situation the lives of health workers and the community would be saved, through less transmission of pandemic or bioterrorism organisms.

Combined Clinical and Technical Skills and Disaster Management Structures

Courses which cover both clinical and disaster structural knowledge can increase the post test scores of the participants (Ablah et al., 2008; Bartley et al., 2007; Chiu et al., 2012; Collander et al., 2008; Glow et al., 2013; Pryor et al., 2006; Qureshi et al., 2004; Reznick et al., 2003; Thomas, 2008; Thorne et al., 2004; Wetta-Hall et al., 2006; Worrall, 2012). It is important that health professionals and support staff are prepared in both the structural aspects of disasters management, including communication lines during disasters or one's role within disasters and the technical or clinical skills, including triage. Some research evaluated participants' perceptions or knowledge who have attended preparedness courses which focus on both clinical, technical and disaster management structures. Whilst this is positive it is important to note studies were not randomised and there were no control groups. Also, the course content is often based on nonstandard competencies (Ablah et al., 2008; Bartley et al., 2007; Chiu et al., 2012; Collander et

al., 2008; Glow et al., 2013; Pryor et al., 2006; Qureshi et al., 2004; Reznick et al., 2003; Thomas, 2008; Thorne et al., 2004; Wetta-Hall et al., 2006; Worrall, 2012). Whilst clinical or technical skills required can vary significantly between professions and types of disasters an additional benefit of also teaching the disaster structural information is that the health professionals and support staff will have some knowledge of their role within the organisation. Knowing who to communicate with and where to source resources from for all types of disasters is necessary (Collander et al., 2008). Disaster preparation may encourage health professionals to have improved collaboration with other health workers once they understand their respective clinical and structural roles within disasters (Wetta-Hall et al., 2006).

Preparing non-clinical staff in both the technical skills required during disasters and the structure of how the hospital will operate during disasters can be beneficial (Thorne et al., 2004). The content may vary depending on the role of the employee. Support staff with direct patient contact, comprising patient care orderlies or medical assistants, benefit from understanding the PPE required to protect themselves and others from contamination during biological terrorism, hospital chaplains with an understanding of bioterrorism can enhance their role in supporting staff during a disaster and engineers need to know about water borne or air borne bioterrorism threats as they control air and water systems in the facility. Generally, all groups need to know about disaster communication structures, involving communication lines. An example of this is understanding their role in communicating with the media (or not), given that media is often present during disasters. Providing this preparation before disasters occur can promote the ability and willingness of support staff to work during disasters (Thorne et al., 2004). Thorne et al (2004) was the only one study identified that evaluating the preparation provided to support staff. This study gives some insight to the benefits of preparation in either technical knowledge or skills and disaster management structures for support staff.

Non-Clinical or Non-Technical Skills

The disaster preparedness courses evaluated in the literature did not cover the non-clinical, non-technical or non-structural disaster knowledge or skills. Non-clinical or non-technical skills are important to provide to health professionals and support staff if they are to function effectively during disasters. Qualitative research reviewed has enabled health professionals to answer open ended questions and has highlighted some important skills (Nasrabadi et al. 2007; Pitts et al. 2009; Willems et al. 2013; Yang et al. 2010).

Following disasters when nurses and surgeons are working in the outside of health care facilities, in remote area, physical fitness is essential to provide effective care (Yang et al., 2010). It is also

important that health professionals can think critically be able to solve problems and provide care with minimal equipment and resources normally available in health care facilities (Nasrabadi et al., 2007; Willems et al., 2013; Yang et al., 2010).

“Austere environment skills” require health professionals to maintain their own health, whilst living in rough conditions which may include sleeping in tents, digging a latrine and undertaking practical hygiene should showers not be available (Willems et al. 2013). The ability to work well within a team, work with different occupational groups and stay positive in difficult circumstances are essential if the health professionals are to protect their own wellbeing and provide optimal care for the community (Nasrabadi et al. 2007; Pitts et al. 2009; Willems et al. 2013). It is important to prepare health professionals and support staff to develop these non-clinical and non-technical skills if health professionals and support staff are going to function effectively during disasters and prevent mortality and morbidity.

2.4.3 Disaster Preparation or Training Methods

Multiple or blended methods of training

Blended training methods can improve the performance and knowledge of health professionals and support staff. It is possible to impart or receive different types of knowledge or skills using different delivery methods (Abatemarco et al. 2007; Chiu, Polivka & Stanley 2012; Collander et al. 2008; Glow et al. 2013; Pryor et al. 2006; Qureshi et al. 2004). As it is unpredictable when disasters will occur, disaster exercises allow staff to practice for disasters which can enhance decision making, practical skills and promotes collaboration between staff and external agencies. Exercises can be costly and labour intensive. Despite the costs and labour resources needed, exercises can be effective particularly when paired with other forms of training. Most exercises also include handouts, plans or didactic lectures to brief participants (Collander et al. 2008; Glow et al. 2013; Pryor et al. 2006).

Exercises involving nurses, physicians, administrators and EMTs who completed functional exercises and didactic lectures were evaluated in a pre / post-test single cohort studies. Scores for these participants significantly increased in post-tests which included measures of triage, communication and incident command knowledge (Collander et al. 2008; Glow et al. 2013; Pryor et al. 2006). Practical learning combined with didactic lectures can also be effective to teach simple practical skills for health professionals. An example cited in the literature demonstrated the benefits in post test scores of EMTs, who knew when and how to fit-test masks when to responding to bioterrorism. Without the theory EMTs may not know when to apply masks and

without the practical, they may not know how to safely fit masks (Abatemarco et al. 2007). These studies indicate that blended learning including didactic lectures or workshops and exercises or practical learning can be effective to prepare health professionals for disaster scenarios.

Another example of blended learning which can be used to prepare health professionals for disasters is the use of didactic lectures or training which is supported by another form of predominantly theoretical learning (Chiu, Polivka & Stanley 2012; Qureshi et al. 2004). In two single cohort pre and post-test studies involving public health nurses, participants received didactic training supported by either online learning modules or handouts of sample plans and competency expectations. Post-tests in both studies indicated the programs had improved the confidence and knowledge public health nurses had to respond to disasters (Chiu, Polivka & Stanley 2012; Qureshi et al. 2004). Lectures, in-services, workshops, handouts, and more recently online learning modules are common forms of preparation which can assist prepare staff for disasters.

The criticisms of didactic courses, workshops, discussions, and disaster exercises are that they can be expensive and labour intensive to conduct. This expense is particularly the case when highly paid health professionals or academics, are the students or facilitators. Clinicians, academics and other health professionals and support staff are also generally busy and managing the time to leave the workplace to attend lectures or exercises may not be practical. It has become increasingly common for health services to promote self-learning to prepare their staff (Bartley, Fisher & Stella 2007).

Self-Directed Learning

Self-directed learning, using books, videos or computer based online learning may have time and cost advantages, provided educational needs are also met or exceeded. Most studies that have been completed have been pre / post-test single cohort studies, measuring primarily physicians, nurses and EMTs. All studies have demonstrated improved outcomes following participants undertaking the self-learning activity (Andreatta et al. 2010; Baez et al. 2005; Bartley, Fisher & Stella 2007; Nyamathi et al. 2010; Olson et al. 2010; Thomas 2008; Thorne et al. 2004; Worrall 2012).

One study conducted by Thorne et al. (2004), is significant as it compares four non-randomly assigned groups undertaking different versions of disaster training and it focusses on support staff. Participants were assigned to four groups: workbook, video, lecture, and small group

discussion. The workbook and video were self-directed learning, and the lecture and small group discussion were instructor guided. All groups recorded statistically significant improvements in attitude and knowledge questions. There was no significant difference in outcomes between the four learning groups. Therefore, the self-directed workbook or video are as effective as the two more expensive options which required an expert facilitator and group teaching (Thorne et al. 2004). Further research is needed given multiple participant variables that could affect outcomes.

Studies evaluated self-directed learning strategies include a hospital disaster education video, reading a government disaster manual and paper-based bioterrorism learning package. These strategies have been effective in improving post-test or survey outcomes for medical and nursing professionals (Bartley, Fisher & Stella 2007; Thomas 2008; Worrall 2012). The video which was designed for emergency medical registrars was 15 minutes in length and could easily be accommodated into the busy clinical workload (Bartley, Fisher & Stella 2007). The government disaster manual was a pre-existing document and therefore the cost of supplying to the emergency nurses in the study would be minimal (Worrall 2012). This finding highlights that preparedness for health professionals and support staff can be both cost effective and realistically scheduled into a clinician's busy workload, whilst still providing required learning outcomes.

Self-learning involving online, or virtual reality can also be effective for health professionals to prepare for disasters. Online learning or virtual reality can replace or partially replace the need for actual disaster exercises or other forms of training or preparedness that may be labour intensive and expensive to repeatedly deliver within health care (Andreatta et al., 2010; Baez et al., 2005; Nyamathi et al., 2010; Olson et al., 2010).

A RCT conducted by Andreatta, et al. (2010) with emergency medicine residents compared pre and post-tests results and triage performance of participants in a live disaster drill and a virtual reality disaster drill with identical parameters. Both virtual reality and live exercises improved disaster performance with no significant difference (Andreatta et al., 2010). A non-randomised study conducted by Olson, et al, (2010) to measure the performance of nurses and disaster management graduates effectively measured disaster performance between groups using online gaming simulation (Olson et al., 2010).

Online learning packages can also improve disaster knowledge. Nyamathi et al. (2010) randomly assigned registered nurses to either a computerised bioterrorism learning program or a standard (paper based) bioterrorism learning program. Both groups improved in post test scores and

there was no significant difference between groups (Nyamathi et al., 2010). The second research study evaluated participants who completed two 15-minute online modules on disaster triage with 55 physicians and EMTs (Baez et al., 2005). There was a significant improvement in both post-test knowledge and correct triage of patients in a scenario (Baez et al., 2005).

Studies like these highlight that using computerised simulation disaster exercises or online educational modules can be an effective way to both educate and evaluate the performance of health professionals for disasters. Once programs have been set up, they can provide a practical way for health professionals to learn, practice and evaluate their disaster management knowledge, without the need for expert clinicians or disaster planners to facilitate exercises or other educational opportunities (Andreatta et al., 2010).

2.4.4 Tools and Methods to Test Knowledge or Preparedness.

Three studies used the EPIQ. This tool is designed to comprehensively assess a nurse's perceived knowledge of emergency preparedness and identify education and training needs. The tool has been used to measure perceived registered nurse competence for disasters in Wisconsin, Texas, South Carolina, and the United Kingdom (Baack & Alfred, 2013; McKibbin, 2011; Worrall, 2012). The benefits of the EPIQ tool which has been developed and validated in studies, adds to the reliability and transferability of results (Baack & Alfred, 2013; McKibbin, 2011).

Three studies within the literature review used the simple triage and rapid treatment (START) system to teach and then assess competence for clinicians (physicians, nurses and EMTs) in disaster triage (Andreatta et al., 2010; Baez et al., 2005; Glow et al., 2013). This tool is an algorithm designed to detect patients that have conditions that may cause them to die within one hour if not treated. Triage is considered a particularly important clinical skill to be used in disasters and it is important to have a tool that can be used to objectively measure competence (Andreatta et al., 2010; Baez et al., 2005; Glow et al., 2013).

It is important to have tools which can be used to evaluate disaster preparedness to ensure health professionals and support staff are prepared for disasters. These tools have their limitations as the EPIQ was designed to measure perceived competence in registered nurses and the START System only measures triage performance (Andreatta et al., 2010; Baack & Alfred, 2013; Baez et al., 2005; Glow et al., 2013; McKibbin, 2011). It could be important to have a tool suited to measuring the disaster preparedness of more health professionals and support staff and a wider range of actual knowledge and skills required.

2.4.5 Willingness to Participate in Disasters

During disasters health professionals and support staff may be even more important than in normal operational periods for health facilities. During infectious disease outbreaks, physicians, nurses, and other health professionals will be needed to treat patients, cleaners will be needed to assist maintain infection control and security guards may be needed to keep antiviral or antibiotics supplies safe. A significant percentage of health professionals and support staff may not be willing nor able to participate in disaster care should they be required. Some studies have estimated that between 30% to 80% of health care workers will not wish to attend work during disasters (Abatemarco et al. 2007; Baack & Alfred 2013; Burke et al. 2011; Fung, Loke & Lai 2008; Gershon et al. 2009; Melnikov, Itzhaki & Kagan 2014; Qureshi et al. 2005; Tebruegge et al. 2010; Thorne et al. 2004).

Whilst some factors that influence willingness to attend work cannot be changed, the type of disaster, preparation strategies including providing training, promoting organisational and personal planning can promote health professionals and support staff to attend work. Health professionals or support staff who have attended education, training or exercises in disaster management are more likely to attend work. This education includes disaster training in higher education programs or education in the workplace. Promoting universities and other education providers to include disaster management within undergraduate and post graduate courses and providing continuing education in the workplace, can promote health professionals and support staff to attend work during disasters (Arbon et al. 2013; Baack & Alfred 2013; Fung, Loke & Lai 2008; Gershon et al. 2009; Melnikov, Itzhaki & Kagan 2014; Qureshi et al. 2005; Tebruegge et al. 2010; Thorne et al. 2004).

Additionally, when staff believe their organisation has a plan, these mechanisms can provide adequate support and protection, promotes health professionals to attend work. This support and protection included providing adequate PPE, vaccination, or antiviral prophylaxis (Burke et al., 2011; Melnikov et al., 2014; Tebruegge et al., 2010). An additional factor related to planning that can influence willingness to attend work is when individuals have a plan for transportation to get to and from work and a plan for care of family members. Encouraging health professionals and support staff to have plans in place can enhance willingness to attend work during disasters (Arbon, 2013; Burke et al., 2011; Melnikov et al., 2014; Thorne et al., 2004).

There is some understanding of the preparation factors that will promote health professionals and support staff to attend work, including education, protection from harm and having a

personal plan for transport and care of family members (Baack & Alfred, 2013; Fung et al., 2008; Gershon et al., 2009; Melnikov et al., 2014; Pitts et al., 2009; Qureshi et al., 2005; Tebruegge et al., 2010; Thorne et al., 2004). It is imperative these factors are incorporated into disasters preparedness to assist prepare health care workers for disasters.

2.5 Conclusion

This literature review has searched the health databases for research pertaining to preparedness of health professionals and support staff for disasters. Following the review process, including fully reading articles and the use of the MMAT to appraise research, 36 research articles were included in the review. The main themes identified in the research literature are the current preparedness of health professionals and support staff, the content covered in disaster preparation, the methods of delivery of disaster preparation, tools used to measure disaster preparation and willingness to work during disasters.

It is evident that disaster medicine, nursing or health care is a relatively new discipline, which has gained traction since the terrorist attacks in New York on September 11, 2001. The search strategy of this literature review dated back to January 1, 1980, however the oldest research article in this review was published in 2003. Most research articles cited recent disasters, including September 11, 2001, within introductory sections. Disasters are not new phenomena, although it appears within the health disciplines, research to improve preparation may be new. Prior to conducting the search, it was expected to identify research identifying preparedness and response to the HIV / AIDS epidemic in the 1980s and the anticipated year 2000 (Y2K) computer issues. These topics were not common in the research literature.

There is a lack of quality research conducted. Of the studies included in the review only 5 were rated as 100% using the MMAT. Most quantitative studies used convenience samples of health professionals and a pre and post-test or survey to evaluate preparedness or the effectiveness of educational strategies to prepare health professionals. All research of this nature demonstrated improvements in preparation of the health professionals following implementation of a training program. Due to research design, this improvement is hard to validate and generalise. There were two RCTs included in the review, although both also had issues with methodology, including a small sample size for one, a convenience sample for the second and neither explained if blinding had occurred. Seven qualitative studies were included in the review which did produce rich data. In these qualitative studies, some issues with methodology resulted in only 2 being rated at 100% using the MMAT. It is vital that future research evaluating disaster

preparedness uses quality research design appropriate for the research to better inform preparedness.

The majority of studies were evaluating nurses, physicians, public health workers or EMTs. There is not much information about support staff or allied health professionals, comprising physiotherapists, pharmacists, dietitians, laboratory scientists, radiographers, or dentists, who all have important rolls to play in various disasters. It is essential to include the whole interdependent health care team in future research. For example, if cleaners are not available to maintain infection control, pharmacists to dispense medications, radiographers to provide emergency imaging or laboratory scientists to perform pathology testing or provide blood supplies, then the hospital staff will not be effective in managing disasters.

The majority of research into disasters focused on preparation for or evaluation of external disasters involving pandemics or other mass casualty incidents. No quality studies (MMAT of 50% or higher) focused on preparation for or evaluation of internal incidents comprising internal fire, floods or power failures affecting health services. Internal incidents are another important area for future research focus. It is essential to share experiences, outcomes and learnings from internal incidents to best identify how health professionals and support staff can prepare for these internal incidents Likewise, there was little research which evaluated how effective disaster preparation was for health professionals and support staff when working in actual disasters. As outlined earlier most measurement of learnings were post-tests. It could be important in future research to evaluate health professionals or support staff who have participated in actual disasters to identify what preparation was most useful for them.

Some studies evaluated the current level of preparedness of health professionals and support staff. Many studies have identified that in spite of an increased focus on disaster preparedness following September 11, 2001, and other disasters, including Avian Influenzas pandemics, health professionals and support staff perceive they are underprepared for disasters. This perception provides a base to indicate that more or more effective disaster preparedness is needed for health professionals and support staff.

Given the issues with research design it is currently difficult to determine what content or methods of delivery are most effective as generally all studies demonstrated improved outcomes. Important questions for future research will need to include what content should be delivered and how should the content be provided. It will be important to identify differences in the needs of health professionals and support staff and also differences in preparation required for different types of disasters.

Whilst watching a 15-minute educational video or a self-learning strategy may effectively prepare medical registrars for mass casualty incidents. It should be important to establish what is most useful for other types of workers and for other types of disasters or an all-hazards approach.

The measurement of effective disaster preparation is also important. The review identified two tools (the EPIQ and START) which have been used in multiple quantitative research studies cited in the review. Limitations of these have been outlined, although the advantages of having a validated tool have been acknowledged. A validated tool that measures a wider range of disaster competencies for a wider range of health professionals and support staff could be beneficial in measuring effectiveness of disaster preparation. An additional important measurement of disaster preparation will be performance in actual disasters. As discussed, earlier research focused on measuring performance during disasters could be a useful future goal.

In addition to exploring the best practice preparation for health professionals and support staff, the review also identified research indicating that a significant number of health professionals and support staff may be unwilling to attend work during disasters. One of the factors that can influence this willingness is effective disaster preparedness. For disaster preparation to be effective it will be important that staff attend work during actual disasters. Future research needs to consider how to best support health professionals and support staff to attend work during disasters.

Prior to conducting the literature review the research question for this thesis, focused on all health professionals and hospital-based support staff. It also had a focus on what preparation the health professionals and hospital support staff may undertake in any context. This context included working in community centres, in international development or even potentially preparedness they may undertake in their own communities. The question was “What are the best practice disaster preparedness methods for health professionals and hospital support staff?”

Following the literature review the research question was refined to limit the health professionals included in the question, to those who are based in hospitals. The focus of the question in relation to preparedness also changed recognising that whilst many health professionals and others may take responsibility for their own disaster preparedness, those that work within hospitals are likely to have their disaster preparedness supported and influenced by the disaster preparedness efforts of the hospital entity. The focus of the question changed to include how hospital managers, including hospital disaster managers, may support the

preparedness of their health professionals and support staff. The revised research question for this thesis as a result of reviewing the literature already completed and considering limitations in the already completed research, was “How can hospital managers support health professionals and support staff to best prepare for internal and external disasters? This recognised internal and external disasters and considering the variety of the health professionals and support staff that will be required prepare for and attend work during disasters.

There has been an increased focus on health disaster preparedness since September 11, 2001, and other recent disasters. There is still room for improvement in terms of best practice disaster preparedness for health professionals and hospital support staff.

2.6 Additional Relevant Research

This section of Chapter 2 discusses recent research published since the publication of the integrative literature review. The original literature review was limited in its scope to focus on key search terms to identify primary research identifying the best practice disaster preparedness for health professionals and support staff. The literature in this additional relevant literature section was initially identified by a search strategy with key words used in the original search strategy applied within the CINAHL and MEDLINE search engines. The search strategy was then extended beyond this considering learnings since the original review and developments over time. Through the experience of completing the integrative literature review and this research, it was noted that disaster preparation is closely aligned to how health professionals and support staff learn. A specific search using the key words ‘learning theories’ was applied, to obtain research including the evaluation of learning theories. Notably, the global pandemic of COVID-19 was having an impact on health care and disaster preparation. A specific search utilising the key words ‘disaster preparation and COVID-19’ was undertaken. Research was selected based on relevance to the topic.

This section focuses on learning theories relevant to how health professionals and hospital support staff learn and prepare for disasters. The section also considers research over the last 6 years, since the conclusion of the original review, focusing on newer developments and contexts. Research relating to the multidisciplinary team involvement in disaster preparation or response is presented and described. The COVID-19 pandemic has amplified the focus on disaster preparedness, as well as identified new or reinforced existing challenges with disaster preparedness. Research related to preparedness for COVID -19 is included in this section. The aim of the inclusion of this additional relevant published research, is to examine broader and

newer research to support the implementation of best practice disaster preparedness for health professionals and support staff.

2.6.1 Learning Theories

The healthcare workforce required for disaster management includes distinct occupations and professions, each with differing educational qualifications, backgrounds and work experience. Health professionals and hospital support staff are adult learners, and their experiences and qualifications can range from on-the-job training to new graduates health professionals and post graduate students and graduates (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Matics 2015).

The “Theory of Andragogy” developed by Knowles, describes that adults learn most effectively when they are self-directed, learning is based on prior life experience and focused on solving relevant problems (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Inal & Ozvaris 2017; Matics 2015; Milligan 1997). Knowledge or skills should be applicable to work or life. The motivation from learning is related to intrinsic rewards or based on what will be most meaningful to the adult learner, rather than acquiring the knowledge itself. Learning is more subjective than objective, as adult learners assimilate new knowledge and skills with their pre-existing knowledge to understand how the knowledge is relevant for them and how they understand the knowledge (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Milligan 1997). These key elements of Andragogy are relevant to how and why health professionals and support staff learn or prepare for disasters. The workforce is diverse with different knowledge and skills levels, some with and without prior experiences (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Matics 2015). Disaster are relevant “problems”, and the workforce has a responsibility to respond and resolve issues caused by the impact of disasters. Disaster education should aim to be interactive, engage questions and discussions. Sessions should be held in a real or simulated practice environment and correlate the problems associated with real life disaster (Inal & Ozvaris 2017). Professional and societal expectations further add to the motivation to learn about or prepare for disasters. The rewards of an effective response which saves life and health resources, can be equated to the intrinsic rewards, similar to why the workforce chooses employment in the health industry (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Milligan 1997). This “theory”, although many do not recognise andrology as a theory, accepts that learners will start with different knowledge levels, are self-directed and will most successfully learn when they accept the benefits of preparing for

disasters (Connell 2011; Galbraith & Simon-Galbraith 1984; Inal & Ozvaris 2017; Zigmont, Kappus & Sudikoff 2011).

Other learning theories pertinent to the health workforce and preparation for disasters included experiential learning and constructionist learning theories (Connell 2011; Gordon, Booth & Bywater 2010; Matics 2015; Zigmont, Kappus & Sudikoff 2011). In Kolbe's Experimental Learning Cycle adults learn in four phases (Matics 2015; Zigmont, Kappus & Sudikoff 2011). These phases are applicable to learning in simulations, although it is also recognised that learning occurs from real situations or experiences (Zigmont, Kappus & Sudikoff 2011). Following experiencing what is known as a "concrete experience", usually in a simulation or potentially a real situation including a disaster, adult learners further learn by reflecting on their performance during the simulation or the actual real-life event and secondly undertaking abstract conceptualisation where reflections are applied to abstract future simulations or life events (Matics 2015; Zigmont, Kappus & Sudikoff 2011). Learners then test their learning in real experiences or simulations if there are no real experiences, including disasters (Matics 2015; Zigmont, Kappus & Sudikoff 2011). Kolbe's Experimental Learning Cycle recognises the value of prior learning, experience, practical exercises or simulations, reflection and real experiences to enhance learning (Matics 2015; Zigmont, Kappus & Sudikoff 2011).

A similar theory to Kolbe's Experimental Learning Cycle, is Constructionist theory (Connell 2011 ; Gordon, Booth & Bywater 2010). Similar to experimental learning, Constructionist theory describes how adult learners develop or construct their knowledge through practical experiences, by reflecting on their past knowledge or experiences including mistakes made (Connell 2011 ; Gordon, Booth & Bywater 2010). The combined learning is greater than the knowledge gained from the exercise alone. Facilitators can further encourage learners to discover things for themselves which enhances to the overall learning for the adults (Connell 2011 ; Gordon, Booth & Bywater 2010). Constructionist theory acknowledges that the generation of new knowledge will occur as group knowledge and also simultaneously as individuals develop knowledge. A group and the individuals within the group would then share their learnings with the group. This sharing of information assists to close any knowledge gaps for both the group and individual (Connell 2011 ; Gordon, Booth & Bywater 2010).

The theory of Pedagogy, is described as a theory of how children learn, where the learner is depended on the teacher for information (Galbraith & Simon-Galbraith 1984). Pedagogy has benefits for health workers in limited situations, including some aspects of disaster preparation. Pedagogy style instruction can benefit when teaching new or complex skills and when the adult

learner has little existing understanding of requisite skills. For example, how to use a new piece of medical equipment or creating awareness of the possibility for a disaster, may be suitable to pedagogy style instruction including didactic instruction (Galbraith & Simon-Galbraith 1984; Inal & Ozvaris 2017). There should be the understanding that once the learner has enough knowledge to be self-directed then this should occur (Galbraith & Simon-Galbraith 1984). Using pedagogical techniques can only form part of disaster preparation. If the pedagogical approach used is to provide a lecture or information, then this should be combined with andragogical techniques including facilitating questions, brainstorming and equating the information with real life (Inal & Ozvaris 2017).

What the three adult learning theories described have in common is the acknowledgement of prior knowledge and experience that adult learners have, the value of practical, problem based or real-life learning and reflecting on learning experiences to improve overall learning (Connell 2011; Galbraith & Simon-Galbraith 1984; Inal & Ozvaris 2017). Pedagogy is necessary with aspects of disaster preparedness for adult learners, particularly those with limited starting knowledge (Galbraith & Simon-Galbraith 1984; Inal & Ozvaris 2017).

2.6.2 Multidisciplinary Disaster Preparedness Research

The inclusion of a range of health professionals and hospital support staff in research providing more understanding of the effective methods of preparedness is crucial to best prepare hospitals or health systems for disasters. Additionally, studies conducted by diverse health professionals and other researchers can provide insight and varied perspectives on disaster preparedness.

Most recent research includes medical practitioners and registered nurses as participants in studies evaluating methods of disaster preparedness or the readiness for disasters (Al-Ali & Abu Ibaid 2015; Al Thobaity, Williams & Plummer 2016; Amberson, Wells & Gossman 2020; Amin et al. 2020; Asemahagn 2020; Brewer et al. 2020; Goniewicz et al. 2021; Khanna et al. 2020; King, Spritzer & Al-Azzeh 2019; Oztekin et al. 2016; Sangkala & Gerdtz 2018; Usher et al. 2015). These studies provide valuable insight into the preparedness of the nursing and medical workforce. Illustrating this finding, the study by Amberson et al. (2020), involved a face-to-face and online education program for emergency department nurses that resulted in post-test disaster knowledge scores for the nurses.

Research provides insight into the preparedness of the multidisciplinary health care team, including a range of health professionals and hospital support staff. Studies have focused on

nurses, medical practitioners, allied health professionals and hospital support staff as participants and provide awareness into how the health workforce can learn together or separately to prepare for disasters (Carlos et al. 2015; King, Spritzer & Al-Azzeh 2019; McCourt et al. 2021; Neupane et al. 2020). These studies demonstrated knowledge and skills of different occupations with regard to disaster preparedness and attributable reasons. In one study army medics were better prepared than army nurses and medical practitioners, due to greater participation in disaster exercises (King, Spritzer & Al-Azzeh 2019). When measuring knowledge regarding prevention, diagnosis and treatment for COVID-19, dentists were the most knowledgeable, medical students the least knowledgeable and nurses, allied health professionals and medical practitioners all had similar and adequate knowledge levels (Neupane et al. 2020). It is also important to understand if the range of health professionals are likely to attend work during disasters. When investigating the level of preparedness for COVID-19 and likelihood that medical practitioners, nurses, midwives, laboratory staff and pharmacists would attend work in Ethiopia, it was identified that 40% were not prepared for managing COVID -19 patients and 20% indicated that would not attend work (Zewudie et al. 2021). It is also important to understand the levels of preparedness for health professionals. Pharmacists can perform a range of services during disasters including ensuring the ongoing supply of essential medications and providing immunisations. Research investigating Australian hospital and community pharmacists, identified that no participants had completed disaster preparedness training and 46% of participants indicated they were not prepared for disasters. Of the 23% who advised they were prepared; they had all experienced previous disasters. Participants argued that whilst disaster experience was important for disaster preparation, so is a foundation in disaster education and support within the community (Mccourt et al. 2021). Studies which provide an understanding of the preparedness of the multidisciplinary health care team are important as they can identify gaps in preparedness and also factors that can assist improve the preparedness for disasters of the multi-disciplinary health care team (Mccourt et al. 2021).

Research involving multi-disciplinary health professionals and hospital support staff as participants and investigators has enabled greater understanding of the roles the health workforce can perform; what disaster preparation is required and what resources are needed (Haire, Brown & Wiggins 2020; Maklada et al. 2020; Ridley, Freeman-Sanderson & Haines 2020; Sharififar et al. 2020; Wurmb et al. 2020). It has been demonstrated that physiotherapists, occupational therapist and the allied health assistants can effectively provide patient care support to palliative care patients during the COVID-19 pandemic, while patients were not permitted to have visitors (Haire, Brown & Wiggins 2020). This patient care support made use of

transferable knowledge and skills including communication (Haire, Brown & Wiggins 2020). Following a 20 minute training session, hospital orderlies and volunteers demonstrated that they could manually ventilate patients for 6 hours in the absence of adequate numbers of functioning ventilators (Maklada et al. 2020). Hospital scientists were able to provide advice on practices and resources needed for hospitals to prepare for bioterrorism (Sharififar et al. 2020). These studies demonstrate that different members of the multidisciplinary team can effectively contribute to disaster preparation and response (Haire, Brown & Wiggins 2020; Maklada et al. 2020; Sharififar et al. 2020).

A critique of a study preparing for a surge in intensive care unit (ICU) patients related to COVID-19 lead by allied health professionals from dietetics, speech pathology and physiotherapy, identified issues with prior planning not considering the contribution of allied health professionals in ICU care (Ridley, Freeman-Sanderson & Haines 2020). The research being critiqued predicted the capacity increase in ICU beds in Australia during the COVID-19 pandemic by considering the numbers of ventilators, ICU beds, medical practitioners and registered nurses that could be available. There was no consideration for the impacts of a patient surge on allied health professional staffing numbers, including dietitians, speech pathologist and physiotherapists, who the authors argued are also essential for ICU patients (Ridley, Freeman-Sanderson & Haines 2020). A similar omission was made in predicting German ICU capacity for COVID -19. A discussion paper preparing hospital critical care units for COVID-19 pandemic in Germany, indicated the need to train medical and nursing professionals from other specialties to work in ICU, although did not consider other disciplines (Wurmb et al. 2020). The value of disaster research involving the multidisciplinary team has been highlighted by recent research. These studies provide insight into disaster preparedness needs and attendance at work, for medical, nursing, allied health professionals and hospital support staff (Carlos et al. 2015; Haire, Brown & Wiggins 2020; Maklada et al. 2020; McCourt et al. 2021; Ridley, Freeman-Sanderson & Haines 2020; Sharififar et al. 2020; Wurmb et al. 2020).

2.6.3 Modes of Delivery, Content and Evaluation of Disaster Preparedness

Evaluations of practical exercises or didactic instruction do comprise the majority of recent research and appear to be the most common form of disaster preparation (Aljahany et al. 2021; Chiang et al. 2020; Maklada et al. 2020; Noh et al. 2020). Findings demonstrate preparation is effective in improving disaster performance or measuring knowledge and skills for nurses, emergency department health care practitioners and support staff (Aljahany et al. 2021; Chiang et al. 2020; Maklada et al. 2020; Noh et al. 2020). Blended learning involving a combination or

lectures, tutorials and practical exercises or demonstrations are also effective in improving performance for nurses, medical practitioners and hospital scientists (Carlos et al. 2015; Pesiridis et al. 2015). Learning consisting of lectures, tutorials, discussions and online learning also improves disaster knowledge for nurses working in emergency department or disaster settings (Amberson, Wells & Gossman 2020; Farra, Smith & Bashaw 2016). Influenced by the COVID-19 pandemic, there was research that evaluated online learning that had taken place for medical and nursing university students, because of physical distancing requirements. Online learning was argued to be necessary during the physical distancing required by the pandemic controls (Ahmed et al. 2020; Singh et al. 2021). Concerns regarding how effective the learning was regarding professional behaviours and teamwork were findings in the studies, although there were also considerations made regarding the lack of technology owned by the students and the pressure that nursing and medical academics were under during the pandemic (Ahmed et al. 2020; Singh et al. 2021).

A development or evaluation of a broad range of knowledge or skills required to perform during disasters were identified in recent research. Most disaster learning focused on the development or evaluation of external disasters. Learning included; infection control, PPE, ethics, chain of command, Incident command systems, disaster information, risks, community vulnerabilities, patient triage, patient management, evacuation, communication, decontamination, leadership, and other knowledge or skills related to disasters including; earthquakes, terrorism, pandemics or chemical, biological and radiological terrorism (Al-Ali & Abu Ibaid 2015; Bank & Khalil 2016; Brewer et al. 2020; Farra, Smith & Bashaw 2016; King, Spritzer & Al-Azzeh 2019; Li et al. 2017; Pesiridis et al. 2015). Programs that deliver disaster preparedness may be more effective when preparing staff for specific disaster types (Asemahagn 2020; Setyawati et al. 2020). When evaluating preparedness for bioterrorism, only nurses that completed specific biological disaster preparation were ready to respond. Nurses who had undertaken generic disaster preparation were not prepared for bioterrorism (Setyawati et al. 2020). Generic preparation can also be effective (Asemahagn 2020). Medical practitioners, pharmacist, nurses and midwives with prior infection control training had higher levels of knowledge related to COVID-19 than those participants without infection control training. There was an indication that specific learning is more effective was in the same study. Participants who had undertaken self-directed learning on COVID-19 via social media Facebook had even greater knowledge levels of COVID-19 than those who had undertaken the generic infection control training (Asemahagn 2020).

Recent research on the use of artificial intelligence, deep learning or decision support for the preparation for and management of disasters has been undertaken. Findings from these studies could signify new required content and resources for health professionals and support staff (Krishnamoorthy et al. 2021; Shearer et al. 2020). A study was undertaken which investigated the accuracy of deep learning (DL) models which compared the DL diagnostic performance with the diagnostic performance of radiologists for detecting COVID-19 signs in chest X-rays. The results demonstrated the DL model had a high sensitivity for detecting COVID-19 signs in a chest X-ray to the degree that it was recommended the technology could be used in low resource environments or when there is a shortage of radiologists (Krishnamoorthy et al. 2021). In a separate study, a decision support (DS) model was developed to guide antiviral treatment in pandemic influenza patients (Shearer et al. 2020). By factoring in the number of cases, available resources and likely treatment outcomes at any given time during a pandemic, the model assisted public health professionals to consider available resources rather than just the treatment options during pandemics (Shearer et al. 2020). The results of these studies provide an indication of the benefits for health professionals and hospital support staff if they have access to artificial intelligence (AI) resources and training for disasters (Krishnamoorthy et al. 2021; Shearer et al. 2020).

One study was identified which used The International Council of Nurses Core Competencies in Disaster Nursing, to develop The Disaster Nursing Core Competencies Scale, relevant to evaluating hospital emergency department nurses (Al Thobaity, Williams & Plummer 2016). The scale was then tested in two emergency departments in The Kingdom of Saudi Arabia. Testing showed the validity and reliability of this scale in relation to competencies, barriers to understanding or performing competencies and disaster nursing roles. This scale could be used to evaluate future disaster preparedness of emergency department nurses (Al Thobaity, Williams & Plummer 2016).

The Disaster Preparation Evaluation Tool (DPET) appears to be gaining greater recognition as a measure of evaluating nurses disaster preparedness (Al-Ali & Abu Ibaid 2015; Brewer et al. 2020; King, Spritzer & Al-Azzeh 2019; Oztekin et al. 2016; Sangkala & Gerdtz 2018; Usher et al. 2015). In one study, the DPET was used to evaluate nurses who work in regional hospitals in New South Wales Australia (Brewer et al. 2020). The tool highlighted nurses had moderate levels of preparedness and also observed in other studies also using DPET, levels of preparedness for biological disasters was an area for development (Brewer et al. 2020).

2.6.4 Disaster Preparedness Research in the Context of COVID-19

Although all data collection for this research were collected prior to COVID-19, research published during the pandemic has produced useful findings to consider. Some COVID-19 research findings have already been described in the earlier section 2.6.2 and 2.6.3. There is useful emphasis on attendance at work and resources generated by COVID-19 that this section will consider.

Between 10 to 30 percent of health care workers are not willing to work during COVID-19 (Ley & Jacobs 2020; Nashwan et al. 2021; Rafi et al. 2021; Zewudie et al. 2021). Study findings have demonstrated that attendance rate is variable and depends on factors which are controllable by hospital management. The provision of PPE, adequate training, and appropriate hospital design increases attendance at work (Ley & Jacobs 2020; Nashwan et al. 2021; Rafi et al. 2021; Zewudie et al. 2021). Personal factors including having family at home, older age or medical co-morbidities of the health workers were associated with participants choosing to stay away from work (Ley & Jacobs 2020; Rafi et al. 2021). The risk associated with providing care to patients with or suspected COVID-19 had mixed impacts on attending work. In one study higher risks resulted in nurses less likely to attend work (Ley & Jacobs 2020). In another study nurses were more likely to attend work when there was higher risk classification. This increase in willingness to attend work was attributed to the risk money that was paid to the nurses caring for COVID-19 patients (Nashwan et al. 2021). These findings provide information related to staff attendance at work that can assist future disaster planning (Ley & Jacobs 2020; Nashwan et al. 2021; Rafi et al. 2021; Zewudie et al. 2021). Recognising risks, the provision of danger money, adequate PPE and other resources that keep staff safe are important factors to promote attendance at work.

There was a greater focus on research identifying resources as areas of concern or interest, stimulated by resource shortages during the COVID -19 pandemic (Amin et al., 2020, Asemahagn, 2020, Ding et al., 2020, Khanna et al., 2020, Ridley et al., 2020, Wurmb et al., 2020). Resources have already been discussed in terms of promoting health workers to attend work (Ley & Jacobs 2020; Nashwan et al. 2021; Rafi et al. 2021; Zewudie et al. 2021). Resources are also important for staff wellbeing and the community wellbeing. Medical practitioners experienced higher levels of stress and depression when they were not provided with adequate PPE (Amin et al. 2020). Medical practitioners also experienced higher levels of stress when it became evident that should they or their family become ill from COVID-19, there were inadequate intensive care beds and ventilators to provide treatment (Khanna et al. 2020). A shortage of appropriate resources was a concern for the provision of adequate patient care

during the COVID-19 pandemic (Asemahagn 2020; Ding et al. 2020; Ridley, Freeman-Sanderson & Haines 2020). Supply chain interruptions can result in delays obtaining resources to treat patients (Wurmb et al. 2020). Hospital resources including adequate numbers of ventilators, disposable equipment, intravenous therapy pumps, feeding pumps, hospitals, beds and the multidisciplinary staff to provide care have all been or had the potential to be affected during the COVID-19 pandemic (Ding et al. 2020; Ridley, Freeman-Sanderson & Haines 2020). Inadequate equipment was a major factor reducing infection control standards during COVID -19 (Asemahagn 2020). Findings from studies conducted during the COVID-19 pandemic have focused attention on the need to prepare and have sufficient resources. Resources include adequate skill mix and staffing levels, physical resources and the construction of whole temporary hospitals (Amin et al. 2020; Asemahagn 2020; Ding et al. 2020; Khanna et al. 2020; Ridley, Freeman-Sanderson & Haines 2020; Wurmb et al. 2020). A shortage of resources not only limits the ability to provide quality patient care, but it also impacts the ability and willingness for staff to attend work (Ley & Jacobs 2020; Nashwan et al. 2021; Rafi et al. 2021; Zewudie et al. 2021).

An additional consideration during disaster preparation is legislating altered levels of care and the legal protection for health professionals (Ingram et al. 2021; Tozzo et al. 2020). COVID -19 as well as other disasters have heightened the need internationally for governments to introduce legislation to permit altered standards of care or crisis standards of care. These legislative considerations can also prompt governments to plan for disasters. For example, when determining legislated standards of care during a pandemic and it is determined there could be inadequate ventilators, government planning can also include the purchase of greater numbers of ventilators (Al-Azri 2020; Ingram et al. 2021). The provision of crisis or altered levels of care legislation has helped to reassure health professionals, and hospitals that they can continue to meet their duty of care during disasters (Al-Azri 2020; Ingram et al. 2021; Tozzo et al. 2020).

2.7 Literature Review Chapter Conclusion

This literature review chapter has reviewed recent research and grey literature pertaining to preparedness of health professionals and support staff for disasters from the 1980s until 2021. Disasters are not new phenomena, although it appears within the health disciplines there is still a need for additional quality research which can demonstrate the most effective methods of disaster preparedness for the multidisciplinary health care team. The limitations in the literature review (sections 2.1 to 2.5) have already been described, including issues with methodology, a focus on external disasters and participant inclusion. The most effective methods of disaster

preparedness cannot be determined from the research findings to date. The review also raised concerns regarding staff attendance at work being inadequate during disasters.

The inclusion of recent research including appropriate learning theories relevant to disaster preparedness or learning for health professionals and support staff is included (section 2.6). Andragogy, experiential learning and constructionist learning theories were considered most relevant to how health professionals and support staff, as adult learners effectively learn.

Multidisciplinary disaster preparedness was explored including research conducted by or including members of the multi-disciplinary health care team as participants. Benefits of this approach included understanding the needs of different occupations and the possibility of different occupations learning together.

A range of different modes of delivery were explored within research. Whilst different modes are not compared within the research, the majority of studies evaluate practical exercises, blended learning, including practical and didactic learning or blended learning including didactic learning and online learning. Findings from all studies improved the knowledge or skills of participants. Physical distancing related to COVID-19 has resulted in two research studies evaluating online learning in the university sector. There were criticisms raised regarding the effectiveness of the online learning, although acknowledgement that many students lacked technology and nursing and medical academics were under pressure during the pandemic.

A wide range of disaster content formed the subject matter in the disaster preparation research. Most commonly disaster preparation related to the preparation for external disasters. Methods of evaluating disaster preparedness were also considered, including a number of studies using the DPET and one study using a modification to the ICN disaster nursing competencies. Studies conducted during the COVID-19 pandemic evaluating disaster preparation demonstrated learnings including on attendance at work and the importance of resources.

The literature review and the consideration of additional relevant research highlights that there is value in disaster preparedness and research evaluating disaster preparedness. There are still gaps in what is published and what is beneficial to know as disaster managers, health professionals and support staff. It is still not possible to determine what the most effective methods of preparation are, although practical methods are most frequently studied, and learning theories suggest these are useful. Whilst there is increased inclusion of allied health professionals in disaster research, studies still identify their omission from disaster planning. Support staff are rarely present as research participants. This finding represents an evidence-

based knowledge gap. Various tools are used to measure disaster knowledge, the EPIC, START and DPET. Validation of these tools is essential as is performance in actual disasters as a measure of effectiveness. Content which is included in disaster preparation is vast and can be specific or generic to disaster type and occupation. Clarity on what is most effective would benefit disaster planning. New areas of knowledge could be incorporated into disaster preparation including the use of AI. Staff non-attendance at work during disasters is still identified in research and the need to identify how staff can be supported or facilitated to attend work during disasters is important. To safeguard the community and the health workforce, it is imperative to understand and implement effective disaster preparedness for the multidisciplinary team during current and future disasters.

“How can hospital managers support health professionals and support staff to best prepare for internal and external disasters?”

Chapter 3 Research Design and Methodology

3.1 Introduction

This chapter describes the underlying philosophical view, research strategy and methods to plan, collect, and analyse the study data. The research aims to understand from the perspective of the participants how hospital managers can support health professionals and hospital support staff to prepare for disasters. The chapter is comprised of the following sections:

- Section 3.2 Research Paradigm. This section describes the paradigm chosen to explore the research question. An interpretivist paradigm was chosen as the literature review revealed there is still much to explore regarding the research question (Bunniss & Kelly 2010; Kumar 2011; Thanh & Thanh 2015). Using qualitative techniques provided the ability to explore the beliefs of the participants in a subject area where little was known. The epistemology viewpoint in this research is underpinned by constructivism. A constructionist ontological perspective was appropriate as Individuals have different views of reality based on their assumptions, experiences, and observations (Creswell & Creswell 2018; Kivunja & Kuyini 2017; Kumar 2011).
- Section 3.3 Case Study Design. Explains why case study design was chosen to examine the data gathered to answer the research question. The steps portrayed by Harrison and Mills (2016) and the Multiple Case Study Framework (Stake, 2005) were used to design the research and analyse the cases. A particular focus of using this multiple case study design was to examine differences and similarities between data obtained and to consider the impact of the case environment on the cases.
- Section 3.4 Data Analysis. Describes the method of coding and thematic analysis. Initially, data were analysed, and structurally coded using colour coding depending on the subject matter or topic being described. A descriptive method of coding was then used code to describe what was being said about the topic area (Belotto 2018).
- Section 3.5 Ethical Considerations. Describes the ethical considerations. Institutional ethics approval was obtained from the University of Tasmania (H0015774), The Practice Development and Research Council at Case 1 (Project R 58), St Vincent's, NSW Health HREC multi-site ethics approval for Case 2 and 3 (LNR/18/SVH/228) and local governance approval Case 3 (LNRSSA/19/WMEAD/5).
- Section 3.6 Conclusion. This section summarises the key aspects of the methodology and reflects on how data obtained may inform hospital management decisions.

3.2 Research Paradigm

The interpretivist paradigm is based on the philosophy of empiricism and follows an unstructured or open approach to collecting data. The aim is to describe rather than to measure, gaining an in-depth knowledge of a smaller sample and exploring perceptions and feelings rather than facts or figures (Bunniss & Kelly 2010; Kumar 2011; Thanh & Thanh 2015). Qualitative techniques were used to gain an in-depth understanding of perceptions, attitudes, beliefs and disaster experiences of health professionals and hospital support staff (Bunniss & Kelly 2010; Creswell & Creswell 2018; Kumar 2011; Thanh & Thanh 2015). The design provided the flexibility required to explore and understand which methods of disaster preparedness can be most effective and why, rather than trying to quantify the magnitude of difference between various methods of disaster preparedness (Kumar 2011). As established in the literature review there was still a significant need for further research to understand which types of preparation can be most effective. There is a paucity of previous research aiming to understand preferred and most effective preparedness. Further exploration is needed to understand the decisions health professionals and support staff could make concerning attendance at work during disasters. Although disaster preparation and response have a long history within the health professions, the specific standalone specialty area of disaster preparedness is relatively new (Tebruegge et al. 2010; Thorne et al. 2004; UNDRR 2015). Disasters have a significant impact on health services, the community, and use significant resources. There is ample evidence and argument that further exploration of what represents the most effective disaster preparation is required (UNDRR 2015).

Epistemology is the study of the beliefs and assumptions regarding the way individuals acquire knowledge; the ways that individuals come to know what they know as the truth or reality (Kivunja & Kuyini 2017; Liamputtong 2010; O'Leary 2017). As well as influencing the design of this research, epistemology was directly relevant to this research study to assist understand how health professionals and support staff can best prepare for disasters. Part of this preparation was referring to resources required, and decisions related to attending work. A major component was also centred around how health professionals and support staff can learn what they need to know which is closely aligned to epistemology (Liamputtong 2010; O'Leary 2017).

This study was guided by the epistemological paradigm of constructivism, recognising that the participants reality is and was likely socially constructed through the experiences, thoughts, or observations and there are and were likely multiple truths for how health professionals and hospital support staff can best prepare for disasters. There may have been many different views

of reality and they can all be valid. The research therefore approached with the epistemological view, that for health professionals and hospital support staff to deliver disaster care, the bulk of their disaster preparation methods (that is, how they learn what they need to know) is a social science phenomenon rather than a natural or physical sciences phenomenon. These views and methods were best identified by holding and exploring through a constructivist viewpoint (Liamputtong 2010; O'Leary 2017). The participants have learnt what they know through study and work within health care disciplines and disaster preparation or participation (Kivunja & Kuyini 2017). The researcher, through semi-structured interviews and focus groups, attempted to identify how participants had acquired their knowledge and why they believe what they know in relation to their preparedness and preparation for disasters (O'Leary 2017).

Ontology is concerned with the nature of existence or reality and how humans make assumptions about the world and what is real. A constructionist ontological view is where reality is subjective, and humans construct their understanding of reality based on what they observe and experience (Al-Saadi 2014; Liamputtong 2010). In research it is important to state the ontological position that underlies why the research has been undertaken in this way. This research sought the opinions of health professionals and hospital support staff on how they see reality or how they see that they can best prepare for disasters. The underlying beliefs of the researcher are also important, as the researcher cannot simply collect data in a completely objective way in the semi-structured interviews and focus groups. Based on experiences, the researcher also had an opinion on how they believed health professionals and hospital support staff can best prepare for disasters, although these opinions or views evolved during the course of the study. It was possible that the researcher's questions, opinions, body language and tone may have impacted on the data collected. A constructionist ontological perspective was most appropriate for this research, acknowledging that individuals may have held different views of reality based on their assumptions, experiences, and observations. Reality is different for different individuals and is affected by the data collection bias of the participants and the researcher (Al-Saadi 2014; Liamputtong 2010; O'Leary 2017; Smith & Noble 2014).

The nature of reality or what exists for participants needed to be identified through the semi-structured interviews and focus groups. Responses were analysed with reference to what is true for participants and their understanding of their disaster preparation preferences. It is possible that there is or was more than one truth for different individuals and multiple constructions of reality can exist (Liamputtong 2010; O'Leary 2017). Data were used to form ideas, outcomes, or

assumptions on how health professionals and hospital support staff can best prepare for disasters.

Given the use of these ontological and epistemological stances, the most appropriate analysis was from a paradigm of interpretivist constructivism viewpoint, having the assumption that there is more than one truth. Given different individuals or scenarios there may be more than one way to best prepare for disasters (Bunniss & Kelly 2010; Kivunja & Kuyini 2017; Thanh & Thanh 2015).

3.3 Case Study Design

Case study design was used to examine the preferred disaster preparation methods and perceived behaviours of the health professionals and hospital support staff participants. Whilst case study design can be used to study either quantitative or qualitative data, it is most frequently used to study qualitative narratives (Harrison & Mills 2016; Kumar 2011; Thomas 2011). Case study design can consist of either a single or multiple case studies, systems, case descriptions or themes. In this research a multiple case study framework to compare the data from different sites.

Qualitative case study designs are ideal for exploring complexities of situations, phenomena, or paradigms about which little is known to assist expand understanding and even to plan larger studies (Harrison & Mills 2016; Kumar 2011; Thomas 2011). The design was chosen for analysing the how, why, and when of disaster preparedness and participation for hospital-based health professionals and support staff. There was still so much to learn about how health professionals and hospital support staff can best prepare for disasters, in part as disaster management or preparedness is still a relatively new “speciality or discipline” within the health professions (Harrison & Mills 2016; Kumar 2011; Thomas 2011). Lack of understanding of preferred methods of preparedness is particularly relevant to participants other than medical and nursing professionals because few studies have included allied health professionals and even fewer studies have included hospital support staff as participants (refer to chapter 2.6). Stake’s (2006) multiple case study theory was chosen to inform the design and guide analysis of the data. This analysis was supplemented by following six steps, as outlined in sections 3.3.1 to 3.3.5 and 3.4 Data analysis, modified from Harrison and Mills, (2016) and Thomas (2011), which guided the case study research.

3.3.1 Step 1 Identify Issues and Refining the Research Question

The initial research question was “What are the best practice disaster preparedness methods for health professionals and hospital support staff?” Health professionals or hospital support staff may undertake a range of preparation activities, including online learning, face-to-face education or in-services or disaster exercises. The most effective method of disaster preparation is not known (Gowing et al. 2017). Adding to the need to understand how best to effectively prepare for disasters, there are increasing financial pressures on health care resources and increasing frequency of disasters on a globally related to climate change and political instability or terrorism (UNDRR 2015). Hospital managers, health professionals and hospital support workers need to know what the most effective methods and resources are to prepare the health workforce for disasters (Abatemarco et al. 2007; Baack & Alfred 2013; Thorne et al. 2004).

Following the review of the literature the original question was further clarified to become:

“How can hospital managers best facilitate health professionals and support staff to prepare for internal and external disasters?”

The researcher elected to focus on one practice setting, the hospital, as it is the practice setting where most acute or critical care is delivered by a wide range of health professionals and by hospital support staff during disasters (Sauer et al. 2009; Sprung et al. 2010). By including hospital management in the research question, it acknowledges that for many that work in hospitals how they prepare is influenced by what programs are put in place by the hospital managers. Hospital managers are responsible for approving external study leave or for engaging professionals and educators employed, contracted, or otherwise engaged by the hospital to conduct disaster preparedness programs (Hendrickx et al. 2016; McCallin & Frankson 2010). The refined question also specifically mentions internal and external disasters, as most published research had a focus towards preparation for external disasters (Andreatta et al. 2010; Baez et al. 2005; Bartley, Fisher & Stella 2007; Nyamathi et al. 2010; Olson et al. 2010).

3.3.2 Step 2 Determine the Type of Case Study.

The most appropriate case study design for this research was determined to be multiple exploratory case study (Stake 2006). Cases in this study are defined as each of the three case hospitals. The research study is an exploratory case study because the views and opinions of the participants were explored within each case, in relation to best practice disaster preparedness (Harrison & Mills 2016). For this research, specific cases (hospitals) were purposively selected, as in the study design it was more important to examine the cases that are most appropriate to

exploration of the phenomenon or research question, rather than to randomly select the cases (hospitals). The three cases were selected in order to show adequate interactivity between the data or situations within each case and allow comparison with the other cases. Each case is related to the phenomena being explored as all have a role in disaster preparedness, although provided different contexts, in relation to disaster response. Differences or similarities include previous exposure to disasters, existing methods of disasters preparation, geographical location or hospital funding source (Stake 2006).

3.3.3 Step 3 Define and Bound the Cases

For this research, the three cases selected were: Case 1, a major inner city (eastern) private hospital. Case 2, a major inner city (eastern) public hospital; and Case 3, a major western Sydney public hospital, which also serves as the state referral centre for a number of disasters and is located near Sydney's second largest central business district. The boundaries of each case were the professionals and staff who work physically in the hospital campus, including undertaking training or disaster preparation provided by or engaged by the hospital. The participants at each site included: two medical practitioners, two registered nurses, six allied health professionals and up to 10 hospital support staff to ensure some form of unity within each case. By maintaining similar demographics of participants at each case, this study may demonstrate diversity or differences of contexts at each site (Stake 2006).

3.3.4 Step 4 Sampling

The aim of the case study research is to have integrated, holistic comprehension of each case (Harrison & Mills 2016). The number of participants were limited at each site so that each case did not become too large to allow for proper comprehension of data (Stake 2006). A maximum of twenty participants were included in the study at each case hospital. Allowing the inclusion of a variety of health professional and support staff disciplines.

The selection of participants was non-randomised using purposive sampling to enable candidates from different occupations, who have experiences with disaster preparedness or disasters (Harrison & Mills 2016; Kumar 2011). Managers or directors at the three case hospitals were contacted and asked to invite their staff with appropriate knowledge and experience to contribute to the study.

Managers / directors and potential participants were provided with the site information sheets (Appendix B) and consent forms (Appendix C) as part of the informed consent process to assist them to decide whether they would participate in the study. There were separate information

sheets and consent forms for the interviews and focus groups as well as for each case to participant clarity and to meet local ethical requirements.

3.3.5 Step 5 Data Collection

Site visits were important for this research to facilitate data collection via observation, interviews, and focus groups (Harrison & Mills 2016). One-on-one semi-structured interviews were selected as the method to collect data with the health professionals. Semi-structured interviews allow for in-depth exploration of the health professionals views. This method enhances the ability to gain accurate and meaningful information as rapport can be developed between the participants and the interviewer (Kumar 2011; Whiting 2008). Rapport and trust were enhanced, particularly as the selection of questions went from the impersonal to more sensitive questioning (Kumar 2011). Using semi-structured one-on-one interviewing with participants can provide the confidence for participants to share in depth and accurate information. The method also utilised audio recording to reduce the distraction of taking notes for the interviewer (Kumar 2011; Whiting 2008).

Focus groups were selected as the method of data collection for hospital support staff. Focus group methods allow exploration and discussion to identify participants' overviews, assisted to equalise the relationship between the interviewer and participants and were a time efficient way to meet a diverse range of participants (Blackburn & Stokes 2000; Gibbs 1997; Kumar 2011; McLafferty 2004). The discussion is designed to lead to the generation of ideas and the ability to learn about the attitudes, beliefs and experiences of the participants (McLafferty 2004). Focus groups also have the advantage of equalising the power imbalance that may exist between interviewer and participants. The participants can feel more comfortable amongst their peers, rather than an interview situation (Blackburn & Stokes 2000; Gibbs 1997).

All interviews and focus groups were conducted by the researcher. The one-on-one interviews with health professional participants began with demographic questions (Kumar 2011). The demographic information for focus group participants were obtained prior to the focus group activity through the completion of a hard copy questionnaire. Up to 10 hospital support staff participants were invited to each group, although the maximum number obtained was 9 participants. Focus groups were an efficient way to meet multiple support staff with diverse occupations within one hour. The interviews and focus groups were audio-recorded and then transcribed to capture accurate information (Kumar 2011; Whiting 2008). Most interviews were conducted at case study sites, although the option was open to complete some interviews via telephone or video conference. Only two interviews were conducted via telephone. All focus

groups were conducted at the case study sites. Open-ended questions were used in the semi-structured interviews and focus groups to allow the participants to respond using their own words (Kumar 2011; Whiting 2008). The semi-structured interview and focus group guide was developed based on the areas highlighted for further exploration in previously published studies (Appendix D). The guide was revised before use following feedback from disaster managers at a major teaching hospital in eastern Sydney. According to Stake (2005) data collection methods between cases can either be similar or quite different. In this study, the data collection methods were the same at the three different case sites, using the same interviewer and semi-structured interview and focus group guide (Stake 2006).

3.4 Data Analysis, Coding, Rigour and Case Findings.

At the conclusion of all interviews and the focus group for each case, the transcripts were analysed (Stake 2006). Each transcript was reviewed and analysed separately to identify the individual participant's preferred methods of disaster preparedness and the factors affecting their views. The profession or occupation of the participants was noted. The individual interview and focus group data were analysed as individual transcripts and individual opinions or arguments were coded (Belotto 2018). These were considered within the context of the case from which they belonged, for example if the opinions may have been influenced by the case location or context. The main focus was how each participant's transcript or data contributed to the data for that case (Stake 2006). An individual participant within a case may have had opinions that differed from others within their case. The participant's opinions may have been different or similar to members of the same profession or specialty in other cases, and this was also considered. The transcripts from each case were also compared to the collection of transcripts for the other cases (Stake 2006).

Coding allowed the researcher to group the responses of all participants into sections of meaningful text. The researcher used structural coding where colour coded passages of interview and focus group data were related to the research findings (Belotto 2018). Responses to questions were highlighted in four different colours to represent preferred methods and content of preparedness, including resources needed (blue), preferred duration and frequency (yellow), likelihood to participate in disasters (green) and learnings from actual disaster experience and other information (orange). The researcher then used a secondary label or descriptive method of coding to label what was being conveyed by the participants. For example, a blue section referring to methods of preparedness may have a comment added indicating a participant "preferred online learning, preferred face-to-face learning or wanted PPE

or policies made available”. A yellow section may have comments added “would like two hours of preparation each year or would like 30 minutes preparation each year or three days four times per year”. Examples of this coding are illustrated in table 3.1. This method of coding facilitated interpretation and thematic analysis of the results (case reports) based on the themes identified in each case (Belotto 2018).

Table 3.1 Examples of Structural and Descriptive Coding

Example	Structural Code	Description
<p>C2AH3 (Case 2 allied health professional 3)</p> <p>A: I think myself, and most of my staff, would say online learning because it's something they can do in their own time. Having said that, sometimes when there's something like fire training you need to do hands on too, you need to be familiar with things and touch things and what have you, so probably a bit of a mixture of both would be helpful.</p>	Preferred method of preparation	Preferred both online and practical methods
<p>C2AH2</p> <p>A: I'm not much of a kind of an online training type learner. I found the kind of more Emergo like experience much more useful and that kind of slight roleplay to get out the issues that are kind of presenting and just the overwhelming nature of a crisis. I do kind of prefer the kind of face-to-face training of the kind of fire training and that type of stuff. So that's usually the most helpful for me - is actually kind of conversational. Hence, when I'm a Social Worker.</p>	Preferred method of preparation	Preferred practical, face-to-face, role plays. Not online
<p>C2AH5</p> <p>A: I think – I mean, I've done lots of online fire training and I guess the practical fire training helps, because you're physically doing it, but the simulation I did was very good. Because everything was measured and estimated. There was a clock. They estimated the time it would take for certain procedures to happen. And they were well thought-out cases. So, there was I guess a constructed demand of the emergency department. And then you had to work in that simulation. And you got feedback along the way. So, I guess you were learning initially in the beginning the whole team was probably less efficient. And by the end of it they were more efficient.</p>	Preferred method of preparation	Preferred practical simulations

Data analysis methods included thematic analysis as described by Belotto (2018). Codes were assigned to the main themes using structural coding (Belotto 2018; Harrison & Mills 2016; Kumar 2011; Stake 2006). The framework and tools developed by Stake (2006) were used to group themes together and to identify differences and similarities. Each case was analysed and

presented separately (see chapters 4, 5 and 6) and then key learnings were discussed (in chapter 7), including similarities, differences, and findings relating to the cases (Harrison & Mills 2016; Stake 2006). An effective coding system was important to enable comparison of the data across the cases. It was important not to start the coding too early to avoid reducing complex phenomena to simple categories (Stake 2006). Coding and analysis were completed at the conclusion of data collection for each case.

As described by Stake (2006), whilst many cross-case study analyses focus mainly on the similarities of the cases, in this study it was also considered important to identify differences. The cross-case analysis therefore considered both the similarities and the differences, including understanding how these may have influenced the quintain or phenomenon (Stake 2006). Each case was analysed to identify what was unique about each one, and assertions were identified when reviewing each case separately, and the three cases collectively. After cross-case analysis, the researcher made assertions about the phenomena, including citing evidence or examples from the case studies to show how uniformity or disparity characterizes the phenomena (Stake 2006).

Key themes and minor themes were identified based on the prominence that emerged during data analysis. For example, one major theme that became evident related to preferred method of preparation and was a preference for practical or face-to-face methods rather than online delivery. The most important themes or topics were identified within each case study and when considering all case studies. These were identified by observing commonly held views in most instances and also views held by key participants, including allied health staff or support staff or staff with actual disaster experience (Stake 2006).

There were three procedural options to undertake the cross-case analysis (see Table 3.2). Track 1 was considered the preferred track for this study, because it best maintains the case findings and the situation of the case that the phenomena or evidence was found within in (Stake 2006). It was considered important in this study to know why and what factors influenced the opinions of the participants at the three different sites (Stake 2006).

Table 3.2 Cross Case Procedure Tracks Table Developed from Stake (2006).

Track	Attributes
Track 1	Preferred track. Maintains situationally and case study findings.

	Uses more sources for generating assertions or findings.
Track 2	Merges similar findings together maintaining a little the situationally of the different cases.
Track 3	Quantitative. Shifts focus from factors influencing findings to findings.

To assist in facilitating the comparison on the phenomenon cases Stake (2006) recommends using worksheets 2-6 which are included in the text Multiple Case study Analysis (2006). It is important to note that these worksheets were used to analyse and categorise the data and not a method of presenting the data (Stake 2006). Worksheet 2 assisted to identify and document the theme areas from the cases. These themes were recorded on the worksheet 2 (Table 3.3 see below). For this study, the key themes were identified and ranked according to the importance of each theme in relation to the data collected for each theme when comparing the data from all three cases. For example, important themes were the preference for various forms of learning and the risk assessment regarding likelihood to attend work during disasters. Worksheet 2 (table 3.3) was used to compare with the data entered onto other worksheets to develop the discussion and assertions.

Table 3.3 Worksheet 2 Themes of the Multiple Case Study Modified from Stake (2006)

	The Themes of the Multi-Case Study
Theme 1	Duration and frequency of disaster preparedness
Theme 2	Content should be included in disaster preparedness / knowledge and skills required
Theme 3	Allied health and Support staff roles and preparedness
Theme 3	Resources needed to be available for disaster preparedness
Theme 4	Preferred methods and resources of preparation
Theme 5	key learnings from disaster experience in relation to effective preparation
Theme 6	Health professionals and support staff willing to attend work

Worksheet 3 was completed for each case study separately. This assisted to identify the themes in each case and then noted if there are comparisons in the other cases. An example of this was preference for practical followed by lecture style learning and also the use of checklists or policies or other guidance documents at case study 1. At case study 2 lecture style and written documents were seen as less important compared with practical learning. At Case 3 practical learning was preferred, although lecture style workshops were also seen as effective. The researcher then considered the reasons why one form of learning was highly regarded at one case, and not the other two. Worksheet 3 (below) was completed in the format described above, covering all themes and all cases included in the study. This allowed for easier comparisons of themes between cases (Stake 2006).

Table 3.4 Worksheet 3 Analyst's Notes Reading a Case Report (brief example version) modified from (Stake 2006)

Worksheet 3.	Analyst's Notes While Reading a Case Report (results) 1
Code Letters for This Case:	Case 1. (eastern Sydney private hospital)
Author(s):	J Gowing
Analyst's Synopsis:	Interviews x 2 and focus groups x 2. Interviews were with 10 health professionals (2 RN, 2 med practitioner, 6 allied health – 2 SW, 1 psychologist, 1 physiotherapist, 1 radiographer, 1 pharmacist). Also 9 support staff over two focus groups – 2 cleaners, 1 orderly, 1 assistant nurse, 1 pastoral carer / chaplain, 2 receptionists, 2 food services staff.
Situational Constraints:	The first research interviews and focus groups conducted by the researcher. The researcher had a working relationship with many of the participants, although no direct reports were included in the study.
Uniqueness among Other Cases:	This case was the only private hospital in the study. Private hospitals in Australia are less likely to experience external disaster responses as this responsibility is first taken by public hospitals.
Prominence of Theme 1 in this Case:	What is the preferred duration and frequency of disaster preparedness? – Most participants preferred short preparation of 2 hours or less. Most also preferred annual preparation. Rationales included – needs to fit into normal workload, learning functions (i.e., less likely to learn if session too long), needs to cover enough information and keeping the same pattern as fire training which is 1-2 hours. A few participants suggested either longer preparation e.g., full day or more frequent e.g., 4 x per year or a couple of times per year.
Prominence of Theme 4 in this case.	Practical learning was considered to be most effective by most participants in Case 1. This included participants who had participated and had not participated in practical exercises. Many participants also recommended lecture style learning and some recommended online learning in combination with practical learning.

	Blended learning involving more than one method was popular. Considered most effective was practical learning with lecture style learning. Checklists , policies and written documents were considered effective to revise or use in disasters. Resources for preparedness were also important including disaster training, policies as listed above. Also, PPE and practical assistance , danger money, child care and transport to work assistance were important.
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Worksheet 4 was used to assist to identify and rate the themes that occur in more than one of the case studies. For example, at case 1 and case 2 a theme was identified that was quite unique to these hospitals. Allied health professionals felt excluded from disaster planning process and therefore did not know how their role would be needed during disasters. This was not found to be the case 3. Worksheet four also highlights a difference in the preference for practical learning in all cases. Whilst practical preparation was preferred at all cases, in Case 1 lecture style learning was more desired than at the other two cases. It was important to ensure that all themes were rated from high to low by the researcher (Stake 2006).

Table 3.5 Worksheet 4 Ratings of Expected Utility of Each Case for Each Theme (Stake 2006)

Utility of cases themes	Case study 1	Case study 2	Case study 3
Allied health and support staff inclusion in disaster plans (not)	High utility	High utility	Middling (medium importance)
Health professionals and support staff willing to attend work (not)	High utility	High utility	High utility
Practical is the preferred method of preparation	High utility	High utility	High utility
Long duration and regular frequency of disaster preparedness sessions	Low utility	Middling	High utility

Worksheet 5A was used to identify further situational differences between the cases. An example of a situational difference related to the higher level of allied health professional engagement in disaster preparedness, was their inclusion in planning and disaster exercises at case 3. In cases 1 and 2 allied health professionals identified that they were excluded from planning or exercises related to disaster management or preparation. Participants in cases 1 and 2 speculated that this was a factor influencing allied health professionals to be less engaged or unaware of their roles in disaster response. By placing worksheet 2 next to worksheet 5 the

researcher rated one theme at a time based on how important the finding was to the phenomena.

Table 3.6 Worksheet 5a- Matrix for Generating Theme-Based Assertions (Stake 2006)

Case				
Case study 1	Allied health Participants felt excluded	Allied Health participate in EMC	Allied health participates in exercises	Allied health had defined roles in disasters
Finding 1. Important to include allied health professionals in disaster planning	High (high importance)	Low (low importance)	Low	Low
Case study 2				
Finding 1. Important to include allied health professionals in disaster planning	High	Middling (medium importance)	Middling	Middling
Case study 3				
Finding 1. Important to include allied health professionals in disaster planning	Low	High	High	High

Worksheet 6 was used to assist develop the assertions which are discussed as key findings in the discussion chapter (section 7.3). Worksheet 6 was a summary of all the key assertions, including similarities and differences. It was also important to reveal if any case is atypical or dramatically different from the other cases. If a case is atypical then assertions are less generalisable to other sites (Stake, 2006). Using worksheet 6 to record and summarise assertions, enabled review and consideration as to what were the most meaningful assertions as not all assertions have been included as key learnings.

Table 3.7 Worksheet 6 Multi-Case Assertions for the Final Report Brief Version (Stake 2006)

Designator	Assertions	Related to which theme or factor	Evidence in which case
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J Gowing	Allied health professionals should be included in disaster planning as they can then add value and are essential to the response as they have important roles in disasters.	Inclusion of all staff in disaster planning e.g., exercises, training, committee membership.	Case 1 & 2. some allied health staff feel excluded, although demonstrated their essential work. Case 3 Allied health staff included and perform a valuable role.
J Gowing	Practical forms of preparation are most effective	Preferred method of disaster preparedness. Learnings from actual disaster performance.	Case 1, 2 & 3 participants argue strong support for practical performance. Cases 2 & 3 participants with disaster experience cited the practical exercises as useful in enhancing performance.
J Gowing	Lecture style preparation is more popular	Preferred method of disaster preparedness when a wider range of disasters are covered, e.g., internal disaster planning, bio preparedness	More case 1 participants prefer lecture style preparation to cover needed information. Case 3 prefer lecture preparation may be related to internal bio preparedness workshop and MIMMS courses
J Gowing	Disaster plans and checklists are important to enhance performance during actual disasters	Learnings from actual disaster performance.	Case 1, 2 and 3 all recommended plans or protocols. Case 1 additionally recognises the need for experts & variations on how staff cope. Cases 2 recommended briefings and practical preparation and Case 3 adequate resources.
J Gowing	Perceived danger has an impact on decisions to attend work during disasters. Staff wellbeing considered more important than patient wellbeing.	Arguments or views from participants regarding attending work during disasters perceived as dangerous and less dangerous.	Cases 1, 2 & 3. Participants more likely to indicate colleagues should attend when they expressed lower risk to staff safety. Additionally, understanding of role seemed to increase attendance even for "dangerous" disasters. Hospital policies & resources help attendance.

Themes often had more than one assertion associated with them in this research (Stake 2006). The theme of preferred methods of learning, had assertions related to practical learning being most effective, online learning being unpopular, lecture or didactic learning considered more effective in case 1 and 3, and checklists, plans and policies were considered more effective in cases 1 and 2. High fidelity practical exercises were preferred by those that had experienced these.

3.7 Ethical Considerations

Appropriate consideration was given to ethical conduct when undertaking this research to ensure confidentiality, respect and safety for those participating in the research (Kumar 2011). Guidance for the development of an ethically sound research protocol was obtained from institutional policies and procedures for the case study site hospitals and the University of Tasmania Human Research Ethics Committee. Additionally, the National Statement on Ethical Conduct in Human Research, 2007, updated 2018 was used to guide the ethical practice in this research. (Kumar 2011; NHMRC 2018). The participant information sheets, and consent forms outline what is involved in participating, risks and benefits (Appendices B and C).

The National Statement on Ethical Conduct in Human Research identifies some special ethical considerations specific to certain vulnerable participants. Specific consideration in this study was given to those with pre-existing relationships with the researcher. Staff with a direct reporting relationship to the researcher were not included as participants in the study (NHMRC 2018).

Low risk ethical approval was obtained from the University of Tasmania (UTAS) Social Sciences Human Research Ethics Committee (HREC) (H0015774). Subsequent ethics and governance approvals were also obtained from the Practice Development and Research Council at the Case 1 (Project R 58) and the NSW Health St Vincent's Health Network HREC for Case 2 and 3 as the St Vincent's HREC provides ethics approval for all public hospitals in NSW (LNR/18/SVH/228). Local governance approval for case 3 was also received by the western Sydney Local Health Network Research Governance Committee (LNRSSA/19/WMEAD/5).

3.8 Conclusion

This chapter has explained the methodology used in the research. The paradigm of constructionist ontology and an epistemological constructionism based on authoritative knowledge influenced this research given the need to explore the subject matter and the

evaluation of health professional or worker subject experts. Most aspects of disaster preparation explored in this research focuses on how health professionals and support staff can best prepare or learn for disasters.

The qualitative multiple case study design using three cases was used to collect data from participants with experience in disaster preparation or response. Of particular importance to this study was the inclusion of health professionals and hospital support staff from a variety of occupations who had not previously been investigated in the disaster preparedness literature. The use of three case studies was designed to provide insight into the participant's experiences, views, and opinions in relation to the research question and so the same semi-structured interview guide was used for interviews and focus groups. This included understanding preferred methods of disaster preparation, content to be included and decisions regarding participation in disasters.

Importantly these data and the analysis inform how hospital managers can best support health professionals and support staff to prepare. Factors including the case environment similarities and differences were considered. The three case studies are presented in detail in the next three chapters. A discussion of the cross-case findings is provided in chapter seven.

Chapter 4 Case 1: An Eastern Sydney Private Hospital

4.1 Introduction

The Case 1 hospital was selected as it is a major private hospital service in Sydney. Disaster preparation has taken place at the hospital. Hospital staff have responded to internal incidents and supported the co located public hospital staff in response to internal and external disasters. In Australia, whilst public hospitals are primarily responsible for disaster response, private hospitals are responsible for managing internal incidents and can be required to support public hospitals. The data collection period was from August 2018 to November 2018.

For presentation of this case, participants have been allocated a participant code. For registered nurses, the code is C1RN 1 or C1RN2 and for medical practitioners C1MP1 or C1MP2. There were six allied health professionals including two social workers and one psychologist, radiographer, pharmacist, and physiotherapist these participants were coded as C1AH1 to C1AH6 to further protect their identity. It is not possible to determine who said what in the focus group, all participants were allocated a code C1SS (Case 1 Support Staff). Transcripts were thematically analysed and coded as described in the methodology chapter using structural and descriptive coding (Belotto 2018) and analysed according to multiple case study methodology (Stake 2006). Exemplar Quotations from transcripts are included in this case study chapter to evidence the themes. Findings from this analysis are outlined under headings describing preferences for disaster preparation: duration and frequency, methods and resources, content, attendance at work during disasters, lessons learnt from actual disaster experiences and other observations which emerged.

Section 4.2 Participants. This section explains the recruitment of participants for the case and presents participant demographic data.

Section 4.3 Preferred Duration and Frequency. This section describes the preferred duration and frequency of disaster preparation. Arguments made by participants are presented.

Section 4.4 Methods and Resources Preferred for Disaster Preparation. This section documents the preferred method of disaster preparation and what resources are required to prepare for disasters.

Section 4.5 Preferred Content of Disaster Preparation. This is the largest section in Case 1 and includes participant preferences of what learning content should be included, international or

national competencies, generic or specific to occupation or disasters and what clinical and non-clinical attributes, knowledge or skills are required for responding to disasters.

Section 4.6 Attendance at Work. The section outlines participant perspectives regarding whether they believe health professionals and support staff should attend work in various disaster scenarios. The section also presents suggestions for encouraging staff to attend work.

Section 4.7 Lessons Learnt from Actual Disaster Experience. This section identifies what preparation was effective for participants with actual disaster experience for improving disaster preparedness.

Section 4.8 Other Observations or Ideas. This section presents the unique issues or ideas raised by the participants in relation to disaster preparedness.

Section 4.9 Analysis. This is an analysis of the key ideas or findings from the Case 1.

Section 4.10 Conclusion. The final section summarises the findings.

4.2 Participants

All participants were invited to attend through a process of third-party recruitment, via their manager's email or verbal invitation. They were provided with an information sheet and consent form by the manager. The researcher verified with participants the information sheet had been received and answered additional questions as needed prior to obtaining the consent form (Appendices B and C). The interviews or focus groups were conducted in private meeting rooms at Case 1 hospital and were audio recorded and transcribed by a third-party transcription service approved by the University of Tasmania. The interview and focus group guide was used during interviews and focus groups (Appendix D).

Ten health professionals and nine hospital support staff were recruited to participate in interviews and focus groups. The demographic data are outlined in Table 4.1. As required by the selection criteria, all participants had experience in either disaster training or preparation activities and nine participants had experience working during actual internal or external disasters.

Table 4.1 Case 1 Participant Demographics.

Occupation and Participant Code	Experience in Health Care	Disaster experience reported	Disaster Training	Qualifications
Registered nurse 1 C1RN1	32 years	No	Internal exercises, mandatory training, fire training, warden training	General Nursing Certificate & Master of Clinical Nursing
Registered nurse 2 C1RN2	35 years	Fire / internal Emergencies	Internal exercises, mandatory training, Fire training, warden training. planning for external MCI emergency	General Nursing Certificate & Master of Clinical Nursing
Medical practitioner 1 C1MP1	28 years	Emergency department during terrorism MCI	Disaster lecture, mandatory training, In-services	Bachelor of Science, Master of Chiropractic Science. Bachelor of Nursing, Bachelor of Medicine, Bachelor of Surgery
Medical practitioner 2 C1MP2	22 years	Emergency Department	Mandatory training, in-services	Bachelor of Medicine, Bachelor of Surgery.
Social work 1 C1AH1	16 years,	Yes, Managing large numbers of refugees	Disaster workshop & committee mandatory training	Bachelor of Social Work
Social work 2 C1AH2	20 years	Yes, Asthma outbreak	Mandatory training	Bachelor of Social Work, Post Graduate Diploma and Master of Health Management
Clinical Psychologist C1AH3	27 years	Yes Cyclone	Mandatory training	Bachelor of Science, Doctor of Clinical Psychology
Pharmacist (oncology) C1AH4	9 years,	No	Mandatory training / fire training.	Bachelor of Pharmacy, Grad Cert in Clinical Pharmacy
Radiographer (Senior) C1AH5	23 years &	Yes, Preparing for Y2K (1), Emergency response team	Mandatory training / fire training , in-service's & Clinical emergency response.	Diploma of Applied Science

Physiotherapist (orthopaedic) C1AH6	6 years	Yes, Preparing for plane crash	Fire training	BSc Hons
Hospital Cleaner 1 C1SS	10 months	No	Fire training	Hospitality Certificate
Hospital Cleaner 2 C1SS	3.5 years	No	Fire training, WH&S, Dangerous goods training	Nil
Patient Care orderly / Wards person C1SS	9 years,	No	Mandatory training, fire training	Nil
Assistant in Nursing C1SS	Six years	No	Mandatory training fire training	Undertaking bachelor's degree in nursing
Chaplin / Pastoral care C1SS	7 years	Fire incident & disaster planning	Mandatory training exercises, trauma studies, first aid, fire training	Master of Education & Clinical Pastoral Education Certificate
Receptionist C1SS	15 years,	No	Mandatory training	Nil
Receptionist C1SS	not specified	No	Mandatory training	Nil
Patient Food Services C1SS	10 years	Power failure	Mandatory training	Bachelor of Business
Patient Food Services C1SS	3 years	No	Mandatory training	Certificate IV in Training and Assessment

4.3 Preferred Duration and Frequency of Disaster Preparation

The participants had varying perspectives regarding the duration and frequency of disaster preparation. Most had the view that disaster preparation should occur annually. A minority of

participants indicated that this preparation should occur twice a year. Participants also had varying viewpoints about the duration of disaster preparedness. The most common suggestion was that it should be a short duration of around two hours or less.

4.3.1 Duration of Disaster Preparation.

The most common reason given for the preference for one to two hours duration of learning was it needed to be realistic in terms of workload and resources (Quotations 4.2.1 to 4.2.4 ,Table 4.2). The activities needed to be sufficiently long enough to cover the subject matter, and not too long so that staff become disengaged with the session or stop learning. An important finding was that the desired length of preparation needs to be longer for people for whom English language is not their first language, many of whom are employed in support staff roles. Allied health and support staff participants also suggested that disaster training needs to be a similar length to other mandatory education programs, for example fire training, cardiopulmonary resuscitation or manual handling which are one hour in duration. Quotations 4.2.1 to 4.2.4,Table 4.2 exemplify these findings.

While participants acknowledged the importance of the program particularly given the potential for terrorist or disaster risk, and also suggested that disaster preparedness could be a relevant and useful program of education, a short period of preparation was the desired length of preparation. Quotations 4.2.5 and 4.2.6, Table 4.2 highlight the importance of annual preparation, given the likely disaster risk. Two allied health participants suggested that disaster preparation should be longer, although articulated that time and/or resources may be limited. This is highlighted by the Quotations 4.2.7 and 4.7.8, Table 4.2. A medical practitioner argued for the longest length sessions. They did not specify that this length was for staff with senior management or disaster management roles and did not consider resources needed, only the learning needs (Quotation 4.2.11, Table 4.2).

Other participants also suggested that the length of the preparation period could vary depending on whether the staff member had either a leadership or disaster management role. Those with management or disaster management roles need more preparation in view of the greater levels of responsibility and knowledge required. The Quotations 4.2.9 and 4.2.10, Table 4.2 give an insight into this argument.

Table 4.2 Exemplar Quotations Preferred Duration of Disaster Preparedness

Quotation Number	Quotation and participant code
4.2.1	"I guess not more than two hours, maybe once per year as a reminder, same as fire training. But if it is longer, it drags people's attention somewhere else" C1SS.
4.2.2	"Some of the people in my area, most of them, English is not their first language, including myself and then if you have to sit there for hours, like after some time you get bored so probably keep it short" C1SS.
4.2.3	"Include as part of mandatory training ... fire training or emergency response...an hour...every year" C1SS.
4.2.4	"Well fire training is once per year; the mandatory training is also once per year. I feel that this is probably enough, like if something were to happen now, I would know where to go. In terms of length of time I would say probably an hour I think is effective to get the point across" C1AH4.
4.2.5	"I think the same as fire training... that you know probably an hour once a year... same as manual handling... because disaster can strike at any time ... although the risk is not that great you need to be prepared" C1AH6.
4.2.6	"Well given its probably quite a fun program to do I think that you could probably do an hour every year...I think Sydney is an obvious target for whatever attacks" C1MP1.
4.2.7	"You've got to fit into the reality of all other work...I don't think we learn very well in full day programs so I would say a couple of hours and if it needs to be longer content then you spread that over a bit of time" C1AH3
4.2.8	"I think there is a lot to be said for Fire training as an example...I would love us to be involved in a mock trial... and I appreciate it is a huge drain on resources... but important to know what the hospital thinks my role is". C1AH5
4.2.9	"We probably need a bit more than 15 minutes; I don't know how much information you can get across it that time... I do not think you need a whole university subject. Unless you had a senior management role, and you may run the whole disaster. Oh, probably a full day" You could do it every couple of years but in the middle do a little online refresher sort of thing... keep you up to date without doing the full day" C1AH2.
4.2.10	"Well, I probably would not need to go to university to do a degree in disaster preparedness, but I certainly think sessions whether they be sort of two hours conducted at least annually...but I certainly think that annually it should be reviewed by most people who are going to be at the frontline and coordinating a possible disaster... so definitely there needs to be training" C1RN1.
4.2.11	"With regards to duration obviously I would say if you wanted to run a course for people you need at least a couple of days, you know of lectures to explain everything. I would say once per year to refresh". C1MP2.

4.3.2 Frequency of Disaster Preparation

The majority of participants indicated that the disaster preparation should be held annually as exemplified by the following Quotations 4.3.1 to 4.3.5, Table 4.3. As with findings regarding the duration, there is a common comparison to other mandatory preparation which also is held annually in the hospital.

One registered nurse, one allied health professional and one support staff focus group member suggested preparation should be more frequent than once per year as illustrated by Quotations 4.3.6 to 4.3.8, Table 4.3. As evident in these Quotations, these three participants had different reasons for wanting preparation to be undertaken more than once a year. Reasons included deteriorating memory retention and the volume of information remembered.

Some indicated that the frequency may need to increase in certain circumstances, including when preparing more senior members of the team. Role complexity in relation to disasters means that those with more complex roles may require additional preparation either in terms of duration or frequency (Quotations 4.2.9 and 4.2.10, Table 4.2). Others indicated it should be routinely longer in terms of duration or more frequent than yearly.

Table 4.3 Exemplar Quotations Preferred Frequency of Disaster Preparation

Quotation Number	Quotation and participant code
4.3.1	"I guess ... maybe once per year as a reminder, same as fire training. But if it is longer, it drags people's attention somewhere else" C1SS.
4.3.2	"Include as part of mandatory training ... fire training or emergency response...an hour...every year" C1SS.
4.3.3	"Well fire training is once per year; the mandatory training is also once per year. I feel that this is probably sufficient, ..." C1AH4.
4.3.4	"I think the same as fire training... that you know probably an hour once a year... same as manual handling... because disaster can strike at any time ... although the risk is not that great you need to be prepared" C1AH6.
4.3.5	"Well given its probably quite a fun program to do I think that you could probably do an hour every year...I think Sydney is an obvious target for whatever attacks" C1MP1.
4.3.6	"I don't know whether one single fire session a year is really enough and weather that's broad enough to cover all disasters that could happen" "I don't thing annual training is

	enough. And even if you do a simulation exercise a year, they're not going to remember it when it comes to the crunch of a disaster...I think at least twice per year" C1RN2.
4.3.7	" two half days over a year. You can get a lot in half a day". C1AH1
4.3.8	"Four sessions a year because they are (disasters) all different". C1SS

4.4 Methods and Resources Preferred for Disaster Preparation

4.4.1 Methods

Preferred methods of preparation were sorted into five main categories: practical; lecture, didactic or classroom preparation; online learning; mixed methods; or other methods of preparation. Most participants preferred practical preparation followed by lecture or classroom style preparation. Mixed methods of preparation were also popular most frequently including one of the above face-to-face versions (practical or lecture) and another form of preparation. Online learning was mentioned by a few participants in combination with other methods. More frequently online learning was described as not being suitable. Other forms of preparation outlined were policies, handouts, videos, or brochures.

Practical Preparation.

Participants suggested that practical preparation is an effective method of planning, more than any other single method. There were variations in rationale for arguing this method including the way participants best learn or the type of learning that is taking place. There was strong support to include practical preparation as at least one component of the overall disaster preparation (Quotations 4.4.1 to 4.4.14, Table 4.4). Many participants referred to practical preparation being highly valued to reinforce knowledge or to learn procedures prior to having knowledge tested. Quotations 4.3.3 to 4.3.5 (Table 4.3) highlight the importance of holding practical sessions to allow staff to practice what they already have learnt about or what they need to know and will be tested on following an exercise. A registered nurse suggested that there is educational merit in performing the tasks required or observing the procedures rather than reading only. By performing the procedure, it was suggested that health professionals and hospital support staff will improve their knowledge (Quotation 4.4.1, Table 4.4).

A support staff participant (Quotation 4.4.2, Table 4.4) argued that practical preparation is best for learning practical skills for example how to wear PPE. Other allied health and support staff

participants spoke about how the practical preparation is the most useful, emphasising practical demonstrations using firefighting equipment (Quotations 4.4.8 and 4.4.9, Table 4.4). Practical preparation was also stated to be useful for scenario-based or role play learning (Quotations 4.4.6 and 4.4.7, Table 4.4). The participants had previous experience of practical disaster exercise days conducted at the hospital or an interactive session prior to a disaster occurring.

Lecture, Didactic or Classroom Style Preparation

Lecture or classroom style preparation was also preferred by participants as an effective method either alone or more commonly in combination with other forms of preparation. Nursing staff did not share this preference for lecture or classroom style preparation. One of the strongest advocates for lecture style preparation was a medical practitioner participant (Quotation 4.4.11, Table 4.4). Lectures presented by appropriately qualified people were considered an effective way to share the needed information. Participants provided favourable comparison with learning by reviewing information online or research, suggesting that lectures are the most effective way to learn and be updated. Support staff suggested that classroom style presentations are most effective as they present the information visually and allow for discussion (Quotations 4.4.13 and 4.4.14, Table 4.4). An allied health professional explained they learnt most effectively as part of a planning committee or in a workshop style of presentation (Quotation 4.4.10, Table 4.4). Another allied health professional indicated that face-to-face methods were most ideal (Quotation 4.4.12, Table 4).

Blended Learning

Very few participants made mention of only one method of preparation as being preferred or required for disaster preparation (Quotations 4.4.1, 4.4.4 to 4.4.7, Table 4.4). Blended forms of preparation described generally involved a lecture or practical session, combined with other resources including readings, policies, checklists, or online learning. Participants described how a lecture can be combined with a practical simulation or role play. A registered nurse participant suggests that if staff are first provided with a lecture and then have the opportunity to practice in a practical simulation then they will best prepare for disasters and correct any knowledge deficits that may exist (Quotation 4.4.1, Table 4.4). Further, a medical practitioner participant suggests that a lecture followed by scenarios or role play allows the learner to best prepare staff for disasters (Quotation 4.4.7, Table 4.4).

Three of the participants, suggested that practical preparation should be combined with online learning either to provide knowledge before a practical session and/or to test knowledge

following the preparation (Quotations 4.4.5 to 4.4.5, Table 4.4). An allied health professional suggested “soft copy education” which is referring to information or policies contained within emails, rather than formal online learning (Quotation 4.4.5, Table 4.4). Another example of a blended learning activity suggested by an allied health participant was the use of a checklist ideally combined with face-to-face learning or alternatively interactive online learning (Quotation 4.4.12, Table 4.4).

Online Learning

In contrast to the findings referred to above supporting practical or lecture style preparation, online learning was disliked by many of the participants, although some indicated it is effective when combined with other forms of preparation (Quotations 4.4.4, 4.4.5 and 4.4.6, Table 4.4). Participants indicated some support for online learning if it is interactive and when other forms of learning are not available. An allied health professional suggested qualified support for interactive online learning, indicating it would be effective. This was qualified support only as the participant indicated that face-to-face learning would be preferred (Quotation 4.4.12, Table 4.4). Another allied health professional indicated that they were starting to appreciate online learning (Quotation 4.4.15, Table 4.4).

Other Methods of Learning

Other forms of preparation included written materials, policies, checklists or even a brochure. Examples of how these written documents assist with disaster preparedness were highlighted by a registered nurse, allied health professionals and a support staff member (Quotations 4.4.12, 4.4.16 and 4.4.17, Table 4.4).

Table 4.4 Exemplar Quotations Preferred Methods of Disaster Preparedness

Quotation Number	Quotation and participant code
4.4.1	“Well, if we look at fire training there is a mix of a lecture and then a bit of active participation.... Which I think is very important to do a simulation, so you go through the procedures and correct your knowledge... I am a hands-on person rather than sitting in front of a computer and doing e learning” C1RN1.
4.4.2	“Practical education how to use PPE”. C1SS
4.4.3	“One thing that consolidates is the fire stuff. Like you do a practical and then that reinforces the last one you did” C1AH3.

4.4.4	"I think the rules and regulations should probably be online but then a practical element's really good just to reinforce everything that you have learnt, so probably a bit of both". C1AH10
4.4.5	"Soft copy education followed by practical training and repetition of that". C1AH5
4.4.6	"Often I think a simulation is quite good followed up by maybe some online questionnaires or scenarios.... A good way to refresh or to get instant knowledge. You know those disaster prep days are good". C1RN2
4.4.7	"... a talk about disaster management with some roleplay of scenarios. Tell you to go and do this... what do you think? ... an interactive talk... much more beneficial than online learning. A bit of practical as well as a didactic lecture... maybe even a video".C1MP1
4.4.8	"One thing that consolidates is the fire stuff. Like you do a practical and then that reinforces the last one you did" C1AH3.
4.4.9	"Practical...because you have actually seen it done that makes sense ... regularly have a scenario". C1SS
4.4.10	"Being part of a planning group or a day workshop "C1AH1.
4.4.11	"Proper courses by qualified people. I would prefer face-to-face. A lecture type thing... Face-to-face you get the opportunity to clarify your doubts...ask questions. I prefer that than just online or going through papers and all that". C1MP2.
4.4.12	"...I think face-to-face would be ideal or if it was something that's online, interactive would be good" "So, I guess a checklist of what needs to be done in the event of a disaster..." C1AH4.
4.4.13	"Visual like you see something on the screen"C1SS
4.4.14	"Face-to-face training the best way...e learning you read it ...and then you forget...but face-to-face you're talking, and you get some idea, and you know" C1SS.
4.4.15	"I am beginning to appreciate the mandatory learning that's online ..." C1AH3.
4.4.16	"...Policies, procedures, guidelines are really beneficial for on the spot.... when you're suddenly put under the gun" C1RN1.
4.4.17	"Print a pamphlet...give to people to read", "policy, procedure..." C1SS.

4.4.2 Resources

There was wide support from medical and allied health professional participants for resources that are equipment or treatment to keep staff safe during disasters. These included PPE to protect both health workers and other patients. Participants also indicated that vaccinations or

medications to prevent illness or treat health workers should be made available or even prioritised (Quotations 4.5.1 to 4.5.4, Table 4.5). A second grouping of resources was related to having appropriate practice guidance. There was wide support for having the appropriate information resources including policy, education, and personnel which provide the necessary answers and guidance to promote effectiveness and safety (Quotations 4.5.5 to 4.5.8, Table 4.5). The third grouping of resources related to practical assistance. Participants spoke about assisting staff to attend work during a disaster, including assistance with transport, accommodation, or financial incentives or recompense. Quotations from participants illustrate this need for support, the strongest support was from hospital support staff to assist in attending work (Quotations 4.5.9 to 4.5.11, Table 4.5).

Table 4.5 Exemplar Quotations Preferred resources for Disaster Preparedness

Quotation Number	Quotation and participant code
4.5.1	"Personal protective equipment... get vaccinated...if it is Tamiflu responsive, they should get free Tamiflu" C1MP1.
4.5.2	"a mask..., alcohol rubs...Tamiflu on hand" C1AH4.
4.5.3	"Appropriate protective equipment...educate staff" C1AH1.
4.5.4	"Make sure staff are aware they will have the right equipment to be safe...more equipment...make sure all health professionals are aware that disasters may strike, so making them familiar" C1AH6.
4.5.5	"We need proper information...information sheets, equipment...a specialist person...for anybody with questions" C1RN2.
4.5.6	"Proper training...that's the main thing" C1MP2.
4.4.7	"There are procedures in place...everything's been checked. We are ok"C1AH1.
4.5.8	"Knowledge is power...you will get people if empowered" C1MP1.
4.5.9	"a bus could be provided to bring staff to work" C1SS
4.5.10	"Cab charges" C1SS.
4.5.11	"Incentives might help... danger money or something like that..." C1AH2

4.5 Preferred Content of Disaster Preparation.

Participants made suggestions about what should be included in disaster preparation with reference to the structure of how disasters are managed. From a clinical or technical perspective, they considered whether national or international competencies were important. Disaster preparation may be either generic or specific to one's occupation or disaster type. The participants were asked their preference on this given the context and profession in which they worked. Importantly participants expressed whether the knowledge and skills needed during disasters are the same or different to those used during usual practice. Additionally, what clinical or technical skills are needed and what non-clinical or non-technical skills are needed were outlined by participants.

4.5.1 Organisational Structure for Disaster Management.

When asked if disaster preparation should include the how disasters are managed, every participant agreed that health professionals or support staff needed to understand how disasters are managed at the hospital or by the state and federal governments' health departments. All participants indicated that it was necessary to understand this chain of command or disaster organisational structure to ensure that they knew who would be in charge and where they get direction, resources or information (Quotations 4.6.1 to 4.6.3, Table 4.6). There was significant commentary around managing effectively during the disaster. This included the efficient and effective use of resources, appropriate allocation of responsibility to different groups or individuals though understanding the structures. There was discussion about the size of the campus and different occupations, so it is possible this is most important in a large multidisciplinary campus. It is important to have the appropriate structure and people in-charge, so the work and responsibilities are well coordinated (Quotations 4.6.4 to 4.6.9, Table 4.6).

Table 4.6 Exemplar Quotations Preferred Content of Disaster Preparedness Programs – Organisational Structure for Disaster Management

Quotation Number	Quotation and participant code
4.6.1	"I think you need a point of call; you need someone you can go to, even just for advice...Its good to know who is in charge" C1AH6.
4.6.2	"Very important ...-you may need to go and seek the person out to get up to date information to relay to staff and patients" C1AH1

4.6.3	"Who to report to..., someone to give guidance" C1SS.
4.6.4	"Yeah absolutely, ...we are a big organisation, and it just will not work if everyone is doing their own thing" C1AH3.
4.6.5	"I know who I am looking for. They are looking for me, although we are a huge campus ... as an entity it is made very clear how it all works...when the power has gone down it has been managed very well" C1AH5.
4.6.6	"For example, if ... is our manager, by the time you contact him and he comes, we need someone just to know for example like ..., just to instruct us what to do...It is very important C1SS.
4.6.7	"I think it is very important ...there should be people who know how to coordinate, the care of patients and who can allocate the proper person with the acquired skills"C1MP2.
4.6.8	"Very important someone leads, I will be told I am anaesthetics today, good to be told what to do, otherwise it would be pandemonium" C1MP1.
4.6.9	"I think all levels, from kitchen, from cleaning, they should all know who the person is to go to if there is a problem, who to communicate with and who to take direction from" C1RN1

4.5.2 National or International Competencies

The interview guide (Appendix D) included a question about competencies. The question was further illustrated by giving the example of a Haiti earthquake (Table 1.1) response where many medical teams who attended did not have proper training, equipment or skills to perform tasks.

All participants with the exception of one medical practitioner agreed that the content of disaster preparation, including the clinical or technical practices used during disasters should be based on national or international competencies rather than the opinions of individuals (Quotations 4.7.1 to 4.7.7, Table 4.7). In separate interviews and focus groups there were common ideas expressed including that disasters create additional risks for patients, often related to available resources and these need to be managed by proper processes based on competencies (Quotations 4.7.1, 4.7.2, 4.7.4, 4.7.6 and 4.7.7, Table 4.7).

Participants suggested that care standards should not be altered during disasters unless there were competency guidelines or standards to do so (Quotations 4.7.1 to 4.7.2, Table 4.7). The participants' perspectives about the place of national or international standards or competencies varied according to their role and the particular circumstances where services

provision cannot be compromised. Examples of particular contexts included: the therapeutic guidelines relating to the administration of medication (Quotation 4.7.1, Table 4.7); the specific considerations for food services (Quotation 4.7.2, Table 4.7); and equipment including fire extinguishers (Quotation 4.7.3, Table 4.7).

Examples were also given about the ways predetermined competencies assist with decision making within the disaster situation. Participants suggested this assisted in prioritising decisions and allocation of resources (Quotations 4.7.4 and 4.7.5, Table 4.7).

Other medical and allied health participants argued that disaster competencies are important to know for specific sets of circumstances including the type of disaster or setting. They indicated that there cannot be one competency for all professions or all disasters. Multiple competencies would need to be developed or used for most disasters (Quotations 4.7.6 and 4.7.7, Table 4.7).

An alternative view was espoused by a medical practitioner suggesting that competencies are not important as medical and nursing staff are well-educated and will make decisions as needed (Quotation 4.7.8, Table 4.7).

Table 4.7 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: National or International Competencies

Quotation Number	Quotation and participant code
4.7.1	"There would be something that is a broad spectrum or works exactly like and it just as good ...all those substitutes could be found in the therapeutic guidelines" C1AH4.
4.7.2	"Whatever we've got available...But then you still got to look out for allergens and texture right in the midst of all that too" C1SS
4.7.3	"Yes, I do if you don't know what your fire extinguisher is that can be a disaster. If you do know what it is and where it is that can prevent a disaster. ...You are responsible for the safety of others ... are you up to date? ...I think if you have the fundamentals then hopefully you will be able to apply them as everything else escalates" C1AH5.
4.7.4	"I came from an area of civil war. You don't have much time. Medical practitioners operating with a candle. No electricity ..., You have not got time to think. So, if that is something, we have already got prepared...these basic competencies. I can do A, B, C ... rather than what is ABC". C1SS.
4.7.5	"Yeah definitely, because some people are not good under pressure...at least you can have an idea how to prioritise things and where to go from there" C1AH6.

4.7.6	"I know for example within ...the department of community services they have designated people trained in disaster competencies of what to do when and I think that would be analogous in the setting" C1AH3.
4.7.7	"I think competencies are important. Specifically, in relation to particular disasters...earthquakes, tsunamis, fire ... biological spread of a virus..." C1MP2
4.7.8	"I really hate the way health care is becoming so tick box competency driven ... doctors and nurses are competent at ... your job ... you prove it every day...re-educated within an inch of your life ... I don't think competencies are going to help...no." C1MP2

4.5.3 Generic or Specific to Occupation

When participants were asked if disaster preparation should be specific to a profession or occupation the majority indicated that it should be specific (Quotations 4.8.1 to 4.8.4, Table 4.8). The main rationale given for specificity in preparation was that the perception that there are differences in both roles and responsibilities as well as the pre-existing knowledge between professionals and support staff, therefore their preparation should also be different (Quotations 4.8.1 to 4.8.4, Table 4.8). Some preparation is relevant for similar groups of professionals or support staff, particularly for those who would use similar knowledge or skills during disasters (Quotations 4.8.5 and 4.8.6 ,Table 4.8). Only one participant suggested that the preparation should be generic to all occupations and each person then applies the relevant information to their specific profession or occupation (Quotation 4.8.7 ,Table 4.8).

Table 4.8 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Generic or Specific to Occupation

Quotation Number	Quotation and participant code
4.8.1	" As I am a clinical leader, I also manage the facility as well, so I think my specific training should be very high level. If you are thinking about someone like an Assistant in Nursing, cleaner or kitchen worker, then they should be trained to what their responsibilities should be ... So, there has to be some difference in training" C1RN1.
4.8.2	"So obviously working in ICU there's lots of patients with chest compromise, then obviously our profession is to aid them to get their lungs working better" C1AH6.
4.8.3	"We don't deal much with the patients, but we deal more with the families... so that would probably be for us to learn different things...not so many patients ...more helping families" C1SS.

4.8.4	"The type of training will depend on a person's original skills... what specialty they are in. For example, paramedical staff will need different kind of training to medical staff... nursing different from other workers...so the workshops should be tailored to that" C1MP2.
4.8.5	"I would need it specifically for social workers or psychologists...We would deal with that patient very differently than ... a nurse, doctor or physio" C1AH1.
4.8.6	"You could have a stream that was generic ...food services. Cleaning...and all different roles ... but then people in their different groups would be staff specific for then. So, they would need add on ... we would know what we need to know" C1SS.
4.8.7	"I think it should apply to everybody and then you just know what applies to you and what does not" C1AH4

4.5.4 Generic or Specific to Type of Disaster

Participant responses were evenly divided in their opinions about whether preparation should be specific preparation for various types of disasters or generic so that it meets the needs of all or most types of disasters (Quotations 4.9.1 to 4.9.9, Table 4.9). Health professionals and support staff advocated the content should be generic, so it is applicable to all or multiple types of disasters (Quotations 4.9.1 to 4.9.6, Table 4.9). One compared disaster preparedness to the universal precautions model suggesting that whilst there are different situations, the response is the same (Quotation 4.9.1, Table 4.9) Others argued that the same preparation should be applied to multiple types of disasters as it was suggested that often the treatment is the same or similar regardless of the type of disaster (Quotations 4.9.2 and 4.9.3, Table 4.9). There was also a suggestion that it is best to prepare for disasters in a generic way because of the limited time and resources available in the workplace. An allied health professional suggested ideally all disasters would be covered as part of disaster preparation. The allied health professional acknowledged given limited resources it is more feasible to be generic (Quotations 4.9.4 to 4.9.6, Table 4.9).

There was an alternate viewpoint from other allied health, support staff and medical participants who advocated for specific preparation for disasters. This argument was that disasters are different, so preparation should focus on specific disasters responses rather than generic (Quotations 4.9.7 to 4.9.9, Table 4.9). One of these participants suggested that whilst the specific needs of all disasters should be covered, it may be more feasible to create a resource with the information and train only the leaders (Quotation, 4.9.9, Table 4.9).

Table 4.9 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Generic or Specific to Type of Disaster

Quotation Number	Quotation and participant code
4.9.1	"I do like the model of universal precautions kind of thing. There is some stuff that is just generic regardless of what the event is". C1AH3
4.9.2	"Keep it quite general, because as long as you can apply it to many different sorts of disasters. Still life-threatening events... like a tsunami. A bomb" C1AH2.
4.9.3	"I guess generic ...most of the things we will have to do in a similar way, like we have lots of patients coming in whatever happens so probably generic and an emphasis on chemical" C1SS.
4.9.4	"I mean I like fire training. It is really helpful. Helps you focus on one...and it would be kind of helpful to learn a bit more about specific types of disasters but equally I am thinking about time and resources...this is ideal world not with a budget. I would say good to get a general one and then maybe a half day ...half an hour on each type of disaster". C1AH1.
4.9.5	"I think in a time capacity it wouldn't be feasible to do every single type of disaster that may happen" C1AH6.
4.9.6	"(Generic) ...Because otherwise you would have too many intensive training days". C1SS
4.9.7	"I think specific for disasters ...like the chemical, biological would be different to SARS" C1AH4.
4.9.8	"Some points relevant to all... some lectures according to biological ... chemical. or fire" C1MP2.
4.9.9	"Good to touch on a few, definitely. We are prone to fire, earthquake. Perhaps terrorist attack... maybe put it all in a guidebook ... or maybe train the leaders" C1SS.

4.5.5 Embedded within Workplace Knowledge and Skills

Most of the participants indicated that the skills they would need during disasters would also be applicable to usual practice as they are already vigilant, delivering complex clinical care and working in crisis mode. They suggested that during a disaster there would just be more emphasis on prioritising care and decision-making (Quotations 4.10.1 to 4.10.6, Table 4.10). Some of the participants stated the skills would be the same as usual practice with minor variations.

Participants suggested that some additional guidelines or learning would be needed to guide how these skills would be used in the disaster context (Quotations 4.10.7 and 4.10.8). In addition, support staff participants hypothesised that their skills would be similar and additional

training in the use of PPE would be needed to accommodate the differences (Quotations 4.10.9 and 4.10.10, Table 4.10).

There were two participants, a registered nurse and medical practitioner, who argued that there would be differences in the context, the processes, the levels of stress and importantly the type of patients or injuries or illnesses, therefore specific preparation is required (Quotations 4.10.11 and 4.10.12, Table 4.10).

Table 4.10 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Embedded within workplace knowledge and skills

Quotation Number	Quotation and participant code
4.10.1	"No, I think I use those skills every day in some form. Maybe not in a disaster program, but certainly in prioritisation care and operational flow... communication is the key" C1RN1.
4.10.2	"I think we might have to prioritise a bit better, delegate... you need a leader to delegate to the team" C1AH6.
4.10.3	"I think they are (the same) ...like you sew someone up, that's no big deal and I can give antibiotic injections, I can get fluids in...you can still do it all" C1MP1.
4.10.4	"Managing illness... No, I think it would be something that we do as part of everyday" C1AH4
4.10.5	"I think our interview technique, our situational questions ... we do situational questions... for example even as I was walking up here there a man sitting on the chairs outside the x-ray door and two junior members of staff stopped and said are you alright? You know it's just being aware of your environment and people deteriorate quickly" C1AH5
4.10.6	"Well, I do a lot of crisis work...I do other jobs as well... so there related to the skills I already have... there in crisis mode but not disaster... yeah". C1AH1.
4.10.7	"The skills to use in critical incident I would say are ubiquitous to the therapist, but knowing how to play them out ...some guidelines would be essential" C1HA3
4.10.8	"All the skills we have are always going to be needed... but we probably need to get an edge ... training ... understanding all the protocols" C1SS
4.10.9	"You have these really good skills but ... change in what you have to wear" C1SS
4.10.10	"Skills probably the same...change what you wear...all transferable". C1SS

4.10.11	"Year I think they are quite different (skills) ...it's a totally foreign situation that you're dealing with...you just don't know what's going to happen...the types of casualties...you don't know what they are going to be like...its very stressful" C1RN2.
4.10.12	"My present job obviously we are not much involved in emergency disaster situation... the patients are long term...working in an emergency for a disaster...you need more (knowledge, skills)" C1MP2

4.5.6 Clinical and Technical Knowledge and Skills

Given the range of health professionals and support staff interviewed for this study there were differences in the types of professional, clinical and/or technical skills required for disaster preparation activities (Quotations 4.11.1 to 4.11.21, Table 4.11). The allied health professional participants focussed on patient counselling or family support skills that are required during disasters. This included crisis interventions, critical incident debriefing and mental health first aid (Quotations 4.11.1 to 4.11.3, Table 4.11). A medical practitioner participant also highlighted the need for psychological support and the need to provide counselling as highlighted in Quotation 4.11.7. Support staff participants spoke about providing direct patient care in the form of basic first aid and in the provision of therapeutic diets or supplements, as well as, having knowledge about communication processes for food allergies (Quotations 4.11.9, 4.11.10 and 4.11.12, Table 4.11).

Many including nursing, medical, and allied health participants raised the need to have knowledge of how to treat physical injuries (Quotations 4.11.4 to 4.11.8, Table 4.11). Some linked the type of responses to the types of disasters that may occur. The treatment of injuries included prescription, dispensing and administration of medications, decontaminating patients, performing surgery, diagnosing, and treating broken bones and the treatment of infections. Included in the treatment of physical health was knowledge related to suitability of the health service and supply of vital medications. There was some discussion about the need to deliver this care under pressure (Quotations 4.11.4 to 4.11.8, Table 4.11).

The most universal request for content amongst the participants was knowledge about PPE and infection control practices (Quotations 4.11.13 to 4.11.20, Table 4.11). The key difference was that support staff focused only on the PPE and the medical, nursing and some allied health participants included broader infection control or infection treatment (Quotations 4.11.16, 4.11.20, 4.11.19 and 4.11.18, Table 4.11). Another key aspect of care that emerged as important was the need to understand or be able to triage or prioritise during disasters. This was raised by

allied health, nursing, and medical professionals (Quotations 4.11. 21 to 4.11.25, Table 4.11). The participants suggested that this is largely related to providing care in the mass casualty context and there was recognition that this would include deciding that care cannot be provided to everyone and that it would be a new skill not normally needed in a private hospital (Quotations 4.11. 21 to 4.11.25, Table 4.11).

Allied health professionals and support staff participants indicated that they are capable to assist their medical and nursing colleagues in the event of a disaster by assisting with nursing care, transferring patients, sitting with anxious patients, bagging intubated patients, or performing basic life support (Quotations 4.11.26 to 4.11.28, Table 4.11). One allied health professional suggested that whilst they believe their existing skills are helpful during a disaster, they were unsure if the hospital leadership would require their assistance as they have not been consulted (Quotation 4.11.29, Table 4.11).

Table 4.11 Exemplar Quotations Preferred Content of Disaster Preparedness Programs – Clinical and Technical Knowledge and skills Required

Quotation Number	Quotation and participant code
4.11.1	"Different types of counselling styles...to whatever is going on". I think more Crisis intervention ...it's a very quick was to assess a patient and provide support, you may not get to see that patient again" C1AH1
4.11.2	"Interventions may apply to not only those affected but to their relatives ...and friends but also that kind of critical incident debriefing for staff or just collegial support" C1AH3.
4.11.3	"Mental health first aid is really important and that's where I would be of most use ...managing grief" C1AH2.
4.11.4	"(Following MCI or tsunami disaster) lots of broken bones...theatre" C1AH5.
4.11.5	"Clinically you can assess injuries during the disaster.... more than just a fire...pandemics...and massive casualties...mixture of injuries what sort of contamination and how suitable it is for our hospital...bed capacity" C1RN2.
4.11.6	"Depending on the disaster...you have to know the antibiotics administered pre surgery and post-surgery, medications required afterwards so that we could prepare...IV antibiotics or IV pain meds. So, we would make sure we have plenty of that available" C1AH4
4.11.7	"Mostly the stuff you be doing every day...basic life support, saving lives...a lot more counselling.... trauma patients. Drownings... radiation ...off the skin first...manage burns...manage their eyed. And lungs" C1MP1

4.11.8	"I think clinically you need quite a lot of procedures...which you would require in the disaster setting under pressure with minimum time...iv cannula, CPR...blood transfusion, iv plasma." C1MP2.
4.11.9	"CPR...basic first aid" C1SS.
4.11.10	"restocking" C1SS
4.11.11	"Source what meals we have available...salad, sandwiches, supplements, Sustagen" C1SS
4.11.12	"Communication of allergic to certain things (food)" C1SS.
4.11.13	"Protocols for gowning up" C1SS,
4.11.14	"use protective clothing" C1SS
4.11.15	"Personal protective equipment" C1SS
4.11.16	"Understanding of infection control...who is at risk" C1AH5
4.11.17	"Equipment ...protecting ourselves. Protective suits" C1AH10.
4.11.18	"spread of disease or medications required...hand hygiene" C1AH4
4.11.19	"Isolation area. Guidelines. Protect staff, prevent the spread of Ebola...treat patients effectively... protection apparel" C1RN1.
4.11.20	"Proper suits ready. Equipment so you and staff not exposed ... Contact precautions, antiseptics...isolation rooms..."C1MP1.
4.11.21	"Triage patients see who needs what... triage people ...the ability to move on. Understand there is someone or something you can help and move on to the next person" C1AH5
4.11.22	"Prioritisation which patient need the most help. Treating the most injured casualties. Prioritising the case load effectively" C1AH6
4.11.23	"To actually Triage patients like they do in ED..., we don't actually do that triaging...but it is good to know how they triage outside...so we know what state their going to be in" C1RN2.
4.11.24	"Bed capacity" C1RN1.
4.11.25	"I think clinically you need quite a lot of procedures...which you would require in the disaster setting under pressure with minimum time ...take care of individual patient, but at the same time managing your work. As fast as you can...not spending too much time on a particular thing" C1MP1
4.11.26	"Nurses won't be able to see patients for some time...pastoral care may need to see them more and spend more time with patients...with those not really sick" C1SS

4.11.27	"Assist the nursing staff in transferring patients" C1SS
4.11.28	"Skill people up as much as they can be...as a social worker I've taken on sort of nursing roles.... non mental health staff being trained as much as they can about mental health" C1AH1.
4.11.29	"I would like to know what the hospital thinks my role is. Just because we can help does not mean they want us all here. What would the expectation be? 100 employees on offer...we would be happy restocking" C1AH5.

4.5.7 Non-Clinical, Non-Technical Skills, Knowledge and Attributes Needed

In addition to the clinical skills, participants highlighted the importance of non-clinical and non-technical skills. These skills or behaviours included remaining calm, thinking clearly, being able to cope and function effectively when working under the pressure (Quotations 4.12.1 to 4.12.9, Table 12). Many participants recognised that additional counselling skills are required to support patients and colleagues, as well as communication skills to keep patients informed. Teamwork, leadership, and communication which were also commonly discussed as important knowledge and skills (Quotations 4.12.11 to 4.12.14, Table 12).

Table 4.12 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Non-Clinical or Non-Technical skills, Knowledge and Attributes Needed

Quotation Number	Quotation and participant code
4.12.1	"Stay calm...assist nursing staff" C1SS.
4.12.2	"Try to stay calm and think what you can do" C1SS.
4.12.3	"Counselling and calming" C1SS.
4.12.4	"Think practically...staying calm..." C1RN1
4.12.5	"You have to remain calm...think clearly and think rationally" C1AH4
4.12.6	"Well, I think it is important that you stay calm and that you're a fairly calm personality. You don't panic- you try to think clearly, think through in a fairly logical manor...Keep it all in perspective" C1AH1.
4.12.7	"Knowledge and skills how to regulate yourself.... The science of your own if you are heading into your own acopia. And then how to get help" C1AH3.

4.12.8	"We deal with one-on-one personal disasters on a day to day, we don't deal with mass loss and mass hysteria" C1MP1.
4.12.9	"Working under a pressure environment" C1MP2
4.12.10	"Communication skills" C1SS
4.12.11	"How to talk to the new patient, keeping them calm, keeping them informed" C1SS
4.12.12	"Good teamwork...good leader..." C1AH6.
4.12.13	"Working with colleagues...communication... leadership, knowing what staff are capable of doing" C1RN2.
4.12.14	"Negotiating, communication." C1RN1

4.6 Attendance at Work

Four disaster scenarios were presented to the participants in the interviews and focus groups and participants were asked if they believed health professionals or support staff should attend work or work in areas affected by the disaster. The disasters presented included a mass casualty incident where a bomb blast occurred at the hospital's nearby central business district; an Ebola virus outbreak affecting Sydney, a request for the health professionals or support staff to change speciality and work in the Ebola virus ward; a pandemic infectious disease outbreak e.g., similar to Severe Acute Respiratory Syndrome (SARS) or avian influenza (flu); and a Sydney-wide power failure where the hospital generator had also failed. Whilst the risks and health care interventions were not outlined as part of the discussion, the participant responses suggested that many perceived some disasters to be more dangerous than others in terms of their personal safety. This seemed to affect their decision-making regarding attendance at work. Generally, the power failure appeared to be considered safer than the other disaster scenarios as none of the participants commented on personal safety.

4.6.1 Mass Casualty Incident (MCI): Bomb Blast

The first scenario outlined was a mass casualty incident (MCI) in the nearby central business district resulting from a bomb blast. The majority of participants indicated that they believed health professions or support staff should attend work. Most participants also advised of the need to assess the personal risks as part of their decision. The implication was that if it was

perceived to be unsafe then staff may not attend work (Quotations 4.13.1 to 4.13.8, Table 4.13). Participants appear to be arguing that staff safety is a greater priority when deciding if health professionals and support staff should attend work. Providing care seems to be the lessor of the two priorities. An allied health participant suggested that a health professional's cognitive ability be affected by safety or family concerns, rather than an actual risk, although they also argued that some health professionals would attend work despite these concerns for their own safety (Quotation 4.13.9, Table 4.13).

A minority of participants advocated responding to the disaster as patients need care and it is their role to provide this care and did not refer to the need for staff safety or a risk assessment and one participant considered duty of care (Quotations 4.13.10 to 4.13.15, Table 4.13).

Participants indicated that they would encourage others to attend work as the hospital needs to function and patients need care (Quotations 4.13.10 to 4.13.15, Table 4.13).

Table 4.13 Exemplar Quotations Attendance at Work During Disasters Mass Casualty Incident: Bomb Blast

Quotation Number	Quotation and participant code
4.13.1	"I think I would be informed by emergency services on if it is safe for staff to come in..., has the perpetrator been caught? and I do have to respect the wishes of my family" C1RN1.
4.13.2	"On the day you would assess the risk ... if that was fear based rather than reality ... you don't put yourself at risk" C1AH3.
4.13.3	"I think the hospital member should go to work cause the risk of another bomb going off is very little, so it's a case of helping those people in need" "you know that is ethically ...what somebody should" C1AH6.
4.13.4	"Right, there is no real (danger)...it's not in the hospital. I like to think the pharmacist should go to work in this scenario ... because there is no real danger to the pharmacist" C1AH4.
4.13.5	"I suppose we would (attend work) ...checking with our bosses, the hospital, the media...if there was an announcement saying we do not feel it's safe...I wouldn't leave the house...can't be any use to anyone if I am attacked" C1AH1.
4.13.6	"Yes, I think they should, if it is safe for them to go to work...I would come to work but if I had to go through the MCI area I'd probably stay home" C1AH2.
4.13.7	"I think there is no danger within the hospital area you should go" C1SS.

4.13.8	"you're working for a hospital, it's part of your job, your duty of care to the patients, it's your responsibility. The bomb has already happened, so it's not likely to happen again...personally I would come" C1SS
4.13.9	"Year I think it has to be personal preference, and I think if they don't want to be there then they shouldn't be there. I don't think they will be focused on what they should be doing...there not listening...there heart and head is elsewhere...if they have someone who is terrified something will happen to them, especially a small child, elderly parent.... Some would go anyway regardless of what their family said". C1AH5.
4.13.10	"Yes, I would advise nurses to come to work...it's business as usual at the hospital and it is important staff turn up for work...reassure it is safe and that they are in an essential service, and we do require them at work" C1RN2
4.13.11	"I think you would be hard pressed finding a doctor who would not go. Most medical practitioners I have met are vocationally driven...they want to help. Most would like to do the hard stuff... your obligation to your profession...moral code...I can save lives and therefore I should" C1MP1.
4.13.12	"Right, I think medical practitioners should definitely attend because you have a responsibility to the community...Even if your family is thinking otherwise but the Doctor has a responsibility to provide much assistance... a difference between life and death" C1MP2.
4.13.13	"Go and help" C1SS
4.13.14	"I believe they should" C1SS

4.6.2 Ebola Virus Outbreak

Participants were provided with scenarios regarding Ebola virus outbreaks where the participants' hospital was the designated receiving centre and staff were required to work in the clinical units caring for patients infected with Ebola virus. Participant views demonstrated there was a greater focus on personal and family safety in the Ebola virus outbreak scenario, compared to the need to provide patient care (Quotations 4.14.1, and 4.14.7 to 4.14.9, Table 4.14). The need for additional learning or the provision of accurate information was suggested to be important for staff to attend work. This indicates that for some they believe colleagues do not have adequate knowledge of Ebola virus (Quotations 4.14.1 and 4.14.9, Table 4.14). It was also common for participants to argue that staff should attend work, although they suggested the staff may not actually attend based on safety and the health of staff seemed to take priority over the need to provide care (Quotations 4.14.1 to 4.14.8, Table 4.14). The exception to this was an argument presented by a medical practitioner who argued that whilst it is terrifying, staff need

to trust that PPE and procedures would be in place to keep them safe (quotation 4.14.6, Table 4.14).

Table 4.14 Exemplar Quotations Attendance at Work During Disasters: Ebola Virus Outbreak

Quotation Number	Quotation and participant code
4.14.1	"I think they would need training and see if they feel confident to do that role and they should not feel pressured to do it ... Depends on the person, how confident they are... if they have had exposure to it before...they are safe to enter that situation" C1AH6.
4.14.2	"Well, the pharmacist will be required ...because very busy with medications...but have to think if a person was immunocompromised...is it worth the risk... a personal decision...pharmacist in high demand" C1AH4.
4.14.3	"Have to do a risk assessment. Speak to management. Make an informed risk assessment...had not to perform my duties but look after my own health needs too" "check what's safe" C1AH1.
4.14.5	"Well, I suppose you have to go...just ask am I going to be protected...what is there to protect me...I suppose ascertain do I really need to go...should put yourself in any risk if you don't have to...may not have to actually physically go there...it's not only me it's my family as well that I have to consider" C1AH2.
4.14.6	"Oh, I think Ebola is so terrifying in that it's so deadly and it seems incredibly transmissible...if we were informed that the masks and suits were fine, you're not going to contract it I feel you should go to work" C1MP1.
4.14.7	"They are not educated medically...I probably want some kind of system in place for food staff...whether they are going to use PPE properly...You can train...not always get the best outcome"C1SS.
4.14.8	"My opinion. I don't think they would come...because its contact with the patient" C1SS
4.14.9	"Not if they have not had training or if they don't feel confident. I would not put them at risk. They would need ...training ... understanding...the risks involved"C1RN2

4.6.3 Pandemic Influenza

Participants were presented with a scenario about a pandemic influenza outbreak and asked if they or their colleagues should attend work. Participants, as indicated by their responses seemed to have less fear compared to when discussing an Ebola virus outbreak (Quotations 4.15.1 to 4.15.4 and 4.15.7, Table 4.15). Participants suggested PPE, infection control guidelines or vaccination would provide satisfactory protection and they expressed a view that health

professionals should attend work (Quotations 4.15.1 to 4.15.4 and 4.15.7, Table 4.15). Only one allied health participant seemed to consider the risk of becoming infected although decided it would be necessary to attend work (Quotation 4.15.4, Table 4.15). One medical practitioner participant did not appear to consider the personal risk to themselves and explained that health professionals should attend work as the patients would need their care (Quotations 4.15.5 and 4.15.6, Table 4.15).

Table 4.15 Exemplar Quotations Attendance at Work During Disasters: Pandemic Influenza

Quotation Number	Quotation and participant code
4.15.1	"Yes (should attend work) because we just follow our protective procedures and guidelines looking after these patients" C1RN1
4.15.2	"Yes, I don't think you would have a problem. PPE is quite safe. Just wear equipment and get vaccinated if it's a vaccinateable disease...year go to work" C1MP1.
4.15.3	"Yeah, definitely because chest physiotherapy is probably going to be vital, as long as you're wearing protective equipment...most professionals have the influenza vaccine" C1AH6.
4.15.4	"Well, that's a difficult one as you don't want to get it yourself...protect yourself with masks and gloves...I think yes" C1AH1.
4.15.5	"Yes, depends on the pharmacist...I do not see why not. There will be increased demand" C1AH4.
4.15.6	"Yes, obviously they should attend because influenza pandemic most of the patients will be elderly or they will have a lot of comorbidities ...need a lot of assistance" C1MP1.
4.15.7	"Year I think very important, you have to come to work...Gastro outbreak in some area... my supervisor call extra staff... extra clean with broom, bleach everything... more staff", "More affected outside hospital...shopping centres, train stations...hospital is safe place" C1SS.

4.6.4 Power Failure with Internal Hospital Generator Failure

The other disaster scenario discussed involved a city-wide power failure when the hospital generator had also failed. In this scenario patient care seemed to be the only consideration for most participants. There was no consideration of personal safety or risk expressed (Quotations 4.16.1 to 4.16.7, Table 4.16). The only consideration was how to get to work for staff that relied on public transport was if the trains did not operate due to the power failure. The participants suggested a taxi voucher indicating their willingness to attend work (Quotations 4.16.8, Table 4.16).

Table 4.16 Exemplar Quotations Attendance at Work During Disasters: Power Failure with Internal Generator Failure

Quotation Number	Quotation and participant code
4.16.1	"Well, we still need patients to be looked after so yes I would like nurses to come in to help" C1RN2.
4.16.2	"Yes, because we are going to need a lot of support" C1RN1.
4.16.3	"Yes, obviously the power failure in a hospital you need a lot of assistance...you will need medical practitioners onsite because patients would need assistance C1MP2
4.16.4	"Yes, if you still have patients struggling through without power then you're going to need medical practitioners... Going to be bagging patients ...more hands-on deck" C1MP1.
4.16.5	"Yes definitely (attend work) ...we know how to mobilise people safely, how to transport, so all professionals can work together" C1AH6
4.16.6	"Well yes the show must go on...the medications will still need to be dispensed. In a power failure we could still access the medications. Hand write labels" C1AH4
4.16.7	"We cannot just leave patients...", "most definitely" C1SS.
4.16.7	"Depends on how you get here, because I come by train", "If we don't have transportation ... we don't have public transport... some cab charges"C1SS.

4.6.5 Encouragement to Attend Work

Participants suggested four main ways to encourage staff to attend work through organisational or individual preparation. Participants suggested the provision of education or information sheets would encourage attendance at work. Arguments were made to ensure that the provision of the information should be presented in ways that engage the participants and also targeted towards certain occupational groups. Information or knowledge were suggested to be very important to advise and empower health professionals and support staff (Quotations 4.17.1 to 4.17.5, Table 4.17). Appropriate PPE and preventative medications/vaccines were considered a priority to promote attendance by many participants. This included the provision of PPE, equipment and medications that help protect the health care workforce. (Quotations 4.17.6 to 4.17.10, Table 4.17).

Some participants argued for practical measures to be implemented to promote attendance including planning that understand who would like to work and how to contact them during a disaster. Other measures were to compensate staff with extra pay or to provide logistical assistance to get to work, providing a bus or taxi vouchers (Quotations 4.17.11 to 4.17.14, Table 4.17). Reminding staff about the privilege, responsibility to the hospital, profession, or patients was suggested as a way to encourage staff to attend work. This if promoted to staff ahead of and during disasters will promote health care work to be valued by staff and society. Promoting the lifesaving value of disaster work and how rewarding it was suggested as a way of promoting attendance at work (Quotations 4.17.5 to 4.17.7, Table 4.17).

Table 4.17 Exemplar Quotations Attendance at Work During Disasters: Encouragement to Attend Work

Quotation Number	Quotation and participant code
4.17.1	"We need proper information, education about the ...disaster...Information sheets, equipment...regular checks and reassurance" C1RN1.
4.17.2	"Knowledge is power...if people provide disaster management and it's a fun topic...gets you thinking of the bigger picture" C1MP1
4.17.3	"Hospital circulate information to all the medical practitioners that says (a disaster) can happen and everyone should be ready...properly informed" C1MP2
4.17.4	"Safe procedures in place to make sure everything has been checked and we are ok" C1AH5
4.17.5	"Giving information on everything" C1SS
4.17.6	"PPE" C1AH5
4.17.7	"have Tamiflu on hand" C1AH4
4.17.8	"Staff aware that they are going to have the right equipment to be safe" C1AH6
4.17.9	"If Tamiflu responsive... come to work, ... give you a box. That stuff is expensive" C1MP1
4.17.10	"...proper precautions...masks" C1MP2
4.17.11	"Mobile contact numbers, everyone knowing each other, open lines of communication...I would like to know who definitely does not want to be involved who would want to be considered, who would show up no matter what...that speeds things up" CIAH5
4.17.12	"Incentives may help. Danger money" C1AH2

4.17.13	"...better to stay ...sleep, shower here... you're not going to see your child...we've got different forms of communication now...skype. Face time" C1AH5
4.17.14	"I mean maybe transportation. If we don't have public transportation and I need to work, then maybe they offer some" "bus" "cab charges". C1SS
4.17.15	"I can and it's kind of an honour and a privilege to do it" C1MP1
4.17.16	"...you're in this profession and you have chosen to help people so why would you not help them in their biggest time of need" C1AH6
4.17.17	"...it's business as usual at the hospital and it is important staff turn up for work... they are in an essential service" C1RN2

4.7 Lessons Learnt Regarding Preparedness from Disaster Experience

Eight of the nineteen participants at Case 1 had actual experience during disasters. The most common lesson learned from these participants with disaster experience was the importance of having a disaster plan to provide reassurance and a practical starting point to manage disasters (Quotations 4.18.1 and 4.18.2, Table 4.18).

Medical and allied health participants with disaster experience argued that having access to experts just before or during the disaster is very helpful for a successful disaster response. Meetings or briefings held immediately before disasters as well as during disasters to provide information, calm staff, to inform about the plan (Quotations 4.18.3 and 4.18.4, Table 4.18).

Another lesson learned was that it is important to be aware that despite preparation and planning, individuals will respond differently during disasters. Some staff during disasters will cope well with the disaster, and others will be distressed (Quotation 4.18.5, Table 4.18). An observation from a registered nurse with disaster experience is the value of learning from the disaster. After the disaster has occurred it is valuable to reflect and share individual or organisational lessons learnt (Quotation 4.18.6, Table 4.18).

Table 4.18 Exemplar Quotations Lessons Learnt regarding Preparation from Disaster Experience

Quotation Number	Quotation and participant code
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4.18.1	"Backup systems ...whole range of printed tray tickets ... we did not have to go from scratch" C1SS
4.18.2	"Comforting knowing someone had a plan...we can save more lives this way" C1MP1
4.18.3	"The talk was very supportive...it left us feeling there was a plan. Don't need to panic" C1MP1
4.18.4	"We all had a meeting...how many beds...we were prepared and trying to relax everybody" C1AH6
4.18.5	"People are in danger and what you do to minimise harm... I found that good... but afterwards there were kids still freaked out...were very distressed ... just going through things but everything was safe". C1SS
4.18.6	"Debriefing exercise afterwards, invaluable...make improvements...from my own performance... Share knowledge too" C1RN2.

4.8 Other Observations or Ideas

At the conclusion of the interviews and focus groups participants were asked if they had other observations or ideas for effective disaster preparedness. Not all participants chose to answer this final question.

Among the responses one of the participants spoke about needing to recognise the importance of the role of social workers in the disaster response. The participant had previously worked as a registered nurse and noted that nurses get a lot more recognition than social workers in the disaster response. The support staff focus group also spoke about disaster preparedness being an important and useful topic (Quotations 4.19.1 and 4.19.3, Table 4.19).

Three participants chose to highlight the importance of learning, knowledge, and their important role in disasters. There was the suggestion that preparation needs to be expanded (Quotations 4.19.4 to 4.19.6, Table 4.19).

Table 4.19 Exemplar Quotations Other Ideas from Case 1 Participants

Quotation Number	Quotation and participant code
4.19.1	"The people out there that want to do harm...they attack so there are victims, and they wait until people, ambos, nurses, medical practitioners go and help ...and that is who they are after..." C1AH5.

4.19.2	"Having been a nurse and now a social worker ...as a nurse you get a lot more recognition than I do as a social worker... the role is equally important" C1AH2.
4.19.3	"This is very interesting? Makes us think about..." C1SS.
4.19.4	"I think training and awareness in the most prominent thing...and confidence" C1RN1.
4.19.5	"I think the chief warden training should be expanded to incorporate other major disasters...hands on training...some e learning tests at the end...practical knowledge and processes..." C1RN2
4.19.6	"I think knowledge is power...you will get better help if people are empowered... Provide disaster management and it's a fun topic...gets you thinking about the big picture... a lot of medical practitioners volunteer and help for different disasters worldwide...it's cool to save lives...normally we don't save many lives". C1MP1

4.9 Analysis

Both duration and frequency seemed to be linked with most participants preferring annual preparation of around two hours or less in duration. One rationale provided for the short preparation was not related to learning outcomes, but rather available resources and the need to complete one's usual workload. Being a private facility may have influenced opinions as this model of funding there is a focus on efficiency and profits. Also, as a private facility staff are less likely to need to respond to external disasters or see the need to prepare, as this is a role primarily of public hospitals in Australia.

Some participants expressed that preparation should be longer for more senior staff or managers. A medical practitioner advocated for the longest preparation time as did the nursing participants in the study whom both had nursing manager roles. This reflects the senior clinical role that the medical profession and for nursing management hold in the organisation. Within the Case 1 as most management responsibility, including disaster response is the responsibility of nursing management.

Whilst practical preparation was the most preferred in Case 1, it is possible that being a private facility, without an emergency department, the focus of disaster preparedness is less about preparing for MCI incidents and more about preparing for internal incidents. These internal incidents may have been considered to be more easily prepared for through lectures, as many participants when speaking about practical preparation referred to infection control, PPE and triage, which are more related to external disasters. Many of the responses, illustrate that

participants from all disciplines view preparation as involving more than one style of preparation. The most popular blended learning was lecture with practical as is used for fire training sessions at Case 1. It is possible that the views of participants in the case study were influenced needing to prepare primarily for internal incidents.

Other forms of preparation were described in Case 1. Checklists or policy guidelines were recommended by various participants. They argued these documents can assist knowing what to do during the actual disaster. Support staff suggested that policies or a disaster brochure can be useful. A brochure may be seen as more colloquial form of document, than a policy, procedure or checklist. The brochure and may have been suggested as it could be more user friendly for the needs of support staff.

Online learning was not popular as a reliable method of disaster preparation. There did seem to be an increasing acceptance of online learning when paired with another style of preparation, despite this not being popular on its own. Two allied health professionals suggested online learning resources were useful preparation before practical preparation and a registered nurse participant outlined online resources were useful to test following the practical preparation. Sequencing may therefore be important when different methods of preparation are used. Online learning did not need to be a sophisticated program when combined with face-to-face learning. As identified by a Case 1 allied health participant, it was simply emailing relevant information and policies to department members. This form of learning was and could be used to share resources online, without needing to develop an online learning program.

Participants indicated they wanted appropriate resources to increase their knowledge so that they knew what is required during disasters. They also argued for appropriate equipment to keep staff safe and to treat patients during disasters. An allied health professional and the hospital support staff suggested for the practical, financial, or logistical support to get to work. This highlights the value of including allied health and support staff in disaster preparedness activities. The learnings from these staff were important, as they may have been more dependent on using public transport to attend work which may be affected during disasters. Case 1 is located in a high socioeconomic suburb of Sydney and many staff travel long distances to get to work. It is important that the practical assistance is factored into preparedness.

The majority of participants felt that disaster preparation should be specific to the profession or occupation. There was some suggestion that similar professions could undertake similar preparation. Participants focused on the differences in roles and responsibilities during disasters, implying that there should be profession or occupation specific knowledge delivered in disaster

care. A pharmacist needs to know which antibiotics to dispense for various infection outbreaks or a food service staff member needs to know how to prepare food during a power failure. In terms of preparing for the different types of disasters some argued that due to time or resources limitations generic preparation was more realistic. Some participants believed while it could be more effective to cover the needs of individual disasters, resources would restrict the ability to cover all types of disasters.

In this case study, most participants placed personal risk over patient care, when deciding to attend work or not when considering the bomb blast scenario and the Ebola virus outbreak scenario. In the power failure and the pandemic scenario, participants were more likely to indicate they would attend work. Case 1 hospital has experienced power failure events and participants believe the risks can be controlled during a pandemic influenza with PPE and vaccination. Case 1 participants were influenced most both by perceived danger, familiarity with procedures and care needed. Duty of care seemed to be a lower priority.

Despite the private hospital's limited exposure to external disasters there were participants working in the private hospital that had experienced disasters either internally with internal incidents or whilst working at other national or international hospitals or workplaces with external disasters. External employment experience had enabled private hospital participants to view that having a plan and access to experts are the most important resources contributing to enhancing disaster performance during disasters. An important consideration for private hospitals is to recognise and consult with staff that have experiences working in external disasters in prior or concurrent employment.

A significant finding from Case 1 was the essential role of allied health and support staff in disaster management which supports their inclusion in disaster preparation and planning. A social worker, who was formerly a registered nurse, described that as a social worker they were not included in disaster preparedness to the same degree as they experienced when working as a registered nurse. A radiographer with responsibility for many allied health professional and support staff, indicated that whilst their staff are willing and capable to assist during disasters, they were unaware if the hospital required their assistance. Support staff and allied health participants in Case 1 indicated they could assist during disasters outside their normal roles, including assisting nurses. Acknowledgement of the ability for allied health and support staff to assist in areas outside their usual roles during disasters, should form part of their and the Case 1 hospital's disaster preparation.

4.10 Conclusion

The participants included a range of disciplines and specialty areas and gave insight into the preparation needs of the private hospital workforce. The private hospital context is important to understand as although the response to external disasters is primarily the responsibility of the public hospital system, private hospitals have significant capacity and health plans are in place for private hospitals to support public hospitals during external disasters. Private hospital staff included in this research have worked during internal incidents within Case 1 hospital and external disasters whilst at other hospitals.

The case study findings demonstrate that Case 1 participants have strong understanding of the methods required for their disaster preparedness. A wide range of subject matter that can be included in preparation and the care required during disasters was also known and expressed by participants. Many participants had prior experience working during disasters and all had completed some form of disaster preparation (mostly mandatory practical fire training sessions or online modules). Support staff in particular had lived experiences internationally during disasters or wars and this partially informed their contribution to the disaster preparedness discussion and findings. Participants indicated a strong preference for practical, lecture or blended methods of preparation and a need for disaster preparation to include a wide variety of clinical and non-clinical disaster related subject matter.

There are gaps in knowledge and skill level with some occupational groups and elements of disaster preparedness. Excluding the nursing participants, only a minority of other participants had undertaken practical disaster exercises at the hospital (Table 4.1). The Case 1 site needs to be more inclusive regarding disaster preparation. There was further support for the need for inclusivity in disaster preparedness, with allied health and support staff participants reporting that they have skills to support disaster care although they were not included in preparation.

Inadequate resources are invested into disaster preparedness for staff in Case 1. Participants expressed a preference for short periods of disaster preparation annually and a wide range of different disaster content or other disaster subject matter that should be included in preparation. It was commonly expressed that preparation needs to fit within existing workload. The hospital management and workforce need to consider if adequate disaster knowledge and skill can be achieved in 30 minutes to 2 hours a year.

Attending work during disasters is important to meet the care needs of patients and this was recognised by all participants. Participants indicated less willingness to attend based on either

the personal risks related to the disasters or a lack of knowledge, experience or information regarding their role. Resourcing effective educational or preparedness methods and other safety resources is required to improve preparedness.

Case 1 contributes important findings on how health professionals and support staff can most effectively prepare for disasters within the context of a major Australian private hospital. The ability of the Case 1 hospital workforce to respond to work and deliver the care or services needed is linked with having adequate disaster knowledge and access to safety equipment and resources.

Chapter 5 Case 2: An Eastern Sydney Public Hospital

5.1 Introduction

Case 2 hospital was selected for the study as it is a major public hospital and trauma centre located closest to Sydney's central business district. Hospital staff have responded to internal and external disasters including mass gathering events, infectious disease outbreaks, the Lindt Café shooting which was treated as a terrorist attack during the event. Internal incidents including flooding, fire and a major power failure with generator failure have also occurred. Staff at the hospital have also participated in disaster preparation. The data were collected on the campus of Case 2 between November 2018 and February 2019.

The methods of data collection and analysis have been used as described in the methodology chapter. For presentation of this case, participants have been allocated a participant code. For registered nurses, the code is C2RN1 or C2RN2 and for medical practitioners C2MP1 or C2MP2. There were six allied health professionals including two social workers and one dietitian, pharmacist, physiotherapist and radiographer, these participants were coded as C2AH1 to C2AH6 to further protect their identity. It is not possible to determine who said what in the focus group, all participants were allocated a code C2SS (Case 2 Support Staff). Transcripts were thematically analysed and coded as described in the methodology chapter using structural and descriptive coding (Belotto 2018) and analysed according to multiple case study methodology (Stake 2006). Exemplar Quotations from transcripts are included in this case study chapter to evidence the themes. Findings from this analysis are outlined under headings describing preferences for disaster preparation: duration and frequency, methods and resources, content, attendance at work during disasters, lessons learnt from actual disaster experiences and other observations which emerged.

- Section 5.2 Participants. This section explains the recruitment of participants for the case and presents participant demographic data.
- Section 5.3 Preferred Duration and Frequency. This section describes the preferred duration and frequency of disaster preparation.
- Section 5.4 Methods and Resources Preferred for Disaster Preparation. This section explains the preferred method of disaster preparation as well as what resources are required to prepare for disasters.

- Section 5.5 Preferred Content of Disaster Preparation. This section is the largest in the case study and includes participant preference of what training content should be included, international or national competencies, be generic or specific for occupation or disasters and what clinical and non clinical attributes, knowledge or skills are required for disasters.
- Section 5.6 Attendance at Work. The section presents participants perspectives regarding whether they believe health professionals and support staff should attend work in various disaster scenarios.
- Section 5.7 Lessons Learnt from Actual Disaster Experience. This section describes of what preparation was effective in terms of improving disaster preparedness.
- Section 5.8 Other Observations or Ideas. This section provides an overview of other issues or ideas raised by participants in relation to disaster preparedness.
- Section 5.9 Analysis. This section is an analysis of the key ideas or findings from the case study.
- Section 5.10 Conclusion. The conclusion summarises the findings of the case.

5.2 Participants

All participants were invited to attend through a process of third-party recruitment, via their manager's email or verbal invitation. They were provided with an information sheet and consent form by the manager. The researcher verified with participants the information sheet had been received and answered additional questions as needed prior to obtaining the consent form. The interviews or focus groups were conducted in private meeting rooms at Case 2 hospital and were audio recorded and transcribed by a third-party transcription service approved by the University of Tasmania.

Ten health professionals and eight hospital support staff were selected to participate in interviews and focus groups in Case 2. One support staff member withdrew after the focus group so there were 7 support staff in the focus group recorded in the demographics Table 5.1 as any identifiable data for the support staff member was not utilised.

It was considered important to learn from participants with disaster experience. As required by the selection criteria, all participants had experience in either disaster training or preparation and 10 participants had experience working during actual internal or external disasters. The managers or directors who invited participants to participate in the research, were advised that

it was preferable to have participants with actual experience working during actual internal or external disasters.

Table 5.1 Case 2 Participant Demographics

Occupation and participant Code	Experience in Healthcare	Disaster experience	Disaster Training	Qualifications
Registered nurse 1 C2RN1	30 years	Yes – Lindt café, city to surf fun run preparation.	MIMMS, MIMMS extended course, Emergo Train training course, participated number of Emergo Train, Monash University disaster Certificate.	Diploma of Health Sc, Diploma of Education (Nursing), Masters clinical epidemiology
Registered nurse 2 C2RN2	7 years	No	Master of Public Health majoring in disaster preparedness & biosecurity, Emergo Train, MIMMS one & three-day course, hospital disaster courses, upgrading disaster plans.	Bachelor of Nursing, Post Graduate Certificate in Emergency Nursing, Master of Public Health
Medical Practitioner 1 C2MP1	20 years	No	MIMMS Courses, Emergo Train exercises, disaster lectures at college meetings	Bachelor of Medicine, Bachelor of Surgery, FANZCA (Anaesthetics), FICM (Intensive Care)
Medical Practitioner 2 C2MP2	25 years	Yes, as a paramedic MCIs	Paramedic and on the job training, Emergo Train exercises	Bachelor of Medicine, Bachelor of Surgery (hons), Bachelor of Paramedic Science.
Social worker 1 C2AH1	33 years	Yes – Bali Tsunami, Disaster victim response	Coroners identification course & counselling course.	Bachelor of Social Work, Bachelor of Arts, Grad Cert Business.
Social worker 2 C2AH2	6.5 years	No	Emergo Train, fire training,	Bachelor of Social Work
Dietitian C2AH3	32 years	No	Fire training, CPR, risk management	Bachelor of Science, Post graduate diploma Nutrition & Dietetics

Pharmacist C2AH4	29 years	No	Emergo Train, disaster training and feedback sessions	Bachelor Pharmacy, Post Grad Certificate Clinical Pharm.
Physiotherapist C2AH5	4 years	Yes – MCI 30 pts to ED following suicide at nearby hospital.	Simulation exercise / training in ED	Bachelor of Science Sports physiology, Masters in Physiotherapy.
Radiographer C2AH6	21 years	yes, Lindt Café briefing	Emergo Train, department plan,	Bachelor of Applied Science Medical Radiation Science
Clerical	Withdrew	Not applicable (N/A)	N/A	N/A
Pastoral Care / Chaplin C2SS	43 years	Yes - Personal experience – caught in flood/ ED and ICU exp	Fire training	Clinical Pastoral Education , Trauma counselling
Pastoral Care / Chaplin C2SS	3 years	Yes, Assisting victims and families of trauma in ICU / ED	Fire training	Chaplaincy / Clinical Pastoral Education
Operating Theatre Orderly C2SS	22 years	Yes, 25years Rural Fire Service (RFS)	Advance life support course, Advanced Fire Fighting with Rural Fire Service	
Food services C2SS	32 years	Nil	One training session / meeting	N/A
Environmental Services C2SS	Two years	Nil	Fire training	N/A

Patient Transport / Wards person /Orderlies C2SS	44 years	Yes, Ambulance commander – all major disasters NSW	MIMMS trainer	Paramedic 34 years / Certificate III Patient Transport.
Patient Transport / Wards person/ Orderlies C2SS	6 months (plus previous clerical experience).	Yes, Brisbane Floods / Victorian Bush fires - Banking	fire training / orientation	Nil

5.3 Preferred Duration and Frequency of Disaster Preparation

5.3.1 Duration of disaster preparation

The preferred duration of disaster preparation by most participants in the Case 2 was short. The most common preferred time frames ranged from half an hour to two hours. Participants gave preference for the shorter time frames and indicated that adequate information could be shared in less than two hours (Quotations 5.2.1 and 5.2.6, Table 5.2). Most of the participants linked shorter preparation times to frequency, suggesting that shorter training should be repeated annually as repetition would enforce the knowledge retention. Participants compared disaster preparation to other forms of mandatory training, basic life support or fire training in terms of the duration required (Quotations 5.2.1 to 5.2.2 and 5.2.8, Table 5.2). The shortest preparation time recommended was 30 minutes if it was to be completed annually (Quotations 5.2.1 and 5.2.6, Table 5.2). Some participants suggested only a short preparation time was needed, as staff would have written resources, policies or task cards, to refer to during actual disasters (Quotations 5.2.3 and 5.2.4, Table 5.2).

Other participants indicated preparation time could be variable depending on one's role. They suggested operational staff, including clinicians could be provided with adequate disaster preparation in one hour or less. Longer preparation would be needed for senior clinicians and managers. The longer session for managers was suggested only if they would need to assume additional responsibilities during the disasters. Quotations 5.2.7 and 5.2.8 in Table 5.2 exemplify these findings.

Four participants, including the two medical practitioners, one registered nurse and one allied health professional, argued that preparation needs to be longer than two hours (Quotations 5.2.6, 5.2.9 to 5.2.11, Table 5.2). Participants advocated preparation times ranging between half a day twice a year to three days up to four times per year. They argued that longer preparation was needed was important for staff awareness, policy reviews, to undertake Emergo Train exercises, to prepare for many different disaster types, and so that staff could immerse themselves in disaster planning. Quotations 5.2.6, 5.2.9 to 5.2.11 in Table 5.2 represent these findings.

Table 5.2 Exemplar Quotations Preferred Duration of Disaster Preparedness

Quotation Number	Quotation and participant code
5.2.1	"Would say minimum, annually... probably 30 minutes... you do it annually..., it becomes part of your learned values... More like the fire training a refresher every year" C2SS
5.2.2	"I think yearly would make sense, like your CPR, I guess. Or like your fire training. I would have thought at least an hour, potentially even longer. Two hours. Yearly". C2AH5
5.2.3	"For a Social Worker, ..., those who are on the on-call roster ... would be called on in a disaster ... some clear training and guidelines ...I think annually ... then there's a policy to fall back on. ...I can imagine a couple of hours focusing on that would be useful ..." C2AH2
5.2.4	"... I think you're needing about an hour and a half.... and thereafter it might just be a refresher of task cards, and that can be the social work manager making sure that happens" C2AH1
5.2.5	"...the Emergo Train training it was a whole day thing, and it was probably too much for a thing like that, it was probably too much for usI think there needs to be a happy medium like a couple of hours every year just to keep things... your disaster plan is up to date, having regular meetings with the guys downstairs that do all of that....Fifteen-minute sessions might not be long enough....something like an hour or two hours every year, similar to what we do for fire and evacuation, for disaster" C2AH6
5.2.6	"I think if you're doing a drill, like a fire drill, and we might just be telling everybody what to do when they hear a code brown ... maybe annually or biannually ... I think it does need to be frequent. I would have to say annually should probably be the minimum and I think optimally, I would go for twice a year (a few hours?) ...Yeah" C2RN1
5.2.7	"You don't want to make it too long that people don't do it, or they forget what they've done, ... An hour or less...managers, might need more ...particularly if there is going to be extra requirements that they might have to take on" C2AH3

5.2.8	“If you're looking at RNs on the floor, once a year and in a 45-minute session is probably good enough.... creates awareness..., that prioritisation and what their responsibility.... expected of them...like ALS or other little things. But I think for people who are taking on a more senior role, it probably needs to be longer - even if it's a day once a year - ...” C2RN2
5.2.9	“To keep the policies and procedures up to date, ... Having an Emergo Train every couple of years, would actually be very informative... (Emergo tends to take about four or five hours?) ...yeah”. C2AH1
5.2.10	“I suppose it would depend on what form the training is taking. You could argue that perhaps for argument’s sake a half-day every six months to a year to maintain people’s awareness would be a good starting point” C2MP1.
5.2.11	“I think a minimum of annual for people who are maybe less likely to be at the forefront of those sorts of things, but probably for emergency services and the emergency department and that sort of thing, I think more...bi-annual. Four times a year would be great, you very quickly forget stuff... I think the ideal would be something like three days, because one day is...I have got a day off work. Three days, I think, is enough to... immerse yourself” C2MP2

5.2.2 Frequency of Disaster Preparation

The most common advocated frequency was yearly. Participants argued that preparation needs to be annual as the repetition assisted staff to improve learning recall. The need for annual repetition is exemplified in Quotations 5.3.1 to 5.3.4 and 5.3.6 in Table 5.3. An additional factor influencing frequency was duration. When participants advocated for more frequent sessions, they also recommended shorter sessions. This link between duration and frequency is exemplified by Quotations 5.3.1 to 5.3.4 in Table 5.3.

Participants also suggested longer sessions should be held quarterly, annually or every second year. This frequency was to facilitate adequate time for disaster exercises and adequate time to learn the required disaster information or skills. (Quotations 5.3.6 to 5.3.10, Table 5.3). Regardless of duration the frequency seems to be important for some participants to recall the disaster preparedness information. (Quotations 5.3.1 and 5.3.10, Table 5.3).

Table 5.3 Exemplar Quotations Preferred Frequency of Disaster Preparedness

Quotation number	Quotation and participant code
5.3.1	"...you do it annually..., it becomes part of your learned values... More like the fire training... a refresher every year" C2SS
5.3.2	"I think yearly would make sense, like your CPR, I guess. Or like your fire training. ...Yearly". C2AH5
5.3.3	"For a Social Worker ...I think annually ... then there's a policy to fall back on ..." C2AH2
5.3.4	"...something like an hour or two hours every year, similar to what we do for fire and evacuation, for disaster" C2AH6
5.3.5	"... probably needs to be yearly, so you remember, and something fairly short that's not too burdensome, I think..." C2AH3
5.3.6	"Having an Emergo Train every couple of years, would actually be very informative...yeah". C2AH1
5.3.7	"Even if it's a day once a year - to be able to facilitate that" C2RN2
5.3.8	"... maybe annually or biannually ... I think it does need to be frequent. I would have to say annually should probably be the minimum and I think optimally, I would go for twice a year (a few hours?) ...Yeah" C2RN1
5.3.9	"Argue that perhaps for argument's sake a half-day every six months to a year to maintain people's awareness would be a good starting point" C2MP1
5.3.10	"I think a minimum of annual for people who are maybe less likely to be at the forefront...but probably for emergency services and the emergency department... I think more....bi-annual. Four times a year would be great, you very quickly forget stuff..." C2MP2

5.4 Methods and Resources Preferred for Disaster Preparedness

5.4.1 Methods

Practical Preparation

Support for practical learning came from the participants representing all professional and occupational groups. Practical learning was preferred as it was seen to be modelling the behaviour and feedback could be provided, it enhanced teamwork, efficiency, and assisted to identify gaps or issues (Quotations 5.4.1 and 5.4.7, Table 5.4). Practical preparation was

suggested to facilitate checking all resources needed, including time is available. Practical preparation also helped to identify overlaps in roles. An example provided was the experience of social workers and chaplains following participation in practical disaster exercises which enabled them to work better together based on improved understanding of each other's roles. It was suggested practical learning also assisted to reduce staff anxiety in a way online learning does not as staff undertaking online learning are normally alone at a computer. These findings are exemplified in Quotations 5.4.1 to 5.4.7 in Table 5.4.

One of the strongest advocates for practical preparation came from a medical practitioner participant. Unlike most of the other participants who argued for desktop scenario or Emergo Train style exercises, the medical practitioner advised that high fidelity exercises involving real equipment and actors as patients creates more realistic preparation that would be most effective, and the knowledge gained can be recalled during real disasters (Quotation 5.4.8, Table 5.4).

Lecture, Didactic or Classroom Style Preparation

No participants argued for lecture style learning without them being an adjunct to other learning methods in case 2. Lecture, didactic or classroom sessions were suggested to be an effective, when combined with practical preparation, to assist participants to prepare for disasters. In a lecture it was suggested that the audience members can be more easily engaged than online learning. There was an argument that lecture style of presentations are effective and that in the course of a lecture, short practical exercises can also be conducted (Quotation 5.4.9, Table 5.4).

Blended Learning

It was rare for any participant to make mention of only one form of preparation as being beneficial. Many of the participants outlined a combined approach to facilitate preparation for disasters (Quotations 5.4.1 to 5.4.9, Table 5.4). Participants advocated blended learning was most effective as each style of learning has a purpose. Practical learning is required for some skills, to practice, identify gaps in disaster plans or resource availability and also has benefits for the team performance. Lectures with discussion are useful for the provision of theoretical information. There is a place for online learning also to provide basic disaster information or for learning which individuals can complete in their own time (Quotations 5.4.5, 5.4.9, 5.4.10 and 5.4.11, Table 5.4).

Online Learning

An allied health participant suggested online learning was suitable for basic messages or information (Quotation 5.4.5, Table 5.4). A medical practitioner participant supported online learning and indicated that it is necessary to make use of all resources available when preparing for uncommon events (Quotation 5.4.11, Table 5.4). It was also indicated that online learning was the most suitable as it was easier to administer or learn from, and also can be completed in one's own time (Quotations 5.4.10 and 5.4.12, Table 5.4). This suggests that online learning was favoured by participants as it can be useful to deliver basic information, it is cost effective and convenient.

Other Methods of Preparation

High fidelity practical exercises were argued to be more realistic than other practical forms of preparation. The benefits of this method of preparation was that staff could develop the ability to understand and work with the emotional response that may experience during disasters (Quotation 5.4.8, Table 5.4). The second unique method which was argued to be beneficial was learning from those with previous disaster experience. Participating in disaster exercises and hearing from those who have experienced real disasters, was suggested to be effective in reducing anxiety in staff prior or during disasters (Quotation 5.4.7, Table 5.4).

Table 5.4 Exemplar Quotations Preferred Methods of Disaster Preparedness

Quotation Number	Quotation and participant code
5.4.1	"I've done lots of online fire training and I guess the practical fire training helps, because you're physically doing it ... Because everything was measured and estimated. There was a clock. They estimated the time it would take for certain procedures to happen. And they were well thought-out cases. So, there was I guess a constructed demand of the emergency department. And then you had to work in that simulation. And you got feedback along the way. So, I guess you were learning initially in the beginning the whole team was probably less efficient. And by the end of it they were more efficient. So, I guess ... it has to be practical, because it's so dynamic and there were people running around everywhere, if you do it by yourself on a computer or in a lecture theatre, it probably won't be as effective" C2AH5
5.4.2	"I think there's probably nothing like Emergo Train to be honest, because everyone thinks about it out of a book, but it's nothing like what might arise when you're actually doing it. ... Simulation ..., it works the best. I've done disaster training at conferences..., seminars and didactic sessions or breakout workshops. But it's never as good, and Emergo Train brings out scenarios that other people would never have thought of actually. Even within our service, it brought up things within

	our own disaster plan, but then having the pharmacist there, ... made people realise actually, oh how would we need to get that" C2AH4
5.4.3	"I'm not much of a kind of an online training type learner. I found the kind of more Emergo Train like experience much more useful and that kind of slight role-play to get out the issues that are kind of presenting and just the overwhelming nature of a crisis. I do kind of prefer the kind of face-to-face training of the kind of fire training and that type of stuff. So that's usually the most helpful for me - is actually kind of conversational. Hence, why I'm a Social Worker" C2AH2
5.4.4	"... so, the practical training because I felt it created a as close to true scenario as you're going to get. Whereas you can read things online and whatever, whereas this did not have real patients, but it had patients and processes that you have to follow, transport and things like that, and time in scanners, and staffing numbers, and all that. So, I think it gives you a truer sense of what a disaster may be, whereas I think if you do things online, you are not really getting that sense of what is going to be happening on the floor on the day...I think you tend to skim more so, whereas in Emergo Train you're immersed in it so it's a lot more beneficial" C2AH6
5.4.5	"I do think it takes face-to-face learning...you can do some basic stuff online but having trained staff in the past, social work staff including other staff ... included chaplains...Looking at what our designated roles are. Helping people understand that your tasks in a disaster are your tasks, and you do not step outside them unless you're directed by an in-charge or a chief ... because otherwise it just causes chaos. So, my view is to train and to test ...face-to-face and test, but through a mock scenario" C2AH1
5.4.6	"Not online because some of them don't do computers and it would have to be a practical one-on-one lesson with, potentially, a walk-through or something like that" C2SS
5.4.7	"... So, I think, being in a group and hearing perspective and having feedback, is more valuable. I would say, mass casualty incident, CBR training, any of those type of issues, where you are going to be scared. I don't think you can replicate that online. I think you need to be hearing from people who have been involved in it. You need to hear conversations about it. You need to be reassured because I think it does come with a lot of anxiety.... regular practical training through the year..." C1RN1
5.4.8	"Practical, as hard as it is. ... I have had a lot of disaster training, and we did a lot of Emergo Train and simulation-based stuff, and some of the Emergo Train would be very low fidelity simulations. So, it would be on a board, on a whiteboard, and moving magnets. That is fine in theory, but when it comes to actually implementing that ... We are all human, and no matter how prepared you are, you have that emotional response, and to be able to resort to practiced patterns of response is invaluable. So, certainly, the large-scale high-fidelity simulations like the recent one at Barangaroo ... that was incredible to participate in because you are physically doing it ... I learn best when I do" C2MP2
5.4.9	"...face-to-face and that's more because you incorporate practical as well as theoretical. People learn differently. Online learning is death by PowerPoint. People just click through it, and they do not really pay attention. They do it because they have to, not because - even if they are interested in it, it can become

	very mundane and boring. So, face-to-face, you can actually captivate your targeted audience...depending on who you are actually facilitating, you can really adapt that program ..." C2RN2
5.4.10	"I think myself, and most of my staff, would say online learning because it's something they can do in their own time. Having said that, sometimes when there's something like fire training you need to do hands on too, you need to be familiar with things and touch things and what have you, so probably a bit of a mixture of both would be helpful" C2AH3
5.4.11	"The first thing to say is you prepare for an uncommon event, so I think really you need to make use of whatever resources there are. I think there is a range of things; online, tabletop exercises. I don't have a particular preference for either of them" C2MP1
5.4.12	"It's always going to be online... makes it a bit easier" C2SS

5.4.2 Resources

Participants advocated that it would be essential to have the appropriate resources including medications, ventilators, and food during disasters. Participants highlighted the need to have appropriate resources for patient care during disasters. The need to have appropriate patient care equipment is exemplified in Quotations 5.5.1 to 5.5.3, in Table 5.5. It was also outlined that it is important to have appropriate disaster plans in place to guide the actions of staff during disasters. Plans could be discipline specific as well as hospital specific (Quotations 5.5.5 and 5.5.8, Table 5.5). Plans were also argued to assist staff obtaining resources during the disaster (Quotations 5.5.6 and 5.5.7, Table 5.5).

Practical resources to protect staff, including PPE, immunisations, and antivirals were outlined as important by participants. These highlighted how important it is to protect the health professionals and support staff or family members. Quotations 5.5.9 to 5.5.12, Table 5.11 exemplify the finding that staff want PPE and medical treatment to protect themselves. Participants suggested support or assistance to help them get to work or to meet the additional personal financial costs that may be incurred as a result of responding to a disaster (Quotations 5.5.13 to 5.5.15, Table 5.5). This assistance included practical financial support or the provision of services to assist with accommodation at work, if staff need to stay away from family, the cost of childcare, food at work and transport to and from work. Quotations 5.5.13 to 5.5.15 in Table 5.5 exemplify the need for financial or logistical support for staff.

Table 5.5 Exemplar Quotations Preferred Resources for Disaster Preparedness

Quotation Number	Quotation and participant code
5.5.1	“What drugs we would supply, what quantities, how we would then supply ...we have set up lists of drugs that are needed for CBR disasters .and we have got information resources that help with what sort of treatments are needed.... accessing stockpiles and getting drugs in to top up the existing stocks” C2AH4
5.5.2	“During a mass causality incident resources will be stretched to the absolute maximum. ... there is no longer a ... state-wide stockpile of ventilators... I think in an era where you could argue that the threat of terrorism is actually increasing.... that probably needs addressing” C2MP1
5.5.3	“Food supplies are very important because we need to feed those patient ... C2SS
5.5.4	“a disaster plan and that would be enacting what the pharmacies role would be in a situation where a disaster would happen” C2AH4
5.5.6	“Clear guidelines around where to go, what to do, how do services respond. So, everyone knows their little bit of the process” C2AH2
5.5.7	“The protocols in place. So, knowing or being able to find out what to do in every scenario...” C2AH6
5.5.8	“Food supplies....to have a plan to deliver all of that you need” C2SS
5.5.9	“I mean, I think back to ... lots of HIV care back in the 80s and 90s. ... the more information you can give about what the risk.... How is it spread, what’s transmission, how can I keep myself safe? ... if we’re asking people to put themselves in harm’s way.... it’s reasonable to offer them the protection that is available as a matter of priority” C2AH2
5.5.10	“(Vaccinations and Tamiflu) ... Yes, because we’re the ones who are coming in here and are more likely to be exposed, definitely, and then, potentially, I guess our families ... all the equipment that we need, we’ve got the appropriate rooms, we’ve got the control mechanisms” C2AH3
5.5.11	“Vaccinations should be prioritised for anyone who is going to be in the vicinity...including your cleaners” C2MP2
5.5.12	“Personal protection equipment for most people, whether you have a breathing apparatus and fully suited up, whether you have showers out in front of ED” C2SS
5.5.13	“A lot has to be done about the psychological effects of that, the social effects of that, the financial aspects of that” C2RN1
5.5.14	“They make sure they bring in things and they make sure they're well prepared. They bring in bedding. They bring in extra food” C2RN2

5.5.15	"The hospital could give cab (taxi) vouchers for people to come to work with no other transport" or "You'd have a bus run up and down from central station" C2SS
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5.5 Preferred Content of Disaster Preparation

5.5.1 Organisational Structure for Disasters Management

All participants indicated that it was important to learn about and understand the structure of how disasters are managed. Some participants argued there could be chaos, panic or disorganisation if there is not a clear chain of command where staff are kept informed of what is happening and what they are required to do (Quotations 5.6.1 to 5.6.7, Table 5.6). There were suggestions that staff need to know their roles and the organisational structure would assist with this understanding. Other participants advised the organisational structure would start the disaster management process (Quotations 5.6.1, 5.6.3-5.6.4 and 5.6.6, Table 5.6). Others suggested knowing the command structure would promote teamwork, communication, patient care and safety (Quotations 5.6.2 to 5.6.5, Table 5.6). Understanding the command structure was also suggested to be important so that all staff are included in the disaster process and are not left out (Quotation 5.6.8, Table 5.6).

Table 5.6 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Organisational structure for disaster management

Quotation Number	Quotation and participant code
5.6.1	"One of the first things disaster will cause is chaos so you need a clear chain of command and communication, so everyone knows what to do" C2SS
5.6.2	"Staff from the hospital should be informed and communicated with...then we cannot create panic with patients" C2SS
5.6.3	"Yes, at a minimum the in-charge people who take on the role are aware how to activate a code brown. without needing direction to start the process" C2RN2
5.6.4	"It's sort of like multiple ships sailing in the ocean and no one really knows what they're doing, but if you have structure, it's all coordinated a bit better" C2AH6
5.6.5	"Communication brings down most scenarios and when there is a gap it is usually around communication" C2RN1

5.6.6	"At some stage I will be called to disaster response stuff...and that is not the time to be learning this stuff...It is having it kind of clear beforehand. I think it is really important" C2AH2
5.6.7	"I actually think that is really important, because people do ask: "who is in charge? Is the operational director running this or is the CEO running this? Who is in charge? Is it the Director of Nursing who is in from the exec?" It gives them a sense of security that there is someone at the helm; otherwise, it feels like an un-ruddered ship and that's not good. You need a captain at the helm" C2AH1
5.6.8	"We are all university graduates, highly trained intelligent people...like to be kept informed...know what's going on...don't like to be kept in the dark" C2AH3.

5.5.2 National or International Competencies

The interview guide (Appendix D) included a question about competencies. The question was further illustrated by giving the example of a Haiti earthquake (Table 1.1) response where many medical teams who attended did not have proper training, equipment or skills to perform tasks.

Participants supported the need for competencies suggesting that these were important to provide a framework or guidelines to support the discussions that needed to be made during disasters. Competencies were considered particularly important when a different or lower level of care, although still appropriate for the patients' needs during disasters. It was also described that competencies will assist with training and the mindset of the health workers when delivering an altered level of care. The existence of competencies could also assist patients to understand that a different level of care may need to be delivered for the wellbeing of all. (Quotations 5.7.1 to 5.7.5, Table 5.7).

Medical practitioners in Case 2, expressed concern for competencies. Whilst neither opposed their use, they did argue that it could be difficult to predict in advance what the competencies should be. There was concern raised about setting standards of care when in advance as the level of care required can be difficult to predict (Quotations 5.7.6 and 5.7.7, Table 5.7).

One participant opposed to the need for competencies or predetermined guidelines of care. The allied health professional argued that senior clinicians may be unfamiliar with some medical conditions and may experience some stress. The participant argued that despite this unfamiliarity and stress, clinicians will be able to adapt and adjust to the needs of the disaster without needing competencies (Quotation 5.7.8, Table 5.7).

Table 5.7 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: National or International Competencies

Quotation number	Quotation and participant code
5.7.1	“Yeah, they (competencies) are important. Because I mean, some of them are resource-intensive, and on that day at that time, depending on the scenario, we may not be able to deliver what we usually would deliver. So, I think the scope of your response, must be conveyed. And you must know what your scope is? You cannot take everybody to theatre if we have only got eight theatres. So, we all must have a collective mindset, I think” C2RN1.
5.7.2	“I think that would be useful ... So, I think to be trained at what is familiar becomes - it sounds like the military analogy, but it is it. If you train for it and you are prepared, you will more respond from an automatic level rather than being in doubt or anxious, and people do not need anxiety at that stage. There is enough adrenalin running around, but if you're trained for it, know what your role is and what is expected of you, and people will use our staff both in social work, like in nursing and meds, to their strengths” C2AH1.
5.7.3	“Very much in that you've got to start to prioritise your patients and it's not good if 100 doctors all run to this patient You need to be able to triage and categorise so that if you have got a person with a broken arm, you do not want 50 people going to them - so you need to somehow identify those people. You know they've got a broken arm; you can quickly throw a sling on and [they can] walk over to there” C2SS
5.7.4	“You know I think it would be beneficial, both for the patients and the staff, because I must admit, I would imagine there's an element, in any emergency patient that some people find it difficult ..., because they can't follow it through all the way to the end. Whereas so I think that would be ... in a disaster situation, so for the staff, it would be good to probably have that (a competency), so it is okay that this is what is done. But then for the patients, you cannot just go dole out X, Y and Z and think that's enough, if it's actually not enough. I think it would be useful” C2AH3.
5.7.5	“It's about understanding what your responsibilities are in serving the population and prioritising those. You don't lower your standards, but you definitely alter the way you give care to maximize helping” C2RN2.
5.7.6	“Absolutely. I think in situations where resources are scarce or victims outnumber responders, there is the temptation for people to stretch their level of practice or go outside what they would normally do...I think competencies are always important, but we need to be careful about mandating, setting a minimum because each situation is fluid and difficult to predict” C2MP2
5.7.7	“Yeah, as to how you're going to measure that. Because even Tabletop exercises and Emergo Train's with actors and that sort of thing provide some training, but as to actual competency on the day I think it's actually quite a difficult thing to assess in advance” C2MP1
5.7.8	“.... I would imagine that there could, potentially, be a whole bunch of injuries that not everyone is that familiar with. Well, what do we do with this? Just say,

	for example, a multi-trauma pregnant lady coming into us, even that would be – because we very rarely see pregnant people here.... - and in a disaster situation we may well have children come here, I guess, and again, that is not our skillset. Again, we could probably adapt and adjust, and we have all got professional linkages where we could get help and so on, but I can imagine that, for us, would be a degree of difficulty and a source of stress” C2AH3.
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5.5.3 Generic or Specific to Occupation

The view shared by many participants was that there should be specific preparation for professions or groups of professions. The same participants also advocated for some generic preparation for everyone. This method was argued, should include an organisation wide generic component and clinical staff or some specialities would also be provided with separate preparation relevant to their profession or specialty (Quotations 5.8.1 to 5.8.7, Table 5.8).

Other participants advocated for generic preparation only for all hospital staff. The argument included the need for effective teamwork and preparation should therefore also be conducted together. Participants argued that having generic training ensures that everyone receives the same information, which will promote understanding of roles between professions or occupations. These arguments are exemplified by Quotations 5.8.8 to 5.8.10, Table 5.8.

One allied health participant presented an argument suggesting that specific preparation is required for each profession. They believed that there is no need for an overall preparation or the need to understand what roles other occupations have. They did suggest it would be acceptable to have a quick overview of what others do or the hospitals response as a whole (Quotation 5.8.11, Table 5.8).

Table 5.8 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Generic or Specific to Occupation

Quotation number	Quotation and participant code
5.8.1	“Look I think the nurses and doctor’s thing because they work closely side by side anyway. I mean, apart from there I guess, their clinical skillsets with regards to interventions, of course there is a differentiation. But I think as far as responding and training for disaster and how to respond and what is expected, would be very similar. I think probably the people who do not kind of get as much and are just as important, would be our Allied Health people. We would need them to respond in a certain way that is a part of the strength of their skill sets and we need to start including them in our training because we will be relying on them. But I think the fact that we don’t actually include our admin staff, our cleaning staff, because I know on the day, they’re all going to want to help, and they will all be affected. So, I think they should be having

	some sort of training. Maybe not clinical skills, but definitely they should be involved in training, and it should be around what we would be expecting of them, on the day” C2RN1
5.8.2	“I think you need an idea of the overall – what everyone is doing – but then I think you need your specific area” C2SS
5.8.3	“Well, there’s two sorts aren’t there really, you can’t be too insular, but you’ve got to have your own house in order. We can run mock, as I mentioned the pharmacy related disaster management, as a simulation in our department. Mind you have got to remember, that we’re a service provision department, so it’s difficult for us to necessarily quarantine three quarters of our staff to do a mock thing. But we could do it in an hour session, so yeah you should be fine. But then really, we need to know how everything else works, and so yes, you do need, that’s where the broader Emergo Train style is really good” C2AH4.
5.8.4	“I think there should be a generic part because part of it is organisational, which affects everyone. And part of it is – yeah, I guess I would just cover that. But then there would be more specific training, I think, to show where you would fit. I guess doctors and nurses kind of more clumped in one area, and then allied health would be – but from what I know in the disaster management that afternoon, was there are some orthopaedic registrars and consultants available. And I guess you would be probably working more with them because they are directing treatment. And things that do not need surgery straight away, basically need to be somewhat immobilised or treated to then be looked at later when it’s not a disaster” C2AH5.
5.8.5	“I think there’s probably some generic in and some higher level, different sorts of things. Again, the clinical guys might just need something a little bit different, but there’s still going to be basic principles that are going to be the same for everyone” C2AH3.
5.8.6	“I can see there being a role for some generic stuff in terms of just an understanding of how the kind of bigger process and service responds and what that might look like to give people a sense of what is happening around them and knowledge that there is someone looking at this issue. ... Generally, I’d say it is a bit more targeted into the kind of clinical skills. So, you know, what the Nurses are doing in a certain department is different to a different department and even what the Wardsman do. I suppose it would be helpful to know that the Wardsmen will do something, but I do not really need to get into the bare bones of what that is, as long as they know. And I can imagine the Executive or the people in charge would need to be very clear about what everyone is doing. But I think much more targeted would be useful to meet everyone’s needs. Because I don’t need to know the specifics of what everyone does, just as long as the people do it” C2AH2.
5.8.7	“I think there should be an overall approach to whichever disaster it is in terms of general principles. But then people are going to have different roles within the emergency, so it has to be tailored to them as well, so it’s a bit of a mix.: Surgeons versus intensivists versus anaesthetists” C2MP1.
5.8.8	“Oh, cross-specialties; no, I think it should be all the same. I think your priorities need to come under the same token, in what needs to be activated, and I think it is going to be a team effort at the end of the day. So, that needs to play out as a team role

	requirement, so everyone is on the same level and understands how to work within that scope" C2RN2.
5.8.9	"I think the training should be together, with people maintaining their roles within. Because, at the end of the day, no one is going to be working separately in a big disaster" C2MP2.
5.8.10	"I think that if there was an inclusive educational process that would assist with regard to preparation rather than being reaction based... at the moment... after the event ...recognised we have something to contribute" C2AH1.
5.8.11	"I think it needs to be designed specifically. Because, obviously, it is pointless telling me all about the triage principles and protocols in a disaster when we have got nothing to do with that. We will work on the next level where it has been triaged, they have sent them to us at a certain urgency, and then we do it. So, I think we need to look at how we would cope with it within our department more so, I do not see the need to see an overall – look, it would be nice to have a quick overview, but it needs to be quick" C2AH6.

5.5.4 Generic or Specific to Type of Disaster

Of those advocating for specific preparation for various types of disasters, participants suggested, that disasters are very different from each other and therefore the type of preparation should also be different. The need to prioritise which disasters are covered based on the likelihood and consequences of disasters was also acknowledged. Participants also questioned how feasible it was to prepared staff for specific disaster types, although did advocate that the more information that can be provided on differences in disaster types the better the preparation would be (Quotations 5.9.1 to 5.9.4, Table 5.9).

There were participants who whilst supporting the concept of generic preparation for disasters, also stated there should be specific focus on the areas that staff would be less familiar with, specifically radiological or chemical attacks or pandemic influenza for staff usually treating trauma patients. PPE use for radiological or chemical exposures it was argued was less well known when compared to biological exposures. (Quotations 5.9.5 to 5.9.8, Table 5.9). Some participants argued for generic preparation, divided into external disasters or internal incidents or non-clinical or clinical disasters. The argument is exemplified by Quotations 5.9.9 and 5.9.10, Table 5.9.

There were also the views expressed that preparation should be generic. The arguments were that if the generic information the preparation, that knowledge could be applied to specific disasters by staff, as the principles will be the same. This addressed the concern that staff cannot

plan for all types of disasters, so covering generic principles will be most effective (Quotations 5.9.11, Table 5.9). The other argument for generic preparation was that there are not adequate resources to specifically prepare for all types of disasters. The following Quotations present these generic preparation views (Quotations 5.9.11 and 5.9.12, Table 5.9).

Table 5.9 Exemplar Quotations Preferred content of disaster preparedness programs: Generic or Specific to Type of Disaster

Quotation number	Quotation and participant code
5.9.2	“Look, I think it would be handy to cover all ...it would be handy to cover disasters that we could envisage happening. Like a tsunami is not highly likely, for instance, in Sydney, but there is, obviously, a likelihood, no disaster, thankfully, is highly unlikely, but things like an airline, or a passenger bus crash they’re more likely... the things that are more likely to happen would probably be more beneficial, so things that is something happening at a football stadium, that’s a likely event” C2AH6.
5.9.3	“Well, I think to the organisation there needs to be elements that are specific, because CBR is very different. Like, an Ebola type event is different to a - you know, a pandemic is different to if we've got the train crash or a Lindt Cafe type scenario...” C2AH1.
5.9.4	“Ideally, yes, I think specific to each type of disaster. I don’t know how feasible that is. I think there needs to be some generalised and overarching procedures, but the more detail you can go into to prepare is better, because a power failure is so different to chemical warfare” C2MP2.
5.9.5	“It needs to be generic but then, you need to have certain unique things. Like if it were airborne and you would have your infectious-contagious, so that would be unique to that type of disaster. I guess if there is a bomb, burns, so you would ramp up. But I think it should be generic” C2SS.
5.9.6	“Well, with the radiation or if it’s a chemical event, these are things out of – you know, you hear about them on TV and you see movies. And I guess there’s definitely additional training, depending on what type of protection you need. You know, we get quite good at protecting ourselves from contact diseases, microorganisms or airborne ... Or fluid contact. But there’s other things which we don’t get trained enough. There’s gas, so I guess, yeah, training in that, in specific areas. So, there’s obviously general and potentially specific as part of the training” C2AH5.
5.9.7	“I think there should be the generic, this is what happens? ...But I think the different types when you’ve got CBR involvement. You have got a pandemic. There is a whole different facet that needs to be covered. So, you can’t just really go oh, here’s a plan that covers that. I will let you read that in your spare time. It should be very specific training and all of us should know our parts in every bit of it” C2RN1.
5.9.8	“Well similar because all disasters have a common element to them in terms of whole of hospital response and forms of communication, acting in unusual circumstances so there needs to be that. But there also needs to be the differences between a mass casualty incident where there’s largely surgical triage or resuscitation versus the response to - and also as we mentioned before the timing of a pandemic is going to be

	a sub-acute emergency, so again elements of generalised ability and also specific training” C2MP1.
5.9.9	“Yeah, I suppose I see it kind of - to me, I think there might be different kind of mass casualty events versus a power failure or a fire in a part of the hospital. I do see the two as slightly different. So, a bit more kind of internal emergencies versus an external mass casualty event. Because a fire is mostly on the cutting edge of that depending on how big the fire is. You know if we have to evacuate the entire hospital” C2AH2.
5.9.10	“I feel you can classify it as ‘clinical’ and ‘non-clinical’ so that the clinical will take care of more specific details and the non-clinical can be prepared for the situation” C2SS.
5.9.11	“I think it should be disasters overall. To target specific disasters - one, within your location, you're not necessarily prone to every disaster there is. And to be able to draw your eyes specifically is very hard even within policy making because not every disaster even if it's a tsunami is going to be exactly the same as the last tsunami. You can't plan for that. So, I think having an idea of your broad structure and understanding how you would like to work within that to combat and obviously, there are a few - chemical and biological is going to be a bit different to a man-made disaster. But having that broad structure in which people are able to work under with specifications to those other areas that are a bit out is definitely - yeah, so, general rather than very specific” C2RN2
5.9.12	“I think it's probably going to have to be generic otherwise there'd be too much training. Within those things there's probably little subsections, but I think you still cover that now. So, “If we had a respiratory thing, an Ebola, SARS type thing, these are the things that might happen. If there is a mass casualty it is like this, if it is a power failure then – I can see it might be divided up. You wouldn't want to have bucket loads of different sorts of training” C2SS

5.5.5 Embedded within Workplace Knowledge and Skills.

Most participants believed their knowledge and skills used during disasters would be similar to their usual workplace skills. They suggested their usual workplace skills would also be used during disasters (Quotations 5.10.1 to 5.10.5, Table 5.10). The same participants did advise that minor differences may be needed to their usual skills although essentially, they would be using the same skills (Quotations 5.10.1 to 5.10.5, Table 5.10). This argument allowed for some minor differences to skills, including performing them in a different context. The context referred to the need to have different time management, computer skills, ability to prioritise, or the ability to work under pressure. The Quotations 5.10.1 to 5.10.5, Table 5.10 exemplify the argument that knowledge and skills needed during disasters will largely reflect staff members usual skills although the context changes.

Three participants did suggest the knowledge and skills would be different during a disaster (Quotations. 5.10.6 to 5.10.8, Table 5.10). A registered nurse participant argued the rules of business, including communication would change and a change to the mindset was also needed as some patients will not receive treatment (Quotations. 5.10.6, Table 5.10). A medical practitioner suggested the nature of injuries and patient conditions would be different with more severe injuries balanced by having less resources to treat the injuries (Quotations. 5.10.7, Table 5.10). An allied health professional suggested for certain specialities the skills would be the same. The emergency department clinicians would use their usual skills during disasters. Other less acute specialties may need different skills to usual during disasters (Quotations 5.10.8, Table 5.10).

Table 5.10 Exemplar Quotations Preferred content of disaster preparedness programs: Embedded within workplace knowledge and skills

Quotation Number	Quotation and participant code
5.10.1	"I think the skills that you have are the same. I think how you use those skills are different. You would manage an airway...resuscitate a patient the same way. But I think prioritisation would be different" C2RN2.
5.10.2	"It is, but it's then refined into a different context. So, to prioritise we have to assess psychological need, psychological impact to provide psychological first aid - is something we're doing often if we've had a car crash and we've got two victims in. We're often dealing with smaller versions - they're disasters for people's individual lives, but you're not dealing with the critical number, the mass that takes it to a disaster response. But our crisis intervention skills, our ability, as I say, to assess everything from mental health, drug and alcohol issues, knowing when somebody is impacted by other things and not just the event, what is taking them to a different place. Yes, we have that skill set" C2AH2
5.10.3	"Probably not different except the IT technical side of things... there are reports that can be run to check inventory... But what I think is different is the magnitude... and prioritisation" C2AH4
5.10.4	"Yes, I think it is like. If you have one patient in cardiac arrest, that is very manageable. That is doable. If you suddenly have four patients in cardiac arrest at one point it's not that the clinical knowledge changes, it is that the challenge...How I manage four patients at once" C2MP2
5.10.5	"We already prioritise and that sort of thing. I think, to be honest, the thing that would be the biggest issue to try and manage, I think, would be a degree of panic, upset, that kind of stuff, and actually trying to manage that more HR type of stuff, to be honest. I can imagine – for example, I've got a couple of quite young dietitians, and particularly one who is only a new graduate, I can imagine that could completely spin that person out because they just haven't had many life experiences in general, never mind where there could be mass casualties, and hearing and dealing with that,

	I should imagine, could be quite difficult and having to manage staff in that way" C2AH3
5.10.6	"I think communication in a disaster is very different because the rules of business change" C2RN1
5.10.7	"Yeah, I think they are (different). Very different to everyday practice. Surgeons with military experience have been selected for triage roles. And then there the recognition that you need to change focus...You may not offer the severely injured treatment...not the most efficient use of resources" C2MP1
5.10.8	"It is something I normally do in my work in the Emergency Department, yes. My colleagues on the physical health wards, less so. And so, we offer training around that when they start doing on-calls because you are that independent clinician responding to disasters, big and small. So, we offer that internally for people as they start their on-call role. But it is something much more bread and butter to the ED than it is anywhere else in the hospital" C2HA2

5.5.6 Clinical and Technical Knowledge and Skills

The first theme to emerge was that participants explained that they or their colleagues needed appropriate clinical or technical knowledge or skills to care for the patients and family members who are the victims of or affected by the disasters. Knowledge and skills differ for each participant as they each represent different health professional or support staff groups (Quotations 5.11.1 to 5.11.9, Table 5.11).

Allied health professionals argued they would need the clinical skills to deal with more complex injuries than normal and more patients with either physical or psychological injuries (Quotations 5.11.1, 5.11.4-5.11.6, Table 5.11). The complexity described involved managing fractures and a focus on supporting and providing information and resources for families and patients, especially with crisis care. They also argued that more patients with less complex injuries may need to be managed by allied health professionals, as medical staff may be treating more complex patients. Treatment may also be a simpler level of care to a greater number of patients. Care included the provision of more X-rays and less complex radiologic scans. It was argued that the need to dispense and provide advice on the medications required for various clinical conditions not regularly seen at the hospital may increase (Quotations 5.11.1, 5.11.4-5.11.6, Table 5.11). Additionally, allied health professionals and support staff advised they would need to ensure they had the skills to prepare and deliver safe food for patients in the disaster circumstances (Quotations 5.11.7 and 5.11.8, Table 5.11).

Some of the participants advised about the ability to prioritise their work, or patients and to triage patients (Quotations 5.11.10 to 5.11.13, Table 5.11). This prioritisation includes not delivering care to all those that need it, based on prioritisation and appropriate allocation of resources. The need to prioritise which healthcare professional or worker would complete each task or see patients with particular injuries was also argued to be required. Physical resources were suggested to require prioritisation, including operating theatres and hospital beds. The need to prioritise or triage care and resources is exemplified by Quotations 5.11.10 to 5.11.13, Table 5.11.

Another skill that emerged which participants argued was important was the ability to care for patients without the usual equipment or technology or deliver services in a modified way (Quotations 5.11.2, 5.11.13 and 5.11.14, Table 5.11). Patient diets may need to be modified with food that does not require cooking. Nurses suggested they may need to monitor patients without the usual monitoring equipment. Radiographers may need to perform more mobile X-rays rather than complex radiologic scans. Physiotherapists indicated they may need to plaster fractures without the confirmation of medical imaging (Quotations 5.11.2, 5.11.13 and 5.11.14, Table 5.11).

Knowledge about PPE or infection control practices was also commonly discussed. The use of PPE and infection control knowledge and skills required during disasters were advocated as important attributes by nursing, allied health, and support staff. Quotations 5.11.15 to 5.11.17, Table 5.11 demonstrate that both health professionals and hospital support staff need infection control knowledge and skills to protect themselves and patients.

Table 5.11 Exemplar Quotations Preferred Content of Disaster Preparedness Programs – Clinical and technical knowledge and skills

Quotation Number	Quotation and Participant Code
5.11.1	"I guess you'd have to understand that there could potentially be more significant injuries than you would see, you could see with the eye. I guess in that case, as a physio there would be fewer injuries that I would treat for those more unwell patients. If they have got a broken foot or something, that's the last thing that – I mean like any trauma, that's the last thing that would get addressed. I guess I would be seeing more patients who are ambulant and might have minor injuries" C2AH5.
5.11.2	"Less complex examinations but more your chest X-rays and things like that..." C2AH6.

5.11.3	<p>“That ranges from what drugs we would supply, what quantities, how we would then supply and what service we would provide within that situation ... experience with moving of drugs around and quarantining ... liaising with microbiology ... lists of drugs that are needed for CBR disasters, but I think that is probably more specialised than anything, ... accessing stockpile ... clinical skills, well it comes down to drug information and clinical pharmacy really ... It is that ability to assess a patient’s drugs and look for, get medication histories, get discharges done, drug interactions, all the rest of the stuff that we would do in clinical pharmacy. Drug information” C2AH4.</p>
5.11.4	<p>“So, acknowledging that the interventions are very time-limited ... It’s about containment, acknowledging that people are in crisis and trying to engage people’s kind of thinking brains so they can start problem-solving for themselves and activating their own networks. The kind of the main things that I think would be useful for training for Social Workers, but also other staff is about how do you respond to someone in crisis, that trauma-informed type response C2AH2”</p>
5.11.5	<p>“... also providing information and what I would call in a sense just immediate crisis response because you're not going to get time for counselling but giving people often written information about normal responses to a trauma or a crisis, because you actually have an opportunity to do some preventative work” C2AH1</p>
5.11.6	<p>“Family members who are anxious. So, I think our team would provide a service in terms of responding to, probably, people who are lower in terms of intensity of injuries because they are going to wait those patients to help keep them calm, keep information flowing. And I think the same with discharging patients. Pastoral care would have a role because some of those patients are going to be more anxious around discharge that was earlier than anticipated, so we might have a role there to play as well” C2SS.</p>
5.11.7	<p>“How can we ensure any patients who are currently in the hospital or come to the hospital would be safely looked after from a food perspective ... they tend to make a lot of people nil by mouth, but even so, we’d want to make sure that - for example, food allergies and all that kind of stuff. As well, on the other hand, if a lot of patients were to require enteral feeding or TPN, that we had enough supplies available” C2AH3.</p>
5.11.8	<p>“Food supplies are very important because we need to feed those patients... deliver all of that food you need” C2SS.</p>
5.11.9	<p>“So, clinical skills would be more understanding that you're going for A, B, C airway breathing circulation and ... from the good of that individual to the best for the majority in that situation ...without sacrificing safety as much as possible ... where to locate the resources ...” C2RN2.</p>
5.11.10	<p>“It’s about identifying major injury from the minor injury. And doing your part in the disaster. You cannot see everyone. Doctors can’t see everyone, so it’s really about lightening the load for them (medical staff) to see the people who really need, so it’s a bit of a triage role” C2AH5.</p>

5.11.11	"What we tend to do in our department is have a priority list, so we would shut down everything that wasn't a priority and just work on priority one patients" C2AH3.
5.11.12	"Stopping elective surgery, discharging patients who are stable and can go to the ward, freeing up intensive care beds, notifying staff, creating surg. beds in other areas that aren't routinely used for intensive care. So, adapting the hospital as best we can to cope with the patients that we're presented with.... hospitals are now operating at near normal full capacity all the time, so surg. beds are going to be at a premium. And the over-riding philosophy of 'doing the most good for the most number of patients' so you need to have doctors who are experienced in triaging severe casualties so that you can concentrate your efforts on the patients who are likely to survive ... you can free up beds ... to create surge" C2MP1
5.11.13	"Everybody is hooked up to a machine these days. So, I think nurses need to be reminded that we actually did a lot of things before we had equipment to do things for us.... there are other ways to do things" C2RN1
5.11.14	"If there is no access to X-ray. Potentially plaster people like it is a fracture ... until you have imaging" C2AH5.
5.11.15	"Train the staff on what chemicals they will use for certain infections and so on, because they cannot use any chemicals" C2SS.
5.11.16	"We look at our precautions, gloves, gowns etcetera, so that we are cleaning the rooms properly. I would not know what routine for Ebola in terms of cleaning is" C2AH6.
5.11.17	"Decontamination...equipment you need, PPE...separate wards" C2RN2.

5.5.7 Non-Clinical and Non-Technical skills, Knowledge and Attributes

Several of the health professionals and support staff spoke about the ability to stay calm, work under pressure and self-care as important knowledge, skills, or attributes (Quotations 5.12.1 to 5.12.6 and 5.12.10, Table 5.12). It was outlined that it is important to consider oneself during disasters and implied that if the patients are traumatised then the staff may also be affected. Coping mechanisms, resilience, communication, and caring skills were highlighted as important. The ability to continue to make accurate decisions about patient care whilst working under pressure was also seen as important. These non-clinical skills or attributes are exemplified in Quotations 5.12.1 to 5.12.6 and 5.12.10, Table 5.12.

Participants also outlined the need to have leadership skills and teamwork during disasters (Quotations 5.12.7 to 5.12.10, Table 5.12). Some advised the need for leadership when under working under pressure or during a disaster may differ from leadership during usual operations.

It was suggested that disasters are more effectively managed when there is strong leadership and that their leaders need to be trained in the disaster context to be leaders. Leadership during disasters includes effective delegation. Leadership under stress was considered important as was the ability to use the plan during disasters (Quotations 5.12.7 to 5.12.10, Table 5.12). The value of teamwork during disasters was also highlighted. It was acknowledged that most staff are strong team players, although not all staff have this attribute or ability. Teamwork was argued to be important during disasters and could be considered a part of disaster preparedness (Quotation 5.12.10, Table 5.12).

Table 5.12 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Non-Clinical or Non-Technical skills, Knowledge or Attributes

Quotation Number	Quotation and participant code
5.12.1	"I'm thinking just self-care...what happens to those we are looking after? If their traumatised, then what are we doing for ourselves?" C2SS
5.12.2	"I think calmness and being able to deal with pressure, being able to achieve results when you're under stress" C2AH6.
5.12.3	"Well, everyone's under a level of stress, so that stress coping mechanisms would I imagine be important, and clear communication skills, and obviously caring skills" C2AH3.
5.12.4	"I think you do need people who are resilient, but also you need people to know that no matter how resilient you are that there's still that potential for that post-traumatic stress type of reaction when you're dealing with large numbers of potential casualties" C2AH1
5.12.5	"Staying calm, communication. How we perceive situations. Our level of concentration. Our cognitive processes. Our cognitive processing ability when we are overloaded and being able to calm within that and still prioritise and see your path clearly. And delegate clearly, because your team is only as strong as your leader, sort of thing" C2MP2.
5.12.6	"I'm thinking just self-care...what happens to those we are looking after? If their traumatised, then what are we doing for ourselves?" C2SS
5.12.7	"You need leaders you know and respect...someone who is a leader in the workplace is not necessarily a leader in a disaster...leaders have to be trained in the disaster..." C2RN1.
5.12.8	"Leadership essential...especially under a stressful situation...able to delegate, communicate ...increase capacity... for unexpected" C2RN2

5.12.9	"... Leadership and the importance of following through the plan that has hopefully been road-tested beforehand to offer the best chance, again offering the most help to most people" C2MP1.
5.12.10	"... I think you also need to be a good team player and most of my team are good team players, but there's always one who is not brilliant at being a team player, and I think in these sorts of situations you do need that... people need to be resilient" C2AH3.

5.6 Attendance at Work

5.6.1 Mass Casualty Incident: Bomb Blast

Most participants indicated they would expect or encourage colleagues to attend work as patients would require assistance (Quotations 5.13.1 to 5.13.6 and 5.13.9 to 5.13.10, in Table 5.13). It was common for participants to consider the danger of attending work during disasters. Participants also considered the logistics of attending work and if transport was feasible based on where the bomb was located (Quotations 5.13.2, 5.13.4 to 5.13.6, 5.13.8 to 5.13.10, Table 5.13). Participants expressed that it was their duty or responsibility as health professionals to attend work as that is what they have been trained to do. Participants considered possible risks and suggested it was the responsibility of health workers to attend work. It was outlined that staff had a responsibility to come to work to support their colleagues to provide patient care. These arguments advocating duty of care or professional responsibility to attend work are exemplified in Quotations 5.13.1 to 5.13.6 and 5.13.9 to 5.13.10, in Table 5.13.

A differing view was also expressed by participants. Consideration was given to a staff members potential competence as a result of the stress of working in a disaster situation. If the staff members fear attending work or they would not feel comfortable being at work, then there was the argument that their performance would be affected and they should consider not attending work (Quotations 5.13.7 and 5.13.8, Table 5.13).

Table 5.13 Exemplar Quotations Attendance at Work during Disasters: Mass Casualty Incident Bomb Blast

Quotation number	Quotation and participant code
5.13.1	"The staff member needs to make an assessment themselves but as a medical practitioner your priority is treatment... of the critically ill. I would urge them to attend" C2MP1.

5.13.2	<p>"I worked in London in the '90s when the IRA bombs were going off everywhere, and we all continued to go to work, you have to keep going to work. I think you'd have to expect people to go to work because, to a certain degree, you have to trust the authorities that they're out there trying to find the perpetrators and to try and keep us as safe as possible. I can understand why people may be frightened to come in ... but I would think that you would need to come in ..."</p> <p>C2AH3.</p>
5.13.3	<p>"I believe they should come to work. ... they would be asked to work according to their area of strength or ability. ... if they couldn't do that, they would be given another task where they could provide support. So, there is always room and scope for our skill set, but they don't have to be directly confronted by this, but they may be able to assist our hospital provide the best service to people in this sort of disaster ..."</p> <p>C2AH1.</p>
5.13.4	<p>"I would say they would attend work, it's about helping the patients, I'm needed, and I need to be there to help," and that, "If it's safe for me to go through I'll be able to get – they wouldn't let me go into an unsafe area so I'm not putting my life at risk, but I'm out there to help someone else who needs it." So, that's where my headspace would be ...a) to help patients, b): to help my colleagues because I know they'd be there and they'd be working their butts off, and so I need to be there to help. C2AH6"</p>
5.13.5	<p>"RN should attend work... if has the capacity and it's not going to inflict harm on her being able to access the hospital. No use her going if she is not going to be fit for work on arrival" C2RN2.</p>
5.13.6	<p>"I mean, you'd have to reconsider it if there was a bomb – if there was a hold up in the hospital, you'd obviously probably not want to enter a hostage situation. If it was close, or if it was Lindt Café probably – you know, and then they had – you know, you knew authorities had secured that area, I'd probably be likely to come in to help out. Presuming – if it were my shift, I'd be rostered in. If not, I would wait to hear from someone" C2AH5.</p>
5.13.7	<p>".... My mindset is from someone who would naturally go to assist, so it is probably a biased response. I think, at the end of the day, if someone is reluctant to be there, or not comfortable, then that is going to hinder the process more than help it" C2MP2.</p>
5.13.8	<p>"Well, should the nurse attend work if she feels emotionally capable of assisting? Because I don't need to be looking after another person. But I think that's something that nurse has to decide. So, I would think nothing of her if she chose, she couldn't because she had an emotional or physical response to attending work. I would expect her to show up because it's her duty to show up. But by the same token, people get scared in this day of age because of social media, because of what they've seen previously. So, I would expect about 10% of staff to feel very frightened about coming and assisting" C2RN1.</p>
5.13.9	<p>"Well, it depends on whether they're going to have to go through that area, and then if they risk-assess and they feel that it's too risky in their own right not to come to work, well, so be it. That's what I would say, but if they're travelling on a train that comes from south, it doesn't go anywhere near there, and then they</p>

	need to allay any fears in the relative, that actually the risk is minimal, and come to work”C2AH4.
5.13.10	“I’d mostly say yes, the Social Worker should attend work. If I was using that train line or I had no other means other than that train line, then I’d mostly advise my boss that I couldn’t make it in logistically. But usually, yes, I would advise to attend, because I suppose my experience is it’s rare in Sydney for there to be multiple kind of more mass casualty events in the one thing. So, it’s likely that is the likely incident, and there’s unlikely to be other issues” C2AH2.

5.6.2 Ebola Virus Outbreak

Most health professionals and support staff indicated that staff should attend work. There was some consideration regarding safety (Quotations 5.14.1 to 5.14.8, Table 5.14). Participants expressed that staff should attend work as they assumed that hospitals would be prepared so staff should feel safe (Quotations 5.14.3, 5.14.6 and 5.14.8, Table 5.14). Part of the argument for those advocating that health professionals and support staff should attend work or care for patients in the Ebola virus clinical area was the professional obligation to attend work (Quotation 5.14.2, Table 5.14).

When asked if health professionals and other staff should be asked to assist in the Ebola virus designated clinical units, should there be a shortage of staff in those areas. Many participants questioned skill and experience of staff as well as safety concerns. Some advocated that working with Ebola virus infected patients would be dependent on appropriate training and others specified it would need to be voluntary (Quotations 5.14.9 to 5.14.15, Table 5.14).

Other participants specified that staff should not attend work due to the risks related to working in an unfamiliar environment. They advised that only staff that are familiar with or, who have regular or recent experience in the specialty should attend (Quotations 5.14.11, 5.14.14 to 5.14.15, Table 5.14).

Table 5.14 Exemplar Quotations Attendance at Work During Disasters: Ebola virus Outbreak

Quotation number	Quotation and participant code
5.14.1	Yes, it needs to be recognized that it is a stressful situation ...people’s concerns acknowledged and every effort...that everyone is up to date with PPE... That should not stop everyone doing their Job” C2MP1
5.14.2	“I do. Because what you're describing is essentially a surge where the number of patients exceeds the usual staffing capacity and, in that situation, essentially the

	rules change and you're trying to do the best for the greatest number of patients. So, I think that would be acceptable provided that the hospital administration was aware that this was an unusual circumstance and that everyone is just trying to do their best" C2MP1.
5.14.3	"Well, I think that's where the preparedness comes in. If staff feel that the hospital is prepared for an Ebola outbreak and that their risk of acquiring the Ebola is minimal, because the safety initiatives put in place have been optimised, then the chief pharmacist would help allay fears of those that are working for them, to be able to come to work" C2AH4.
5.14.5	"All pharmacists deal with infectious diseases and the adequate treatment of them. There'll be, so the icing on the cake of more specific antimicrobials that need approval and that's why that pharmacist can particularly be useful. Yeah, all pharmacists can do infectious diseases to a point" C2AH4. .
5.14.6	"Same thing, they should come in. And again, you'd trust that there's the appropriate plans in place to protect them. If people didn't come in, then we wouldn't be able to care for our patients" C2AH3.
5.14.7	"Yes. Well again, it would be prioritising. So, if those patients were a priority, according to our clinical decision making, yes" C2AH3
5.14.8	"Ideally, a health professional could attend work safely. Certainly, with a heads-up, as opposed to something coming in that we don't realise is infectious. Do I think that. Our first response is Danger, right, so you are not going to . No, I don't think they should go in and infect themselves, but I would hope that appropriate PPE could be provided, and appropriate precautions taken, and they could attend work safely, because they are going to be needed" C2MP2.
5.14.9	"It just depends in what capacity they are asked to help. Because, if you are asking an endocrinologist to operate a ventilator, same as if you ask me to operate on a heart, it is not going to happen. I think, I just wonder about the usefulness of that, and I think really you just need people who are trained in the relevant presentation" C2MP2.
5.14.10	"Ebola's hard. It is a difficult one because a lot of people have very strong. I think they shouldn't attend if they haven't had the training or are aware because again, you need to be safe within yourself to then be able to take care of others and make sure that you're not going to be contaminated as well because that does no one any good. Hesitation towards that, hopefully, should and would be addressed within that training and I guess there's a certain staff population that may not actually be able to" C2RN2.
5.14.11	"Absolutely not. I think within that circumstance, you need to know your environment, you need to feel safe in your environment and you need to trust your colleagues and know who they are. So, I think crossing specialties at a time that is highly stressful and you're under a lot of pressure is not a good idea...It also depends on the clinical skills that you need for that patient. You are not going to put a ward nurse who's never looked after an intubated ventilated patient into a scenario where they're looking after an intubated and ventilated patient. ...You need to make sure that they're safe and they're working within a scope. You also need to make sure that the patient's safe within that circumstance C2RN2.

5.14.12	<p>“Well, if they feel that they have been competently trained and they think that they will be professionally protected, I expect every nurse to show up. Will they? No. I would expect them to be very fearful for their lives. And as demonstrated in the SARS epidemic in Canada, a lot of their staff didn’t show up. And that was to protect their family. A lot of them isn’t about them. It’s like, I’m not bringing that home to my kids. And I think that’s a very normal human response. And I think that’s something that can only be mitigated by making them confident and competent that we could control that situation. And if you look at the Western African experience and Central African experience. If you put in the precautions and you train your staff, you can contain an epidemic” C2RN1.</p>
5.14.13	<p>“Voluntarily. I wouldn't expect that nurse to be ordered to work somewhere they would feel their life was at risk. Because that person will make mistakes which will endanger everybody else. So, I think in that situation it has to be voluntarily sought. I don't think you can make anybody work under duress for any reason. So, whether she's a surgical nurse, an ICU nurse. It has to be volunteers please yeah” C2RN1.</p>
5.14.14	<p>“Probably not. I think the – I mean the value of having me there probably is not as strong as the risk of me getting infected by Ebola. But I mean, if I had training and I was able to even help out to some extent, I would consider coming in if it was safe” C2AH5.</p>
5.14.15	<p>“Probably not. I mean, they’re not much help if they don’t know the processes and the systems. If they had worked – I mean, there’s quite a few physios who do work occasionally in the ED. So, if there was a disaster, they could probably step up, even though they’re not there full-time. If it’s the Ebola example”, “It depends how long – how far out they’ve been from university. In your first two, three, four years you generally rotate, and everyone gets experience in ICU or should get experience in ICU” C2AH5.</p>

5.6.3 Pandemic Influenza

The majority of participants argued that health professionals and support staff should attend work during a pandemic with only two raising serious questions and a few more clarifying that it would be subject to having reasonable PPE and policies in place at the hospital (Quotations 5.15.1 to 5.15.9, Table 5.15). Most cited the need to provide treatment of care for patients as the reasons for suggesting staff attend work (Quotations 5.15.1 to 5.15.7, Table 5.15). The contribution to patient care of different professionals including physiotherapy, pharmacy and social work were outlined implying they would be there and needed to provide care. The need to provide care was the main argument for attending work during a pandemic influenza. Some added that additional infection control education may be needed although staff would attend work (Quotations 5.15.1 to 5.15.7, Table 5.15).

Two of the participants, whilst supporting the need to attend work, did express concern regarding staff attending work during a pandemic (Quotations 5.15.8 and 5.15.9, Table 5.15). They argued pandemic patients need treatment whilst also expressing the concern for staff getting to work safely during a pandemic and remaining safe at work. It was argued some staff would choose to stay home. There was also concern around needing to be quarantined at work and some may not be able to be quarantined away from their family (Quotations 5.15.8 and 5.15.9, Table 5.15).

Table 5.15 Exemplar Quotations Attendance at Work During Disasters: Pandemic Influenza

Quotation number	Quotation and participant code
5.15.1	"I definitely think so. I guess from a chest perspective, it can be handy in I guess getting sputum samples and educating patients on how to manage, if they have secretions. Also, to educate patients on infection control, quarantine. Yep" C2AH5.
5.15.2	"Yeah....The same goes with it though – I think in the past with SARS or swine flu or whatever the flu was, avian flu, I think the links with the pharmacy and the microbiology department who are crucial to allay any fears to anyone, gives them a strong plan of attack about if patients come, this is what you do, this is how you treat, this is what you can give blah blah blah ..." C2AH4.
5.15.3	"I still think the holistic care...that social work has something to offer with regard to who the person is in the context of their world and their environment. And while we're not going to be in intensive care resuscitating or doing ECMO, we'll be supporting the family. ... So, I suppose it's the ICU social worker in me that when you're engaged as part of a team, if you are as a social worker in ICU, you've got a lot to add and contribute, and ... our consultants would absolutely validate that. So, yes, I want them to come to work" C2AH1.
5.15.4	"Yes, because that's where our role is important. These cardio thoracic patients are really dependent on imaging for diagnosis and things like that. I think that we're all trained well enough to know what precautions to take and how to clean and things like that, and that should minimise any spread to staff as long as we're cautious and do things properly. So, I don't think that should be a reason to stay at home" C2AH6.
5.15.5	"Yeah, same thing. And again, I think the hospital should be offering any vaccinations that's required. They just need to trust that the hospital will do all those things" C2AH3.
5.15.6	"Definitely. Again, making sure you're training, PPE, they're well aware of the situation. Again, unless there's health that's precluding them to be able to effectively manage that patient say the P2 mask and people with beards, those certain things that are going to inhibit the care or the safety to themselves. But influenza isn't outside our scope of practice to look after. Same as the last question. We've got adequate training in being able to deal with that. It's within your scope. It's reasonable to ask people to work, yes" C2RN2.

5.15.7	"...Yes.... Again, we are human, and we are not heroes. I don't think it is reasonable to expect anyone to walk into a dangerous situation without the appropriate measures in place, but we should be able to manage the risk to staff in something like an influenza outbreak" C2MP1.
5.15.8	"Yes. The problem is, you know, getting to work safely and then when you're at work staying safe. But, you know, realistically, people need healthcare. The only way to actually resolve the pandemic is to treat people and treat the illness. So yes, I can envision people choosing to stay home with family and things like that. What I wonder is around the consequences for not attending, what should people face or not? But I think it's reasonable to request people to attend and expect people to attend and acknowledge that there will be some people who choose not to. And I don't know what consequences they should or shouldn't face" C2AH2.
5.15.9	"If they're rostered on and they've been trained, I don't see why they wouldn't want to come. ... It is infectious, and they will be quarantined, then I think we should be providing them with the information ahead of that time to tell them that in that situation, once you arrive, you probably won't be released. That you will be staying here until it is over. And that we have made plans to – and that way they know when they volunteer, it will encourage them to volunteer if they know that we have made allowances for their family. ...what are the safeguards for that person if they do get infected?" C2MP2

5.6.4 Power Failure with Internal Hospital Generator Failure

With the exception of one health professional there was universal support that staff should attend work as they would be needed to care for patients (Quotation 5.16.10, Table 5.16). Participants expressed a desire to attend work and help if transport logistics enabled staff to attend. There was no discussion about safety concerns and participants indicated they would recommend staff attend work (Quotations 5.16.1 to 5.16.9, Table 5.16). Extra staff were even advocated to attend rather than expressing concern about staff needing to stay away. The participants advocated need for extra staff to replace the deficit in technology. Consideration was given to ventilators being inoperable and staff may need to ventilate patients manually, removing drugs from fridges or the need for extra staff to distribute food if elevators or electric trolleys were not functioning (Quotations 5.16.1 to 5.16.2 and 5.16.4 to 5.16.9, Table 5.16). Medical and nursing staff would be busier with their usual duties, so an allied health participant considered that they may need to assist (Quotations 5.16.3, Table 5.16).

One participant did express concern about health professionals being required to report to work during a power failure, with generator failure, particularly if they are not rostered to work. They expressed that they may be needed in the community, to care for family members (Quotation 5.16.10, Table 5.16).

Table 5.16 Exemplar Quotations Attendance at Work During Disasters: Power failure with Internal Hospital Generator Failure

Quotation number	Quotation and participant code
5.16.1	"I think you would need extra staff and I think it's reasonable to call in staff to attend because you'd need a lot more hands to be able to crank a lot of the machinery and hand-bag. So, I think it's very reasonable that you ask for people to attend" C2RN2.
5.16.2	Yes. Absolutely. You need hands on deck for that sort of thing. You need to manually. Whereas one person was looking after a patient plus a machine, you now need probably three people with a patient" C2MP2.
5.16.3	"I'd assume yes ...we will have a whole lot of distressed family members concerned that their loved one is dying because of the power failure. So, I can see a clear role for a Social Worker around that supporting and containing families so that the Nurses and Doctors can do their jobs... I see it being clearly needed in that kind of situation" C2AH2.
5.16.4	"Well, having been in a hospital through a cyclone in far north Queensland, we showed up for work and we were doing things like buckets of water outside and filling toilets, and getting them to flush because we had lost water and power.... having to handbag if your generators had gone down,may be needed to diversify our skill sets a little bit ... trying to work with transport to get people home. ..." C2AH1.
5.16.5	"Absolutely. might need to be very hands on, go down to the kitchen and assist, and ... bringing food up to patients... all hands-on deck. ... our job, to make sure that people get fed, and we all believe in it, and enough to drink as well, so we'd be wanting to make sure that bottles of water were going up to the wards and everyone was being fed. That would be a priority for us, and I don't think you'd have anyone who would argue with you in my department" C2AH3.
5.16.6	"Look, we'd be lame ducks because everything runs on power, however, saying that we do have some equipment which is mobile and can run on battery power for a certain amount of time, ...So, I would expect a couple of radiographers would come in, but I don't think the entire team would need to come in. I'm more than happy to push a bed or to do whatever is needed, or to help ventilate a patient, if someone needs you to bag them or whatever, or to gather oxygen bottles from the wards to take them to" C2AH6.
5.16.7	"Yeah, I think so. As I've mentioned before, if they can't get an ultrasound or an X-ray, those are I guess the only things we usually order which require electricity. Most of what we do is plastering, doing the clinical assessment. We do assessments on the side of the sports field without electricity. ..." C2AH5.
5.16.8	"Oh yeah...God, decamp everything in all the fridges" C2AH4.

5.16.9	“Those who can come. It may not be logistically possible. There’s lots of ways of dealing with that. You’d duck out and buy half a dozen generators from Aldi or whoever... Bunnings” C2SS
5.16.10	“No. Again, it depends. I mean, have these nurses got a business at home that they need to get their fridges and freezers sorted out? It has to be voluntary... quite a few people I know also have businesses and lives outside of work. So, if they were rostered on, you would expect them to show up for their rostered shift. But I wouldn't expect them to go above and beyond. And I would expect them, if they have real or legitimate concerns about the power off, I've got a something business and I need to stay at home and get something happening” C2RN1.

5.6.5 Encouragement to Attend Work

Participants advocated having a plan or procedures which are up to date was necessary to promote staff to attend work. It was advocated for staff to have a comprehensive knowledge of the disaster plan so that staff training should be provided so staff understand the disaster plan. All managers and staff need to be aware of the plan to promote attendance at work (Quotations 5.17.1 to 5.17.5, Table 5.17).

The second key idea which participants presented to promote health professionals and support staff to attend work was that staff should be provided vaccinations, appropriate PPE or medical treatment to health professionals and support staff that have participated in the disaster (Quotations 5.17.16 to 5.17.18, Table 5.17). Participants expressed the need to have appropriate isolation rooms, tests for infectious diseases and other protective resources. Access to antiviral medications for the whole healthcare team was suggested to promote staff to feel safe to come to work is required. Health professionals and support staff expressed they wanted to feel safe when they attend to disasters involving infectious diseases and these Quotations 5.17.16 to 5.17.18, Table 5.17 exemplify this need.

The third theme that emerged regarding promoting health professionals and support staff to attend work was logistical or financial support (Quotations 5.17.10, 5.17.11 and 5.17.19, Table 5.17). Participants suggested extra or overtime payments could encourage staff to come to work during a dangerous disaster. Covering the costs of childcare or caring for elderly parents if called to work during a disaster, providing accommodation and other compensation if injured at work was also argued to be important (Quotations 5.17.9 to 5.17.10, Table 5.17) . Some support staff argued taxis or busses provided by the hospital management would assist staff to get to work during a disaster and therefore would help promote attendance(Quotations 5.17.11, Table 5.17).

It is important that staff are supported so that they can more likely attend work during disaster (Quotations 5.17.9 to 5.17.11, Table 5.17).

Table 5.17 Exemplar Quotations Attendance at Work During Disasters: Encouragement to Attend Work

Quotation number	Quotation and participant code
5.17.1	"Yeah, and that it's publicly known within its staff, how these are going to be dealt with, and for the safety of the patients as well as the staff" C2AH4.
5.17.2	"Again, I think if people felt confident that the management knew what they were doing and that they had a plan, and that it was being implemented and being monitored, I think people would feel safe" C2AH3.
5.17.3	"First of all, I think just within the training that you mentioned before it's probably worth addressing that upfront. Saying that there'll be situations where staff members because of the situation outside the hospital may be concerned about even travelling to the hospital. There'll be situations because of infectious pandemics where people are concerned about their own welfare. But as medical practitioners we really just have to accept that as part of the job" C2MP1.
5.17.4	"Prepare. I think it would be very intimidating to get a message ...to turn on the news and see some sort of September 11 style thing in our backyard and then expect people to rock up to work with never having been involved in any disaster simulation" C2MP2.
5.17.5	"So, I think awareness is big. Like I was saying, even just doing the call list, no one actually thinks of what they would do or what they would have to facilitate. So, I think creating that awareness and I think that also comes down to training, so, people who then are interested in that side of the preparedness, and getting people involved in that and stuff like Emergo Train. I think it's getting people involved and engaging them, so they've got a greater understanding" C2MP1.
5.17.6	"I think the more information you can give around what the risk actually is so people can then make informed judgements, the better. I mean, I think back to St Vincent's used to provide lots of HIV care back in the 80s and 90s. To me, that's a kind of clear example of the more information you can give about what the risk actually is so you can confirm that it is an Ebola outbreak, how is it spread, what's transmission, how can I keep myself safe. So how can I access that area and do my job safely" C2AH2.
5.17.7	"That's right. So, they would want to know, Yeah, we have a plan, we've got all the equipment that we need, we've got the appropriate rooms, we've got the control mechanisms about who goes in and out, we've got the testing procedures, all of that kind of stuff. They'd want to know that everything is hunky dory" C2SS.

5.17.8	" ... (Antivirals and vaccinations)... I suppose, they should be prioritised for anyone who is going to be within that vicinity....Yes but including your cleaners. Yes. Absolutely" C2MP2.
5.17.9	"So, I guess having a financial incentive, it would definitely influence some people. I think they do – if it's the weekend and you've worked a week and you're filling in for someone, they might give you overtime" C2AH5.
5.17.10	"... if they are coming to that environment, as with the SARS in Canada, they didn't go home for 13 weeks ... Well, that is a separation from a patient and their families. Like what have we done to mitigate that? ...and if they are caring for elderly parents or children, it is our responsibility to make sure we have thought about that in our plan because in those infectious disease type situations, you are quarantined. You're effectively – so, I think a lot has to be done about the psychological effects of that, the social effects of that, the financial aspects of that" C2RN1.
5.17.11	"Maybe the hospital could give cab vouchers for people to come to work if they have no other transport...Or the little bus. You'd have a bus you can run up and down to Central Station" C2SS.

5.7 Lessons Learnt Regarding Preparedness from Disaster Experience

There were two themes that emerged from the participants who had experience working during disasters when they were asked to reflect on the preparation and what they found to be useful in improving their performance during disasters (Quotations 5.18.1 to 5.18.4, Table 5.18).

Participants expressed recognition that having a plan or protocols in place was very important to enable staff to perform well during disasters (Quotations 5.18.1 and 5.18.2, Table 5.18). It was acknowledged that training may not always be provided but at least if there is a plan then the staff can use the plan to assist with work during disasters. One participant described the victim identification process following an international terrorist attack. Not many health professionals get regular experience undertaking victim identification. When the Bali bombing (2005) disaster occurred, participants indicated having the appropriate documentation assisted the staff to perform their role (Table 1.1). Plans which include information about the role of staff and resources available during disasters are important to improve performance during disasters (Quotations 5.18.1 and 5.18.2, Table 5.18).

The second learning highlighted by health professionals with disaster experience was the importance of a briefing or practical learning, providing information and the ability to rehearse

prior to the disaster (Quotations 5.18.3 and 5.18.4, Table 5.18). In the lead up to the Lindt Café Siege in Sydney (Table 1.1) it was highlighted how the briefing held prior to the disaster response enabled staff to know what they and others would be doing. In a separate incident, attending a mass casualty incident in the prehospital phase, a participant recalled the benefits of the Emergo Train exercise held prior to the real disaster and the impact the exercise had on improving decision making during an actual disaster. These arguments highlight the benefit of briefings or exercises (Quotations 5.18.3 and 5.18.4, Table 5.18).

Table 5.18 Exemplar Quotations Lessons Learnt regarding Preparation from Disaster Experience

Quotation number	Quotation and participant code
5.18.1	“Usually there has not been a lot of training, but at least by having protocols and having them written gives us the foundation from which to begin...” C2AH1.
5.18.2	“During a nursing home evacuation, you need plans, and you need experience...we know a lot of people would come who had dementia. A boarding school identified in the plan had kitchens...laundry...everyone’s got a single bed...it’s got its own 30 bed infirmary...but there were 950 other beds there” C2SS
5.18.3	“Being briefed on what was happening and what was expected ...get an idea of what everyone else was doing...what it would mean for us... we would have to think” C2AH6.
5.18.4	“I recall the triage area and the allocation of resources on the board. This sort of translated to the scene when we ended up setting up a mass triage area. You had 20 ambulances.... It was so different to any form of response I had done before but there was direct reassurance from training that I had done previously” C2MP2.

5.8 Other Observations or Ideas

An allied health participant compared healthcare disaster responses to more obviously dangerous occupations including the police and fire fighters, whom the participant advised, consider the risks and hazards in advance more that healthcare occupations do. The participant suggested in healthcare risks are not considered until they happen. The suggestion was that we should consider these risks ahead of time for proper preparation (Quotation 5.19.1, Table 5.19).

Table 5.19 Exemplar Quotation Other Ideas from Case 2 participant

Quotation number	Quotation and participant code
5.19.1	"Police and fire brigade sign up accepting a reasonable amount of risk. ...for us there is that risk, but we do not fully acknowledge it. It changes the equation quickly" C2AH2.

5.9 Analysis

In Case 2, most participants advocated annual preparation of two hours or less which is relatively short to cover a range of disaster scenarios. There was the suggestion that more senior staff should have additional preparation time. These included managers and members of the medical or nursing profession. When analysing the views expressed by different professions, both medical practitioners and one registered nurse included in case study expressed support for more frequent and longer preparation periods. This view may represent the senior role which medical practitioners and some nurses hold within existing disaster management arrangements at the hospital. It could also be a sign that allied health and support staff members are not currently being included in disaster preparation activities to the same extent. Based on the data obtained in the interviews and focus groups allied health and support staff have not been fully included in disaster preparedness. If allied health professionals and support staff were included in disaster exercises, it would be useful to discover if they would also prefer longer or more frequent disaster preparation in the future.

There was very strong support for the preparation to be practical learning. Of the opinions expressed by health professionals and support staff, thirteen indicated support for practical learning, three participants indicated support for classroom or lecture style of learning and four participants indicated support of online learning. Most participants also supported blended learning involving practical with another form of learning. It is noteworthy that those who specified that preparation should be practical learning, also specified that it should not be lecture style and should not be online. Whilst allied health and support staff have not always been included in practical Emergo Train exercises, some of these participants worked in the emergency department, which had hosted separate Emergo Train exercises, including allied health staff. Additionally, only one participant reported experiencing high fidelity preparation and they advocated for this style of practical preparation as they argued it was as close as

possible to reality. It would be important to examine if others experienced high fidelity practical preparation in the future if they would also prefer it to other forms of preparation.

Many participants expressed that online learning was not suitable to form the major component of disaster preparation, despite the facility having mandatory online disaster preparation for all staff. Online learning may be more cost effective for hospitals to conduct, particularly as some online learning programs have already been developed for public hospitals by the Health Education and Training Institute. If staff do not find the online learning effective, then it may not truly be cost effective from a financial or capability perspective.

There were four main aspects to resources outlined by participants. These aspects included appropriate resources to treat patients, protect staff, having plans or policies in place and practical measures to support staff. The focus on adequate equipment to treat patients was likely related to the Case 2 hospital's role in responding to mass casualty disasters. Support staff participants, in particular focused on the need for practical assistance to get to and from work, including the provision of a bus or taxi vouchers. The Case 2 hospital is in a high socioeconomic location with easy access to public transport and limited staff parking. It is possible more support staff travel longer distances to get to work via public transport. If public transport is less viable during disasters, it is important support staff are involved in disaster planning to identify these issues or needs before disasters occur.

The desire to include the hospital command structure in disaster planning so that allied health professionals are included in the disaster preparation process rather than being left out of the planning process was an important finding. It was important as it signified the need for allied health professionals to be included in disaster planning. This belief highlights an issue already identified where allied health professionals are not being fully included in disaster planning.

Most participants also indicated that national or international disaster competencies are important although it is clear from the interviews that some participants had concerns. Both medical practitioners expressed caution when developing competencies to ensure they are realistic. The concern was that treatment needs are hard to predict in advance and can change based on resources. The medical practitioners whilst supporting the importance of competencies questioned how these could be accurately prepared. One allied health participant argued they were not needed as senior clinicians could adjust to unfamiliar circumstances or patient needs within a disaster. This objection to disaster competencies based on the view that health professionals will be able to make their own decisions. Learnings therefore include the need to examine how to make competencies realistic and how to convince health professionals,

that despite being experts, disaster competencies may assist care and appropriate decision-making during disasters.

A useful learning emerged when discussing if disaster preparation should be specific or generic to profession or occupations. It was raised that as well as considering professions or occupations, different specialities within and across more than one profession also need to be considered. An important learning from this case is to consider whom to deliver specific preparation. Preparation could be targeted towards a specialty, for example orthopaedics and include the occupations that work in this specialty including orthopaedic surgeons, nurses and physiotherapists. Alternatively specific disaster preparation could be directed towards occupations or professions and have training for medical, nursing, physiotherapy, cleaners or other occupations. There was evidence in the data that already there is some specialty specific preparation occurring with disaster exercises including emergency department personnel. These exercises included allied health and support staff that work in the emergency department.

When the participants considered if the preparation should be generic or specific to disaster type, again there were divergent views. There was a split between those participants that suggested specific training to cover various types of disasters and generic preparation that could be applicable to all disasters. Some participants focus on resources when advocating disaster preparation should be generic. The argument was that staff would not have time to cover preparation of many different types of disasters, so generic preparation should be covered. In a major public hospital, which has a responsibility to manage external disasters and internal incidents it is worth considering if inadequate resources, or the perception of inadequate resources, should be a rational for determining content of preparedness.

Given the wide range of health professionals and support staff interviewed for this study at Case 2 it is not surprising that there were a wide range of professional, clinical and / or technical skills provided in the responses. The knowledge and skills to care for patients specific types of patients during disasters emerged to be important in Case 2. The need for specific preparation was highlighted when contrasting the different scenarios versus the Ebola virus scenario. An Ebola virus outbreak was a newer disaster at the time of data collection in contrast to bomb blasts, pandemics or power failures. There was a greater request for training when discussing Ebola virus due to a lack of knowledge or experience. This lack of knowledge or experience may be an argument for hospital managers to provide adequate resources and the ability to focus on disaster preparation to cover preparation for multiple disasters.

The need for disaster leadership emerged when considering the non-clinical or technical skills, knowledge or attributes that would be important to have during disasters. The observation made that disaster leadership is different to usual leadership. This need and observation demonstrated that additional disaster leadership development may be required at Case 2.

With regard to attendance at work, the concept of a risk-benefit analysis raised by allied health participants. The risk of the healthcare worker being infected or injured versus the benefit of improved patient outcomes. If health workers did not have a major role in care or if someone else could deliver care on their behalf, then they advocated staying away from work. Therefore, if a dietitian, physiotherapist, or social worker believed a nurse or medical practitioner could provide the care of the allied health professional or if absence of these modalities would not cause major health concerns, then some argued then it is not worth the risk of them attending work. This belief about their role, could be indicative of the need to be more inclusive of allied health professionals in disaster preparation facilitating understanding of allied health professionals roles in disasters by all hospital staff and managers.

The key learnings in relation to attending work were that most participants suggested that staff should attend work during all disaster scenarios outlined. When presented with the Ebola scenario for most participants, there were various reasons presented why staff would or may choose not to attend work, including lack of knowledge or experience. The main findings of this case related to encouraging staff to attend work are to have plans available, and to ensure that staff have adequate training or knowledge for new or emerging disasters.

Overall, there are key learnings to be taken from the Case 2 participants. These findings are inclusive preparation and the need to dedicate more time and resources to allow for more comprehensive preparation. The preparation needs to be more inclusive, so staff are engaged, and the range of disaster topics covered. Preferably this preparation should be practical learning. Preparation could include briefings at the time of disasters, particularly if it is a new or unexpected disaster type which has not been prepared for previously. Dangers or hazards of disasters play a key factor in staff ability to perform or willingness to attend work, so should be considered in advance.

5.10 Conclusion

The participants included staff from a range of disciplines and specialty areas, and they gave insight into the preparation needs of a major public hospital located close to Sydney's central

business district (CBD). Public hospital staff in Australia have most responsibility when external disasters occur, so it is particularly important to understand their preparedness needs.

Important insights into disaster preparedness have emerged from Case 2. One insight was the preference for disaster preparation that is generic, so it is inclusive of the many occupations in the hospital. When specific preparation is advocated, a learning was that the preparation can be targeted to specialty or occupation. Already implemented in Case 2, the emergency department is considered a speciality and specific preparation targeted to the many occupations that work in the emergency department is in place. This needs to be considered for other specialties.

Alternatively, occupations specific preparation was also advocated for, in particular for radiographers. There was very strong support for practical exercises and blended disaster preparation from all participants, as effective methods of disaster preparation.

Improvements to disaster preparation are required at Case 2. Only allied health participants that worked in the emergency department and medical and nursing participants had previously been involved in practical disaster exercises. All participants undertake mandatory online learning and practical fire training. Online learning was not considered the most effective method of preparation and whilst many participants had not participated in practical disaster exercises, practical scenario-based learning was considered most effective.

Allied health participants and hospital support staff are less included in disaster preparedness, compared to medical and nursing staff in Case 2. Examples of allied health staff being included in disaster response by convenience or not being informed emerged in interviews. Allied health and support staff need to be more engaged in preparedness in Case 2.

There was acknowledgement that leadership during disasters can be different, and development may be required for Case 2 leaders. Attending work during disasters is important to meet the care needs of patients and this was recognised by all participants. A lack of knowledge and risks were a factor in reducing potential attendance at work, which indicates the need for more effective disaster preparation.

Case 2 is major trauma centre, close to the Sydney CBD and is well supported by nearby major hospitals. Case 2 contributes important findings on how health professionals and support staff can most effectively prepare for disasters within the context of this public hospital.

Chapter 6 Case 3: A Western Sydney Public Hospital

6.1 Introduction

Case 3 was selected for the study as it is the major public hospital and trauma centre located in Sydney's western suburbs and close to Sydney's second largest central business district. The hospital was the state referral centre for pandemics including SARS and the Ebola virus. Hospital staff have responded to internal and external disasters including mass gathering events including music festivals, a terrorist shooting at the New South Wales police headquarters (Table 1.1) and a major power failure. Staff at the hospital have also participated in disaster preparation. The data collection period was from April 2019 and May 2019.

The methods of data collection and analysis have been used as described in the methodology chapter. For presentation this case, participants have been allocated a participant code. For registered nurses, the code is C3RN1 or C3RN2 and for medical practitioners C3MP1 or C3MP2. There were six allied health professionals including two physiotherapists and one dietitian, radiographer, social worker, and pharmacist these are coded as C3AH1 to C3AH6 to further protect their identity. It is not possible to determine who said what in the focus group, all participants were allocated a code C3SS (Case 3 Support Staff). Transcripts were thematically analysed and coded as described using structural and descriptive coding (Belotto 2018) and analysed according to multiple case study methodology (Stake 2006). Exemplar quotations from transcripts are included in this case study chapter to evidence the themes. Findings from this analysis are outlined under headings describing preferences for disaster preparation: duration and frequency, methods and resources, content, attendance at work during disasters, lessons learnt from actual disaster experiences and other observations which emerged.

- Section 6.2 Participants. This section explains the recruitment of participants for the case and presents participant demographic data.
- Section 6.3 Preferred Duration and Frequency. This section outlines the preferred duration and frequency of disaster preparation.
- Section 6.4 Preferred Content and Resources. This section is the largest in the case study and includes participant preference of what learning content should be included, international or national competencies, generic or specific to occupation or disasters and what clinical and non-clinical attributes, knowledge or skills are required for disasters.

- Section 6.5 Attendance at Work. The section outlined participants perspectives regarding whether they believe health professionals and support staff should and would attend work in four disaster scenarios. The section also presents suggestions for staff to attend work.
- Section 6.6 Lessons Learnt from Disasters Experience. This section aimed to gain an understanding of what preparation was effective in terms of improving disaster performance.
- Section 6.7 Other Observations. This section provides an overview of other issues or ideas raised by participants in relation to disaster preparedness.
- Section 6.8 Analysis. This section is an analysis of the key ideas or findings from the case study.
- Section 6.9 conclusion summarises the findings from Case 3.

6.2 Participants

All participants were invited to attend through a process of third-party recruitment, via their manager's email or verbal invitation. They were provided with an information sheet and consent form by the manager. The researcher verified with participants the information sheet had been received and answered additional questions as needed prior to obtaining the consent form. The interviews or focus group were conducted in private executive meeting rooms at Case 3. All were audio recorded and transcribed by a third-party transcription service approved by the University of Tasmania.

Ten health professionals and eight hospital support staff were selected to participate in interviews and focus groups at Case 3. The data in Table 6.1 includes the demographics of the health professionals and hospital support staff. The participants included registered nurses, medical practitioners, allied health professionals, and support staff.

It was considered important to learn from participants with disaster experience. As required by the selection criteria, all participants had experience in either disaster learning, or preparation and 10 participants had experience working during actual internal or external disasters. The managers or directors who invited participants to participate in the research, were advised that it was preferable to have participants with actual experience working during actual internal or external disasters.

Table 6.1 Case 3 Participant Demographics

Occupation & Participant code	Experience in Health Care	Disaster experience reported	Disaster Learning	Qualifications
Registered nurse 1 C3RN1	Twenty Years	Yes. Train crash	Major Incident Medical Management Support (MIMMS) Learning, and MIMMS Commander Learning, Emergo Train and Tabletop exercise, PPE learning	Bachelor of Nursing, Master of Applied Management, Graduate Certificate in Emergency Nursing
Registered nurse 2 C3RN2	Ten years	Yes. Nursing home fire	Major Incident Medical Management Support (MIMMS) Learning, commenced master's in public health (includes disaster subjects not yet studied), High fidelity disaster exercise	Bachelor of Nursing, Graduate Certificate in Critical Care Nursing
Medical Practitioner 1 C3MP1	Twenty-two years	Yes. Multiple disasters. NZ earthquakes.	MIMMS training, CBR learning, ICS learning, AUSMAT Learning, International Diploma Humanitarian Assistance, Masters in Disaster Medicine. Emergo Train exercises	Bachelor of Medicine, Bachelor of Surgery (MBBS) Fellow Australasian College of Emergency Medicine learning.
Medical Practitioner 2 C3MP2	Nine and a half years	Yes. Terrorist shooting.	MIMMS training, MIMMS commander learning, simulations, Emergo Train exercises and bio preparedness workshops.	Bachelor of Arts, Bachelor of Medicine, Bachelor of Surgery (MBBS) , Advance Medical trainee (Primary exams & 1 fellow exam)
Social worker C3AH1	Seven years	No	MIMMS training, Victim identification learning	Bachelor of Social Work, Post Graduate learning in Grief and Loss
Dietitian C3AH2	Thirty-Three years	No	My Health online learning (disasters). Emergo Train exercise	Bachelor of Science, Graduate Diploma in nutrition, master's in science and Medicine, master's in public health
Pharmacist C3AH3	Four	Yes. Mass gathering music festival	Disaster Handover	Bachelor of Pharmacy

Physiotherapist 1 C3AH4	Thirty Years	Yes. SARS and Earthquakes in China.	Workshop in SARS Management Emergo Train exercise	Diploma of Physiotherapy, Masters of Physiotherapy
Physiotherapist 2 C3AH5	Seventeen years	No	Emergo Train exercises & MPH lectures.	Bachelor of Applied Science, Master of Public Health, Diploma of Management
Radiographer C3AH6	Twenty- Three years	No	Emergo Train exercises	Diploma and Bachelor of Applied Science and a master's in health management
Clerical C3SS	Twenty-six years	Yes	Emergo Train assistant instructor, Emergo train exercises, simulation exercise Olympic Park	N/A
Pastoral Care / Chaplin C3SS	20 months	No	Disaster recovery course for chaplains, disaster scenario, Emergo Train exercise	Chaplaincy / pastoral care learning, Theological qualifications.
Pastoral Care / Chaplin C3SS	Ten years	Yes . Floods	Disaster recovery course for chaplains, disaster relief, rehabilitation, recovery & rights Disaster services international	Religious learning, Director Camillian Disaster Service Australia
Operating Theatre Technician / assistant C3SS	Eighteen years	No	Simulation learning at hospital, Emergo Train exercises	N/A
Food services C3SS	Thirty-four years	Yes	Business continuity plans	N/A
Environmental Services C3SS	Sixteen years	Yes	Mandatory learning	N/A
Patient Transport / Wards person	Thirty-four years	No	Disaster learning Disaster Exercises Closed ward (high fidelity)	N/A

C3SS				
Patient Transport / Wards person C3SS	Twenty-nine years	No	Disaster learning	N/A

6.3 Preferred Duration and Frequency of Disaster Preparation

6.3.1 Duration of Disaster Preparation

The duration preferred by the participants in Case 3 was divided between longer learning (greater than 2 hours) and shorter preparation time (less than 2 hours). More participants argued for longer preparation periods of learning than shorter periods (Quotations 6.2.1 to 6.2.7, in Table 6.2). Longer learning ranged from a few hours to a few days. Participants indicated preparation needed to be longer to include the volume of information for the variety of potential disasters. Whilst it was suggested a full day may be appropriate for most clinicians, it was argued that those with more involvement, either due to clinical speciality or management responsibility, would require additional preparation. This view is suggested in Quotations 6.2.1 to 6.2.7, Table 6.2. Additional preparation included some staff or managers undertaking additional workshops that related to the role, speciality, or seniority. Participants presented arguments for a wide range in preparation time. One participant (C3RN2) argued that twenty to thirty minutes was adequate for regular staff. Senior or in charge nurses were recommended to undertake a Major Incident Medical Management Support (MIMMS) course which is a day to three days (Quotations 6.2.1 and 6.2.8, Table 6.2).

There were also some participants advocating for short periods of preparation ranging from 20 minutes to two hours (Quotations 6.2.8 to 6.2.10, Table 6.2). Both nursing participants argued that most clinical nursing staff should receive relatively short learning periods, between 20 minutes and 2 hours, and this preparation would enable adequate information to be covered. Support staff participants argued that thirty minutes could be adequate for support staff to understand the required disasters information (Quotations 6.2.8 to 6.2.10, Table 6.2).

Table 6.2 Exemplar Quotations Preferred Duration of Disaster Preparedness

Quotation number	Quotation and participant code
6.2.1	"As team leader I think it is important we know a bit more in terms of the command structure and things like that. I think enrolling more nurses into MMIMS learning would be helpful as well". C3RN2
6.2.2	"So, I think the basic stuff for most clinicians that work within a hospital I would say a full day maybe six monthly, would probably be okay. And then for somebody who's going to deploy or who's going to lead or is involved in organising responses say would need quarterly type of exercising or some sort of ongoing learning" C3MP1
6.2.3	"I think it has to be more than a day; disaster preparation is quite a big topic to cover. I mean you can go through all different sorts of situations. Probably cover a few days that they would probably have to run it" C3AH3
6.2.4	"Well, you want to cover the respiratory, the plastering ... and to have a better understanding of the whole situation of the hospital. I think your probably looking at about half a day just to refine or refresh everyone" C3AH4
6.2.5	"For the general staff I think probably one to two hours just so they understand it, but then for the people that have specific roles and the people you want to train up, it's probably twice that, probably two to four hours" C3AH5
6.2.6	"I think it varies. If you have got an emergency department who may be exposed to this on a different level to your geriatric ward who may not be impacted... So, I think if ...you work in a clinical area that is likely to be directly impacted, then it might be lengthier" C3AH1
6.2.7	"The last time I remember when we had done here three, four hours it took" C3SS
6.2.8	"20 minutes, 30 minutes in-service or an online module where they are clicking through everything, that could be helpful" C3RN2
6.2.9	"I think there is PPE ...and there is just the disaster. And there so many changes in the hospital – assembly points and things like that. Maybe an hour for PPE and an hour for the general stuff" C2RN1
6.2.10	"Thirty minutes on a computer" C2SS

6.3.2 Frequency of Disaster Preparation

The frequency was also argued to be important in Case 3. Participants outlined that disaster preparation should be held every six months or twice per year, with some participants also suggesting preparation should be more frequent (6.3.1 to 6.3.3 and 6.3.5 to 6.3.6, Table 6.3). The rationale for frequent preparation was the complexity of some tasks required during disasters. It was advocated that more frequent preparation of three to four times per year, was for those with disaster organisational or deployment responsibilities should be provided. Advocated frequency of disaster preparation is exemplified in Quotations 6.3.1 to 6.3.3 and 6.3.5 to 6.3.6, Table 6.3.

There were participants who argued that annual preparation would be ideal (Quotations 6.3.6, Table 6.3). It was argued that annual sessions could allow for a different type of session to be delivered each year. Support staff suggested theoretical preparation once per year and then practical preparation every second year for the key staff involved in disasters (Quotation 6.3.4, Table 6.3).

Table 6.3 Exemplar Quotations Frequency of Disaster Preparation

Quotation Number	Quotation and participant code
6.3.1	"For instance, the bio preparedness and the special PPE it's not something you can just do once, it's really something you need to go back to and do once or twice a year, because you need to have that muscle memory with it and it's not a simple process....for something like fire evacuation... not really that complicated as a mass casualty event ...so less frequently" C3MP2
6.3.2	"Fire evacuations every year...two hours practical learning twice a year and then probably an hour or two for online learning" C3AH2
6.3.3	"I mean people have different levels of how much they want or how interested they are...so I think the basic stuff for most...6 monthly... and then somebody who is going to deploy ...or lead organising responses. Need to be quarterly" C3MP1.
6.3.4	" Every two years we should be having a scene set with actors... but everyone won't be able to go...just the major players.... otherwise just the basic stuff once a year... simple points"C3SS
6.3.5	"Oh, every six months" C3RN1
6.3.6	"... I think yearly 20-minute, 30-minute in-service or an online module where they are just clicking through everything" C3RN2

6.3 Methods and Resources Preferred for Disaster Preparedness

6.3.1 Methods

Practical Preparation

Most participants preferred the practical or scenario-based methods of preparation including Emergo Train scenarios, tabletop exercises and high-fidelity exercises (6.4.1 to 6.4.6, Table 6.4). It was argued that practical methods assisted to prepare, whilst also facilitating working with the multi-disciplinary team (6.4.1 to 6.4.2, Table 6.4). It was suggested the disaster exercises allowed participants to think as they would in a disaster and understand the flow of activity required. Undertaking a practical exercise was considered the best way to test the emergency plan and identify issues with this plan. Participants also suggested that Emergo Train exercises allow the real hospital resources to be tested (6.4.3 to 6.4.6, Table 6.4). Participants outlined that whilst some resources can be increased during disasters, others may not, including computed tomography (CT) scanners or magnetic resonance imaging (MRI) scanners. The Emergo Train exercise stimulated health professionals and support staff to critically think given the available resources. These advantages and why participants find practical exercises most effective are exemplified by Quotations 6.4.1 to 6.4.6, Table 6.4.

The benefits of High-fidelity exercises were raised as suggested to be beneficial by some participants that had experience participating in these exercises. High fidelity exercises were argued to provide a more realistic preparation of actual actions needed and also working with teams. The high-fidelity exercises included multiagency exercise in Sydney's Olympic Park and a hospital based high fidelity exercise in a closed ward (Quotations 6.4.1 and 6.4.6, Table 4.6).

Lecture, Didactic or Classroom-Style Preparation

Lecture, didactic or classroom-based learning were also popular among some participants (Quotations 6.4.7 to 6.4.9, Table 6.4). This type of preparation was often highlighted by participants who had undertaken the MMIMS learning or other classroom-based learning at or engaged by the hospital. It was outlined that whilst it may be more expensive to conduct lectures or classroom sessions, this style of presentation provides the best opportunity for people to ask questions (Quotations 6.4.7 to 6.4.8, Table 6.4). Participants compared face-to-face preparation with online learning when they highlighted the benefits of face-to-face learning. The benefits they outlined included being able to ask questions and make sessions more meaningful when compared to online learning (Quotations 6.4.7 to 6.4.9, Table 6.4). There was also a comment about preparing in a site removed from the regular workplace termed

“going somewhere”, which perhaps suggests it is useful for learning to be removed from the regular workplace (Quotation 6.4.8, Table 4.8). Hosting learning away from the workplace, may be referring the MIMMS courses which are conducted by external organisations engaged by the hospital. It should also be noted that the MIMMS courses also include an element of practical scenario-based learning, so could be considered blended learning.

Blended Learning

Participants outlined that a combination of learning methods can be most effective. A combination of online, face-to-face and practical learning can be effective as it allows theory to be learnt and then tested (Quotations 6.4.10 to 6.4.12, Table 6.4). The benefits of self-learning, face-to-face lectures and practical exercises were also specifically mentioned. A medical practitioner participant outlined that without the theory it is not possible to effectively learn from or to participate efficiently in the practical exercise. This combination of learning, including self-learning as argued to be the way medical practitioners learn for specialist practice, so this combination can also be the method when preparing for disasters (Quotation 6.4.11, Table 6.4).

Online Learning

Participants suggested online learning had a place in combination with other methods of preparation as argued in Quotation 6.4.12, Table 6.4. Online learning can be effective to gain some basic knowledge prior to extending it with face-to-face or scenario-based practical exercises. No participants advised that online learning would be suitable as standalone preparation (Quotations 6.4.5, 6.4.8 and 6.4.9, Table 6.4).

Other methods of Preparation

Participants in the support group suggested that participating in real disasters was a very useful way to prepare for future disasters. They argued that workflows operate more efficiently in real disasters than in exercises (Quotation 6.4.13, Table 6.4).

Table 6.4 Exemplar Quotations Preferred Methods of Disaster Preparedness

Quotation Number	Quotation and participant code
6.4.1	“(High fidelity exercise) I found it really useful seeing how all the teams work together...I am more a kinaesthetic learner...I like hands on... rather than reading a book” C3RN2.
6.4.2	“I like the Tabletop exercises; I think they explore avenues...and the whole hospital is involved” C3RN1.

6.4.3	“(Emergo Train exercises), you actually run through the scenario, helps with the actual flow and logistics...and how we are moving patients through the hospital” C3AH2.
6.4.4	“We used our disaster plan to show staff what would be doing and also problem solve any issues...with the disaster plan...the best way is actually practical” C3AH3
6.4.5	“I actually like the Emergo Train. It puts you ...not necessarily in the same scenario but you got to think laterally. I’ve a limited number of resources. Where can they be sent to? Yes, you can look at something on paper or online, but you have to think laterally in a scenario-based process” C2AH6.
6.4.6	“We used to have simulations where a closed ward. Bomb had gone off...patients with makeup...broken legs. It was a process of how we treated and prioritised...putting you as close as a real situation as you could get” C3SS
6.4.7	“My preference is face-to-face, I’m really aware that it is the most time consuming and expensive, you have to pay to come in and all that sort of thing. But the reason I like it is because these so many possibilities and people have so many opportunities to ask questions with regard to disaster preparedness that you really only get when you are face-to-face” C3MP1.
6.4.8	“Look, I’m definitely a fan of face-to-face contact. I find we do so much electronically in terms of our HETI mandatory learning that it just becomes click and move through just to complete sort of thing. I definitely found I get a lot more out of the MMIMS course. Going physically somewhere to be able to ask questions, to be able to make it more meaningful as opposed to just clicking on the computer, but that’s just me” C3AH1.
6.4.9	The face-to-face PPE learning is good... so yeah I like face-to-face – I hate online learning because I just click through to get off it as quickly as possible” C2RN1.
6.4.10	“It can be a combination of a bit of everything. I think some good hands-on experience is always good to put things into perspective just to bring the literature and theory into actual” C3AH3.
6.4.11	“I think people ...learn in different ways., but you need to have the knowledge set. Say for instance learning through simulation is all well and good, but if you go into it without any background knowledge you are going to fail. You are not going learn the adequate skills that you need. So... a combination. a bit of reading, self-directed – I think doctors are pretty good at that, because that’s what we’ve got to do for most of our careers – and then face-to-face teaching and then really cementing it and making the most of it in hands on simulation... that really drives the memory of it into longer term” C3MP2.
6.4.12	“For those who have not experienced disasters before I think a bit of general information like online modules, online videos would be a good introduction for them and then after it would be good to have a drill to do it practically as well” C3AH4.
6.4.13	“I’ve been in quite a few Emergo Train exercises here. While they run quite well, I just do not think there run as well as in a real disaster. I’ve been in quite a few real disasters and people do tend to jump in” C3SS.

6.3.2 Resources

Many of the participants highlighted the need for useful information to assist in the preparation for and response to disasters. This included the need to understand the risks and how they are managed (Quotation 6.5.9, Table 6.5). Essential resources included information for staff and their families, having disaster plans that were understandable, plans which explained staff roles and effective learning. It was suggested that accurate information presented during hospital information weeks would be important to have properly prepared staff (Quotations 6.5.1 to 6.5.3 and 6.5.8, Table 6.5). Examples of insufficient information were given to further the argument for useful and accurate evidence. Participants reflected on recent experience with the Ebola virus outbreak and identified that misinformation was a problem. There was also reflection on past disasters including the Human Immunodeficiency Virus (HIV) epidemic where inadequate and incorrect information was given to hospital support staff at Case 3 which partially resulted in staff stopping work and refusing to assist patients with HIV (Quotations 6.5.1 and 6.5.9, Table 6.5).

Participants indicated the need for vaccinations or treatment should they be affected whilst working during disasters. Treatment included psychological support, although mostly focused on their physical health (Quotations 6.5.4 to 6.5.5 and 6.5.10 to 6.5.11, Table 6.5). Participants suggested the need to have adequate resources to do their work safely for both themselves and so that safe care could be delivered to patients. Resources to work safely included having adequate staff to provide care and to take over during breaks and at the end of shifts, adequate PPE, and security to facilitate safety for staff during mass casualty incidents. It was also argued that safety concerns need to be addressed to keep staff safe (Quotations 6.5.4 to 6.5.6 and 6.5.12 to 6.5.13, Table 6.5). A need for staff to develop a plan to facilitate transport to work or childcare so that they would be able to respond to disaster was suggested by one allied health participant (Quotation 6.6.7, Table 6.6).

Table 6.5 Exemplar Quotations Preferred Resources for Disaster Preparedness

Quotation number	Quotation and participant code
6.5.1	"We saw this ourselves during the potential Ebola virus outbreak. There was a lot of confusion and misinformation. People kind of learning from the media. You could minimise confusion by having really good information for staff and the community so that families would also understand" C3MP1
6.5.2	"Explaining actual roles and how important it is" C3AH2

6.5.3	“There’s the hospital week. There is a range of things. Infection control obviously plays a massive part in that if its Ebola virus or something. There could be a promotional activity that they run” C3AH6
6.5.4	I think flu vac should be mandatory for all staff members and yes I think Tamiflu, although it hasn’t been shown lately to have great efficacy unless your high risk, so your immunosuppressed or pregnant, but sure if its available then fine” C3MP1.
6.5.5	“I suppose peoples greatest concerns would be around their safety so I suppose information about the situation, and communication will be crucial... ensuring that you’ve got staff who can have their brakes, who will have opportunities to go home...shift changes... so people know they’re not going to be indefinitely stuck at work”C3AH1.
6.5.6	“I guess it is important to make sure staff are protected” C3AH3
6.5.7	“The other concern would be practical arrangements around your own lifestyle if you’re stuck at home with no cares or no access to transport, facilitating some of those things if you need to” C3AH1
6.5.8	“We have our business continuity plan...that would be the first thing we would grab. It tells us who to contact, what to do, how to do stuff... It’s got a number of scenarios in there... what we are doing...is very important” C3SS
6.5.9	“If we go back a couple of years to the mid-80s, we had HIV. The scare tactics of HIV were mainly because people weren’t told. We knew nothing much about it. ...went on strike once a month for nearly 12 months solely because they weren’t being given the information other than everyone’s going to get AIDS, and everyone is going to die” C3SS
6.5.10	“Yeah... vaccinations or any kind of medical preparations ...” C3AH1
6.5.11	“...Yeah, if you are kind of coming into contact with that kind of stuff, Tamiflu and all that sort of stuff. Yeah. Staff health usually are very good with looking after staff exposures’ C3AH3
6.5.12	“Trained in high level PPE. We’d need multiple areas that are ready for the donning and doffing” C3RN1
6.5.13	“I think making security a priority ... you're going to get blown up, or stabbed, or shot, ... there's a strong police presence...reassure staff that they can do their jobs and be safe...” C3MP2

6.4 Preferred Content of Disaster Preparation

6.4.1 Organisational Structure for Disaster Management

Most participants believed it was important for members of their profession or occupation to understand the organisation or structure of how disasters are managed. Participants outlined the benefits of staff understanding these structures included staff understanding communication lines, staff roles to avoid duplication, to streamline work to the needs of the disasters. It was identified as important for staff to know who to contact particularly after hours when their managers are not at work (Quotations 6.6.1 to 6.6.6 and 6.6.7, Table 6.6). The knowledge and promote wise use of resources as staff may have a better idea of what other staff are doing. This knowledge will also prevent duplication as staff will not unknowingly try to perform the same task (Quotation 6.6.1 and 6.6.5, 6.6.6, Table 6.6). Knowing the appropriate person to contact, and the command structure was important to aid clinical care and would assist staff to streamline tasks during disasters as they may normally have a very broad role. During a disaster staff may need to be more focused on a particular function than usual duties (Quotation 6.6.3 and 6.6.6, Table 6.6). It was suggested that staff understanding the disaster organisation structure was even more important on weekends or after hours when less managers are present (Quotation 6.6.4, Table 6.6).

One participant suggested that junior health professionals will always look to senior staff or their managers for what to do during a disaster. They argued for this reason that it is not necessary for junior staff to understand the command structures. Quotation 6.6.5, Table 6.6 exemplifies this argument.

Table 6.6 Exemplar Quotations Preferred Content of Disaster Preparedness Programs – Organisational Structure for Disaster Management

Quotation Number	Quotation and participant code
6.6.1	"It is important to know who their point of contact is" C3RN2
6.6.2	"Yeah, because that's all part of communication so it's important, yeah. It's important to make sure that people know their roles and how communication is going to occur. Because what can happen sometimes is people, if they don't know what the communication is going to be, they just start doing something but then they don't realise that someone else is doing the same thing, they might duplicate, or they might be missing out things. So, it's important, yeah" C3AH5

6.6.3	“ When you’re in disaster mode, you’re really looking at streamlining what you have and trying to address the most urgent stuff first and it might cause things like your early discharge into the community that just might need to happen” C3AH1
6.6.4	“They need to understand that and how it all gets coordinated, particularly...on the weekend” C3AH2
6.6.5	“Yes and no. The junior staff, the first and second year, I don’t think necessarily they need to know the intricacies of it all. They know what’s required of their role. They know who their senior staff are. They know who their managers are so they’re going to take direction from those people. The higher up the food chain you go, yes” C3AH6
6.6.6	“Year I think it’s really important because your priorities can change... Instinct is I want to do everything for that patient... need to distribute resources appropriately ... maybe lead a team, that’s really important. C3MP2
6.6.7	“We have to know who to go to because you can’t have 5 people going to Dave... 10 people coming to me... everyone needs to go to the one person...the hierarchy...you’ve got chain of command” C3SS.

6.4.2 National or International Competencies

The interview guide (Appendix D) included a question about competencies. The question was further illustrated by giving the example of a Haiti earthquake (Table 1.1) response where many medical teams who attended did not have proper training, equipment or skills to perform tasks.

Most participants supported the concept that disaster preparation should include or be based on national or international competencies rather than having individual health professionals or organisations determining the level of care or services to deliver during disasters (Quotations 6.7.1 to 6.7.4 and 6.7.6, Table 6.7). Competencies were not clearly articulated by the hospital support staff. They referred to the triage staff or anaesthetist to define levels of care and one health professional did raise concerns about the resources taken to develop these competencies properly. They did support the concept that competencies were important (Quotation 6.7.5 and 6.7.8, Table 6.7). The benefits of competencies were highlighted when discussing appropriate selection of medical imaging procedures during disasters so that the needs of patients could be provided, including considering the available resources. Competencies advising on the best type of medical imaging examination for certain patients could guide medical staff to order appropriate tests for the patient and situation (Quotation 6.7.1, Table 6.7). It was also emphasised by participants that disaster competencies were important for health professionals or hospital staff to know what care may be needed during a disaster. An example provided was

the correct diets in relation to food allergies and for patients who may aspire if given the incorrect textured diet during disasters. Provision of the incorrect diet could adversely affect patient outcomes(Quotation 6.7.4, Table 6.7).

Table 6.7 Exemplar Quotations Preferred Content of Disaster Preparedness Programs – National or International Competencies

Quotation number	Quotation and participant code
6.7.1	“We had a radiologist and a registrar that was stationed in emergency so rather than every junior doctor at emergency, “I need a CT. I need this. I need this,” everything was vetted through an emergency consultant and a radiologist to go, “That’s not necessarily the appropriate test.” So, you had experienced people sifting through what was requested so they could use what resources we had to the best capability or capacity” C3AH6
6.2.2	“Yeah, definitely, because I think Australia’s very fortunate, we have so few – you know, touch wood – mass casualty, we’ve done a lot of book-learning and things like it, but I think putting that into practice, there’s potential for a wide range of variations, and I think further evidence-based guidance on best practice from places that have already had these disasters is really, really useful...” C3MP2
6.7.3	“Yes, absolutely because you don’t know what you don’t know...” C3MP1
6.7.4	“We have to be cognisant of the actual allergy. And the other high-risk area is the texture mod diets, so people that are on thickened fluids or pureed diets or have swallowing issues, that we give them the correct diet. So, they’re our too high risk, it’s the allergies and also the texture modified diets for patients who have got swallowing issues” C3AH6
6.7.5	It would be a good idea but that would be a lot of resources. C3AH4
6.7.6	“I think having a framework where people are not working outside of their scope... ensuring people have guidelines on what they can and cannot do” C3RN2
6.7.8	“Probably one of the anaesthetists” ... “It comes down to triage... They’re the ones that set the priority rule”. C3SS

6.4.3 Generic or Specific to Occupation

The main theme to emerge was that preparation should be both generic and specific (Quotations 6.8.1 to 6.8.3, Table 6.8). Participants indicated learning should be generic so that everyone knows what others will be doing, or because everyone will be working as a team during the disaster (Questions 6.8.1 to 6.8.3 and 6.8.7, Table 6.8). Preparation needs to also be specific because each profession or discipline will be performing different functions during the

disaster (Quotations 6.8.4 to 6.8.5, Table 6.8). One participant argued the differences in work between staff as a reason to require both generic and specific preparation. A surgeon will perform different functions to a cleaner or pharmacist during a disaster. It was also argued that different specialities within the same profession will perform different functions and need different preparation. An example was made comparing an emergency medicine physician and a cardiothoracic surgeon and their different roles that they will perform during disasters (Quotations 6.8.1 to 6.8.3 and 6.8.8, Table 6.8).

Two participants suggested that the preparation for disasters should only be specific for profession (Quotations 6.8.4 and 6.8.5, Table 6.8). The main rational was that each profession or occupation would be performing sometimes very different functions and therefore the preparation also needs to be different. They had a secondary argument that there is only limited time or resources to prepare so it is better to focus on what that individual profession will need to do rather than what all professions may need to know (Quotations 6.8.4 and 6.8.5, Table 6.8).

There were some participants that suggested separating the professions or occupations into clinical and non-clinical occupations to undertake their disaster learning. It was suggested that the number of professions or occupations that could be included in clinical or non-clinical sessions, would also depend on how detailed the preparation was that was offered (Quotation 6.8.6, Table 6.8).

One participant suggested that preparation should only be generic for all occupations and specialties (Quotation 6.8.7, Table 6.8). It was argued that people, professions, and specialties cannot work in silos. The emergency department needs to work closely with all areas of the hospital and understand how to interact with them during disasters. The participant suggested that all professions and occupations working in the emergency department, or an operating theatre should receive the same preparation, so that they know about and can work with other professions during the disaster (Quotation 6.8.7, Table 6.8).

Table 6.8 Exemplar Quotations Preferred Content of Disaster Preparedness Programs – Generic or Specific to Occupation

Quotation Number	Quotation and participant code
6.8.1	“There should be a generic learning that covers all the stuff that everyone should know, and then each of the specialties like physiotherapy, like we did have our own specialised learning and practical learning within that area. So, everyone knows overall

	what everyone's role is but then everyone in their area knows their specific roles as well" C3AH5
6.8.2	"So, if you want to have your hospital have the same level of awareness about what a disaster is and what the response from the hospital would look like? But then obviously, for a social worker, the skills and knowledge that we require is completely different to say what a medical officer on the front line would need to have, so that's very different, so both, yeah"C3AH1
6.8.3	" I think there's some generic stuff which everyone should have, and they should all have the name of it, using the same language and understanding the concept of triage and understanding the command of control structure. I think that would be universal. And then I think for surgeons and anaesthetists would obviously need a bit more stuff about damage control for surgery and how they would potentially minimise initial operations and maybe go back in later and all that sort of thing. Physicians would be more looking at more pandemic type situations and how to make sure we've got good infection control practices and that public health is a key part of all of that. And I guess the other thing ... learning together so you're not doing this in isolation because then I think you don't realise how important the other parts of the team are" C3MP1
6.8.4	"...think specific because for a doctor in a disaster it's more about discharges and then the other learning would be important, but yeah, and I think wards men still are different as well. Allocated for each audience I think would be better" C3RN2.
6.8.5	"It should be specific but at the same time, it's how everyone fits in with everyone else. I don't think you can have just a vanilla; this is what's going to happen. Everyone needs to know their roles in that. Whilst yes, it will be specific for this person, but this other department has nothing necessarily to do with them, but how they come together and what their roles are. So, you get an appreciation for what the other person does, but you don't need to know exactly what they do. It still needs to be specific for your area but how it interacts is actually quite a good way of looking at it" C3AH6
6.8.6	"You can divide it into clinical and non-clinical staff. I mean definitely feel that clinical and non-clinical should have different learning. But within that group it depends how specifically you want to train and what level you want to do"C3AH4
6.8.7	"I think you have to tailor it for where you are. So, I can really only speak to what's in ED, because when there is a mass casualty event, we are the front line, but I think for ED learning it can't be siloed, so we have to be able to communicate with other parts in a hospital, and also it needs to be multi-disciplinary, so we need to know what's going to work with our nurses, and our physios, and radiology. We need to be able to liaise very closely, and make sure our policies work with, say, theatres, and with the surgeons, and anaesthetics. So, I think it's okay to tailor some stuff to certain areas of the hospital, but whatever it is, you have to be able to communicate in and out, and not silo it off, and make it multi-disciplinary" C3MP2
6.8.8	"Both yeah" "we need to know what each department does but not the finer points" "yeah because I care what you do... If I had to push a bed, I'd come and push a bed". C3SS

6.4.4 Generic or Specific for Type of Disaster.

When participants considered if disaster preparation should be generic or specific to the type of disaster, most of the participants advocated for generic preparedness that would cover the needs of all disasters (Quotations 6.9.1 to 6.9.5, Table 6.9). There were different rationales for having disaster preparation that could be generalised to many types of disasters. A common idea was about the practicality and resources available to prepare for disasters. It was suggested that whilst disasters are quite specific, and it could be best to have specific preparedness for each type it was more feasible to have a generic form of preparedness that could meet the needs of many disasters as there is limited time that can be spent on education or preparation (Quotations 6.9.1 to 6.9.3, Table 6.9). There were also ideas presented focusing on the educational or disaster preparation benefits of a generic approach. An argument was made that the principles should be covered so that they can be applied to different disasters as needed by the staff when required. Some argued their functions would be similar regardless of the type of disaster so it was advocated that the preparation should also be generic (Quotations 6.9.4 and 6.9.5, Table 6.9).

It was also common for participants to suggest for that generic preparedness and also select a few specific types of disasters or specific types of preparation to include in disaster preparedness (Quotations 6.9.5 to 6.9.11, Table 6.9). Common suggestions for specific disasters preparation were biohazards, Ebola virus, radiation. A specific preparation was to cover PPE. Importantly these participants still argued for a predominantly generic preparation which also provided information about some specific subjects (Quotations 6.9.5 to 6.9.11, Table 6.9).

One participant suggested that there should be specific preparation for different disaster types. They argued for a variety of presentations by different experts on different disasters. They suggested whilst they have completed mass casualty preparation mostly focussing on trauma, this does not prepare them for mass Ebola virus patient admissions (Quotation 6.9.12, Table 6.9).

Table 6.9 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Generic or Specific to type of Disaster

Quotation number	Quotation and participant code
6.9.1	"I think specific...I think quite individualised... (Generic?) ...Well, we don't have days of study leave..." C3RN1

6.9.2	“.. To be realistic, generic will be more realistic. I mean if you want to look at the different types of this data, yeah it will need a lot of resources and a lot of time” C3AH4
6.9.3	“I think there are limits to how much time and resources you can dedicate even to learning people, like you can’t run a disaster sim every week or every month, it’s just not possible, so to a certain extent, you’d have to kind of overlap, just like a MIMS course will cover lots of different things, but there are certain parts that can’t be made generic. So, your biohazard stuff, you can’t just randomly involve that, it’s not a 15-minute thing. For the radiation stuff, not that we do a lot of radiation things at work, again that’s also very specific, but in terms of surge protocols of what happens when you suddenly have 100, 200 patients present to the ED, to a certain extent that’s reasonably generic” C3MP2
6.9.4	“Should be generic to cover the big principals because then you can adapt to whatever the specific situation might be” C3MP1
6.9.5	“It comes back to the role of what we do and what’s required of us which is similar to what we do in a daily basis. I think you could have that probably generic. It’s still going to be, we need this. That’s what we do daily” C3AH6
6.9.6	“Generic and then specific for the particular ones that we’ll hopefully never have to come across, like Ebola virus and radiation” C3AH2
6.9.7	“I think that the hard thing is to try and cover everything in one go. So, I think when we do a scenario, we do a specific one but then you can add in a few facts at the end in your feedback sessions that these are other types of disasters” C3AH4
6.9.8	“You could probably have a generic exercise, like Newcastle, ’94 fires, the 2000 whatever they were when they went through Warragamba and all that. You can have a generic exercise which their recovery is your change, but it should be. Or have one generic one year and then do some specifics after.” C3SS
6.9.10	“Specifics should be included in the yearly one. As indicated earlier, if it’s a chemical issue, it’s treated totally different to anything else. So, if it was a plane crash, etcetera, that’s like a bus crash really” C3SS
6.9.11	“Maybe touching on certain things but keeping it broad” C3AH3
6.9.12	“If you think about it, something like Ebola virus is very different to say your stadium collapsing in mass casualty. So, you might have a handful of people who present which is quite like a medicalised kind of presentation....we haven’t really been involved in much of the Ebola virus learning. But for example, the EMERGO TRAIN, that mass kind of disaster type situation, we’ve been quite heavily involved, so already we are differentiating the two different types. So, I think probably a variety of learning is done using different examples for different circumstances would be helpful” C3AH1

6.4.5 Embedded within Workplace Knowledge and Skills

Four health professionals who expressed that the skills used during disasters would be different to those normally used during disasters, three previously experienced working during disasters and they also work in emergency or critical care specialties. These participants suggested knowledge and skills needed was different during disasters when compared to their usual practice (Quotations 6.10.1 to 6.10.3, Table 6.10). One nursing participant when presented with a patient suspected of being infected with the Ebola virus at the hospital, outlined that the department managers needed to care for the patient as other staff were unwilling (Quotation 6.10.1, Table 6.10). Additionally, there was unwanted media attention as a student shared the information on social media. The participant argued staff needed skills to manage Ebola virus patient as well as the media. It was argued that the management of information as well as the delivery of care, and who will deliver the care, can be different during disasters (Quotation 6.10.1, Table 6.10). A second nursing participant argued that the type of patients needing care during disasters can be quite different to normal practice. The participant gave the example of needing to care for burns patients in a regular intensive care unit by staff not normally familiar with the care of burns patients (Quotation 6.10.2, Table 6.10). A third argument, from an allied health professional, referred to a power failure. This participant suggested for the newer staff who were untrained in paper or manual processes, indicating different skills are required during an information technology or power failure. Some younger or newer clinicians it was argued have never delivered healthcare without computer technology (Quotation 6.10.3, Table 6.10).

Other participants suggested that depending on the speciality of the health professional, the knowledge and skills may be the same or different to that required in a disaster (quotation 6.10.5, Table 6.10). Most participants argued that staff working in acute specialties or hospitals would consider their skills to be similar to those used in disasters. Those working in less acute specialties or small community hospitals could have skills that are very different from what is needed during disasters (Quotations 6.10.4 and 6.10.5, Table 10.5).

Participants also argued that the knowledge and skills they use during normal practice are the same as those needed in a disaster (Quotations 6.10.6 to 6.10.8, Table 6.10). A participant argued that for most radiographers the skills would be the same and the only exception would be very junior staff who may not be familiar with all procedures (Quotation 6.10.6, Table 6.10). It was argued by a medical practitioner, that the skills would be the same with the exception of adding high level PPE to the role. The same participant also argued that whilst the chain of

command would be different, clinical knowledge and skills would be the same (Quotations 6.10.6 to 6.10.8, Table 6.10).

Table 6.10 Exemplar Quotations Preferred content of disaster preparedness programs: Embedded within Workplace Knowledge and Skills

Quotation number	Quotation and participant code
6.10.1	"It was a very weak query Ebola virus, ..., but when it came down to the crunch, the manager and the director ended up in the room with the patient...we had students at the time, and someone had got on Facebook. That's probably one of the big things with disaster is containing the information" C3RN1
6.10.2	"As an ICU nurse I think it's much different because it's a bit more of your emergency resus nurse type skills, which is slightly different to ICU which is a bit more technical... things like burns, we don't get that here, so if there was a big fire or something, we're not so exposed to that up here" C3RN2
6.10.3	"Well, the processes are a bit different because we've now gone very much electronic and Wi-Fi. But for the people that worked 10 years ago we did have paper menus, so for people like that we're used to that. Perhaps for the new ones, maybe they're not and they just need to understand that. But it's about saving the information each night and it's just accessing that and downloading it and then using the printed menus as tray tickets" C3AH2
6.10.4	"Well coming from a large trauma hospital and specialising in orthopaedics, I'd say that the skills that you use there would be very similar. But for someone working in outpatients or someone working in women's health for example, the skills would be different" C3AH5
6.10.5	"...particularly for me, working in the emergency department is something I utilise every day" C3AH1
6.10.6	"It's their routine skills that they use. Of course, you'd want someone who has several years more experience but at the moment, depending on their experience and how long they've been in the profession for, you'd probably redeploy" C3AH6
6.10.7	"I think the clinical skills themselves are probably not too different from our usual scope of practice, but the exception to that would be the high-level PPE, like you would use for, say, like a biohazard, like an Ebola virus patient, you know, donning, doffing" C3MP1
6.10.8	"The chain of command and who you report to because that may not reflect normally what would happen with our usual hierarchy. The hierarchy during a mass casualty event might actually be quite different" C3MP1

6.4.6 Clinical and Technical Knowledge and Skills

It was common for the participants to describe knowledge and skills related to infection control when suggesting what knowledge and skills they would require during disasters (Quotations 6.11.1 to 6.11.4, Table 6.11). This included discussing the need to understand PPE, infection control and cleaning requirements. Skills related to infectious diseases or chemical, biological, or radiological disasters were considered important by the participants. These were raised by a range of disciplines as being important clinical skill during disasters to protect both oneself and also others (Quotations 6.11.1 to 6.11.4, Table 6.11).

Three of the medical and nursing participants indicated the need to understand how to triage patients in a disaster situation to ensure the most patients receive the appropriate care during a disaster. The knowledge required included basic triage, prioritisation knowledge and skills and also disaster triage (Quotations 6.11.7, 6.11.8 and 6.11.12, Table 6.11). Working with available resources and prioritisation was also described. Participants presented that prioritisation could include the need to increase food production to feed extra patients. Other ideas considered theatre, equipment, or bed availability and adequate staff numbers for the disaster period. Staffing numbers included planning for rest breaks and ongoing shifts. The mental processes to simultaneously manage multiple types of patients at the same time, including regular patients and disaster patients was raised as a skill (Quotations 6.11.9 to 6.11.12, Table 6.11).

Allied health participants have been engaged as part of the emergency planning to deliver particular services to help manage the flow of patients and resources during a disaster. These roles are separate from their usual roles (Quotations 6.11.13 to 6.11.18, Table 6.11). The dietitians are tasked with helping to coordinate families and the physiotherapists to provide additional care and movement of patients. A social worker advised their work would be assisting with psychological injuries, assisting the police and coroner with the deceased patients, liaising with authorities, and supporting families (Quotations 6.11.13 to 6.11.18, Table 6.11).

In terms of the specific patient care processes that were considered during disasters by participants, discharging patients was commonly mentioned. There was discussion about needing to complete discharge medication counselling by a pharmacist. The need to support patient discharges and to assist the wards to make beds available for new patients was presented by different participants (Quotations 6.11.13, 6.11.15 and 6.11.17, Table 6.11).

Table 6.11 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Clinical and Technical Knowledge and skills

Quotation Number	Quotation and participant code
6.11.1	"PPE Stuff...What to wear" C3SS
6.11.2	"Trained in high level PPE. We'd need multiple areas that are ready for the donning and doffing" C3RN1
6.11.3	"I want most people to be able to understand is the concept of early isolation and escalation to public health and infectious diseases so that you can get the right people knowing that the patient is early as possible" C3MP1
6.11.4	"Because it's a highly infectious disease, they will be admitted to ICU in an isolation room. I think there is some isolation rooms in ICU for airborne precautions and that sort of thing, those things should be isolated. So, number one is do we need to see the patient? We try to eliminate the risk as much as possible. If not, then we try to think of a substitution or we need a PPE for them as well" C3AH4
6.11.5	"Move the people away from the fire first? Okay. And then we will wait for further instruction for whether we need to do an evacuation or not" C3AH4
6.11.6	"Evacuation; evacuation points; access and egress; security; fire service; direction to the fire service because our footprint has changed so much; and I guess staffing numbers for that day - who's rostered on, head counts" C3RN1
6.11.7	"The basic triage measures... and I guess prioritising care as well, so being able to say I'm going to spend time with these ten patients rather than this one" C3RN2
6.11.8	"...deal with the influx of new patients. Again, you'd need senior trained staff to be leading that, and then assess patients with possibly the disaster triage, rather than the standard triage" C3MP1
6.11.9	"Ensuring that there is enough staff to be able to care for them and for however long they're needed to be cared for" C3RN2
6.11.10	"Check and make sure all of these teams are enough staffed, also to make sure future planning for example, if the disaster is going for a period longer than that shift, sending people home to make sure they've got time and new staff coming in for the next lots after that" C3AH5
6.11.11	"... lack of equipment. If there's like a bomb blast, or car accident, a lot of limbs probably lost, hips, head injuries, we didn't have enough. If we got six head injuries come and we've got three pieces of equipment" C3SS
6.11.12	"If you've got multiple patients, and you're aware of what it is that you're dealing with. So, you have to segregate your emergency department, so you've got your patients that are presenting with just regular problems, you know, broken bones, strokes, all of that

	kind of stuff, you have to separate those from the people you suspect may have Ebola virus” C3MP2
6.11.13	“a group of physiotherapists that go to the wards to see if they can expedite any discharges for patients, ... a group of therapists that go to some of the clinics here in the hospital to do things like manage casts, walking aids for patients that come to the hospital that don’t need to be admitted. And there’s a third group of physiotherapy people that need to get organised to be treating the acute patients that do get admitted into the hospital”C3AH5
6.11.14	“We’ve got a team who’s deployed to the mortuary for any identifications or liaison with the police and the coroner, we’ve got a family designated area response team” C3AH1
6.11.15	“So, for allied health we each have our role. The head of physiotherapy is our disaster coordinator...My role is to liaise with security to stop family and friends coming in...take them to the allied health reception area ... social work will set up a system of collecting names... C3AH2
6.11.16	“Immediate psychological first aid crisis responding things to victims who may be coming in” C3AH1
6.11.17	“I guess if they’re going to send someone home on antibiotics or just some simple analgesia or something like that, then obviously being able to do the counselling for the patients when they go, I guess that’s time saving for doctors” C3AH3
6.11.18	“Sending people up to the wards and facilitating those early discharges to make room for people coming in.” C3AH1

6.4.7 Non-Clinical and Non-Technical Skills, Knowledge and Attributes

The need to have effective counselling or psychological support skills was considered to be important (Quotations 6.12.1 and 6.12.2, Table 6.12). These skills were suggested by both a social worker and physiotherapist who argued the important during disasters. Counselling or psychological support skills may be applied differently during disasters by social workers by using crisis techniques different to their usual techniques or by other professionals who do not normally provide support as part of their core professional functions (Quotations 6.12.1 to 6.12.2, Table 6.12).

Resilience, the ability to work under pressure or in uncomfortable environments was described as an important skill. It was argued that there may be additional pressure, people may be less polite during disasters. Staff may need to work in difficult circumstances where there is security and safety issues. The Quotations 6.12.3 to 6.12.5, Table 6.12 exemplify the need to have skills to work under pressure, including resilience and emotional competence.

The ability to work well as a team was one of the most frequently non-clinical or technical attributes to be outlined. Teamwork was considered to be important. It was summarized that teamwork means staff need to extend their performance beyond normal, and also for assisting other disciplines with their work as required during disasters (Quotation 6.12.6 to 6.12.8, Table 6.12).

Table 6.12 Exemplar Quotations Preferred Content of Disaster Preparedness Programs: Non-clinical and Non-Technical Skills, Knowledge and Attributes Needed

Quotation number	Quotation and participant code
6.12.1	“Psychological first aid. So, I think for us, it’s very important to - because we’re so used to long term therapeutic counselling relationships which is very different in a disaster kind of setting. So, having access to understanding the crisis models and quick interventions” C3AH1
6.12.2	“You might not be having to deal with counselling or trauma or anything like that, but I think they’re probably important things as well” C3AH5
6.12.3	“People will say things that might not necessarily be polite. They just want to get their point across and highlight the urgency of it. You take that with a grain of salt, some of the things that are said so resilience is probably a good thing” C3AH6
6.12.4	“Working under pressure..... I guess being disaster, yeah, I guess it might be a different environment that you’re working in, so I guess resilience, which is what you touched on. I guess being emotionally or psychologically competent to be able to deal with these sorts of events, if you’re not used to seeing these sorts of things every day” C3AH3
6.12.5	“What makes you uncomfortable, so especially ... understanding security and safety issues” C3MP1
6.12.6	“Like your usual day to day skills that any clinician would have. Working as a team” C3AH3
6.12.7	“I mean I am not too worried about communication, its more the teamwork...I want to stress on” C3AH4
6.12.8	“Being prepared to undertake tasks that may be outside of the person’s normal scope or learning...You’ve got to do what’s got to be done... Working as a team” C3SS

6.5 Attendance at Work

6.5.1 Mass Casualty Incident: Bomb Blast

In relation to the MCI bomb blast there was a view by the two nursing participants that focused on how the stress of the situation or event may mean that the staff members are unable to function adequately at work. The view was that they should not be made to attend work as they would either be too stressed to work or would not function adequately to be useful (Quotations 6.13.1 and 6.13.2, Table 6.3). Allied health participants shared similar views. They advised that attending work should be optional given either the real or perceived safety threat. They suggested that it should be the choice of the health worker if they attend work following a bomb blast disaster situation. Quotations 6.13.3 to 6.13.5, Table 6.13 exemplify the choice that should be given to staff based on risk. There was some discussion about duty of care or responsibility as an employee of the health system. The predominant view or priority was the safety or perceived safety of the health worker (Quotations 6.13.3 to 6.13.5, Table 6.13).

There was also significant argument from medical, allied health and support staff participants that staff should attend work as they would be needed to care for patients. If a staff member was rostered to work, it was more strongly argued that staff should attend work (Quotations 6.13.6 and 6.13.9 to 6.13.11, Table 6.13). Of those that believed staff should attend work, a few argued it should still be a choice. Most participants indicated staff would or should choose to attend. Participants argued that it is their duty to attend for patient need and they strongly argued staff have a responsibility to attend (Quotations 6.13.6 to 6.13.11, Table 6.13).

Table 6.13 Exemplar Quotations Attendance at Work During Disaster: Mass Casualty Incident Bomb Blast.

Quotation number	Quotation and participant code
6.13.1	"If they don't want to, they should not attend. They would be useless" C3RN1
6.13.2	"If they're rostered to work, they should, but I think sometimes the stress of that can mean people are not capable of getting through that shift mentally. So, if people need to call in sick then they just do that through the right channels and then obviously the hospital will have to cover" C3RN2
6.13.3	"If there's no risk to them. If there's a risk to them then they shouldn't be coming" C3AH2
6.13.4	"I'd say if it's safe to then they could come to work but if they've got concerns about their safety then that's up to them" C3AH5

6.13.5	"I suppose that's up to each individual clinician to decide for themselves in terms of their own safety and the situation that they're in. So, the expectation is that we would obviously, our duty of care is to provide a response because we work in the health system, however, if it means it is - it happened on someone's been at work and they're now stuck with more children at home and they can't physically come to work and their safety is affected, then obviously, that's their decision and that should be respected" C3AH1
6.13.6	"If they're rostered to work, they should attend and if staff needed to be called in or what have you, that's when whoever is the assigned manager of the area would do that. If more services are required, that person will call them in but the staff and for the most part, I'd say most of my staff would come in" C3AH6
6.13.7	"Nobody can be forced to come in. However, I would have to say 90 plus percent of staff would automatically make themselves available as soon as possible ... everybody has their right as to whether they come in, but you see it day after day in this place where people do put their hand up" C3SS
6.13.8	"I think they would go. I would definitely go but I think most people would go" C3MP1
6.13.9	"I think they should because you can't leave the department short. It's one thing if you're being asked to come in and you're not working, but if you are expected to be there, you damn well should turn up" C3MP2
6.13.10	"Yes, there is a call of duty ... there are still patients" C3AH4
6.13.11	"...I think the pharmacist should go to work. I can't say my personal point of view but from a professional point of view, the pharmacist should go to work" C3AH3

6.5.2 Ebola Virus Outbreak

Participants reflected on an increased perception of danger that staff may be exposed to during an outbreak of Ebola virus (Quotations 6.14.1 to 6.14.3 and 6.14.18, Table 6.14). It was also presented that it may not be the health professional or hospital support staff member affected, it could also be family members (Quotation 6.14.2, Table 6.14). Some participants indicated that many staff may not attend work due to the greater perceived personal danger to themselves and also the potential to transfer the virus to family members at home. The decision to attend work was hypothesised to be based on a health professionals or hospital support staff members determination if it would be safe to attend work. If safe, then most participants indicated that staff would attend work. Quotations 6.14.1 to 6.14.2, Table 6.14 exemplify the argument that staff will consider risks before deciding if they will attend work. Support staff have demonstrated a fear of Ebola virus during a mock drill. During the exercise staff were worried and intimidated

when they thought a patient's Medicare card may transmit Ebola virus. Quotation 6.14.3, Table 6.14 highlights the example of staff being fearful of Ebola virus. There was comparison made to how staff reacted during the HIV epidemic in the 1980s (Table 1.1). Staff were not willing to care for patients with HIV and went on strike (Quotation 6.14.4, Table 6.14). There were participants that argued staff would or should attend work. Medical practitioner participants said that staff should attend, although believed that it should be a choice. One suggested many may not and the other suggested it should be a choice as those unwilling would make mistakes if they were forced to work when uncomfortable. These views are exemplified in Quotations 6.14.1 and 6.14.8, Table 6.14). Participants anticipated many health professionals may not attend work or care for Ebola virus patients.

There were participants who advocated that staff would attend work during an Ebola virus outbreak because the hospital has the procedures including any restrictions in place. Three participants including a registered nurse and two allied health professionals argued that the health professionals would attend work during an Ebola virus outbreak. They indicated that it would be safe as the hospital would have the appropriate measures in place (Quotations 6.14.5 to 6.14.7, Table 6.14).

Table 6.14 Exemplar Quotations Attendance at Work During Disasters: Ebola Virus Outbreak

Quotation number	Quotation and participant code
6.14.1	"I mean if you've been given the directive to and it's safe to do so, then I guess that's fine and by all means, yes" C3AH3
6.14.2	"Sorry, should they? I think yes, they should. Would they? I think that's going to be a very variable answer. I think it's much different to the answer of an MCI.... Yeah. There is going to be personal danger which didn't necessarily exist in the MCI example.... It's the perceived personal danger. And I think there's a perceived danger of bringing the virus home" C3MP1
6.14.3	"Have been in a situation where they've done a couple of mocks... when it has happened, they freaked" C3SS
6.14.4	"If we go back a couple of years to the mid-80s, we had HIV. The scare tactics of HIV were mainly because people weren't told. We knew nothing much about it. ...went on strike once a month for nearly 12 months solely because they weren't being given the information other than everyone's going to get AIDS, and everyone is going to die" C3SS
6.14.5	"I would say that they should because the hospital would have protocols in place to manage the Ebola virus. So, I think they should, yeah" C3AH5

6.14.6	“Well, my understanding is we come to work, and we’re just directed by everything in terms of the restrictions placed on our professions”C3AH1
6.14.7	“Yes, they should. Because we’ve got all the systems in place to care for them” C3RN2
6.14.8	“Yes, I think they should but what they do should depend on their learning and willingness. You have to be willing... You can’t ask someone who is not willing to look after Ebola virus patients , because they won’t make the correct choices. They will make mistakes. You have to ask for volunteers to look after biohazard patients. C3MP2.

6.5.3 Pandemic Influenza

The majority of participants suggested staff should attend work during an influenza pandemic. Arguments focused on the need to provide patient care. Participants outlined that patients cannot be left unattended, and it is the health professionals’ duty to provide care. Patients will need appropriate care and nutrition to fight the infection and without health professionals attending work it was argued this care could not occur (Quotations 6.15.5 and 6.15.6, Table 6.15). Participants also clarified some concerns for safety or danger, whilst still advocating staff would attend work (Quotations 6.15.1 to 6.15.4, Table 6.15). The availability of a vaccine was also considered in the decision to advocate staff should attend work (Quotation 6.15.2 and 6.15.6., Table 6.15).

Three of the participants made special mention of either staff who were immuno- suppressed, pregnant or whom had children at home and suggested they may need to stay away from work (Quotations 6.15.1 to 6.15.3, Table 6.15). Two of the participants stated that health professionals may stay away to protect patients when they are personally unwell or potentially unwell if their partner is infected. If staff were well the same participants argued that they should go to work to care for patients (Quotations 6.15.8 and 6.15.9, Table 6.15). Overall unlike in the Ebola virus scenario the predominant belief was that staff should attend work unless they themselves were unwell or vulnerable, as patients will need care and there are procedures and processes in place, including vaccinations, to keep staff safe.

Table 6.15 Exemplar Quotations Attendance at Work During Disasters –Pandemic Influenza

Quotation Number	Quotation and participant code
6.15.1	“I do on the proviso they’re not – like, I know when SARS was there, there was heaps of pregnant staff that just went off and stuff like that, so I do appreciate. Also, if they’ve got small children at home”C3RN1
6.15.2	“Yeah, if they’re rostered, yes, I think that’s appropriate. Influenza, I mean it can kill people, but on the whole it doesn’t, and we’ve got very clear processes about vaccination and things like that. It’s definitely a surge of patient’s situation where you do need additional staff to deal with increased presentation, and again, if you’ve got massive numbers, you should probably segregate flu presentations into their own clinic to try and keep them away from other patients and other staff, but yes, I don’t think it’s an unreasonable expectation. That said, if that staff member is immunosuppressed, or pregnant, I guess you can kind of understand, but on the whole, yeah, they should turn up to work”C3MP2
6.15.3	“I think the expectation is that you come to work as usual and take direction from your department head unless it’s obviously unsafe for you to do so. So, say for me at the moment, I’m pregnant, I’m probably, if there’s a whole epidemic of something or some sort of outbreak, I’m probably going to raise my concerns to my manager that I may not be able to attend work if it’s going to impact my health and safety, but any other circumstance, the expectation is that I would come to work, and I would participate in the health response” C3AH1
6.15.4	“I guess that comes down to the same principle if the work environment is safe to do so” C3AH3
6.15.5	“Yes! Well, I guess the number one is we have a pandemic outbreak, we have an influenza outbreak, I mean as I said before, we still have other patients to look after. We can’t just leave them here. That’s our call of duty” C3AH4
6.15.6	“Yeah, because we’re all having our shots for the winter season, and we’re all needed for the winter season. So yeah, definitely we would come, and we’d all have our roles anyway. I imagine that the workload may be higher because people will need feeding, there’s the gastric feeds and feeding up to help fight the infection as well” WSH6.
6.15.7	yeah..... of course, yeah” C3RN2
6.15.8	“Yes. It is what we are paid to do. We are paid to do a job and provide a service. Again, I think the reason that most people go into health is they want to help people. You will get some people that choose not to, and they might have a family issue or a family concern or a sick partner and again, that is understandable. That happens now with carers leave and FACS leave and all that sort of thing but for the most part I’d say yes, people would come in”C3AH6
6.15.9	“So obviously not if they’re unwell themselves but if they were meant to be at work yeah, absolutely” C3MP1

6.5.4 Power Failure with Internal Hospital Generator Failure

During power failure scenarios all participants argued that staff should attend work. There was uniform insistence that staff should attend work as the patients need care (Quotations 6.16.1 to 6.16.4, Table 6.16). Assistance to deliver the food around the hospital or make up for the absence of functioning ventilators or monitors will be needed. Participants indicated staff would also deliver care outside their normal roles (Quotations 6.16.1 and 6.16.2, Table 6.16). One participant questioned if extra staff would be needed, although acknowledged that staff should attend if they were asked to and were able to (Quotation 6.16.7, Table 6.16). There was no discussion about non-attendance due to danger, only discussion on if patient care is needed. Patient need is also an important factor that may be overlooked if actual or perceived danger is a concern.

Table 6.16 Exemplar Quotations Attendance at Work during Disasters – Power Failure with Internal Generator Failure

Quotation number	Quotation and participant code
6.16.1	"Yeah, because we may need help in distributing food across the hospital" C3AH2
6.16.2	"Yes. I think they should. Because you actually need to be doing things like bagging patients if your ventilators aren't working" C3MP1.
6.16.3	"Yes, they should attend" C3RN1
6.16.4	"I think the expectation is you come to work unless you're instructed otherwise by your department head" C3AH1.
6.16.5	"Yes, our role does not stop", "just need torches", "Probably going to need more staff rather than less in that situation" C3SS
6.16.6	"If asked to and in a position to then yes, but I am not really sure what extra staff could do in that ... hold torches? ... not sure additional staff would be of great benefit". C3MP2

6.5.5 Encouragement to Attend Work

Participants indicated the importance of provision of education and accurate information. Some participants suggested education or information that could advise the staff member's role and why it is important to come to work (Quotation 6.17.2, Table 6.17) It was presented that education or mock disaster scenarios should be provided so that staff could see how the disaster

would work (Quotations 6.17.1 to 6.17.9, Table 6.17). The information provided needs to be accurate and focussed also on how staff will maintain their safety. Staff should receive this information from the hospital, not the media (Quotations 6.17.1 to 6.17.9, Table 6.17)

Participants stated that having access to adequate resources was a method to promote attendance at work. Participants described protective or treatment resources including PPE or providing vaccinations or other medical treatment to protect staff could encourage attendance (Quotations 6.17.11, Table 6.17). Vaccines or Tamiflu should be made available to staff should they be treating a vaccine preventable or Tamiflu responsive virus. Other ideas included adequate security, sufficient clinical staff to share the workload (Quotations 6.17.10 - 6.17.11, Table 6.17).

Other resources ideas included practical measures that could be in place to promote attendance at work. Health professionals need security at work and have appropriate resources at work to feel safe as argued by a medical practitioner (Quotation 6.17.12, Table 6.17). They also need to manage their own lifestyle and also consider transport to work and childcare during disasters (Quotations 6.17.13, Table 6.17). The hospital management need to ensure adequate staff are available to cover breaks and take over at the end of the shift (Quotations 6.17.14, Table 6.17).

Table 6.17 Exemplar Quotations Attendance at Work During Disasters: Encouragement to Attend Work

Quotation number	Quotation and participant code
6.17.1	"I think maybe having mock disaster scenarios where people can see how it would work. I think ensuring that the learning isn't overwhelming" C3RN2
6.17.2	"Probably just explaining what their actual roles would be and how important it is. Because from my understanding, we still need a work force here to actually do the work, to do all the assessments of the people because unless they shut down the hospital, which is unlikely" C3AH2
6.17.3	"They need to promote it...Because 90 percent of the staff will come. The moment you start saying to people you have to is when they're going to say we're not...people put their hands up if you need help" C3SS
6.17.4	"Yeah, so the first would be education. So, I think that we...I mean we saw that ourselves here during the potential Ebola virus. There was a lot of confusion and misinformation and people kind of learning things from the media and not really – may or may not have been actually true. I think all of those things you could definitely minimise by having really good information to your staff and information to the community so that the families also have a bit of that understanding, basic understanding of what was going on and that you were prepared and that you are considering various possibilities of what might happen and so on" C3MP1

6.17.5	<p>"I think maybe give some information about people that work in our African countries with outbreak about healthcare, transmission rates, because it's the fear factor. (So accurate information?). Yeah, yep" C3SS</p>
6.18.6	<p>"Well, I think probably a lot of it is about education, because I'm not an expert on a lot of these conditions. So, education of the staff, and that would probably need to be something before the disaster occurred because once it's occurred, it's too late for people. Like for Ebola virus for example, if they have education about the risks and how this has been managed, and all this type of stuff, before any sort of disaster happens. But as you say, it's hard to do that for every single scenario. But, if possible, for example if there's Ebola virus, for example if there's an outbreak in Africa or whatever and there's an increased risk, then it's important for the hospital to sort of educate the staff as much as they can" C3AH5</p>
6.18.7	<p>"I suppose people's greatest concerns would be around their safety. So, I suppose information about the situation and that communication is probably going to be crucial to your own decision making about how safe you feel going to work or coming. So, I suppose that information exchange that happens quite early, having a point of contact for where you might be able to raise concerns if you need to leave early or what not" C3AH1.</p>
6.18.8	<p>"... More like promotional things throughout the year. There's the hospital week. There's a range of things. Infection control obviously plays a massive part in that if it was Ebola virus or something. There could be promotional activities that they run" C3AH6</p>
6.18.9	<p>"There could be something on, maybe broadcast a message that this is coming out for those interested. Who knows who you get as a starting point? I think it only has to start with one person and if they're happy and they're content they'll tell a few other people. A few other people might put their hand up and so it hasn't got to be a massive thing to start with. This is what happened. There was only me and another person and then we spoke to a few others, and we got a few others on board. They're happy. I think if I wanted to, I probably could have pushed it in even further and had 10 or 15 but luckily we never had to enact it" C3SS.</p>
6.18.10	<p>"Yeah, a hundred percent, so if you've got your epidemics or whatnot, it's quite different to your one, so just providing people with that reassurance around their level of safety and equipment that they're going to use. ... vaccinations or any kind of medical preparations and probably not forcing someone to go into a situation that they don't want to be in without really working out why and addressing their issues" C3AH1</p>
6.18.11	<p>"it's probably all about reassurance. Yeah, I think a lot of people just have that initial mindset of not wanting to be exposed - if it's some biological sort of thing, why would you want to be exposed to that? I guess knowing that there are appropriate measures in place when these things happen and being able to provide the staff with that reassurance that their safety isn't compromised. (So appropriate measures is you'd want appropriate resources there, like PPE and vaccinations if they're available). Yeah, if you are kind of coming into contact with that kind of stuff, and I guess from a nursing point of view that's I guess what you'd be most concerned about, so yeah. Tamiflu and all that sort of stuff. Yeah. Staff health usually are very good with looking after staff exposures" C3AH3</p>

6.18.12	"I think making security a priority for staff, because I think that's the thing that we really worry about the most, you know. If you think you're going to get blown up, or stabbed, or shot, I mean, why would you turn up to work? If you could prove that say, look, if we declare that there's been some sort of terrorist incident, we're screening everyone that comes into the hospital, there's a strong police presence, or those kinds of things, you can reassure staff that they can do their jobs and be safe, then I think you would not get everyone come in, but I think you would have a higher amount turning up to work" C3MP2
6.18.13	"I suppose the other concern would be practical arrangements around your own lifestyle if you're now stuck at home with no carers for your children or no access to transport, facilitating some of those things if you need to, but also ensuring that you've got your staff who are going to have their breaks, who are going have their opportunities to go home, you've got good preparation in terms of turnover and shift changes and things like that so people know that when they come to work, they're not going to be stuck here indefinitely for three days managing the disaster without a backup plan where people are going to relieve them and they're going to be able to go home and things like that" C3AH1
6.18.14	"They always should think about a contingency plan for themselves about transportation or alternate routing. Yeah, that may be one thing they can think about" C3AH4

6.6 Lessons Learnt Regarding Preparedness from Disaster Experience

Learning undertaken prior to the disaster participation prepared participants for what they thought they would need to do during disasters (Quotations 6.18.1 to 6.18.3, Table 6.18). The learning provided the participants with a framework to operate within, even when there were aspects of the disaster they could not be prepared for in advance of a disaster (Quotation 6.18.3, Table 6.18). If the learning did not prepare staff, it was a start for what was required in the event of a disaster. Participants acknowledged that the scenarios they had completed in disaster preparation were not the same as scenarios they had experienced in real disasters. Preparation gave the participants foundation information, including getting to know the people they needed to work with during the disaster. The learning prepared them to function effectively in the unfamiliar environments (Quotations 6.18.1 to 6.18.3, Table 6.18).

An additional learning was to have a disaster plan with adequate resources. Two of the health professionals were involved in a mass gathering music festivals, with multiple drug overdoses, and one health professional was working in the hospital, during a fire at a nearby nursing home resulting in mass evacuations to Case 3 (table 1.1), (Quotations 6.18.4 to 6.18.6, Table 6.18). In

determining adequate resources for the music festival disaster management, it was important to develop a plan, consider past experiences, literature and consult with those with past music festival disaster experiences. During the music festival disaster, due to planning there were adequate intubation kits to and medications to manage drug overdoses (Quotations 6.18.4 to 6.18.5, Table 6.18). When describing the nursing home fire incident, the participant described that the hospital staff worked efficiently, first discharging patients from the hospital wards and then discharging patients from ICU so there were plenty of beds available for the evacuated nursing home residents (Quotation 6.18.6, Table 6.18). Planning, having a plan and staff following the plan, was key to effective care during a mass gathering event and for a MCI resulting from a local nursing home fire, as exemplified in Quotations 6.18.4 to 6.18.6, Table 6.18.

Table 6.18 Exemplar Quotations Lessons Learnt regarding preparation from Disaster Experience

Quotation number	Quotation and participant code
6.18.1	"I think, for me, you do the MIMMS course and it's about the communication, but you don't actually...you're not put in a scenario where you don't have oxygen on a wall, and you don't have...there's no mock exercise with the MIMMS...t's all about communication and hierarchy and that sort of thing, but you don't actually put the person in a mock environment, which is very different when you work in a hospital" C3RN2
6.18.2	"And although the learning might not be specific to what's happening, the basics kick in, that you know what you've got to do. I've got to contact this person, I've got to make my sandwiches, I've got to make sure this is happening ... at least you would know already who the people to the talk on these things" C3SS
6.18.3	"...done deployment with an AUSMAT team which was to the Solomon Islands in the floods of 2014. And prior to that I had just completed my International Diploma of Humanitarian Assistance... So, I had a very good sense of public health issues and international – WHO guidelines on different things. So that was formed as to my mind like it was exactly just before I left as well as my own ED learning. So, it was quite useful. And then I had also completed the – the AUSMAT learning which was very useful for things like team safety, and we had a Tsunami alert in the middle of the night and responding to that, just all that how to be part of a team, how to be safe, what kind of things you might want to consider including having a car accident, all those sorts of things. So that was really helpful practical information I got to put into practice which was quite good" C3MP1
6.18.4	"We sat down, and we ran through some scenarios and said, "Okay, well if we must intubate a patient, what's the standard list of equipment we need? What sizes do we need? How many times do we multiply this? Like, how many patients do we think we're going to need for this? How much drugs are we going to have?" And all of that stuff was invaluable" C3MP2

6.18.5	"Have a meeting with all the stakeholders, so the team at the event. ... Some of the doctors and nurses and such who are on the disaster team...'How much of 'x' do we want to bring?' and then over a time we refine those quantities in terms of "Did we have enough at the first music festival? Do we need more at the second?" So just refining it at that point" C3AH3
6.18.6	"Much more efficient working day in terms of me personally. ... It didn't feel all that different. It's just that the system worked a bit better in that patients were discharged. There were loads of beds, and then people were efficiently getting people off to ICU and out of ICU very quickly" C3RN2

6.7 Other Observations or Ideas

The first idea outlined by a medical practitioner and allied health professional was that disaster preparation is relevant to everybody and should be multidisciplinary (Quotations 6.19.1 and 6.19.2, Table 6.19). The multidisciplinary team need to be prepared for disasters and need to know adequate information for their role. Staff should be included in disasters preparation so they can reflect on the learnings and know what they need to do should a disaster occur (Quotations 6.19.1 and 6.19.2, Table 6.19).

The second key other idea was that whilst disasters can be dangerous and evoke fear and anxiety for health professionals and support staff. It needs to be remembered disasters are what health professionals and support staff have prepared for and responding to disasters and saving lives can be rewarding. Staff need to be reminded of the intrinsic and extrinsic rewards during disaster preparation (Quotation 6.19.3, Table 6.19).

The third idea was recognising that funding is an issue for disaster preparation. It was implied that not enough support is available for disaster preparedness (Quotation 6.19.4, Table 6.19). Finally, it was suggested by an allied health professional with experience in both a pandemic and earthquake in China, despite all the types of disaster preparation, nothing can completely prepare all staff for a disaster. Some will experience anxiety. The hospital management needs to do as much as possible to prepare staff for disasters (Quotation 6.19.5, Table 6.19).

Table 6.19 Other Ideas from Case 3 Participants

Quotation number	Quotation and participant code
6.19.1	"I think the only thing I would say is I think it's relevant to everybody. I think people go oh that's not going to happen here, or we don't need to know that. The truth is

	everybody needs to know something about what they're required to do. And I think doing the learning does make you start to think a bit about well how I would respond if this happened, what would I do if that happened, and get a sense of that" C3MP2
6.19.2	"I think to make a multidisciplinary because you're going to have situations where you need to work together and if they've never - if that's never been tried out, we're lucky enough to include Allied Health and social workers in all of our ED learning workshops and things like that which is super helpful because you know who people are, you know what their roles are, you know what your responsibilities and they're aware of the same. So, that standard, the expectation is there already" C3AH1
6.19.3	"I think the education is very interesting and it can be quite entertaining not's the word, but it can be quite – just not boring.... Yeah. It's not boring. It can be interesting and very rewarding, yeah.... most people have gone into healthcare with a good – altruistic reasons and so to kind of understand how you can be helpful and not a hinderance and be useful in a setting like that is really – it's good to know" C3MP1.
6.19.4	"Funding's obviously an issue" C3RN1
6.19.5	"I must say that I have an experience in a sort of pandemic/epidemic outbreak, and actually... the earthquake in China. They have a lot of earthquakes and then I went up to China to help them for the rehabilitation. ... to China as a supporting team, and that experience is nothing you can prepare. No matter how much learning, how much online module, how much scenario cases you do, I mean that learning, that experience that impacts a person and makes you think about how you can contribute. Again, it depends on the individual. Some people are more anxiety, or some people is more open and maybe it's something we can't change. But, as a society, as a hospital, as an employer, how we actually can equip our staff as much as possible" C3AH3.

6.8 Analysis

To meet the preparedness requirements for disasters most participants advocated for disaster preparation of more than two hours at least twice a year. This advocacy may indicate a workforce engaged and understanding of the importance of disaster preparedness. It was advocated for nursing staff that preparedness should be less than 30 minutes or less than 2 hours, possibly indicating that preparedness should take place between usual work or as an in-service activity rather than as dedicated preparation time. Resources were a factor in at least one of the nursing participants quotations, which may have guided the belief that shorter preparation may be adequate for the nursing profession. Limited resources could be a significant concern if the clinical nursing and support staff workforce receive shorter preparation time based on resources rather than on learning requirements. The hospital management, despite having participants that generally advocate for longer periods of preparation, may need to more effectively resource disaster preparation to allow for longer preparation time for clinical nurses and support staff. As a state designated receiving centre for infectious disease

pandemics, a major trauma centre and also being isolated from other major hospitals, there is a likely chance of receiving received disaster victims. Whilst it appears positive that most occupations advocate for significant disaster preparation time, it is concerning that nurses and support staff may need to fit disaster preparation into their normal daily workload.

Participants at Case 3 overwhelmingly valued the benefits of practical scenario-based exercises. Tabletop, Emergo Train or high-fidelity activities were viewed as a beneficial way of testing plans, working together, and making decisions with available resources using a method suggested to be as closer to a real disaster than other methods of disaster learning. The belief that lectures or classroom-based preparation were also effective, appeared to be influenced by many participants who had attended either the externally conducted MIMMS courses or the internally organised bio-preparedness workshops.

Despite online learning being delivered to all staff in Case 3 via a mandatory programme, online learning was not popular. A few participants acknowledged that online learning could assist to complement other learning. During interviews or focus groups that many participants preferred both practical and lecture style presentations, suggested that blended learning combining more than one method of learning was also a preferred option for being most effective.

Other methods of preparation outlined as effective in this case, included self-directed learning. Self-directed learning was advocated by a medical practitioner who argued that for specialty learning self-directed learning is how many medical practitioners learn. The participant advocated that self-directed learning was also effective to prepare for disasters. The creation or growth of disaster medicine, nursing, allied health as a speciality area may promote more staff to undertake self-learning, rather than relying on hospitals and other providers to deliver the learning. Only one participant had completed post graduate university level disaster qualifications and one other had completed disaster subjects within a public health master's degree (Table 3.1). Currently it seems at Case 3, even though many participants appear engaged and motivated towards preparing for disasters, most participants rely on the hospital managers to deliver or organise disaster preparation.

Most participants suggested generic preparation when it comes to the content of disaster preparation. Whilst mostly they indicated that generic knowledge could be applied to the specific disasters as needed, there were some participants who suggested the reason for generic learning was due to limited time or resources. Most notably the argument of inadequate resources was from the nursing participants. One referred to only so many study days being available to staff each year. The hospital may need to dedicate more time and resources to

disaster preparation, covering multiple disaster types, particularly for but not limited to nursing staff.

Discharging patients, was emphasised as part of the disaster planning. The hospital had engaged the allied health staff to assist in this process, which likely resulted in more participants raising patient discharge procedures as a key clinical function. Four of the six allied health professionals expressed that they would need to assist with discharging patients during a disaster. These demonstrate how the hospital environment, culture and disaster planning can impact the clinical skills which staff value as needed.

The majority of health professionals and support staff participants considered health professionals and support staff should attend work in all situations. Clarifications included being a personal choice, the need to consider staff safety or the need to consider if adequate learning or preparation were or could be provided. The overwhelming view was that if staff do not wish to be at work, then they should not attend as they will not be productive, or they could make mistakes if they do not want to be there. During discussion in the support staff focus group a useful comparison was made to the HIV pandemic with relation to misinformation and fear. The argument that staff were not provided with adequate information by the hospital during the HIV pandemic contributed to the belief they would become infected. The support staff subsequently went on strike once per month for twelve months to express concern because they were not given the accurate information about HIV. Within the focus group, participants indicated staff had similar fear and also a lack of accurate information regarding the recent Ebola virus outbreak. The importance of providing all levels of staff, with accurate information as part of inclusive disaster planning is highlighted by these examples.

There were two broad concepts that emerged when discussing how organisations or individuals could promote staff to attend work during disasters. The first concept focussed on providing education and accurate information to health professionals before and during disasters. The second concept was around providing adequate resources to the health professionals and support staff. These resources included adequate staff during emergencies, security staff, PPE, vaccinations, or medical treatment. Case 3 participants highlighted the need for both accurate information and appropriate disaster and infection control practices, resources and plans. Decisions of staff to attend work according to participants, was based on the perception that the hospital would have clear directions and plans in place.

Participants who had experience working during disasters identified two themes as being important in improving performance during disasters. These themes were having learning and

having a plan supported by adequate resources during disasters. The importance of planning was demonstrated by participant examples when preparing for and working at a major music festival and secondly responding to a mass casualty incident, caused by a nursing home fire. In the example of the music festival the plans enabled having enough intubation equipment and pharmaceuticals for drug overdoses. During the nursing home fire, planning enabled having and efficient processes for discharging ward and then ICU patients to create bed availability for the nursing home residents to be admitted.

There were additional key ideas that were mentioned by participants at in Case 3. Disaster preparation is applicable to every staff member. Participants acknowledged that whilst not everyone needs the same knowledge, everyone needs to have a base-line level of generic preparedness. Furthermore, it was important to remember that whilst responding to disasters may be dangerous or provoke fear, attendance during disasters is rewarding and aligns with health care work. Investment in resources are important for disaster preparation and whilst not everyone will be prepared for disasters when they happen the more preparation staff receive the better prepared, they will be.

Case 3 appears to invest time and resources into disaster preparedness, including engaging allied health professionals into key disaster roles. Despite preparedness which appears to have been achieved, there are still learnings, including ensuring nursing and support staff receive optimal disaster preparation time.

6.9 Conclusion

The participants included a range of disciplines and specialty areas and gave insight into the preparation needs of a public hospital workforce. Hospital context is important to understand as the hospital was the state receiving centre for pandemic patients, including SARS, Avian influenza and Ebola virus and had also received a victim of terrorism from the nearby western Sydney CBD. Hospital staff included in this research have worked during disasters at Case 3 and elsewhere.

The study findings demonstrate that Case 3 participants have a strong understanding of methods required for their disaster preparedness and many had been included in disaster preparedness activities at the hospital including online learning, exercises and workshops or courses. Allied health and support staff in particular had participated in disaster preparation in disaster preparedness, including during practical exercises and undertaking MIMMS courses. Participants indicated a preference for practical, lecture or blended methods of preparation and

a need for disaster preparation to include a wide variety of clinical and non-clinical disaster related subject matter. Most participants had gained their disaster preparedness in exercises, online learning, in short courses or workshops although one participant had completed post graduate degrees in disaster preparedness and one disaster preparedness subjects in post graduate studies. No participants recommended university preparation or post graduate qualifications as the method of disaster preparedness for hospital staff, although this question was not specifically asked.

There were gaps or areas for potential improvement in Case 3. Evidence suggested that clinical nursing staff and hospital support staff may be limited in their access to disaster preparedness activities. It was recommended by one participant that nurses should receive 20 to 30 minutes preparation each year and a second nursing participant suggested there are only limited resources for study leave. Across all participants the other occupational groups advocated for longer preparation time than the nursing or support staff participants.

Attendance at work during disasters was considered important to meet the health care needs of patients. Many participants advocated that staff need to consider the risks to themselves and may need or choose to stay away from work, in part based on incorrect knowledge. The hospital management and staff need to ensure there is accurate information and resources to promote attendance at work.

Case 3 contributes important findings on how health professionals and support staff can most effectively prepare for disasters within the context of a major Australian public hospital that was also the designated centre for pandemic patients (pre COVID-19) and also a major trauma centre located in the western suburbs of Sydney. Participants at the hospital indicated that staff are included in disaster preparedness, although there were areas in need of more resourcing, including a focus on nursing and support staff preparedness and facilitating staff to attend work during disasters.

Chapter 7 Discussion

7.1 Introduction

Globally, disasters internal and external to healthcare facilities are continuing to occur and affect the populations' health and wellbeing, as well as healthcare and other infrastructure (UNDRR 2015). The professional and ethical responsibility, and the political and societal expectations for responding to the health-related consequences of disasters rests with the healthcare workforce. It is crucial that the workforce is prepared to respond and deliver lifesaving care (Al-Ali & Abu Ibaid 2015; Goniewicz et al. 2021).

The research question for this thesis, "How can hospital managers best facilitate health professionals and support staff to prepare for internal and external disasters?", remains critical to answer to further facilitate a healthcare workforce that is prepared and able to work during disasters and the aftermath. It is vital to know what methods of disaster preparation are most effective for the numerous occupations that make up the hospital workforce. The healthcare system is under pressure and with new and ongoing disasters currently affecting the globe, knowing how best to prepare and support the workforce is paramount (Amberson, Wells & Gossman 2020; UNDRR 2015). This preparation includes supporting the healthcare workforce and their decisions and ability to attend work.

A mix of hospital-based health professionals and support staff from three major hospitals have provided their perspectives about disaster preparation in semi-structured interviews and focus groups. This research has built on previous knowledge and has generated new insights and a more in depth understanding of disaster preparation. This chapter draws on the literature review, together with findings presented in the Cases 1, 2 and 3 (chapters 4, 5 and 6) to discuss the implications for future disaster preparation, including how to encourage participation and improve performance in the event of a disaster. In particular, this discussion highlights the importance of inclusive whole health workforce disaster preparation, how perceived risk or lack of knowledge can influence attendance at work, and how to address non-attendance. The discussion also emphasises preferred methods of preparation, what is effective, and finally the necessity to ensure adequate resources are invested by hospitals into disaster preparedness.

Disaster management is a recent specialty within healthcare disciplines, and it has been observed that as a specialty it requires a stronger research focus and evidence-base (Jillson et al. 2019). Evidence also exists to indicate that healthcare professionals are not adequately prepared

for disasters (Bartley, Fisher & Stella 2007; Neupane et al. 2020; Usher et al. 2015). This chapter makes meaning and relevance of this research in relation to disaster management preparation within hospitals. These findings can be considered by disaster management practitioners and health professionals to implement changes to hospital disaster preparedness practices, to better prepare the hospital workforce for disasters with all the benefits this brings for the workforce and community.

- Section 7.2 Cross Case Analysis. This section examines the cases for differences and similarities related to the key findings. Despite differences in each case, the section also excludes any of the cases as being atypical. If a case is identified to be atypical then more caution needs to be taken before comparing the findings with other cases (Stake 2006).
- Section 7.3 Best practice disaster preparedness methods for health professionals and hospital support staff. This section discusses the four key learnings related to how hospital managers can best assist health professionals and support staff to prepare for disasters. This section discusses the findings from the case-studies integrated with the previous research. Disaster managers and health professionals can use this section to enhance disaster planning, to assist health professionals and support staff to perform effectively during disasters.
- Section 7.4 Recommendations for practice and future research. This section translates the research findings into disaster management practice and suggests implications and recommended future research. This section can assist hospital managers, clinicians, support staff and researchers prepare for, and further research disaster preparedness.
- Section 7.5 The conclusion summarises this chapter and leads into the conclusion of the thesis.

7.2 Cross Case Analysis

It is important to discuss differences and similarities in cases to describe factors which have influenced key findings, and also to monitor for atypical cases where extra caution needs to be applied before accepting results. An atypical case is described as unusual or extraordinary case when considering deviations in the quintain (Stake, 2006). The quintain in this study were the hospitals and staff preparedness for disasters. Whilst there were differences in Case 1 funding from Cases 2 and 3 and location for Case 3 from Cases 1 and 2, disaster planning and governance were similar. Participant transcript reviews identified differences and similarities between the

Cases 1, 2 and 3 which have had an impact of the disaster preparedness within the Cases. There were no unusual or extraordinary deviations from the main themes particularly when also considering finding within previous research (Stake 2006).

7.2.1 Inclusion of Allied Health Professionals in Disaster Preparedness

One of the key differences that emerged when examining the Cases 1, 2 and 3, was the degree of inclusion of allied health professionals across the three sites. This difference is important to acknowledge as the first key finding was that allied health professionals and support staff need to be included and have important roles to contribute to disaster planning.

In considering the inclusion of allied health professionals in Case 1, the disaster training that allied health participants have completed is less than that of nursing participants. The nursing participants have completed disaster exercises, emergency warden training, as well as the mandatory and fire training. By comparison four of the six allied health professionals have only completed the hospitals mandatory training, with one also completing a disaster workshop at another facility and a second completing additional training within Case 1 (Table 4.1). Allied health participants have not listed participating in disaster exercises as part of their preparation. Two of the allied health professionals made arguments that they were not included in disaster preparation at Case 1. One allied health professional advised they and their team had skills to assist during disasters, although they did not know if these skills were needed. They indicated they would like to be involved and would like the hospital management and the allied health team to have clarity on what the roles during disasters are (Quotation, 4.11.29, Table 4.11). A social worker, who was formerly qualified as a registered nurse, compared social workers to nurses and advised that nurses were more included in disaster planning (Quotation 4.19.2, Table 4.19). In common with other participants in Case 1, allied health participants expressed their views about disaster preparedness and have experiences, often at other facilities, of preparing for, or participating in disasters. These examples included describing the value of participating in a disaster workshop, preparing for a plane crash and managing refugees in Belgium (Quotations 4.4.10, Table 4.4, and Table 4.1). Participants of all disciplines expressed they had the knowledge and skills to contribute to disasters. Some of the examples of these knowledge and skills include specific contributions of crisis counselling, radiology and stockpiling and dispensing medications (Quotations 4.11.1 to 4.11.12, Table 4.11). Data included disaster training completed (Table 4.1) and quotations demonstrating less consultation or inclusion were validation that in Case 1 allied health participants were not included in disaster planning to the same level as the nursing participants (Quotations 4.4.10, Table 4.4). The data indicated useful skills and prior disaster

experience also demonstrated that allied health participants had knowledge and skills along with other participants to contribute to disaster planning and management, including prior involvement in disasters at other facilities (Quotations 4.11.1 to 4.11.12, Table 4.11).

In Case 2 allied health participants appeared to have a significant level of inclusion in disaster preparedness with most allied health participants participating in practical disaster exercises as well as mandatory training (Table 5.1). This inclusion in disaster exercises was due to four of the allied health professionals working in the emergency department which had held multidisciplinary “emergency department only” Emergo Train exercises (Quotations 5.4.2 to 5.4.4, Table 5.4). There were some arguments provided which demonstrated that the inclusion of allied health professionals and support staff was not as comprehensive as it could be. A social worker advised that they were included in a disaster response as the hospital executive walked through the social work department and believed the social workers could be useful to assist. The participant advocated for an inclusive, proactive (pre-emptive) preparation process rather than reactive (after thought) where knowledge and skills were recognised during or after the event (Quotation 5.8.10, Table 5.8). An allied health professional suggested the inclusion of the hospitals incident command structure was important in disaster preparation, so their profession did not get forgotten or excluded as part of the disaster preparation and response. The participant also highlighted their profession’s value referring to educational qualifications (Quotation 5.6.8, Table 5.6). A nursing participant at Case 2 suggested that allied health professionals were not provided with as much preparation as nursing and medical staff and advocated for their inclusion. The nursing participant also reported hospital managers expected support staff to work during disasters even without adequate preparation (Quotation 5.8.1, Table 5.8). There were many arguments highlighting the contribution allied health professionals can provide during disasters. These contributions included allied health professionals providing basic first aid assistance and ensuring the delivery of meals to patients (Quotations 5.11.3 to 5.11.10, Table 5.11). A Case 2 allied health professional participant, whilst employed at another facility, was involved in victim identification during the Bali Bombings (Table 1.1). The participant argued the importance of training and protocols (quotation 5.18.1, Table 5.18). These examples emphasise the ways that allied health professionals at Case 2, have made useful contributions to disaster preparedness although they were not included in all aspects of disaster preparation.

Within Case 3 some allied health professionals and support staff had completed disaster exercises alongside MIMMS training, disaster specific training in SARS or victim identification (Table 3.1). Allied health professionals described their role as part of the Case 3 disaster plan

which included specific roles for physiotherapists, dietitians and social workers commensurate with their knowledge and skills. The physiotherapy manager was described as a commander and the physiotherapists, dietitians and social workers all had different responsibilities supporting patients or family members during disasters (Quotations 6.11.13, 6.11.15 and 6.11.18, Table 6.11). Allied health participants explained the clinical contribution to disaster care for patients entering and leaving the hospital (Quotations 6.11.3 to 6.11.18, Table 6.11). There was no discussion about allied health professionals or support staff not being fully included in the disaster preparation process in interviews or the focus group conducted at Case 3.

These differences and similarities were key in identifying learnings. In Cases 1 and 2 there were less opportunities for inclusion of allied health professionals participants in disaster preparation training. In both cases allied health participants did not know their roles in the disaster plan of the organisation and in Case 2 inclusion was by accident or convenience. In Case 2 it was identified that whilst some allied health professionals were not included, those working in the emergency department were more likely to be included. Case 3 demonstrated that allied health professionals were included in disaster preparation and their roles were part of disaster plans. Allied health participants also demonstrated they understood these roles included in disaster plans. In Cases 1 and 2 allied health participants had disaster experience, knowledge and skills from prior employment in other organisations. This demonstrated the value they can make to disaster preparation and response if included at Case 1 and 2. The difference was that in Case 3 allied health inclusion resulted in a formalised role in the disaster response. There are research findings supporting that other hospitals or research include or exclude allied health professionals in disaster preparation (Haire, Brown & Wiggins 2020; Ridley, Freeman-Sanderson & Haines 2020).

7.2.2 Disaster Preparation: Duration, Frequency and Methods

Duration and Frequency

There were differences and similarities in the duration and frequency advocated by participants at Cases 1, 2 and 3. Whilst the most effective duration and frequency for disaster preparedness has not been included as a key finding, there were some important learnings from the cases.

In Case 1 the most common preferred duration and frequency was less than 2 hours training once each year. Most participants recommended disaster preparation should be around 1 hour annually (Quotations 4.2.1 to 4.2.8, Table 4.2). The rationale for the duration and frequency was related to either learning outcomes, what could be accommodated within a working day or

based on existing practices (at Case 1). The participant demographics did not appear to influence the preferred duration or frequency with three participants advocating for longer preparation belonging to different professions (medical, nursing and allied health) and three participants advocating for bi-annual sessions being nursing, allied health and support staff (Quotations 4.2.9 to 4.2.11, Table 4.2 and Quotations 4.3.6 to 4.3.8, Table 4.3). There was no correlation between those with actual disaster experience preferring longer or shorter preparation (Table 4.1). In Case 1 the duration seemed to be linked to a perception of available resources, learning outcomes and established practices with other mandatory training at Case 1 (Quotations 4.2.9 to 4.2.10, Table 4.2, and Quotations 4.3.6, 4.3.7, 4.3.8, Table 4.3).

In Case 2 the participant demographics have influenced the preferred duration and frequency with both medical practitioners advocating for longer duration, one nurse and one allied health professionals. Three of these four participants had experience working during real disasters so this prior experience could be a factor for wanting longer preparation (Table 4.2). The majority of participants in Case 2, advocated annual preparation and duration of less than 2 hours (Quotation 5.2.1 to 5.2.8, Table 5.2). The duration was linked to learning outcomes and there were some participants who compared this to existing training including fire training or basic life support when recommending duration. There was no mention of limited resources as a rationale for shorter preparation (Quotations 5.2.6 and 5.2.9 to 5.2.11, Table 5.2, and Quotations 5.3.8 to 5.3.10, Table 5.3). The two medical practitioners advocated for the longest preparation time of either half a day twice a year or 3 days, 1 to 4 times each year. The rationale was based on the need to retain information (Quotation 5.2.10-5.2.10, Table 5.2).

In Case 3, the majority of participants advocated for longer preparation time, a few hours to a few days and recommended this should occur twice a year or more frequently than twice a year. The longer duration was advocated for most occupations (Quotations 6.2.1 to 6.2.7, Table 6.2). Case 3 nursing participants only recommended nursing managers or leaders to have longer preparation. The nursing participants recommended clinical nurses should have between 20 minutes and 2 hours annual disaster learning (Quotations 6.2.8 to 6.2.9, Table 6.2). Whilst occupation or profession appeared to be connected there was not a connection with disaster experience with a mix of those with and without disaster experience advocating for both shorter or longer and more frequent disaster preparation (Table 6.1). The decisions in Case 3 were made based on learning outcomes, with the exception of the nursing participants where both learning needs and resources influenced the need for shorter duration (Quotations 6.2.1 to 6.2.8, Table 6.2 and Quotation 6.3.1 to 6.3.4, Table 6.2).

There were key differences at Case 3 versus the Cases 1 and 2. The first was that more of the participants at the Case 3 had more disaster experience than at either Case 1 or 2. Second, the allied health professionals (60% of health professional participants) were more engaged in Case 3 as they were more likely to have undertaken practical exercises and other disaster preparation than allied health participants in Cases 1 and 2. Case 3 also was more isolated being 20 kilometres from the closest trauma hospital. Case 1 and 2 have two trauma hospitals within an 8 km radius of each other. Case 3 also served as the referral centre for pandemic outbreaks and Ebola virus infected patients (prior to COVID-19). It is possible that one or more of these factors had resulted in participants at Case 3 arguing for longer and more frequent durations. Case 1 had the shortest preferred preparation with the fewest participants advocating for longer preparation. This preferred shorter duration could be related to the status of private hospital rendering it unlikely that casualties from external disasters will need care at the hospital. The implication of these case study findings is that disaster preparation could vary in length and duration based on the needs of the staff working in hospitals. Based on previous research duration of disaster preparedness can vary between hospitals (Bartley, Fisher & Stella 2007; Carlos et al. 2015; Worrall 2012). None of the Cases 1, 2 or 3 are atypical. Disaster preparation measured in previous research ranged from as short as fifteen minutes through to disaster exercises over several days to university subjects (Ablah et al. 2008; Bartley, Fisher & Stella 2007; Chiu, Polivka & Stanley 2012; Wetta-Hall et al. 2006; Worrall 2012).

Preferred Method of Preparation

Participant recommendations for the preferred method of preparation had more similarities than differences. Only minor differences with regard to the preferred methods of preparation were suggested at the three cases. At Cases 1, 2 and 3 practical methods of learning combined with another method of Learning were considered most effective.

In Case 1 practical preparation was considered most effective as staff could practice what was needed and tested at the same time (Quotations 4.4.1, 4.3.3 to 4.3.5, Table 4.3). Participants also favoured practical methods for the preparation of certain types of equipment needed in disasters, including PPE or firefighting equipment as practical preparation can include direct observation or actually practicing (Quotations 4.4.8 and 4.4.9, Table 4.4). Lecture style preparation was advocated for by medical, allied health and support staff participants at Case 1. The rationales included the ability for staff cover a range of topics and the capacity to observe the presentation, discuss and ask questions (Quotations 4.4.7 and 4.4.11 to 4.4.17, Table 4.4). Participants who advocated for lectures had not undertaken practical disaster exercises. Blended

learning involving practical exercises and a lecture, online learning or other resources, including policies or pamphlets were also considered effective (Quotations 4.4.1, 4.4.4 to 4.4.7, Table 4.4). Online learning was not considered effective by most participants unless to support other methods of preparation (Quotations 4.4.4, 4.4.5 and 4.4.6, Table 4.4).

In Case 2 the majority of participants preferred practical and blended learning. Practical learning was preferred as staff could perform tasks, work within the team, receive feedback and identify gaps in individual or organisation performance (Quotations 5.4.1 to 5.4.7, Table 5.4). One participant advocated for high fidelity practical exercises involving actors. This was argued to be more realistic in terms of engaging the human emotions (Quotation 5.4.8, Table 5.4). Blended learning needed to contain practical learning. It was suggested by participants that online and didactic learning were not suitable unless combined with practical learning (Quotations 5.4.1 to 5.4.9, Table 5.4). Three participants favoured online learning as it was flexible for staff, easy to monitor and to utilise all available resources as online disaster learning was provided at no cost to public hospitals in NSW (Quotations 5.4.5, 5.4.10 and 5.4.12, Table 5.4).

In Case 3 the majority of participants favoured practical learning, including Emergo Train, table top exercises and high-fidelity exercises. Participants suggested practical learning permits staff to think, test resources, identify gaps in plans and understand the flow of disasters (Quotations 6.4.1 to 6.4.6, Table 6.4). High fidelity exercises were argued to be realistic when preparing participants (Quotations 6.4.1 and 6.4.6, Table 6.4). Medical and allied health participants valued the lecture or face-to-face methods for the ability to ask questions and to understand the information. This desire for this style of Learning was motivated by undertaking or delivering bio-preparedness and MIMMS courses (Quotations, 6.4.7 to 6.4.8, Table 6.4). Blended learning was considered effective in Case 3. A combination of online, face-to-face and practical learning was suggested to be effective as it allows theory to be learnt and then tested (Quotations 6.4.10 to 6.4.12, Table 6.4). No participants advised that online learning would be suitable as standalone preparation as staff just “click” through the modules (Quotations 6.4.5, 6.4.8 and 6.4.9, Table 6.4).

The similarity across all cases was the desire for most participants to value practical preparation over all others. Blended learning was also considered effective by most participants across all sites, suggesting that practical learning cannot deliver all information and for participants who preferred learning via lecture and discussion. Online learning was considered to be ineffective by most participants across the three cases. The differences are useful to examine. In Case 2 lecture or didactic learning is not seen as effective by the participants. In Cases 1 and 3 this style of

learning is viewed as effective. In Case 1 it is speculated that as a private hospital there is more focus on internal incidents where the responses are less practical than an external disaster and more conducive to lecture style learning. In Case 3 many participants had undertaken the MIMMS and internal bio-preparedness workshop. Content and the prior learning experiences influence learning preferences. Prior research also reflected different methods of preparation and identified all are beneficial. Whilst the research literature does not identify which method of preparation was most effective, practical exercises or blended workshops were the most common methods of preparation to be evaluated (Abatemarco et al. 2007; Carlos et al. 2015; Chiu, Polivka & Stanley 2012; Collander et al. 2008; Glow et al. 2013; Qureshi et al. 2004). The differences in cases regarding the preferred methods of learning do not make any case atypical, just different, which can guide the findings of the research (Stake 2006). The common factor was that across all cases, practical and blended learning were considered more effective, and online learning was considered least effective for disaster preparedness.

Resources

There were minor differences regarding resources recommended by participants. Although differences were minor, they highlighted the importance of having appropriate resources for disasters, including different disciplines of staff in the disaster planning process. In Case 1 there was wide support from medical and allied health professional participants for resources to keep staff safe during disasters. These resources included PPE to protect both health workers and other patients. Vaccinations or medications to prevent illness or treat health workers (Quotations 4.5.1 to 4.5.4 ,Table 4.5). There was broad support for having the appropriate information resources including policy, education, and personnel to promote effectiveness and safety (Quotations 4.5.5 to 4.5.8 ,Table 4.5). The third grouping of resources related to practical assistance, including assistance with transport, accommodation, or financial incentives or recompense (Quotation 4.5.9 to 4.5.11, Table 4.5).

In Case 2 resources including medications, ventilators, and food for patient care during disasters were advocated (Quotations 5.5.1 to 5.5.3, in table 5.5). Applicable disaster plans in place to guide the actions of staff during disasters were also recommended (Quotations 5.5.5 and 5.5.8, Table 5.5). These plans were argued to assist staff obtaining resources during the disaster (Quotations 5.5.6 and 5.5.7, Table 5.5). Resources to protect staff, including PPE, immunisations, and antiviral medications were defined as important by participants (Quotations 5.5.9 to 5.5.12, table 5.11). Participants highlighted the need for support to aid attending work or meet the additional personal financial costs that will be incurred as a result of responding to a disaster.

This assistance included financial support or the provision of services to assist with accommodation at work (if staff need to stay away from family), the cost of childcare, food at work and transport to and from work. Quotations 5.5.13 to 5.5.15 in Table 5.5 exemplify the need for financial or logistical support for staff.

Case 3 participants highlighted the need for useful information to support preparation and response to disasters. Information on risks for staff and their families, understandable disaster plans, job roles and useful training or education were advocated for effectively prepared staff (Quotations 6.5.1 to 6.5.3 and 6.5.8, Table 6.5). Participants presented previous examples where insufficient information was provided to further the need for useful information. Case 3 staff experiences related to the Ebola virus outbreak and HIV epidemic, where clinical and support staff refused to care for patients, due in part to misinformation (Quotations 6.5.1 and 6.5.9, Table 6.5). Participants in Case 3 indicated the need for vaccinations or treatment should they be affected whilst working during disasters. Treatment included psychological support, although mostly focused on their physical health (Quotation 6.5.4 to 6.5.5 and 6.5.10 to 6.5.11, Table 6.5). Participants suggested adequate resources to do their work safely so that safe care could be delivered to patients, necessitating adequate clinical staff, PPE, and security (Quotations 6.5.4 to 6.5.6 and 6.5.12 to 6.5.13, Table 6.5). A need for individual staff practical planning including childcare and transport to work was recommended by one participant (Quotation 6.5.7, Table 6.5).

In all three Cases, participants advocated for resources that provide staff with useful information so that staff understand their roles, which prevents misinformation. Participants in Cases 1, 2 and 3 argued that measures to keep staff safe were important. The measures were PPE, antiviral medications and vaccinations. In Case 3 participants suggested having adequate numbers and types of staff also keep staff safe. One variation between Cases was the advocacy for practical resources which the hospital management can provide to assist staff to attend work. Cases 1 and 2 had similarities which were different to Case 3. Hospital support staff in Cases 1 and 2 indicated the need for transport assistance to get to work during the disaster, including the provision of taxi vouchers or buses (Quotation 5.5.15, Table 5.1, Quotations 4.5.10 and 4.5.11). This issue was not raised as a need in Case 3 by support staff. Cases 1 and 2 are located near the Sydney CBD in a high socioeconomic suburb of Sydney and are serviced by many public transport buses and trains. Case 3 is located further from the Sydney CBD in a lower socioeconomic suburb and only one train line connects to the Case 3 hospital. More staff may live closer or use their cars to commute to work at Case 3. This difference in Cases highlights variations in the planning

needs of the support staff in Cases 1,2 and 3 and the significance of including a range of staff disciplines in disaster planning. Whilst there are different contexts, Case 3 is not atypical according to Stake's (2006) definition of atypical cases, as hospitals are located in many different locations throughout metropolitan Sydney, each with different socioeconomic status and access to public transport and they will have different planning needs.

7.2.3 Attendance at Work during Disasters

In Cases 1, 2 and 3 there were definitely more similarities than differences between Cases when comparing views on staff attendance at work. Four scenarios were outlined to participants who were asked to advise if staff would attend work and factors that would be considered in staff decisions. The scenarios were: 1. A bomb blast in the nearby business district ; 2. an Ebola virus outbreak; 3. a pandemic influenza and 4. a city-wide power failure with hospital generator failure.

In Case 1 the majority of participants argued that staff should attend work following the bomb blast if they considered it safe to do so (Quotation 4.13.1 to 4.13.9, Table 4.13). The exception to this finding was from the 2 medical practitioners and 1 registered nurse who indicated staff have a duty of care and should attend (Quotation 4.13.10 to 4.13.10, Table 4.13). When considering the Ebola virus outbreak there was a greater focus on risk assessment for personal safety and the need for additional training before attending work (Quotations 4.14.1 to 4.14.5, Table 4.14). One medical practitioner advocated staff should attend work with appropriate PPE (Quotation 4.14.6, Table 4.14). Other participants, including a registered nurse advocated staff should not attend due to safety concerns or because they have not been trained to care for patients infected with Ebola virus. Lack of training and fear of risks associated with Ebola virus were major barriers to attending work (Quotations, 4.14.1 to 4.14.5 and 4.14.7 and Quotation 4.1.9, Table 4.14). The scenario of the pandemic influenza highlighted the benefits of staff training, vaccinations and hospital procedures. In contrast to the Ebola virus scenario, the majority of participants advocated staff should attend as the hospital had staff training, vaccinations and hospital procedures in place (Quotations 4.15.1 to 4.15.7, Table 4.15). Case 1 has experienced many power failures and all participants indicated staff should attend work as the patients need care during the power failure scenario. There was no consideration for risks or additional training required, just the need to provide care (Quotations 4.16.1 to 4.16.7, Table 4.16).

When considering the bomb blast scenario in Case 2, most participants examined the safety risks and logistics if needing to pass through the site of the bomb blast on their way to work. The

sentiment was that unless attending work was unsafe, staff should be encouraged to attend (Quotations 5.13.1 to 5.13.6, Table 5.13). A medical practitioner and registered nurse participant suggested if staff were too stressed by the incident or they did not want to attend, they should not, as they would hinder the response rather than assist (Quotations 5.13.7 to 5.13.8, Table 5.13). When presented with the Ebola virus outbreak scenario, the majority of participants indicated staff should attend work as patients need care. This attendance at work, was dependent on staff training and should be considered voluntary (Quotations 5.14.1 to 5.14.13, Table 5.14). Two allied health participants and one registered nurse argued that staff should not attend work as they would be unfamiliar and the risks would outweigh the benefits (Quotations 5.14.12, 5.14.14 to 5.14.15, Table 5.14). The pandemic influenza generated a greater focus on attending work due to the need to provide care. The availability of vaccines and hospital procedures to promote safety were regularly considered as factors that participants believed would encourage staff to attend work (Quotations 5.15.1 to 5.15.7, Table 5.15). After being provided with the power failure scenario, most participants advocated staff should attend work, including indicating that they would need to work beyond the scope of their usual role to assist patients and other staff, compensating for a deficit in technology (Quotations 5.16.1 to 5.16.9, Table 5.16).

Case 3 participants had mixed views regarding staff attendance at work during the scenarios. When discussing the bomb blast scenario arguments included: focusing on the stress or danger of the incident requiring staff be given the choice not to attend work (Quotations 6.13.1 and 6.13.5, Table 6.3) or focusing on a duty to provide care to patients, requiring staff to attend work (Quotations 6.13.6 to 6.13.11, Table 6.13). Some participants advised that during the Ebola virus outbreak scenario, staff will choose not to attend work due to fear of infection and passing the virus on to family members. A lack of knowledge was also suggested as a reason staff would not be willing to attend work during the Ebola virus scenario (Quotations 6.14.1 to 6.14.4 and 6.14.8, Table 6.14). Other participants advocated that staff should attend work as the hospital policies and systems are in place designed to facilitate safety for staff and patients (Quotations, 6.14.5 to 6.14.7, Table 6.14). In contrast to the Ebola virus scenario most participants indicated staff would attend work during pandemic influenzas. Participants demonstrated a greater level of knowledge advised treatment staff would need to provide to treat pandemic influenza patients. There was more willingness and more knowledge of the care needed articulated when compared to Ebola virus (Quotations 6.15.1 and 6.15.9, Table 6.15). Some participants raised concerns for those who were pregnant, immune suppressed and for those infected. It was considered likely not all staff would attend work during a pandemic influenza due to themselves

being vulnerable to infection or being infected themselves with the influenza (Quotations 6.15.1, to 6.15.6, Table 6.15). When discussing the power failure scenario all participants suggested staff would attend work and provide the care needed. One medical practitioner advised that if rostered medical should attend, although there was no need for extra medical staff during a power failure (Quotations 6.16.1 to 6.16.4, Table 6.16).

When comparing Cases 1, 2 and 3, the common concerns for participants were the danger or risk to staff members, the stress that could affect staff member ability to practice and a lack of knowledge or training for various disasters, particularly an Ebola virus outbreak. Views that promoted participants to believe staff would attend work included policies and protocols, PPE or vaccinations and the duty to provide care. Views that influenced participants to believe participants would not attend work included logistical barriers, if a disaster presented a danger to the staff member or their family or if staff were unfamiliar with the work required during a disaster. These similarities impacted on the research findings and are supported by other research that has identified when staff have resources including hospital plans, adequate PPE and vaccinations the health professionals' willingness to attend work increases (Burke et al. 2011; Ley & Jacobs 2020; Melnikov, Itzhaki & Kagan 2014; Nyashanu, Pfende & Ekpenyong 2020; Tebruegge et al. 2010). The research also identified when health professionals did not have access to resources including PPE or if they had personal health concerns or concerns for family members at home, they were less likely to attend work (Ley & Jacobs 2020; Rafi et al. 2021).

There were minor differences in views, across cases. In Case 1 there was more concern expressed for staff attending work during the Ebola virus scenario. Fear of the risks and the suggestion staff would need training were presented as barriers which participants expressed would stop staff attending work. Previous research identified that when staff are not confident in their ability to respond to disasters, they are less likely indicate they will report to work or place themselves at risk (Baack & Alfred 2013; Oztekin et al. 2016). In cases 2 and 3 this research found participants believed if staff were stressed to the point of affecting their performance, they should not attend work. In relation to the contribution of this finding from Cases 2 and 3, it is important that staff believe they are ready for disasters and have adequate psychological preparation.

7.3 Best Practice Disaster Preparedness Methods for Health Professionals and Hospital Support Staff

Research from the 1980s to the present and from the Cases 1, 2 and 3 there have been many learnings which can influence practice to better prepare health professionals and hospital support staff for disasters (Chapter 2, 4,5 and 6). Whilst learnings can be identified within chapters 2, 4, 5 and 6, this section discusses four key findings. These learnings do not stand alone, the first key finding identifies that allied health professionals and hospital support staff have important roles in disasters and this finding needs to be incorporated into disaster plans. The second finding relates to attendance at work during disasters. The third key finding covers the preferred mode of preparation for disasters and the fourth relates to having adequate numbers of suitable resources. The interconnectedness of these key learnings is important to acknowledge as the implementation of a key finding will also require the implementation of other key findings to be effective. Firstly, if allied health professionals and support staff are not prepared for disasters, then the hospitals are not prepared for disasters. Medical practitioners and registered nurses will not be able to rely on allied health professionals and support staff to come to work and perform key roles including radiography, provision of food services, laboratory diagnostics and blood bank or cleaning. If the preferred method of preparedness is not implemented for all health professionals and hospital support staff, the hospital operations will be less prepared for disasters, will not function effectively and staff may not come to work. Finally, if hospital management do not invest adequate resources into preparedness, then key staff will be left out of preparedness activities, use a less optimal mode of preparation and staff will be less likely to attend work. The key findings relate to how to enhance preparation and participation and are discussed in this subsection.

7.3.1 Allied Health and Support Staff Inclusion in Disaster Preparation

Allied health professionals and support staff have significant roles in disaster planning and during disasters and need to be included in disaster plans.

Both allied health and support staff were well-positioned to make significant contributions to disaster management. This study found that allied health professionals and hospital support staff were not frequently represented in the literature reviewed (see chapter 2, section 6 and section 7.4). Quotations from participants in Case 1 and 2 indicate that locally, allied health and support staff are not included in disaster planning or plans (Quotations, 4.11.29, Table 4.11, Quotations 4.19.2, Table 4.19, Quotations 5.8.10, Table 5.8 and 5.6.8, Table 5.6). The data

obtained from participants in this study demonstrates that allied health and support staff make a valuable contribution to disaster management and these actions should be included in disaster management plans.

Including allied health professionals and hospital support staff in disaster management preparation and planning and describing their role during disasters needs to be part of hospital disaster plans. The data from this research indicate there are three key roles for allied health professionals and support staff that need to be defined within disaster management plans. First, allied health professionals and hospital support staff need to have their contribution to patient care or other services documented into the disaster plans (Quotations 4.7.4, Table 4.7, 5.5.1, Table 5.5, 5.11.1, Quotations 5.11.8 and 5.11.15, Table 5.11, Quotations 6.11.4 and 6.11.6, Table 6.11). This documentation in disaster plans includes aspects of care that form part of their clinical or technical role, and knowledge that they can draw on during disasters. A physiotherapist outlined how they could review and treat minor fractures and allow the medical practitioners to treat major cases during a mass casualty incident. In addition, during a power failure when X-rays will not be available, a physiotherapist described their skills in assessing fractures similarly to when they assist on the side of a sports field and then treat without medical imaging confirmation (Quotation 5.11.1, Table 5.11). A pharmacist outlined they would supply large quantities of medications during various disasters to both patients being admitted to the hospital and also for patients being discharged early to make room for new patients (Quotation 5.5.1, Table 5.5). A radiographer highlighted that they needed to provide medical imaging to victims of disasters, and they had also developed a protocol to keep x-ray boards clean when undertaking the procedure with patients infected with the Ebola virus. This procedure has also been published in a national industry journal (Quotation 6.11.4 and 6.11.6, Table 6.11). Hospital support staff advocated for the importance of their role during disasters in providing services and care support. This role included staff having an important responsibility in the provision of food to patients, the need to provide special diets and to accommodate food allergies (Quotation 4.7.4, Table 4.7). The important role of cleaning, with particular reference to infection control during pandemics and other disasters was also highlighted (Quotations 5.11.8 and 5.11.15, Table 5.11).

Whilst the majority of published research conducted into disaster preparedness has focused on medical and nursing staff within the hospital context, there were some research studies that support a role for support staff and allied health professionals during disasters. There are studies demonstrating the role and importance of disaster preparedness for allied health professionals

(Carlos et al. 2015; Haire, Brown & Wiggins 2020; Tebruegge et al. 2010). One study which evaluated Australia's preparedness for a pandemic included allied health professionals along with medical practitioners, nurses, and students. Of all groups allied health professionals were the most likely to indicate they would not attend work during a pandemic. The study highlighted that those with better understandings of the risk of infection as well as the effectiveness of prophylaxis and treatment were more likely to attend work (Tebruegge et al. 2010). It is necessary to include allied health professionals and their roles in disaster plans to improve their performance during disasters, including attending work. A second study included medical technologists which are degree qualified hospital scientists that work in the Philippines along with medical practitioners and registered nurses (Carlos et al. 2015). The study identified key responsibilities for hospital scientists during an Ebola virus outbreak, including using disinfectants, PPE and also measured knowledge and confidence in knowing the procedures in a pre-test, educational intervention, post-test format. The study identified that hospital scientists (medical technologist) improved their confidence in knowing the procedures following the intervention as well as highlighting the important role of a hospital scientist during an infectious disease outbreak or pandemic (Carlos et al. 2015). Whilst there are few studies which include allied health professionals, these studies highlight the importance of allied health professionals, including hospital scientists understanding their disaster roles and being included in disaster plans.

With regard to support staff, a qualitative study of medical directors and administrators of community health centres in New York City identified that it would be essential to have security guards and cleaners during disasters (Ablah et al. 2008). These staff would need to be trained and have procedures for patient isolation and decontamination including cheat sheets, flip charts or cards that prompt roles and responsibilities (Ablah et al. 2008). Additionally, a study which identified the key roles which support staff including engineers, housekeepers, laundry workers, chaplains, mailroom workers, food service workers and nursing assistants undertake during disasters and then measured the effectiveness of four different methods of education identified support staff had improved knowledge following the training (Thorne et al. 2004). The training covered key areas of responsibilities for support staff to work safely during disasters including infection control procedures, use of PPE and providing disaster risk information to their families and techniques on how to communicate this information (Thorne et al. 2004). These studies provide additional evidence and concur with the findings of this research, that support staff have important roles during disasters and demonstrates that by including support staff in disaster planning. Understanding the value and roles of hospital support staff can lead to

improved disaster management (Ablah et al. 2008; Thorne et al. 2004). These examples with the case studies and the prior research indicate that allied health professionals and support staff are needed during disasters, including to deliver care within their existing scope of practice.

The second role or attribute that allied health professionals and support staff could have during disaster management is their professional knowledge or skills that while are not part of their usual roles, are transferrable to a disaster response situation. Allied health professionals and support staff also make up a significant number of the hospital workforce and whilst they have knowledge that underpin their core skills, taking X-rays, CT scans or environmental cleaning, they also know the hospital environment and have additional skills that can be of assistance during disaster situations. A physiotherapist could assist with mass patient discharges, or a social worker or hospital chaplain could provide psychological support to family members, or a food service staff member could restock the shelves in a clinical area (Quotations 6.4.6, Table 6.4, 6.17.5, Table 6.17 and 6.8.8, Table 6.8). Allied health professionals and support staff could also assist with manual handling and patient transport or delivering pathology specimens, particularly as they know the layout of the hospital (Quotations 4.17.11 and 4.17.13, Table 4.17). A dietitian advised how their team could assist in the kitchens as they had the skills to assist in food preparation. The participant suggested their skills are most needed to help produce extra food during a mass casualty incident or during a power failure (Quotation 5.11.7, Table 5.11). A radiographer advised that their equipment does not work during power failures, and they could assist to push beds or manually ventilate a patient if ventilators were not functioning. Across Cases 1, 2 and 3 in this research, allied health professionals were included in the disaster preparation process most inclusively at the Case 3 hospital and they had defined roles within the emergency plan. Their contribution was already part of the emergency plan, and this planning was evident. The physiotherapists would assist with patient discharges as they have the manual handling or patient movement skills, dietitians would assist with family information as they have effective communication skills, although less patient movement skills (Quotations 6.11.3 and 6.11.5, Table 6.11). These examples highlight the importance of including the roles of allied health professionals and support staff in disaster plans. Firstly, so all staff understand their role and secondly as this understanding improved allied health engagement at the Case 3 hospital.

There is limited research identifying roles beyond the usual roles for allied health professionals and support staff. The roles included in the research studies focused on traditional roles including laboratory techniques and allied health professionals working in a fever clinic during a pandemic (Ablah et al. 2008; Carlos et al. 2015; Tebruegge et al. 2010; Thorne et al. 2004).

During the current COVID-19 pandemic, one study evaluated how physiotherapist, occupational therapist and their assistants provided care support in palliative care units, as family members were not permitted to visit (Haire, Brown & Wiggins 2020). Hospital orderlies in a study had the skills to successfully manually ventilate intubated patients, following a 20 minute education program (Maklada et al. 2020). Despite the near absence in previous research, the data across three different cases in this study has identified that allied health and support staff can have additional roles beyond their traditional roles during disasters. It is important to consider how this contribution to the disaster response can be developed and included in hospital plans.

Thirdly, allied health professionals and support staff have other professional and life experiences that can enhance disaster planning, including experience with international disasters (Quotation 4.7.4, Table 4.7). Therefore, hospitals need to include allied health professionals and support staff in disaster management planning and preparation. Whilst Sydney, Australia has experienced few natural disasters and wars, participants in Case 1 had experience prior to residing in Australia of living in countries experiencing natural disasters and civil war. Overseas experience can contribute valuable learning for organisations in Australia. In Case 1 a support staff member from the Philippines had significant exposure to floods and suggested staff in Australia can learn from international experiences (Quotation 4.7.4, Table 4.7, Tables 4.1, 5.1). Support staff also come from diverse career backgrounds. A support staff in Case 1 had experience working as a school teacher during a school fire and in Case 2 staff in the transport department had experience working as a paramedic and in the banking sector during disasters (Tables 4.1, 5.1). There was no research which identified that allied health professionals and support staff can contribute to disasters due to their broader or more diverse lived experience, compared to registered nurses and medical practitioners. A study which included registered nurses, medical practitioners, and army medics, identified that medics have better disaster knowledge than medical and nursing officers as the medics participate in more disaster drills (King, Spritzer & Al-Azzeh 2019). A study conducted in Nepal measuring the knowledge of various healthcare professionals and medical students towards the Corona virus infectious disease 2019 (COVID-19) found that medical, nursing, allied health professional and medical students had similar knowledge levels with regard to general information, screening, management and infection prevention for COVID-19 (Neupane et al. 2020). This finding demonstrates that it is important to consider all staff, not just medical practitioners, and registered nurses, as being able to positively improve disaster performance and outcomes if they are included in the disaster preparation process.

Despite the surge in hospital admissions and the focus on needing to upskill the nursing and medical workforce to accommodate more intensive care unit patients during the COVID-19 pandemic, there was little research published on the role of allied health professionals in this expansion of services. An Australian study of intensive care unit bed expansions only considered how many extra medical practitioners and registered nurses would be needed, despite allied health professionals having recognised roles in intensive care units (Ridley, Freeman-Sanderson & Haines 2020). One study did identify that following a reduction in usual healthcare services delivered by allied health professionals during COVID -19, allied health professionals, predominantly comprised of physiotherapists played an important role in supporting palliative care patients with companionship, personal care and communication with family members (Haire, Brown & Wiggins 2020). This finding demonstrates that during the current pandemic, whilst there is a role that allied health professionals and support staff could play, particularly there are staffing shortages, allied health professionals are still be underutilised.

In summary data obtained in this research, and supported by limited published research, both allied health professionals and support staff contribute to effective disaster response and this contribution will be enhanced when it is documented in disaster plans. Allied health professionals and support staff also need to be fully included in disaster planning. Furthermore, the research has demonstrated that without allied health professionals, including hospital scientists and support staff performing their usual roles, including radiography, pathology tests, dispensing medications, cleaning or decontamination of rooms, and food service provision, this absence will seriously limit the ability of the medical and nursing professions to perform their roles during disasters. Hospital management should not leave the important roles that allied health professionals and support staff can make to chance by not consulting with them and including them in disaster committees or exercises and including their roles in disaster plans.

7.3.2 Attendance at Work During Disasters

If disasters are perceived to be dangerous for the health worker, they may not attend regardless of patient need. Only a minority of participants across all sites consider their professional responsibilities over their risk and hazard considerations. When staff are familiar with their roles, they are more likely to attend work.

Learnings associated with health professionals and hospital support staff attending work during disasters are critical because if staff do not attend work during disasters, then they cannot provide the care and services needed by the community. Four scenarios were outlined to the participants to gauge how likely they believed their colleagues would be to attend work in each

scenario. Whilst there were differences in the case settings, and some differences in the findings, there were two key findings related to risk and disaster knowledge. For most participants in Cases 1,2 and 3, if they considered the scenario a risk or hazardous to the wellbeing of the health worker, then they argued that health workers should have the choice not to attend work, regardless of the implications for patient care and their co-workers. The second key finding is that if staff are more familiar with the care they need to deliver and if they have confidence in the hospitals procedures then they are more likely to attend work, even if a disaster is dangerous.

Attending at Work following MCI Incident bomb blast

Participants in all case studies expressed that staff should attend work, although this decision was premised on an evaluation of the risks. Participants in Case 1 were the most likely to express that health professionals and support staff should or would not attend work or believed it should be a personal choice to attend work in scenarios they judged to be a risk to safety or wellbeing (Quotations 4.13.1 to 4.13.10, Table 4.13). There were no specific comments made regarding working in a private hospital, which in Australia do not have the primary responsibility for managing external disasters. As participants are less likely to experience mass casualty incidents, the lower exposure to disasters could have been a factor which influenced participants opinions suggesting staff will not work.

Overall, in all Cases most participants did indicate that their colleagues would or should go to work, after considering the risk rather than the patient need. Most participants considered the risks to be low as the bomb had already detonated in another part of the city and unless staff needed to travel through the area of the bomb. Participants considered it unlikely the bomb would present ongoing risks, so advocated staff should attend work to care for the injured community members (Quotations 4.13.1 to 4.13.10, Table 4.13, Quotations 5.13.1, 5.13.4 & 5.13.9, Table 5.13, Quotations 6.13.3 to 6.13.5, Table 6.13). There were suggestions that whilst staff should attend work, and most would likely would, they should not be forced to attend work (Quotations 6.13.2, 6.13.5, 6.13.7, Table 6.13). Some participants indicated that if there were direct logistical barriers to attending work, if the bomb blast was at the hospital or on the train line on the staff members commute to work then it may not be possible to attend work (Quotations 5.13.6, 5.13.9, 5.13.9, Table 5.13).

A useful observation was that whilst some participants indicated it should be a personal choice to attend work during the bomb blast, some outsourced their judgement to the “authorities” or their “managers” to advise if it is safe to attend work (Quotations 4.13.5, 5.13.2, Table 4.13).

This reliance on authorities highlights the importance of effective communication with staff needing to attend work following bomb blasts by authorities or employers. Preference to attend work, was also based on the ability to perform work well, including staff making correct decisions and having accurate judgment when stressed by the situation. This stress was also suggested to include worrying about the wellbeing of family members who may also be stressed (Quotations 4.13.9, Table 4.13, Quotations 5.13.7, 5.13.8, Table 5.13, Quotations 6.13.1 and 6.13.2, Table 6.13). This suggestion that staff would not be able to function effectively due to stress was more common in the nursing participants.

Duty of care, a professional responsibility or responsibility as an employee of a hospital and to provide lifesaving patient care was also raised as a reason why staff should and, in some situations, would attend work. At Cases 1, 2 and 3 medical practitioners were prominent amongst those that cited the duty of care as a reason to attend work. Participants from the public hospitals (Cases 2 and 3) were also more likely to suggest duty of care as a reason for attending work lives (Quotations 4.13.10 to 4.13.14, Table 4.13, Quotations 5.13.1 to 5.13.8, Table 5.13, Quotations 6.13.5 to 6.13.11, Table 6.13). Some participants advocating the duty of care, professional, employment or patient care responsibilities still referred to it being a personal choice or considering the risks, whilst others simply advocated that staff should attend because of their responsibilities or the training they have to save lives (Quotations 4.13.10 to 4.13.14, Table 4.13, Quotations 5.13.1 to 5.13.8, Table 5.13, Quotations 6.13.5 to 6.13.11, Table 6.13). The belief in professional responsibilities or duty of care was an important factor in promoting participants to believe staff should attend work. A less common reason to argue staff should attend work was because their colleagues would need them. If staff do not attend work, those choosing to attend would be overworked and not have enough support (Quotations 5.13.4, Table 5.13, Quotations 6.13.9, Table 6.13).

The findings of this study, following a bomb blast are that a minority of participants suggest staff will attend work based on their duty of care other professional or employment obligations to provide care. The guidance of authorities or management and the desire to assist other colleagues with the workload were also found to be factors that suggest staff will attend work. The main factor was if the staff member considered that there was no safety risk and then they would likely attend work.

Safety and logistical barriers were of concern in multiple studies included in the literature review (Abatemarco et al. 2007; Baack & Alfred 2013; Burke et al. 2011; Fung, Loke & Lai 2008; Gershon et al. 2009; Melnikov, Itzhaki & Kagan 2014; Qureshi et al. 2005; Tebruegge et al. 2010; Thorne

et al. 2004). A study of Israeli nurses following terrorist actions identified safety and logistical barriers as reasons for being less likely to attend work (Melnikov, Itzhaki & Kagan 2014). Additionally medical practitioners were less likely to report to work during COVID-19 when they had underlying health issues or were older and they determined the safety risk was greater (Rafi et al. 2021). Personal safety was the most cited barrier to attending work and providing care. Stress impacting the ability to provide care was also cited as a barrier. Some logistical barriers were also of concern, particularly if a staff member needed to travel through the bomb blast site to get to work or if the workplace was the site of the bomb blast.

Attendance at work: Ebola Virus Outbreak

It is acknowledged that at the time of the data collection the Ebola virus outbreak in West Africa had resolved (Table 1.1). The outbreak was in the two to three years prior to interviews, so it is possible and evident for some participants that this outbreak was still a recent memory. Ideas around attending work during the Ebola virus outbreak scenario and the need for more educational preparation, seemed to be more important than providing the care for patients with Ebola virus.

Participants when considering if staff should attend work spoke of the need to consider safety and personal risk. Some participants acknowledged there would be a high demand for patient care, although still placed the safety of the healthcare workforce ahead of the needs for patient care. It was also a factor raised that unlike a bomb blast there is a risk of taking the infection home to friends or family (Quotations 4.14.1 to 4.14.6, Table 4.14, Quotations 6.14.2, 6.14.4 to 6.14.5 and 6.14.7, Table 6.14). Many of participants argued they would consider the staff members educational preparedness to care for patients infected with Ebola virus and their personal risk first. There were those who advocated that without experience or knowledge of caring for patients infected with Ebola virus should not be required to work in the Ebola virus clinical area if they were not confident to do so. The need for accurate information was highlighted (Quotations 4.14.1, Table 4.14, Quotations 5.14.9 to 5.14.15, Table 5.14, Quotations 6.14.4, Table 6.14).

Participants spoke about the duty or need to provide patient care and to work in the Ebola virus clinical area. This duty was predominantly clarified with the requirement that staff should care for patients if they are provided with the required PPE and assurance that they would be safe (Quotation 4.14.6, Table 4.14, Quotations 5.14.1 to 5.14.8, 5.14.12, Table 5.14, Quotations 6.14.1, 6.14.5, 6.14.6, 6.14.7, Table 6.14). It became evident that participants in the two public hospitals (Cases 2 and 3) were more likely to suggest that staff will attend work than that of Case

1 a private hospital (Quotation 4.14.6, Table 4.14, Quotations 5.14.1 to 5.14.8, 5.14.12, Table 5.14, Quotations 6.14.1, 6.14.5, 6.14.6, 6.14.7, Table 6.14). This lack of willingness to respond could be as private hospital staff are less likely to expect to respond to external disasters as they mostly support public hospitals, or it could be because the data collection occurred one year sooner after to the Ebola virus outbreak in West Africa. It may be understandable that given Ebola virus has not been common in the Australian community or hospitals many of the healthcare workforce will not have experience managing or working with patients with Ebola virus. It will not meet the healthcare requirements of patients during an outbreak if those without prior experience do not work with the patients.

The danger of infection with the Ebola virus to oneself or of taking the virus home to family members was raised as a concern (Quotations 4.14.6, Table 4.14, Quotations 5.14.12, Table 5.14, Quotations 6.14.2, Table 6.14). Quotations more often focused on if it was safe and some also focused on the need to be directed or to volunteer to provide patient care. The safety of health workers and family is a key consideration in this scenario (Quotations 4.14.1, Table 4.14, Quotations 5.14.9 to 5.14.15, Table 5.14, Quotations 6.14.4, Table 6.14). Also, key considerations are having appropriate information, training, and PPE. Only Case 2 had a majority of participants advocating that staff should be attending work to care for patients infected with Ebola virus. Case 1 had the least support for willingness to care for patients infected with Ebola virus.

All participants in the case study research have participated in various types of disaster preparation (Tables 4.1, 5.1 and 6.1) and all hospital sites had disaster plans at the time of data collection. In spite of this preparation most participants believe their colleagues may not wish to attend work during the Ebola virus outbreak scenario. Lack of knowledge or experience and the perceived risks were the two main reasons for this view. Two studies, support the findings of this research regarding attendance at work when the staff member considers the disaster dangerous and when they do not have accurate information on the care required when working in a disaster (Chiang et al. 2020; Oztekin et al. 2016). One study evaluating clinical performance and hazardous materials disasters, identified for disaster preparation and knowledge to be useful it needs to be specific. In the hazardous materials study it was found that general disaster preparedness programs did not prepare participants for hazardous materials. The study did find that specific hazardous disasters programs did improve preparedness (Chiang et al. 2020). A second study of Japanese nurses identified that despite participating in disaster preparation only 74.1 % believed this to be effective and 84% wanted more education (Oztekin et al. 2016).

Additionally whilst 92.6 % of participants were aware their hospital had a disaster plan, 86.1% were not confident this plan would be well implemented. Significantly only 6% believed they personally could respond well to disasters (Oztekin et al. 2016). Many health professionals and support staff may not wish to attend work during an infectious disease outbreak which they are not familiar with and which can pose a personal risk to the staff or their families. Studies identified disaster preparation does not always lead to increased response rates for health professionals.

Attendance at work: Pandemic Influenza

Participants in Cases 1, 2 or 3, when considering pandemic influenzas did not indicate significant resistance to attending work, largely as they believed that the hospital processes in place, PPE and vaccinations would keep them safe. Most participants mentioned these factors, so personal safety was still a consideration for the participants and staff to consider (Quotations 4.15.1 to 4.15.6, Table 4.15, Quotations 5.15.1 to 5.15.9, Table 5.15, Quotations 6.15.5 to 6.15.8, Table 6.15). Whilst this data suggesting high attendance rates, is contrary to that found within previous studies that indicates that a significant percentage of health professionals will not wish to attend work (Ley & Jacobs 2020; Tebruegge et al. 2010). In Cases 1, 2 and 3 the high indication of attendance from participants is likely related to the perception that the hospital staff are prepared, the annual influenza vaccine and PPE will keep health workers safe. Previous research showed that the greater prepared the hospital staff are and the higher the belief that a vaccine, PPE or anti-viral medications will protect the healthcare workforce, then the higher the attendance rates (Tebruegge et al. 2010). Similarly, in a survey of nurses in the United States of America, working during the current COVID-19 pandemic, organisational support or lack of organisation support was key in determining nursing staff stress levels and decisions to abandon the workplace in relation to caring for patients with COVID-19. If the organisation provides support, including adequate PPE, then nurses had lower levels of stress and were more likely to indicate they would not abandon their workplace (Ley & Jacobs 2020).

There were some suggestions that if the environment is not safe or for pregnant staff, those with young children and immunosuppressed staff, then there may be reasons not to attend work during a pandemic influenza, depending on the nature of the virus (Quotations 6.15.1 to 6.15.4, Table 6.15). Additionally, it was argued that if the staff member is sick with the virus, then they should stay away (Quotations 6.15.8 to 6.15.9, Table 6.15). Two of the participants did have safety concerns regarding attending work (Quotations 6.15.5 and 6.15.6, Table 6.15). This finding is also consistent with that found in the previous research that indicates that, whilst duty of care

may compel some staff to attend work, even when there is perceived danger, this decision is further reduced when there are concerns about infecting family members including children (Tebruegge et al. 2010). A qualitative study of nurses and support workers in the United Kingdom, identified when there was a lack of PPE and clear guidance on COVID-19, this lack of resources led to fear and uncertainty when needing to provide care to residence in care homes (Nyashanu, Pfende & Ekpenyong 2020). Additionally, due to a lack of testing for healthcare workers in the United Kingdom, and the need for staff with flu symptoms to isolate, leading to staff shortages (Nyashanu, Pfende & Ekpenyong 2020). These factors may reduce the pool of available staff to work during a pandemic despite most participants believing their staff will attend work and deliver the care needed.

Importantly most participants in cases 1, 2 and 3 did consider the need for patient treatment and care. This need for treatment included recognising that those affected by influenza will likely be elderly or have many comorbidities and discussing some interventions that will be provided including chest physiotherapy, ventilation, isolation, chest x-rays, pharmaceuticals, and social work for family members (Quotations 4.15.5, 4.15.6, Table 4.15, Quotations 5.15.1, 5.15.2, 5.15.3, 5.15.4, Table 5.15, Quotations 6.15.6, 6.15.8, Table 6.15). Participants were quite confident about discussing the care needs of patients during a pandemic influenza and outlined that it is a disease they are trained for and within their scope of practice (Quotations 4.15.1, 4.15.2, 4.15.5, Table 4.15, Quotations 5.15.6, 5.15.7, 5.15.8, 5.15.9, Table 5.15, Quotations 6.15.5 to 6.15.9, Table 6.15). Research supports the desire for healthcare workers to provide care during a pandemic although also needs to be balanced by staff safety, particularly when managing a new and potentially life-threatening pandemic (Nyashanu et al., 2020).

Being familiar and having accurate information regarding with medical conditions that a disaster has a positive influence on staff willingness to attend work. Important factors identified in Cases 1, 2 and 3 were the availability of policies, protocols, PPE, and vaccinations to keep staff safe. Also important were familiarity with the disease process with most participants outlining their speciality or discipline role in treatment. If a pandemic is a new infectious disease with uncertain treatment and transmission, uncertainty will likely mean health workers could make different decisions regarding provision of treatment, than one with known treatment and prevention of transmission options (Ley & Jacobs 2020; Nyashanu, Pfende & Ekpenyong 2020; Tebruegge et al. 2010). When staff are more familiar with the disaster type and have appropriate resources to stay safe, there is more readiness to attend work.

Attendance at Work: City Power Failure with Internal Generator Failure.

The discussion in interviews and the focus groups of the internal disaster of a power failure scenario, identified that when considering scenarios with little perceived personal danger, all participants argued that health professionals and support staff should attend work, without referring to a risk or hazards (Quotations 4.16.1 to 4.16.6, Table 4.6, Quotations 5.16.1 to 5.16.10, Table 5.6, Quotations 6.16.1 to 6.16.14, Table 6.6). All participants argued patients need care, all participants indicated that staff should attend work for their rostered shifts. There was no consideration of safety or being a voluntary decision for rostered shifts. The only factor considered was the patients' need for care (Quotations 4.16.1 to 4.16.6, Table 4.6, Quotations 5.16.1 to 5.16.10, Table 5.6, Quotations 6.16.1 to 6.16.14, Table 6.6).

Participants additionally focused on the need for staff to attend work to assist other staff with their duties, working beyond their usual role. Examples provided included delivering patient food, dispensing medications without the assistance of computers, reassuring patients, and manually ventilating patients if ventilators do not work. Some clinicians spoke about the need for additional patient monitoring using manual techniques (Quotations 4.16.2, 4.16.4, 4.16.6, Table 4.16, Quotations 5.16.1 to 5.16.9, Table 5.16, Quotations 6.16.1 to 6.16.2, Table 6.16). In a Case study involving a telecommunications failure to a region affecting rural general practices, staff continued to deliver patient care, and also worked outside their normal roles to ensure continuity of care (Tran & Pedler 2017). Examples of staff working outside their normal roles including using personal mobile phones to make up for the loss of the practice telecommunications and driving to other healthcare providers and pharmacies to deliver messages (Tran & Pedler 2017).

In addition to the low perceived personal danger and the continued belief that patients need care during power failures, it is known that all case hospitals had experienced prior power failures (Table 1.1). Prior experience with power failure may have affected participants responses, as participants may be more familiar with power failure disasters. If health professionals and support staff do not perceive personal danger and are more familiar with the disaster, then they will more likely attend work and provide care to patients.

Encouragement to Attend Work

A major component of how to promote attendance at work has already been discussed in reference to the Ebola virus outbreak scenario. Participants advised that if staff had adequate education, training, or experience, they could work in the Ebola virus ward or clinical area. Participants in the Cases 1, 2 and 3, argued education or accurate information was key to

encouraging participants to attend work (Quotations 4.17.1 to 4.17.5, Table 4.17, Quotations 5.17.1 to 5.17.7, Table 5.17, Quotations 6.17.1 to 6.17.10, Table 6.17). Studies evaluating disaster preparedness programs have identified that health professionals who have attended disaster preparation report their willingness to attend disasters increased following preparation (Arbon et al. 2013; Baack & Alfred 2013; Fung, Loke & Lai 2008; Gershon et al. 2009; Melnikov, Itzhaki & Kagan 2014; Qureshi et al. 2004; Tebruegge et al. 2010; Thorne et al. 2004).

Measures to improve safety are also critical to improving attendance at work. A useful example related to attendance at work was seen in the pandemic influenza's scenario. Participants believed their colleagues had the knowledge; the hospital had the protocols and the required equipment to promote a safe working environment for staff. Measures to improve safety included the provision of PPE, vaccinations where available, education or information, adequate staffing resources including clinical staff and security to promote a safe environment. Informing staff about these safety measures is critical including actions to keep the hospital safe and promote attendance at work (Quotations 4.17.1 to 4.17.10, Table 4.17, Quotations 5.17.16 to 5.17.18, Table 5.17, Quotations 6.18.11 to 6.18.12, Table 6.18).

Logistical arrangements including staff contact numbers, transport to work, childcare and danger money were also important for Case 1 and 2 hospitals (Quotations 4.17.11 to 4.17.14, Table 4.17, Quotations 5.17.10, 5.17.11, and 5.17.19, Table 5.17). In the scenario of the bomb blast, transport to work was one of the main barriers to attending work if staff believed they would need to travel through the area of the bomb blast (Quotations 4.13.6, Table 4.13, Quotation 5.13.9, Table 5.13). Logistical concerns were not raised in Case 3 which is in a deferent geographical location. It is possible the location of the hospital and how difficult it is for staff to access during a disaster was the factor and the location needs to be considered during disasters and disaster planning. It is important to consult with staff to determine if logistical assistance may be needed to get to work during disasters. The idea that resources are needed to promote safety and attendance at work is also reported to be important within the published research literature. Providing resources including adequate PPE and vaccinations and having plans that improved the personal logistics of getting to work increased the health professionals' willingness to attend work (Burke et al. 2011; Ley & Jacobs 2020; Melnikov, Itzhaki & Kagan 2014; Nyashanu, Pfende & Ekpenyong 2020; Tebruegge et al. 2010).

The privilege, responsibility to the hospital, profession, or patients is another factor that can be managed to influence staff to attend work (Quotations 4.19.6, Table 4.19, 4.13.11, Table 4.13, Quotation, 6.19.3, Table 6.19). Medical practitioners volunteer in disasters worldwide because it

is important to save lives. Disaster management is a rewarding specialty and staff volunteer worldwide, saving many lives. It is privilege and honour to save lives. Work is varied and rewarding during disasters (Quotations 4.19.6, Table 4.19, 4.13.11, Table 4.13, Quotation 6.19.3, Table 6.19). Participation during disasters is affected by multiple factors including accurate information, adequate resources and duty of care or professional responsibility. The specific rewards (other than those implied within duty of care) were not evaluated in the research literature in terms of promoting attendance at work (Baack & Alfred 2013; Melnikov, Itzhaki & Kagan 2014; Tebruegge et al. 2010).

This research has identified that health professionals and support staff will consider the risks to their own safety when deciding if they should attend work and provide patient care during disasters. A minority of health professionals and support staff are likely to attend based on their duty to provide care. This attendance will be improved by providing appropriate education, information and adequate resources to support attendance at work and safety at work.

7.3.3 Preferred Method of learning

Disaster preparedness training involving blended learning, which includes practical education, is the preferred method of disaster preparedness. This research recommends that hospital management facilitates preparation which includes practical learning and the use lecture, limited online learning, and other methods of learning.

This research has established that participants prefer a blended method of learning which depending on the context included practical style preparation and avoiding too much reliance on online learning. Participants frequently explained that they are practical learners. Participants argued being a hands-on or kinaesthetic learner rather than undertaking e-learning (Quotations 4.4.1, Table 4.4, Quotation 6.4.1, Table 6.4). Being able to touch and use the equipment during practical preparation was considered important for learning and more likely to be utilised in the real situation. Practical preparation included specific mention of various types of skills or equipment including PPE or firefighting equipment (Quotations 4.4.1, 4.4.2, Table 4.4, Quotation 5.4.9, Table 5.4). An example cited in the literature demonstrated the benefits in post test scores of emergency medical technicians, on how to fit-test masks when responding to bioterrorism (Carlos et al. 2015). Without the practical component, the emergency medical technicians did not know how to safely fit masks (Abatemarco et al. 2007). A study of medical practitioners, registered nurses and hospital scientists involving an intervention of lectures, practical exercises and discussions resulted in improved confidence and knowledge to care for patients infected

with Ebola virus, including theoretical and practical knowledge and donning and doffing of PPE (Carlos et al. 2015).

The benefits of practical participation do not extend just undertaking practical skills, tasks, or equipment. The practical approach or the performing rather than just watching or reading was described as more effective during or scenarios or role plays. The role plays or scenarios allow staff to see or experience how the teams work together, including experiencing what others do to avoid duplication (Quotation 6.4.1, 6.4.3, Table 6.4, Quotation 4.4.7, Table 4.4). When performing the actual skill or skills during practical preparation was is easier to receive feedback (Quotation 5.4.1, Table 5.4). Published research findings support this finding, demonstrating disaster exercises allow staff to practice for disasters which enhance decision making, practical skills (Abatamarco et al. 2007; Carlos et al. 2015; Chiu, Polivka & Stanley 2012; Collander et al. 2008; Glow et al. 2013; Qureshi et al. 2004).

The desire to prepare for disasters by doing or participating in practical learning echoes some of the Learnings from Chapter 2 when considering the learning theories. Most directly the experiential and constructivist learning theories apply to this style of preparation (Gordon, Booth & Bywater 2010; Matics 2015) . Kolbe's experiential learning theory describes how adult learners learn best when they participate in practical simulations or a real-world event (Matics 2015; Zigmont, Kappus & Sudikoff 2011). The theory describes how through reflection on practical experience and incorporating other new and existing knowledge adults learn what they need to know. This learning is then tested in either real events, disasters or practical simulations if a disaster does not occur (Matics 2015; Zigmont, Kappus & Sudikoff 2011). Other learning theories also assist to explain why participants prefer to learn by doing, rather than by watching or reading. The constructionist theories describe that adults learn best when they experience a practical simulation or real-life experience and then reflect on their past knowledge or past practical experiences. Facilitators can further encourage learners to discover things for themselves which enhances to the overall learning for the adults (Connell 2011; Gordon, Booth & Bywater 2010). As discussed in Chapter 2, the most commonly cited learning theory in relation to how health professionals learn is andragogy. Andragogy has five key beliefs which were described in chapter 2, section 2.7. These beliefs include the learner being self-directed, using prior knowledge as the basis for new learning, learning best when they know the knowledge or skills is relevant to work or life and is part of problem solving and when they are rewarded by internal rewards (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Inal & Ozvaris 2017; Matics 2015; Milligan 1997). Whilst all five assumptions within the theory are

relevant to the finding that participants in cases 1,2 and 3, prefer practical learning, the fourth belief relating to problem solving is particularly relevant. Adults learn best by problem solving rather than by being provided with information which they may consider relevant (or irrelevant). In a practical learning setting the learners need to solve a problem and put learnings into practice (Galbraith & Simon-Galbraith 1984; Milligan 1997). The three adult learning theories provide theoretical validation explaining why most participants in this study find practical learning most effective.

This study has also found that practical disaster preparation is most effective as it allows staff to work in the teams that they will need to work with during disasters. The logistics of working with teams, how to avoid duplication and making realistic use of resources. The representatives from the whole hospital should be included in the disaster exercises which is beneficial to test resources, plans , identify duplication and develop teamwork (Quotations 5.4.1, .5.4.4, 5.4.5, Table 5.5, Quotation 6.4.2, Table 6.4) It was described that during practical exercises, in the beginning of an exercise the team is less efficient and by the end the team members worked more cohesively. The disaster exercise also allowed staff to clarify their roles and avoid overlap with other team members. Chaplains and social workers participated in a team exercise, they clarified their roles and avoided the overlap in roles (Quotations 5.4.1, .5.4.4, 5.4.5, Table 5.4).The research literature supports these findings as it also identified that practical exercises enabled staff to improve their teamwork or ability to work with other staff or agencies (Abatemarco et al. 2007; Carlos et al. 2015; Chiu, Polivka & Stanley 2012; Collander et al. 2008; Glow et al. 2013; Qureshi et al. 2004).

The closest preparation to participating in a real disaster is experienced during practical preparation. The knowledge and skills required plus the emotional or human response is simulated. The practical exercises allow or requires the participants to think and act as required in a real disaster scenario (Quotation 5.4.1, 5.4.2, 5.4.3, 5.4.4, Table 5.4, Quotation 6.4.1 to 6.4.6, Table 6.4). The high-fidelity practical preparation, with actors playing patient roles, was argued to be even closer to a real disaster in terms of the emotional response needed by the treating clinicians to prepare for a real disaster emotional response (Quotation 5.4.8, Table 5.4, Quotations 6.4.1 and 6.4.6, Table 6.4). Studies involving practical exercises improve the knowledge or practical skills of participants, although they tended not to evaluate how effectively they prepared participants for the human or emotional response to disasters as the participants in this study have suggested (Collander et al. 2008; Glow et al. 2013; Pryor et al. 2006).The practical methods of preparation were also most effective to test the resources and

emergency plans available for real disasters. It becomes evident during a practical exercise that there are adequate or inadequate resources to manage a disaster scenario or to check and correct emergency plans (Quotations 4.4.1, Table 4.4, Quotation 5.4.1, Table 5.4, Quotations 6.4.4, 6.4.5, Table 6.4). Studies conducted by Daniel et al. (2016) and Collander et al. (2008) have also demonstrated the effectiveness of practical exercises for identifying gaps or lack of resources in staff knowledge or hospital plans or resources.

Andragogy suggests that adults learn best when learning can be applied to the real-world and they can see the relevance in learning to their role (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Milligan 1997). Motivation is described in the theory as being able to understand how learning will be applied in life situations. Identifying issues in emergency plans, establishing how teamwork will function during disasters, avoiding duplication and developing the emotional responses needed to function during a disaster are all examples of the third and fifth assumptions of Andragogy in action (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Milligan 1997). This understanding demonstrates the need for learning to be relevant to work or life and being motivated by internal satisfaction, by developing new knowledge as it will need to be applied during disasters. The reference to “fixing” errors in either the staff member’s own clinical or non-clinical skills or in the organisation’s disaster plan could also be compared to being self-directed rather than teacher directed and reflecting on prior knowledge in the development of new knowledge or skills (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Milligan 1997). When staff correct their own errors through participation in practical learning by reflecting on performance this also relates to the reflection that occurs in either experiential or constructionist learning theories following simulated practical learning or real events, which leads to greater learning (Connell 2011; Gordon, Booth & Bywater 2010; Matics 2015; Zigmont, Kappus & Sudikoff 2011).

In addition to practical learning, additional preparation is required to be provided or facilitated by hospital managers. Some knowledge needs to be learnt prior to undertaking practical preparation, some knowledge is best learnt by other methods and some staff will prefer other methods of preparation. As resources can be limited and as staff learn by different methods a variety of methods to support the learnings of practical methods can be used (Quotation 5.4.9, 5.4.11, Table 5.4, 6.4.11, Table 6.4). These include lectures or didactic or online learning, checklists or self-directed learning, reading or personal research. It is important that staff have some knowledge prior to undertaking practical exercises so that they function effectively during the exercise and build on their knowledge. The knowledge needed before practical exercises is

theoretical including knowledge about hospital procedures and when the practical skills will be needed to be used (Quotations 4.4.1, 4.4.4, 4.4.5, Table 4.4, Quotations 6.4.11 to 6.4.12, Table 6.4). Lectures were preferred by most participants in this study to gain supplementary knowledge, others suggested that online learning or other forms of self-learning was also effective. The main advantages identified by those supporting online learning, videos or self-learning were being able to undertake the learning in their own time whilst the advantages of the lectures or talks where that staff are presented with the information in what was argued to be a more engaging way, staff could see the information being provided, ask questions and have discussion as needed (Quotations 4.4.1, 4.4.4, 4.4.5, 4.4.7, Table 4.4, Quotation 5.4.5, Table 5.4, Quotations 6.4.10 to 6.4.12, Table 6.4). This concept was also supported within some of the published research literature (Bartley, Fisher & Stella 2007, Thorne, 2004 #742).

Lectures, online learning, checklists, policies or self-directed learning were also preferred for learning some types of knowledge or by some participants over practical preparation. Types of knowledge that either lectures, presentations, self-directed learning or online learning were preferred than practical preparation, included basic disaster knowledge for those without prior disaster experience, theoretical knowledge, knowledge ranging over a variety of disaster types, policies, and procedures (Quotations 4.4.1, 4.4.4, 4.4.5, 4.4.7, 4.4.11, 4.4.13, 4.4.14, Table 4.4, Quotations 5.4.9, 5.4.10, 5.4.12, Table 5.4, Quotations 6.4.7, 6.4.8, 6.4.9, 6.4.11, 6.4.12, Table 6.4). Additionally, in lecture style preparation it was suggested by some participants that the lecture provided a medium where a variety of information can be included and it is easier to ask questions (Quotations 4.4.11, 4.4.14, Table 4.4, Quotation 5.4.9, Table 5.4, Quotations 6.4.7, 6.4.8, 6.4.11, Table 6.4). The research literature also supports that lectures, online learning, checklists or policies and self-learning is effective to learn particularly theoretical knowledge (Abatemarco et al. 2007; Collander et al. 2008; Glow et al. 2013; Qureshi et al. 2004; Thorne et al. 2004). In two studies involving public health nurses, participants received didactic training supported by either online learning modules or handouts of sample plans and competency expectations. Post-tests in both studies indicated programs had improved the confidence and knowledge of public health nurses had to respond to disasters (Chiu, Polivka & Stanley 2012; Qureshi et al. 2004). In another study participants were assigned to four groups: workbook, video, lecture, and small group discussion (Thorne et al., 2004). The workbook and video were self-directed learning, and the lecture and small group discussion were instructor guided. All groups recorded statistically significant improvements in attitude and knowledge questions (Thorne et al. 2004). There were studies also that used a combination of mostly lectures with

practical learning and this method achieved improved knowledge in post test scores (Abatemarco et al., 2007, Collander et al., 2008, Glow et al., 2013).

Some participants favoured online learning to complement the practical learning. Online learning was opposed by many participants across the three sites in this study as the common belief is that staff just click through the presentations to get to the end. Caution should therefore be applied to utilising online learning even as a compliment to practical learning (Quotations 4.4.1, 4.4.7, Table 4.4, Quotations 5.4.1, 5.4.3, 5.4.6, Table 5.4, Quotation 6.4.9 Table 6.4). This finding was not supported by the research literature that has identified that the use of online learning or web-based scenarios have positive outcomes in terms of improving disaster knowledge in post test scores (Andreatta et al. 2010; Baez et al. 2005; Nyamathi et al. 2010; Olson et al. 2010). This research included one randomised controlled trial and one non-randomised study which compared online learning with practical preparation. Both groups improved in their bioterrorism or triage disaster knowledge with no significant difference (Andreatta et al. 2010; Olson et al. 2010). More examples demonstrating online learning being effective can be found in chapter 2, section 2.5.3. During the COVID 19 pandemic there was the “necessity” to introduce physical distancing to prepare the healthcare workforce. As a result, there was an increase in online learning and a reduction in face-to-face or practical methods of learning (Ahmed et al. 2020; Singh et al. 2021). Two studies that evaluated the online learning delivered to medical and nursing students identified that whilst there are benefits of online learning, particularly during a pandemic, there are aspects of practical learning which may be efficacious. In a qualitative study of faculty and medical students identified that with online learning it is more difficult to establish relationships, professionalism, teamwork, communication, and clinical skills compared to face-to-face or practical teaching (Ahmed et al. 2020). Similarly, a study of online learning medical and nursing student’s experiences in India during COVID-19 identified that there were issues with the social inequality affecting ability to learn. Many students did not have access to computers or private rooms at home to learn productively online. Only 20% of students felt online learning can replace conventional teaching (Singh et al. 2021).

Self-directed learning definitely reflects the principles of andragogy, and some forms of didactic or online learning may reflect andragogy, if there is significant interaction between the learners and the teacher or online learning program (Carpenter-Aeby & Aeby 2013; Galbraith & Simon-Galbraith 1984; Milligan 1997). These modes of learning also closely reflect the values of pedagogy. In pedagogy learning the teacher generally directs the learning for students. This

mode is not normally considered the most effective way for adults to learn. There are times when pedagogy can be used in combination with andragogy or is preferred over andragogy, experiential learning or constructionist theory (Galbraith & Simon-Galbraith 1984; Inal & Ozvaris 2017). Providing didactic learning with an interactive question and answer session was considered effective by participants in Case 1 and Case 3 (Quotations 4.4.11, Table 4.4, Quotations 6.4.7 to 6.4.9, Table 6.4) and can be considered to be using both pedagogy (the lecture) and andragogy (the question and answer session) (Inal & Ozvaris 2017). Pedagogy may also describe the preferred method of learning, particularly when health professionals and hospital support staff, have little existing knowledge of a subject (Galbraith & Simon-Galbraith 1984). Additionally, pedagogy style methods may be preferable when it is a highly technical procedure of which the students know little about or even if the task being demonstrated does not require the degree of self-reflection and interpretation normally associated with education (Galbraith & Simon-Galbraith 1984). The procedure for using complex technical equipment or cleaning an infectious room, including the disinfectants needed, may be training rather than education and learning methods supported by pedagogy may be preferred in this circumstance (Galbraith & Simon-Galbraith 1984; Inal & Ozvaris 2017).

Resources or financial pressures on disaster preparation, were reported in the literature and in Cases 1, 2 and 3 as a reason to deliver disaster preparation via online learning. Online learning is believed to be a cost-effective method compared to face-to-face methods of preparation (Collander et al. 2008; Glow et al. 2013; Pryor et al. 2006). The findings of this research does not recommend online learning should replace practical exercises given the strong support for practical preparation by participants in all three cases. Online learning should only form a component of the preparation and be combined with practical preparation. This view is supported by research conducted with emergency department nurses in Southern California (Amberson, Wells & Gossman 2020). Whilst it was recognised that there is a need to have cost effective disaster preparation, the study evaluated a blended evaluation program which included face-to-face sessions, the use of a white board and online learning delivered on disaster preparation to the emergency department nurses. Importantly the face-to-face sessions were held during normal meeting times, so that they did not add to the cost of preparing the nurses. A pre-and-post test was conducted using the Emergency Preparedness Information Questionnaire categories and there was a significant improvement in the post test results in all Emergency Preparedness Information Questionnaire categories (Amberson, Wells & Gossman 2020). Studies similar this support the findings from Cases 1, 2 and 3 that whilst it is necessary to consider the cost of disaster preparation, online learning should not be used in isolation to prepare for

disasters. Practical or face-to-face preparation needs to form part of a blended education program for disaster preparedness.

7.3.4 Resources for Disaster Planning and Preparation

Without adequate resourcing there can be limitations of including the whole healthcare team in preparedness, the preferred methods of preparedness may not be used, and health professionals and support staff will not be adequately prepared to respond during disasters.

The significance of resources was evident when discussing preferred content, duration, frequency of disaster preparation and also when discussing if content should be specific or generic to profession and disaster type. Participants expressed opinions which they linked to available resources rather than learning outcomes in Cases 1, 2 and 3. The participants in Case 1, discussed the availability of resources when considering preferred preparation. There was a common suggestion in Case 1 that limited resources were an issue and preparation duration, type and content needed to fit within other responsibilities rather than focusing on potential educational outcomes (Quotation 4.4.7, 4.4.8, Table 4.4, Quotations 4.9.5, 4.9.6, Table 4.9). Participants were most likely to argue for short preparation times of less than two hours annually, whilst still advocating for preparation which is separate for each profession, covers a wide variety of disasters, clinical and non-clinical skills (Quotations 4.8.1 to 4.8.6, Table 4.8, Quotations 4.9.7 to 4.9.9, Table 4.9, Quotations 4.11.1 to 4.11.8 Table 4.11). In Case 3 there were additional arguments about needing more resources. Participants argued for the longest and most frequent disaster education resources of the three Cases (Quotations 6.2.2 to 6.2.4, 6.2.7, Table 6.2, Quotations 6.3.1 to 6.3.3, Table 6.3). Despite longer preparation times, during the recent Ebola virus outbreak it was suggested that inadequate information was provided to the hospital staff and as a result misinformation was an issue (Quotations 6.5.1, 6.5.3, Table 6.5, 6.17.4, and 6.17.5, Table 6.17). There was also a particular resourcing concern regarding the nursing staff. Shorter disaster preparation times of than 20 minutes were advocated for clinical nursing staff and in the context of nurses attending study leave to prepare for disasters, it was argued funding was an issue (Quotation 6.2.8, Table 6.3, Quotation 6.19.4, Table 6.19). Additional resources need to be provided to facilitate the provision of accurate information during disasters. The suggestion by participants that nurses only require twenty minutes of disaster education each year and that there is inadequate funding to allow “study leave” for disaster preparedness, is strongly indicative that more resources to backfill staff are required, so that nurses can attend disaster preparation. In Case 2 participants were also likely to argue for short periods of annual preparation with the requirement to cover a variety of disasters. For

clinical nursing and support staff it was suggested 30 minutes to 45 minutes and for most other occupations less than 2 hours annually. The exception was medical staff where suggestions ranged from half a day twice a year to 3 days 4 times per year (Quotations 5.2.1 to 5.2.5, Table 5.2, Quotation 5.8.11, Table 5.8, Quotations 5.9.1 to 5.9.10, Table 5.9). Unlike in Cases 1 and 3, no participants indicated these short periods of education recommend were due to inadequate resources and most argued the educational benefits related to the short preparation times.

Inadequate resources dedicated to disaster preparation has an impact on the participants views on if staff should attend work during disasters. A major factor in influencing participants to suggest staff should or may not attend work in the Ebola virus outbreak scenario was a lack familiarity with the requirements. Conversely a major factor in promoting staff to attend work in the influenza scenario was familiarity with the care needs and preparedness for this type of disaster. There needs to be disaster preparation time resourced, to facilitate preparation for the range of disaster scenarios which does not appear to be in place at present for all or some staff at the Case hospitals. Staff need specific information about care requirements and the hospital's disaster plan needs to address specific disasters to facilitate comprehensive disaster preparation and encourage staff to attend work when a disaster is considered dangerous (Quotations 4.14.1, Table 4.14, Quotations 5.14.9 to 5.14.15, Table 5.14, Quotations 6.14.4, Table 6.14, Quotations 4.15.1, 4.15.2, 4.15. 5, Table 4.15, Quotations 5.15.6, 5.15.7, 5.15.8, 5.15.9, Table 5.15, Quotations 6.15. 5 to 6.15.9, Table 6.15). Many participants advocated for generic forms of disaster preparation in the study, suggesting this advocacy was based on the available resources as there is only limited time to cover different disaster types (Quotations 4.9.4, 4.9.5, 4.9.6, Table 4.9, Quotation 5.9.4, Table 5.9, Quotations 6.9.1, 6.9.2, 6.9.3, Table 6.9). This advocacy for generic preparation based on limited resources, strengthens the finding of this research that more resources are required for disaster preparation in the case hospitals so that specific disaster preparation should be provided for different types of disasters. There is support for the finding from previous research (Amberson, Wells & Gossman 2020; Bartley, Fisher & Stella 2007). Resources can be an issue in the delivery of disaster education preparation to the health workforce (Amberson, Wells & Gossman 2020; Bartley, Fisher & Stella 2007). Additionally, preparation for disasters is more effective if it covers specific subject matter so it is effective in increasing staff knowledge for certain disasters including preparing for biological hazards (Bartley, Fisher & Stella 2007; Carlos et al. 2015; Chiang et al. 2020; Setyawati et al. 2020).

The need for appropriately resourced disaster preparation was further supported by suggestions from participants with actual disaster experience (Quotations 4.18.3, 4.18.4, Table 4.18,

Quotations 5.18.3, 5.18.4, Table 5.18, Quotations 6.18.1, 6.18.3, 6.18.4, 6.18.5, Table 6.18). The need for education prior to the disaster including practical or lecture-based education where scenarios can be tested or questions be asked, were key reflections of those participants that had participated in actual disasters. These sessions were important to improving disaster performance by the participants. Whilst the sessions described were either brief or long, what the sessions had in common was that they were all face-to-face sessions either practical or in a classroom setting, allowing scenarios, questions, and discussion (Quotations 4.18.3, 4.18.4, Table 4.18, Quotations 5.18.3, 5.18.4, Table 5.18, Quotations 6.18.1, 6.18.3, 6.18.4, 6.18.5, Table 6.18).

All case hospitals used online learning as part of their required disaster preparation. Most participants in this study both with and also without disaster experience indicated, the practical methods, combined with other methods (including online learning) were more effective than online learning. The need for practical or lecture-based disaster preparation is difficult to justify when considering the previous research, as all methods of preparation lead to improvements in knowledge or attitudes, although costs or resources needed to conduct practical or lecture style preparation are greater compared with online learning (Amberson, Wells & Gossman 2020; Andreatta et al. 2010; Nyamathi et al. 2010; Thorne et al. 2004). Learning theories do provide some support for providing methods of preparation which the adult learners see and experience as most relevant (Burnard 1989; Galbraith & Simon-Galbraith 1984; Matics 2015; Milligan 1997; Zigmont, Kappus & Sudikoff 2011). A practical exercise where learners can practice and later reflect on their performance and learnings or the ability to ask questions or have a discussion in a lecture style presentation is more consistent with the learning theories that support adult learning. These methods are supported by andragogy, constructionist and experimental learning theories as adult learners need to see relevance in learning to real world situations and benefit most from the ability to practice and discuss (Burnard 1989; Galbraith & Simon-Galbraith 1984; Matics 2015; Milligan 1997; Zigmont, Kappus & Sudikoff 2011).

Adequate resources to provide patient care during disasters, includes having adequate drugs, food and equipment needed to treat patients, for a wide variety of disaster scenarios including chemical, biological or radiological attacks, pandemics, including preparing for a surge in patient population (Quotations 4.7.1, 4.7.2, Table 4.7, Quotations 4.6.7, 4.6.8, Table 4.6, Quotations 5.5.8, 5.5.7, 5.5.4, 5.5.3, 5.5.1, Table 5.5, Quotations 6.11.11 and 6.11.17, Table 6.11). It was identified in this research that whilst there was once a central state stockpile of ventilators and there is no longer a surplus of ventilators a surge in ICU beds be needed (Quotations 5.5.1 to

5.5.3, Table 5.5). The finding that inadequate quantity of supplies can limit the ability to treat patients during a disaster was also supported by previous research (Li et al. 2017; Yang et al. 2010). Nurses were unable to provide adequate care following an earthquake in a rural hospital due to inadequate equipment to treat the patient injuries (Yang et al. 2010). In another study, it was recommended that special reserves of equipment needs to be established including, pharmaceuticals, logistical equipment and materials to treat the injuries (Li et al. 2017). Further supporting the need for equipment and resource stockpiles, is research conducted during the COVID-19 pandemic (Ding et al. 2020; Wurmb et al. 2020). Hospital supplies of equipment, including ventilators and disposable equipment were seriously compromised with supply chains interrupted making it slower to replace stock (Ding et al. 2020; Wurmb et al. 2020). These research findings support this research in Cases 1, 2 and 3 that ensuring adequate access to equipment needs to form part of disaster preparedness, so it is available for health professionals and hospital support staff during disasters.

Adequate staff are also considered an important resource, including adequate clinical staff to deliver care, coordinate the overall care of patients and prioritise tasks clinicians should undertake (Quotations 4.6.7 and 4.6.8, Table 4.6, Quotation 6.5.5, Table 6.5 and Quotation 6.11.9, Table 6.11). These findings are supported by previous research as discussed in chapter two and in the research conducted during the current COVID-19 pandemic. Staff shortages limit both the ability to treat patients and to ensure the wellbeing of other staff (Ding et al. 2020; Nasrabadi et al. 2007; Willems et al. 2013; Wurmb et al. 2020).

Resources are also required for staff safety and wellbeing. There was focus within Cases 1, and 2 regarding the need to have equipment to treat and protect staff including vaccinations, antivirals, and PPE (Quotations 4.5.1 to 4.5.4, Table 4.5, Quotations 5.5.10, 5.5.11, 5.5.12, Table 5.5). There was also a focus in Case 3 on ensuring adequate staff resources to relieve meal breaks and take over at the end of the shift (Quotations 6.5.5, Table 6.5 and Quotations 6.11.9, Table 6.11). Adequate staff, also means adequate support staff. Security staff to keep the treating hospital staff safe, particularly in terrorism related disasters (Quotation 6.18.12, Table 6.18). Adequate resources are an important factor in keeping staff safe during disasters and also in promoting staff to attend work during disasters (Burke et al. 2011; King, Spritzer & Al-Azzeh 2019; Li et al. 2017; Melnikov, Itzhaki & Kagan 2014; Sangkala & Gerdtz 2018; Tebruegge et al. 2010). Studies which exemplifies the findings, identified that if participants had access to antiviral prophylaxis during a pandemic influenza, then the indicated attendance at work rate increased from 17.6% to 36.5% (Tebruegge et al. 2010). The COVID-19 pandemic has also limited

the availability staff (Nyashanu, Pfende & Ekpenyong 2020). The unavailability of PPE and the limited availability of test kits, directly resulted in staff shortages to nursing homes (Nyashanu, Pfende & Ekpenyong 2020).

This research has identified that hospital management need to resource disaster preparedness. There is a requirement to focus on ensuring enough medical equipment, medications, food and staff to treat patients and keep staff safe. There also needs to be appropriate education, support and protection for staff. Having adequate resources contributes to the three other key findings of this research outlined in this chapter.

7.4 Recommendations

As argued in the literature review discussion, it is critical to understand how best to prepare health professionals and support staff for disasters. Including a wider range of staff disciplines in disaster research will improve this understanding. To date most research related to disaster preparedness has been about understanding disaster preparedness from a nursing and medical perspective. It is a recommendation of this research that future research should investigate and understand the perspectives of more hospital disciplines that are required to practice during disasters. By researching professions and occupations other than nursing and medicine, disaster researchers and managers can best learn about the needs and contributions of these occupations. The research conducted for this thesis has included participants from a range of allied health and support staff disciplines. Design in further research could include strategies to gain an even wider range of participants or have studies designed to investigate particular professions or occupations and different specialties within professions. Disciplines targeted for future research could include hospital scientists, radiographers, cleaners, hospital managers and critical care, acute care and sub-acute specialties of nursing, medicine and allied health professions.

The second recommendation is that disaster preparation, including disaster planning needs to include a wide range of health professions and support staff who are needed to work in hospitals during usual operational periods. This research has analysed data which demonstrates the benefits of including a variety of disciplines within disaster preparedness. Disaster plans are important and need to be developed with allied health and hospital support staff and include their roles during disasters. The inclusion of allied health professionals and hospital support staff, alongside their nursing and medical colleagues cannot be accidental or based on convenience. To improve disaster preparedness for individual professions, occupations and the

collective hospital service, all disciplines need to be included disaster education, developing and exercising plans. As practical preparation was identified to be most beneficial by participants in this research, allied health professionals and hospital support staff involved in hospital operations need to be included in practical preparation exercises. The discussion has included evidence obtained in this research plus that cited within the research literature that indicates that practical forms of preparation are more resource intensive, than online Learning. The recommendation is that practical preparation needs to be used to prepare all health professionals and support staff for disasters as providing online learning alone will not adequately prepare staff for disasters.

Further research is required to understand what educational preparation is important in the different modalities, with particular consideration of online learning. Online learning is growing in prominence within the three Case hospitals and beyond including at universities and other places of education or training for health professionals and hospital support staff. During the current COVID-19 pandemic in NSW there was a significant rise in the use of online learning as public health responses to the pandemic required staff to physically distance and avoid face-to-face education. This research identified that online learning for disaster preparation is deeply unpopular amongst the majority of the participants included in this study. To benefit hospital preparedness, it is important that further research evaluating the benefits and weaknesses of online learning and other modalities be evaluated, as there appears to be mismatch in what hospital managers are providing and what health professionals and support staff find most useful to prepare for disasters.

Further research on how to promote health professionals and support staff to attend work is also a key recommendation. In this research the key finding was to have emergency plans, accurate information, and face-to-face exercises or lectures to promote health professionals and hospital support staff to attend work during disasters. Having appropriate preparation and emergency plans were also recommended by those that have participated in disasters in terms of improving actual disaster performance. In this study most participants considered that health professionals and hospital support staff should consider the personal risk above the need to provide healthcare in disasters they perceived as dangerous. This view was less prominent when participants believed staff had comprehensive knowledge of the specific disaster type, care required and knowledge the hospital was prepared for similar disasters. Further research into understanding how to encourage and motivate health professionals and support staff to attend work during disasters or all types is key.

The final recommendation is the need to develop a balance between investing adequate resources to be prepared for disasters versus not investing too much for disasters that may never affect the hospital. Financial and time pressures of staff working within hospitals makes it important to evaluate what resources are needed to prepare staff for various types of disasters. This research has identified the type of preparation and some staff protective and patient treatment resources which participants consider important. Some disaster subject matter and delivery techniques which should be included in disaster preparedness have also been collected. Further research to identify how comprehensive education and resources are should be, so that health professionals and support staff are adequately prepared for disasters, including having the knowledge, skills, motivation, and equipment to attend work and perform effectively during disasters.

7.5 Conclusion

This discussion has identified key findings from integrating information or argument from participants, the Cases 1, 2 and 3 and previous research. The study included three major metropolitan Sydney based teaching hospitals as Cases. One private hospital, two public hospitals. Two sites were located in Eastern Sydney with a higher density of hospitals and higher socioeconomic communities and one site was in western Sydney with lower socioeconomic communities and lower density of hospitals. These differences appeared to have been a factor in influencing some views and arguments of participants. No cases are atypical as defined by Stake (2006), so the findings from each case are considered and contribute to the key findings. There were a diverse range of participants from different healthcare disciplines, when compared to participants included in previous research published and included in the literature review. Ideally the range of participants should be even more diverse with future studies or even target specific professions or occupations that have not previously been studied in relation to disaster preparedness.

The key findings identified from this study are:

Allied health professionals and support staff have important roles during disasters, and these should be included in disaster plans. This assists with engagement, knowing the plan, what is expected from the health workers and teamwork. Disciplines that are included in disaster planning is more likely be able to deliver their own professional or occupational skills during disasters and also assist medical and nursing staff or the broader hospital and patient needs during disasters. Inclusion includes having representatives on committees and participating in

disaster exercises. Medical and nursing participants in exercises should not be used to make allied health or support staff decisions, because those occupations have not been included.

Many participants in this research argued that health professionals and hospital support staff should consider the risks and hazards involved in disasters over the need to provide care when deciding if health professionals and support staff should attend work. Key strategies about how to promote attendance were argued by participants. These included providing adequate information and equipment including PPE. If staff have comprehensive knowledge on the care required during care of patients and how to protect themselves during specific disaster types, they are more likely to attend work.

Blended learning methods including practical exercises and another form of preparation was most widely held by participants at all three Cases. This is also supported by the literature with many studies involving blended learning. High fidelity practical learning was preferred by those who reported experiencing it. Whilst online learning was widely reported in the research literature as effective, this was not considered effective by most participants at all three sites. It is recommended that online learning, if used, be used as a component of the overall preparation for disasters. Participants highly value the ability to practice and ask questions during preparation. Learning theories including andragogy, constructionist and experiential learning theories have recognised principles or assumptions that also support practical learning and the ability to have discussions and ask questions to make learning relevant for adult learners.

Adequate resources need to be invested into disaster preparedness, including for all staff, the use of appropriate educational methods and other resources to promote effective and safe performance during disasters. The benefits include the ability to include all types of health professionals and support staff in disaster preparedness, being able to utilise the staff members preferred methods of preparation, promoting staff knowledge and awareness of different disaster types and promoting staff to attend work during disasters.

Discussion was also outlined on the key recommendations for hospital disaster preparedness practice and also future research. The first two recommendations involved including allied health and hospital support staff firstly as participants in future research and secondly via full inclusion in disaster preparation and planning in hospitals. The next recommendation was to further examine how to promote health professionals and support staff to attend work during disasters. Whilst arguments were presented on having adequate training, equipment and information, most participants also indicated they would consider risks before attending work. Those with a comprehensive knowledge of a disaster type and when effective plans are in place,

were more likely to attend even if the disaster is dangerous. Further research is required to fully understand how to successfully encourage health professionals and hospital support staff to attend work. A recommendation was also made to further evaluate the usefulness of online learning. This recommendation was created as the overwhelming majority of participants did not value online learning, yet increasingly organisations including hospital managers are using this platform to prepare staff for disasters. Physical distancing has minimised the use of practical and other face-to-face methods of preparation during COVID-19. Further research and hospital practice needs to examine what resources need to be invested into preparing for disasters, given limited resources available to hospitals. Learnings from this research indicate that there is currently inadequate time and equipment dedicated for disaster preparedness for some staff at the Cases 1, 2 and 3.

This discussion chapter has identified the key findings of this case study research and also the key recommendations for hospital disaster planning and future disaster research. These have been considered in view of other published research findings. The next chapter is the conclusion to this thesis and will consider the findings, recommendations and limitations of the research.

Chapter 8 Conclusion

8.1 Introduction

This final chapter provides a synthesis of the key findings this research contributes to broader healthcare emergency or disaster management discipline. The implications of the findings of this research for researchers within the health care disaster or emergency management discipline are also discussed. A section on the limitations of this study and suggested areas of future work is included.

The research question related to how hospital managers can best support health professionals and support staff to prepare for disasters was addressed in this research. The focus on identifying the views of allied health professionals and support staff highlights the originality of this research.

- Section 8.2 Summary of Key Findings. This section outlines the four key research findings of this research.
- Section 8.3 Research Contribution. This section considers the research contribution of this research in relation to theoretical perspectives, methodological perspectives, and substantive perspectives.
- Section 8.4 Implications for practice. This section expands on the substantive level research contributions and articulates how this research can guide the practice of hospital managers, health professionals and support staff in relation to preparing for disasters.
- Section 8.5 Limitations. This section outlines the key limitations of this research.
- Section 8.6 Future research. This section considers the findings from this research, and the limitations to suggest areas of further research to be conducted.
- 8.7 Concluding reflections. This section reflects the findings of this research, the importance of health professionals and support staff in providing disaster care and how the findings may assist to enhance disaster preparation in hospitals.

8.2 Summary of Key Findings

Key themes were identified as part of the structural and descriptive coding as described by Belotto (2018) and the use of Stake's (2006) Cross case analysis tables to assist with the organisation and identification of the key themes. There were multiple findings described in the

Chapters 4, 5 and 6 describing the preferred duration and content of disaster preparation for the participants within the Cases and aspects of preparation which improved performance during actual disasters. Four key learnings were identified through analysis of the three Cases and were discussed in Chapter 7. In summary the four key learnings are:

- Allied health professionals and hospital support staff have important roles in the disaster response and these roles should be included in disaster plans and planning. The roles allied health professionals and support staff need to undertake were their usual roles professional or support functions essential for hospital functioning. Additional roles which used their professional or life knowledge or knowledge of the hospital which may fall outside their usual roles can improve the disaster response when included in hospital planning.
- Many health professionals and support staff consider the hazards or risks to their own safety or wellbeing prior to making the decision to attend work. In some disasters this included risks to family members. If a disaster was considered dangerous by participants, then the predominant view was that the health professional or support staff member should be free to choose to attend work or stay away even when rostered to attend work. Factors which promote attendance at work were familiarity with the care which needs to be delivered and an understanding that the hospital has plans, procedures and resources in place related to the safe management of the disaster.
- Blended methods of preparation are preferred, and these should most frequently include a practical component as the major form of preparation. Online learning was prominent in all three Cases as a method of learning. This method of learning was argued by most participants to be ineffective as the major component of preparation for disasters. Some participants suggested online learning is suitable as an adjunct to other forms of learning. Other forms of learning which should complement practical preparation include lecture or classroom-based learning, self-directed learning or reviewing booklets, manuals, policies, brochures or other printed materials.
- Adequate resources are required to facilitate the inclusion of multidisciplinary staff in the disaster preparation process, so that roles can effectively be included in disaster plans and planning. Adequate resources are also required so that the most effective methods of disaster preparation can be provided to health professionals and support staff. Resources are also essential to promote staff safety and to care for the community during disasters. These resources all influence the inclusion of staff in preparedness, the type of preparation provided and attendance at work during disasters.

8.3 Research Contributions

This section reviews the contributions which this research makes to understanding how health professionals and support staff may best prepare for disasters or emergencies. The focus is on health professionals and support staff in the hospital environment, although the literature review included paramedics and community-based health services. The contributions were considered from a theoretical, methodological and substantive level.

Theoretical Level

Much of the research conducted to date on the disaster preparedness of health care professionals has been quantitative studies involving a single group of participants and evaluating one or more different types of disaster preparation. Additionally, most of this research has focused on the evaluation of only two types of hospital-based health care professionals being nursing and medical professionals. This research has added to the theoretical knowledge of understanding how a wider range of hospital-based professionals and support staff believe is effective disaster preparedness, including attendance at work during disasters.

The research aimed to undertake a deep analysis of the thinking of health professionals and hospital support staff, to enhance understanding of preparation for inevitable disasters which may occur. Qualitative research methods of semi-structured one on one interviews with professionals and focus groups with up to ten support staff have been analysed through the view of constructionist ontology and epistemology. These methods were effective to gain an understanding of the participant's beliefs, what would be most effective, recognising that there was more than one truth and the collective themes identified may have only been relevant for those interviewed. Shared beliefs may also have significance for wider health professional and hospital support staff. Importantly these data and these key findings in particular, have added to the theoretical knowledge for the multidisciplinary health care team of how they can most effectively prepare for disasters.

Methodological level

Methodologically this research obtained qualitative data, following a literature review. It was decided that there was still a need for in-depth understanding of the knowledge surrounding what a diverse range of health care workers believe about disaster preparedness, including attendance at work. By using the three-site design and the case study methodology the research provided insights into key themes regarding health worker thinking, opinions and arguments on

disaster preparedness. The method also identified some of the case related factors that may have influenced beliefs or thinking. These data and finding presents health professionals, disaster managers and those involved in supporting health professionals and hospital support staff to prepare for disasters with additional important information to assist their work. Additionally, researchers can use this data to undertake further research.

Substantive level

On a substantive level this research provided valuable insights into several areas relating to how health professionals and support staff can effectively prepare for disasters. Importantly it included the range of the health workforce who should be participants in disaster preparedness and disaster preparedness research. The insights are outlined below.

Firstly, resulting from the literature review and confirmed through participant responses, is the importance to consider allied health professionals and support staff both when designing disaster research and preparedness. Allied health professionals and support staff perform important functions in hospitals, both during normal periods and as confirmed in this research during disasters. If they are not included as research participants then it will not be known how they can best prepare for disasters, what they contribute or if they will or are likely to attend work during disasters. The findings of this research demonstrate that allied health professionals and support staff have important roles in disasters and when they were included in disaster planning and plans, they were more engaged and hospital managers and staff knew what roles they could perform during disasters.

The research also support findings in previous studies that significant numbers of health professionals may not attend work during a disaster. Whilst most participants in Cases 1, 2 and 3 indicated that their colleagues should attend work during a disaster this was frequently contingent on risks. If it was considered dangerous for the health worker or if the health worker did not feel prepared, then it was considered that they should have the choice to not attend work. Some participants considered duty of care and patient needs. Key initiatives hospital managers could undertake to improve attendance at work identified, included providing accurate information, appropriate resources including equipment, policies and adequate types and numbers of staff.

A third substantive contribution from this research is that a blended method of learning is considered most effective including practical learning and in some instances lecture or other face-to-face sessions. These methods can be combined with other methods of preparation including online learning. The finding of this research is that online learning is not the most

effective method of disaster preparedness on its own. Online learning can be a useful adjunct to other forms of learning.

The research identified that a lack of resources allocated to preparedness could be influencing the type, content, and duration of disaster preparedness to be less than that which is ideal or preferred by staff. It was not uncommon for participants to include consideration of resources when advising on preferred length and method of disaster preparation. The research also found that adequate numbers and types of equipment and staff to keep staff safe at work during disasters and also to provide appropriate care to the community during disasters.

8.4 Implications for Practice

This research has provided data which can be used by health professionals, educators, disaster managers and others in the healthcare, disaster management or education sectors to assist prepare health professionals and support staff for disasters. As the focus was on what individual participants believe, rather than about organisations, the information would also assist individual professionals and support staff to reflect on how they feel that they can best prepare themselves for disasters or emergencies.

In Cases 1 and 2 in this research, allied health and support staff were less likely to be included in the disaster planning process. In contrast, Case 3, where allied health professionals were more likely to be included in disaster preparedness, this research provides recommendation for managers of hospitals or disaster managers, to include allied health professionals and support staff in disaster planning. Findings demonstrated that allied health participants in Case 3 had a greater understanding of their function in disasters and this was part of the hospital's disaster plan. Additionally, in all Cases allied health professionals and hospital support staff demonstrated they can undertake important roles during disasters that are essential for the hospital functioning or add value to disaster response. To enable the multidisciplinary team, including medical practitioners and registered nurses to provide care to the community during disasters, allied health professionals and hospital support staff must be included in disaster preparation and have defined roles in disaster plans. If allied health professionals and hospital support staff do not perform their roles, this gap in workforce participation will limit the ability for health care team as a whole, to diagnose, treat or care for patients. Disaster preparation and planning needs to be a multidisciplinary activity.

A significant implication for practice relates to attendance at work during disasters. This research has added more evidence that health workers may not attend work during disasters. Many

health professionals and support staff participants considered the perceived risks or hazards to themselves or family members, over considering duty of care to patients affected by the disasters. Understanding the care that needed to be provided and knowing the hospital had disaster specific plans in place for that disaster did appear to increase the prospect that staff would attend work. The implication for practice of this research finding is the need to implement evidence-based strategies which will encourage health professionals and support staff to attend work. One of the learnings with regard to attending work was that across Cases 1, 2 and 3, when health professionals and support staff understood their roles and knew the hospital had a plan, participants were more likely to indicate staff would attend work, even when the disaster may be dangerous. Including disaster preparation which addresses specific disaster needs is required so staff understand their roles during disasters. Participants gave practical advice on how to encourage health professionals and support staff to attend work. Appropriate resources including equipment to treat patients, adequate staff to deliver care, adequate security for safety and equipment or resources to promote health-worker safety. Some differences in planning needs were identified between the Cases. The need for assistance for the commute to work was identified as important in Cases 1 and 2 for support staff, although not highlighted in Case 3. These differences highlight the need to for local level disaster planning with all disciplines.

Within the three Cases and more broadly online learning is gaining prominence as the method to undertake education and training within hospitals and the educational institutions which prepare health professionals and hospital support staff. The research affirms that blended learning, including practical preparation along with face-to-face lectures or other modes of learning, including online learning should be resourced so that health professionals and support staff can effectively be prepared for disasters. Whilst previous research did not support this implication for practice as all methods of preparation were identified to be effective in improving disaster knowledge, andragogy, experiential and constructionist adult learning theories provided theoretical support for the findings. Hospital managers need to review the effectiveness of online disaster preparation if online learning is used as the major form of disaster preparedness for most staff.

The final implication for practice relates to the fourth key finding that adequate resources are essential for disaster preparedness. This finding has implications for the preparation of staff, staff safety and the treatment of patients and the community during disasters. It was acknowledged by participants advocating for practical and face-to-face methods of preparation

that these are also more resource intensive. Hospital managers need to consider the true costs and benefits related to the methods of disaster methods made available to hospital staff. The investment in effective methods of disaster preparation which are more resource intensive may result in greater overall benefits compared to providing methods, which are less resource intensive and effective. The current COVID-19 pandemic has contributed to a global shortage of resources. All data for this research were collected prior to COVID-19 and participants still identified that resources including adequate numbers and skill-mix of staff, adequate PPE, staff vaccinations or medicines and equipment and medications to treat patients were important. It is essential that hospital managers consider resources in disaster preparation. To promote the safety of staff and the community it is important that the hospital resources are adequate and ready if needed.

8.5 Limitations

There are limitations to this research in terms of both scope and bias. The study included three Cases based in the greater Sydney area. Whilst there are differences with these Cases, including funding model, location, and previous disaster exposure, additional or different hospitals could have been selected. Examples include rural hospitals, sub-acute hospitals and interstate or international centres of excellence. There may be a participant bias related to having the perspective on disaster preparedness influenced by working in major metropolitan or major Sydney based hospitals. It is unknown if participants in rural hospitals or hospitals in other cities in Australia or globally would have different perspectives.

A wide range of health professionals and support staff were invited and chose to be included in the study although there are some occupations or specialties who have not been represented. Of the support staff, most occupations were selected due to their patient focus. There are many non-patient focussed support staff including accountants, human resources professionals and security guards who would all likely have roles to play in disaster preparedness and response and they were not invited to participate. Similarly, not all health professionals or specialties were represented. Some professions including hospital scientists were invited, although, staff did not accept due to workload. Examples of other professions not included were occupational therapists, sonographers, enrolled nurses or dentists. The case study selection process may have also caused bias as managers or supervisors may have been more likely to invite participants or occupations, they thought were motivated, knowledgeable and will represent the department well in terms of disaster knowledge.

The diverse range of participant occupations included in this study also diluted capturing the collective beliefs of participants from individual professions. Whilst in each Case 10 health professionals and up to 10 support staff were included as participants, this design may not have given adequate profession specific information. If 10 social workers, 10 cleaners or 10 dietitians were included at each Case, rather than the mix of occupations, findings may have provided more relevant information about profession or occupation specific disasters planning needs.

8.6 Future Research

This research has raised questions for further research to be conducted. It will be important to undertake additional research, including allied health professionals and support staff as participants, to assist facilitating an understanding of how to engage allied health professionals and support staff. It would also be important to ensure that there are a range of specialities selected remembering that disaster preparedness is a whole of hospital process and not focused on critical or acute care.

It will also be important to include different types of health care facilities in the multidisciplinary research process. The selected Cases in this study were all major metropolitan teaching hospitals. It would be important to understand how less acute facilities, including remote hospitals and health services can effectively support the disaster preparedness needs of participants. All health facilities can be affected by disasters and need to respond.

Further research is also required to determine what disaster content should be included in disaster preparedness programs. Whilst not considered a key finding, universally all participants value the disaster command structures to be included into disaster preparation programs. There were mixed findings on other topic areas from competencies, human skills, clinical or technical knowledge. If profession, specialty or occupation specific content is required, then this will have implications for the content, duration and the resources needed to deliver disaster preparation. Similarly, if content needs to be specific to the type of disaster, to be most effective then this preparation will also influence the duration and resources required for disaster preparedness delivery.

Further investigation is also required to how to support health professionals and hospital support staff to attend work during disasters. Suggestions from participants in this research, included providing accurate information, training, and adequate resources. Further research to understand the thinking and choices health workers make regarding attending work when they are needed to deliver care could be undertaken.

Using a range of disaster preparation methods, it may be possible to conduct a randomised controlled trial to identify which is the preferred method for a selection of participants from diverse health facilities. This study has identified that blended approaches which include practical preparation are most desired. These findings could be further tested in a RCT. COVID-19 public health measures require physical distancing; therefore, education has been delivered via remote methods, including online learning and it will be important to measure the effectiveness of online disaster preparedness education in the post COVID-19 period.

One of the gaps in research conducted to date was that the effectiveness of preparation was not measured by evaluating how this impacted on the effectiveness of performance during actual disasters. Whilst this research attempted to answer this question, more investigation is needed. No key finding related to performance in actual disasters was identified in this research. Further research evaluating disaster preparation and related disaster performance may be able to take place following Australian recent disasters including the 2020 summer bushfires, COVID-19 pandemic or after future disasters.

8.7 Concluding Reflections

This research has contributed to the disaster preparedness knowledge for hospital managers, professionals, and support staff. Key learnings have been identified highlighting the need to include the multidisciplinary team in disaster planning, including practical preparation combined with other forms of preparation and to have strategies to increase participation in disasters. Additionally, for disaster planning to be effective, adequate physical and human resources need to be dedicated to preparedness including to implement the learnings listed above.

Other learnings and recommendations for future research have also been identified, including gaining a greater understanding of content which should be included in disaster preparedness and also how performance during disasters can be measured as a way of evaluating the preparedness. There are still many areas of research to be explored to improve the evidence base and have health professionals and hospital support staff prepared for the many types of disasters.

In order to deliver care during internal and external disasters, it is essential that health professionals and support staff are prepared and attend work during disasters. This research has contributed substantial direction as to how to make this happen.

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It is the following published article: Gowing, J., Walker, K., Elmer, S., Cummings, E., 2017. Disaster preparedness among health professionals and support staff: what is effective? An integrative literature review, *Prehospital and disaster medicine*, 32(3), 321-328. doi:10.1017/S1049023X1700019X

Appendix B Participant Information Sheet Health professional information sheet and Support Staff.



Disaster preparedness among health professionals and support staff. What are the most effective methods of disaster preparation?

Health Professionals Information Sheet

Invitation

This study will involve interviews with health professionals to gain a better understanding of the preparation techniques and the knowledge required to best prepare for disasters in the hospital environment. Disasters could include both external disasters where many people require treatment in hospitals (e.g., caused by terrorism, train crashes or other accidents, pandemics (disease outbreaks) and internal incidents such as hospital fires, computer failure, medical gas failure, power failures etc.

What is the purpose of this study?

The knowledge identified in this study will help to inform better disaster planning for health professionals and support staff at hospitals or educational institutions which prepare health professionals or support staff (e.g., TAFE or Universities).

Why have I been invited to participate?

You have been sent an invitation by a manager or director at your hospital as they thought you may have the knowledge or experience to contribute to the study. It is important to note that your decision to participate or not will have no impact on your employment or your relationship with your manager or hospital management. We have only contacted you through your manager's invitation as we believe they may know who at the hospital has appropriate disaster preparation or experience to contribute to the study. We are keen to learn from staff or VMOs who have experience in preparing for, participating during or managing disasters. Most research conducted to date has evaluated doctors and nurses so if you are an allied health professional, we are particularly keen to learn from you. We also want to meet with doctors and nurses given their central roles in disasters.

What will I be asked to do?

You will be interviewed by the student researcher. Questions will inquire into your previous experience or education which could help you prepare for disasters (specific and general), how prepared you feel for different types of disasters, what preparation do you feel is important, if health professionals should participate during disasters and why you have these views. We will be trying to develop new knowledge from your answers, so it is important we fully understand you. We would also like to know if health professionals and support staff would hypothetically

respond to certain disaster situations. The interviews should last 1 hour, will be held at your hospital and will be audio recorded.

Are there any possible benefits from participation in this study?

Whilst there will be no reimbursement for the study, the interview will be held in your work time or shortly before or afterwards if you prefer. While there may not be any direct benefit to you, the finding from the study will inform future disaster preparation for staff.

Are there any possible risks from participation in this study?

There are no foreseeable risks from participation in this study beyond discomfort. It is acknowledged that there could be discomfort that results from discussing actual or hypothetical disaster experiences.

You do not need to answer any questions if they are uncomfortable for you, and you can end the interview at any time. The student researcher will also check throughout the interview that you are ok. The researchers encourage you to access your employee assistance program for free and confidential counselling if required. Alternatively, you could visit your general practitioner.

Confidentiality can be assured in interviews. The information in any research finding or publication will not be attributable to individuals. Again, you will not need to answer questions you are not comfortable answering.

What if I change my mind during or after the study?

Participants are free to withdraw from the study at any time. Data from interviews can be removed from the study up until it is incorporated in the student researcher's thesis papers or publications (approximately 1 month after interviews).

What will happen to the information when this study is over?

The information will be stored for 5 years post publication in a locked cabinet at the University of Tasmania Sydney campus and on a password protected secure UTAS server. Following 5 years hard copies will be shredded and soft copies will be written over with the assistance of the UTAS information technology department.

How will the results of the study be published?

The results will be published in the student investigator's Doctor of Health theses. In addition to this, result will be presented at conferences, published in peer reviewed journals and presented at appropriate meetings or publications. Participants will not be identifiable in any form of the dissemination of the results. The unpublished and/or published version of the research will be loaded to the Student Researcher's (Jeremy Gowing) Research Gate account for any interested participant to review.

To express interest in participating in the study:

Please contact (email or telephone) Jeremy Gowing, Student Investigator.

Email: Jeremy.gowing@utas.edu.au Phone:

What if I have questions about this study?

If you have any further questions about the study, please contact:

Mr. Jeremy Gowing, RN, MN, Nursing Unit Manager – Doctor of Health Candidate / Student investigator

Professor Kim Walker, RN, PhD, Professor of Health Care Improvement UTAS / Chief Investigator

Dr Shandell Elmer, RN, PhD, Senior Lecturer, UTAS / co-investigator

Associate Professor Elizabeth Cummings, RN, PhD, Associate Professor & Graduate Research Coordinator UTAS / co-investigator

“This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on +61 3 6226 6254 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. Please Quotation ethics reference number H0015774.

This information sheet is for you to keep. To be involved as a participant in the survey you will need to sign a written consent form and provide this to the student investigator.

If you would like to participate in this study – Please contact Jeremy Gowing, Student investigator.

Email: Jeremy.gowing@utas.edu.au or phone:



Disaster preparedness among health professionals and support staff. What are the most effective methods of disaster preparation?

Support Staff Information Sheet

Invitation

This study will involve focus groups with hospital support staff to gain a better understanding of the preparation techniques and the knowledge required to best prepare for disasters in the hospital environment. Disasters could include both external disasters where many people require treatment in hospitals (e.g., caused by terrorism, train crashes or other accidents, pandemics (disease outbreaks) and internal incidents such as hospital fires, computer failure, medical gas failure, power failures etc.

What is the purpose of this study?

The knowledge identified in this study will help to inform better disaster planning for support staff at hospitals or educational institutions which prepare support staff (e.g., TAFE colleges or Universities).

Why have I been invited to participate?

You have been sent an invitation by a manager or director at your hospital as they thought you may have the knowledge or experience to contribute to the study. It is important to note that your decision to participate or not will have no impact on your employment or your relationship with your manager or hospital management. We have only contacted you through your manager's invitation as we believe they may know who at the hospital as appropriate disaster preparation or experience to contribute to the study. We are keen to learn from staff that have experience in preparing for or participating during disasters. The researcher aims to conduct focus groups with support staff that have disaster experience. Most research conducted to date has evaluated doctors and nurses so we are particularly keen to meet with support staff members so we can learn from you.

What will I be asked to do?

For hospital support staff (e.g., chaplains, clerical staff, cleaners, nursing assistants, orderlies, food preparation staff) we will be conducting meetings with up to 10 staff present and ask you to express your views on several questions or ideas. Questions will inquire into your previous experience or training which could help you prepare for disasters (specific and general), how prepared you feel for different types of disasters, what preparation do you feel is important, if staff should hypothetically attend work during disasters and why you have these views. We will be trying to develop new knowledge from your answers, so it is important we fully understand you. We would also like to know if support staff would hypothetically respond to certain disaster situations. The focus group should last 1 hour, will be held at your hospital and will be audio recorded. All staff will be advised that the group is confidential, and discussion should not extend beyond the group to others.

Are there any possible benefits from participation in this study?

Whilst there will be no reimbursement for the study, the focus group will be held in your work time. While there may not be any direct benefit to you, the finding from the study will inform future disaster preparation for staff.

Are there any possible risks from participation in this study?

There are no foreseeable risks from participation in this study beyond discomfort. It is acknowledged that there could be discomfort that results from discussing actual or hypothetical disaster experiences.

You do not need to answer any questions if they are uncomfortable for you, and you can end the interview at any time. The student researcher will also check throughout the interview that you are ok. The researchers encourage you to access your employee assistance program for free and confidential counselling if required. Alternatively, you could visit your general practitioner.

The information in any research finding or publication will not be attributable to individuals. Again, you will not need to answer questions you are not comfortable answering. Focus groups participants will be advised that the information discussed should remain confidential (not spoken about after the meeting). The researchers can guarantee this confidentiality for themselves, but not for the other participants.

What if I change my mind during or after the study?

Participants are free to withdraw from the study at any time. Focus group data cannot be removed following the focus group however as it is collected anonymously.

What will happen to the information when this study is over?

The information will be stored for 5 years post publication in a locked cabinet at the university of Tasmania campus and on a password protected secure UTAS server. Following 5 years hard copies will be shredded and soft copies will be written over with the assistance of the UTAS information technology department.

How will the results of the study be published?

The results will be published in the student investigator's Doctor of Health theses. In addition to , results will be presented at conferences, published in peer reviewed journals and presented at appropriate meetings or publications. Participants will not be identifiable in any form of the dissemination of the results. The unpublished and/or published version of the research will be loaded to the Student Researcher's (Jeremy Gowing) Research Gate account for any interested participant to review.

To express interest in participating in the study:

Please contact (email or telephone) Jeremy Gowing, Student Investigator.

Email: Jeremy.gowing@utas.edu.au Phone:

What if I have questions about this study?

If you have any further questions about the study, please contact:

Mr. Jeremy Gowing, RN, MN, Nursing Unit Manager – Doctor of Health Candidate / Student investigator on

Professor Kim Walker, RN, PhD, Professor of Health Care Improvement UTAS / Chief Investigator on

Dr Shandell Elmer, RN, PhD, Senior Lecturer, UTAS / co-investigator on

Associate Professor Elizabeth Cummings, RN, PhD, Associate Professor & Graduate Research Coordinator UTAS / co-investigator

“This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on +61 3 6226 6254 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. Please Quotation ethics reference number H0015774.

This information sheet is for you to keep. To be involved as a participant in the survey you will need to sign a written consent form and provide this to the student investigator.

If you would like to participate in this study – Please contact Jeremy Gowing, Student investigator.

Email: Jeremy.gowing@utas.edu.au Phone:

Appendix C Participant Consent Form Health Professionals and Hospital Support Staff



Disaster preparedness among health professionals and support staff. What are the most effective methods of disaster preparation?

This consent form is for participants in the semi-structured interviews.

I agree to take part in the research study named above.

I have read and understood the Information Sheet for this study.

The nature and possible effects of the study have been explained to me.

I understand that the study involves participating in an **interview** with the student investigator, Mr Jeremy Gowing, Nursing Unit Manager and Doctor of Health Candidate University of Tasmania. The interviews will take approximately 1 hour. These will be audio recorded.

I understand that there are no foreseeable risks from participation in this study beyond discomfort; however, it is acknowledged that discussing disaster preparedness or previous disaster experience may cause discomfort. I understand that I can choose not to answer any questions or end my participation in the interview if I am not comfortable answering questions. The student researcher will also monitor the wellbeing of the participant and end the interview as needed.

I understand that all research data will be securely stored on the University of Tasmania premises for five years from the publication of the study results and will then be destroyed.

Any questions that I have asked to have been answered to my satisfaction.

I understand that the researcher(s) will maintain confidentiality and that any information I supply to the researcher(s) will be used only for the purposes of the research.

I understand that the results of the study will be published in a way so that I cannot be identified as a participant.

I understand that my participation is voluntary and that I may withdraw at any time without any effect.

If I so wish, I may request that any data I have supplied be withdrawn from the research.

Participant's name: _____

Participant's signature: _____

Date: _____

Statement by Investigator

☐ I have explained the project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐ The participant has received the Information Sheet where my details have been provided so participants have had the opportunity to contact me prior to consenting to participate in this project.

Investigator's name: _____

Investigator's signature: _____

Date: _____



Disaster preparedness among health professionals and support staff. What are the most effective methods of disaster preparation?

This consent form is for participants in the focus groups.

I agree to take part in the research study named above.

I have read and understood the Information Sheet for this study.

The nature and possible effects of the study have been explained to me.

I understand that the study involves participating in a focus group with the student investigator, Mr Jeremy Gowing, Nursing Unit Manager and Doctor of Health Candidate University of Tasmania. The focus group will take approximately 1 hour. This will be audio recorded.

I understand that there are no foreseeable risks from participation in this study beyond discomfort; however, it is acknowledged that discussing disaster preparedness or previous disaster experience may cause discomfort. I understand that I can choose not to answer any questions or end my participation in the focus group if I am not comfortable answering questions. The student researcher will also monitor the wellbeing of the participants and offer participants the choice to leave the focus group if needed.

I understand that all research data will be securely stored on the University of Tasmania premises for five years from the publication of the study results and will then be destroyed.

Any questions that I have asked to have been answered to my satisfaction.

I understand that the researcher(s) will maintain confidentiality and that any information I supply to the researcher(s) will be used only for the purposes of the research. In focus groups all members will be advised that the information discussed is confidential, however the researcher cannot guarantee that other participants will not breach confidentiality.

I understand that the results of the study will be published in a way so that I cannot be identified as a participant.

I understand that my participation is voluntary and that I may withdraw at any time without any effect.

I understand that I will not be able to withdraw my data after completing the focus group as it may not be possible to separate individual data from the discussions.

Participant's name: _____

Participant's signature: _____

Date: _____

Statement by Investigator

☐

I have explained the project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation.

If the Investigator has not had an opportunity to talk to participants prior to them participating, the following must be ticked.

☐

The participant has received the Information Sheet where my details have been provided so participants have had the opportunity to contact me prior to consenting to participate in this project.

Investigator's name: _____

Investigator's signature: _____

Date: _____

Appendix D Semi-structured interview and focus group questions including demographic questions.

Disaster preparedness among health professionals and support staff. What are the most effective methods of disaster preparation?

Interview & focus group indicative guide

Guide only – questions may change as interviews / focus groups progress

- Guide developed following review of previous research conducted, in consultation with UTAS supervisors and disaster managers.
- The student researcher (who is also an experienced registered nurse) will check that participants are ok during interviews / focus groups and make it clear that they do not need to answer any questions which make them uncomfortable. The interviewer will be sensitive to participants and Interviews will be stopped before participants anything more than discomfort (which is not expected). Also, participants can stop their participation in interviews or focus groups at any time (as per information sheet instructions).

Demographic questions (obtained prior to focus groups & in interviews)

Profession / occupation

Length of experience in health care:

Specialties as applicable:

Disaster experience:

Disaster specific training / qualifications:

Other qualifications:

Qualitative / semi-structured interview / focus group questions.

Introductory questions

Can you please advise me what you understand disaster preparation to be?

Can you please advise what disaster training or preparation you have had?

I will outline some different disasters. What knowledge or skills do you think you would need to effectively work in these disaster situations?

Power failure at your hospital?

Fire in a large ward at your hospital?

Terrorist attack in nearby business district – 100 patients to be admitted to your facility.

A pandemic outbreak of Ebola virus affecting your city. Your hospital is the designated receiving centre.

Chemical weapons (mustard gas) attack of spectators at the Rugby league grand final 40 thousand spectators and players may be affected.

A tsunami in a heavily populated area?

Methods of preparation

Can you explain what your preferred method or methods of disaster preparation could be?

What appeals to you about each method?

What is your decision based on?

Content of preparation

What clinical or technical skills do you feel it is important to have during disasters?

Are these skills different in any way than the skills you normally have to perform your work?

Do you believe disaster competencies are important?

Can you tell me if there are other skills you feel you may need?

Do you feel you need to understand anything about the structure of how disasters are managed? (E.g., who is in charge at your hospital or agencies that work with your hospital?)

Are there other things that you feel are important to know about or to have the skills to do during disasters?

Duration & frequency

In the disaster literature I reviewed training programs can be university degrees, subjects, one-week courses or short 15-minute sessions. All seemed to demonstrate improved outcomes for participants. What Length and frequency of training would you like and why?

Needs of specialties/ disciplines

The speciality or discipline a person works within may have influences on their optimal disaster preparation. Can you please advise me of your specialty or discipline and advise what impact that may have on your preparation requirements?

Type of Disaster

Can you advise me if you believe disaster preparation should be general to cover all disasters or specific to the type of disaster? Why?

Have you been required to attend to a disaster?

Did this experience leave you with any thoughts on what preparation would assist you, your colleagues or other health professionals or support staff?

Hypothetical likelihood health professionals or support staff could attend work

The literature reports that many health professionals and support staff may not be willing or able to attend work during disasters. Professional codes and community expectations however may advocate health professionals or hospital staff have a responsibility to attend work.

I have a scenario for you to discuss:

1/ There has been a mass casualty incident in a central business district. There are many patients that have been affected by a bomb blast of the Train line. A family member or friend urges a hospital staff member not to go to work due to danger. Can you advise if you believe the hospital staff member should go to work?

Why?

What were you thinking about?

2/ There is an Ebola virus outbreak at a hospital. There are many patients and staff that have been affected by Ebola. Can you please advise if you believe health professionals or support staff should report to work?

A staff member that normally works on the designated Ebola virus ward is off sick and there is a shortage of staff / VMOs to care for the Ebola virus infected patients. A director or manager asks a staff member / VMO from a different ward / specialty to work in the Ebola virus ward (outside their specialty area) as their specialty area is not needed due to the Ebola virus outbreak.

What should they do & why?

What factors could be put in place by the staff member / VMO or the hospital to encourage staff / VMOs to attend work during these disasters? How would this help? Why?

3 / Can you advise me how this if health professionals or support staff should attend work if there was pandemic influenza?

What should they do & why?

What factors could be put in place by the staff member / VMO or the hospital to encourage staff / VMOs to attend work during these disasters? How would this help? Why?

4/ There is a regional power fail affecting a major hospital and the city generally. The generators at the hospital have failed. Can you please advise what health workers not on duty or already at work should do?

Thank you for your time. Is there anything you would like to add regarding your recommendations for the best form of disaster preparation?