“Not another Katrina.” Interpersonal Communication at Interagency Interfaces when Responding to the Needs of Vulnerable People during the Christchurch Earthquakes of 2010 and 2011

Degree of Master of Health Science

University of Canterbury

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2018

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Foreword

The motivation to undertake this thesis came from personal experiences as a clinician on duty the night of February 22nd, 2011, when one of the deadliest and most cost intensive natural disasters to ever hit New Zealand occurred.

As the full extent of the earthquake damage started to emerge and the loss of life and numbers of seriously injured being brought into the emergency department steadily rose, it was deemed necessary to free up all possible capacity at the acute tertiary level hospital. This resulted in a number of frail unwell older people being transferred across town to an older persons' health hospital.

I was one of the team standing waiting to receive these patients on a cold jet-black night, with power out across the city and critical infrastructure damaged. As I watched a large furniture truck backing up to the hospital, it was hard to comprehend the fact that there were no ambulances available and that truck drivers across the city had volunteered their vehicles to assist with the transfer of the somewhat more stable patients to other hospitals so that there were hospital beds for the many wounded and dying arriving at the emergency department. In this darkness, beams of torch light gleamed out of the side curtains of the truck, and the realisation hit home that these were head lamps that the nurses in the back of the truck were wearing to provide light while they moved around caring and supporting the elderly patients during the trip across the city. In order to get the patients off the truck, a makeshift bridge using milk crates and two large pieces of plywood was formed and patients were transferred across and into the shelter and care of the hospital staff at this site. The care and compassion shown that night will stay with me forever, as will the stories told of how elderly and vulnerable were prioritised during this traumatic event.

On that same night, when the full scale of the event was realised, a highly respected senior nurse leader uttered a phrase to the Chief Executive Officer that became almost like a rallying cry to clinicians and members of the Emergency Operation Centre. She stated "this will not be another Hurricane Katrina! We must and will respond to the elderly and vulnerable." The Chief Executive Officer agreed, and he echoed this phrase when persuading senior national officials to help evacuate vulnerable residents. This message became like a litmus test throughout the disaster response, when determining what action would be taken for the vulnerable people of Canterbury.

So, to ensure the learnings about the communication, the prioritisation, the problem-solving and the management of the needs of vulnerable people by those staff working at the interagency interfaces during a natural disaster were not lost, I undertook the study on which this thesis reports.

Acknowledgements

Eight years ago, a significant earthquake changed life's trajectory for the people of Canterbury. This thesis is in recognition of that day, of the bravery of so many responding to those who were the most vulnerable. It is written in dedication to the vulnerable people of Christchurch, those in care within the community, those who endured much including evacuation and who, in most cases, returned back to Christchurch. This thesis is dedicated to the memory of the few who did not make it back. To the amazing teams who aided, sustained and cared for the vulnerable until help arrived, the true unsung heroes along with those for whom you bravely cared for. A special mention must be given to Dr Kathy Peri, our powerhouse of a nursing leader who led the charge with such clear focus on ensuring the vulnerable were prioritised. And to the research participants, your valuable insights have contributed so much to new knowledge gained in this research. To the senior executives at Canterbury District Health Board, thank you for your leadership and strong interest in this thesis. A very special thanks to Mary Gordon who also supported me through this process and was such an inspiration for the role she played during those days. We are all in awe of you. Thank you for all of your support.

To my primary supervisor, Professor Colleen Mills, Management, Marketing and Entrepreneurship Department, University of Canterbury, thank you for your guidance and sustained interest in this research endeavour through this long journey. And to Professor Philip Schluter, School of Health Sciences, University of Canterbury, your professionalism and expert processes played a special part in achieving this. A very special thanks to the Hope Foundation for the scholarship that contributed to enabling me to undertake this research.

To colleagues who are such a part of this journey. My team for their understanding and encouragement while I undertook this endeavour. To Sarah Berger, Medical Faculty Heidelberg, my long-time friend and nursing colleague, who offered such valuable comments at critical stages to spur me on, and who generously proof-read this thesis. To my thesis buddy, Gail Houston, thank you for travelling with me and continually checking in with me. And to Alieke who provided the final grammar and punctuation review. I want to also pay tribute to the wonderful Anne Bray, Associate Research Professor who, before her untimely death, encouraged me to undertake the Master of Health Science.

To my dear family who have been amazing. My Mother, who has followed this journey and believes in her children and celebrates their achievements. To Lucy, Sam, Adrian and wee Bella, the light of my world, you have kept me so sane and encouraged me over these years. Finally, to my dear husband Martin, I could not have done this without you. All the laughter, the meals, the hot drinks, and love has pulled me through, you mean the world to me. Thank you all sincerely for being part of this journey.

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Abbreviations

ARC	Aged and Residential Care
CDEM	Civil Defence and Emergency Management
CDHB	Canterbury District Health Board
CERT	Community Emergency Response Team
CIMS	Coordinated Incident Management System
CIT	Critical Incident Technique
DHB	District Health Board
EOC	Emergency Operations Centre
H1N1	An influenza virus commonly known as “swine flu”
HLO	Health Liaison Officer
IERT	Interagency Emergency Response Team
interRAI	International Resident Assessment Instrument - a suite of clinical assessment tools
MCDEM	Ministry of Civil Defence and Emergency Management
MOH	Ministry of Health
MTS	Multi-Team Systems
Mw	Moment magnitude – a measurement that describes the size of an earthquake
NGO	Non-Governmental Organisations
NHEP	National Health Emergency Plan
NVivo	A qualitative data analysis computer software package
NZDF	New Zealand Defence Force
OVID	A set of databases provided by Ovid Technologies
P&F	Planning & Funding – a division of the Canterbury District Health Board
UNISDR	United Nations Office for Disaster Risk Reduction
VPT IERT	An Interagency Emergency Response Team focussed on vulnerable people
VPT	Vulnerable Persons Team

Abstract

Background: We are in a period of history where natural disasters are increasing in both frequency and severity. They are having widespread impacts on communities, especially on vulnerable communities, those most affected who have the least ability to prepare or respond to a disaster. The ability to assemble and effectively manage Interagency Emergency Response Teams (IERTs) is critical to navigating the complexity and chaos found immediately following disasters. These teams play a crucial role in the multi-sectoral, multi-agency, multi-disciplinary, and inter-organisational response and are vital to ensuring the safety and well-being of vulnerable populations such as the young, aged, and socially and medically disadvantaged in disasters.

Communication is key to the smooth operation of these teams. Most studies of the communication in IERTs during a disaster have been focussed at a macro-level of examining larger scale patterns and trends within organisations. Rarely found are micro-level analyses of interpersonal communication at the critical interfaces between collaborating agencies. This study set out to understand the experiences of those working at the interagency interfaces in an IERT set up by the Canterbury District Health Board to respond to the needs of the vulnerable people in the aftermath of the destructive earthquakes that hit Canterbury, New Zealand, in 2010-11. The aim of the study was to gain insights about the complexities of interpersonal communication (micro-level) involved in interagency response coordination and to generate an improved understanding into what stabilises the interagency communication interfaces between those agencies responding to a major disaster.

Methods: A qualitative case study research design was employed to investigate how interagency communication interfaces were stabilised at the micro-level ("the case") in the aftermath of the destructive earthquakes that hit Canterbury in 2010-11 ("the context"). Participant recruitment was undertaken by mapping which agencies were involved within the IERT and approaching representatives from each of these agencies. Data was collected via individual interviews using a semi-structured interview guide and was based on the "Critical Incident Technique". Subsequently, data was transcribed verbatim and subjected to inductive analysis. This was underpinned theoretically by Weick's "Interpretive Approach" and supported by Nvivo qualitative data analysis software.

Results: 19 participants were interviewed in this study. Out of the inductive analysis emerged two primary themes, each with several sub-factors. The first major theme was *destabilising/disruptive factors of interagency communication* with five sub-factors, a) conflicting role mandates, b) rigid command structures, c) disruption of established communication structures, d) lack of shared language and understanding, and e) situational awareness disruption. The second major theme *stabilising/steadying factors in interagency communication* had four sub-factors, a) the establishment

of the IERT, b) emergent novel communication strategies, c) establishment of a liaison role and d) pre-existing networks and relationships. Finally, there was a third sub-level identified during inductive analysis, where sub-factors from both primary themes were noted to be uniquely interconnected by emergent "consequences" arising out of the disaster context. Finally, findings were synthesised into a conceptual "Model of Interagency Communication at the Micro-level" based on this case study of the Canterbury earthquake disaster response.

Discussion: The three key dimensions of The People, The Connections and The Improvisations served as a framework for the discussion of what stabilises interagency communication interfaces in a major disaster. The People were key to stabilising the interagency interfaces through functioning as a flexible conduit, guiding and navigating communication at the interagency interfaces and improving situational awareness. The Connections provided the collective competence, shared decision-making and prior established relationships that stabilised the micro-level communication at interagency interfaces. And finally, The Improvisations i.e., novel ideas and inventiveness that emerge out of rapidly changing post-disaster environments, also contributed to stabilisation of micro-level communication flows across interagency interfaces in the disaster response. "Command and control" hierarchical structures do provide clear processes and structures for teams working in disasters to follow. However, improvisations and novel solutions are also needed and often emerge from first responders (who are best placed to assess the evolving needs in a disaster where there is a high degree of uncertainty).

Conclusion: This study highlights the value of incorporating an interface perspective into any study that seeks to understand the processes of IERTs during disaster responses. It also strengthens the requirement for disaster management frameworks to formally plan for and to allow for the adaptive responsiveness of local teams on the ground, and legitimise and recognise the improvisations of those in the role of emergent boundary spanners in a disaster response. This needs to be in addition to existing formal disaster response mechanisms. This study provides a new conceptual model that can be used to guide future case studies exploring stability at the interfaces of other IERTs and highlights the centrality of communication in the experiences of members of teams in the aftermath of a disaster. Utilising these new perspectives on stabilising communication at the interagency interfaces in disaster responses will have practical implications in the future to better serve the needs of vulnerable people who are at greatest risk of adverse outcomes in a disaster.

Key words: disaster response, interagency emergency response team (IERT), interagency interface, interagency communication, sensemaking, critical incident technique, interpretive approach, stabilising factor

1 Introduction

Effective and timely health response during a natural disaster is imperative to best serve the needs of the community, especially their vulnerable people (Danna, Jones, Bernard, & Mathews, 2009; Prizzia & Helfand, 2001; Slepski, 2007). With the number of international disasters increasing over the past few decades, disaster planning and preparedness for protecting vulnerable communities has become an increasing concern for many nations (Bennett, 2009, 2010; Bethel, Foreman, & Burke, 2011; Goldstraw et al., 2012).

One such disaster, an earthquake measuring 7.1 Mw[1] hit the Canterbury region on September 4, 2010, where a number of Aged and Residential Care (ARC) facilities sustained significant damage (Goldstraw et al., 2012). The Canterbury District Health Board (CDHB), which funds nearly all health and disability services for the region, set up an Interagency Emergency Response Team (IERT) to address the needs of vulnerable people with significant health and disability needs who were unable to access support due to the effects of the earthquake. This team became known as the Vulnerable Persons Team (VPT) and was comprised of a number of clinicians within the CDHB who liaised with their own community teams, Civil Defence's welfare arm within their emergency response centre, as well as the ARC facilities.

On February 22, 2011, five months after the first event, the region was again hit by a devastatingly shallow earthquake centred near downtown Christchurch which resulted in hundreds injured, loss of life and severe damage to infrastructure. Many more ARC facilities were badly damaged and several were destroyed, with over 500 elderly and disabled people displaced (Goldstraw et al., 2012). The emergency response team for vulnerable people was established on a much larger scale than for the 2010 event and involved numerous other agencies because of the size and scale of the disaster. This team continued to work together for nearly ten months after its formation and consisted of over seven agencies working with the ARC sector and the community where vulnerable people were identified.

The responsibilities of the IERT for vulnerable people (VPT IERT) response did not lie simply with the CDHB. Rather, the response to the emergency required key members of the VPT IERT to engage with representatives from a range of other agencies that had to collaborate in order to meet the needs of the vulnerable people. Communication had to occur across a web of interagency interfaces. Thus, the integrity and stability of these interfaces was central to achieving a satisfactory outcome for the vulnerable people the CDHB was seeking to serve.

[1] Mw = "moment magnitude" is a scale to measure the force and total energy of an earthquake including both the size and friction of the event https://en.wikipedia.org/wiki/Seismic_magnitude_scales#Mw

1.1 The Purpose of the Study

The purpose of this study was to gain insights about the complexities of stabilising interagency interfaces from those working in an IERT and engaged in communications when responding to vulnerable people and their needs in the aftermath of destructive earthquakes that hit Canterbury in 2010-11.

1.2 The Research Question

Most of the studies associated with interagency communication, or on multi-system teams in disasters, are focused at the macro-level of each organisation. The few studies that did address micro-level communication processes did not address the management of disaster response. Little is known about what sorts of interpersonal communication practices stabilise team processes and help agencies to ensure their staff members contribute constructively at interagency interfaces in a disaster response. This study sought to address this paucity of knowledge with the following research question:

"What can we learn about stabilising interagency interfaces from those that were engaged in the communication that occurred between the agencies responding to the vulnerable people during the Christchurch earthquakes?"

The intention was that insights gained from this study could contribute to increased understanding and more effective management of interagency interfaces in emergency and disaster communications at the micro-level.

1.3 Definitions

During a natural disaster such as an earthquake, flood, tsunami or landslide all members of the community can be vulnerable, exposed as they are to some level of risk to their personal wellbeing, possessions, property, and livelihoods. The term "vulnerable", however, is often used to denote specific populations within the community. The World Health Organization's definition (World Health Organization, 2002), which is a popular benchmark, states vulnerability is "*the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters*" (p.13). This means the young, aged, physically and mentally unwell and socio-economically disadvantaged are most commonly referred to as vulnerable populations. For the purposes of this study, the term vulnerable people was defined using the VPT's definition used during the earthquake response as "*those people with significant health and disability needs that are unable to access support through the usual channels, or whose needs are much greater than can be provided for through other support/help agencies. This includes liaisons with any residential care providers – aged, intellectual disabled and children*"(Canterbury District Health Board, 2011, p.3).

The term "interagency emergency response team" (IERT) is a rubric covering a range of terms used in the literature to refer to disaster and emergencies teams involved in multi-sectoral response, multi-agency coordination, multi-discipline response, and inter-organisational response (Hickmott and Mills, 2015). Lloyd et al. (2001, as cited in Warmington et al., 2004) describe these "interagency" teams as "*more than one agency working together in a planned and formal way*" at either a *"strategic or operational level"* (p.6).

Where two or more teams, consisting of multiple organisations, work together on a collective goal (Mathieu, Marks, & Zaccaro, 2001; Shuffler, Rico, & Salas, 2014), the term multi-team systems (MTS) is often used. IERTs typically have members from a wide range of governmental and non-governmental organisations (NGOs) including local, regional, and national agencies and are formed in anticipation or response to disasters. In this thesis, the term IERT is used to ensure the breadth of the multi-agency teams emergency response teams is captured.

Within the New Zealand context, a Coordinated Incident Management System (CIMS) is enacted in an emergency response and is defined as "*a proactive incident management framework that systematically manages incidents regardless of size, hazard and complexity*" (New Zealand Government, 2014, p.63). Within this structure an Emergency Operations Centre (EOC) is often formed as a "*local level coordination centre that coordinates the local response and provides support to incident level response activities*" (New Zealand Government, 2014), with members across a number of agencies.

The communication in these IERT teams can take many forms. At the macro-level (i.e., organisational), communication varies according to the range of agencies involved. In contrast, micro-level communication refers to the individual (i.e., personal level) as well as the face-to-face interactions that often occur at the local or at the interface level (Bachmann & Inkpen, 2011; Kuhn, 2012). As such micro-level communication can be classified as interpersonal communication.

1.4 Background

Effective and timely response to a disaster is a central issue for all communities globally (Hickmott and Mills, 2015). The World Bank organisation in their publication Building Resilience – Integrating Climate and Disaster Risk into Development states that, *"since the 1980s, there has been an upward trend in disaster losses"* (World Bank, 2013, p.5) with climate-related events attributing for 87% of disasters. Many large and devastating earthquakes have occurred in the last 10 years and resulted in disasters in a wide range of countries including Mexico, Nepal, Japan, China, Haiti, Indonesia and New Zealand.

Worldwide, it is recognised that the elderly, people with disabilities, minority populations, and those in low socio-economic areas are often the most affected by a disaster and have the least input into how to best prepare or to respond to them (Aitsi-Selmi, Egawa, Sasaki, Wannous, & Murray, 2015). With global awareness of the rising risk of disaster, disaster planning and response to vulnerable populations should be at the forefront of the risk management of agencies that have legislative requirements to respond. United Nations Office for Disaster Risk Reduction (UNISDR) emphasises the importance of prioritising, having an action plan and actively targeting and including vulnerable populations in these plans (Aitsi-Selmi et al., 2015). Not surprisingly, an effective response to the needs of the community and vulnerable people and preparedness in disaster planning is widely considered as an imperative (Aitsi-Selmi et al., 2015; Danna et al., 2009; Prizzia & Helfand, 2001; Slepski, 2007). One positive consequence of the increased number of international disasters over the past few decades is that disaster planning and preparedness for vulnerable communities has become a prominent consideration for many nations (Aitsi-Selmi et al., 2015; Bennett, 2009, 2010; Bethel et al., 2011; Goldstraw et al., 2012).

1.4.1 The Canterbury Earthquakes

An earthquake measuring 7.1 Mw hit the Canterbury region on September 4, 2010, causing significant damage to ARC facilities (Goldstraw et al., 2012). Concerns were raised early on in the response that there were not many presentations to the Emergency Department of vulnerable people (personal communication, N Millar, Geriatrician, 05 September 2010), and that further investigation into the needs of the vulnerable communities was required. Further scrutiny revealed that significant support was required, and it was decided that there was a need to construct a CDHB interagency response team to address the specific requirements of vulnerable people with significant health and disability needs and the VPT was set up.

On February 22, 2011, the region was again hit; this time by an even more devastatingly shallow earthquake centred near the central business district of Christchurch. This resulted in 185 deaths and injuries to reportedly more than 6,500 people (Schluter, Hamilton, Deely, & Ardagh, 2016). These were directly attributed to the earthquake with the majority happening at the time of the earthquake although some occurred immediately after due to the environmental hazards (Johnston et al., 2014).

Severe damage occurred to the infrastructure at multiple levels including water, sewerage, power, phones, roading, and collapsed buildings, with severe liquefaction affecting some city and outlying suburbs. In the first week after the February earthquake, a further 361 aftershocks were experienced including a 5.9 Mw event that occurred two hours after the primary earthquake. Many ARC facilities were badly damaged, and several destroyed due to the severity of the shaking and some also had

liquefaction flooding their facilities. Over 600 ARC beds were lost, and 500 elderly and disabled people were displaced (Goldstraw et al., 2012).

The IERT for vulnerable people was established again but on a much larger scale. In response to the latter more devastating event, the IERT for vulnerable people had to broaden its scope to interact with representatives from many other agencies due to the size and scale of the damage. This interaction occurred under extreme conditions, many aspects of which could not have been anticipated despite the experience gained in September 2010 when the first major earthquake struck Canterbury.

Christchurch Civil Defence activated the CIMS and became the lead agency as the disaster was a civil matter affecting the city and the surrounds and therefore it needed to establish control to coordinate the response of all agencies involved in the disaster. The CDHB was a support agency and worked under the lead agency of Civil Defence alongside all the other agencies. The key functions within the CIMS structure included control, intelligence, planning, operations, logistics, public information management and welfare (New Zealand Government, 2014).

Civil Defence set up an EOC at the Christchurch Art Gallery as their own bunker where emergency response centres normally were set up was badly damaged during the earthquake (McLean, Oughton, Ellis, Wakelin, & Rubin, 2012). The CDHB had established their own EOC as did all other agencies involved in the response and these agencies worked to achieve a coordinated incident response to the disaster. CDHB also had health staff in the local Civil Defence EOC, as part of the normal CIMS structure. When the full extent of the damage was realised a national state of emergency was subsequently declared when the full extent of the damage was realised, and the National Civil Defence Controller arrived in Christchurch and took over control from the local level.

Many essential services were inoperable for weeks and in some areas, it took months to restore sewerage. Communication was extremely challenging and infrastructure damage hampered this further. For example, staff in clinical areas were not able to access essential electronic information on vulnerable people and other clients on their servers. Cellular phone usage was limited initially due to damage to cellular towers, and later as a result of system overload as people from around the world attempted to contact their relatives and friends.

1.4.2 The Healthcare System

New Zealand has a public healthcare system that is funded through taxation. The Minister of Health, supported by the Ministry of Health (MOH), has overarching accountability for health and disability services (Ministry of Health, 2018). There are 20 District Health Boards (DHBs) and they receive funding from the MOH for the provision of free hospital care across New Zealand. DHBs own and fund

their public hospitals and have a responsibility to plan and deliver health services regionally (Ministry of Health, 2018).

The health sector has a National Health Emergency Plan (NHEP) that gives direction on how the health and disability sector should work together in the event of a disaster or emergency that affects health. It outlines the local, regional and national responsibilities as well as approaches to planning and responding to emergencies (Ministry of Health, 2015).

1.4.3 The National Emergency Response

The Ministry of Civil Defence and Emergency Management (MCDEM) leads and supports Civil Defence and Emergency Management (CDEM) planning, operations and coordination at a national, regional and local level (Ministry of Civil Defence and Emergency Management, 2018). Central government responds to larger scale emergencies that are shown to be beyond the capacity of the local level authorities. All health and disability providers are required by law to have major incident and emergency plans in place (Ministry of Health, 2015). DHBs take on either a lead or support role alongside Civil Defence depending on the type of emergency.

1.4.4 Canterbury Health System

Canterbury has a population of approximately 558,830 people (Canterbury District Health Board, 2017-2018). The CDHB receives funding from the MOH on a population-based funding model and receives approximately $1.747 billion dollars annually to deliver healthcare (Canterbury District Health Board, 2017-2018). Canterbury is the second-largest health employer in New Zealand and has six facilities and approximately 30 smaller rural hospitals and community bases, three District Nursing Services, 105 ARC facilities and 56 Mental Health providers along with three Primary Health Organisations with numerous primary health practices and community pharmacies.

Canterbury has been working towards an integrated, patient-centred health system since 2007. Gullery and Hamilton (2015) describe it as having *"embarked on a journey of transformation focused on a shared vision of a 'connected system', centred on people that aims not to 'waste their time'"* (p.114). Canterbury also has "*a shared commitment to the vision of one health system that provides a seamless flow of care, irrespective of the provider"* (p.116). The goals developed for what the future health system should look like proved pivotal post the earthquake events of 2010 and 2011. They provided focus for the immediate transformation of care that needed to occur under urgency.

1.4.5 Canterbury District Health Board and Canterbury Region Emergency Response

On September 4th, 2010, after the 7.1 Mw earthquake, the CDHB enacted their EOC under the CIMS structure. Each hospital/division set up their own EOC and reported through to the over-arching

CDHB-wide Emergency Coordination Centre. Concerns were raised early on by clinicians as to how different vulnerable populations would be coping. Previously, during exercises run in conjunction with Civil Defence and the MOH, such as Exercise Cruikshank (Ministry of Health, 2007) and Pandemic planning, it was recognised that vulnerable people, as a cohort of the population, were at high risk during these events (personal communication, N Millar, Geriatrician, 20 October 2014). Because of this, CDHB discussed the need to ensure that a specific group within the health structure took responsibility to ensure support was given during a general response.

After the September 2010 earthquake the CDHB established an IERT for vulnerable people. This team was composed of clinical assessors who were either nurses or social workers that - in normal conditions - assessed the clinical need of residents wishing to access or who were determined as medically requiring admission into ARC. These assessors already had a working relationship with many of the facilities and their staff. The IERT for vulnerable people also consisted of medical staff, both gerontologists and psychogeriatricians, and nursing staff as well as CDHB's Planning and Funding (P&F) managers. The P&F managers were responsible for service development and contract management and also had previously established extensive relationships within this sector as well as knowledge across the wider Canterbury health system. CDHB's P&F function has a population perspective and is responsible for integration across the health system.

On February 22nd, 2011, the IERT for vulnerable people was immediately reassembled. This time it included members from other agencies and coordinated the care needs and (for some elderly and disabled persons) evacuation and relocation either within Christchurch or to other locations around the country. At this stage some facilities had already self-evacuated while others required support to do so which included engineering and clinical assessment (personal communication, T. Gutschlag, Senior Manager, 10 August 2014). In the initial emergency response phase, the CDHB was not entirely sure what was needed within the community setting due to the nature of the destruction but knew that an extraordinary response was required for vulnerable people living in the community. After the severe earthquakes hit in February 2011, clinicians were deployed out to the areas identified as needing assistance. They worked with the facilities that required support, liaising and communicating back to the team members of the VPT working back at the base site staffing the phone lines and coordinating key things such as water, engineers, and oxygen in conjunction with the logistics arm of the CDHB and Civil Defence EOCs. Some of the ARC facilities were significantly damaged and residents had to be relocated to other ARC facilities within Christchurch. Some vulnerable populations living in the community also had damage or felt unsafe to continue to live in their own homes and the remaining ARC services that were able to function consequently filled up with the relocated residents

plus those wanting to move out of their homes. This resulted in a capacity issue posing problems for patients with high health needs requiring immediate access to ARCs. At this point the CDHB took control of access for all of the 5,000 ARC beds and established a Single Point of Entry process to ensure those with the greatest need were prioritised (Carswell, 2011). To provide more support for at-risk populations to manage at home, the VPT interacted with representatives from many other agencies to coordinate and facilitate care to the vulnerable within the community setting and also established a hotline so that any agency, family member or member of the public could phone and outline concerns or to obtain information from a tracking database that had been initiated.

1.4.6 The Author's Role

The author, a senior nursing leader at the CDHB, was stationed at Civil Defence as a CDHB Health Liaison Officer (HLO) for the first five weeks of the emergency response. The role required working closely with welfare and social services and helping with triage and referral for the teams who went knocking door to door, checking each home throughout Christchurch. In this process the team encountered elderly, disabled and vulnerable people with no food, power and heating, without their medications, and living in dangerous conditions. The HLO fed information back into the VPT to ensure that the information was documented, and care and assistance was coordinated. In the initial 48 hours post-earthquake, the CDHB HLO fielded numerous phone calls from the general public, ARCs, Disability Support Services and Civil Defence teams out in the field regarding concerns about health issues and support needed. The phone calls went through the Civil Defence hotline and all health calls were forwarded onto the HLO phone. The HLOs role involved advising and connecting people through to the VPT and helping get essential supplies to the ARCs, or ensuring teams were sent out to uplift those residents who were struggling or at risk and were without supports.

1.4.7 Establishment of an IERT for Vulnerable People

With the high needs being identified within from the ARC community, clinicians from the VPT were immediately deployed according to their relationship with the ARC facilities. These clinicians made decisions with assistance from Civil Defence and staff from the Primary Health sector as to whether an ARC facility could remain open, albeit without power, water and sewerage. The IERT for vulnerable people then liaised with the CDHB's EOC logistics team to provide essential items such as water, portaloos[2], portable oxygen, medicines, food and linen. If the ARC was deemed unsafe due to damage or risk - such as boulders and cliffs crumbling - then residents would be evacuated and the VPT staff liaised with the teams in the CDHB and Civil Defence EOCs to manage and coordinate the relocation process in conjunction with the other agencies including St John Ambulance Service, MOH teams, and

[2] A portable outdoor toilet

the New Zealand Defence Force (NZDF). Each agency provided a liaison within the VPT to assist with the communication both locally and nationally and the VPT became an IERT.

The CDHB subsequently set up a temporary holding bay for relocated residents in a hospital office block that had previously been decommissioned as an inpatient unit and received vulnerable people in transit that were to be relocated out of the city either by bus or by plane. The IERT for vulnerable people attempted to contact families regarding the relocation of their family members, however communication with relatives proved particularly challenging. Issues arose as phone contact was difficult in the initial 24-48 hours post event due to the overloading of the network and damage to the infrastructure. Some of the residents' contact lists contained incorrect information as providers had not always updated this information in recent times (personal communication, T Gutschlag, Senior Manager, 10 August 2014), and some contact information was out-dated as families had shifted out of damaged homes in the September earthquake and the updated details were not recorded.

To minimise multiple contact points for enquiries, the IERT for vulnerable people set up a direct 0800 phone line to provide a single point of contact, consistent messaging, and an entry into health for concerned family members of ARC residents. It also provided a point of contact for neighbours worried about vulnerable people within their community or for out of town family attempting to track where their family member had been relocated to. The contact information was promoted through the Civil Defence and primary health teams; broadcast through media as well as with several radio stations and flyers were also printed and delivered out to the suburbs by teams from Civil Defence headquarters.

1.5 The Rationale for This Study

The rationale for this research stemmed from the author's role during the Christchurch earthquake as one of the CDHB HLOs at Civil Defence, which involved a wide range of interactions with many agencies locally, regionally and nationally. While working in this role, a number of both timely and effective communications were witnessed, as well as barriers and factors inhibiting communication and coordination at interagency interfaces in the disaster response, especially in relation to responses to the needs of vulnerable people caught up in the disaster. Shortly after the author took on this role the CDHB requested support be given to the IERT for vulnerable people and seconded the author to take a lead in the repatriation of the elderly and young disabled evacuees back into Canterbury. While working with this team, the author became more aware of the enormity of what this team was tasked to coordinate, and the striking commonalities in team members' experiences in communication at the interagency interfaces while working within the Civil Defence CIMS structure. There were also many personal stories from residents and staff at the interagency interfaces about micro-level

communication experiences in the emergency response phase after the natural disaster. These experiences became the catalyst for study reported in this thesis.

The efforts of the IERT for vulnerable people in the community as well as those in the ARCs represented a whole health system response to the people of Canterbury that crossed traditional boundaries and systems. Technically, the CDHB had no legal mandate to respond to the needs of vulnerable people within the ARCs, as they receive independent health funding to provide care. Nevertheless, it was felt that the CDHB had a moral and ethical responsibility to ensure that vulnerable people were supported across the health system in Canterbury.

When reflecting on the events, the author realised that the way the IERT for vulnerable people was formed, and the wider interagency response to the vulnerable people of Canterbury was extraordinary and that learnings and experiences of staff working at interagency interfaces needed to be captured.

1.6 Structure of the Thesis

This thesis consists of seven chapters. This first chapter introduces the rationale for the research topic by providing the background for the study, the national and Canterbury context, the research question, key definitions, and the author's involvement in the disaster response in the IERT for vulnerable people. The literature review is outlined in the second chapter, where published findings were examined on disaster responses as well as communication in disaster response were examined, including the realities of interagency communication and the area of communication and vulnerable communities. Gaps in the literature were identified, in particular, the paucity of published material found on disaster response management relating to vulnerable populations, and interagency interfaces at the micro-level of communication. For example, factors allowing interagency teams to function effectively and the sorts of interpersonal communication practices that would stabilise team processes are not well described. In Chapter 3, the methodology and methods of the thesis are outlined where the qualitative approach using a case study research methodology, which was underpinned theoretically with Wieck's *Interpretative Approach* (Helms Mills, Thurlow, & Mills, 2010; Weick, Sutcliffe, & Obstfeld, 2005) is described. The findings are reported in Chapter 4 where stabilising and destabilising factors at interagency interfaces are described in detail. A discussion of the findings in relation to the literature is outlined in Chapter 5. Chapter 6 summaries the research in the conclusion and Chapter 7 highlights future research potentials and summarises how new knowledge emerging from this study might assist in coordinating and managing communication at interagency interfaces in future emergency and disaster responses.

2 Literature Review

2.1 Introduction

Appropriate and timely responses to natural disasters are important objectives for communities globally, especially given the increasing number of natural disasters and the magnitude of their impacts (Centre for Research on the Epidemiology of Disasters, 2015). According to the (World Bank, 2013), disaster losses have been climbing since the 1980s and have impacted significantly on many nations including Japan, China, Haiti, Chile, Indonesia, Mexico, New Zealand, India, and Nepal (Hickmott and Mills, 2015). Internationally it is recognised that the elderly, people with disabilities, minority populations and those in lower socio-economic areas have the least ability to either prepare or to respond to disasters despite often being among the most affected when one strikes (The United Nations Office for Disaster Risk Reduction, 2013; World Bank, 2013; World Health Organization, 2002).

Originally formed during World War II as part of the civil defence response to gas and air raid attacks, emergency response teams have become a vital part of disaster response (Swarbrick, 2012) and play a crucial role in the CDEM Framework (New Zealand Government, 2015). Community Emergency Response Teams (CERTs) (Department of Homeland Security, 2018) and IERTs are commonly mentioned within the literature. CERTs are local community-based teams set up across the United States of America to train people to deal with local emergencies. In contrast, IERTs are any inter-organisational team set up to respond to disasters or emergencies affecting the community at large. These teams are often established specifically to attend to post-disaster needs of vulnerable groups within the community and are likely to include a wide and diverse range of stakeholders including representatives from state health and welfare ministries, NGO support agencies, the military, police, Civil Defence, and local authorities (e.g., city councils). In New Zealand, the MCDEM has the national oversight in times of natural disaster and recovery and the local CDEM groups (New Zealand Government, 2015) lead the implementation in partnership with responding agencies.

In this chapter the results of a literature review examining communication in interagency teams responding to the needs of vulnerable communities in a disaster are presented. Firstly, the literature was examined to see what is known about the micro-level communication that exists between interagency teams responding to a disaster. Effectively this thesis addresses this gap in the disaster communication literature regarding how individuals experience interagency interfaces within a disaster response team, and which communication practices help interfaces function effectively. Further searching sought to examine how emergency response teams approached vulnerability or the way these responses served to construct vulnerability. The review led to the conclusion that there is an opportunity to apply micro-analysis approaches in organisational communication literature to the

study of disaster responses in interagency collaboration, and there is a need to improve understanding of the communication roles and responsibilities of interagency team members and of how individual members manage organisational expectations, hierarchies, and identities following a disaster.

2.2 Search Strategy

The general online MultiSearch function provided by the University of Canterbury library, as well as the OVID system for searching medical journals, were employed to locate relevant literature. OVID was used to supplement the MultiSearch facility.

As the review was exploratory, it began broadly to make certain an extensive literature base was identified from which a more focused review could be conducted. This ensured the common catch of choosing too many key words or being too specific initially was avoided (Croucher & Cronn-Mills, 2015). The single key word "disaster" was chosen as the starting point for the search as it captured the general field of interest and was unambiguous, embracing all manner of natural and human constructed events that have the potential to disrupt human populations. Approximately 900,000 articles and books were found. Then the key words "disaster" and "response" were added. This reduced the articles and books to approximately 480,000. A superficial examination of the results of this search suggested much of the literature located focused on the responses to large-scale disasters such as the New York terrorism event of September 11, 2001; weather events such as Hurricane Katrina in New Orleans; and earthquakes such as the 2011 event in the Tōhoku Region of Japan (Hickmott and Mills, 2015). Due to the significant number of literature sources obtained from this search, time limits were utilised. The review was narrowed to the years from and including 2001 to the time this review was undertaken, and only peer-reviewed items were sought. The limitations further reduced the hits to approximately 141,000. The time limit was chosen for two reasons. Firstly, this was a way to acknowledge that many sources produced after this date provided reviews of literature produced prior to this date. Secondly, communication technologies advanced rapidly in the last quarter of the 20th century with the result that studies in the 21st century are more likely to refer to technologies that are currently in use.

A further search was undertaken using "disaster response" (over 44,000 hits) and "response teams" (nearly 96,000 hits). Combined, these search terms produced over 950 hits with the limits applied. Five hundred and fifty-six of these hits were on CERTs. These were judged not to be as relevant as they refer to community groups composed of local individuals rather than members of government agencies, NGOs, and local authorities.

A search using the term “natural disasters” produced over 400,000 hits. These hits included a wealth of books, reports, studies, and discussion papers around the topic of disasters and disaster response. The list of disaster events addressed was extensive with severe storm events such as Hurricane Katrina in New Orleans, Hurricane Sandy in New York, and the recent earthquakes in New Zealand (since 2010) and Japan (2011) drawing significant attention.

A separate search was undertaken using the terms “communication” and “disasters”. This produced over 397,000 hits. When restricted to literature published after 2001 and peer-reviewed sources 85,025 hits (1 July 2015) resulted. The keywords “communication” and “interagency teams” allowed the search to be narrowed considerably. Using these terms reduced the search to just over 1,000 hits. This was further honed using the keywords “interagency teams” and “interface communication” to examine communication in interagency teams such as IERTs that include members from organisations with different priorities, ways of operating and cultures (Hickmott and Mills, 2015). Specifically, the search sought to identify any studies that had explored the impacts of organisational identity and interagency communication. Over 9,000 articles were found. When this search was limited to 2001 to present day and peer reviewed articles, this reduced the hits to 879 articles. Next, a search was undertaken on “interagency interfaces in disasters” and 8,934 articles were found. When the search was limited to peer reviewed articles this reduced the yield to 507 articles. The results of these two searches were examined and found to include many of the same items.

Finally, a search using the term “vulnerable people” was conducted. This yielded over 342,000 hits and combined with “natural disasters” generated over 27,000 hits when time limits and peer review search refinements were added.

In addition to academic databases, government websites regarding disaster response were reviewed for relevant documentation or reports commissioned such as United Nations Office for Natural Disaster Reduction, Civil Defence Emergency Management Guidelines and Federal Emergency Management Agency. In addition, NGO websites of organisations such as World Health Organization were examined for articles or reports on responding to vulnerable populations in natural disasters. The articles that were eventually reviewed were further narrowed to just over 350 by ensuring that the only peer reviewed journal literature and government and NGO reports included were those that had one or more of the following key words:

1. Disaster;
2. Crisis communication;
3. Interagency; and
4. Vulnerable populations.

The collection of sources identified was then assessed by downloading the abstracts and reading these more closely to establish how well they related to the overarching objective of understanding what is known about micro-processes in IERTs during a disaster response for vulnerable people. Abstracts judged to be informative and relevant for the review were then sourced and read in full. Results were contrasted and coded in terms of the key words of the study. The results of this review process are presented under two main headings: Disaster Responses and Communication in Disaster Response.

2.3 Disaster Responses

A significant number of articles on disaster response and response teams focussed on providing a retrospective analysis of what occurred and future requirements for planning, training, education and support for groups preparing for these sorts of significant events (Ardagh et al., 2012; Curry, 2011; Danna et al., 2009; Garnett & Kouzmin, 2009; Goldstraw et al., 2012; Kang et al., 2012; Pekovic, Seff, & Rothman, 2007; Slepski, 2007; Sugimoto, Krull, Nomura, Morita, & Tsubokura, 2012; Tyler & Singh, 2011; Yang, Prasanna, & King, 2009; Zakour & Gillespie, 1998). Prominent among the articles located were ones that focused on the preparedness of response teams, organisations, and populations based upon the issues identified in previous disaster responses (Ardagh et al., 2012; Bethel et al., 2011; Curry, 2011; Eriksson, 2009; Goldstraw et al., 2012; Janssen, Lee, Bharosa, & Cresswell, 2010; McLean et al., 2012; Slepski, 2007). An underlying theme in most of these articles was the need for response teams to be ready, responsive, and flexible during disasters (Hickmott and Mills, 2015) and a recurring recommendation was the necessity for strong interagency engagement and communication (Kapucu, 2006; Williams, 2011). However, often the specifics of what was required were missing.

Prizzia and Helfand (2001) conducted an extensive review of agencies from central government to local community level in Hawaii, to establish the capacity of these organisations capacity to work in a coordinated fashion. This review revealed that strong inter-organisational interfaces that can operate effectively in a disaster response are fostered when private providers, primary health centres, and the community work together on disaster preparedness, drills, and training. Pre-disaster activities like these ensure procedural similarities across organisations. These similarities would be an advantage given Hawaii is an area vulnerable to natural disasters. Certainly, in the New Zealand event where preparatory exercises involving private, primary, and community providers helped ensure pandemic readiness, the intersectoral pandemic national exercise on influenza, titled “Exercise Cruikshank” (Ministry of Health, 2007), ensured the Canterbury Health System’s “collaborative system-wide response” was able to minimise the threat of H1N1 (i.e., swine flu) virus pandemic.

2.4 Communication in Disaster Response

There are numerous articles on crisis communication in natural disasters with a focus on the use, or lack of availability, of technology due to the impact of the disaster (Garnett & Kouzmin, 2009; Stephan, 2007). Some of these outline problems on effectiveness and efficiency (Slepski, 2007; Yang et al., 2009) and focus on internal communication and cooperation rather than the wider interface of crisis communication and management of vulnerable populations in a disaster across the sector (Hickmott and Mills, 2015).

While there are thousands of studies that examine disaster response, those that address the nature of communication during disaster responses tend to focus at a macro-level (Comfort, 2007; Garnett & Kouzmin, 2009; Kapucu, 2006; National Commission on Terrorist Attacks Upon the United States, 2004; Palttala, Boano, Lund, & Vos, 2012). There are findings about media, information flows and organisational performance (Bharosa, Lee, & Janssen, 2010; Garnett & Kouzmin, 2007; Steelman & McCaffrey, 2013) and response team communication with the community (Palttala et al., 2012), but this research rarely ventures into the micro-level to analyse the interpersonal communication between individuals at the critical interfaces, such as those between the individuals from the various emergency response agencies. We know little about the interpersonal communication practices at the heart of interagency team operations (Hickmott and Mills, 2015) or what makes this communication either effective or ineffectual (Williams, 2011). There appears to be a gap in the disaster communication literature, meaning our understanding about how individuals experience interagency interfaces within a disaster response team, and which communication practices help these interfaces function effectively is limited.

2.4.1 The Realities of Interagency Communication

The search addressing interagency interfaces yielded articles that discussed interagency, inter-organisational, and multi-organisational interfaces (Arnaud & Mills, 2012; Bachmann & Inkpen, 2011; Bharosa et al., 2010), but not all of these specifically addressed interfaces during disaster responses (e.g., Arnaud & Mills, 2012). Yang et al. (2009) focused on internal communication but identified the need for examining interagency or multi-agency interfaces. Garnett and Kouzmin (2007, 2009), in contrast, examined the interactions and inter-relationships between each organisation involved in the response to New Orleans during Hurricane Katrina. Their article titled "Crisis communication post Katrina: What are we Learning?" Garnett and Kouzmin (2009) proved highly relevant to the topic of interest and provided an example of multiple case modelling for developing a conceptual framework to help bring awareness of crisis communication in a response. The authors identified four lenses: "*crisis communication as interpersonal influence*", "*crisis communication as media relations*", "*crisis*

communication as technology showcase", and "*crisis communication as inter-organizational networking*" (2009, p.386). They showed that the effectiveness of crisis communication is centred around the quality of interactions and interorganisational interfaces between key agencies involved in crisis management. They also described "*turf battles*" (Garnett & Kouzmin, 2009) and other limitations to effective communication such as when the state and federal governments work independently of each other.

The review showed that disasters often happen in localities that have very scarce resources to aide in response, or if they do, these resources can be damaged or rendered ineffectual by the disaster (Bennett, 2009; Garnett & Kouzmin, 2009; Janssen et al., 2010; Kang et al., 2012; Stephan, 2007). Such conditions have consequences for communication generally and the operation of IERTs in particular. For example, reports on the Canterbury event (Ardagh et al., 2012; McLean et al., 2012) revealed power supply was not available or reliable for a large proportion of the population following the worst of the earthquakes and this impacted on phones, the ability to charge cell phones, internet access, and landlines (Hickmott and Mills, 2015). Estimates were that 75% of the city had power disrupted on the day of the earthquake (Brookie, 2012) with electricity restored within three days of the event (McSaveney, 2014). Facilities that provided essential services, such as hospitals, had back-up power generators to ensure services could be delivered to the more than 7,000 injured, but damage had also occurred to the back-up generator lines and to storage facilities. This created challenging communication conditions and compromised the response teams' ability to deliver care to patients with complex injuries. Lack of electricity created communication problems and issues with alerts throughout the health system both locally and nationally (Ardagh et al., 2012). Due to the power outages clinicians at many sites were unable to retrieve clinical notes with vital information including family contacts (Ardagh et al., 2012; Carswell, 2011). Similarly, emergency services and local authorities faced communication challenges as all available communication channels became quickly overloaded (McLean et al., 2012). Thus, the ability to gain access to communication media and the subsequent effective use of this media was an issue at both personal and agency levels as people tried to link to others and coordinate their responses. For this reason, IERTs often involve agencies from outside the disaster zone or personnel from in-zone agencies who work in other regions (Comfort, 2007), for example, Red Cross, Armed Forces and Urban Search and Rescue teams. Furthermore, such agencies may have remote headquarters and so communication is geographically distributed (Hickmott and Mills, 2015).

The critical framework to examine crisis communication described in Garnett and Kouzmin (2007, 2009) offers a template for more thorough inspection and understanding of disaster events and

explains the "*focal actors*" (2007, p.173), their roles, communication mode, key issues, strengths and limitations. These authors also outline what they see as *"inter-organizational networking"* (2007, p.180) and the complexities involved in multiple agencies responding to an emergency and the difficulties experienced in the exchange of communication and networking in a complicated changing environment. Most significantly for this review, they recognise that communication as interpersonal influence is an important lens for examining disaster response communication. The communication actions they describe that are consistent with this lens are very much aligned to top-down command and control communication.

During Hurricane Katrina, there were multiple failures between agencies and within agencies, both at federal and state level. Problems of trust, *"turf boundaries and battles"* (p.388) over jurisdiction at the local, regional, and national levels and lack of consistent boundary spanning occurred (Garnett & Kouzmin, 2009). These same researchers (Garnett & Kouzmin, 2007) had previously written about the dangers of utilising only one lens as a framework to understand crisis communication. They suggest using just one lens can lead to the sort of "crisis-handling fiasco" (Garnett & Kouzmin, 2009) that emerged during the response to Hurricane Katrina. Using multiple lenses to understand and manage communication can create the opportunity to have thorough review, transparency, and visibility (Garnett & Kouzmin, 2009). Garnett and Kouzmin (2007) also note the impact of distance where key decisions are made at central government level without the face-to-face liaison and cooperation within the local level response. These experiences were echoed to some degree in the Canterbury earthquake events, with the National Controller not initially being in Christchurch (McLean et al., 2012) as well as the subsequent confusion that occurred when there was a departure from the normal CIMS structure with the merging of two different agencies within the response centre causing many incidents of inefficiency, disorganisation, replication and role confusion (Hickmott and Mills, 2015).

Aziz, Peña-Mora, and Chen (2009) state that, "*current disaster relief operations are characterized by numerous shortcomings that inhibit optimal decision-making during disaster management operations*" (p.35). They assert, "*obstacles in the disaster response process include no communication, miscommunication, misleading information and the inability to access information and the lack of standardization, collaboration, coordination, and communication*" (Aziz et al., 2009, p.35-36). This created challenges and misunderstandings for the individuals responding to this particular disaster. The 9/11 Commission Report (National Commission on Terrorist Attacks Upon the United States, 2004) outlined that during emergency response operations, effective decision-making was hampered by problems in command and control and in internal communications to an extent that "*incident commanders from responding agencies lacked knowledge of what other agencies and, in some cases,*

their own responders were doing" (p.305) resulting in challenges with "*command, control, and communications*" (p.315).

In an article on civil and military relations, Sylves (2009) outlines the way communication took place between the authorities during Hurricane Katrina and how sophisticated the military communication was (Hickmott and Mills, 2015). Sylves (2009) makes a salient point that "*military culture and civilian culture were highly incompatible*" and outlined how the military uses clear communication working within a "*command-and-control structure*" (p.76). It is important to note that these organisational command and control structures may not always be as efficient in a developing complex emergency, with Kapucu (2006) finding that "*hierarchical networks can work efficiently during routine operations, but they function very poorly in dynamic environments of emergencies*" (p.208). Members of these agencies identify with this way of controlling activity and the communication patterns it produces (Comfort, 2007) recognising that the expectations they foster can contrast sharply with those in NGOs and voluntary organisations. Coordination relies on effective communication (Arnaud & Mills, 2012) and common understandings among those participating in the collaborative action. This then raises the question as to how members from highly hierarchical organisations adjust to flatter structures with less defined or less rigid lines of command and to what extent they adapt their interface between these stakeholder agencies in this rapidly changing environment when working together to respond to vulnerable population needs.

Combining these cultures and structures into MTSs or IERTs adds different dynamics and ways of working. It may be because of this that MTSs are an area of increasing research interest (Hickmott and Mills, 2015). Williams (2011) maintains the importance of research examining these kinds of MTS members' experiences as there are some assumptions made about MTSs. For instance, rather than being interdependent and reciprocal they work in parallel or side-by-side without interacting in the true sense. Research on MTSs is also often focused higher up within organisations or in a "*laboratory setting*" and the review determined that there is "*the need for research identifying the underlying processes and success strategies and best practices of MTSs*" (Shuffler et al., 2014, p.238-239). Williams (2011) states that "*perhaps the most striking challenge to our current conceptualization is the lack of communication between individual members in the larger system*" (p.162) and that future research could be centred on a specific case study examining the teams involved in a specific response. There is also little understanding about how individuals navigate the interface between their identity as member of a MTSs and their identity as a member of their home organisation. There were recommendations to study and focus more clearly on the human interface as "*human-centred approaches allow researchers to assess the inter-organizational communication links, processes, and information…*" (Janssen et al., 2010, p.4). Arnaud and Mills (2012) state that the research on the

interface created by collaborating firms has not shed light on *"the relationships between operational-level employees, and how these are manifested and sustained at a micro-interactional level at the interfirm interface*" (p.453). These shared expectations and ways of working, common knowledge and expectations may be potentially similar to the interactants intersecting with the VPT who often had repeated interactions with each other. There are some interesting parallels in that previously the VPT had been established in September 2010, therefore there were some established relationships such as those described in the Arnaud and Mills (2012) article.

In general, the section of the search that looked at interagency interface literature uncovered articles that specifically examined interagency or multi-organisational interface during disasters (Garnett & Kouzmin, 2009; Janssen et al., 2010; Prizzia & Helfand, 2001). With significant disaster events such as devastating earthquakes, responders are often faced with the challenge of working in physical surroundings with multiple teams facing substantial communication problems (Eriksson, 2009; Garnett & Kouzmin, 2007, 2009; Janssen et al., 2010; Kapucu, 2006; Larson, Metzger, & Cahn, 2006; McLean et al., 2012; Steelman & McCaffrey, 2013).

2.4.2 Communication and Vulnerable Communities

The criteria that define vulnerable people or populations are debatable and a consistent definition appears somewhat elusive in the literature (Rouf, 2004). The terms "vulnerable people" and "natural disasters" yielded articles focused on vulnerabilities during disasters that impacted on infrastructure areas such as technology, roads, and housing, and how this impeded the disaster response (Bennett, 2009; Garnett & Kouzmin, 2009; Janssen et al., 2010; Kang et al., 2012; Stephan, 2007). Articles were located that focused on the healthcare and/or social needs of different vulnerable groups such as elderly, children, disabled, those in abusive situations, refugees and those living in lower socio-economic conditions (Bennett, 2009; Bethel et al., 2011; Fjord, 2010; Fjord & Manderson, 2009; Goldstraw et al., 2012; Rouf, 2004; Sinclair, 2014; Sugimoto et al., 2012; Tyler & Singh, 2011; Zakour & Gillespie, 1998). A contrast can be seen in the Fjord (2010, p.13) description of vulnerable people as *"certain sorts of people, grouped by their lack of particular physical, emotional, cognitive or social resources…*" while Bennett (2009, p.110) defines vulnerable populations as *"individuals with a disability, individuals 65 years or older; and individuals with a combination of the two."*

The term "vulnerable" was viewed by some researchers as categorising groups in a labelling or paternalistic sense (Fjord, 2010; Rouf, 2004). However, the terms "vulnerable people" and "vulnerable populations" are used throughout numerous disaster articles by researchers (Bennett, 2009; Bethel et al., 2011; Garnett & Kouzmin, 2009; Klaiman et al., 2010; Missildine et al., 2009; Paton & Johnston, 2001; Pekovic et al., 2007; Rouf, 2004). It is also outlined extensively in local, national and international

disaster response or preparedness guidelines (Aitsi-Selmi et al., 2015; Canterbury District Health Board, 2011; McLean et al., 2012; Ministry of Health, 2015; The United Nations Office for Disaster Risk Reduction, 2013; World Bank, 2013).

A helpful definition also developed by Flaskerud and Winslow and cited within several articles defines vulnerable populations as "*social groups who have an increased relative risk or susceptibility to adverse health outcomes*" (Missildine et al., 2009, p.516; Rouf, 2004, p.419). Vulnerable people can have unique needs that compromise their functionality or macro-factors that act as barriers to achieving full participation, but they may also need specialist care and rely on a number of specialist agencies to meet their needs. In times of disaster these groups, as defined earlier, may not be able to access their normal support networks or their needs may be much greater than what is able to be actioned through the support agencies working in a large-scale disaster event (Canterbury District Health Board, 2011). For example, in the Christchurch event, some of the ARC facilities had flooding or liquefaction damage which required immediate evacuation (Goldstraw et al., 2012; Pekovic et al., 2007; Stephan, 2007; Teperman, 2013). As defined earlier, for the purposes of the review, vulnerable people or populations were defined as groups at increased risk of being impacted by disasters and unable to access their normal supports or care (Canterbury District Health Board, 2011; World Health Organization, 2002).

The majority of the articles that covered the movement or evacuation of vulnerable people were situated around significant disaster events such as Hurricane Katrina, Gustav and Sandy (Danna et al., 2009; Missildine et al., 2009; Pekovic et al., 2007; Teperman, 2013), Cyclone Yasi in Queensland (Woods, Goodman, Mills, Usher, & McBride, 2011) and on the earthquakes in both Japan (Sugimoto et al., 2012) and China (Kang et al., 2012). Publications of Hurricane Katrina, which resulted in the deaths of over 1,000 people, were particularly common. In this event, communication capability was destroyed, vulnerable people were badly affected, and the storm forced the evacuation of many residents (Pekovic et al., 2007; Stephan, 2007). In the 2010-11 Canterbury earthquakes evacuations of vulnerable people occurred (Ardagh et al., 2012; Goldstraw et al., 2012) including the elderly, neonates, intensive care patients, and people with disabilities or those on dialysis for chronic conditions or those patients with crush injuries resulting in nephrotoxic metabolites being released into the bloodstream on rescue. Very similar problems regarding the evacuation process occurred for populations in New Orleans as well as New York City.

Teperman (2013) article on Hurricane Sandy and its impact on New York City found that three hospitals were evacuated, and 29 ARC facilities were heavily flooded requiring over 4,000 hospital and 1,500 rest home residents to be subsequently evacuated when the storm hit (Hickmott and Mills,

2015). Teperman (2013) described similar evacuation methods and disaster response issues around communication as those experienced in the Christchurch event (e.g., patients had to be transported down flights of stairs due to elevators potentially flooding and ambulances assisted in transferring patients to different facilities throughout the city). There were challenges with communication at some of these facilities and electronic medical records were not available because of the power outages. Information packs had to be created for each patient containing clinical information, care plans, and medications (Teperman, 2013). Similar issues around medical records, and sewerage also occurred in Christchurch (Goldstraw et al., 2012) and decommissioned wards were reopened to patients (Hickmott and Mills, 2015). The approach taken in this literature was typically descriptive. Few articles were located which looked critically at how emergency response teams approached vulnerability or the way these responses served to construct vulnerability and reinforce the social inequalities and marginality experienced by vulnerable populations.

2.5 Emergence in Disaster Responses

In terms of understanding the unpredictable, contradictory and emergent aspects of a disaster response in the complex post-disaster environment, three new areas of research are offering promising new insights for micro-level interpersonal communications at interagency interfaces. Firstly, the importance of "the people" has been highlighted in recent studies, with the suggestion that this factor should not be underestimated concerning their influence on the effectiveness (or not) on communication in a given disaster response (Kapucu, 2006; Williams, 2011). In addition, the ways in which the people work together, communicate and interact based on "the connections" they have is a further area of focus that is emerging in the literature, where current research has explored the impacts on the disaster response of how key responders were either connected or disconnected in the response (Bharosa et al. 2010; Garnett & Kouzmin, 2009; Kapucu, 2006). A third promising new aspect aiding understanding of communication during the disaster response is the research into "improvisations" and spontaneous innovations which emerge out of specific contexts and specific situation as teams adapted within the crisis (Bharosa et al., 2010; Constantinides & Barrett, 2012).

2.6 Summary

This review reveals that despite a bountiful literature addressing disasters, both natural and those caused by humans, scant attention has been given to the micro-level communication that allows key IERTs to function. Furthermore, despite many sources stressing the importance of understanding the needs of vulnerable people and the impacts disasters have on these groups (Fjord & Manderson, 2009; Goldstraw et al., 2012; Rouf, 2004; Sugimoto et al., 2012), especially in relation to disaster preparedness (Bethel et al., 2011; Curry, 2011), their needs are not examined in the literature in

depth. Such oversights underline the importance of ensuring that representatives of vulnerable groups are included in national as well as local emergency response planning (Bennett, 2009) and emergency response teams. Missildine et al. (2009) agree. They observe that "*there is a gap in the literature in the emerging area of disaster response, especially from the perspective of the most vulnerable - the medical special needs evacuee*" (Missildine et al., 2009, p.516) and stress the importance of vulnerable people being part of a planning process where their needs can be registered in the event of a disaster. Yet the literature demonstrates that vulnerable people are often not engaged in emergency planning (Cornell, Cusack, & Arborn, 2012). It was concerning to note a somewhat paternalistic tone in some of the literature from local and national agencies with regard to disaster planning and response in relation to vulnerable people and populations (Cornell et al., 2012; Rouf, 2004). Furthermore, not only was there a lack of consensus on a definition of vulnerability in the literature (Rouf, 2004), but vulnerability was treated as a consequence of group membership. This ignores the fact that many members of groups designated as vulnerable, such as elderly, are independent and fully functioning in their communities. If vulnerability is seen as a result of physical impairment or lack of mobility, social isolation and economic restraints (Cornell et al., 2012; Fjord, 2010) then it can span all groups in society.

In Hurricanes Katrina and Sandy, the vulnerable were acutely affected by the disaster and the communication varied hugely in both events. For example, during Hurricane Katrina (Garnett & Kouzmin, 2009) both cellular and landline telephone systems were down for days, significantly delaying a response to the vulnerable. Misinformation was widespread due to the lack of communication between local and national agencies with calamitous results to vulnerable communities leaving numerous people trapped and 1,500 dead. Hurricane Sandy - though catastrophic in scale with communication badly hampered - having established inter-sectoral relationships prior to the disaster and communication via text, resulted in effective evacuations of facilities and responses to vulnerable people and communities (Teperman, 2013). Such examples underline the importance emphasised throughout the literature of sound communication across service sectors and the significance of relationships (Goldstraw et al., 2012; Zakour & Gillespie, 1998) with the different agencies to enable an effective disaster response.

The evidence clearly shows that IERTs working in disasters must collaborate and communicate with representatives from multiple agencies when responding to the needs of vulnerable people, yet very little is known about the micro-level communication that exists at the interface between these teams. Individuals responding within an IERT operate at the micro-level of communication and this requires a trusting relationship forming (Bachmann & Inkpen, 2011) to enable a rapid and cohesive response to a disaster. Yet IERTs often are working not only within complicated evolving environments but also

within complex structures that are inter-reliant on the work of the other responding agencies (Bharosa et al., 2010). Therefore, understanding how the individuals' actions contribute to "*collective competence at an operational level*" (Arnaud & Mills, 2012, p.453) may help provide greater stability, trust, and confidence in IERTs operating within a disaster response.

Williams (2011) recommends focusing on a specific event and subjecting the experiences of those involved in the disaster response to a micro-level examination, as some important lessons may be learned about collaboration and communication management in disasters that can lead to more effective responses for vulnerable populations. For example, this would allow a definition of knowledge and skills multi-agency team members require to navigate the diverse communication protocols, procedures and expectations that exist across different organisations. Most importantly, it would allow collaboration in interagency response teams to be approached more strategically and help eliminate inefficiencies and errors.

While there are many and varied studies on interagency communication in IERTs and multi-system team responses following disasters (Mathieu et al., 2001; Shuffler et al., 2014; Williams, 2011), most of the research located addresses the macro-level of the organisation rather than at the interactions between the individual members who enact the responses. This suggests that views of organisational communication are strongly influenced by public relations and not an interpersonal or group communication perspective. This is certainly true of much of the literature arising with the key word search of 'crisis communication'.

The review also reveals a dearth of studies on disaster response management relating to vulnerable populations that examine the micro-dynamics at the interagency interfaces seeking to meet the disaster needs of vulnerable people. Those studies located that do address micro-processes (i.e., interpersonal communication) do not address disaster response management. The literature is silent about what sorts of interpersonal communication practices stabilise interagency interfaces at the micro-level and how responding agencies can ensure their members are skilled and constructive contributors to the different interagency processes associated with these teams. This is unfortunate because managing the welfare of vulnerable populations is seldom a one-agency affair. This review therefore concludes that there is a significant opportunity for researchers to apply the micro-analysis approaches evident in the non-disaster organisational communication literature to the study of disaster responses involving interagency collaboration. It also confirms there is scope to understand more thoroughly the communication roles and responsibilities of interagency team members and how individual members manage organisational expectations, hierarchies, and identities in the complex, evolving, and unstable environment during and immediately following a disaster.

3 Methodology and Methods

3.1 Overview

A case study research methodology was used to explore the phenomenon, the nature of micro-level communication at the interagency interfaces following a disaster. On the basis of individual interviews, experiences of members of the IERT for vulnerable people and members of key agencies it interfaced with were collected in order to gain insights and improve understanding into those elements that supported and enabled effective responsiveness and interagency coordination. An inductive approach to data analysis of the interview transcripts was informed theoretically by Weick's qualitative interpretive approach (Weick et al., 2005).

This chapter describes the research methodology and then details the procedures used to gather and analyse data. It also explains ethical considerations and limitations of this study.

3.2 Qualitative Research Methodology

A qualitative research design was selected for this study. A qualitative approach was judged to be aligned with the purpose of this research endeavour, which was to gain an in-depth understanding into micro-level interagency communications at interagency interfaces in a disaster response. The interpretive aspect of a qualitative research approach, with a subjective ontology, assumes reality is subjective rather than that a singular, objective truth exists separately to the human experience (Bourgeault, Dingwall, & De Vries, 2010). In this paradigm, the researcher's role is to uncover and reconcile participants' subjective sense of their experiences in order to conceptualise it (Denzin & Lincoln, 2011). They do this by working in an iterative manner, moving between data (i.e., specifics) and emergent generalisations that reconcile the specifics to create a defensible whole, rather than from a pre-emptive conceptual framework that is then tested (Flick, 2018). A qualitative approach was judged to be appropriate for this research as the researcher sought to explore and gain insights into the subjective experiences of participants engaged in communication at interagency interfaces while responding to the needs of vulnerable people during the Canterbury earthquakes.

3.2.1 Qualitative Research in Studying Natural Disasters

IERTs are commonly formed in response to natural disasters. Multi-team systems research examines both the individual as well as the system, looks at the interactions between teams and is often used to examine groups involved in complex crisis events that are working across boundaries and involved in incident management (Mathieu et al., 2001). Mathieu et al. (2001) describe these types of interactions in relation to major events such as emergency responses as "multiteam systems":

> "*Multiteam systems are two or more teams that interface directly and interdependently in response to environmental contingencies toward the accomplishment of collective goals. MTS*

boundaries are defined by virtue of the fact that all teams within the system, while pursuing different proximal goals, share at least one common distal goal; and in so doing exhibit input, process, and outcome interdependence with at least one other team in the system" (p.290).

Communication processes are vital but often precarious in times of crisis (Palttala et al., 2012). In order to try to understand what sense participants made of the communication they were part of or encountered, it was important that a research approach that tapped into participants' perspectives was employed rather than simply to seek the ever elusive 'objective' truth. Sensemaking is about creating plausible understandings rather than objective truths, especially during crisis or unpredictable situations when uncertainty and equivocality exist (Sellnow, Seeger, & Ulmer, 2002; Weick, 1988). Weick et al. (2005) describe sensemaking as the process of *"turning circumstances into a situation that is comprehended explicitly in words and that serves as a springboard into action"* (p.409).

In their article, 'Organizing and the process of sensemaking', Weick et al. (2005) define how sensemaking is used to bring meaning to an event and is about the *"continual redrafting of an emerging story so that it becomes more comprehensive, incorporates more of the observed data, and is more resilient in the face of criticism*" (p.415). Sensemaking focuses on the micro-level rather than the macro-level, which is exactly where the focus of this study was placed (i.e., the sense participants made of the micro-level of the interpersonal communication between individuals at critical interfaces between the emergency response agencies).

3.2.2 Trustworthiness and Data Quality in Qualitative Research

The researcher is inevitably part of the accounts they draw out from participants. In this thesis, the author did have in-depth knowledge about the chronology of events and the establishment and operation of the VPT and the IERT that emerged around it. This knowledge was vital as it ensured the research process was appropriate. In particular, it enabled the researcher to be sensitive to the complexities of the IERT and use her subjective experience to help establish who should be interviewed. It also provided a sense of shared experience upon which to build rapport with the interviewees as both parties had first-hand experience of the event. There were politics and sensitivities around the organisations that worked with the IERT for vulnerable people, as well as within the team itself, and it was therefore important to ensure trust, confidentiality and discretion were features of the engagement with all interviewees. These features were vitally important as they reassured participants that they were part of a well-managed and professional research process and that their voices would be accurately represented. In their article on rigour in inductive research Gioia, Corley, and Hamilton (2013) state that it is important to "*make extraordinary efforts to give voice to the informants in the early stages of data gathering and analysis and also to represent their voices*

prominently in the reporting of the research, which creates rich opportunities for discovery of new concepts rather than affirmation of existing concepts" (p.17).

3.3 Study Design

3.3.1 Case Study Research

Yin (2014) defines a case study as "*an empirical inquiry that investigates a contemporary phenomenon (the case) in-depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident*" (p.16). A case study research approach allows a system or phenomenon to be studied in-depth in a way that allows the context and interrelation of the parts to be appreciated (Creswell, 2007). According to Huberman and Miles (2002, p.9), "*case study is a research strategy which focuses on understanding the dynamics present within single settings*". Case studies are of particular use when the researcher wishes to study a specific unit or phenomenon of interest within a specific context such as the micro-level communication at the interagency team response.

The research described in this thesis was based on a case study of the communication of the IERT for vulnerable people across the interagency interfaces. A case study approach was seen as appropriate as it allowed for a detailed inquiry and analysis of the interagency communication during a specific disaster response to be studied (Yin, 2014).

The interagency response coordination and crisis communications of the CDHB IERT for vulnerable people during the disaster response was of interest for several reasons. Firstly, it brought together participants from a wide range of agencies, each with their own agendas and ways of working. Secondly, it did this during a highly charged and demanding time when lives were at stake and the need to act swiftly meant processes had to be quickly established and lessons learned in a constantly evolving disaster situation. Thirdly, there was a mix of local Canterbury members that were being impacted personally by the natural disaster and people brought in from outside of Canterbury to help respond to the disaster.

Case studies, in all qualitative study designs, are often criticised because of a perceived lack of generalisation to populations and transferability (Yin, 2014). In this situation, a case study was deemed appropriate because the literature review revealed there was scant research on communication at the micro-level in natural disasters or how IERTs manage the interface between themselves and other agencies to create a coordinated interagency disaster response. The case study research approach enabled an in-depth exploration of this topic to be carried out while taking into account the specific context of the February 2011 Canterbury earthquake and its aftermath.

3.3.2 Interviews Based on Critical Incident Technique

The semi-structured interview guide that was developed to collect the narratives from each study participant was based on the critical incident technique. A critical incident is defined by Flanagan (1954, as cited by Bott & Tourish, 2016) as follows,

> *"By an incident is meant any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person performing the act. To be critical, an incident must occur in a situation where the purpose or intent of the act seems fairly clear to the observer and where its consequences are sufficiently definite to leave little doubt concerning its effects*" (p.327).

Critical Incident Technique (CIT) is often utilised within qualitative research and is centred around actual events *"in order to reveal a commonly experienced range of challenges and situations"* (Bott & Tourish, 2016, p.280). It is a tool that allows the researcher to drill down within the interviews to gain insight into the phenomenon under investigation in the case study. By utilising CIT as the basis of the semi-structured interview guideline, it allowed concrete examples to be recalled by study participants related to micro-level communication at interagency interfaces.

As some participants were from the health sector and the research involved them sharing critical incidents of microlevel communication at interagency interfaces, a definition of the term critical incident within this research context was needed. This was because in the health sector, the term critical incident usually refers to a sentinel event (i.e., where serious patient harm has occurred). To ensure clarity of terminology, the researcher communicated an explicit definition of critical incidents to participants. A critical incident was defined as "*an incident, which actually happened to you or was directly observed which was critical or significant for you*". The researcher also outlined to the participants that the examples they provided could be either supportive or positively influencing, or inhibiting and negatively influencing micro-level communication at interagency interfaces.

3.3.3 Weick's Interpretative Approach

Weick's qualitative interpretive approach was utilised as the theoretical framework that underpinned the data analysis. This approach is of value when research is attempting to examine the sense and meaning people make of their experiences (Klenke, 2008). The interpretive approach focuses on understanding the meaning in human interactions (Creswell, 2007). It helps to illuminate or "*uncover salient issues*" and provides an "*opportunity to tell a story that few know about*" (Tracy, 2013, p.5). The interpretive approach is of particular value when researchers want to understand the system or phenomenon from the perspective of the interviewees or stakeholders (Klenke, 2008). Tracy (2013) maintains that "*the interpretive paradigm suggests that it is absolutely necessary to analyze social action from the actors' standpoint…*" and that researchers use this methodology to try and "*see the*

world from the participants' eyes" (p.41). Drawing on Weick's qualitative interpretive approach as a theoretical framework enabled the authentic perspectives of the participants from the VPT to be preserved through the data analysis.

For the case study described in this thesis, the standpoint of the participants in the IERT for vulnerable people towards interagency interactions and micro-level communications as they responded to the vulnerable people in the disaster were of primary interest. Specifically, the researcher was interested in determining each participant's sense of the micro-level interagency interfaces communication that occurred between them and others at interagency interfaces. Weick's interpretive approach ensured that the focus remained on how participants negotiated ways of communicating in the rapidly changing environment in the wake of the natural disaster.

3.4 Data Collection Procedures

3.4.1 Field Access

Each agency involved in the response for vulnerable people was identified and approached to seek approval to interview key staff involved in the emergency response. There were six agencies that intersected at a significant level with the IERT for vulnerable people, and a further 12 agencies were involved in the response, but interacted with the IERT for vulnerable people to a lesser degree. Of the six agencies, five of them had a representative that was part of the IERT for vulnerable people.

The researcher was able to identify the key agencies in the response process due to her involvement in the disaster response. Although not directly working within the IERT for vulnerable people, the researcher intersected with members of the IERT for vulnerable people while working within the Civil Defence CIMS structure. In this role, the same agencies were involved but often in different contexts (e.g., dealing with the general public). Those agencies that were approached were those that directly intersected and worked with the IERT for vulnerable people in responding to the needs of vulnerable people. These agencies were further tested through the discussion, development and validation of Figure 1 with key senior leadership members involved in the response as well as the VPT members themselves. The diagram below lists how the CIMS structure worked and where the VPT sat within that structure. It also shows the interface with the general public and the ARC teams requiring support and response as well as all agencies involved in the VPT response.

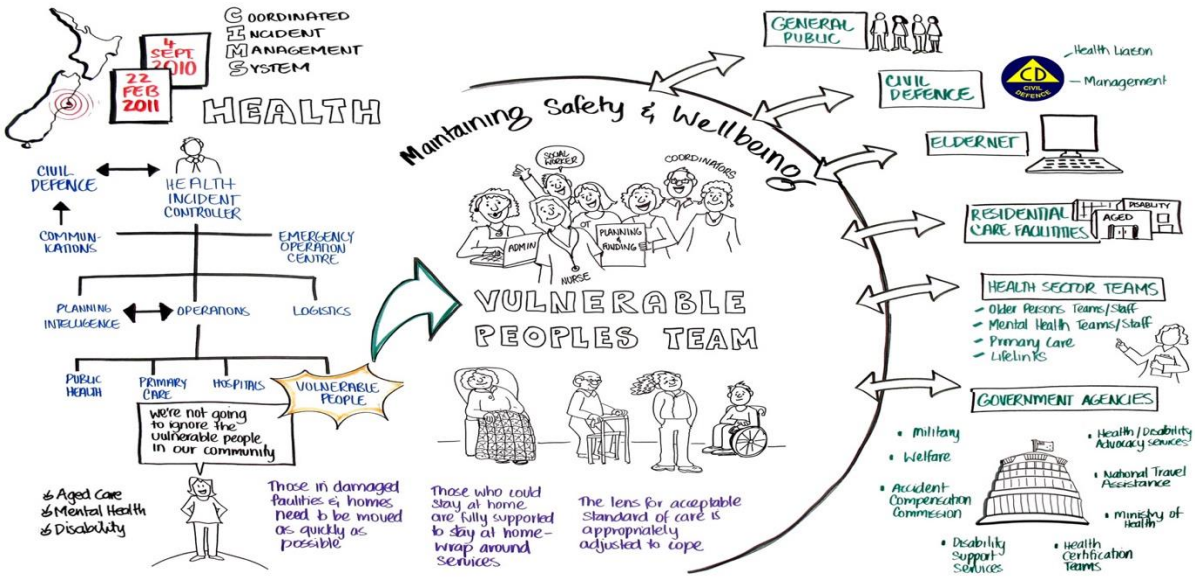

Figure 1 - The CDHB's IERT for Vulnerable People

Note: the ARC sector was one of the group of agencies at the centre of the response but was not involved in interviews as they were in the situation of receiving support and action from the VPT rather than being an active member or responder within the IERT alongside the other agencies.

3.4.2 Agency Selection

A letter inviting participation in the study and an information sheet on the researcher's aims and the nature of the study were sent to the leaders of the seven agencies involved in the IERT for vulnerable people. These invitations were followed up with a phone call and e-mails. After this approach was made, four agencies responded to the letter and e-mails and nominated representatives from within their agencies to meet with the interviewer. Some of these agencies were large and complex, with different branches and subgroups, and the agency leader of some of these subgroups also nominated a person to represent their agency for interview. Despite several approaches along with networking with key people, no response was received from three of the agencies listed below. The agencies contacted were:

- Civil Defence;
- New Zealand Defence Force including their other related agencies;
- Ministry of Health and their other related agencies;
- National Health Coordination Centre;
- Ministry of Civil Defence and Emergency Management;
- Canterbury District Health Board and other related health sector teams; and
- St John's Ambulance Service.

3.4.3 Recruitment

Each agency that responded to the invitation to participate in the research identified employees who had operated at an interagency interface within the response team dealing with vulnerable people.

Once approval was granted from the agency leader for their agency to participate, and key staff identified, letters were sent, contact was made and subsequently interviews were arranged.

3.4.4 Participant Selection

A mapping out of the IERT for vulnerable people diagram assisted in identifying the agency intersections, and the key people working within these teams who would need to be interviewed. A map of how the IERT for vulnerable people was set up within the EOC and arrows showing how interactions with the agencies was drawn up and then validated with the key clinicians (see Figure 1). This helped to identify how the agencies intersected within the VPT response and gave an image that demonstrated that the key goal of the IERT for vulnerable people was to ensure that vulnerable groups in damaged facilities and homes would be moved as quickly and safely as possible and that those who could stay at home would be fully supported with wrap around services. By undertaking this exercise this enabled the researcher to see more clearly the participants and how each organisation influenced and responded to the needs of vulnerable people. This understanding directed the plan for recruitment.

Table 1 - Participant role and hierarchies in target agencies

Agency Description	Interview Participant	Level in Agency Hierarchy	Gender	Disaster Response Role
Agency 1 Health agency responsible for providing and funding healthcare services in a region	CGA1*	High	Female	Local Manager
	DMA1	High	Male	Local Controller
	MGA1	High	Female	Local Controller
	NMA1	High	Male	Local Controller
	SWA1*	Medium	Female	Local Controller
Agency 1a A sub agency within Agency 1 that has a focus on older persons' health and disability service provision and within which the VPT was operationalised with external agencies contributing to the response	JDA1a*	Low	Female	Local Coordinator
	KPA1a*	Middle	Female	Local Responder
	LIA1a*	Middle	Female	Local Responder
	MDA1a*	Low	Female	Local Responder
	STA1a*	Low	Male	Local Coordinator
	TGA1a*	Middle	Female	Local Controller
	VFA1a*	Low	Female	Local Responder
Agency 2 An overarching agency that plays a role in providing regional, national and international security	GWA2	Middle	Male	Central Coordinator
Agency 2b A branch of Agency 2 that provides the land support and transport	BWA2b	Middle	Male	Local Manager
Agency 2d A branch of Agency 2 that provides the air transport and patrol	BJA2d	Middle	Male	Local Coordinator
Agency 11 Agency that leads the health and disability sectors	AFA11*	Low	Female	Central Responder
	GMA11*	Low	Male	Local Responder
	MMA11	Medium	Female	Central Manager
Agency 11a A specific agency that is set up as a structure under the accountability of Agency 11 which nationally coordinates and manages health responses to, as well as recovery from, emergencies when a national emergency is considered or has been declared	CBA11a	High	Male	Central Controller

**denotes member of VPT*

3.4.5 Interview Process

A total of 19 participants across the four agencies that agreed to contribute to the study consented to be interviewed. Each of these participants had operated at an interagency interface within the health response to vulnerable people. They were sent an information sheet and confirmation of their nomination by their agency leader prior to the interviews. An interview time was set up and, before the interview commenced, the consent form was discussed and signed. This outlined that the candidate could choose to withdraw at any point throughout the process. Once consent was obtained, the interviewees were provided with an overview of the interview process. The interviewer advised the participants not to name individuals, but instead refer to positions or agencies to decrease the risk of personal identification. Interviews took place from mid 2014 to early 2016.

A semi-structured interview guide was used, and participants were asked to reflect upon their experiences of communicating at the micro-level at interagency interfaces in the response to vulnerable people from the September earthquake until the end of the response period following the February earthquake events. Specifically, they were invited to give accounts of relevant critical communication incidents. The interviewer gave a definition of a critical incident as outlined in section 3.3.2. In order to mitigate some of the recall issues, information was sent to the interviewees well in advance of the interview to give them time to think through and remember events. Interviewees were also able to review their interview transcript and provide changes, ask any questions they may have had after the process was complete and also to forward any further additional information they may have thought of after the interview or review of the transcript. One candidate took the opportunity to provide further information via e-mail once the interview had been completed. This was added to the transcript notes and used in the analysis process.

Interviews took between 30-90 minutes and, on average, were approximately 50 minutes in length. Interviews were recorded using an iPhone device and the voice memo software so that the language used to tell each narrative could be examined in detail. The digital recording process was explained to participants, and the device was placed centrally and yet as unobtrusively as possible. Participants had the opportunity to comment on the data they provided at the end of each interview and were able to clarify or revise any points they may have made at that point but also after a transcript was made. Participants were able to withdraw from the research without any negative consequences up until the start of the analysis phase.

3.5 Data Analysis

3.5.1 Transcription

Digital recordings of the interviews were uploaded into a secure iCloud to enable the transfer of the memo software on the digital recordings. Once this initial upload occurred it was subsequently transferred onto a secure network once transcription was completed. The recordings were then deleted from the iCloud. Verbatim transcripts of all 19 interviews were made. Thirteen of the transcriptions were carried out by the author, with the remaining six undertaken by a professional transcriber. This person signed a confidentiality clause prior to completing the transcription. The names of the participants were pseudonymised using a coding system to ensure they could not be personally identified outside of the research team.

3.5.2 Participant Checking

As part of the quality management process of the data, participant checking was undertaken (Birt, Scott, Cavers, Campbell, & Walter, 2016). Participants were each sent their interview transcript for checking and were able to remove or correct any aspect of the data that they believed was incorrect or potentially personally or professionally harmful. Five of the interviewees provided corrections and feedback, which were accepted, and transcripts were amended. Although there was follow up with the other interviewees, no further feedback or changes were received.

3.5.3 Moving from Data to Conceptual Framework

An inductive approach to data analysis of interview transcripts was undertaken, based on Weick's qualitative interpretive approach. The transcripts were examined for accounts of communication examples at the micro-level that stabilised (and destabilised) interagency interfaces. At times, the interviewees did not identify an incident by using the specific word "critical incident". The researcher therefore had to judge if the event described was a "critical incident". This was done using the definition given at the time of the interview.

Each account was placed into a table that identified the incident, the interviewee, transcription line, the interactions and themes as part of the analysis, and the key communication challenges or successes that were attributed to the incident. Once the challenges or successes were identified, a code was applied. Codes were written on large sticky notes and were placed on the wall (635x775mm) (See Appendix) and grouped. As a result, over 45 codes were applied.

In a next step, relationships between codes were sought, which enabled the process of grouping codes into categories of meaning. Further analysis of the categories revealed similarities and overlapping content in some categories, which were finalised down to nine categories. As a final step, the categories were grouped under two core themes, which resulted in the development of a conceptual

model of interagency communication at the micro-level in natural disasters. At several points in the analysis process the researcher, in collaboration with her primary supervisor, reviewed data codes and categories to form a consensus on the analysis findings. The in-depth interpretative analysis of the transcripts was undertaken manually and then with the assistance of NVivo software, version 11.4.2, QSR International Pty Ltd., Australia.

3.6 Ethical Considerations

3.6.1 Ethical Aspects

The University of Canterbury Ethics committee formally approved the ethics application and supporting documentation for this study. A broad range of ethical considerations were examined including the issues around retrospective recall of the event, mentioned earlier, due to the length of time since the earthquake and the emergency response.

Also considered was the fact that in any qualitative study the researcher is inevitably part of the accounts they construct with the interviewees in interviews and the potential bias of the researcher who was already familiar with the response team. Rather than being seen as a concern, the researcher's knowledge of the chronology of events around the establishment and subsequent operation of the IERT for vulnerable people was judged to be vital to the research process. It allowed the researcher to have an in-depth knowledge about what was being studied and to ask well- founded questions regarding the critical incidents. The researcher was also able to use this knowledge to establish who needed to be interviewed and to develop rapport with them based on this first-hand experience. It also made the researcher particularly aware of the politics and sensitivities that permeated the IERT and the importance of trust and discretion. This awareness ensured that every possible effort was made to ensure participants felt safe and able to freely discuss the issues. It was important that the researcher was alert to any potential conflicts of interest between her researcher role and having been associated with the VPT. This was done by being transparent about her experience and giving participants as much control over the interview process as possible. Furthermore, each participant was given their interview transcript so that they had the opportunity to change their minds about participation or withdraw any of the data they had concerns about. These measures ensured the researcher's voice was minimised and participants felt safe and their voices were privileged in the data collection process.

3.6.2 Researcher Role in CDHB Emergency Response Team

As noted in the Introduction, the researcher was a member of the CDHB emergency response team and so had first-hand experience of the emergency itself even though she did not work directly with those interviewed during the response period. This meant she had knowledge of their positions, the

role of the IERT for vulnerable people, and the interagency interactions from the general briefings given at the time of the earthquakes.

This insider status was viewed as a positive and key part of the research design as someone present during the emergency response was judged to be well-placed to appreciate what occurred for the participants and to empathise with their experiences. At the same time, it is important to note that this knowledge increased the chance that familiarity, intimate involvement, and common history would influence the data provided and introduced the risk of bias. It was decided that this was balanced by the high level of trust that was possible between interviewees and the research because of the common history. Institutional superiors were also interviewed with no professional tensions or concerns with the interview process noted.

3.6.3 CDHB Researcher Role in Data Privacy and Security

All information was collected and stored in a confidential and secure manner. Data were transcribed and (continues to be) stored in a locked cupboard in a locked office on a floor that requires a security scan-card access. No information was shared with anyone outside the research team, i.e., the researcher, primary supervisor, and transcriber. Electronic data was stored on a password-protected file pathway on a secure computer. The signed consent forms have also been stored in a lockable cabinet on the floor with security scan-card access. All names have been removed from files to ensure the sources cannot be identified. Recordings have not been shared except with other members of the research team (e.g., the transcribing technician who signed a confidentiality agreement). They also will not be made available to any third parties outside the research team. The data will be kept for 10 years and then destroyed. Participants were informed of this when consent was obtained.

One of the most fundamental principles within health as well as in research is to minimise harm (Polit & Beck, 2012). Therefore, it was imperative that the researcher established a relationship of trust and demonstrated integrity throughout the research process (Creswell, 2007). For example, sometimes in research when a participant sees the written record of what was discussed during their interview, even when all references to their identity are disguised or eliminated, they may feel let down or potentially misrepresented. It was important to closely follow the process outlined earlier to mitigate this risk. The participants were offered confidentiality but not agency anonymity in the research process. They were not identified in the research, and the agency they worked for was given a broad description to allow the findings to be understood and to minimise the chance of compromising the agency's interests.

The researcher was aware of the possibility of disclosure of personal experiences (Creswell, 2007) and was sensitive to the possibility that a participant might became distressed through the process. A list

of support services was compiled so that she was able to refer the applicant to appropriate resources if required (e.g., counselling services). The information on support services was also provided to each participant and is included as Appendix 7.

Polit and Beck (2012) describe the ethical principle of ensuring respect of the dignity of the interviewee and how each individual has the right to decide if they wish to participate in the study. Through informed consent the participant was provided information of the nature of the research prior to the interview date. Informed consent also ensured that the research and its risks and benefits were clearly outlined (Creswell, 2007). See Appendix for a copy of the consent form that was used.

The CIT used in this study asked for both stabilising or steadying influences and de-stabilising or disruptive influences. It is acknowledged that retrospectively recalling memories may mean that this information can be flawed. However, there was considerable similarity between many of the interviewees' critical incidents across all agencies to be able to discern clear patterns. When making overarching statements about the study, the researcher made every effort to respect the integrity of the participants and to strive to authentically represent the data.

3.7 Constraints and Limitations

One of the constraints and limitations of this study is that not all agencies interacting with the IERT for vulnerable people agreed to participate. Numerous invitations were sent out to all agencies involved, and key staff that had previously been identified within the organisations were approached but no response to the invitation to participate was taken up. This has meant that several agencies that could have contributed different views of the incident were not represented. However, it is important to note that there were substantially similar responses from the four agencies that did respond and were interviewed both at the local and national level which adds some rigour to the process.

Time delays meant the data collection was spread over more than two years. This was partly due to intermittent availability and the length of time taken to respond by the interviewees. This delay may mean that some of their recollection of events may have been altered. Each interviewee was given information at least a week prior to the interview to give them to time to think back on events. There was also an opportunity to provide further information or feedback after the interview which one candidate did, sending further information she wished to have added to her interview transcription.

With any study that focuses on one occurrence there is always the question of how applicable the emergent conceptualisation will be in other situations. This concern needs to be balanced against the rich and finely nuanced data that underpins the conceptualization that is produced by a qualitative case study like the one undertaken in this project.

4 Findings

4.1 Introduction

Two primary themes were identified from the participants' experiences in interagency communication, firstly, *destabilising/disruptive factors* in interagency communication and secondly *stabilising/steadying factors* in interagency communication. The first theme, *destabilising/disruptive factors in interagency communication* was partitioned into five sub-factors, namely: i) conflicting role mandates; ii) rigid command structures; iii) disruption of established communication infrastructures; and, iv) lack of shared language and understanding; v) situational awareness disruptions (see Figure 2). In addition, under this first theme, there was a third sub-level identified during inductive analysis, where sub-factors were noted to be uniquely interconnected by emergent "consequences" arising out of the disaster context.

The second theme, *stabilising/steadying factors in interagency communication* was divided into four sub-factors: i) establishment of an integrated emergency response team; ii) emergent novel communication strategies; iii) establishment of a liaison role between agencies; and, iv) pre-existing networks and relationships.

In the following sections, these two primary themes and their associated sub-factors will be fully described with the use of key quotes from participant's critical incidents to illustrate the findings. The two themes and their associated sub-factors are summarised graphically in Figure 2.

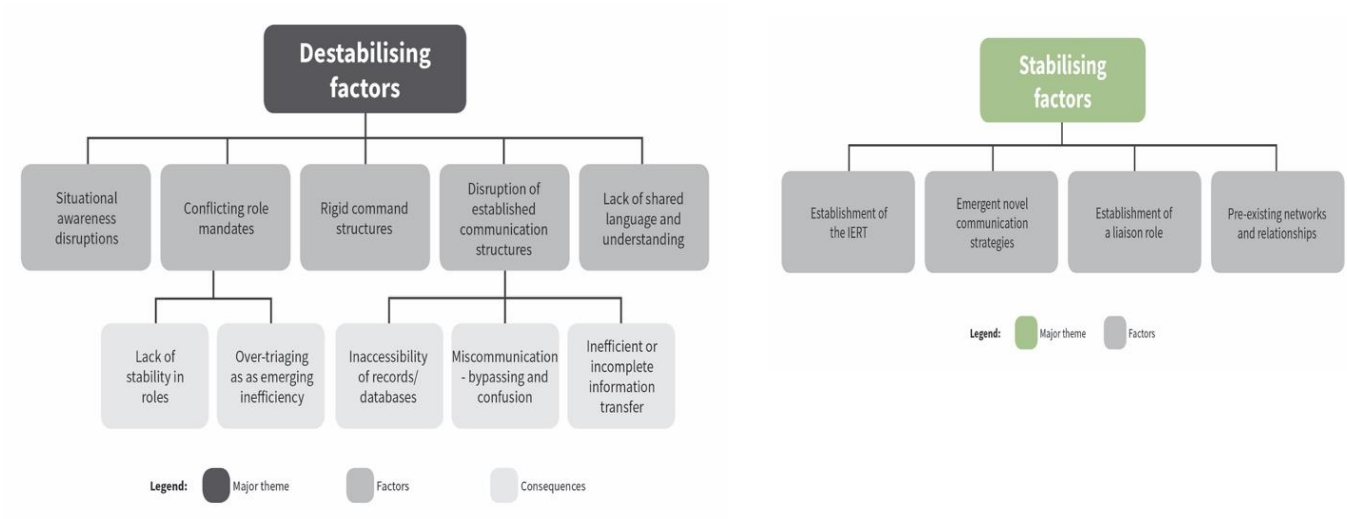

Figure 2 - Factors in interagency communication

4.2 Destabilising Factors in Interagency Communication

The first primary theme which emerged from the analysis of the interview transcripts was (a) destabilising/disruptive factors of interagency communication, which is defined as the elements that inhibit effective responsiveness and interagency coordination at the time of a disaster. Under this overarching theme, five sub-factors are presented as distinct inhibitory elements *(see Table 2)*.

Table 2 – Destabilising factors, definitions and consequences

Sub - Factor	Definition	Consequence
Conflicting role mandates	Role clarity issues at both the personal and the organisational level impairing emergency response to vulnerable people	• Lack of stability in roles; and, • Over-triaging as emerging inefficiency
Rigid command structures	Rigid communication practices and varied organisational cultures impairing the emergency response	• Inflexibility in response
Disruption of established communication infrastructures	Disruptions to normal communication infrastructures impacting on the response to the vulnerable	• Inaccessibility of records/ databases • Miscommunication and confusion • Inefficient or incomplete information transfer
Lack of shared language and understanding	Differing organisational languages and cultures resulting in misunderstanding and impairing the emergency response	• Miscommunication and confusion
Situational awareness disruptions	Breakdown in comprehension of the situation and unclear perceptions of the changing environment impairing emergency response	• Miscommunication and confusion

4.2.1 Conflicting Role Mandates

Conflicting role mandates was the code applied to the first major sub-factor that participants reported disrupted interagency communication. The critical incidents participants employed to account for their views about conflicting role mandates that hindered communication at the micro-level were coded to this sub-factor – 'conflicting role mandates'.

In the context of the natural disaster, role clarity problems arose in the rapidly changing environment. Local agency participants described their uncertainty about whether they had appropriate skills for the situation and reported the questioning their delegated authority in "emergency response" roles, as opposed to their normal roles. They acknowledged that they were at times confused and conflicted about what exactly these roles entailed (KPA1a, LIA1a). Some participants in local agencies also

disclosed that this lack of clarity had a flow on affect to their team members, who were subsequently puzzled and struggled to understand what was required of them (KPA1a, LIA1a). There was also confusion about where the normal role ended and where the emergency response role started, especially where there was overlap (KPA1a, LIA1a, STA1a). A further difficulty encountered was having the wrong type of personnel in the wrong roles. For example, in the early days of the natural disaster response, some VPT members did not have the communication skillsets initially required to interact with other agencies appropriately at the interpersonal level and this detracted from the quality of the interactions between agencies (GMA11, MMA11, STA1a). In addition, participants within one local agency reported occasions where several internal teams undertook different components of the interagency response for vulnerable people, and yet leaders in this local agency did not have a clear overview of these various team roles external to their agency or their emergency response mandates. Participants also reported situations arising where local agency staff members had a misperception around their remit, sometimes making pivotal decisions on vital resources without clarifying first whether this was within their mandate to do so (LIA1a, STA1a). In the immediate response to the natural disaster, confusion arose at both the personal and organisational level related to changing roles and uncertainties due to rapidly evolving responsibilities and role mandates.

Lack of Stability in Roles

Participants reported these uncertainties and problems regarding conflicting role mandates destabilised interagency communication and produced a lack of stability in roles that contributed to initial chaos in the emergency response. Such experiences were coded as a consequence. Some participants expressed frustration that they did not have one point of contact: *"we found it really difficult trying to get hold of people in Agency 10s…because you know…managers and staff change all the time"* (MMA11, lines 510-522). One of the participants from the VPT highlighted the long work hours and multiple roles being fulfilled by people in the early days after the natural disaster: *"the same staff were there two days later after the earthquake…couldn't get any of their own staff in…they'd been 48 hours on the run…every time you rang the Agency 10 a resident answered the phone"* (LIA1a, lines 159-167). Rapid changes and discontinuities in role assignments in the emergency response led to frustrations that further destabilised interagency communication.

Part of this issue was due to the complex range of problems arising in the chaotic environment post natural disaster. This included, for example, the need to determine the health status of hundreds of vulnerable people, triaging to assess evacuation need and managing physical safety for staff and vulnerable people due to the magnitude of damage to facilities and the on-going aftershocks. This was vividly described by one participant as *"… thinking about how…how could water get to the, how can*

generators get to them, do they need to evacuate, what's the process for that?", or having to *"… be in the moment of the assessment while all around them was chaos"* (SWA1, lines 161-171). The chaotic environment and lack of role clarity was experienced as especially demanding by participants tasked with the difficult decision of whether to evacuate vulnerable people (DMA1, GMA11a, LIA1a, MDA1a, NMA1). As one participant reported:

> *"…so, they said "All these people have to leave"…[…]…one of the criticisms that we suffered was that people felt that we were moving older people around during the middle of the night when they were very vulnerable. You know what, in hindsight, yeah. But during…if something really horrific had happened, people would have said, "Well, why didn't you move [them] earlier?"* (MDA1a, lines 211-220).

Another participant elaborated on the difficulties:

> *"I mean people made appeals, appeals, "please don't take my mother."… […]…and you know we basically just said, "We can't do this on a whoever screams loudest gets to stay. Everybody has to go." And even people I knew quite well…[…]…I knew it wasn't going to be good for them to go. I was like, "You've got to go. We don't have a place for you and I can't play favourites because I know you."* (MDA1a, lines 455-457).

Based on health assessments, some local agency participants considered the responsibility for the decision on evacuating each individual vulnerable person was theirs but found their decisions were overridden by other agencies. For instance, based on health assessments, the senior teams of local Agency 1 made a decision that specific vulnerable people required a plane to allow them to be evacuated. However, a national agency over-ruled this decision and sent a bus instead (CGA1, DMA1, KPA1a, MGA1). The other agency also removed people from the lists without consultation. One participant described this poignantly, *"they [Agency 2d] were drilling through lists and if they saw anything they didn't like they wouldn't take the person…[…]…with dementia…[…]…had words like aggression in their notes and stuff. So, they would certainly start to wipe them out [remove them from air evacuation lists] and we would say "No, no, no! It's a little old person. If you don't annoy them, they won't hit you"* (LIA1a, lines 453-474). At the organisational level, participants reported confusion caused by the lack of stability in roles and role mandates of personnel from participating organisations that destabilised interagency communications and, as a result, the emergency response for vulnerable people was disrupted.

Over-triaging as Emerging Inefficiency

A major inefficiency emerging out of the problem of conflicting role mandates. This was over-triaging and this was coded as a consequence. Triaging is a medical term used to describe the sorting of patients in order of their injuries or illnesses. In this context, the majority of those being moved were

relatively stable, and it was felt by the interviewees that those being evacuated were over-triaged. Participants from different agencies described the frequent re-assessment of vulnerable people noting that *"every time they changed transport mode, they got re-triaged…[…]…introducing a huge delay for somebody that uh…you know had a diagnosis and a treatment plan in place and you know…their condition hadn't really changed"* (CBA11a, lines 83-93). Furthermore, as each different agency prepared to handover of evacuees, this (re)triaging was often carried out by individuals without the appropriate skill level to do so. For example, Agency 2 and 2d teams were trained in the context of unstable battlefield casualties, rather than skills for evacuating frail elderly with relatively stable but chronic conditions (AFA11, BWA2b, CBA11a, JDA1a, KPA1a, NMA1, SWA1a). In the complex and chaotic environment after the natural disaster, over-triaging occurred as a result of conflicting role mandates at organisational level, which led to delays in evacuation of vulnerable people and inefficient use of over-stretched resources.

4.2.2 Rigid Command Structures

Rigid command structures was the code applied to the second major destabilising sub-factor in interagency communication. The critical incidents participants employed to account for their views about the way rigid command structures hindered communication at the micro-level were coded to this sub-factor – 'rigid command structures'.

Participants gave numerous examples of critical incidents where rigid command structures disrupted interagency communication (KPA1a, NMA1, MGA1, STA1a). It was acknowledged that everyone had similar overarching goals but the *"bureaucracy and our processes and our organisational um…cultures kicked in um…and became barriers to productive communication between agencies"* (SWA1a, lines 83-88). When coming up against differing organisational to their own, some interviewees described themselves as feeling *"bewildered"* (KPA1a, lines 359-371) and unsure how to interact and navigate through foreign methods of communication. For example, one participant outlined how difficult it was to influence responsiveness to reported needs "on the ground"; i.e., when given an order that was *"created in Wellington…"* (LIA1a, lines 144-149). Regardless of the crisis situation, this participant reported "*…they would just stand there literally like robots and say "our orders are to do A"…[…]…and is was like oh my God, are you human?"* (LIA1a, lines 144-149). Participants reported rigidity in communication pathways and command structures the slowed down responsiveness to the natural disaster by making interagency communication difficult.

Participants from local agencies experienced a lack of flexible responsiveness from national agencies during their efforts to address the needs of vulnerable people in the crisis following the natural disaster. This was most apparent in the processes related to evacuation of vulnerable people.

Widespread damage to local infrastructures (lack of power, water, sewerage etc.) meant these people could not be adequately cared for locally and their lives were endangered as a result. For example, when it was realised that there was an urgent need to remove vulnerable people from the region, the VPT, alongside Agency 3, worked with Agency 2 to ensure that the paperwork required for the evacuation was finished in a timely fashion. However, transport of vulnerable people to the airport could not be commenced until the standard required by Agency 2 and Agency 2d was met (CGA1, DMA1, KPA1a, MGA1). The prescribed rules and procedures of national agencies (with which local agencies were not necessarily familiar) created delays and increased stress for vulnerable people resulted. As one of the VPT leaders, SWA1 described the situation:

> *"…for those vulnerable people that was a horrendous experience. They had had two days and nights in darkness [at their Agency 10 facility]…[…]…then bussed…[…]…that was challenging in terms of mobility, continence, uh…dementia, medication, um…confusion and so they were arriving in the middle of the night to be orientated to a really foreign place…[…]…because we couldn't convince them [Agency 11] that we needed them to be airlifted…[…]…it became a bureaucratic nightmare to get it done…"* (SWA1, lines 223-262).

National agency participant BWA2b stated that local Agency 1 had a *"lack of understanding of…when Agency 2d says the doors [are] closing at a time, it closes, and the aircraft goes"* (lines 205-214). However, Agency 1, the VPT and Agency 3 were not flaunting rules; rather they were uninformed about them. As one VPT member working directly on evacuation said *"…no one told us that we should've had them on the bus earlier than that…[…]…if we had got them on the bus earlier and got them on the plane quicker, then they would've flown…[…]…and that was probably the saddest night for me"* (KPA1a, lines 141-152). This was echoed by another participant, who said it was "*this incredible bureaucracy in the middle of the disaster that broke the back for a number of people*" (MGA1, lines 423-489) and reflected that:

> "*I don't think anyone felt they had done a good job because of the bureaucracy…It's a bit like the situation of someone standing in Wellington saying this is dreadful, you can't have these people [living like this]…and we were saying you ought to be down here, it is dreadful here."* (MGA1, lines 423-489).

This lack of flexible responsiveness from national agencies to the needs of vulnerable people requiring evacuation from the disaster zone in Christchurch meant that protocol had to be challenged through an appeal to a higher authority. Tensions had built because national agencies were declining to continue evacuations as darkness approached. Reasons outlined by participants from national agencies were that, for example, the *"aircrew ran out of flying hours"* (BJA2d, lines 243-250) and that although a special allowance was given to allow some staff to continue flying, approaching nightfall was also a problem because *"Dunedin had no air traffic control after a certain point of time that day"*

(BJA2d, lines 243-250). For teams on the ground in Christchurch dealing with the desperate situation of hundreds of frail elderly, stressed vulnerable people stranded at the airport, this was difficult to hear. As one local agency participant reported:

> "…*"we are not flying them today because it's dark"…and I said "dark, dark, what do you mean? You fly people in the dark. What do you mean you are not flying in the dark? For god's sake turn the lights on the runway." My God!"* (LIA1a, lines 838-851).

A participant reported that for a senior leader in Agency 1 the situation had become untenable. A decision was made *"to override the central response because they said their planes couldn't take off. There was no way. And we ended up [requesting] an intervention through the Prime Minister's office…"* (DMA1, lines 306-310). This critical incident is one example of how the rapidly changing environment following the natural disaster together with red-tape and bureaucracy impeded responsiveness to the needs of vulnerable people and highlights how rigid command structures caused both confusion and frustration and were experienced as a destabilising factor that created unproductive interagency communication.

Inflexibility in Response

The use of rigid command structures by responding agencies had significant impacts on the vulnerable people and the participants responding to their needs within Christchurch. These rule bound structures resulted in significant inflexibility in the disaster efforts as a consequence. It appeared that participants struggled to influence these external agencies as well as their decision making and responsiveness. This added inflexibility meant that evacuations of vulnerable people were delayed, inappropriate decision making was made, and there was an over-arching failure to recognise the impact these rules and policies had on the most vulnerable awaiting urgent assistance as well as those on the ground responding.

4.2.3 Disruption of Established Communication Infrastructures

Disruption of established communication infrastructures was the code applied to the third major destabilising sub-factor that disrupted interagency communication. Coded to this sub-factor were the critical incidents participants used to account for their views about disruption of established communication infrastructures, which hindered communication at the micro-level.

Damage sustained to communication infrastructures disrupted emergency responses and co-ordination between agencies in the aftermath of the natural disaster. For example, the damage to IT network systems meant that the medical records of vulnerable persons were inaccessible for a period of time. As one interviewee outlined *"We had it on our physical internet, and until our internet came back up, we couldn't get to it…"* (CGA1, lines 283-304). One of the agencies identified that it was a

"complex sort of operation…very hard to get any clinical information about them at all" (BJA2d, lines 149-186). In addition, another participant described the scale of the operation and the difficulties of managing the response with inadequate IT infrastructure, *"management of information was clumsy within our team as we were trying to keep up to date status reports on over 100 Agency 10 facilities"* (TGA1a, lines 134-142), as well as a significant number of vulnerable people within the community. The collation of data through the single point of contact meant that information came in from a variety of sources including families ringing into the hotline, Agency 10s notifying of issues, and information being gathered from the teams out working with the evacuations. Furthermore, a VPT participant bemoaned the complexities created by a breakdown in usual IT operating systems, *"issues around data, and data collection and how we managed the data…there were a lot of issues around managing that."* (VFA1a, lines 115-132). Another interviewee highlighted that there were *"lots of errors"* due to multiple people entering data and multiple copies made within the system (TGA1a, VFA1a). Information then needed to be merged onto one spreadsheet at the end of each day but at times vital information was lost or subsumed with the amount of data that was entered. Interagency communication was at times incomplete, untimely and difficult due to the earthquake damage to critical communications infrastructure.

Moreover, the disrupted communications infrastructure delayed emergency responses and co-ordination between agencies in getting necessary help and resources to staff supporting vulnerable people "on the ground". For example, one participant reported an incident where one local agency's staff arrived at Agency 10 they found the owner deceased, crushed under a boulder and visible to distressed patients and staff who could not sound the alert or arrange timely help:

> "*…so, we had driven down there past massive pot holes that the car could've got lost in and get down there to a place that's under the cliff and there are boulders and stuff that could come down. And the team got out of the car and didn't want to go in. And so it is, my god, everyone is so fearful…"* (LIA1a, lines 114-138).

In addition to confronting their own fears, this team were distressed to find that when they got to the Agency 10 and realised the severity of the situation, they were then unable to communicate the urgency of the situation back to the VPT across the other side of the city because of the infrastructure damage to the phone lines and cell towers. They had to make the difficult decision to leave these Agency 10s to go get help to plan this critically important evacuation back at their base rather than commencing their movement immediately (LIA1a). The is just one instance where a participant experienced damaged communications infrastructure that severely hampered interagency communication and thus effective co-ordination of emergency responses in the aftermath of the natural disaster.

Inaccessibility of Records/Databases

Communication of relevant information about vulnerable people was impeded by earthquake damage sustained by the physical storage of information. As a consequence, records/databases were inaccessible and slowed emergency responses and coordination between agencies. Such experiences were coded as a consequence under disruption of established communication infrastructures. One of the examples given by interviewees that negatively impacted on the communication interfaces between agencies was the inability to access vulnerable peoples' clinical records due to the severity of damage to residential facilities their vulnerable people had to be immediately evacuated without any documentation. The conditions were best described by one of the VPT members when discussing the situation with a vulnerable person's relative, *"she's been living here with liquefaction up to the window sills, she hasn't been able to make it back to her bedroom, it's unsustainable…"* (LIA1a, lines 346-371).

Miscommunication and Confusion

A further consequence of disruption to established communication structures, arising from the natural disaster, was miscommunications that resulted in confusion. This appeared to destabilise interagency communication between local and national agencies and hindered the emergency response. For example, there was a requirement by the central Agency 11 for a national daily briefing teleconference with all of the central agencies as well as the other 20 Agency 1s across the country to gain a sense of what was happening, and what resources were required to support Canterbury in the emergency response (CBA11a, MGA1). However, in the first national briefing process, Agency 11 led the discussion and started out by firstly asking every other Agency 1 across the nation for an update on how the Canterbury earthquake was affecting them before finally asking for an update from Christchurch where the actual event took place. This particular communication event was described by one participant as:

> *"…a complete and utter abortion. It was just chaotic, there was no discipline…[…]...and I am thinking the disaster has occurred in Canterbury and you haven't even started the teleconference with "can we have an update with what's occurring in Canterbury"…I just couldn't believe it…*" (MGA1, lines 239-257).

This is an example of how the national teleconference process was initially challenging as some of the Incident Controllers reportedly did not have experience in running emergencies of the scale and magnitude in Canterbury.

Convoluted processes of communication added to the chaos in the wake of the natural disaster. This was described by an Agency 11 staff member on the ground in Christchurch working as a liaison within

the VPT. These convoluted communication processes were experienced as causing difficulties in getting timely responses from central agencies. An example is given below:

> "*…so, I was reporting to Agency 11 in Wellington and some of the things that came back, there was, from National Agency 4 [who were a central agency but physically managing the response in Christchurch]. So, it would go to Wellington and come back and there was something that had not happened in New Zealand before, it was something we weren't prepared for…[…]…the chain of command was unclear…[…]…that national group that sort of took a lot on themselves and broke the established link, the process*." (GMA11, lines 111-122).

The request would go from the liaison person in Christchurch up to Agency 11 in Wellington, who would then liaise higher up with Agency 11a and then this agency would send the communication request back down to Agency 4 in Christchurch to get the information. Then Agency 4 would feed the response back up to Agency 11 or 11a in Wellington and they would then feed this back down to their liaison person in Christchurch. As one participant highlighted, *"the limited coordination linkages happening centrally were really evident, with the left hand and the right hand not really knowing what they were doing"* (DMA1, lines 155-162). Another participant outlined the challenges emerging as a result:

> *"…we didn't have any direct lines of communication with logistics on the ground. That created two problems. One was we had a lot of trouble getting timely, accurate clinical information. There was a clear disconnect between what clinicians on the ground thought was adequate information and what we thought was adequate information. And being able to talk to them directly at that point would have been really helpful so that they could understand where we were coming from"* (BJA2d, lines 199-205).

Cumbersome processes of reporting up through structures to central agencies and back down through various channels to local agencies resulted in confusion and such miscommunications hindered effective interagency communication in the emergency response.

Inefficient or Incomplete Information Transfer

Participants experienced information transfer between multiple stakeholders was impaired in the volatile changing environment after the natural disaster and was also coded as a consequence of the disruption of established communication structures. For example, damaged telecommunications infrastructure and only an intermittent ability to communicate by phone meant that sometimes families were unaware that their loved ones were being evacuated. The decision to evacuate was often critically important for the safety of vulnerable people, and this left very little, if any, time to contact the vulnerable person's next of kin. Information transfer was also hindered by next of kin details not being up-to-date (GMA11). This coupled with the problem that the teams assisting with the evacuation of vulnerable people were also unaware that families were not informed:

> *"…a gentleman turned up to the airport and in a very agitated state. And he said "My wife is on your aircraft"…[…]…he hadn't been told that she was going anywhere…[…]…that was a surprise to me. And I realised at that point that probably none of the people on the aircraft knew where they were going and that probably their families did not know where they were. Which wasn't easy. So I took him on board…[…]…and he looked around and he said "you bastards, you've got my Grandma as well."…[…]…I found it hard…[…]…In retrospect, I understand what happened and I understand the challenges of the situation here within Christchurch, and that in a major disaster like that, there are not good choices."* (BJA2d, lines 224-231).

Another example of poor information transfer occurred at the interagency level. Between central and local agencies, there was increasing confusion in the process of information exchange regarding vulnerable people needing to be evacuated out of Canterbury. An information spreadsheet was prepared by Agency 1 at the request of Agency 11 and Agency 2. This contained vital information on each vulnerable person to be used by Agency 2d in the care and relocation of vulnerable people. An experienced clinician assessed each individual vulnerable person and the clinical information requested by Agency 2d was inserted, reviewed and sent to the central coordinating agency. However, the central coordinating agency notified Agency 1 that they would not evacuate because the information was "*just not good enough, and we don't have the details we have, and we are not going to be able to fly*." (CGA1, lines 436-453). As the VPT were in the middle of the acute earthquake response, they described having to divert team members to teleconference with Agency 11a and Agency 2 to go through each person line by line on the spreadsheet to check the accuracy of information (MGA1). Although, as requested, the local agency undertook this lengthy process with the national agency, no changes were made to the spreadsheet through this process. One participant complained that, "*we went through every single line of that spreadsheet, and we did not make a single change. There was not a single piece of information missing from that spreadsheet, there was nothing we needed to change*" (CGA1, lines 436-453). Participants from local agencies perceived that central Agencies 11a and 2 were "*trying to inflict processes, and not listening to what was happening in Christchurch"* (MGA1, lines 338-392). The challenges and disruptions to the processes of information transfer caused distress and confusion for many stakeholders in the aftermath of the natural disaster, which appeared to destabilise interagency communication.

4.2.4 Lack of Shared Language and Understanding

Lack of shared language and understanding was the code applied to the fourth major destabilising sub-factor in interagency communication. Those critical incidents participants used to account for their views about a lack of shared language and understanding that hindered communication at the micro-level were coded here.

In particular, participants from local agencies highlighted difficulties in interagency communication arising from the lack of shared language and understanding. One local agency participant expressed the wish for, *"simply the problem [to be] interpreted and explained…[…]…in a language that the person receiving it understands. Because each of these groups [inter-agencies]…all speak different languages and deal with things in different codes…"* (NMA1, lines 494-498). Another participant described the feelings of disempowerment the lack of shared language and understanding triggered, *"we felt a bit powerless to be honest. We didn't understand the system. We were always puzzled."* (KPA1a, lines 68-73). The absence of commonalities to draw upon meant that in the crisis and chaos of responding to a natural disaster, communication between agencies was hindered.

This led to problems effectively responding to the needs of vulnerable people following the natural disaster, which was most apparent in the processes related to evacuation of vulnerable people. Examples of the type of misunderstandings due to a lack of shared language were given by participants. One interviewee reported that Agency 2d documented some of the vulnerable people as *"hazardous cargo"* (NMA1, lines 189-192). Standard clinical statements from health professionals working at local agencies were interpreted differently by Agency 2 and Agency 2d staff (KPA1a, LIA1a). As one participant explained, *"when we describe people as dangerous or complex in Agency 1…we would describe that as a 92 demented old lady…it's different from dangerous cargo…"* DMA1 (lines 175-187). There was evidence of frustration by the VPT surrounding this as well as the way Agency 2 and 2d made changes based on this information:

> *"They then decided they needed the clinical notes and then they started…then they came back literally and said… "Um…we will take these 12 but not those 4." "What?? Why won't you take those four?" "Well, it says they are violent [Laughs]…yeah, okay, they've got dementia. They weigh about 40 kgs., I am sure you can manage them." Um…"oh, no, no, we can't possibly be putting anyone on a plane who has violent tendencies." So, we then had to go back and sanitise all of the notes so that the clinical notes that they [Agency 2] saw didn't say "violent." Because they would literally just reject people on the basis that the notes said they were violent. And we are talking frail older people. Very, very tiny frail older people."* (CGA1, lines 492-504).

A VPT senior leader stated, *"that's actually just normal ageing and that's not an issue…[…]…we would try to normalise but they [Agency 2 and 2d] couldn't"* (KPA1a, lines 21-64). Therefore, the clinicians took a few more hours to amend their notes in order to meet the threshold of Agency 2 to be able to proceed with the evacuation, which further added to evacuation delays. This lack of commonality and shared understanding appeared to destabilise interagency communication in the emergency response and had as a consequence miscommunication that resulted in confusion as previously outlined in section 4.1.4.

4.2.5 Situational Awareness Disruptions

S*ituational awareness disruptions* was the code applied to the last major destabilising sub-factor in interagency communication. Under this sub-factor, situational awareness disruptions were identified as creating major challenges in interagency communication during the natural disaster response.

Participants described critical incidents to account for their views about situational awareness disruptions, which hindered communication at the micro-level i.e., interpersonal level stating that there was:

> *"…[a] lack of understanding of what was really going on, on the ground…I was talking to those people [Agency 11] every shift…[…]…and it was just like repeating your story 50 times and there was just some block there. I don't know what it was, and I said "is this not written down? We've talked about this this morning. And it hasn't changed since this morning." And an individual would have to be briefed down to everything, but of course they had no concept of what was going on in Christchurch. They didn't really know what you were talking about, much less living in your reality…"* (LIA1a, lines 321-333).

Participants reported experiencing such disruptions horizontally, at the local level, between agencies as well as vertically with central government and other national emergency response agencies at national level. At the local level, interagency communication problems linked to situational awareness disruptions were mostly due to damage done to communication infrastructure by the earthquakes. Whereas communication problems linked to situational awareness disruptions with central government agencies, more often related to difficulties in navigating different agencies reporting structures, work cultures, and differing ways of working and meant that misunderstandings and mistrust arose at times.

A number of critical incidents identified by participants described situational awareness disruptions that were due to geographical distance. They not only referred to the geographical distance between Wellington (central government agencies) and Christchurch (local agencies) but sometimes to the geographical distance between the local agency (e.g., offices or base) and their outreach staff working with vulnerable persons in their place of residence or other settings (i.e., "on the ground").

At a local level, geographical distance between decision-makers in agency offices and their staff members "on the ground" meant that local decision-makers could not always tell what was needed. As one participant mentioned: *"We just took on faith that when people said they needed something, they needed it"* (CGA1, lines 581-586). Similarly, participants from VPT and Agency 1 held the view that "*the only people who know what they need are the people right there on the ground*" (CGA1, lines 571-582). Geographical distance limited prompt communication and timely maintenance of

situational awareness between agencies at local level and was primarily due to disruptions to usual communication channels caused by the natural disaster.

However, geographical distance was experienced as a significant destabilising factor that contributed to situational awareness disruptions in interagency communication between local and national agencies. Central agency staff in communication with the local VPT did not always appear to listen to those on the ground in Canterbury, who had direct knowledge of key issues (CGA1a, DMA1, LIA1a, MGA1). Participants from local agencies frequently reported that they felt central agency staff were second-guessing and questioning the information they provided (DMA1, lines 116-120). As one participant complained: "*all of these remote experts [were] thinking that they knew better what it was that needed to be done*" (CGA1a, lines 571-582). Another one local Agency 1 staff member reflected that:

> *"…the frustration was again getting the central…it was occurring down here in Canterbury but Wellington, both Agency 11a and Agency 2 Headquarters not understanding or…trying to inflict processes, and not listening to what was happening in Canterbury."* (MGA1, lines 338-392).

The disruptive impact of geographical distance on situational awareness was likened to being part of a completely different paradigm of reality by another participant:

> "*So, it was the paradigm shift that occurs when you are quite close to the event. You have to quickly adjust. But you don't see that further away from the event, because it's not obvious. So, their paradigm was not our paradigm and that was often difficult*." (MGA1, lines 409-423).

Local agencies reported communication problems with central government agencies that were linked to situational awareness disruptions. These communication problems at the local agency-central government interface were exacerbated by unfamiliar reporting structures, foreign organisational cultures, and differing ways of working, and meant that misunderstandings and mistrust arose.

Mounting doubts and misunderstandings arising in the interagency communication, caused by situational awareness disruptions due to geographical distance, meant central government agencies developed serious concerns as to whether local agencies were responding effectively to the needs of vulnerable people. For example, participants from one central agency described mistrust in local VPT decision-making and felt they needed to visit Christchurch themselves to verify the local (i.e., Canterbury's) reporting of events. A further driver behind this decision was responses from the general public. In the aftermath of the natural disaster, Agency 11 was fielding numerous phone calls from people concerned about their relatives. As one key official who was a study participant stated:

> "*the anecdotal reporting, we were getting or reports from members of the public going into the Minister's office of unacceptable conditions where…[…]…their parents were. You know that drove the need to do those visits [in Christchurch]…[…]…Just because your provider tells*

you everything's fine and good, it's probably something that needs to be independently validated" (CBA11, lines 446-453).

Geographical distance contributed significantly to the situational awareness disruptions that destabilised interagency communication between central government and local agencies, resulting in misunderstandings and mistrust. The consequence of these misunderstandings, the second guessing, and mistrust from the loss of situational awareness contribute to the chaos was miscommunication that resulted in confusion. This consequence is further outlined in section 4.1.4.

To improve situational awareness, a central government agency resolved to make an information seeking visit to the region hit by the natural disaster. Participants from central government Agency 11 could not comprehend from a distance how widespread the damage was and had concerns about the accuracy of local Agency 1's reporting. For example, one participant from a central agency highlighted how disturbing it had been to even imagine that: *"Agency 10 [was] operating in Christchurch with no water, no toilet, no sewage facilities and no power"* (MGA1, lines 205-238). However, participants from local agencies like Agency 1 knew it was "*…situation normal for everybody in Christchurch*" (MGA1, lines 205-238) that 80% of Christchurch residents were without power and and a similar percentage were without water and sewage. Furthermore, due to the severity and scale of the earthquake event, it was understood locally that the *"lens of acceptable standard of care had to be changed"* (TGA1, lines 442-443). For example, one short-term aim was to keep all of the Agency 10 service providers operational despite the entire city's infrastructure being severely damaged. Significantly, no further changes to the emergency response were made as a result of the central government agency visit, despite their concerns about whether local agencies were responding adequately. Nevertheless, study participants from local agencies did highlight that the central agency visit improved situational awareness regarding the widespread challenges within Christchurch and the sheer complexities of what the local agencies were dealing with (TGA1a, VFA1a).

4.3 Stabilising Factors in Interagency Communication

The second key theme emerging from the analysis of the interview transcripts was *stabilising/ steadying factors in interagency communication.* This theme is defined as the elements that support and enable effective responsiveness and interagency coordination at the time of a disaster. Under this overarching theme, four sub-factors are presented as distinct enabling elements (see Table 3). In the following sections, these themes and sub-factors will be fully described with the use of key quotes from participant's critical incidents to illustrate the findings.

Table 3 - Stabilising sub-factors and definitions

Sub-Factor	Definition
The establishment of the IERT	Putting together an interagency emergency response team to help ensure access to critical services for vulnerable people following a natural disaster
Emergent novel communication strategies	New communication strategies arising at interagency interfaces in the emergency response to vulnerable people
Establishment of a liaison role	Liaison role as a conduit facilitating communication between agencies and supporting the emergency response
Pre-existing networks and relationships	Pre-existing networks and relationships, both through ongoing planning and exercises, as well as through normal business processes, facilitating communication at agency interfaces during the emergency response

4.3.1 The Establishment of the IERT

The *establishment of the IERT* was the code applied to the first major stabilising sub-factor in interagency communication. Under this sub-factor, participants described critical incidents to account for their views about the establishment of an IERT focussed on vulnerable people, which improved effectiveness in communication at the micro-level.

The establishment of an IERT focussed on vulnerable people (VPT IERT) was highlighted by a number of participants as being one of the crucial sub-factors that helped to stabilise communication interfaces between agencies, as they sought to ensure access to critical services for vulnerable people following the natural disaster. The IERT for vulnerable people drew from previous experiences of planning for pandemics and other disaster scenarios, where they had been *"rehearsing and thinking through what would happen to this group of people"* (NMA1, lines 25-33). They had identified "*… that vulnerable people in a disaster become even more vulnerable"* (MGA1, lines 48-80) and as one senior clinician outlined "*you could say vulnerable persons is the responsibility of every group, and it is, but I still think you need something to hold it together"* (NMA1, lines 667-674). As one of the participants summed it up:

> *"Yes, really clear in terms of we were not going to have another Hurricane Katrina. So, who suffered in that? Actually, it was the elderly. It was the vulnerable communities that no one gave a shit about…[…]…I think it probably reflects a bit of the values-based thinking right through the organisation…[…]…it all kind of resonated with them…[…]…I guess in a peculiar sort of way that was one of the critical sort of success factors that we put into place, without realising it probably at the time, is we set a benchmark; this is not going to be Hurricane Katrina."* (DMA1, lines 507-516).

The IERT for vulnerable people was able to draw on past experience and training in their sensemaking processes in the rapidly changing environment following a devastating earthquake.

The IERT for vulnerable people set up formal communication channels and regular times for information exchange, which helped stabilise communication between agencies during the emergency response. For example, processes and one of the immediate actions immediately after the major earthquake was to phone each Agency 10 to determine their status twice a day and document key issues and communicate out what actions were required (CGA1, JDA1a, SWA1, TGA1a, GMA11). During these phone calls, key standardised questions were asked of each Agency 10, such as *"do you have power, do you have water…[…]…have you had an engineer there, you know, what's the state of the building"* (JDA1a, lines 195-202). This twice daily reporting seemed pivotal in meeting emerging needs in this ever-changing environment, and the clinical team appeared to be highly functional, practical and adaptable to change as the situation itself evolved. An example of this was when Agency 4 distributed portaloos out to each facility, but they were found to not be practical for the elderly or those with disabilities. The VPT IERT identified this issue, communicated it back and then worked with other agencies to come up with solutions more appropriate for these groups. As one of the Agency 1 leaders described this way of working, *"so it was the problem solving that went on, looking at things through the lens of the vulnerable."* (MGA1, lines 772-785). This enabled the VPT IERT to prioritise and plan based on need, in order to help ensure access to critical services for vulnerable people following the natural disaster.

The VPT IERT provided a pivotal and prioritised communication link into logistics both in Agency 1 as well as within other agencies. This meant that the Agency 10, who like the rest of Christchurch were without core infrastructures, were able to obtain much-needed supplies such as water, medications, oxygen, bandages, hygiene items, and portaloos to keep them operational. For example, after phone triage processes each day, teams were sent out face-to-face to verify the status of each agency, and if appropriate, identify which ones may require urgent evacuation (JDA1a, MGA1, TGA1a). Making the crucial decisions to evacuate was not without its challenges as described by those present:

> *"Also, being clear that for many of these elderly people they would be shifting to somewhere else in the country and many of them would never come back. And that…you know, kind of that sense of…very clear decisions that were going to impact forever on…[…]…the end of people's lives."* (DMA1, lines 135-144).

A number of those interviewed outlined the value of going out to see the 100-plus facilities and to visit vulnerable people within their communities (JDA1a, KPA1a, MDA1a, STA1a, TGA1a, VFA1a). It allowed them to be the eyes and ears for their agencies and communicate back greater understanding of Agency 10's status and needs, such as structural or engineering support. As one of the VPT IERT leads described it, they worked hard to provide *"…anything that enabled people to keep looking after people in their care...."* (TGA1a, lines 425-433). It also ensured that engineers could be obtained and

brought in urgently to assess the Agency 10 sector home to assist in stabilising these facilities so that they could continue to operate and deliver vital care to older people and those with disabilities. Regular communication briefings by the VPT IERT to other agencies responding also enabled the wider agencies to understand that although the facilities were damaged and that *"standards around quality [had] changed"* (TGA1a, lines 424-432), the primary goal was to ensure that supplies were delivered, facility problems were addressed, and that issues were escalated immediately as they arose (JDA1a, TGA1a). The establishment of the VPT IERT proved stabilise the interagency communication during the emergency response and they played a key role in facilitating interagency coordination to ensure access to critical services for vulnerable people following the natural disaster.

4.3.2 Emergent Novel Communication Strategies

The *emergence of novel communication strategies* was the code applied to the second major stabilising sub-factor in interagency communication. Under this sub-factor, participants described critical incidents to account for their views about the emergent novel communication strategies, which they believed improved effectiveness in communication at the micro-level during the natural disaster response.

In the wake of the disaster, new communication strategies emerged during the emergency response, which provided critical information flow between the VPT IERT and to other supporting agencies. They consisted mostly of the novel use of technological solutions such as interRAI [3], an 0800 hotline, an internet platform, and texting.

The national interRAI dataset emerged as a novel solution to assist in rapidly determining which vulnerable groups were the most at risk post-disaster. During phase one of the emergency response, a senior Agency 1 VPT IERT member proposed that the interRAI dataset could potentially be utilised and contacted the national agency that managed it. The question was posed to the person responsible for the data as to whether there was an ability to calculate which vulnerable person would be at the highest risk, what their needs were and where they lived. An algorithm was developed and a dataset of "*about 1000 people in order of risk in the community*" (NMA1, lines 75-93) was generated. This enabled the VPT IERT to prioritise the most vulnerable people and provided good information enabling triaging, prioritising and communication out to those who were the most vulnerable, assisting them to be found urgently (AFA11, CBA11a, NMA1). The tool was by no means perfect (at the time of the devastating earthquake, interRAI had only been in situ for two years, which meant that volumes of

[3] The interRAI system, which stands for "International Resident Assessment Instrument", is a "suite of seamless and comprehensive clinical assessment tools, developed by an international collaborative to improve the quality of life of vulnerable people" (https://www.interrai.co.nz/).

assessment were low due to the relatively recent rollout of the tool) and although useful information was obtained, it was not comprehensive due to the programme's infancy. In addition, datasets were *"only a snapshot in time"* (LIA1a, lines 432-443) and therefore any changes to vulnerable people would not have been necessarily captured between the point of the assessment and the evacuation period. However, as one participant noted, *"…if you could target in a neighbourhood 20 people with dementia…[…]…know how bad the dementia was…[…]…and whether they are likely to survive in that environment"* this helped to guide the type of agency response and resources required to manage them (NMA1, lines 568-570). In the absence of any other superior alternative, the novel use of interRAI enabled emergency responses for vulnerable people to occur more quickly and more precisely.

A further strategy strengthening communication at the micro-level during the natural disaster response was the establishment of a hotline for vulnerable people. This hotline was staffed by experienced personnel who collated information, provided guidance and follow up, and contributed to ensuring needs were effectively collated in terms of critical services for vulnerable people in the community, or within an Agency 10. As one participant stated, "*…so the system kicked in, we knew where everybody was, no one was lost*" (SWA1, lines 287-288). The information on each vulnerable person gathered from the hotline was entered into a database. Although this was seen as essential by participants (TGA1a, VFA1a), in hindsight it was identified that this database needed to be internet- or cloud-based rather than being reliant on an organisations internal information communication technology structure (GMA11). This would have enabled other agencies to review and see the documentation, family or next of kin input, and to see issues facing each individual vulnerable person and share information they had gathered as well. The 0800 hotline for vulnerable people streamed information into one single point of contact helping to provide continuity and ease of access to coordinating agencies for anyone that had concern for a vulnerable person.

Similarly, the ElderNet[4] website proved to be a novel solution strengthening communication between agencies at the micro-level during the natural disaster response. This was a private website already in use by Agency 10 to communicate with each other in their service delivery prior to the natural disaster and was commercially sensitive. Access was made available to the VPT IERT to enable them to determine *"how many vacant beds they've got…so we got a live bed state…twice a day"* (JDA1a, lines 159-164) which enabled them to prioritise what beds could be utilised for the most vulnerable. It also *"became a key means of communication after the February quake…"* (TGA1a, lines 218-226), allowing distribution of key information, news, or notifications to all of the Agency 10 sector simultaneously

[4] A website resource that provides impartial and comprehensive information for older people within New Zealand (https://www.eldernet.co.nz/Services%20Directory).

(GMA11, JDA1a, SWA1, TGA1a). This included providing current status updates, key contact information such as where to get supplies, as well as notify them what the current status was for evacuating vulnerable people out of Christchurch. Agencies could also share information and tips they may have as well through this website and it *"became the go-to place for people who were facility providers to get information"* (SWA1a, lines 333-336). The only drawback of this website was that access was limited to the VPT IERT, Agency 1 and ElderNet members rather than opening it to all agencies involved in the vulnerable people response. Having the ability to communicate using this web-based interagency interface simultaneously in this way improved the effectiveness of the coordination and emergency responsiveness dramatically.

The use of text messaging to complement phone calls emerged as a novel solution to assist in the coordination between overburdened agencies caring for vulnerable groups post-disaster. A VPT IERT member described its effectiveness in the following way:

> *"…we set up a texting system, which was the most effective means of communication because the cell phones are kept up to date by the providers themselves on [the ElderNet website]. We could get a message out to clinicians who were roving the floor, the managers, that didn't take them away from their day job to go and answer the landline and they could send a message very quickly back to us saying yes we need help or no we are okay"* (TGA1a, lines 241-247).

When a major damaging aftershock occurred, each facility would be texted asking if they were okay and whether resources or support was needed. The agencies could simply text back a simple "No" or state what help was needed. This strategy ended up benefiting the Agency 10s, both in terms of decreased time spent on the phone, as well as to keep service delivery flowing efficiently. It also significantly shortened the time taken to contact facilities. For instance, in the February event it took up to five days to make direct contact with every agency. But, through review, refining and redrafting the communication strategy and implementing the text messaging process rather than using the traditional phone lines, the VPT IERT were able to subsequently contact all agencies within 2.5-3 hours (TGA1a) after strong aftershocks. The introduction of text messaging dramatically reduced turnaround in contact time, and improved timeliness in communication status updates with all facilities.

4.3.3 Establishment of a Liaison Role Between Agencies

The establishment of a liaison role between agencies was the code applied to the third major stabilising sub-factor in interagency communication. Under this sub-factor, participants used critical incidents to account for their views about the establishment of the liaison role, which improved effectiveness in communication at the micro-level during the disaster response.

The establishment of official liaison persons proved to be pivotal in stabilising communication interfaces when working face-to-face with the interagency teams. Participants highlighted that in emergency responses, a liaison role should be in situ as soon as possible to connect together all of the different agencies responding, to gather information and to navigate and provide assistance through each agencies report structures. As CGA1 put it *"…so someone needed to understand the context of the whole thing we were trying to pull off. But also give us advice, um…about how best to do it...together we problem-solved*" (lines 527-531). It was reported that the liaison role smoothed the way, helped to broker issues and represented the perspective of their agency. One participant summed the importance of this role up by saying:

> *"…it's always easier to deal with an organisation if you've got a liaison person in an emergency because the person you're talking to understands the whole…[…]…because there's been a discussion, they've thought through the process, and you haven't got to explain it all again. And we learnt that by having liaison people…[…]…they just gave us a perspective, and they gave our perspective across so that I think was a critical factor. Prior to the earthquake I used to think liaison sounds nice but…doesn't sound essential. But it is essential, because…they understand what's going on at one end and can talk to somebody at the other end…[…]…I realised that liaison was critically important…otherwise the message is going to be this long [arms stretched out wide]."* (NMA1, lines 503-532).

The liaisons were able to "*influence the messaging and…to raise issues…that needed escalation. But also…able to influence the thinking*" (MGA1, lines 181-187), and "*cut through the red tape*" (JDA1a, lines 236-246) to get answers to questions without having to go through all of the EOC and multi-organisational layers. For example, one participant reported that when a request went through for a very large generator and the need was challenged by a national agency, the liaison person was able to provide context and outline that a number of the hospital beds were without power and this generator would keep critical clinical equipment and the facility operational. This resulted in the request for the generator being prioritised and expedited to the facility (NMA1). As another participant, who was a senior Agency 1 member recalled:

> *"……the only people who know what they need are the people right there on the ground…[…]…the only people who knew what that Agency 10 needed are the people in that Agency 10. So, you can't sit here and second-guess what they are dealing with. Nor can you sit in Wellington and second-guess what Christchurch is dealing with. I would say the one single issue were all of these remote experts thinking that they knew better what it was that needed to be done…the key piece of learning…so that if you are going to run a disaster, you therefore have to take on faith what the people who are actually on the ground, actually in the situation say that they need. You can guide them and give them suggestions and say you know…have you thought of…but you know, you can't tell them "no you don't need that, you need something else"* (CGA1, lines 570-613).

The liaison role linked and shared information across agencies. In connecting key agency stakeholders in the disaster response, they contributed to stabilising communication by improving the communication flow, through enhancing situational awareness, by breaking down inter-organisational barriers, and providing resources and support to each agency.

4.3.4 Pre-existing Networks and Relationships

Pre-existing networks and relationships was the code applied to the fourth and final major stabilising sub-factor in interagency communication. Under this sub-factor, participants described their views about the pre-existing networks and relationships, which improved effectiveness in communication at the micro-level.

The role that prior established relationships played both through ongoing planning and exercises, as well as through normal business processes, proved to be substantially important and provided *"a stabilising influence"* (GWA2, lines 76-87) for the communication at the agency interfaces during the disaster response. Overall, 18 out of 19 interviewees felt that having prior established relationships was *"absolutely critical"* (GWA2, lines 76-87), and that these connections were invaluable because there was *"a high degree of trust already in the system"* (MGA1, lines 791-807). As one participant recalled:

> *"So when the disaster struck, there was a sense of we knew who we were dealing with and that's really important…[…]…that sense of…organisations taking very personal responsibility or ownership of the challenges…[…]…without those connections…we would have been operating blind"* (DMA1a, lines 255-278).

The value to the emergency response of having staff with an understanding and knowledge of the health and emergency response sector was consistently highlighted by participants, as was the value of pre-existing relationships with colleagues in other agencies both locally and nationally. This enabled participants to, *"reach out and get information"* (GWA2, lines 49-55). As one participant with a leadership role described it *"…they knew who their vulnerable people were…they had good networks established…[…]…And I think they had a really good understanding …who the vulnerable people were, and having prior established good communication networks…they could get messaging out…"* (MGA1, lines 703-713). The word "trust" was used often (AFA11, CGA1, DMA1, GMA11, TGA1a) when describing the role pre-existing relationships played, and as one interviewee put it "*we couldn't have done what we did if we didn't already have those connections and those ways of working. But what it did was took it from rhetoric to reality… you need help? We will do it"* (CGA1, lines 738-747). Pre-existing relationships contributed to the stabilisation of communication between agencies and aided emergency responsiveness because there was already knowledge of each other's agencies and interpersonal connections.

4.4 Model of Interagency Communication at the Micro-level in Natural Disasters

From this analysis, a model of interagency communication at the micro-level in natural disasters has been developed (*see Figure 3*). This model represents graphically stabilising and destabilising factors in interagency communication at the micro-level during a natural disaster response. Five destabilising or disruptive sub-factors inhibiting effective emergency responsiveness and interagency coordination due to the rapidly changing environment after a natural disaster are listed and their impact symbolised by the shaking jagged arrows. The counterbalancing effects of four stabilising sub-factors in interagency communication during a natural disaster response are listed and their impact symbolised by the steadying influence of the hands.

Overall complexity following a major disaster significantly problematises the disaster response. In the health sector, in particular, as essential services still must be delivered within an unpredictable complex and rapidly changing post-disaster environment, improved understanding is needed to plan and prepare for destabilising forces in terms of communication and thus purposively seek to counterbalance these with recognised stabilising forces at the interagency interfaces. The presented "Model of Interagency Communication at the Micro-level" contributes new insights and understandings to enhance the disaster response, in particular, to better serve the needs of vulnerable people.

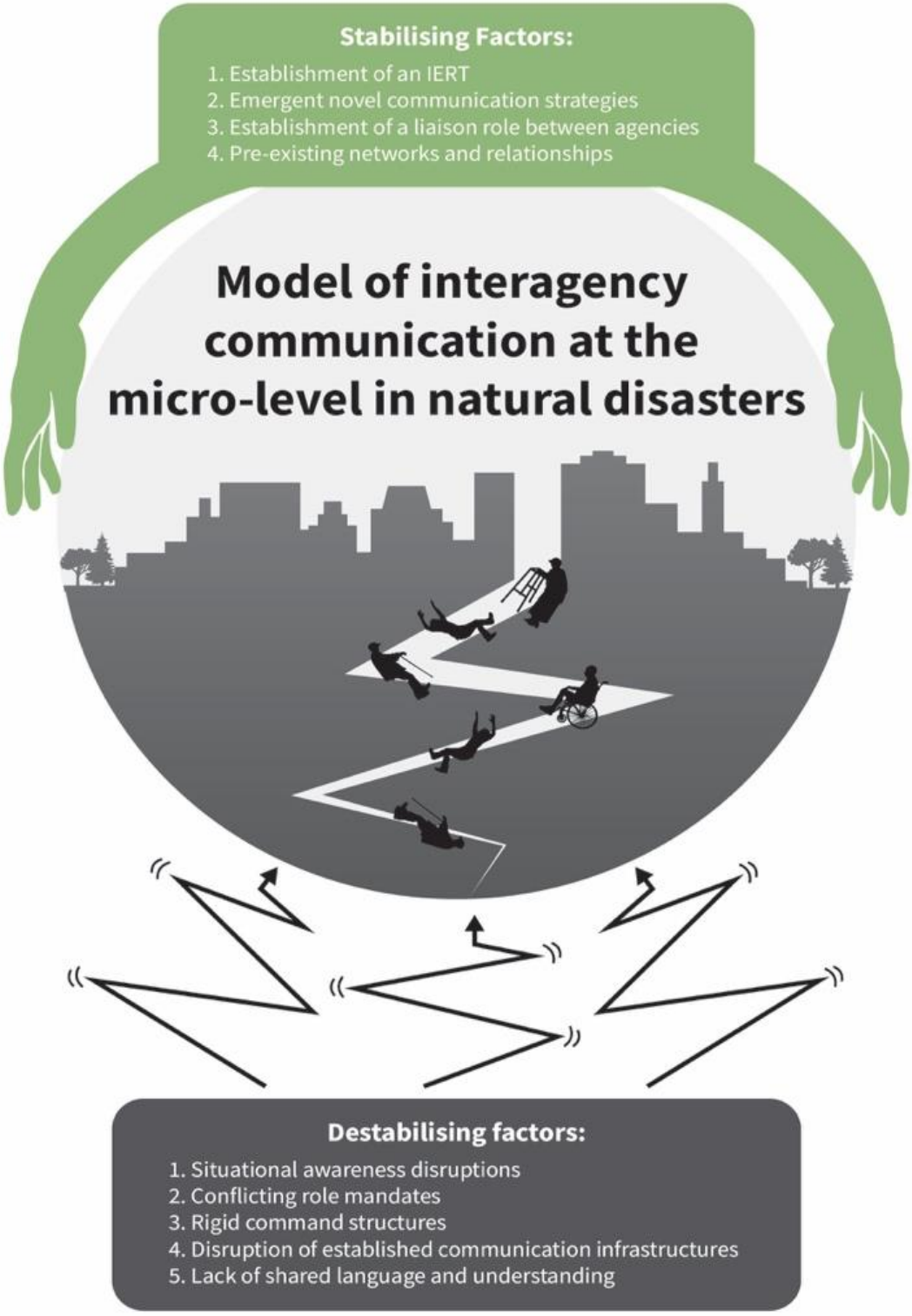

Figure 3 – Model of Interagency Communication at the Micro-Level

5 Discussion

5.1 Overview

This study examined stabilising factors influencing micro-level interpersonal communications at interagency interfaces in a disaster response. This chapter discusses key learnings regarding these stabilising factors that were identified through the analysis and discusses these findings in terms of existing understandings in the literature. In particular, it was found in this study that pre-existing collaborative working relationships supported a cohesive response given that a) post-disaster environments are complex, evolving, and turbulent and b) disaster responders work within complex structures and must rely on other agencies in order to respond effectively. To date the macro and the meso levels of communication in a disaster have been well explored, however, as highlighted in Chapter 2 (Literature Review) sound communication practices at the micro-level are equally necessary across service sectors in a disaster response and evidence in this area remains scarce. The discussion in this chapter will elaborate on new understandings about stabilising factors influencing micro-level interpersonal communications at interagency interfaces. The stabilising factors can be best understood through the lens of three key dimensions i.e., a) The People, b) The Connections, and c) The Improvisations (in the rapidly changing and chaotic disaster environment).

5.2 The People

This section discusses the dimension of The People in a disaster response with a focus on their communication at interagency interfaces.

A key finding was that destabilising factors impacted negatively on micro-level communication at interagency interfaces. This included role clarity issues both at the personal and organisational levels, and rigid communication practices that hindered and slowed disaster responsiveness. These aspects have been documented within the literature (Berchtold, Müller, Sendrowski, & Grigoleit, 2018; Bharosa et al., 2010; Comfort, 2007; Palttala et al., 2012). Coordination across interagency interfaces is described by Sonenshein and Maitlis (2010) as particularly challenging because "*information is dispersed across people and locations in a rapidly changing situation…resources are inadequate to enable any real shared model of what is going on"* (p.565). This study showed that the establishment of the IERT for vulnerable people assisted in stabilising the response, effectively counterbalancing such problems. Liaison members became conduits with their organisations improving communication at the interagency interfaces in the disaster response. Boin and Bynander (2015) stated that, *"researchers typically ask what brings about such collaboration between actors that may have never worked before"* (p.124). Not all organisations see the need, or at least have consensus around the need, for what it takes to form an interagency response team in disaster environments (Berchtold et

al., 2018). This is in large part due to the chaos and each agency's own competing urgent obligations and responsibilities (Boin & Bynander, 2015). Such pressure results in competing priorities during the disaster response.

In terms of the dimension of The People, at the micro-level, roles, tasks, methods of working and agreed communication structures of an IERT are still poorly understood and undefined within the disaster setting (Berchtold et al., 2018; Boin & Bynander, 2015; Owen et al., 2013; Palttala et al., 2012; Warmington et al., 2004). Nevertheless, as Owen et al. (2013) highlights, it is *"critically important that we know how to strengthen individual and shared mental models within teams, as well as the processes needed to ensure these mental models appropriately support coordination between teams and organisations"* (p. 14). Shared mental models contributed to successes of the IERT for vulnerable people in this study. Most of the people working within the IERT for vulnerable people in the Canterbury region had prior pandemic planning experience. Collective sensemaking that took place in previous earthquake responses enabled them to start effectively collaborating when they reconvened for the February 2011 earthquakes, albeit though still re-encountering challenges. The people reconvened as an IERT and held a shared vision and clearly defined goal of responding to the needs of vulnerable people. This stabilised their responsiveness despite being under enormous pressure. Furthermore, at the local level, they were familiar with the cultural context of the people they were responding to as well as understanding the challenges within the particular disaster environment they were dealing with. Boin and Bynander (2015) have also described IERTs as a stabilising factor as *"marked by collaboration between a functioning emergent network and authorities arriving on the scene. There is a division of labor, a shared sense of mission, a willingness to assist others in the network, and a minimal degree of legitimacy"* (p.127). The People collaborating in the IERT communicating at interagency interfaces were characterised by their flexibility, local knowledge and shared mental models. The participants within the IERT confirmed that this enhanced their ability to channel information quickly into and out of the region, thus, stabilising the communication at the micro-level and facilitating appropriate allocation of resources.

These study findings regarding the dimensions of the people challenge traditional views of IERTS within a disaster response that use a 'command and control' approach or a hierarchical type of communication structure. 'Command' means the establishment of a commander within an organisation to oversee their staff. This person has accountability to the organisational leader, and is responsible for internal information flow during the disaster (Berchtold et al., 2018). 'Control' is the legislative authority of an agency to direct and drive the overall response direction across a number of agencies and to task the agencies with key responsibilities (Berchtold et al., 2018; Boin & Bynander,

2015). Traditionally, agencies utilise coordination as an *"hierarchical chain of command and control"* versus *"cooperative ways of crisis management"* that have more *"decentralised decision making structures"* (Berchtold et al., 2018, p.27). Hierarchy is seen as essential by many formal disaster organisations and drives the allocation of responsibilities and tasks as well as setting the reporting processes (Kapucu, 2006; National Commission on Terrorist Attacks Upon the United States, 2004; Sylves, 2009). Conventionally, agencies involved in disaster responses are organised internally around their departments and feed information outwards to the overarching lead agency who has mandated authority to lead the response (Bharosa et al., 2010). These formalised structures are well rehearsed and practiced in case of a disaster or crisis, and because of the disciplined nature and predictableness of the training, it ensures that emergency protocols and plans are met and structures are in place for a systematically similar response by each formal agency (Boin & Bynander, 2015; Sellnow & Seeger, 2013). However, in a major disaster, the literature has described such traditional command and control response groups as poor adapters to highly complex and unstable environments, where they remain dominant but constraining (Helms Mills et al., 2010; Sellnow & Seeger, 2013), and *"want to impose their preplanned mechanisms on the emerging network"* (Boin & Bynander, 2015, p.133).

Boin and Bynander (2015) describe more recent approaches to this traditional approach, as a bottom-up cooperative approach, or the *"emergence of a node"* (p.129) that is responsive and adaptive within the disaster setting. Increasingly, it is being recognised that in the complexity of the disrupted post-disaster environment, *" people, units and organizations work together"* to *"save lives, protect people, and restore critical systems"* (Boin & Bynander, 2015, p.125-127) need flexibility and adaptability as the more traditional agencies often move too slowly in the disaster due to the rigidity in their structures and planning. Distributed leadership is more readily able to take action (Boin & Bynander, 2015). Findings from this study highlighted that the IERT for vulnerable people was able to improve disaster responsiveness through "*co-locating of agencies (which helped to build 'instant trust')"* (Boin & Bynander, 2015, p.130) as well as the operations out in the field. The flexibility and adaptability of the people collaborating as an IERT made *"quick wins by* [the] *'forward leaning' of all involved"* (Boin & Bynander, 2015, p.130).

The achievements, i.e., "quick wins" created by the IERT were attributed by participants as having a stabilising effect upon micro-level communication. Decision-making and sensemaking within the chaos after a disaster (such as the one in Canterbury) are critically important, and occur at an individual, collective organisational level. Crises after disasters involve many people and organisations in the response and there are equally many ways in which people and organisations make sense of events within the collective disaster response effort. In order to create a shared understanding,

disaster responders at the micro-level need to be able to communicate with each other, share information, and collaborate on how to best coordinate and communicate in an effective manner. Participants reported that the stabilising impact enacted by the IERT for vulnerable people in this study was enhanced by the people making up its membership and their shared vision. Overall the analysis of participants' experiences revealed a shared sense that the degree to which interfaces between agencies operated effectively was as a direct result of the motivational skills of those working across the interagency interfaces.

In particular, the analysis suggested that the role members played as a liaison between the IERT for vulnerable people and their base organisation were experienced as a flexible conduit that facilitated information flow and built connections in both directions, guiding and navigating communication at the interagency interfaces to enhance understanding of what was going on both within Christchurch as well as nationally. In this capacity, members of the IERT functioned as "*boundary spanners"* (Kapucu, 2006, p.210). Boundary spanners are key people described as having the underlying qualities of *"reciprocity, mutual trust and willingness to share information among organizations…"* (Bharosa et al., 2010, p.4). In addition, they are sufficiently *"institutionalized to enable information exchange among organizations"* (Bharosa et al., 2009, p.4). The liaison members of the IERT in this study linked and shared information across agencies and connected everyone up by ensuring appropriate communication flow, and thus improving situational awareness.

As boundary spanners, the IERT members were perceived as breaking down inter-organisational barriers and confusion and provided resources and support to agencies flexibly and adaptively in the disrupted post-disaster environment. The boundary spanner role has not been well articulated within the disaster management literature and very little evidence exists as to how they work across the agencies and influence the disaster response (Curnin, Owen, & Trist, 2014; Janssen et al., 2010). Nevertheless, in this study, boundary spanners within the IERT were experienced as contributing to the stabilisation of communication as Curnin et al. (2014) described. This spanning across, into, and back out of the boundaries of their organisations as conduits for information, decipherers of cultural differences, coordinators of needed resources, and decision-makers for those on the ground was due to reciprocity in interactions and relationships at the micro-level, their rapid sensemaking, their agility and their focus on responding to the needs of the vulnerable. The boundary spanning of the IERT team was key to their stabilising impact at interagency interfaces.

In the traditional approaches to disaster management reported in the literature, collective action with multiple people and agencies creates difficulties due to different methods of communication, which vary according to organisation cultures and structures, different operating procedures, and poor or

inefficient information sharing (Berchtold et al., 2018; Bharosa et al., 2010; Curnin et al., 2014). The boundary spanner role was experienced as a stabilising factor in the micro-level communication at the interagency interfaces and was judged by many participants to be *"a key role in interpreting and reframing critical cues to create a bridge"* (p.9) between each organisation and the IERT (Owen et al., 2013). Nevertheless, as outlined by Bharosa et al. (2010), boundary spanners can make incorrect assumptions or place significance on some things whilst neglecting other more important factors. (Berchtold et al., 2018) raised the concern that if vital information is not passed on, then the ability and capacity to respond is greatly reduced and may even result in a lack of apportionment of vital resources, which is less likely in formal control and command disaster response structures.

Rather than having these effects, participants in this study gave examples of how the boundary spanners within the IERT were highly successful in obtaining essential support to keep agencies viable and operational through their liaison and the collective focus of the group. They were experienced as having what has been described as a "*shared identity, which provides a vital anchor around which collectives construct meaning and understand their experiences"* (Sonenshein & Maitlis, 2010, p.563). The analysis of participants accounts of communication at the interagency interface between team members suggested participants experienced a strong sense of a shared identity within the IERT for vulnerable people. It was not just one person who was seen to be pivotal, but the sum of the whole or the *"distributed capacity of a system which is not easily reducible to an individual"* (Lingard et al., 2017, p.186). The overall analysis suggests that there was a strong sense of collective competence in the IERT. Members' sense was that together their individual efforts enhanced the disaster response, improving their group's impact and the translation of knowledge into action.

Sonenshein and Maitlis (2010) referred to the work of Dunbar and Garud (2009) as well as Yanow and Tsoukas (2009) who outlined the *"importance of both information collection and knowledge transfer…a focus on information collection and its subsequent interpretation has been something that sensemaking scholars in both crises and change have taken seriously, but the knowledge transfer part – that is, the development of shared meanings based on collective knowledge – has been more elusive"* (p.565). As Kweit and Kweit (2006) outlined, both the message being delivered as well as those trustworthy responders who are communicating are equally important in determining whether the messages received were understood as well as realising the effect they were potentially going to have. They described that *"clear, consistent, credible messages that are actually received by appropriate decision-makers are more likely to have their desired impact than messages without those characteristics"* (Kweit & Kweit, 2006, p.379). This ability to decipher and translate into each organisation was experienced as crucial within Canterbury's IERT response to vulnerable people.

When the messages did get through to each liaison person, and were deciphered for each organisation, the response process worked effectively. When the messages did not get through, due to the lack of a local liaison person or because of confusion, the resulting miscommunication had detrimental effects on vulnerable people. While the literature does outline the importance of the boundary spanner in deciphering and translation, it also outlines that "*communication failures are often caused by individual social factors such as the misinterpretation of messages by the receiving individual"* (Berchtold et al., 2018, p.33) and that this is often down to *"cultural communication barriers which result from a lack of pre-existing communication channels and routines as well as from a lack of trust between organisations"* (Berchtold et al., 2018, p.46). It does not discuss the importance of geographical location. However, the findings in this study showed that the participants within the IERT believed that location on the ground was important for situational awareness. In addition, it enabled more timely feedback loops ensuring that messages were clearly interpreted and communicated effectively and any problems were immediately resolved through communication interfaces.

What was found in this study, was that those liaison people (i.e., boundary spanners) working *in situ* within the IERT in Christchurch felt and were perceived locally to have a more comprehensive sense of the situation than those liaison persons in central agencies (who felt they did not require a liaison person to be situated locally within the IERT for vulnerable people). For instance, in this study there was evidence that people within central agencies that had roles specifically around disaster or crisis management with clear command and control structures situated remotely had a rather more limited sense of what was actually occurring within Canterbury. In fact, their lack of presence was perceived by IERT local members to add to the chaos, disruptions and miscommunications. Local participants reported that this impacted negatively on the IERT for vulnerable people and also on the agencies evacuating vulnerable people, the liaison staff working directly with patients, and the patients being made to wait a further 24 hours before being airlifted out of Christchurch. Geographical distances and traditional hierarchies were experienced as destabilising communication at the micro-level at interagency interfaces in the post-disaster environment in Canterbury. Furthermore, a lack of flexibility in some agencies' communication processes, as well as their reliance on their own traditional and rehearsed methods of response, were judged to have further destabilising the response.

Weick (1988) highlighted that *"the danger in centralization and contraction of authority is that there may be a reduction in the level of competence directed at the problem as well as an overall reduction in the use of action to develop meaning"* (p.312). The liaison staff working together on the ground in Canterbury within the IERT for vulnerable people did not all have the same practiced level of training

or planning as some of the larger agencies such as Agency 2 and Agency 11. They had their own set of geographical challenges within the Canterbury region as well, but were considered by many IERT participants to be more adaptive and flexible to the immediate and ongoing needs of the vulnerable. Nevertheless, part of responding to any natural disaster or emergency will always involve dealing with a spectrum of cultures including those types of 'command and control' agencies and organisations with flatter structures and more negotiated forms of communication. The interagency response in Canterbury is an example of this particular complexity. The participants' accounts suggested each agency had their own ways of communication and different interpretation of boundaries and hierarchies. In fact, although there were those who were fearful of some decisions being made, that were at times in opposition to the wishes of their individual agencies, they reported that they would often over-ride these fears to do what they felt was the right thing for vulnerable people. An example of this was sending more clinical staff to the airport when expressly told not to by the leadership of Agency 2. The participant concerned reported over-ruling their own chain of command as they saw the greater need of the vulnerable people and were supported by the IERT in making this decision collectively. This was accounted for in terms of the trust they considered they built daily between each other, which ensured the development of a mutual sensemaking approach to each issue as it arose (Bachmann & Inkpen, 2011; Bharosa et al., 2010).

In summary, the analysis confirmed that participants considered boundary spanners or liaison persons played a key function in stabilising interagency interfaces. Boundary spanning was thus judged by the researcher to be a key element in the dimension of The People in the VPT's disaster response. The findings confirmed those fulfilling this role were seen to need credibility both within their own agency as well as within the IERT. The boundary spanners or liaison persons were found by participants to work together locally to analyse and to make sense of the situation, which enables them to maintain strong situational awareness of the disaster. They could be flexible and adaptable, working alongside other IERT members and agencies in the response. The participants' experiences provided strong support for the proposition that boundary spanners are stabilisers of micro-level communication at the interagency interfaces, having both *"horizontal and vertical networking"* (Beaven, Wilson, Johnston, Johnston, & Smith, 2017, p.4) abilities, crossing over and working in the spaces or the boundaries between organisations and influencing both the strategic and operational components of the responses. The participants in the IERT for vulnerable people within this study confirmed that having people operating in this way was of great importance. In particular, the study's findings indicated that the IERT boundary spanners on the ground were experienced as pivotal to stabilising micro-level communication at the interagency interfaces. Furthermore, their experiences suggest the

earlier boundary spanners are established post-disaster, the earlier communication interfaces can be stabilised.

5.3 The Connections

This section discusses the dimension of The Connections and outlines how pre-existing networks and relationships were experienced as strengthening communication and stabilising the interagency interfaces in the interagency response team's disaster response. Findings in this study highlighted that pre-existing professional relationships were considered by the IERT members to assist in the disrupted environment post-disaster as response agency people were able to connect with each other with confidence as they had prior knowledge of each other's capabilities. The importance of pre-existing interpersonal relationships were clearly confirmed in this study. For example, as noted in the findings, participants confirmed that because of their pre-existing professional associations there was already a relationship of trust to leverage off which meant that information flowed more freely because of this across the interagency interfaces.

The literature abounds with examples of communication failures in disaster responses due to breakdowns in the connections between disaster responders (Aziz et al., 2009; Comfort, 2007; Garnett & Kouzmin, 2007, 2009; National Commission on Terrorist Attacks Upon the United States, 2004). During Hurricane Katrina, communication failures occurred at times between agencies and within agencies, both at the federal and regional level (Garnett & Kouzmin, 2007, 2009). In Louisiana, differences in organisational culture and cooperation, and a loss of situational awareness through poor communication processes resulted in a lack of trust in the federal response by those responding at local level (Comfort, 2007). Similar occurrences were reported by the IERT participants in this study after the earthquakes in Canterbury, where there seemed to be a similar lack of trust and communication issues at the interagency interfaces between the local responders and national authorities, especially when, as previously outlined, not all of the IERT liaison persons were present on the ground. Due to the geographical challenges of the remote liaison staff, and some assumptions made about each of the response teams roles, actions and mandates. This meant that not all of the operating procedures and responsibilities of each agency were fully understood by the IERT for vulnerable people. Not all members within agencies were connected and vital information was therefore not passed on to the IERT or was reportedly missed. In addition, the cumbersome and multi-layered hierarchical communication structures within some agencies that the IERT was intersecting with, as well as their command and control processes, were used by participants to account for why crucial information was not shared with those on the ground at the critical interagency interfaces. The IERT liaison staff gave clear accounts of the difficulties in navigating the communication interagency interfaces when they were not able to communicate directly.

Berchtold et al. (2018) described how organisational barriers may impact on shared situational awareness in disasters where key interactants working across considerable geographic areas often have less cognisance of the relationships locally, where information can be distributed more rapidly and actioned quickly across the organisational boundaries due to their established relationships and co-location. In the Canterbury context, the connections between agencies was supported through pre-existing working relationships in prior events such as the Exercise Cruikshank (Ministry of Health, 2007), the 2010 earthquake event, but more importantly the 2009 Pandemic planning and response (Williams, 2011). These prior experiences set the scene for ongoing successful intersectoral connections between all agencies within the response. The pandemic scenario demonstrated that *"based on peer leadership and building on existing relationships"* these key people at the interagency interfaces had the ability to *"mobilise and reconfigure"* the response in *"an unprecedented way"* (Williams, 2011, p.328). The most salient finding from this particular study was *"the importance of preparing and working together across the sector"* and that this prior planning and working together *"further strengthened existing relationships, and has enhanced Canterbury's capacity to provide a co-ordinated response not only to future pandemics, but also to other health system challenges"* (Williams, 2011, p.329). The connections and the pandemic planning enabled an immediate activation of an interagency response based on the familiarity and trust of these prior established relationships and ways of collaborating across agencies.

The literature has also outlined that in terms of disaster responses *"extreme events necessarily require greater flexibility, detailed knowledge of the environment, and access to wider knowledge bases on the part of the organization and the user"* (Comfort, 2007). The Canterbury earthquakes were undoubtedly an extreme event within a highly changeable environment that required multiple agencies to connect and respond. The IERT for vulnerable people already had pre-established ways of working and relationships, and though widening the structure to include further agencies, these connections had a stabilising impact on the interagency interfaces because of trust and common processes previously developed. The demands within this severely disrupted post-quake atmosphere resulted in a significant amount of intelligence and information flowing between multiple sources and situational awareness was constantly being updated. A clear picture of what is occurring in a disaster is often hard to determine within the chaos and disruption of the event, and the workload appears daunting as the initial chaos of the response gets underway (Berchtold et al., 2018; Bharosa et al., 2010). Although forming an IERT can assist with connectedness, it does not come without its challenges. Majchrzak et al. (2007, as cited by Boin & Bynander, 2015) describe that this is often because *"such emergent groups are 'distinctly different from disaster response groups that operate with pre-existing structures and that have experience working together…'"* (p.127).

In the international literature traditional views of disaster coordination, connections and relationships highlight the formal hierarchical approach that requires responders to *"establish control, specify tasks, allocate responsibilities and reporting procedures, and presumably gain reliability and efficiency in workflow"* (Bharosa et al., 2010, p.2). These processes are used formally by many agencies in training exercises to provide standardisation and a tool to direct and steer the response (Boin & Bynander, 2015). Although these processes may work well in smaller or contained events (because of a reduced need to rely on many other groups), these hierarchical and formal structures have the ability to adapt more responsively. However, in a major catastrophe or disaster, due to the sheer scale of the event, jurisdictional and organisational barriers kick in (Bharosa et al., 2010). This is further problematised by *"turf battles"* (Garnett & Kouzmin, 2007, p.182) or the positioning for power. Formal processes that inhibit or slow down disaster responses include *"differences in values, allegiance, and even language (e.g., jargon) can complicate communication"* (Garnett & Kouzmin, 2007, p.181). Increasingly, the literature is highlighting that 'command and control' processes do not work as efficiently in large scale disasters and emergencies because of the complexity of the situation and the need for quick and adaptive responses to whatever is occurring in the immediate aftermath of a disaster (Sellnow & Seeger, 2013). In the experiences of members of the IERT within the Canterbury event, the examples given of the evacuations being substantially slowed down because of the processes of one "command and control" agency validates this. The IERT members working at the interagency interfaces experienced significant delays in evacuation due to confusion around what the "command and control" agency required on their lists of patients, the misunderstanding on how they interpreted some of the information, as well as the over-triaging that took place due to their "command and control" processes. The key liaison person for this agency was geographically distant and was equally frustrated at not being able to work with the IERT directly. The cumbersome processes meant that there was significant delay in the evacuation of the vulnerable out of Christchurch.

It is important to note, however, that these types of agencies are an inevitable part of major disaster responses and some researchers would argue that the *"hierarchy in governance process prevents goal displacement and keeps decision making on track"* (Kapucu, Arslan, & Demiroz, 2010, p.455). Hierarchical structures, utilised by agencies such as Civil Defence in Christchurch, provided for the safety of citizens after disaster as well as those involved responding on the ground. Following the Canterbury earthquakes, a state of emergency was declared and legislative processes implemented to support local government who were overwhelmed with the size and scale of the significant infrastructure damage, and multiple issues requiring significant resources to manage the disaster (Brookie, 2012; McLean et al., 2012). Difficulties arose when more formal groups, like Civil Defence, arrived and implemented their operations under central government legislation and guidelines. The

systems required to be set up are significant and initially slowed down the response, and created some barriers, as teams already on the ground perceived them as imposing or enforcing their ways of working (Boin & Bynander, 2015). This was not unlike the Hurricane Katrina response, where too much reliance on the central government agencies proved to be a mistake. Information is key to a successful response and local people who have prior established connections appear to have the ability and trust to unlock that information more quickly (Berchtold et al., 2018; Comfort, 2007; Kapucu, 2006; Kweit & Kweit, 2006). In the Canterbury context as well as Hurricane Katrina the impact of geographical distance (where key decisions were made at central government level without the face-to-face liaison and cooperation within the local level response) led to inefficiencies and duplication of processes within the actual response, as well as disorganisation and role confusion around each agency's responsibilities. Miscommunication meant that there were knowledge gaps about what other agencies were doing. Kweit and Kweit (2006) highlighted that "*there would be a temptation to look to greater centralization of power in a single level of government to overcome the messiness of a multilevel government response"* (p.376). However, these groups are often more focussed on obtaining information rather than information sharing with other agencies (Bharosa et al., 2010). This has been particularly prominent in both government level responses and the military where information is often withheld or restricted to those with appropriate clearance due to perceived security risks (Sylves, 2009).

At the interagency interfaces, the connections are created and maintained most effectively by boundary spanners (Bharosa et al., 2010; Curnin et al., 2014). The literature suggests that their primary concern is that of linking up and sharing of information across organisations and interagency interfaces. In the Canterbury earthquake context, participants found that having pre-existing relationships and networks enabled quick and rapid responses as the key people to contact were already identified. The collective competence the IERT for vulnerable people at the micro-level resulted in emergent solutions that could not necessarily have succeeded in the same way if they had been practiced and planned out in advance. The collective competence of the IERT, the prior established relationships bringing the multiple connections, and the distributed cognition, enabled by the connections stabilised the interagency interfaces and enhanced the comprehensive response to vulnerable people.

Challenges for the boundary spanners can be that some local agencies working alongside hierarchical agencies appear to slot in more easily than others (Curnin et al., 2014). For instance in this study, if an organisation was a 'command and control' agency but had trained or responded together previously to a disaster, their ability to understand each other's language and culture was improved through

experience. However, if an agency had less hierarchy and very little prior contact, their boundary spanner could struggle when coming into contact with more hierarchical agencies. This proved true in the findings of this study. Some of the IERT members interviewed described the lack of a shared language and inability to interpret their ways of working with one agency triggered feelings of powerlessness, bewilderment, and frustration due to a lack of understanding of how these agencies functioned and what their operational mandate or focus was (Curnin et al., 2014). Some agencies in this study were more siloed and autonomous in their approach and made decisions in relative isolation based on their own situational awareness assessment. This situation can be challenging for the boundary spanners seeking the *"sharing and exchange of information"* and to fulfil their core task to *"make decisions concerning information gathered"* (Kapucu, 2006, p.210). This can be difficult to achieve if the boundary spanners start without the prior connections and understanding of the cultural and operational differences between various agencies. Weick (1988) outlined that *"tenacious justifications can be forces for good because they generate meaning in times of ambiguity, surprise and confusion"* (p.131). However, the converse is that "*it produces blind spots. Once a person becomes committed to an action, and then builds an explanation that justifies the action, the explanation tends to persist"* (Weick, 1988, p.131).

Boin and Bynander (2015) also outlined that it is unclear how coordination emerges when boundary spanners have no pre-existing connections and come together to form a collaboration in the first instance after a disaster. In the case of the IERT for vulnerable people, this was fortunately not an issue as connections and the pre-existing relationships with the wider response teams stabilised the communication interfaces between agencies as was outlined in section 4.3.4.

The findings indicate that the IERT and their connections and their prior established relationships helped to stabilise interpersonal communication (micro-level) at the interagency interfaces. It appears that this was due to their ways of working, their connections in the previous earthquake that gave them a platform to build upon. It was the shared decision-making, and the integrated approach that allowed them to be adaptive and flexible at the micro-level, with individuals from each organisation coming together to respond to the vulnerable. Weick (1988) states that "*the more a person sees of any situation, the higher the probability that the person will see the specific change that needs to be made to dampen the crisis"* (p.311). Working within an IERT for vulnerable people meant that through the combining of these cultures and structures, the liaison members became the 'focal actor', the navigator, the translator, and 'boundary spanner' and due to their connections they acted as a broker for not only their own agency but also for the IERT. Connections at the micro-level enhanced communication of the IERT.

The importance of pre-existing relationships is vitally important in disaster responses as it enables the establishment of principles of engagement, decision frameworks and the process of sharing information prior to disasters. Careful planning in disaster exercises builds these connections, brings greater clarity around how other agencies work and provides understanding of mandates. Following a disaster, the connections help to reduce the barriers and assist each agency in understanding and navigating the disaster and stabilises micro-level communication at the interagency interfaces. Certainly, in the case of the IERT for vulnerable people, almost every participant outlined the value of prior planning exercises. They also outlined that these relationships were built on established trust which allowed them to reach out to their key connections, and to navigate through some of the barriers to enable the interagency interfaces to be stabilised.

5.4 The Improvisations

This section examines the dimension of The Improvisations in a rapidly changing and chaotic disaster environment. Findings discussed in this study highlight that novel ideas and inventiveness emerged out of the disaster response which stabilised micro-level communication flows between, into and across supporting agencies and the wider response to vulnerable people. In the Canterbury earthquake disaster setting, novel communication strategies materialised, which helped to define issues and make sense of the situation enabling the IERT to guide the most appropriate response from moment to moment and thus contributing to stabilising micro-level communication at the interagency interfaces. Emergent technological solutions were one type of "improvisation" reported. This included steps such as utilising a private internet webpage to provide information out to the aged care sector, the use of the interRAI dataset to rapidly determine where the most vulnerable were located within the community, through to setting up a vulnerable peoples hotline, and using texting rather than phone calls to the aged care sector to enable them to continue to provide essential care. These organically arising and innovative solutions were part of what Boin and Bynander (2015) describe in their research as an "*emergent perspective"* (p.133). This helps explain and understand how collaboration occurs at the ground level after a disaster. Coordination is *"thought to take place through improvisation, which is in sharp contrast to relying solely on shared models"* (Constantinides & Barrett, 2012, p.274). Okhuysen and Bechky (2009, as cited in Boin and Bynander, 2015) describe this fundamental premise by explaining that *"when people face an unforeseen problem that is hard to solve, they will be inclined to seek collaboration to come up with solutions"* (p.126).

Participants reported that improvisations often emerge with local first responders arriving at a volatile unstable scene and having to create new processes and new systems until the more formal agencies construct their official response (Boin & Bynander, 2015). In the case of the IERT for vulnerable people, this team were driven by a sense of immediacy and urgency. They were in the best place to determine

the most critical needs, and were galvanised to take action and begin to problem solve the immediate issues they were faced with. This is how disaster responders improvise (Janssen et al., 2010) and is in sharp contrast to ways of doing business that formal agencies utilise when they take charge during a disaster, often characterised by slowness and difficulty adapting in a timely manner (Boin & Bynander, 2015; Constantinides & Barrett, 2012).

Disaster or crisis situations of their very nature are rare, complex, arbitrary and highly consequential. Weick (1988) describes crises as "*low probability/high consequence events that threaten the most fundamental goals of an organisation"* (p.305)*,* which was borne out in the Christchurch earthquake event. It is difficult to pre-empt what action to take in a disaster as each event is unique. However, as Weick (1988) has previously outlined people will often use a comparative process against previous events to make sense of their current environment. In the case of the Canterbury earthquakes, the September 2010 earthquake allowed for an immediate course of action to be implemented after the February 2011 earthquakes. The IERT for vulnerable people was immediately re-established, which enabled teams that knew each other and their processes to re-enact their previous ways of working and come together and start improvising in response to the disaster.

Immediately post-disaster, the shake up in the physical environment and the new ways of working appeared to have created space for improvisation for the IERT. It generated conditions where improvised solutions became viable. In the disaster environment local teams, clinicians and responders across many agencies and with multiple units reacted immediately to provide crucial aid and life-preserving services (Boin & Bynander, 2015). Participants reported that these teams were inventive and often had to rely on their wits and the creative input of those working alongside them to continue to provide essential services to the public. However, improvisations are not part of conventional disaster operating procedures. For instance, within the military, staff are trained consistently to have a standardised, well-rehearsed response to crisis, and this is drilled into them from the outset of training (Sylves, 2009). Whereas in a disaster environment, there is a need to be adaptable and flexible (Comfort, 2007) in order to meet the ever changing needs of both the people, the physical surroundings, and the responders. In the aftermath of a disaster, there is a significant number of *"participants dispersed over a vast geographic area, operating on the basis of divergent agendas and contexts"* (Berchtold et al., 2018, p.16) and this presents significant challenges to the way they are able to share information and coordinate themselves. There is a requirement for radical adjustments and modifications as well as unparalleled cooperation and coordination to fulfil disaster response tasks. With all of the multiple agents in this disrupted uncertain environment, each organisation needs to adjust to the challenging conditions and significant demands placed on them by

those who most need them (Bhakta Bhandari, Owen, & Brooks, 2014). The challenges in a disaster are profound, and the requirement for adaptive and enabling decision-making by locally empowered responders is essential (Janssen et al., 2010).

Improvisations and emergent solutions in disaster management can be inhibited by *"turf boundaries and battles"* (Garnett & Kouzmin, 2007, p.388) between more official disaster organisations and those more local responder groups that form instinctively after a disaster. Traditional disaster management literature details steps that should take place within the response and communication processes (Berchtold et al., 2018; Boin & Bynander, 2015). It emphasises specific legal authorities and jurisdictional boundaries, which in themselves can sometimes hinder the response as well as prevent the coordination and collaboration from occurring (Bharosa et al., 2010; Sellnow & Seeger, 2013). Such traditional structures mean *"personnel are hindered by a lack of information, constraints on innovation, and an inability to shift resources and action to meet new demands quickly"* (Janssen et al., 2010, p.2). An example of this after the Christchurch earthquake was when key staff reported being prevented from liaising with staff within the IERT directly meaning red tape and bureaucracy prevented vulnerable people from being evacuated in a timely fashion. On the other hand, formal response mechanisms will often do well once the situation is more stable or when the size and scope of the disaster is more contained (Berchtold et al., 2018, Boin & Bynander, 2015).

Boundary spanners are key improvisers in the rapidly changing conditions of a disaster environment. They are described as *"information orchestrators"* who provide essential information and *"an end-to-end coordination process over multiple agencies"* (Bharosa et al., 2010, p.4). They utilise sensemaking to create understanding and situational awareness during complex and rapidly changing situations. In this study, the liaisons (the official boundary spanners) smoothed the way and helped navigate and expedite communication at interagency interfaces through complex systems. They also were able to quickly cut through "red tape" and escalate issues as required. However, several organisations were not represented on the ground initially post-disaster, which meant that micro-level communications at interagency interfaces were challenging and messages sometimes confused. This caused a significant delay to the evacuation process. One agency that declined to place a liaison locally was nevertheless key to the evacuation process. With the added dimension of having to navigate through a complex structure and significant breakdowns at the communication interfaces, this resulted in major problems for the vulnerable being evacuated. In contrast, when another agency eventually placed someone into Christchurch, the micro-level communications between the IERT and this agency improved communication significantly.

The IERT boundary spanners also came up with significant innovations. An example of this in the Canterbury earthquakes was the establishment of the hotline for vulnerable people living out in the community, as well as the team working out directly within the field gaining insights and making key decisions with all of the key agencies. By establishing this communication tool and working directly with affected areas, vital information was provided and communicated out to all relevant agencies responding. It assisted with situational awareness and tracking of each vulnerable person within the community. Klein, Moon, and Hoffman (2006) described this type of improvisation as providing a "*motivated, continuous effort to understand connections (which can be among people, places, and events) in order to anticipate their trajectories and act effectively"* (p.71). The boundary spanner creates the potential for improvisations by connecting and increasing the potential for innovative collaborations between agencies.

5.5 Limitations

This qualitative case study was interpretive in nature. This means that, rather than seeking to produce causal explanations, it set out to understand participants' experiences of micro-level interpersonal communication at interagency interfaces in a disaster. The results offer rich analytical descriptions of stabilising factors that participants considered influenced their micro-level interpersonal communications at interagency interfaces. As a case study, its results emerged out of one specific research context and so cannot be generalised. Different results could occur in different settings. The findings about The People, The Connections and The Improvisations presented in this case study may not function in the same way in another disaster environment. A similar study design undertaken elsewhere could still produce results that vary markedly from those presented here. Even so, the results in this study contribute new and unique insights into stabilising and destabilising factors that were experienced as influencing micro-level interpersonal communications at interagency interfaces in a disaster response and offer a framework for other researchers to build upon in future work.

It is important to recognise that the devastating Canterbury earthquakes occurred in 2010 and 2011. There was a time-lapse of three years until the first interviews took place in 2014. Interviews continued into early 2016. Some interviewees reported lapses in memory and were challenged at times in recalling some specific details of micro-level interpersonal communications that lay back in the past and took place in the chaotic rapidly changing post-disaster environment. This is acknowledged as a limitation of this study. It cannot be ruled out that recall bias played a role in the participants subjective experiences and recollections and that significant detail may have been lost in the process. Nevertheless, in the 19 interviews there was consistency of reporting across a number of critical incidents described.

In addition, study results will be influenced by the fact that some agencies that played a key role in the disaster response did not take up the offer for interview. In some cases, this was because the liaison had moved on from the organisation. In other instances, no response was received to the invention to participate. The reasons for this were not communicated to the researcher. Therefore, the findings should be interpreted with caution.

A further consideration is the researcher's own subjectivity within this research endeavour. The researcher was involved in the Canterbury disaster response and had common history with participants with respect to the chronology of events that were at the heart of the study. However, she was transparent about her experience at the time of participant recruitment. She only proceeded if prospective participants declared they felt comfortable being interviewed by someone who had personal experience of the VPT. In addition, each participant was given the opportunity to review and alter their transcript or withdraw at any time should they have emergent concerns about the process or their relationship to the researcher. That the researcher had been so closely involved in the emergency response was actually seen by some as an advantage as they felt the researchers was well placed to appreciate the accounts they were giving of their experiences. For her part, the researcher was constantly mindful in both the data collection and analysis processes to minimise the influence of her voice.

6 Conclusion

6.1 Review of the research endeavour

The aim of the study was to gain insights into the complexities of the interpersonal communication (micro-level) involved in interagency response coordination and to generate an improved understanding into what stabilises the interagency communication interfaces between the agencies responding in a natural disaster from the perspective of those who have participated in an IERT. It began with an acknowledgement of the impact of disasters on organisations, their responders, and most importantly, on those that are most vulnerable. This is because they are least able to respond adequately and to access support through their usual channels due to the disruptions occurring after a disaster. The efforts of the IERT for vulnerable people in Canterbury represented a whole health system response for the people that crossed traditional boundaries and systems.

This study presents a synthesis of participant's sensemaking of events influencing micro-level interpersonal communications at interagency interfaces in a disaster response as detailed in the findings. This included the development of a conceptual model that captured the core concept of stability which was at the heart of participants' experiences. This model presented destabilising and stabilising factors that participants reported experiencing in communication practices at the interagency interfaces of this IERT. The three key dimensions of : The People, The Connections and The Improvisations were experienced as key to stabilising the interagency interfaces through functioning as a flexible conduit, guiding and navigating communications at the interagency interfaces and improving situational awareness. This study showed specifically that the establishment of the IERT for vulnerable people itself was experienced as assisting in stabilising the response, with the liaison members becoming crucial conduits with their organisations thereby improving communication at the interagency interfaces in the disaster response. "The Connections" showed the importance participants placed on the liaison person or boundary spanner having relationships of trust to leverage off, as these were perceived to enable communication and information to flow more freely across the interagency interfaces. They were considered to provide the collective competence, shared decision-making and prior established relationships that stabilised micro-level communications at interagency interfaces. And finally, "The Improvisations" also were considered to contribute to the stabilisation of micro-level communication across interagency interfaces through the novel ideas and inventiveness that emerged from teams responding within the rapidly changing post-disaster environment

The experiences of participants in this study highlight the requirement for disaster management frameworks to formally plan for and to allow for adaptive responsiveness, and legitimise and recognise the improvisations of emergent boundary spanners connecting into a disaster response.

"Command and control" hierarchical structures were not considered to provide clear processes and structures for teams working in disasters to follow. However, improvisations and novel solutions are also needed and often emerge from first responders (who participants judged to be best placed to assess the evolving needs in a disaster such as the Canterbury Earthquakes where there is a high degree of uncertainty).

6.2 Contributions

This study makes several important contributions to both theory and practice. Firstly, from a theoretical perspective, it highlights the value of incorporating an interface perspective into any study seeking to understand the processes of IERTs during disaster responses. Secondly, it provides a conceptual model that can be used to guide future case studies that seek to explore stability at the interfaces of other IERTs. Thirdly, it highlights the centrality of communication in the experiences of members of teams, especially those composed of members from different agencies with different structures and communication cultures, in the aftermath of a disaster.

Finally, these new perspectives on stabilising communication at the interagency interfaces in disaster responses have practical implications. They will enable us, in the future, to better serve the needs of vulnerable people who are at the greatest risk of adverse outcomes in a disaster.

6.3 Future Implications and Research

It is important for students and researchers to continue to study micro-level interpersonal communications at interagency interfaces, to increase understanding of critical roles, tasks, methods and ways of working within the disaster setting. The conceptual model presented in chapter 4 could be tested for its relevance in different disaster setting and further built upon. There is a need to conduct continuing research into the improvisations, connections and pre-existing relationships of members of IERTs and how these can be further adapted to strengthen interagency interfaces in disaster responses.

It is recommended that clinicians, disaster responders and policy makers examine the way formal command structures, though vital, may inhibit and disrupt interagency interfaces at the micro-level of communication on the ground following a disaster. Specifically, it is important to consider what can be done to strengthen relationships between responding agencies and allow for more distributed leadership structures, to deliberately make space for emergent improvisations, and to adapt interactions to accommodate and utilise the strengths of local teams in disaster responses.

By more deliberate planning and participating in joint disaster scenario training, this may help to enhance the stablising sub-factor of pre-existing relationships, and thereby, lessen confusion and

improve communications at the interagency interfaces when responding in disasters. It is also important for all agencies to continue to examine ways in which they share information across the interagency interfaces and identify ways in which they might be more reciprocal and flexible, especially with policies and procedures.

Furthermore, on-going research is needed into the role of liaisons or boundary spanners with the right skillsets i.e, strong interpersonal skills, pre-existing networks, and trust with relevant collaborating agencies. This should include the aspects of disaster planning to ensure liaisons or boundary spanners are not geographically distant but rather on the ground and face-to-face with the wider response to avoid miscommunication and confusion around the messages and to improve situational awareness and knowledge transfer and a more cohesive response.

Finally, the establishment of the Canterbury IERT for vulnerable people in the aftermath of the devastating earthquakes focused attention on the vulnerable to ensure their needs were explicitly prioritised. Their unique whole of system approach looked across the both the community and hospital settings informed by the philosophy that vulnerable persons are the responsibility of every group. A strong recommendation is made to all health agencies, including related national government departments, to consider an IERT focused on the vulnerable in disaster policy planning and operational structures. In addition, there is a need to continue to do more research into teams responding to vulnerable people to make sure we continue to respond effectively to those who have the least ability to access their normal supports or care after a disaster and are, therefore, at greatest risk of adverse outcomes.

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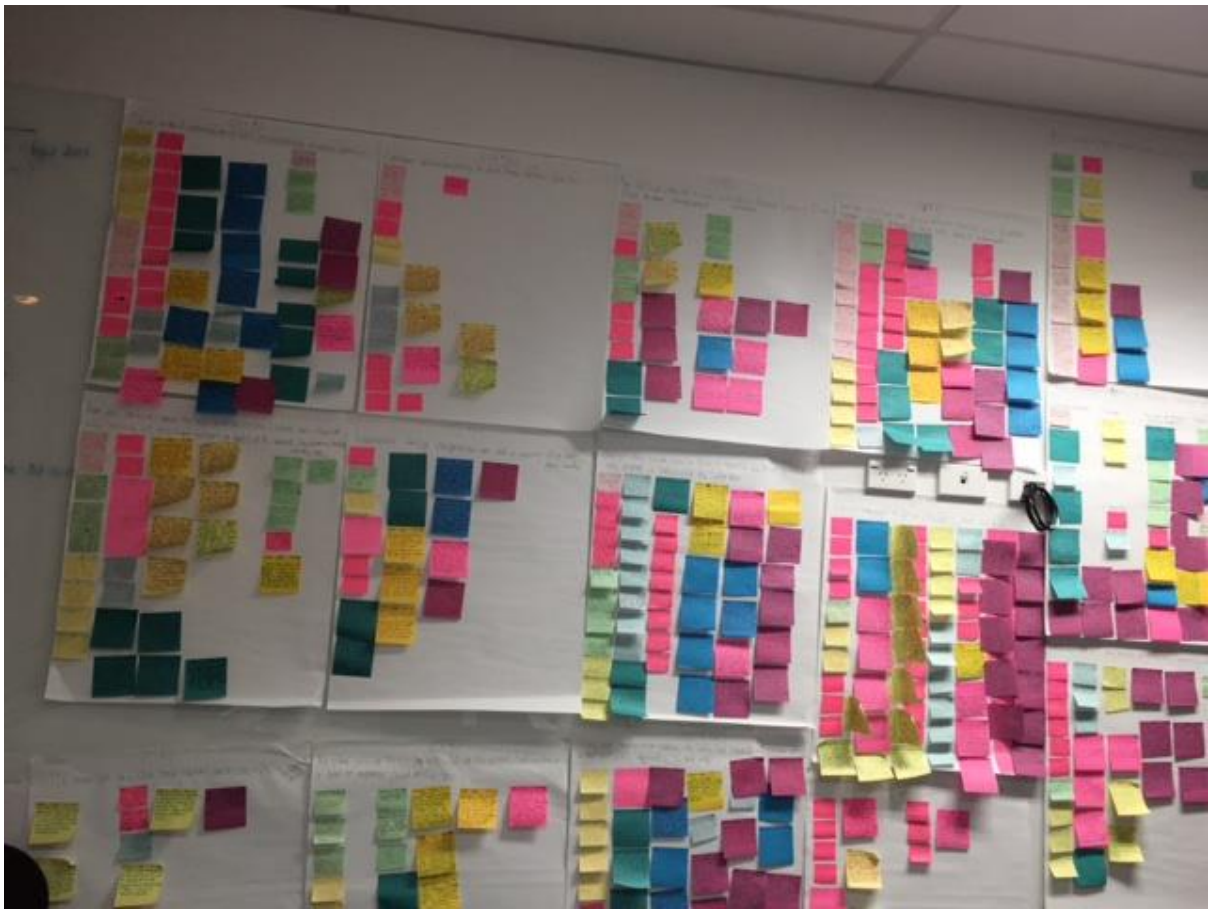
Appendix

Appendix 1 - The Post-It Board of Data Coding



Appendix 2 - **Consent Form**

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

RESPONDING TO THE NEEDS OF VULNERABLE PEOPLE DURING A NATURAL DISASTER
A study of the critical communication incidents from the inter-agency interfaces

Consent Form

I confirm that:

- ☐ I have read the information sheet concerning this research and understand what it is about.
- ☐ All my questions have been answered to my satisfaction.
- ☐ I understand I am free to request further information at any stage.
- ☐ The agency I was working for at the time of the September 2010 and February 2011 earthquakes has given me written permission to participate in this research

I understand that:

- My participation in the research is voluntary.
- I am free to withdraw from the research without any penalty up until the start of the analysis phase which is anticipated to start in November 2013. It is entirely my choice which critical incidents I choose to discuss to illustrate the communication attributes I believe positively or negatively impacted on inter-agency communciation.
- The interviews will be recorded and transcribed.
- I will be given the transcript for checking and can remove or correct any aspect of the data that is incorrect or potentially personally harmful.
- I will be required to complete an anonymous survey, which will allow me to view and comment on the conceptual framework created from the analysis of

the interview data and to also provide information I may have felt unable to provide in the interview process.

- The data will be analysed and findings will be reported in at least one research presentation, a research thesis and possibly in academic publications (e.g., academic journal articles).
- My identity will not be disclosed without my consent in any presentation, report or publication.
- This research proposal has been reviewed and approved by the University of Canterbury Human Ethics Committee.

I voluntarily agree to take part in this project. My signature indicates I am giving my informed consent to participate and am completely comfortable with sharing my experiences with a member of the VPT.

Signature: Date:

Support Available

It is recognised that describing the events and your involvement in the Canterbury earthquakes may potentially cause or trigger feelings of emotion or distress. Should you feel you need support after this interview has occurred there are numerous agencies able to assist you:

Quake Support and Counseling Services Helpline - **0800 777 846.**

Earthquake Support and Counselling Hotline - 0800 777 846

Canterbury District Health Board Specialist Mental Health Services **-** (0800) 920 092

Phone your Doctor who can connect you into free counselling:
Christchurch General Practices
canterbury.webhealth.co.nz/provider/search/category/5/
Rural General Practices www.rcpho.org.nz/about-us/location-map/

Free Counselling Services:

Counselling Helpline - 0800 777 846

Harakeke Cantre - 356 0000 All welcome - specialises in children and families.

Canterbury Charity Hospital - All welcome - specalises in youth 360 2266

Victim Support - 0800 842 846. Provides a 24 hour Telephone contact. People may need to leave their details and a volunteer will ring them back.

Samaritans - 0800 726 666. Provides a 24 hour national telephone listening and support service staffed by volunteers.

Relationship Services - 0800 735 283. Offers a free Government funded crisis counselling service for anyone affected by the Christchurch earthquakes:

- 24 hour telephone support for Christchurch residents and others outside Christchurch
- face-to-face counseling for those outside of Christchurch.

To find the nearest RSW office call 0800 RELATE (0800 735 283) or visitwww.relate.org.nz.

Lifeline - 0800 543 354. 24 hour trained telephone counsellors.

Whanau Trauma Line - 0800 222 042. 8:00am - 8:00pm. Te Puna Oranga is offering this free service for anyone who would like to korero or who needs someone to listen. This service is available if you are feeling stressed after the earthquake, family relationships building up, not feeling safe, physical, emotional, sexual abuse past trauma still affecting you and your whanau.

Iwi Maori and Pacific Island Residents - 0800 524 8248 (Te Runanga O Ngaitahu) 0800 875 839 or 027 600 9412 (Te Puni Kokiri)

Depression helpline – 0800 111 757, also see website for more information http://www.depression.org.nz/

Heart Foundation Managing Stress - http://www.heartfoundation.org.nz/healthy-living/managing-stress

Ministry of Social Development – Fact sheets – Support after the quake, http://www.msd.govt.nz/emergency/factsheets.html

Appendix 3 - Information Sheet for Participants

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Information for participants

RESPONDING TO THE NEEDS OF VULNERABLE PEOPLE DURING A NATURAL DISASTER
A study of the critical communication incidents from the inter-agency interfaces

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December 2012

Introduction

An earthquake measuring 7.1 hit the Canterbury region on September 4, 2010. Some Aged and Residential Care (ARC) facilities sustained significant damage and the Canterbury District Health Board (CDHB), which funds nearly all health and disability services, set up a an interagency emergency response to address the needs of vulnerable people with significant health and disability needs who were unable to access support through the usual channels or whose needs were much greater than can be provided for through other support/help agencies.

On February 2011 the region was again hit by a devastatingly shallow earthquake near the centre of Christchurch with hundreds injured, loss of life and severe damage to infrastructure. Many ARC facilities were badly damaged and several destroyed. Over 600 ARC beds were lost and 500 elderly and disabled people were displaced. The emergency response for vulnerable people was established again but on a much larger scale. This coordinated the care needs, and for some elderly and disabled persons, evacuation and relocation either within Christchurch or to other locations. Such responses required members of the CDHB Vulnerable People's Team (VPT) to interact with representatives from many other agencies. This interaction occurred under extreme conditions, many aspects of which could not have been anticipated despite the experience gained in September 2010 when the first major quake struck Canterbury. The success of the VPT did not lie simply with the CDHB. Rather, the success of the emergency response required members of the VPT to engage with representatives from a range of different agencies (e.g., Civil Defense, Ministry of Social Development, Police, and the Military), which had to collaborate in order to meet the needs of the vulnerable people. Communication had to occur across a web of inter-agency interfaces. Thus, the stability of these interfaces was central to achieving a

satisfactory outcome for the vulnerable people the CDHB was seeking to serve.

This study focuses on the nature of the communication at the inter-agency interfaces. It proposes to collect narratives from those interacting with operational members of the VPT as they sought to locate and secure the safety of people of concern. These narratives will be analyzed to uncover accounts of communication events that stabilized (and destabilized) the interagency interfaces. These critical incidents will then be subjected to in-depth analysis in order to develop a framework for interagency communication best practice. This framework will then be presented to respondents and they will be provided with an anonymous forum (an online survey) that will allow them to assess how well the model accommodates their experiences and provide any other information that they may have felt unable to provide in the interview process. The knowledge gained will assist to create frameworks for managing the communication at such interfaces in future emergencies.

Research Questions

The overarching question for this study is:

What can we learn about stabilizing inter-agency interfaces from the communication that occurred between the agencies responding to the vulnerable people during the Christchurch earthquakes?

Specific questions this study will seek to answer are:

a. How did each agency manage the communication link between their organisation and other agencies as they responded to the needs of Canterbury's vulnerable people?
b. What role did previously established relationships play in the interactions between agencies?
c. What critical incidents illustrated ideal and less than ideal inter-agency communication practice?
d. What communication strategies do interactants consider could be implemented to enhance the quality of future inter-agency responses to vulnerable populations during times of disaster?

Process

1. Consent sought from agencies to take part in the interview process.

2. Interactants who operated at an inter-agency interface with the health response to vulnerable people will be interviewed and then asked to complete an anonymous questionnaire.

3. Interviews will be transcribed with names of interactants concealed using a coding system to ensure they cannot be personally identified.

4. Interviewees will be provided with their transcribed interview to check for accuracy.

5. Interviews are expected to take 30-90 minutes and may be followed up with further e-mail or telephone conversations once the analysis is commenced. This will allow for views to be clarified or elaborated upon.

6. Participants will be asked to reflect upon their experiences of participating in the response to vulnerable people from September until the end of the response period after the February earthquake. Specifically their account of events of and assessments of critical communication incidents will be sought.

7. The interviewer will counsel participants on the need to manage their comfort and protect their interests and those of the people they refer to. They will be advised not to name people where possible. Instead they will refer to positions or agencies to decrease risk of person identification. They will also be asked to select incidents they feel comfortable talking about.

8. Interviews will be recorded using a digital taping device so that the language used to tell each narrative can be examined in detail. Any references to this data, either orally or in written, will be made in a way that ensures that identity of the speaker cannot be determined.

9. Data will be stored in a locked cupboard in a locked office on a floor that requires scan card access. All information will be collected and stored in a confidential and secure manner. No information will be shared with anyone except the researcher, supervisors and transcriber. Any data in digital form will be stored on a password protected computer in a locked room. All names will be removed from files to ensure the sources cannot be identified. . Tapes will not be shared except with other members of the research team (e.g. transcribing technician who will sign a confidentiality agreement). They will also not be made available to any third parties outside the research team. The data will be kept for 10 years and then destroyed. Participants will be informed of this when consent is obtained.

10. Participants will have the opportunity to comment on the data they provide at the end of each interview and clarify or revise any points they have made. They will get a second opportunity to comment and revise once transcription is completed. At this point they can withdraw without penalty any section of the transcript they are uncomfortable with. Further revision will not be possible after this point.

11. The interviewer was a member of the CDHB response team. This first-hand experience is seen as a key part of the research design as only someone who was there in the thick of the emergency response can appreciate what went on and empathise with the experiences of other participants. At the same time there is a chance familiarity and history of intimate involvement may shape the data provided. For this reason

each interviewee has been given the opportunity to review and alter their transcription to ensure it accurately reflects their thoughts and views.

12. Feedback about the study's findings will be offered to participants. This will be discussed with each participant when the thesis is completed.

13. Articles presenting and discussing the findings of the study will be presented at conferences and in seminars and eventually published. Participants personal and business identities will be disguised when excerpts from the interviews are used to support or illustrate the findings in any presentations or publications.

14. The research project has been approved by the University of Canterbury's Human Ethics Committee

15. Data collected is for a Masters study and only for academic purposes. No agency has commissioned this work

Outcomes

It is hoped that the findings will add to our understanding of the complexities of inter-agency response coordination, the challenges of inter-agency integration of crisis communication and suggest ways to enhance the quality of response delivery to vulnerable communities in times of disaster. It is therefore a very important project and one we are delighted you have agreed to contribute to.

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