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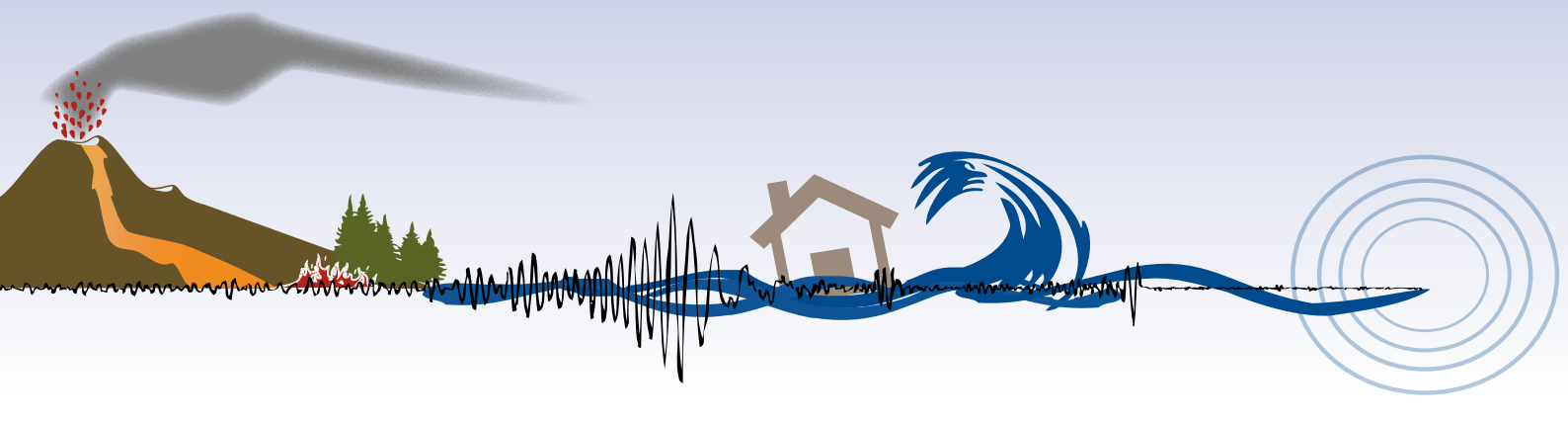

Contents:
Volume 20, Number 2

Special Issue Editorial

First International Conference on People in Disasters
Joanne M Deely & Michael W Ardagh 57
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Editorial.pdf

Research Papers

The Cat's Cradle of Responsibility: Assigning and Taking Responsibility for Companion Animals in Natural Disasters
Cheryl Travers, Chris Degeling & Melanie Rock 61
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Travers.pdf

A Review of Compassion Fatigue of Nurses During and After the Canterbury Earthquakes
Jai Chung & Nicky Davies 69
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Chung.pdf

'Te Waioratanga': Health Promotion Practice - The Importance of Māori Cultural Values to Wellbeing in a Disaster Context and Beyond
Emma Rawson 81
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Rawson.pdf

An Innovative Response to Family Violence After the Canterbury Earthquake Events: Canterbury Family Violence Collaboration's Achievements, Successes, and Challenges
Lesley M Campbell & Susie J Jones 89
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Campbell.pdf

Resilience in Youth With Type 1 Diabetes Following an Earthquake
Heidi Su, Helen Lunt & Kit Hoeben 101
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Su.pdf

Building Resilience Through Post-Disaster Community Projects: Responses to the 2010 and 2011 Christchurch Earthquakes and 2011 Tōhoku Tsunami
Maria R Dionisio & Eric Pawson 107
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Dionisio.pdf

Ripples of Recovery and Resilience: Tracking the Effects of the Canterbury Earthquakes on Older New Zealanders
Fiona Alpass, Sally Keeling, Brendan Stevenson, Joanne Allen & Christine Stephens 117
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Alpass.pdf

Thriving After Trauma: Posttraumatic Growth Following the Canterbury Earthquake Sequence
Rebekah Smith, Virginia V W McIntosh, Janet D Carter, Helen Colhoun, Jenny Jordan, Frances A Carter & Caroline J Bell 125
URL: http://trauma.massey.ac.nz/issues/2016-2/AJDTS_20-2_Smith.pdf

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Special Issue Editorial: First International Conference on People in Disasters

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Abstract

The first International People in Disasters Conference was held in Christchurch, Aotearoa/New Zealand, from 24 to 26 February 2016. The conference showcased the dilemmas of living and working within a disaster context, and best practice approaches to response and recovery. The Canterbury earthquakes of 2010 and 2011, particularly the earthquake of 22 February 2011, were the disasters of most interest to delegates. Key messages driving this conference were: that people's narratives are healing; to learn from lessons of past disasters; that human-animal bonds are important; to trust each other; that shared leadership and decision-making works best; that ethnic minorities contribute to a holistic response and recovery; that long-term mental health care is required; and to transform to a new future. These key messages were embedded in the conference themes: response, recovery, and resilience. New insight was provided on the value of community and cultural groups as first responders. The significant role of community responses after the Christchurch Earthquake led to Aotearoa/New Zealand's Ministry of Social Development revising its disaster policy to support community initiatives. Other important topics included: 1) diminished psychosocial wellbeing, 2) treatments for disaster-related mental illness, 3) initiatives that have empowered the psychosocial recovery of Christchurch's population, and 4) resilient individuals and communities managing their own recovery. This Special Issue includes papers on: caring for companion animals, compassion fatigue of nurses, promoting Māori psychosocial recovery, family violence, managing diabetes post-disaster, comparing community recovery projects in Aotearoa/New Zealand and Japan, wellbeing of older people, and posttraumatic growth. As Guest Editors for this special edition, we are delighted with the results of the conference and hope that the following papers will be useful to researchers and practitioners working in the fields of disaster response, recovery, and resilience.

Keywords: *Canterbury earthquakes, Australian bushfires and floods, psychosocial wellbeing, mental illness, community response*

The first International People in Disasters Conference was held in Christchurch, Aotearoa/New Zealand, from 24 to 26 February 2016. This event commemorated the five-year anniversary of traumatic events of 2010 and 2011 throughout Asia Pacific, particularly the Canterbury earthquakes, and Australian bush fires and floods. The earthquake experienced in Christchurch, New Zealand on 22 February 2011 was a specific focus. The conference was unique in that it exhibited stories of people living in affected areas, and stories of workers across health and emergency services. Numerous examples showcased the dilemmas of living and working within a disaster context, and best practice approaches in emergency situations. Key messages driving this event included:

- That people's narratives are healing;
- To learn from lessons of past disasters;
- That human-animal bonds are important;
- To trust each other;
- That shared leadership and decision-making works best;
- That ethnic minorities contribute to a holistic response and recovery;
- That long-term mental health care is required; and
- To transform to a new future.

These key messages were embedded in the conference themes, which covered the three vital elements of community revival after a disaster: response, recovery, and resilience. Community responders and academics provided new insight and understanding about the value of community and cultural groups as first responders during the *heroic* and *honeymoon* phases

of disaster response and recovery, in the initial days and months. Many isolated communities resolved their own requirements for food, freshwater, and sewage disposal in the initial days and weeks following what is commonly referred to as the Christchurch Earthquake, of 22 February 2011. This led Aotearoa/New Zealand's Ministry of Social Development to mandate that future disaster responses must support community initiatives.

During the conference, presentations by researchers and health providers highlighted that in the last five and half years, there has been a significant increase in the numbers of individuals with diminished psychosocial wellbeing - largely caused by disillusionment over delays in insurance settlements over homes, loss of schools, community and sports facilities, and familiar landmarks. Early and late onset mental illness have also been factors within this diminished psychosocial wellbeing. Conference presentations further highlighted a wide range of treatments for disaster-related mental illness, and initiatives that have empowered the psychosocial recovery of the Christchurch population.

Despite the continued struggle after the 2010 and 2011 events, numerous conference presentations highlighted that many people were resilient, or psychologically recovered. These people were reconstructing their lives, and able to take responsibility for their own recovery. Some individuals were described as having experienced posttraumatic growth. At the community level, this has led to rebuild projects.

The Organising Committee received many abstracts for both oral and poster presentations (see Ardagh et al., 2016). Selecting the best fit from a range of great contributions involved a blind peer-review of the abstracts before final decisions were made for the conference and published proceedings.

This Special Issue of the *Australasian Journal of Disaster and Trauma Studies* showcases a selection of papers presented at the People in Disasters Conference. The related presentations were reviewed at the conference, using set criteria, by an international expert who attended the sessions in person. Content that had been previously published was not considered for this special issue. From a further short-list, manuscripts were invited for publication after peer-review. The peer-review process involved participation of prominent scientists and practitioners, many of whom are members of the Researching the Health Implications of Seismic Events (RHISE) Group. The resulting Special Issue includes papers on: caring for companion animals; compassion fatigue among nurses; promoting Māori psychosocial recovery; family violence; managing diabetes post-disaster; comparing community recovery projects in Aotearoa/New Zealand and Japan; wellbeing of older people; and posttraumatic growth.

Travers, Degeling and Rock (2016) highlight the issues and challenges involved in taking responsibility for pets using case examples from the 2009 Victorian Bushfire Royal Commission. They found that individuals and communities cope better during and after natural disasters when the wellbeing of their pets is planned and provided for. The psychological impact of the Christchurch Earthquake on responders is depicted in the paper by Chung and Davies (2016), on compassion fatigue among nurses. She found that maintaining nurses' wellbeing and patient safety are key components of delivering high quality healthcare, post-disaster. Rawson (2016) describes how the Canterbury District Health Board's Māori health promotion plan, Te Waioratanga, was developed. It successfully promoted Māori psychosocial recovery at family (*whanau*), extended family (*hapū*), and extended tribal group (*iwi*) levels.

Campbell and Jones (2016) describe the development of the Canterbury Family Violence Collaboration, which has raised awareness of the increase in family violence since the Christchurch Earthquake. Su, Lunt and Hoeben (2016) report the results of their study on the impact of the Christchurch Earthquake on insulin-dependent, diabetic patients. They found psychological and family support contributed to good self-management and prevented metabolic complications and hospitalisation. In their paper, Dionisio and Pawson (2016) compare community rebuild and resilience projects in Japan with projects in Aotearoa/New Zealand following the recent disasters experienced in each country. Their findings demonstrate the importance of community initiatives in local and central government disaster recovery projects.

Alpass, Keeling, Stephens and Stevenson (2016) surveyed older persons in Christchurch following the 2011 Christchurch Earthquake. They found that older people generally experienced greater support from family and community, and experienced long-term emotional and economic gains. Smith et al. (2016) investigated posttraumatic growth in a group of relatively resilient individuals who experienced the Canterbury earthquakes, in 2010 and 2011. Their results highlight several important aspects of posttraumatic growth.

As guest editors of this Special Issue, we are delighted with the results of the conference and hope that the following papers will be useful to researchers and practitioners working in the fields of disaster response, recovery, and resilience. The People In Disasters Conference was jointly hosted and organised by the Canterbury District Health Board, and the Canterbury-based RHISE Group. However, many people kindly helped us prepare and organise the conference. We thank the organising committee, key note and invited speakers, scientific committee and reviewers for their comprehensive and timely reviewing of papers, and our sponsors who helped us manage the costs for attending delegates. In addition, we thank the Editors of the *Australasian Journal of Disaster and Trauma Studies* for publishing both the proceedings of the conference, and this Special Issue of selected papers.

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The Cat's Cradle of Responsibility: Assigning and Taking Responsibility for Companion Animals in Natural Disasters

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Abstract

Responsibility is often regarded as a unified concept. However in everyday language, the term refers to a cat's cradle of related ideas and perceptions. Although there might be consensus that individuals should be ultimately responsible for their own animals during crises, individuals and groups may disagree about the norms and obligations we ought to adopt and what we owe to animals that are dependent on our care. A coherent account of responsibility for companion animals, or pets, in disasters is yet to be articulated. At the same time, there is good evidence showing that individuals and communities cope better during and after natural disasters when companion animals receive protection alongside their human families. Against this backdrop, the concept of responsibility is increasingly invoked in public communication as a motivation for pet owners to comply with emergency management plans. While top-level emergency managers seem clear on their responsibilities, studies have shown that operational-level emergency responders and service providers are less likely to know who is responsible for pets and in what ways. In this paper, we undertake a structured examination of how different concepts of responsibility are enacted around human-companion animal relationships in the context of natural disasters. Case examples from the 2009 Victorian Bushfires Royal Commission are used to examine issues and challenges in the effective translation of the concept of responsibility into operational practice. We explore how a more structured approach, with sensitivity to both human and non-human vulnerabilities, may help front-line responders, service providers and policy-makers to better engage with owners concerning responsibility for their companion animals during disasters.

Keywords: *companion animal, responsibility, taxonomy, natural disaster, Black Saturday*

Attributions of *responsibility* are central to how we manage people in disasters. Often regarded as a single generic concept, this term actually refers to a veritable *cat's cradle* of related ideas and perceptions (Vincent, 2011). In Australia and New Zealand, owners are considered responsible for their companion animals, or pets, before, during, and after a natural disaster (Glassey & Wilson, 2011; White, 2012). To reflect variable uses of these terms in surrounding literature, the words pet and companion animal are used interchangeably throughout the current paper. To fulfil their responsibility, owners are encouraged to have a disaster plan for their pets. While this is a fundamentally important task, we question whether having a plan fulfils the obligations and duties implied. We ask:

1) Do pet owners understand what it means to be responsible across the emergency management cycle?
2) Are they willing and able to take responsibility for their animals in a crisis?
3) What are the implications for front-line emergency responders, the health of the community, and for companion animals themselves?

Putting responsibility for companion animals in disasters in context: Victoria's Black Saturday

Black Saturday (7 February, 2009) was preceded by a prolonged heatwave causing what have been referred to as *tinder-dry* conditions, i.e. extremely dry and flammable. In the state of Victoria in Australia, temperatures soared to over 45°C in many areas and fires broke out across the state. Fanned by storm-force winds, fire conditions shifted from a *normal bushfire*, which is a natural feature of the Australian environment

(Council of Australian Governments, 2011), to a *catastrophic event*, characterised by "…extraordinary levels of mass casualties, damage, or disruption…" (FEMA, 2008, p.1). Black Saturday claimed the lives of 173 people and countless animals, and the scale of these and other losses changed the future of disaster planning throughout Australia (McLennan & Handmer, 2012, Victorian Bushfires Royal Commission, 2010).

The national policy at the time was to "Prepare, stay and defend or leave early" and was also known informally as *stay or go* (Victorian Bushfires Royal Commission, 2010, p.5). The emphasis was on self-reliance of individuals and communities, because emergency responders cannot always be present during a disaster. The emphasis of this policy has therefore since shifted to one of shared responsibility between government and communities. The Victorian Bushfires Royal Commission (2010, p.6) has defined shared, although not equal, responsibility as "increased responsibility for all" when dealing with disasters. The Commission acknowledged that responsibility can only be apportioned relative to capacity, so that fire authorities would assume greater responsibility than the community during a bushfire response because they are more capable of identifying and minimising the associated risks (Council of Australian Governments, 2011; Victorian Bushfires Royal Commission, 2010).

The normative vision of sharing responsibility for animals, i.e. how things ought to be, appears to be contested among emergency management practitioners and stakeholders. The processes and practices required to realise a vision of shared responsibility in complex and unpredictable situations have been described as unclear and conflicted (McLennan & Eburn, 2015; McLennan & Handmer, 2012; Taylor et al., 2015). Current thinking also highlights an anthropocentric bias, where the norms we ought to adopt in assigning and taking responsibility for companion animals during a crisis do not appear to make a good fit.

Two key themes emerge in the literature regarding animals in natural disasters (Thompson, 2013; Travers, Degeling, & Rock, In Press). Firstly, companion animals can be a *risk factor* for human health and safety. This is because pet-related factors such as strong human–pet bonds can influence the decision of pet owners or others to stay, exposing owners to the risk of injury or death. The loss of pets can also cause high levels of anxiety and depression, and post-traumatic stress disorder. Secondly, companion animals are *at-risk* themselves, particularly if their owner has a low level of attachment or commitment to them or if the owner is unprepared for an emergency event. Running beneath these discussions is the notion of responsibility. However, what this responsibility entails does not appear to have been clearly explained.

Against this background, the concept of responsibility is increasingly invoked in public communication as a motivation for pet owners to comply with emergency management plans (Thompson, 2013; Thompson et al., 2014). However, while top-level emergency management appears clear in its operational responsibilities towards animals, studies and reports (see: Decker, Lord, Walker, & Wittum, 2010; RSPCA, 2011; Taylor et al., 2015) suggest that, at the operational level, responders are less likely to know who is responsible and how.

The current paper outlines a structured examination of how different concepts of responsibility can be enacted around human–companion animal relationships in the context of natural disasters. Drawing on witness testimony from the 2009 Victorian Bushfires Royal Commission (VBRC), we applied Vincent's (2011) Structured Taxonomy of Responsibility Concepts to three pet owners' experiences of Black Saturday. We then explore how this structured approach can help owners and responders better understand and engage with the concept of responsibility for companion animals during a disaster event.

Methods

Materials

This paper is mainly based on Volume IV: The Statements of Lay Witnesses of the Victorian Bushfires Royal Commission's final report (VBRC, 2010a). Supplementary information was gathered from media interviews and reports. This volume is publicly available in an electronic, searchable format "to assist research and provide a public record of the Victorian Bushfires Royal Commission website" (VBRC, 2010a para 1). It contains "the written statements of each lay witness who gave oral evidence to the Commission" (VBRC, 2010a, para 2). It also "includes associated material provided by these witnesses, such as photographs and videos" (VBRC, 2010a, para 2). All lay witnesses participated voluntarily and none were required to testify. "The lay witnesses were identified in various ways, including

from community consultations…and written submissions to the Commission." (VBRC, 2010a, para 4) These witnesses all agreed to being identified publicly as a result of the Commission. Their addresses and some names were nonetheless deleted from the transcripts to protect their privacy and the privacy of third parties.

Research ethics

Throughout Australia, ethics certification is not required for research using documentary sources such as Commission of Inquiry reports, newspapers and news websites, or where the information is based on publicly available information (Office of Research Ethics & Integrity, 2016). The Commission worked closely with witnesses to ensure that the level of privacy afforded was acceptable to them. The ongoing use of witnesses' testimony is therefore not assumed to carry any clear risk of harm.

Conceptual framework

There are various research-based frameworks for responsibility, each covering conceptually related theories and approaches, with a lot of overlap between them. No one theory or approach appears to constitute the best frame. Instead, each one draws attention to particular issues and challenges (McLennan & Handmer, 2014). We chose Vincent's (2011) taxonomy to help us unpack the concept of responsibility in different contexts and scenarios. Breaking down the notion of responsibility is not new. However, Vincent has identified the relationships between the concepts in particularly considerable detail.

Vincent's taxonomy

Vincent's (2011) taxonomy describes six forms of responsibility in common language use: capacity, role, causal, virtue, outcome, and liability responsibility. *Capacity* responsibility refers to the capacity of an individual – their ability to understand what is required and to have the resources to act appropriately. *Role* responsibilities are created by the institutional position and circumstances of an individual. For example, firefighters are responsible for fighting fires.

Capacity and role responsibility are closely linked; the greater the capacity, the greater the role responsibility, in terms of duties or obligations, that might reasonably be expected of an individual. Capacity also relates to causal responsibility, which can be understood as those causal links that connect our actions and decisions to an event or state of affairs. *Virtue* responsibility involves a history of commitment to do what is considered right or moral. *Outcome* responsibility concerns responsibility for actions and is "backward looking" (Vincent, 2011, p.17) at a state of affairs or outcomes. It is morally imbued as here we often apportion praise or blame. *Liability* responsibility is derived from both virtue and outcome responsibility. This aspect of responsibility raises the essential question of who is held responsible, and how they are held responsible, for what has happened.

A key insight here is that the term "responsibility" can be used to describe very different features of a situation. Some of these features have no moral dimension in particular. An individual might have the capacity to assume responsibility. However, to be held accountable in this way, the person usually requires control over a decision and the ability to carry out the decision. Using Vincent's taxonomy as an analytic framework, our analysis proceeded through several cycles of immersion and crystallization of insights. This research process was based on Borkan (1999) and comprised repeated readings, constant comparisons, discussions among all the authors, periods of testing of alternate explanations, and then re-immersion within the research material.

The first author examined all the transcripts of the witness statements provided to the VBRC that dealt with pets. Witness statements that addressed other non-human animals such as livestock or wildlife and/or with no mention of pet animals were excluded from the analysis. Below, we present three case examples to help illustrate different aspects of responsibility illustrated by our analysis of all applicable witness accounts. These selected examples also provide sufficient detail regarding fire context, intentions, motivations, and interactions to discuss and draw conclusions regarding the different notions of responsibility for pets during disasters. They reflect variations in:

- decisions to stay or go;
- level of preparedness (well prepared, partially, unprepared); and
- contact (or not) with front-line responders during the event.

Findings

There were 100 statements selected, with 44 of them mentioning companion animals. Many individuals affected by the Black Saturday fires planned to stay and defend their property while others felt their homes

were not defendable and planned to leave. Many felt their plans were sufficient to deal with what they described as a normal bushfire. Most individuals had some fire awareness education, particularly through annual sessions provided by the Country Fire Authority (CFA). However, Black Sunday appeared to eliminate many good plans.

Ron's story

Pre fire. The Commission chronicled how Ron and his wife were breeders of Airedale dogs which were considered part of their family. At the time of the bushfire they had 21 dogs, including 11 puppies. Ron is noted as saying that they made the decision to stay and defend their home mostly because of the dogs and knowing that the main road could be impassable during a bushfire (VBRC, 2010b, para 8). Ron and his wife had assumed responsibility for their safety, and had built their capacity to defend their home, their dogs, and their own lives. They had attended the CFA's annual education sessions and followed the advice provided. They conducted an exercise drill moving their dogs from the kennels into crates kept in the house where they would stay and defend (VBRC, 2010b).

During the fire. The Commission detailed how two family members arrived to pick up the puppies but became trapped by the speed and ferocity of the fire (VBRC, 2010b). Ron put their plan into action, patrolling the house and watching for embers, wetting down walls and doors. The dogs were in their crates and were moved from room to room as each room fell to smoke or fire. Ron stated that:

> *We never saw a wall of flame approaching—one minute there was dense smoke and then everything was on fire. Even when that happened I was not overly worried— I thought that we would just have to focus on keeping the house intact and not worry about anything else.*
>
> (VBRC, 2010b, para 18)

Post fire. The fire destroyed the house. Once it had passed Ron and his wife loaded the dogs into the cars and left the property. Through some luck and a lot of good management, Ron, his family and dogs survived. Ron praised the Country Fire Authority, acknowledging their role in the outcome:

> *Every year, the St Andrews CFA conducts a session in our area where all the property owners can go through their fire plan… . The advice was invaluable and frankly, I don't think we would have survived without it.*
>
> (VBRC, 2010b, para 9)

Summation. Ron had deliberately developed a capacity to deal with the circumstances he found himself in so he could better perform his role responsibility of managing risks posed by the fire. His actions and decisions, or causal responsibility, led to a good outcome with all lives saved. In many ways Ron has embodied the ideal model of someone who takes his responsibility for his animals seriously. It is worth noting, however, that the fire exceeded Ron's capacity to protect his home. Ron told the Commission how he and his wife chose to rebuild with additional safety features based on the lessons learned, as it was a good location for their dog breeding (VBRC, 2010b). Some may view this decision as enhancing his capacity to assume role responsible for future events while others might argue that it is irresponsible to rebuild in an indefensible area.

Juliet's story

Pre fire. Juliet lived on a property with her dog and three horses belonging to her friend, Priscilla. According to the Commission (2010c, para 9), Juliet's initial plan was "just to go". Later, she decided to stay if she did not feel safe to leave. The latter plan comprised basic actions such as turning on the sprinklers and staying indoors. At the time of the fire, Juliet had a trailer for transporting horses (horse float) but no tow bar on her car (VBRC, 2101c).

During the fire. According to the Commission (VBRC, 2010c), Juliet would have left earlier with her dog if not for the horses and knowing that Priscilla was on the way. Priscilla arrived with her brother, father, and a horse float. Departure was delayed and they became trapped by the rapidly encroaching fire. A television helicopter appeared, flew away, and returned with a police helicopter. Police Sergeant Key was lowered to the ground. The situation was dire and Sergeant Key knew they had to leave immediately (VBRC, 2010c). As Juliet and her dog were being winched up, the dog panicked and broke free of her arms (Carnovale, 2009). She stated that, "I think it also dawned on me that I would be leaving everyone and I didn't want to do that. At that point I yelled for them to let me off" (VBRC, 2010c, para 31).

Juliet thought that she was lowered to the ground because she demanded it. However, Sergeant Key

tells us (Silvester, 2015, para 19): "I knew if they tried to winch us up I could bring the aircraft down." Following operational protocol, Sergeant Key cut them both loose because of the danger to the helicopter and crew (Carnovale, 2009; Ross, 2011). They left the property by car driving through flames on both sides of the road, guided by the helicopter pilot, while Priscilla held one horse by the halter out of the car window (VBRC, 2010c). This was extremely dangerous, meaning that Sergeant Key could have forced abandonment of the animals. However he did not.

Post fire. The next morning, Juliet returned to her property with a friend. Her house was still there. They drove down the mountain road, through the devastation, to find out if anyone needed help. They loaded up some horses belonging to another neighbour and then left the mountain (VBRC, 2010c).

Summation. Juliet might be regarded as irresponsible for being largely unprepared, and not ensuring she had the capacity to take care of the animals in her care, even for during a normal bushfire. Thus her ability to perform her role responsibility was diminished during the fire event. Juliet had planned to leave earlier that day with her dog but stayed because of the horses, and she believed she had a moral responsibility to do so.

Sergeant Key assumed operational responsibility once he was on the ground, and was causally responsible for saving their lives. However, this also marks a potential for tension and conflict between responder and pet owner when the responder takes on role/operational responsibility and the owner refuses to relinquish what they may see as *their* responsibility. Control resides with the police but Juliet seemed unaware of this shift. In some sense, Sergeant Key allowed Juliet and Priscilla to share responsibility for saving the animals. But the force of the owners' attachment to their animals and their relative incapacity to manage the situation they found themselves in shows how contingent and complex the outcomes of a decision to take responsibility can be, for owners and responders alike.

Elaine's story

Pre fire. Elaine and Len were an older couple living on a half-acre, approximately 2000 m^2, property in a small town. Len was in poor health with heart problems and limited mobility. His heart problem required regular medication. Len still drove a car but Elaine did not (VBRC, 2010d). They had no fire plan largely due to a sense of security after living in the town for 50 years without a fire incident of note (VBRC, 2010d).

During the fire. As the fire drew closer, Elaine made many attempts to convince Len to leave but he refused to recognise the danger (VBRC, 2010d). Elaine was very frightened. At one stage, she tied their dog to the tray of their ute (pickup truck) hoping that Len would change his mind. When she saw flames, she pleaded with Len to leave but he would not accept that the fire would reach their home. Eventually, she thought "I'm not staying here to burn" (VBRC, 2010d, para 20). She walked away, taking nothing. A neighbour picked Elaine up and drove her to an evacuation point. Elaine went on to state that:

> *When I left the house, I had no idea where I was going—the only thing I can remember is that I wanted to get out. I was not thinking clearly because I was so annoyed with Len and I was also feeling terribly guilty about leaving him.*
>
> (VBRC, 2010d, para 21)

Post fire. Len and the family dog were killed in the fire. A police officer found their cat near to death. A local vet nursed it back to health before returning the cat to Elaine without charge.

Summation. This is a tragic case involving two vulnerable people who lacked the capacity to deal with a natural disaster exceeding their experiences and expectations. It is notable that the safety of their companion animals was not central to their decision-making, or to the awful outcome. Although Len could drive the car, he did not have the capacity to recognise the risk, to assume role responsibility for addressing the situation, and to act accordingly. Perhaps this example is a reminder of the need to share responsibility between government, individuals, and communities to ensure that more vulnerable people have adequate support. It also highlights how vulnerability and risk crosses boundaries between species. In providing support we should also consider how a person's desire to protect and care for their companion animals is often experienced as a moral duty, and can act as a prompt for greater preparedness amongst owners (Thompson et al., 2014).

Conclusion

Care must be taken to initiate and guide discourse on disaster responsibilities in a structured manner. Care

must also be taken to ensure everyone agrees how their obligations and duties to other humans and to nonhumans can guide their actions within prescribed limits, depending on the circumstances faced. The case studies outlined above highlight how attributions of responsibility are often more akin to reactive expressions of our attitudes to risks rather than well-constructed moral arguments.

One challenge facing emergency management is ensuring that their conversations about responsibility with pet owners do not degenerate into simplified arguments about blame. While Vincent's (2011) taxonomy helps us to unpack responsibility and identify relationships between concepts, an oversimplified use of this framework could unwittingly steer conversations in an emergency management environment towards this direction, of blame. McLennan and Handmer (2014) recommend the use of multiple responsibility frameworks to ensure the capture of elusive issues. Multiple frames could also help explore responsibility in a more proactive manner, using positive constructs. Concerning simplified arguments about blame in particular, Thompson (2015) suggests that the term *responsibility* might be too austere, *obligation* too onerous, and *duty* a little too earnest. Instead, it seems that we should identify terminology that resonates with animal owners and inspires a duty of care rather than seeking compliance.

Whatever the terms, conversations about responsibility in emergency management need to engage pet owners and front-line emergency responders alike. This conversation should extend beyond whether pet owners have a plan, to tackle difficult questions about who takes responsibility, how, and when. There is much work to be done in this complex area. For example heuristics could be developed to guide people in comparable situations, so they can make better decisions that meet accepted norms of ethical behaviour concerning their pets. Increasing awareness of responsibility and how it is enacted around the human–companion animal relationship in natural disasters could help achieve better outcomes for all concerned, including non-human companions.

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A Review of Compassion Fatigue of Nurses During and After the Canterbury Earthquakes

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Abstract

The significance of compassion fatigue in health professionals was highlighted during and after the Canterbury earthquakes, in New Zealand. A lack of consistent definition of and comprehension about compassion fatigue, particularly in relation to understanding disaster response processes, may impact upon nurses both emotionally and physically when caring for traumatised survivors. In light of this, the current article focuses on an exploration of national and international literature. Findings from this review include definitions and theories of compassion fatigue, exposure, impacts, and interventions. The international literature has demonstrated the significance of compassion fatigue for nurses as well as other health professionals; however, very little New Zealand literature specifically refers to compassion fatigue. Researchers in New Zealand tend to view the symptoms associated with compassion fatigue and burnout as a combined condition rather than two distinct syndromes, which could impact upon clinical awareness in New Zealand. Limitations of international and New Zealand literature are discussed and gaps within the research are identified, along with recommendations for future research in this area, especially from a New Zealand perspective.

Keywords: *compassion fatigue, earthquake, emotional exhaustion, disaster, nursing*

Disasters related to natural hazards are a part of human history with a significant impact on life, physically, psychologically, and psycho-socially. In the last 50 years, the number of disasters has increased and more than 10,000 natural disasters have occurred (Arbon, 2010; World Health Organisation, 2013). Over 270 million people have been affected, including 12 million deaths, and over $4 trillion (USD) of financial loss has been reported (Arbon, 2010; World Health Organisation, 2013). New Zealand is no exception with reports of 185 deaths, 150,000 homes damaged, and $20 billion (NZD) rebuild costs after the Canterbury earthquakes (Parker & Steenkamp, 2012).

With an increase in severe disasters globally, the significance of health professionals, including nurses, and their ability to respond has been acknowledged (World Health Organisation, 2013). A fundamental role of acute nursing, caring for the injured can be emotionally and physically arduous work. Potentially, health professionals are at high risk of experiencing indirect suffering, such as feelings of fear and pain, while articulating empathy and compassion (Chung, 2016; Davies, 2009; Gauthier, Meyer, Grefe & Gold, 2015; Günüşen & Üstün, 2009; Hinderer et al., 2014; Itzhaki et al., 2015; Stewart, 2015). It is concerning that a workforce such as nursing that expounds these qualities on a daily basis may well lack awareness of the impact of compassion fatigue in terms of nurses' well-being and the quality of patient care.

The risk of earthquakes is clearly identified as New Zealand is situated amongst the Pacific Ring of Fire, an area in the Pacific Ocean more prone to earthquake activity due to plate tectonics. Following the Canterbury earthquakes, disasters related to natural hazards have become a current, priority concern in New Zealand. Raising awareness of compassion fatigue during times of disasters has become essential as the risk for future earthquake activity, resulting in human casualties, is high. A lack of understanding of compassion fatigue in nursing may potentially threaten nurses' wellbeing along with patients' safety. The purpose of this article is to explore New Zealand literature and compare it to international literature on compassion fatigue in order to answer these review questions: what is compassion

fatigue, what situations expose nurses to compassion fatigue, what is the impact of compassion fatigue, and what possible interventions exist for managing or even preventing symptoms of compassion fatigue in nurses in New Zealand.

Methodology

Strategies were adopted from Bettany-Saltikov (2012) and the PRISMA protocol from Huggard and Unit (2013) and Moher, Liberati, Tetzlaff, and Altman (2009) in order to locate, appraise, and extract quantitative and qualitative data of national and international articles related to compassion fatigue. Preliminary searches related to compassion fatigue guided the selection of appropriate databases to create inclusion and exclusion criteria which were then applied to literature (Huggard & Unit, 2013). Figure 1 presents this process.

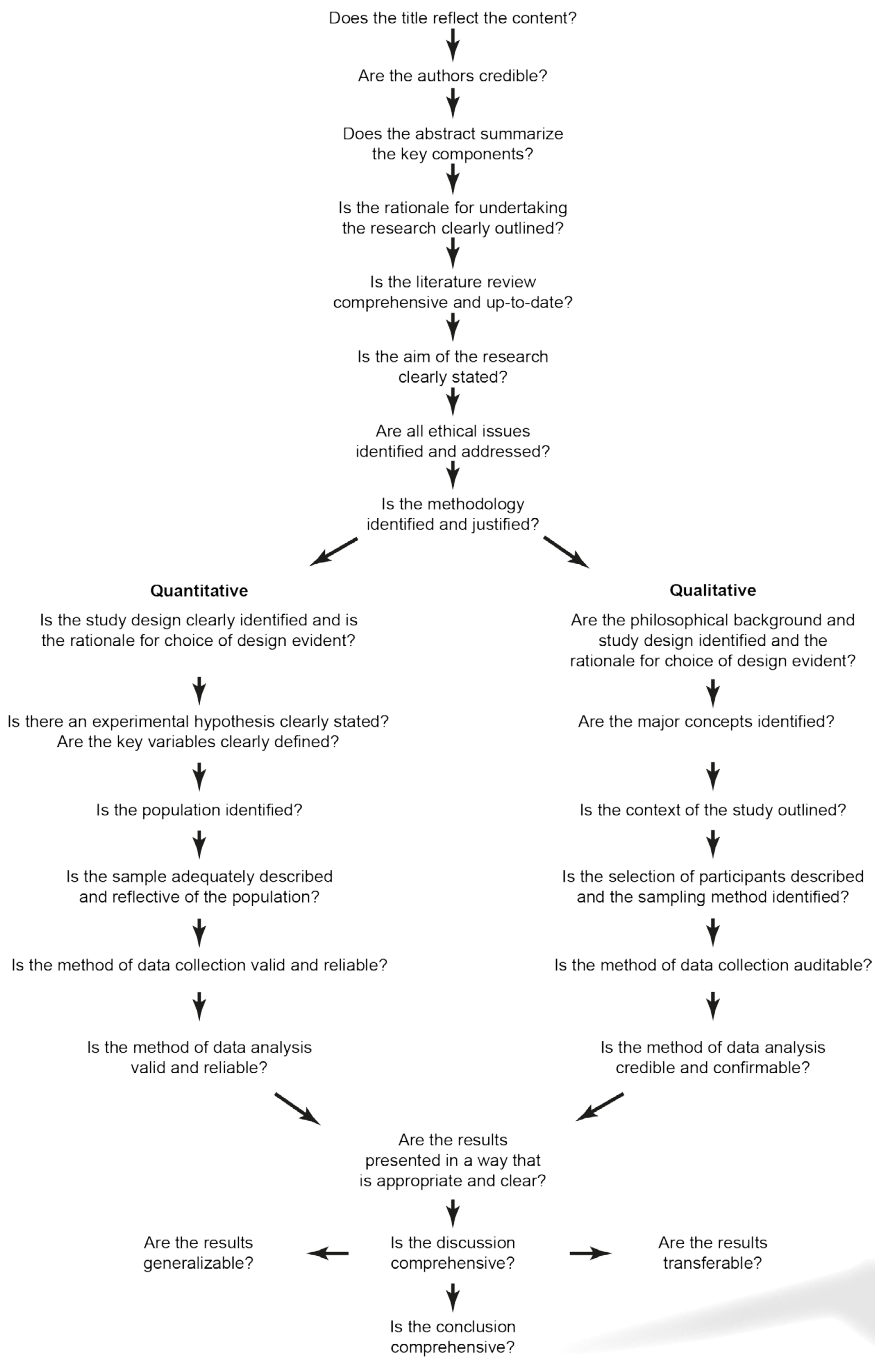

Figure 1. Literature review framework. From "Developing a framework for critiquing health research: An early evaluation" by K. Caldwell, L. Henshaw, and G. Taylor, 2011, *Nurse Education Today, Volume 31,* pp. e1-7. Copyright 2011 by Elsevier. Adapted with permission.

It was evident in the initial stages of this process that New Zealand literature directly related to compassion fatigue in nursing was limited and only a few articles matched the protocol. In response to the result, the New Zealand literature search was expanded to include dissertations/theses. The expanded search was conducted through nzresearch.org.nz, canterbury.ac.nz (University of Canterbury) and researcharchive.vuw.ac.nz (Victoria University of Wellington). These webpages were used due to the open access availability of published and unpublished nursing theses in New Zealand, whereas the remaining New Zealand universities restricted or limited access to nursing theses. The international literature search remained focused on peer-reviewed literature rather than dissertation/theses on account of sufficient and adequate quantity of research available. A decision was made to rule out a meta-analysis as the majority of studies from New Zealand were qualitative, descriptive studies, or literature reviews. Consequently, there was not sufficient statistical commonality between the studies to warrant a meta-analysis. The appraised studies were categorised alphabetically. Also included was information about; country of origin, research aims, and results. Results from the studies were summarised into topics and then grouped into themes (see Appendix 1). This process adopted deductive reasoning.

Search strategy

Key terms and search criteria located appropriate studies for this review, from CINAL, PsycINFO, ProQuest, PubMed, Scopus, Google Scholar, nzresearch.org.nz, canterbury.ac.nz (University of Canterbury) and researcharchive.vuw.ac.nz (Victoria University of Wellington). Four study categories were identified: health professionals (nurses), natural disasters, compassion fatigue (or stress), and crisis interventions. Key words for these categories were as follows: compassion, stress or fatigue, post-traumatic stress disorder, vicarious trauma, nurs*, crisis intervention, program or evaluate* and stress management, natural disasters, earthquake*, tsunami*, hurricane*, cyclone*, flood* or bush fire*. Research related to compassion fatigue, published between 2000 and 2015, was selected for the review. Database results were then screened based on inclusion and exclusion criteria. Eligible articles for the review had to meet one of the criteria:

i. nurses' views, understanding or experiences during or after natural disasters;
ii. nurses' exposure to compassion fatigue;
iii. impacts by natural disasters;
iv. interventions in order to suggest possible solutions for compassion fatigue.

Exclusion criteria were as follows:

i. not written in English language;
ii. international dissertations/theses on compassion fatigue.

Quality appraisal

Appraising research quality is an essential process to maintain rigour and transparency and to avoid methodological biases (Adriaenssens, De Gucht & Maes, 2015; Bettany-Saltikov, 2012). Quantitative and qualitative articles may require differently focused criteria: authenticity and trustworthiness for qualitative research, and validity or reliability for quantitative research (Bettany-Saltikov, 2012). Initially, each quantitative and qualitative article was read thoroughly. The articles were appraised for quality by selecting yes or no against each of the review criterion in the framework in figure 1. No quality scores were applied, however, only articles that met all appraisal criteria were included in this review.

Results

The initial search identified 465 articles and 22 New Zealand dissertations/theses.

Following further examination based upon the inclusion and exclusion criteria, duplication, and quality appraisal, 32 references remained: 5 from New Zealand research and 27 international studies. Figure 2 summarises the overall research selection process.

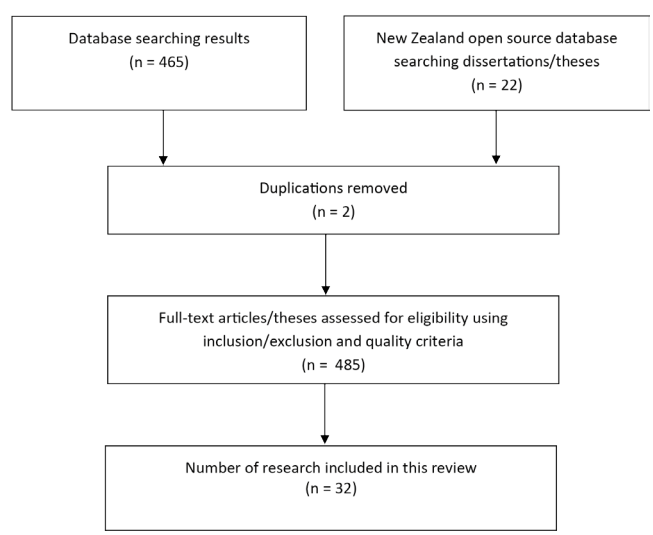

Figure 2. Adapted PRISMA flow diagram used to select studies.

Appendix 1 provides a summary of results and themes from the parsed set of literature. The majority of the 32 research studies on compassion fatigue were conducted in the USA, followed by China, Taiwan, Japan and Turkey. International studies were largely quantitative and utilised different tools to measure degrees of compassion fatigue. These include Professional Quality of Life and Post or Secondary Traumatic Stress scales for compassion fatigue (Armagan, Engindeniz, Devay, Erdur & Ozcakir, 2006; Zhen et al., 2010). Of the five New Zealand studies included in the review, the majority were qualitative, descriptive studies or literature reviews. Four themes were identified relating to compassion fatigue and nursing: definitions and theories, exposure, impact, and interventions.

Definitions

The theme of definition or lack of it was noted across the New Zealand literature. Compassion fatigue in nursing can be the result of experiences of indirect trauma while caring for distressed patients, in stressful circumstances, for a short period of time. The indirect stressful emotions can evoke secondary traumatic stress in nurses, which may lead to feelings of vulnerability, hopelessness, helplessness, and insecurity (Figley, 1995). Further definitions of hopelessness in particular are provided in Appendix 1. Alternatively, burnout is caused by chronic emotional exhaustion due to stressful professional relationships at the organisational level for a prolonged period of time (Figley, 2002). By extension, short-term emotional secondary stress or compassion fatigue can potentially develop into long-term emotional exhaustion, also known as burnout.

Despite the way that compassion fatigue and burnout share similarities (Figley, 1995, 2002; Maslach & Jackson, 1981; Maslach, Schaufeli & Leiter, 2001), the lack of separation and identification as two distinct concepts only leads to further misunderstanding. There is, therefore, a need for clear definitions for both conditions if health professionals are to fully understand exposure, impacts, and interventions, and the way these relate to professional practice.

Throughout the literature review process, it was apparent that international researchers adopted two key theories which underpinned the majority of research: compassion fatigue by Figley (1995, 2002) and burnout by Maslach (Maslach & Jackson, 1981; Maslach et al., 2001). Consequently, the majority of international research clearly distinguished between compassion fatigue and burnout and adopted clear definitions to decrease confusion between the two terms. Conversely, researchers in New Zealand tended to use various theoretical backgrounds and symptoms associated with compassion fatigue and burnout interchangeably (Davies, 2009; Hall, 2001; Hall & Powell, 2011; Itzhaki et al., 2015).

Upon closer inquiry, the status of research in New Zealand appears to fail to address the issue of compassion fatigue as a direct focus. Indeed, only one of the New Zealand articles (Hughes, Grigg, Fritsch, & Calder, 2007) and one dissertation (Gillespie, 2013) use the term compassion fatigue briefly, citing Figley (1995, 2002) as the underpinning theoretical source. While it may be implied that the concept of compassion fatigue can be inferred from some elements reported in the remaining set of New Zealand articles, none of the authors appear to have done so. It therefore seems counter-productive to critique these authors' application of the concept.

Exposure

Balancing clinical judgement, ethical responsibilities, and the personal distress and emotions associated with the aftermath of a natural disaster is extremely challenging for many health professionals. Early recognition of the potential sources of compassion fatigue may contribute to understanding the development of this condition in nurses.

Findings shown in appendix 1 indicate that patient burden ratios, unexpected aftershocks (Dolan et al., 2011), high patient ratio (Richardson et al., 2013), threatened safety (Dolan et al., 2011; Lyneham & Byrne, 2011), and limited communication and access to caring resources (Dolan et al., 2011; Richardson et al., 2013), may cause compassion fatigue within a New Zealand context. In this context, patient burden ratio refers to "safe staffing for nursing…monitoring and taking action if there are not enough nursing staff available to meet the nursing needs of patients on the ward" (National Institute for Health and Clinical Excellence, 2014 para 2). International literature highlights these additional causes: ethical dilemmas (Arbon, 2010), weakness of health infrastructures (Arbon, 2010), nurses' adverse feelings of powerlessness and helplessness (Armagan, 2006; Boyle, 2011; Shih, Liao, Chan & Gau, 2002; Yang, Xiao, Cheng, Zhu & Arbon, 2010), repeated indirect trauma (Armagan et al., 2006; Ben-Ezra, Palgi, Hamama-raz, Soffer & Shrira, 2013; Boyle, 2011; Zhen et al., 2010),

a lack of professional training for disasters (Yang et al., 2010), psychological vulnerability (Ben-Ezra et al., 2013), and unpredictability and uncontrollability (Zhen et al., 2010) as potential sources of compassion fatigue.

Impacts

Exposure to compassion fatigue can cause severe emotional distress which may impact upon professional role, and psychological and physical health (Armagan et al., 2006; Boyle, 2011; Yang et al., 2010; Zhen et al., 2010). However, the literature summarised in appendix 1 revealed that New Zealand research into compassion fatigue was limited and focused solely on the psychological impact following natural disasters: the fear of unpredictable future earthquakes, and negative effects of overall mental health (Hughes et al., 2007; Lyneham & Byrne, 2011).

In contrast, international literature covered a wider range of effects which included the impact upon three perspectives: professional role – avoidance (Armagan et al., 2006; Boyle, 2011; Dominguez-Gomez & Rutledge, 2009; Guo et al., 2004; Palm, Polusny & Follette, 2004; Zhen et al., 2010), hypersensitivity (Guo et al., 2004), decreased focus and concentration (Dominguez-Gomez & Rutledge, 2009), and increased vigilance (Armagan et al., 2006; Dominguez-Gomez & Rutledge, 2009); physical loss of energy (Boyle, 2011; Yang et al., 2010), feelings of inadequacy (Armagan et al., 2006), insomnia (Yang et al., 2010), and somatic symptoms (Armagan et al., 2006; Ben-Ezra et al., 2013; Boyle, 2011); and psychological health concerns and fears (Ben-Ezra et al., 2013; Hammad, Arbon, Gebbie & Hutton, 2012; Shih et al., 2002), anxiety/depressed mood (Armagan et al., 2006; Zhen et al., 2010), and being easily startled (Armagan et al., 2006; Dominguez-Gomez & Rutledge, 2009; Zhen et al., 2010). It appears that there are major differences in global awareness relating to the impact of compassion fatigue.

Interventions

Two key intervention theories may help to address compassion fatigue: personal control and stress and coping processes by Folkman (1984), and psychological empowerment in the workplace by Spreitzer (1995). These theories and other comparable literature are outside of the 2000 to 2015 timeframe as the search criteria for appendix 1. However, they are considered seminal works and inform the discussion presented within the review articles.

Folkman's theory relates to personal and organisational coping mechanisms: emotional and problem focused coping respectively. Greater awareness of these coping strategies could contribute to improved stress management within the nursing profession. Additionally, Spreitzer's theory provides psychological empowerment components including meaning, competence, self-determination, and impact. Spreitzer places emphasis on autonomy, initiation, and continuity throughout the caring process, which may assist nurses to identify potential risk factors, search for solutions, and cope with highly stressful working environments. Both Folkman's and Spreitzer's theories incorporate education, self-empowerment, and mindfulness.

Education programmes focus on dealing with distressing circumstances as external problems and promote problem-focused interventions based upon effective communication, positive co-worker relationships, efficient leadership by management teams, debriefing sessions based on cultural recognition, and mentoring programs at an organisational level (Hunsaker, Chen, Maughan & Heaston, 2015; Mealer, Burnham, Goode, Rothbaum & Moss, 2009; Sacco, Ciurzynski, Harvey & Ingersoll, 2015). Mentoring programmes can be particularly useful for new graduate nurses who can learn from experienced nurses regarding stress management (Günüşen & Üstün, 2010; Hinderer et al., 2014; Hooper, Craig, Janvin, Wetsel & Reimels, 2010; Ishihara, Ishibashi, Takahashi & Nakashima, 2014).

Self-empowerment is an intervention that has a problem and emotional focus which includes meaning, competence, self-determination, and impact. These four elements can contribute to improved professional competency based on self-management through the construction of positive networks, journaling, spending time with family, regular exercise, seeking advice from other health professionals, and in some instances, medical or pharmacological intervention (Hinderer et al., 2014; Hochwälder, 2007; Sacco et al., 2015). Self-empowerment as an intervention for managing compassion fatigues concentrates on managing personally distressing emotions and then taking actions to tackle challenges. External and internal problems tend to be managed simultaneously.

Finally, Mindfulness-Based Stress Reduction (MBSR), developed by Samuelson, Carmody, Kabat-Zinn and Bratt (2007), consists of emotional coping, self-awareness, and improvement in self-resilience (Moll,

Frolic & Key, 2015). It has an important emotional focus as this technique relies upon the acknowledgement of the present moment in order to perform current tasks, and manage traumatic flashbacks and stressors. Concentrating on present time can help nurses to engage calmness without self-judgement and to deliver effective care. This process may also augment nurses' ability to think critically and objectively about emotionally stressful events and to search for constructive coping strategies in order to improve self-resilience (Flarity, Gentry & Mesnikoff, 2013; Hinderer et al., 2014). Resilience is an essential factor for decision-making processes and effective self-management during caring processes.

Discussion

The current exploration of literature concerning compassion fatigue provides an overview of existing national and international literature. The results of this review have revealed a lack of consistent definition of and comprehension about compassion fatigue in New Zealand. Nationally, this inconsistency has resulted in further misunderstanding when the terms compassion fatigue and burnout have been used interchangeably, despite being two different conditions –according to Chung (2016). This interchangeable use of definitions may impact upon the early recognition and understanding of symptoms related to these similar but separate conditions.

Possible reasons for the misuse of definitions of compassion fatigue and burnout may be related to the inappropriate application of compassion fatigue theories to research. The majority of New Zealand research in this domain is qualitative and explores individual nurses' in-depth emotions and experiences of compassion fatigue (Davies, 2009) with limited application of compassion fatigue theories. In contrast, international literature appears to adopt mainly quantitative research methods to investigate compassion fatigue based on compassion fatigue theories (Günüşen & Üstün, 2010; Hinderer et al., 2014).

A consistent and succinct definition of compassion fatigue can be constructed when the research is underpinned by a recognised theorist such as Figley (1995, 2002). This kind of clear definition of compassion fatigue, based on a globally acknowledged theory, may help to develop research in New Zealand that will assist nurses recognise or even prevent symptoms of compassion fatigue following a natural disaster. A clear definition may also help to prepare for effective disaster response.

Research concerning nurses' exposure to compassion fatigue is still comparable between New Zealand and international literature. Nationally and internationally, the work pressure in disasters appears to cause intense emotional distress and increase the risk of emotional exhaustion. This potential emotional exhaustion is closely related to unexpected, emotionally demanding circumstances and potentially life threatening environments (Chung, 2016). In distressing circumstances, compassion fatigue can be caused by challenging and stressful circumstances of patients' care, as noted in appendix 1. Nurses may experience indirect or secondary distress and trauma leading to compassion fatigue. This may have been the case during and after the Canterbury earthquakes in the South Island of New Zealand in 2011.

The impact of compassion fatigue is highly significant due to the direct influence on quality of care and the ability of the nurse to meet patients' needs (Hunsaker et al., 2015). If compassion fatigue is not recognised promptly, it may contribute to a vicious cycle: high stress levels may lead to errors, decreased safety, and dissatisfaction of patients and families. Poor work performance may lead to increased work pressure resulting in extensive emotional exhaustion and avoidance. Improving and maintaining nurses' wellbeing may help to improve patient safety and standards of care while preventing a potential vicious cycle leading back to compassion fatigue.

As outlined in the introduction to this article, disasters related to natural hazards have a significant impact on people's lives, physically, psychologically, and psycho-socially. These impacts were highlighted during and after the Canterbury earthquakes in New Zealand. Despite this, research to develop interventions to address or prevent compassion fatigue is limited. The current authors could not locate research that considered New Zealand specific interventions for compassion fatigue. International literature, however, may act as a guide for New Zealand researchers as they begin the search for appropriate concepts for nurses.

Possible strategies include education, self-empowerment, and mindfulness (Folkman, 1984; Gauthier et al., 2015; Itzhaki et al., 2015; Spreitzer, 1995). Education offers a problem focused coping strategy which may improve communication, positive

social networking, co-worker relationships, debriefing time, and mentoring programmes (Hinderer et al., 2014; Hunsaker et al., 2015; Sacco et al., 2015). Self-empowerment may aid the prevention of, or recognition and acceptance of, compassion fatigue as a legitimate condition. Recently, mindfulness as an emotional coping strategy has become a trend to promote nurses' wellbeing in order to deal with compassion fatigue (Günüşen & Üstün, 2009, 2010). Mindfulness practice can help nurses to clear and expand their mind to face challenges and difficulties in their daily nursing practice. Self-empowering processes and self-determination can prepare nurses to embrace stress, concerns, trauma, challenges, and risks to manage distressing situations in order to improve their resilience and minimise the risk of developing compassion fatigue.

Conclusion

International literature has demonstrated the significance of compassion fatigue for nurses as well as other health professionals. However, very little New Zealand literature specifically refers to compassion fatigue. Researchers in New Zealand have tended to use definitions of compassion fatigue and burnout interchangeably, which could impact upon clinical awareness in New Zealand. Furthermore, limited research and the dissemination of findings based on various theoretical backgrounds of compassion fatigue may lead to nurses not recognising their symptoms, or the impact that this condition can have personally or professionally (Chung, 2016); Davies, 2009; Hall, 2001; Hall & Powell, 2011; Itzhaki et al., 2015).

In New Zealand, the focus on nurse/clinician wellbeing has increased after the Canterbury earthquakes, particularly in the media. After five years, the impact of earthquakes on nurses may have triggered the public's interest due to recognition of the direct relationships between nurses' wellbeing and public safety in health systems (Chung, 2016; Stewart, 2015). Nurses' wellbeing is closely related to nurses' satisfaction, meaning that the close relationship between patients' satisfaction and nurses' satisfaction may contribute to preventing compassion fatigue. Compassion can be a key to augment nurses' resilience when dealing with distressing working environments such as those encountered following the Canterbury earthquakes. Ultimately, compassionate nurses may be better equipped to embrace challenges and to maintain professional quality of care.

In this context, New Zealand has a great opportunity to clearly define compassion fatigue and burnout with a view to promoting better understanding (Chung, 2016). Despite the limited availability of appropriate interventions for nurses in New Zealand, international research can act as a guide for future New Zealand research and practice. Clearly there is a pressing need to prepare nurses for natural disasters, including how to maintain personal well-being, professionalism, and quality of care during these times. From a health perspective the promotion and maintenance of nurses' wellbeing and patients' safety are key components of delivering high quality of care.

Understanding compassion fatigue is complicated. Public interest following events such as the Canterbury earthquakes has prompted health professionals to consider the concept of compassion fatigue and its impacts on personal and professional roles. Nurses' ability to recognise the symptoms and impacts of compassion fatigue needs further investigation, particularly from a New Zealand perspective. Working towards understanding, increasing awareness, prevention, and how to overcome compassion fatigue will help to form compelling and holistic processes to enhance nursing resilience in New Zealand.

Limitations

This article has some limitations, including that the majority of international studies included in the review are quantitative research and were from one country, the United States of America. Sample sizes were small due to restricted study regions. In addition, there were no longitudinal studies and only one study, by Itzhaki et al. (2015), was conducted comparatively, among five countries. New Zealand had a limited number of studies of compassion fatigue which makes it even more challenging to investigate potential interventions from within an appropriate context. Further summaries of literature concerning compassion fatigue can avoid these limitations by broadening search strategies to include more studies with different methodologies.

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Appendix 1: International Literature and New Zealand Literature and Dissertations/Theses Included in the Review

Country	Reference	Research aims and measures used	Themes
NZ	Al-Shaqsi, Gauld, McBride, Al-Kashmiri & Al-Harthy (2015) [1]	To investigate health professionals' responses to emergency circumstances prior to the Canterbury earthquakes Quantitative research/ Cross-sectional national survey	Preparedness for natural disasters
NZ	Dolan, Esson, Grainger, Richardson & Ardagh (2011) [2]	To describe nurses' responses to the Canterbury earthquakes Descriptive study	Preparedness for natural disasters, threatened safety, unexpected aftershocks, limited communication, and access to caring
NZ	Lyneham & Byrne (2011) [3]	To study factors that assisted or delayed the nurses when delivering nursing care in the three days after the Canterbury earthquakes Qualitative (phenomenological) research/Narrative method	Fluctuating demands of patient care routines, threatened safety, the fear of unpredictable future earthquakes, negative effects of overall mental health
NZ	Richardson, Ardagh, Grainger & Robinson (2013) [4]	To review initial responses and lessons from the Canterbury earthquakes Qualitative research/Interview	High patient ratio, limited communication, and access to caring resources
Australia	Arbon (2010) [5]	Learned lessons applied to the Haiti Earthquake response aid Descriptive study	Ethical dilemmas, weakness of health infrastructures
Turkey	Armagan, Engindeniz, Devay, Erdur & Ozcakir (2006) [6]	To assess the occurrence of post-traumatic stress disorder among the members of the Turkish Red Cross Disaster Relief Team after the Tsunami in Asia Quantitative research/CAPS – 1 (Clinician-Administered Post Traumatic Stress Disorder Scale)	Nurses' adverse feelings of hopefulness, powerlessness and helplessness, re-experiencing indirect trauma, avoidance, increased vigilance, feelings of inadequacy, somatic symptoms, anxiety, easily startled
USA	Boyle (2011) [7]	To explore compassion fatigue Literature review	Nurses' adverse feelings of hopefulness, powerlessness and helplessness, re-experiencing indirect trauma, avoidance, loss of energy, somatic symptoms
Japan	Ben-Ezra, Palgi, Hamama-Raz,Soffer & Shrira (2013) [10]	To study the potential difference between hospital professionals and residents' reactions to the 2011 Tohoku earthquake and tsunami Quantitative research/Survey (questionnaire)/The 22-item Impact of Event Scale-Revised (IES-R)	Re-experiencing indirect trauma, psychological vulnerability, fear, somatic symptoms
USA	Boley (2011)	To explore compassion fatigue Literature review	Exposure: nurses' adverse feelings of hopefulness, powerlessness and helplessness, re-experiencing indirect trauma Impacts; avoidance, loss of energy, somatic symptoms

USA	Dominguez-Gomez & Rutledge (2009)	To investigate Secondary Traumatic Stress (STS) in emergency nurses Quantitative research/ Secondary Traumatic Stress Scale (STSS)	Impacts; avoidance, decreased focus and concentration, increased vigilance, easily started
USA	Figley (1995)	To investigate and examine compassion fatigue Theory	Definition
USA	Figley (2002)	To comprehend compassion fatigue Theory	Definition
USA	Flarity et al. (2013)	To investigate the effectiveness of an educational program to prevent compassion fatigue and increase resilience in emergency nurses Quantitative research/Professional Quality of Life	Interventions; self-resilience
USA	Folkman (1984)	To examine stress and coping processes Theory	Interventions; theory
Taiwan	Guo et al. (2004)	To investigate different stress responses between professional and non-professional rescue workers Quantitative research/Questionnaire including Davidson Trauma Scale (DTS-C) in Chinese	Impacts; avoidance, hypersensitive
Turkey	Günüşen & Üstün (2010)	To assess the efficacy of coping and supporting group interventions to decrease burnout in nurses Quantitative research (Randomised controlled trial)/Maslach Burnout Inventory	Interventions; education programmes
Australia	Hammad, Arbon, Gebbie, & Hutton (2012)	To review nursing knowledge while working during a disaster Literature review	Implication; fear
USA	Hinderer et al. (2014)	To investigate burnout, compassion fatigue and compassion satisfaction Quantitative research (surveys)/Professional Quality of Life (Pro-QOL)	Interventions; education programmes, self-empowerment, self-resilience
Sweden	Hochwälder (2007)	To study the effectiveness of empowerment on burnout Quantitative research/questionnaire/Maslach Burnout Inventory	Interventions; self-empowerment
USA	Hooper et al. (2010)	To investigate the prevalence of compassion satisfaction, burnout and compassion fatigue among frontline nurses in an ED (emergency department) setting and other selected specialty areas Quantitative research/Professional Quality of Life (Pro-QOL)	Interventions; education programmes
USA	Hunsaker et al. (2015)	To examine compassion satisfaction, compassion fatigue and burnout Quantitative research/Professional Quality of Life (Pro-QOL)	Interventions; education programmes
Japan	Ishihara et al. (2014)	To examine newly graduated nurses' intention to leave related to organisational matters and working environments Quantitative research/questionnaire	Interventions; education programmes
USA	Maslach & Jackson (1981)	To study specific patterns of burnout and to formulate an instrument Quantitative research/Maslach Burnout Inventory (MBI)	Definition
USA	Maslach et al. (2001)	To analyse job burnout based on the past 25 years research Review	Definition

USA	Mealer et al. (2014)	To examine psychological disorders and the effectiveness of a 12 week intervention Quantitative research/questionnaire/Connor Davidson Resilience Scale (CDRISC)/Posttraumatic Diagnostic Scale (PDS)/Hospital Anxiety and Depression Scale/Maslach Burnout Inventory (MBI)	Interventions; education programmes
Canada	Moll et al. (2015)	To investigate the impact of mindfulness-based interventions on interactions of nurses with their co-workers, patients and families Mixed methods (qualitative and quantitative research)/ questionnaire/ Maslach Burnout Inventory	Inventions; self-resilience
USA	Palm, Polusny, & Follette (2004)	To study vicarious trauma reactions across different professionals Literature review	Impacts; avoidance
USA	Sacco et al. (2015)	To understand compassion satisfaction and compassion fatigue in adult, paediatric and neonatal critical care nurses Quantitative research/survey/Professional Quality of Life	Intervention; education programmes, self-empowerment
Taiwan	Shih, Liao, Chan & Gau (2002)	To examine nurses experiences at the central site of the 9-21 Taiwan earthquake Qualitative research/interview	Exposure; nurses' adverse feelings of hopefulness, powerlessness and helplessness Impacts; fear
USA	Spreitzer (1995)	To investigate and validate measurements of psychological empowerment at work Quantitative research/Confirmatory Factor Analysis	Interventions : theory
China	Yang, Xiao, Cheng, Zhu & Arbon (2010)	To investigate Chinese nurses responses to the 2008 Wenchuan earthquake Qualitative research/Gadamer's Philosophical Hermeneutics	Exposure: Nurses' adverse feelings of hopefulness, powerlessness and helplessness, a lack of professional training for disasters Impacts: loss of energy, insomnia
China	Zhen et al. (2010)	To study the occurrence of Post-Traumatic Stress Disorder (PTSD) after the 2008 Wenchuan China earthquake Quantitative research (Survey)/PTSD Scale (CAPS)/Major Depressive Episode (MDE) module of the Structured Interview for DSM-IV (SCID) for comparison	Exposure: re-experiencing indirect trauma, unpredictability and uncontrollability as potential sources of compassion fatigue Impacts; avoidance, somatic symptoms, anxiety, easily started

'Te Waioratanga': Health Promotion Practice - The Importance of Māori Cultural Values to Wellbeing in a Disaster Context and Beyond

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Abstract

In September 2010 and again in February 2011, the city of Christchurch, Canterbury, New Zealand was hit by significant unexpected seismic activity resulting in the loss of over 180 lives and over half of the inner city. To date, there have been over 11,000 earthquakes in the Canterbury region since the first major quake in September 2010. Efforts to support social and psychosocial recovery have been a constant challenge. Te Waioratanga, meaning the activation of wellbeing, is a health promotion project in direct response to 2013 research by the All Right? campaign. All Right? was developed by the Mental Health Foundation of New Zealand and the Canterbury District Health Board, with the aim of empowering Canterbury residents to take simple steps towards psychosocial recovery. Their research findings clearly showed that the campaign had not been as effective for Māori, indigenous New Zealanders, as for the mainstream population. Te Waioratanga was launched as a vehicle for the All Right? campaign to address mental health and wellbeing needs of the Christchurch Māori Community. Its unique strengths-based formula and positive messaging engaged Māori and non-Māori alike. Te Waioratanga symbolises the soundness of mind and body that comes from doing simple things to support one's wellbeing. Te Waioratanga allows Māori to take pride in relevant aspects of Māoritanga, or Māori culture, while sharing them with the world. This project has been an example of a highly effective relationship between the Canterbury District Health Board, Ngāi Tahu –who are mana whenua or indigenous people of the area, the Mental Health Foundation of New Zealand, and the Christchurch City Council. The current paper looks at the translational process from research to Te Waioratanga implementation and highlights the unique contribution that Māori culture has to offer to wellbeing in a post-disaster context.

Keywords: *Māori, wellbeing, Te Waioratanga, Māori health promotion, responsiveness*

The All Right? Campaign arose in response to the needs of Canterbury people after the 2010 and 2011 Canterbury earthquakes. It is a social marketing/ health promotion campaign led by the Canterbury District Health Board and the Mental Health Foundation of New Zealand. There have been five simple messages to improve wellbeing at the centre of the campaign: take notice, be active, connect, keep learning, and give. All Right? is funded by New Zealand's Ministry of Health and has also had support from the Ministry of Social Development, and many other organisations including Red Cross, Strategies with Kids Information for Parents (SKIP), the Christchurch City Council and Waimakariri District Council. All Right? undertakes regular research into how Canterbury residents are doing. This research informs everything All Right? implements, from raising awareness among community groups, organisations and businesses, to creating tools which promote the things we can do to improve our wellbeing.

Innovative, translational health promotion work was carried out as a result of the All Right? research conducted in 2013. The purpose of this paper is to demonstrate how the data collected was used to implement effective health promotion for the priority group for whom the research was conducted; in this case Māori communities in Christchurch post 2010, 2011 earthquakes.

Historically, it appears that Māori think about and experience health from a holistic point of view. Durie's (1982) Te Whare Tapa Whā, one of the most commonly used Māori Models of wellbeing, serves to display the need to acknowledge not only the physical health of

a person but also the spiritual and emotional. It also displays the need to acknowledge wider environmental determinants of health such as relationships with family and aspects of cultural practice which are paramount to how Māori experience wellbeing.

A social marketing campaign was undertaken 2011, through Healthy Christchurch, the Mental Health Foundation and the Canterbury District Health Board (CDHB) on the recommendation of the Christchurch Psychosocial Response Committee. The All Right? Campaign was using psychosocial messaging to support the wellbeing of the Canterbury population following the numerous seismic events and subsequent emotional, physical and environmental trauma experienced there.

Relevant, Māori specific research was then carried out on behalf of the All Right? Campaign by Opinions Market Research (2013), involving a number of communities within Canterbury. From time to time research is also undertaken with specific communities such as Māori, Parents and culturally and linguistically diverse peoples. As well as researching wellbeing, the campaign uses market research to measure impact, behaviour change and the effectiveness of its communication. This paper looks at the translational process from this research to the creation of Te Waioratanga, which loosely translates to mean the activation of wellbeing. This process highlights the unique contribution that Māori culture has to offer in a wellbeing context post disaster.

Method

The original research was conducted collaboratively by Opinions Market Research, Canterbury District health Board and the Mental Health Foundation. A number of Māori living in greater Christchurch were consulted and asked for their input at key stages of the research process: project design, question development and reporting. An exploratory qualitative approach was employed comprising four focus groups and one key stakeholder interview. Each focus group comprised 8 to 12 participants and lasted 2.5 to 3 hours. The fieldwork took place from the 6th to the 25th of November 2013.

A series of four group discussions and one key stakeholder interview were also conducted among Māori living in greater Christchurch. The group discussions were structured to ensure a range of people according to age, marital status, gender, and life stage, including with and without dependent children, took part in the research. A range of Māori tribes were represented across the sample.

The occupational status of participants consisted of a mix across the groups: retired, currently looking for work, stay at home parent, school student, and those in unpaid and paid employment. Participants included a general manager, school principal, community work and café. Figure 1 provides further details about the characteristics of each focus group.

Group 1	Whānau (families), male and female, 16-80 years
Group 2	Whānau (families), male and female, 16-80 years
Group 3	Kaumātua (elders) and management staff
Group 4	Māori total immersion school: students, parents and staff

Figure 1. Focus group structures.

This research focused on the wellbeing of the Māori participants who took part, rather than providing a comprehensive exploration and understanding of all Māori and of Māori culture. We also acknowledged the intrinsic connection to culture that is inherent for Māori who identify as Māori regardless of where or how they were raised.

It is important to acknowledge that there were differences in how individual participants described their wellbeing. These differences were noted at all levels; from an individual to a tribal level. However, the current paper reports the broader, overall perspective of wellbeing for participants. The original research was limited in scale and as such the findings remain indicative, representing the opinion of those we spoke to. The participants took part in this research in late 2013 and the findings reflect the wellbeing of the participants at that time.

Findings and Discussion

Findings included the way that wellbeing was viewed by participants from a holistic mind, body, spirit perspective. These understandings are outlined with reference to participants' experiences in figure 2.

The key message from the focus groups was that *Whānau*, being family or family-like groups, is the centre of wellbeing for these people. Having connections, interactions and being supported by Whānau and culture are paramount. As one person said: "If my Whānau are not well, I am not well."

Te Taha Tīnana/ Physical health Having necessities met such as food, clothing, affordable housing, healthcare, schooling, finance	**Te Taha Hinengaro/ Psychological health** Having needs and customs understood and respected by the wider community Use of karakia (prayer/incantation) Whakataukī (proverb) Whakamā (feelings of inadequacy)
Te Taha Wairua/ Spiritual health Having needs and customs understood and respected by the wider community Acknowledging Papa-tū-ā-nuku (earth mother) Existence of wairua (spirit/soul) Use of karakia	**Te Taha Whānau / Family health** Connecting with Whānau (family), hapu (extended family) and iwi (tribe) Togetherness, sharing kai (food) with Whānau Looking after Kaumātua (elders) Feeling supported by others including ancestors, identity, whakapapa (genealogy) Interaction with others, whanaungatanga (kinship) How you act with others, manaaki (hospitality) Having time for family and relationships

Figure 2. Wellbeing as defined by Māori participants as shown using Te Whare Tapa Whā as a framework for wellness.

Māori focus groups identified that Whānau were not depicted in the campaign imagery and that overall, there appeared to be more of a focus on the individual. The lack of groups of people or Whānau in the imagery and visual acknowledgement that connectedness was anything other than one to one interaction was incongruent with Māori collectivism. This highlighted the need for themes and cultural concepts that Māori could identify with and therefore relate to and be motivated by.

Putting Whānau at the centre of any campaign which aims to reach Māori was undeniably the strongest message from the participants. The use of *Te Reo Māori*, the Māori language, in some of the messaging was keenly received and suggestions were made to use more Māori language throughout the rest of the campaign. Durie (2004) clearly stated that for health promotion to be useful to indigenous peoples it should be consistent with their values, attitudes and aspirations. Research on similar social marketing campaigns and their effectiveness for Māori supported this perspective and strengthened subsequent recommendations for increasing effectiveness of the All Right? campaign for Māori. Thornley and Marsh (2010) acknowledged the need to centralise campaigns that target Māori around Whānau while noting the effectiveness of the appropriate use of Te Reo Māori when reviewing the success of the It's About Whānau campaign. They highlighted that the It's About Whānau campaign built on the importance of Māori identity and Whānau relationships, and used empowering, positive messages.

Many of the research participants were second language learners of Te Reo Māori. They saw this as an important part of their identity and significant in terms of reclaiming their cultural identity. The association with this renewal of practice and pride in culture, particularly the language, *Tikanga*, or protocols, and other rituals gave them a greater sense of belonging, for example the practice of *Karakia*, being incantations of protection, guidance, cleansing provided a sense of safety and protection that enhanced resilience for many. This was congruent with Muriwai, Houkamau and Sibley (2015), who found that increased cultural efficacy, or the ability to navigate the Māori world, has a direct protective effect that can reduce the risk of negative psychological outcomes and associated risk factors.

The benefit and importance of unique cultural practice and ritual and its place in strengthening resilience and recovery was highlighted in a report to the Health Research Council (Thornley, Ball, Lawson-Te Aho, Signal & Rawson, 2013) acknowledging that these practices and rituals are not only beneficial to Māori but also to others who suffered adversely from the Canterbury earthquakes. The report suggested that there are ways to adapt these cultural aspects to the benefit of the wider community.

Cultural considerations

It was important for the creation and implementation of a Māori specific campaign to consider the observed barriers to higher levels of wellbeing. Definite opportunities existed for the All Right? campaign

to increase effectiveness for Māori. As a result of Taking the Pulse findings (Opinions Market Research, 2013), it was clear that Māori in Canterbury were still struggling on a number of levels. Stress issues related to continued difficulties with living arrangements, lack of adequate accommodation and the inability to practice self-determination over many aspects of general day to day life. Recurrent themes of discrimination and *institutional racism*, where institutions treat a group of people negatively based on race, were narrated in the *korero*, or stories, of participants who dealt with social services and support agencies. There clearly needed to be some recognition of the lived realities of these groups in our community.

An increase and widening gap in terms of inequality and discrimination, perceived or experienced, was identified. Feeling discriminated against has the potential to damage self-respect, confidence and the ability to exert *rangatiratanga*, or self-determination over ones' own life and that of the extended Whānau. The earthquakes have also contributed more generally, to a widening level of inequality in the community. The slow response of Government to address the social recovery has added to the stresses of Maori who were already living in deprivation. These groups felt an increased sense of powerlessness.

The frustration of trying to deal with service providers who appear to have little empathy for the reality of day to day struggle experienced by these groups means people have an exacerbated feeling of loss of control or are unable to cope and are either marginalised or do not connect at all with these services. Work and Income New Zealand (WINZ) and Housing New Zealand were given as examples of services where it was felt that it is now more difficult to deal with social service agencies. A number of the participants spoke of experiencing institutional racism and considered it a barrier to successfully engaging with support services. For example:

> *Sometimes I feel it [inequality]. A lot of it is to do with the colour of who I am. I can see it happening to others. A lot of it is systems.*

This issue was also highlighted by Came (2012) who described institutional racism as a pattern of differential access to material resources and power determined by race.

The inability to access government support is a particular barrier for some Māori, especially those less able to articulate their needs and deal effectively with what they refer to as "the system". The nature of *māhaki*, humbleness, or *whakamā*, being shyness or embarrassment, in Māori culture means one remains modest in their requests for help and/or feels a sense of shame in asking for assistance. Many people would rather avoid the feeling that they are being judged by race and or incorrect assumptions of race and behaviours than ask for help from services that overtly discriminate against the groups of people they are set up to support.

Some Māori in the groups expressed a sense of injustice due to perceived social inequalities and a lack of understanding of Māori culture and the needs of Māori among mainstream society in New Zealand and, in particular, by social service agencies. For some Māori, the current problems arising from the earthquakes are more profound because of the social inequalities that remain largely unaddressed. The lack of resolution after this length of time means there has been a tendency for issues to resurface, to compound and multiply. Some find themselves unable to exercise the same level of self-determination within Whānau and/ or social services that they had pre-earthquake.

There needed to be a focus on how to interrupt the negative impact of support services and interventions, identified as discriminatory, on both the groups surveyed and on those like them. The aim was to strengthen their ability to deal with the ongoing effects of the Canterbury earthquakes and increase their long-term wellbeing, resilience and sense of empowerment.

Development process – Te Waioratanga

The project Te Waioratanga was developed to support the voices heard in the research. It was already apparent that the generic All Right? campaign had not had much impact in the Māori communities in Christchurch at that time. What was required was health promotion and social marketing that reflected the concepts and values that these groups regarded as theirs and regarded as relevant to their life situation. The desired outcome was to create a piece of work that would acknowledge and highlight these concepts, values and unique qualities of *Te Āo Māori*, the Māori world - as a way of enhancing wellbeing and appropriately honouring those who told their stories in the research. Another observation

when working on the design of the campaign was the scale of some of the social issues experienced by the participant groups. Declarations of institutional racism had prevented people seeking help. It was important to address this in some way as racism has been widely acknowledged as a determinant of health. Jones (2001), Harris et al. (2006) and Paradies, Harris and Anderson (2008) all highlight that racism is a determinant of health. They also highlight that it is not just interpersonal racism but structural, or institutional, racism that creates significant barriers to equity in health outcomes for vulnerable people. The difficulty with this issue was how to address the perceived institutional racism and its wider effect as a determinant of health within a social marketing campaign with a main focus on enhancing the wellbeing of the wider Christchurch population.

Te Waioratanga was born out of the ideas that had been shared by the research participants. It needed to reflect all the aspects that these people had said were important to their wellbeing and resilience. It seemed most important to take a *Kaupapa Māori*, Māori values based methodology, approach that put Te Ao Māori in the centre of the project. This meant starting with the assumption that Māori cultural values and ways of operating are the norm. This approach allows for the participants worldview to inform the process from the outset. The translation of the research into health promotion resources that were imbued with tangible and intangible aspects of Te Ao Māori that affect wellbeing was more effective. This was because a Māori consultant who had co-facilitated the focus groups was also contracted to write up the scoping report from the findings, make recommendations for responsiveness to Māori by the All Right? campaign, and then create and lead the development of final resources.

A portrait style poster campaign was decided on as the best way to incorporate some of the key suggestions, including the use of real people and reflections of the culture, particularly spirituality, which had been missing from previous iterations of the All Right? campaign. The poster campaign timeline fitted well with the return of Te Matatini, the national Māori *Kapa Haka*, performing arts, competition held once every two years across the nation. This is the biggest Māori festival in the country. Significantly for Ngai Tahu, who are *mana whenua* as the South Island iwi who occupy Canterbury, this was the first time since 1972 that a Te Matatini festival had been held in their rohe, or tribal area.

It was decided that the first theme for the project portraiture would be based on the cultural art of Kapa Haka. This complemented the arrival of Te Matatini, while recognising that Kapa Haka is a very serious competition in Te Āo Māori. There are many teams and individuals who are recognised nationally and internationally as experts in this art form. A major component of Kapa Haka is its power to affect wellbeing, and to positively transform the lives of individuals and communities. Kapa Haka is seen as a medium for fostering a richer, more cohesive and inclusive society in Āotearoa New Zealand. As such, it makes a major contribution to

Figure 3. Three of six posters featuring Kapa Haka exponents and family members from Te Waioratanga posters campaign. From 'Te Waioratanga posters' by N. Macbeth and M. McCarthy (2015). Copyright 2015 by Community and Public Health, Canterbury District Health Board. Reproduced with permission.

building and strengthening New Zealand's nationhood (Pihama, Tipene & Skipper, 2014).

The idea was to engage a number of these Kapa Haka exponents, well known to many, or rising leaders, particularly in the South Island and Canterbury, and to ask them to describe the benefits of Kapa Haka for their well-being. A series of six posters were created profiling individuals, families and leaders in the Kapa Haka world. These people were specifically chosen for their *whakapapa*, genealogical, connections, public profile, proficiency in Kapa Haka and because they all reflected the important cultural values and concepts highlighted by the research.

The established relationships of trust between the consultant, Manu-Kahu Associates, All Right? and the project subjects was key to who and how the new campaign was able to engage. This trust was essential in creating the right rapport between the subjects, photographer and graphic designers and in turn being able to capture and incorporate tangible and intangible cultural concepts, maximising the impact of the final resource.

The hardest part was how to engage non-Māori with the campaign when this was primarily a campaign for Māori. We wanted to encourage wider communication about the meaning of things Māori and to positively encourage openness and sharing, with a view to improving cross cultural relationships, momentarily or otherwise, and deepening the wider community appreciation of the depth of Māori culture. The use of Te Reo Māori was used in part to reflect the participants desire to see themselves and their values reflected. It was also used to encourage non-Māori exposed to the posters to ask questions about what the words meant or what the poster represented. Some of the posters had no translations. Some had both English and Māori and some were only in English. The main attraction was the use of imagery that exuded the feeling the subjects felt when practicing their cultural art form. This was evidenced when, at the launch of the project in early 2015, many who attended noted that they could see and feel the *wairua*, or spirit, of the people coming out of the posters.

Ultimately the success of the campaign was due to a genuine commitment to actual responsiveness to the needs of Māori by the Canterbury District Health Board. Consultation between Māori health promotion staff, Christchurch City Council, Mental Health Foundation NZ, All Right? and, most importantly, Ngai Tahu was central to the creative process led by consultants Manu-Kahu Associates. This level of collaboration as part of an authentic attempt to create health promotion interventions, which actually address and reflect important issues while recognising cultural values and activities that support resilience and wellbeing, is often not seen as valid. Hawe and Sheill (2000) noted that the political aspects of social capital are generally under-utilised. However, this was not the case for the Te Waioratanga campaign.

Ratima (2001) highlighted that Māori health promotion is the process of enabling Māori to increase control over the determinants of health and strengthen their identity as Māori, and thereby improve their health and position in society. The freedom to create work that reflected the beauty and relevance of the Māori culture and actually honoured the stories of the research participants and the wider Māori community in a public health intervention is rare. It seems that engagement by not only the target group, but also by the wider community of Christchurch and opportunities for new conversation, acknowledged the distinct contribution of the Māori world to resilience and well-being, particularly in a disaster context but also more widely. This had previously not been seen in health promotion to the same extent. Recent data, collected in the latest research by All Right? campaign, showed that the Te Waioratanga project is clearly one of its more recognisable pieces of work across the population (Opinion Market Research, 2015)

Conclusion

On reflection, there have been lessons that could apply for all those attempting to work bi-culturally. The biggest of these lessons is that sustainability and consistency are vital. Often, attempts are made to create targeted Māori health promotion. On the whole, Māori specific health promotion projects tend to be supported when they are first implemented, however resources are often not prioritised to keep supporting these targeted interventions. They become watered down, as a result, and eventually become absent from the project situation. The aspect of the Te Waioratanga campaign that had most impact was its strengths based approach. Positive messaging in health promotion for positive wellbeing that affects health outcomes may seem to make sense however it has only recently become a recognisably valid approach. The idea of supporting and appreciating

indigenous, holistic views of wellbeing is not new but perhaps we are at the point where the supporting data is finally recognised and where messages from the people are able to be used to their best effect. This may form a remaining challenge for mainstream health providers because funders may not think that this approach directly addresses the issues at stake.

Durie's (1982) Te Whare Tapa Whā model was created to ensure that all aspects of the indigenous wellbeing were acknowledged and supported within the current health system. This model is used widely across the nation and if this, or other models of Māori health, continue to be used by mainstream to inform cultural responsiveness then they must be used to their full extent. Māori models are not, and never were, the whole answer. More importantly, it requires a genuine and active intent to get the approach right. We need to see more projects that focus on positive messaging and positive approaches to indigenous health, while uplifting and acknowledging cultural values and concepts. This positive, Culture as Cure, approach (Houkamau & Sibley, 2015) will be central to health promotion and other interventions in shifting the burden of disease for Māori and for recognising the cultural contribution and social capital Te Āo Māori offers to mainstream health and wellbeing.

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Mo tātou a mō kā uri a muri ake nei'.For us and our children who follow after - Ngai Tahu Whakatauki, a proverb of the Ngai Tahu tribal group.

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An Innovative Response to Family Violence After the Canterbury Earthquake Events: Canterbury Family Violence Collaboration's Achievements, Successes, and Challenges

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Abstract

There has been an increase in the reported incidents of family violence, sexual violence and child abuse following the 2010 and 2011 earthquake events in Canterbury, New Zealand. These increases have occurred both in immediate- and longer-term timeframes following the earthquakes, in line with previous research findings concerning an international range of post-disaster settings. Challenging events like the Canterbury earthquakes and series of aftershocks highlight the importance of, and provide the catalyst for, strengthening connections and working with various communities of interest to explore new ways of responding to the complex issue of family violence. It was within this context that the Canterbury Family Violence Collaboration emerged and began implementing a range of responses focused on five strategic priority areas: Prevention, crisis response and intervention, youth, housing and staff learning and development. The current paper describes experiences from this collaborative effort and lessons learnt by the Collaboration's partners during the five years since its establishment. It describes the major achievements alongside key success factors and challenges as part of a unique contribution that enhanced awareness and responsiveness to the family violence experienced by Canterbury residents within the post-disaster setting. Over the past five years, the multi-dimensional, evidence-based package of system-level, whole-of-community initiatives successfully implemented by the 45 Government and Non-Government-Organisation member agencies could not have been undertaken by any single agency or sector. The Collaboration's extended delivery of this unique package of prevention, workforce development and evidence-gathering strategies has made a significant contribution to the community, by assisting them to effectively recognise and respond to family violence following the Canterbury earthquake events.

Keywords: *family violence, collaboration, cross sector, disasters*

Family Violence is a major issue that affects the lives of many New Zealanders and creates significant economic and social costs across New Zealand society. Compared to other Organisation for Economic Co-operation and Development (OECD) countries, New Zealand has high rates of family violence and partner sexual violence (New Zealand Press Association, 2011). The statistics in table 1 illustrate a high rate of domestic and sexual violence against women, a high percentage of children and adolescents experiencing family violence, a rapidly growing number of Police investigations of family violence, and pressure on services delivered by women's refuges. Family violence is estimated to cost New Zealand between $1.4 and $7 billion (NZD) each year (Kahui & Snivley, 2014), with the direct costs to Government of providing family and sexual violence services calculated at $1.4 billion (NZD) (Ministerial Group on Family Violence and Sexual Violence, 2014).

The incidence of family violence in Canterbury is a significant concern for the region's community. In 2012, for example, Canterbury Police investigated over 7,400 family violence incidents. This equates to approximately 19 investigated family violence incidents per day (Personal communication, Stephen Hill, Canterbury Police District Communications manager, 2013).

The Canterbury magnitude mW 7.1 earthquake in September 2010, the magnitude MW 6.3 earthquake in February 2011, and the resulting loss of life, injury and massive damage to infrastructure and key services have strongly influenced family violence statistics. The

earthquakes have had indirect and direct impacts on the incidence of family violence in Canterbury, with patterns of heightened incidents and severity of violence and vulnerability during the aftermath (True, 2013).

Challenging events or crises like the Canterbury earthquakes highlight the importance of, and provide the catalyst for, strengthening connections between stakeholders to explore new ways of thinking, working and responding to the complex issue of family violence. During the immediate aftermath of the 2010 and 2011 Canterbury earthquakes, key Canterbury Family Violence Sector leaders grasped the opportunity to explore innovative and system-level ways in which to collaborate to address the unique challenges and heightened needs faced by families/whānau who experienced family violence within this post-disaster context. In 2012, these Canterbury Family Violence Sector leaders established the Canterbury Family Violence Collaboration (the Collaboration).

This paper describes the family violence context in Canterbury during the first five years of post-disaster recovery and rebuild. It also outlines the experiences and lessons learnt by the Collaboration's partners during that period, including its major achievements and the key success factors and challenges experienced during this collaborative effort.

What Happens to Family Violence Rates in Post-Disaster Settings?

There is now a significant body of post-disaster research, from across multiple international jurisdictions in both developed and developing countries, that shows that family violence, including intimate partner violence, child abuse and sexual violence, increases after disasters (Anastario, Shehab & Lawry, 2009; Dasgupta, Siringer & Partha, 2010; Enarson, 2000; World Health Organisation, 2005). Most research has been undertaken in Canada, the United States and, more recently, Australia. Table 2 provides examples of

Table 1. *Examples of Statistics related to Family Violence in New Zealand*

Period	*Problem/victim*	*Population affected*	*Reference*
2000 to 2010	Intimate partner physical violence/women	33%	United Nations Women (2011)
2000 to 2010	Intimate partner sexual violence in life time/women	14%	United Nations Women (2011)
2009 to 2012	Family violence deaths/homicides	139 in total 35 per year	Family Violence Death Review Committee(2014)
2013	Police family violence investigations	95,981 in total	Statistics New Zealand (2015)
2014	Police family violence investigations	101,981 in total 1 every 5 ½ minutes 7% increase on 2013	Statistics New Zealand (2015)
	- 0-16 year olds	62% affected	
2013 to 2014	Women's refuge service demand		National Collective of Independent Women's Refuges(2014)
	- crisis calls	78,161 in total	
	- advocacy services	5,198 in total	
	- safe house accommodation	2,794 women/children	

Table 2. *Family Violence in International Post-Natural Disaster Settings*

Natural Disaster	*Reported Family Violence*	*References*
1980 Mount St. Helens eruption, Washington, USA	46% increase during the seven months post eruption compared to same period in previous year	Adams and Adams (1984)
1989 Loma Prieta earthquake, California, USA	50% increase in temporary restraining orders	Prodger (1990)
	300% increase in sexual assaults	Commission for the Prevention of Violence against Women (1989)
1992 Hurricane Andrew, Miami, USA	50% increase in spousal abuse helpline calls	Laudisio (1993)
1998 Quebec and Ontario ice storms, Canada	25% of calls to local Police from women	Enarson (2012:1)
2009 Black Saturday bush fires, Victoria, Australia	- Increase in families with no previous family violence	Parkinson and Zara (2013)
	- Increase in severity where previous family violence	

reported family violence and response trends following natural disasters in developed countries.

In line with this international evidence, reports following New Zealand disastrous natural hazard events show that during the initial two years post disaster, family violence increases and incidents are more severe and more frequent (Houghton, 2010). These reports are summarised in table 3.

Post-disaster research across multiple countries has therefore established an evidence-base that shows that family violence increases in the immediate- and longer-term following disastrous natural hazard events. Other commentators in the literature have sought to explain this trend. Houghton (2009, 2010) and others (Jenkins & Phillips, 2008: Le-Ngoc, 2015; Parkinson & Zara, 2013; Soroptimist International of the Americas, 2011) note that in the aftermath of natural disasters, individuals and families experience loss, unpredictability and uncertainty. For example, people may lose their social support networks and experience increased isolation due to relocation to different city suburbs or regions. Loss of homes leads to frustration with temporary living conditions, such as overcrowding caused by multiple family members residing in one house, and uncertainty about accessing replacement accommodation in a post-disaster environment of limited affordable and appropriate housing stock. At the centre of these housing problems is uncertainty about the outcomes of insurance claims. Many people also experience loss and/or uncertainty about employment and income. It is argued that post-disaster uncertainties and loss of control over many aspects of daily life cause perpetrators of family violence to increase their controlling behaviour within family contexts with increased prevalence and severity of reported family violence.

In addition to these explanatory factors, findings from a number of post-disaster studies show that some community members frequently use unhealthy coping mechanisms, such as alcohol and drug use and aggressive behaviour, to cope with the stresses inherent in the post-disaster recovery and rebuild settings. These unhealthy coping mechanisms also appear to fuel family violence (International Federation of Red Cross and Red Crescent Societies & Canadian Red Cross, 2010; Le-Ngoc, 2015). Research undertaken since the Canterbury earthquake events showed a significant increase in the self-reported stress levels of the Greater Christchurch respondents in 2012, compared to reported pre-earthquake levels of stress (Canterbury Earthquake Recovery Authority, 2015); and nearly one-fifth (17%) of respondents in the All Right? Campaign research agreed that they drank more alcohol in 2012 than they had before the Canterbury earthquake events (Bolger, 2013).

Table 3. *Family Violence in New Zealand Post-Natural Disaster Settings*

Natural Disaster	Reported Family Violence	Reference
2005 Whakatane Floods	100% to 200% increase over 2 years' post-disaster Trebled demand for women's refuge services	Houghton (2010)
2006 Timaru Snow Storms	100% increase over first year post disaster Doubled demand for women's refuge services from first-time help seekers	Houghton, Wilson, Smith & Johnston (2010)

Canterbury Earthquakes: Family violence trends

In line with previous research findings in post-disaster settings, administrative data on the prevalence of family violence, sexual violence and child abuse in Canterbury suggest that there have been increases in reported instances. This appears to have occurred both immediately following the 2010 and 2011 Canterbury earthquakes and over the longer term. Moreover, during the past 5 years, there has been a dramatic increase in the level of demand and case complexity for core Family Violence Sector services in this region.

Within the context of the series of Canterbury earthquake events and aftershocks experienced over the initial 5 and a half years, Parkinson (2011) noted that the New Zealand Police reported a 53 percent increase in callouts to family violence incidents over the weekend following the 04 September 2010 earthquake. Furthermore, provisional data sourced from the New Zealand Police's operational database shows increases in reported family violence in Canterbury for each month over the period September to November 2010, compared to the same period in the previous year (New Zealand Police, 2011). This data is summarised in table 4.

Table 4. *Recorded Family Violence Offences for Christchurch Central & Northern and Southern Canterbury*

	September	October	November
Total family violence offences 2010	434	282	302
Total family violence offences 2009	291	271	255

Following the 22 February Christchurch Earthquake, a Canterbury District Police spokesperson stated that, during the initial weeks following this natural disaster, there had been an increase in calls reporting family violence -as compared to calls received during the same period during the previous 4 years. Statistically, this amounted to 18 family-violence-related calls each day during the period 22 February 2011 to 09 March 2011, compared to 13 calls each day during the same period, in 2007, 2008, 2009 and 2010 (Lynch, 2011). Also during this early period, women's refuges operating in Christchurch, reported a heavy demand for their services (True, 2013), with one family violence service reporting a 50 percent increase in calls received by their crisis helpline during the months following the February 2011 Christchurch Earthquake (Stewart, 2016). As shown in table 5, total family violence incidents reported to the Canterbury District Police increased in the first month after the Christchurch Earthquake. (New Zealand Police, 2011; Bellamy, 2014).

Table 5. *Recorded Family Violence Offences for Christchurch Central & Northern and Southern Canterbury*

	February	March	April	May
Total family violence offences 2011	262	291	171	253
Total family violence offences 2010	264	327	258	265

Provisional data sourced from the New Zealand Police's operational database suggest relatively low levels of reported family violence incidents during March to May 2011 compared with the numbers reported during the same months in the previous year. However, the Canterbury Earthquake Recovery Authority (2014) noted that lower reporting could be due to the pressures caused by the earthquake and the Ministry of Justice (2015) estimated that 76 percent of family violence incidents are not reported to the police. This phenomenon of low levels of family and sexual violence reporting during the immediate aftermath of the Canterbury earthquake events has also been reported in other post-disaster research (Parkinson, 2011).

Following the 14 February 2016, 5.7 mW magnitude earthquake in Canterbury, the Canterbury District Police reported there were 53 Police callouts to attend family violence incidents over the three post-earthquake day period. This was double the usual number of callouts received during the same period around 14 February during previous years. Comments from Christchurch Police suggest that this increase in family violence was triggered by the stress caused by this aftershock earthquake and the increase in mental health issues that have emerged in the Canterbury community since the 2011 earthquake (Stewart, 2016).

There appears to be a paucity of post-disaster reports that examine the prevalence of family violence and/or the demand for family violence services during the period two or more years after a natural disaster (Parkinson & Zara, 2013). This is despite data that strongly suggests an increase in demand. For example, the number of family violence incidents attended by the Canterbury District Police appeared to increase in the short term after the Canterbury earthquakes, alongside an increase in demand for Family Violence Sector services. The available data also suggests that such increases have been sustained during the recovery and rebuild post-disaster phases. For example, 10,108 family violence investigations were undertaken by the Canterbury District Police during a twelve-month period in 2014 and 2015. Of these, 8,706 were undertaken in the Christchurch Metropolitan Area. This was an approximate 10 percent increase on the number of investigations reported during the same timeframe in 2013 and 2014 (Personal communication, Lisa-Marie Brooks, District Communications Manager, Canterbury District Police, January 2016). In addition, pre- and post-earthquake data from Christchurch-based women's refugee services affiliated to the National Collective of Independent Women's Refuges suggest significant increases in the demand for their crisis line and refuge services in the first 2 to 3 years after the Canterbury earthquake events. In 2003, these women's refuge agencies received 2,779 crisis calls compared with 4,396 in 2013. In addition, 848 clients received women's refuge services in 2003 compared with 1,600 in 2013 – almost doubling the demand for services (Eleven, 2014).

Some examples of post-disaster literature also suggest that the prevalence of sexual violence and child abuse increase following disastrous natural hazard events (World Health Organisation, 2005). Annual recorded offences for sexual assault and related offences within the Canterbury District, noted in table 6, show a 24 percent increase in the year ended 30 June 2011, compared to the previous year. Note that the year ending 30 June, 2011 is the year in which the 2010 and 2011 Canterbury earthquake events occurred. The numbers of recorded offences of this nature remained elevated during 2012, 2013 and 2014. Within this three-year period, there was a 28 percent increase in recorded

Table 6. *Sexual Assault and Related Offences Recorded for the Canterbury District**

Year Ending 30 June 2010		Year Ending 30 June 2011		Year Ending 30 June 2012		Year Ending 30 June 2013		Year Ending 30 June 2014	
recorded	resolved	recorded	resolved	recorded	resolved	recorded	resolved	recorded	resolved
310	160	384	206	381	193	486	264	423	177

*Annual Recorded Offences for the Latest Fiscal Years, recorded by Statistics New Zealand.
Note: Recorded offence is an incident that is reported or detected by the police where police believe an offence is likely to have been committed. Resolved offence is where one or more offenders have been apprehended.

sexual assault and related offences for the year ended 30 June 2013 (Mathewson, 2012).

Substantiated reports of abuse also appear to have increased over the years following the 2010 and 2011 Canterbury earthquakes. Of the total substantiated abuse cases within the Canterbury operational area of Child Youth and Family, the data show that such cases increased from 1,130 in 2009 to 1,650 in 2011, 1622 in 2012, 1,642 in 2013, 1,428 in 2014 and 1,146 in 2015 (Child Youth and Family, 2015).

The Canterbury Family Violence Collaboration

The Canterbury Family Violence Collaboration operates as a partnership, rather than a legal entity such as a charitable trust. It is comprised of a Reference Group, a Steering Group and a number of work streams. The Reference Group includes all the Collaboration's partners working from within national and local government and non-government-organisation (NGO) agencies and across a diverse range of sectors, for example: family violence; justice; health; mental health; youth; education; social development; housing; community development. There are currently 45 partner agencies actively involved in the Collaboration. They are represented by 107 individuals, on behalf of 1,100 workers and 809 volunteers. Meeting every three months, the role of the Reference Group is to provide advice about the Collaboration's strategy and operation, and the human resources required to implement work stream projects. The Reference Group elects the members of the Steering Group, comprising 12 government and NGO leaders who meet monthly, to whom it delegates the authority to oversee the day-to-day operation of the Collaboration.

Each of the Collaboration's five work streams is led by a convenor. The work streams incorporate teams of people from the Collaboration's partner agencies who work on projects aligned to the identified strategic priority areas: prevention; crisis response and intervention; youth; housing; and staff learning and development. The Collaboration has also nominated a host agency, Barnardos, to provide financial management and human resource management for the part-time project management and communications roles that provide backbone support for all the structural elements of this partnership (Turner, Merchant, Kania & Martin, 2012, July).

Collaborative strategies for addressing post-disaster family violence

The post-disaster evidence base has guided the Collaboration's choice of projects undertaken by each of its work streams. This evidence suggests that effective strategies for delivering desired outcomes for individuals, families/whānau and communities concerned with family violence post-disaster include the following.

Primary and secondary prevention strategies. These approaches aim to prevent and respond to family violence after a disaster (World Health Organisation, 2005). They involve delivering education and awareness campaigns that seek to bring about social change and influence social and cultural norms about violence within families. They also provide community members with guidance about how to recognise and report family violence, and provide information about available services and assistance. In addition, evidence suggests that prevention strategies should not only target the affected community as a whole, but also target identified at-risk groups within a given community. These at-risk groups have been shown to be at risk of poor social, psychological and/or physical outcomes after a natural disaster (Aday, 2001; Garcia-Ortega et al, 2012; National Disaster Management Authority – Gender and Child Cell, 2014; Wisner, Blaikie, Cannon, & Davis, 2004).

During the period from 2013 to 2015, the Collaboration therefore focused some of its initiatives on a few of the identified at-risk groups within the post-disaster Canterbury community. These included: refugee and migrant groups, particularly those who had moved to Christchurch seeking rebuild work (Olam & Stamper, 2006); people for whom English is a second language

(Hoffman, 2009); and young people (Centres for Disease Control and Prevention, 2009; Fendya, 2006).

Workforce professional development across diverse sectors. Many people disclose experiences of family violence to professionals who work outside the core family violence sector. With this in mind, building the capability of the wider cross-sector human service workforce has the potential to enhance access to appropriate services for those affected. (Parkinson, 2011; World Health Organisation, 2005).

Data and research. Commentators in the literature note the paucity of data collected about family violence across the rescue, recovery and rebuild stages following a disaster. Data is not only needed to better understand how each of these stages impacts on those affected by family violence. It is also needed to provide an evidence base to inform decision making about appropriate responses to address the presenting needs of this group (Parkinson, 2011).

Raising awareness of family violence in Canterbury post-earthquakes

In terms of prevention strategies, the Collaboration has delivered three significant family violence awareness campaigns in Canterbury: The Canterbury Can Stand Up Against Violence Campaign; the Pasifika Campaign; and the White Ribbon Campaign. The first campaign was delivered during 2013 at a time when stress levels were high, resilience was reduced, and relationships were under strain. The key message of this Campaign was that: "Family violence is an important issue facing Canterbury" and families/whānau, friends and neighbours should never ignore it (Scott, 2013, para 6). Eight Canterbury celebrities served as campaign champions. These included: Sir Mark Solomon, Ngai Tahu Kaiwhakahaere; Reverend Mike Coleman, community advocate, minister and school counsellor; Jason Gunn and Janine Morrell-Gunn, renowned media personalities; Anna Galvan and Sophia Fenwick, Canterbury Tactix; Sela Faletolu, Director of No Limits Performing Arts and local youth leader and Lio Fasi, youth leader. Two thousand posters and 2,000 postcards picturing these champions and their messages were distributed, along with billboard advertising and advertising on the back of buses. Forty-eight of the Collaboration's partners participated in 14 community events, attended by thousands of Canterbury people. Family violence awareness and help-seeking resources were also distributed. One hundred percent of the 360 people surveyed at these community events reported that the Collaboration's messages were clear and had increased their knowledge about family violence and accessing support. Moreover, results from a convenience sample of 106 local people participating in the Collaboration's 2014 Community Survey, showed that 80 percent had seen the Campaign's messages about living free from violence in Canterbury.

The second campaign, called the Pasifika Campaign, was launched in four Canterbury Pasifika churches where more than 500 families received family violence prevention messages in their own languages. This was accompanied by four weeks of family violence prevention messages delivered by the Collaboration's Pasifika youth leaders via the local community radio station, Mai FM.

In partnership with the Canterbury District Police and the Canterbury District Health Board, the Collaboration also delivered local White Ribbon Campaigns in November 2013, 2014 and 2015. These Campaigns involved a number of public events designed to increase the number of local people who showed leadership and commitment to promoting safe, healthy relationships within families/whānau. Over this period, community participation in Christchurch's White Ribbon march increased from 200 people in 2013 to over 1,500 in both 2014 and 2015. Local White Ribbon riders also distributed thousands of white ribbons and family violence prevention messages to children and young people within local schools.

For the Canterbury rebuild workforce and their families, the Collaboration in partnership with the local primary health organisation, Pegasus Health, designed and distributed 1,000 Wellbeing and Family Violence Information Packs through multiple channels. These channels included construction companies' rebuild workforce induction programmes, local refugee and migrant services, the local immigration service, local income support services, libraries, and schools. Between 2011 and 2015, there was an influx of rebuild workers and their families after Immigration New Zealand approved 4,739 temporary work visas specifically linked to the Christchurch rebuild. Many of these immigrants were unaware of the human services and supports available within the region, for example health services, men's support services, services for pre-school children, family violence services, and how to access them (Meier, 2015). Moreover, anecdotal evidence suggested that some brought their family violence experiences with

them and could seek helping services. Therefore, the Collaboration's purpose of distributing the Wellbeing and Family Violence Information Packs was to enhance awareness about family violence and pathways to services and supports for this Canterbury rebuild workforce and their families as a targeted group.

For young people, the Collaboration worked with No Limits, a performance group open to Pacific and Māori secondary school students, the Christchurch Polytechnic Institute of Technology and He Waka Tapu, a Christchurch-based kaupapa Māori health and social service organisation, to deliver the Bus Stop Tour. This was a performance focused on the issues of family violence, alcohol and drugs and suicide, delivered within 15 Canterbury schools in 2015. Following every performance, students were provided with the opportunity to engage with the family violence sector professionals with whom they had an existing relationship, as well as staff from the local Strengthening Youth initiative and from the local helpline, Youthline.

This initiative offered young people the opportunity and resources to learn about signs that a young person is unsafe. Young people also received tips on helping their peers, and information on how to contact helping services. Overall this initiative reached 1,575 young people. The findings from an online survey, designed to evaluate the impact of the Bus Stop Tour and completed by 94 young people, indicated that 94 percent of respondents reported that the initiative had made them more aware of their peers' family violence experiences. Eighty-eight percent of the respondents reported that they had increased knowledge about where they could access help. Sixty-four percent said they were more confident about discussing and contacting a service for help with family violence. This was a significant improvement on the findings from an earlier, Youth Voices, project delivered by the Collaboration - during which young people in a sample of Canterbury secondary schools stated that they were reticent about seeking help for family violence experiences because of trust and confidentiality issues. By contrast, 90 percent of Bus Stop survey respondents reported they were more likely to recommend a helping service to a friend.

Building workforce capability

Of the workforce development initiatives, the Collaboration sought to contribute to the sustainability of the workforce by encouraging young people to pursue their careers within the Family Violence Sector. It also supported a *no wrong door* message, referring to how an organisation might link an individual or family to a service in a manner that is streamlined, effective and seamless from the clients' perspective, even if that service is not offered by that organisation or the particular sector in which they operate. This approach was supported in practice by building the capability of cross-sector professionals to recognise family violence experiences within the context of their respective clients' presenting needs and their capacity to respond effectively.

The Collaboration's initiatives that contributed to workforce professional development purposes included a video clip for Careers New Zealand. This video was disseminated on YouTube and tertiary education organisations' websites to describe the career paths, rewards and challenges of work undertaken by Family Violence Sector practitioners. There were 570 views during the first four months following release of the video clip.

Three symposiums for professional development were held on family violence topics, for example on the Family Violence System and Family Violence and the Law. Another symposium was held on the Sexual Violence Response System. These symposia were attended by almost 300 cross-sector and cross-discipline professionals. Feedback from participant evaluation forms indicated that most delegates gained new knowledge about family violence and sexual violence response systems and about where to seek expert help for their respective client groups. The participants indicated that they planned to integrate this learning into practice.

Family violence and accommodation data in post-disaster Canterbury

Together with the Collaboration's achievements related to its prevention and workforce development initiatives, other Collaboration partners' efforts also achieved desirable outcomes for Canterbury people experiencing family violence. These outcomes resulted from collecting and disseminating housing and family violence situational and impact data.

Macdonald (2007) noted that the availability of emergency, temporary and long-term accommodation is a critical factor in people's decisions to leave violent relationships. Moreover, research undertaken by Chung, Kennedy, O'Brien and Wendt (2000) found that not being able to access a refuge safe-house and/or having to remain in a safe house for lengthy periods increased

the likelihood that people will continue to live in violent relationships or return to violent relationships. This may often be due to the unavailability of affordable temporary and long-term housing options (Chung et al., 2000)

Enarson (1997) and others (Tually, Faulkner, Cutler & Slatter, 2008) have found that these kinds of issues are further exacerbated after disasters because demand for emergency safe-house accommodation is greater than the supply. Also, those who do access such accommodation stay longer because of the diminished supply of affordable housing stock (Enarson, 1999). This diminished supply causes a bottle neck preventing many women accessing safe houses at times of family violence crises. These accommodation issues for those who experience family violence, described by these researchers in other post-disaster contexts, were mirrored in Canterbury after the earthquake events.

In order to influence and provide an evidence base for decisions concerning an appropriate response by leaders in the region's housing sector, the Collaboration completed two data collection activities. The Collaboration completed a literature review of effective measures to ameliorate the housing issues faced by people who experienced family violence. A survey was also administered, to collect real-time information about the accommodation circumstances of those who presented for services with family violence experiences during 2013. The findings from this survey showed that 47 percent of clients who presented for services from across a diverse range of sectors (including responses from health, mental health, education, social, elder care, youth, kaupapa Māori, sexual and family violence sectors) had both housing and family violence issues. The main housing issues reported were overcrowding (94%) and lack of affordable housing (94%), likely because of the diminished social housing stock and the escalated costs of renting from the private market.

The combined evidence base resulting was disseminated at a number of housing and wellbeing forums. It contributed to the government's decision to fund an 18-month short-term accommodation service for those experiencing the greatest vulnerability, including those experiencing family violence, within the post-disaster context. Accommodation was provided for a three-month period at 80 percent of the market rental, together with a support service to assist people in accessing more permanent accommodation.

Success factors

During the 5 years since inception, the Collaboration has identified a number of factors that have supported its success, as well as others that have been challenging. Factors that appear to have had a powerful influence on the success of this multi-agency partnership are described below.

Have a compelling reason for initiating a collaborative venture and a mutually agreed and beneficial purpose for its operation. The compelling reason for the Collaboration's establishment was the increase in the prevalence and severity of family violence in post-disaster settings that had been signalled by an empirical evidence base. The Collaboration's vision and purpose had to take account of the diverse interests, philosophical positions and operational foci of many different groups and sectors comprising its membership. This meant that the purpose and vision nonetheless needed to add value to each of the partner organisation's goals to empower their involvement. The Collaboration's vision reflects these qualities: "A community that values respectful relationships. A community where families, whānau and individuals do not use physical, sexual or psychological violence" (Canterbury Family Violence Collabodation, 2012, para 4).

Build on predisposing factors. Three predisposing factors supported the emergence of the Collaboration. Firstly, the Canterbury human services sector had a strong history of connectedness through various within-sector and across-sector alliances and networks. Secondly, everyone in Canterbury had shared an experience of the earthquake sequence. This shared experience created a culture of connection, innovation and flexibility driven by the loss of pre-disaster infrastructure. The hallmark of what was being referred to as the new normal was cooperation, rather than competition. Thirdly, evidence (Cuevas & Rennison, 2016; Murphy & Fanslow, 2012; Payne & Gainey, 2015) had strongly suggested that effectively tackling the complex problem of family violence requires collaborative, system-wide and ecological approaches.

Adopt a combination of system-network, coordination, and backbone models of operation. Bureaucratic models of operation and hierarchical leadership do not work within the kind of collaborative ventures operationalised by the Canterbury Family Violence Collaboration. Rather, this Collaboration can be conceptualised as a living system that has

intentionally crossed boundaries to engage different sectors, groups and disciplines in collectively responding to family violence across the region. The inclusion and participation of a wide range of partners, from central and local government, private and non-government-organisation sectors, iwi and Māori groups, academia and citizens, together with the adoption of a more distributed leadership approach, has been critical for enabling responsiveness and innovation. Encouraging leadership across the Collaboration while including partners with diverse lenses on the problem of family violence has been critical to keep abreast of the ever-changing environment within which the Collaboration operates. Among other benefits, this has helped to grasp opportunities as they emerge. It has also provided the basis for promoting creative solutions that have meaning for the Collaboration's community. This has in turn led to a large group of motivated collaborators contributing the work required to shift ideas into action.

At the same time, some coordination and backbone support was required to bring order and alignment to the chaos of an otherwise open-system approach. For the Collaboration, this backbone support involved systematically supporting the activities that emerged across the various elements of its structure. These activities have included: building internal- and external-stakeholder support for the collective purpose; collecting and disseminating various forms of data to support decision making; mobilising the financial resources required for viability; and providing mechanisms for the Collaboration to advocate for wider system change.

Use diverse, inclusive and regular channels of communication. The Collaboration has used diverse forms of communication to support its combination of distributed leadership within a system network. Regular and purposeful face-to-face meetings have been essential for the partners to build relationships, trust and understanding of diverse perspectives. Quality conversation in person brought together their thoughts and ideas, towards collective solutions and actions that contributed to the outcomes being sought by the Collaboration.

The work of the Collaboration's eight official, and other non-official, champions has been indispensable in bridging connections with regional and national bodies of influence. This has also helped raise awareness, while advocating in support of the Collaboration's endeavours. In addition, the use of information technology and social media have enabled the expertise and advice of the partners to be shared across the Collaboration and beyond, to a range of external stakeholders.

Challenges experienced

While the Collaboration has learned about and shared a range of success factors during its implementation journey, it has also experienced a number of challenges. These challenges have each had a particular bearing on its continued viability and sustainability.

On occasions, maintaining the momentum of the partners' engagement and active participation in the Collaboration's efforts has been difficult. A key underlying reason for this difficulty is that human capabilities and capacities for implementing the Collaboration's projects has been voluntary in nature, over and above each member's responsibilities to their employing agency. Moreover, the workforce in this post-disaster setting has been experiencing various levels of exhaustion from multiple, personal and professional impacts of the Canterbury earthquakes. To counter this issue of waning participatory capacity and capability, the Collaboration has encouraged new membership and, on the advice of the Reference Group, has adjusted the focus and number of projects it undertakes.

Securing funding for the Collaboration has also been an on-going challenge, particularly in a contracting environment that has traditionally provided financial resources for programmes of a defined length and delivered by single organisations. Moreover, the Collaboration has had to manage potential conflicts of interest and risk between member NGO's competing for funding from the same sources, to support the delivery of their own services.

While the Collaboration recognises that demonstrating results is critical for its sustainability, it has been continually difficult to access outcome data concerning the individuals and groups targeted by the Collaboration's. The Collaboration found that there was a paucity of relevant key performance indicators to meaningfully assess the degree of correlation between the Collaboration's interventions and observed outcomes. Moreover, the system-level nature of the Collaboration's interventions and the likelihood that these interventions were only one of many factors that influenced outcomes has made it difficult to determine contributions to outcomes.

Finally, the Collaboration has experienced difficulties accessing administrative data in a regulatory environment that requires agencies to carefully manage privacy and confidentiality. Despite this challenge, the Collaboration has endeavoured to collect knowledge, behavioural and/or attitudinal change data from target populations engaging with its activities.

Conclusion

Following Canterbury's series of earthquakes and aftershocks since 2010, the data show that there has been an increase in the numbers and severity of reported family violence incidents, both in the immediate- and longer-term after this disaster. It was within this context that the Canterbury Family Violence Collaboration emerged and, over the initial five years, successfully delivered a multi-dimensional, evidence-based package of system-level, whole-of-community initiatives. These initiatives are family violence response initiatives that could not be undertaken by any single agency or sector. The Collaboration's delivery of this unique package of prevention, workforce development and evidence-gathering strategies during the recovery and rebuild post-disaster phases has made a significant contribution. In sum, this contribution has been to assist members of the local community with effectively recognising and responding to family violence following the Canterbury earthquake events.

Based on the Canterbury Family Violence Collaboration's experiences, we offer the following recommendations for delivering post-disaster collaborative initiatives:

1) *Build on pre-existing success factors*: The efficiency with which post-disaster collaborative ventures are established and strategies mobilised is greatly enhanced when they are founded upon existing connections and trusted relationships. Furthermore, drawing on existing evidence of what works increases the potential for delivering effective collaborative initiatives.
2) *Establish a compelling and inclusive purpose*: The success of cross-sector and cross-discipline collaborative work depends on communicating a purpose that takes account of, and adds value to, the diverse interests of contributing agencies
3) *Provide the collaboration with a balanced open-system and support structure*: For collaborative ventures to remain responsive and innovative they need to remain open to new and diverse membership and adopt a distributive leadership style. The open system supports the creation of connections amongst diverse groups and networks and this in turn simulates the development of creative solutions to enduring and complex problems. Distributive leadership not only enables the vigilance of many agencies to identify emerging community needs in the ever-changing post-disaster environment, but also builds commitment as people work on solutions together. To balance the potential chaos of this open system model, collaborations need a dedicated human resource that coordinates efforts and maintains momentum across the various activities undertaken by the partners. Critical capabilities for this support function include supporting strategic planning and policy development; engaging stakeholder support and advocacy; mobilising financial resources; and carrying out performance monitoring.
4) *Be strategic about the collaboration's viability and sustainability*: In part, the sustainability of collaborative ventures depends on demonstrating achievements. Therefore, priority should be given to gathering and disseminating evidence about the outcomes achieved for the communities served. In addition, collaborations should pay attention to securing on-going financial and in-kind resources. On the one hand, this requires less reliance on time-limited disaster funding and more effort to build a diverse income portfolio. On the other hand it requires collaborations to continually seek new partners. New partners provide fresh perspectives and energy that ensure responsiveness to changing community needs while countering workforce fatigue.

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Resilience in Youth with Type 1 Diabetes Following an Earthquake

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Abstract

Disastrous natural hazard events impact negatively on diabetes self-care, with potentially catastrophic consequences for patients with type 1 diabetes mellitus. Insulin may be inaccessible or spoiled due to inadequate storage conditions, self-care apparatus may be misplaced or damaged, food security may be compromised and physical and psychological stress may contribute to unstable diabetes. However, following the 2011 Christchurch earthquake, there was no increase in hospital admissions for metabolic decompensation observed. To better understand this apparent case of diabetes-related resilience, Youth aged 16-25 years, identified from a type 1 diabetes database, were asked complete an online questionnaire a year after the earthquake. This questionnaire asked about the physical and psychological consequences of the earthquake on diabetes self-management. Of the 63 respondents, 42 experienced major physical disruptions in their living conditions. Eighteen reported immediate changes in insulin requirements which settled after 4 to 210 days. Professional psychological support was obtained by 12 respondents and support from family was also considered important. Some changes were positive, for example one respondent commented on eating healthier, with less availability of junk food. Surprisingly, glycated haemoglobin, a measure of overall diabetes control showed only minimal change following the 2011 earthquake. In conclusion, while acknowledging that questionnaire respondents represent only a minority of local residents with type 1 diabetes, the metabolic impact of the earthquake on respondents was minimal in this patient subgroup. Awareness of disaster planning is likely to have been influenced positively by an earlier, September 2010 local earthquake and its aftershocks. Personal disaster planning should form part of the education curriculum for patients with type 1 diabetes mellitus.

Keywords: *disaster medicine; type 1 diabetes, resilience*

Previous research has shown that natural disasters have a negative impact on diabetes self-management, especially for those taking insulin (Fonseca et al. 2009; Ng, Atkin, Rigby, Walton & Kilpatrick, 2011). There are multiple reasons for this observation, including loss of diabetes medications either through direct damage or through spoiling due to inadequate storage conditions. Also, considering that dietary modification is a cornerstone of diabetes self-management, food security may be particularly problematic after a disaster. The September 2010 Canterbury earthquake caused physical damage and psychosocial distress, however the 2011 Canterbury earthquakes caused huge disruption to local infrastructure, including loss of domestic electricity and water supplies (Stevenson et al, 2011; Potter, Becker, Johnston, & Rossiter, 2015). They also caused disruptions for both primary and secondary care services responding to acute medical problems (Ceismic, 2016).

The disruption of housing and other infrastructure affected insulin users' ability to undertake the following: keep their stocks of insulin cool; ensure hands are clean prior to capillary glucose monitoring; ensure apparatus such as glucagon and test strips are stored in optimal conditions. In type 1 diabetes mellitus (T1DM), insufficient insulin, administered by injection or with an insulin pump, predisposes individuals to metabolic de-compensation. If insulin insufficiency is severe, this results in diabetic ketoacidosis (DKA) and eventually in death. Although local diabetes services anticipated an increase in diabetes related admissions, there was no obvious increase in DKA presentations observed

by service providers, following either the 2010 or 2011 earthquakes.

This study aims to explore the impact of these earthquakes, with a focus on the February 2011 earthquake, on diabetes self-care for those with T1DM while gaining some insight concerning their coping mechanisms. For this purpose, DKA admissions were used as one, negative, proxy for self-care. Admission rates for those aged 15 years or more, representing youth and adult populations, were reviewed before and after the two major Canterbury earthquakes, in September 2010 and February 2011.

Youth with T1DM are especially vulnerable to metabolic de-compensation, when compared with older adults. The second part of the study therefore aimed to gain a better understanding of self-management strategies employed by Youth under stress. This was achieved by surveying how they had coped with their diabetes self-management in the months immediately following the main February 2011 earthquake.

Methods

For the first part of the study, data concerning Youth and adult DKA admissions were obtained for the greater Christchurch region, through the Canterbury District Health Board's Decision Support services. These data specifically concerned the absolute number of DKA admissions by month for the total population aged 15 years and over. Christchurch is relatively isolated geographically. This means these data are likely to reflect DKA rates amongst the resident population in Christchurch at the time.

For the second part of the study, contact details of Youth aged 16-25 years with T1DM and thought to be resident in Christchurch in February 2011 were obtained from Diabetes Youth Canterbury, a lay support organisation. For the purpose of the current study, a minimum age of 16 years was chosen as it was considered that these participants would be able to consent to and complete the questionnaire, without parental or caregiver support. A postal questionnaire was considered problematic in a post-quake environment marked by a lot of residential mobility. The current questionnaire was conducted using an email-weblink approach instead. Eligible young people were initially contacted by mail, phone or in person, asking if they wanted to participate in the questionnaire. For those interested in participating, the questionnaire link was e-mailed to them. Although all responses were de-identified, participants were asked for permission to link their unique national health identifier with their glycated haemoglobin (HbA1c) results. HbA1c is a blood test that measures glucose control over the preceding three months and was included because the study aimed to incorporate how HbA1c trended over the year following the 2011 earthquake. This meant that HbA1c results that were closest to the 3 and 12 month post-quake time period were selected. The study as a whole was approved by the Upper South B Regional Ethics Committee - reference URB/11/EXP/047.

Statistical analysis

DKA admissions are usually reported by number of admissions per 100,000 population. This approach was inappropriate in the post-earthquake environment, because of the lack of reliable data concerning such a mobile population. DKA admission data were therefore collected as absolute numbers of admissions. The average number of monthly admissions before and after the 2010 and 2011 earthquakes was then compared using non-parametric tests: The Wilcoxon Rank Sum test was used for two-sample comparisons and the Kruskal-Wallis test for three-sample comparisons. Comparisons of HbA1c results were also undertaken, using paired t-tests comparing the following time points: 1. comparing before the 2011 earthquake with three months following the earthquake; 2. comparing before the 2011 earthquake with one year following the earthquake.

Results

Figure 1 shows monthly DKA admissions across the total population aged 15 years or more, in relation to either the 2010 or the 2011 earthquakes. Visual inspection of figure 1 shows no obvious increase in monthly admissions following either the September 2010 or the February 2011 earthquakes. The apparent lack of increase was nonetheless tested using statistical analysis. The number of monthly admissions was divided into in three unequal blocks: i. before September 2010; ii. between September 2010 and February 2011; and iii. after February 2011. There was no statistically significant difference in admission numbers between these three time periods using the Kruskal-Wallis test ($X^2(2, N = 96) = 0.89$, $p = 0.26$). The number of monthly admissions was also considered in two blocks: before and also after February 2011. There continued to be no statistically significant difference in admission numbers using the Wilcoxon Rank Sum test ($z=0.07$, $p = 0.94$).

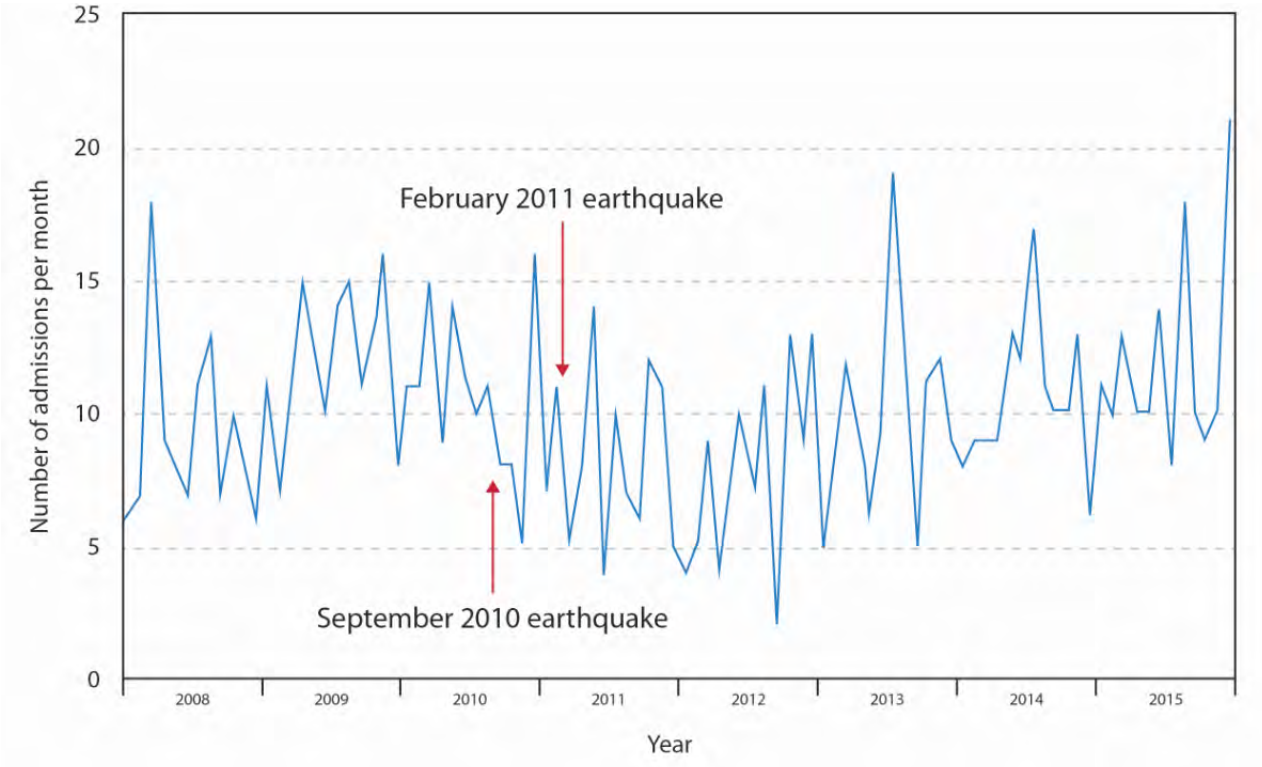

Figure 1. Absolute number of diabetic ketoacidosis admissions by month to Christchurch hospitals, for youth and adults aged 15 years or more.

The absolute numbers of admissions for DKA in the 16-25 year, youth, age group were too small for meaningful statistical analysis. Admission rates in this age group did not however show any obvious increase in the post-quake period: The average monthly Youth admission rate from January 2008 to September 2010 was 4.2. From September 2011 to February 2012, from the first earthquake up until the anniversary of the most devastating earthquakes, it had fallen to 2.8 and from April 2012 to December 2015 it had increased back to 4.6.

Regarding the online questionnaire, 23 percent (63 of 278) of the estimated eligible population responded. The average age of responders was 20 years. Fifty-four percent were female and 90 percent were of New Zealand European ethnicity, reflecting the fact that T1DM is most prevalent in European New Zealanders. At the time of the earthquake, 83 percent of respondents were studying or working.

Of the 63 respondents, 42 participants (67%) experienced major physical disruptions in their living conditions, as detailed below. Eighteen of 63 participants (29%) reported immediate changes in insulin requirements which settled after 4 to 210 days. Professional psychological support was obtained by 12 (19%) of respondents and support from family was also considered important. Some changes were positive, such as the qualitative response from one participant: "Began to eat healthier; junk food less available". Other responses to specific questions are outlined in table 1.

Glycated haemoglobin (HbA1c)

Eighty four percent of participants (n = 53) consented to linking of their unique national health identifier with their HbA1c data. This high level of consent to data linkage suggests that there was a high level of what Moore & Niemi (2016) called *social licence*. In other words, within the context in of the current research, community members appeared to readily approve of our use of their personal data. Two or more HbA1c data points were available from 50 participants within the study time frame. These participants' data was therefore able to be analysed by paired t test, comparing values before and approximately three months after the 2011 earthquake, and/or comparing values before and approximately twelve months after the same earthquake. Mean HbA1c values (mmol/mol) were as follows: pre-quake 77 (N = 50), three months post-quake 79 (N=44), twelve months post-quake 75 (N= 47). The paired t test results before and three months post-quake were t (43) = 0.88 (p = 0.39). The corresponding values for before and 12 months post-quake were t (46) = 0.42 (p = 0.67), thus there were no statistically significant or clinically

significant changes in HbA1c seen post-quake in the study participants.

Table 1. *Participant Responses to Specific Questions about Post-Earthquake Situation*

Type of Disturbance	Percentage of Participants Giving a Positive Response
Domestic infrastructure	
Had damage to their home	30%
Lost domestic power	73%
Lost domestic water	54%
Lost domestic sewerage	43%
Lost time from school/tertiary study/work	81%
Psychological disturbance	
Sleep disturbance	56%[a]
Changes in appetite	30%[b]
Reduced energy levels and fatigue	48%
Reduced mood and or increased irritability	49%
Increased stress levels	62%
Insulin requirements	
Changes in insulin requirement	29%[c]

[a]Participants describing sleep disturbance reported that it was often of many months duration and it was related to aftershocks and anxiety.

[b]Participants describing a change in appetite reported a mix of eating healthy due to lack of choice of "junk" food, but also some "comfort eating", usually with suboptimal food choices.

[c]Participants reporting changes in insulin requirements typically said requirements were "now all over the place". The majority found this change in insulin requirement settled, several months after the February 2011 earthquake.

Discussion

Youth with T1DM showed considerable resilience after the February 2011 earthquake. They tended to be living under adverse physical and psychological conditions and had reduced clinical support. However they showed no increase in presentation to the local health services with DKA. Also, patients who allowed us to review their HbA1c results showed no metabolic deterioration over one year. Circumstances seemed difficult but not impossible for most, and this may have contrasted with other disaster-affected populations suffering a much larger magnitude of devastation.

The local experiences documented by the current research suggest that for T1DM, personal diabetes self-care responses to a disaster are an extension of general preparedness for difficult medical situations, including sick day management. Patients need to trouble shoot problems using the resources available. While we endorse the standard recommendations of having several days of medical and general supplies available at home, some disasters such as earthquakes occur without warning. This means that many patients may not have access to their home supplies. We consider that diabetes disaster preparedness advice around availability of domestic medical supplies should be extended to carrying around some personal supplies at all times. This applies to patients reliant on insulin and blood glucose self-monitoring in particular.

It is difficult to undertake research in a post disaster environment without encountering methodological limitations. The 2010 earthquake and subsequent aftershocks are likely to have primed individuals' disaster preparedness, so individual's responses to the 2011 earthquake may not represent responsiveness in a setting where a disaster is less anticipated. Another limitation was the low questionnaire response rate, of 23 percent. Responses are likely to have been subject to individual biases, although it is difficult to know in which direction such biases were operating, towards over-reporting or under-reporting earthquake impacts for example. It is nonetheless reassuring that individual questionnaire responses generally align with commentary provided to the authors, by older T1DM patients in a clinical setting.

There were many anecdotal stories from around New Zealand, of T1DM patients arriving into other health districts with significant psychological and metabolic distress shortly after the February 2011 earthquake. One study, by Newell, Beaven, & Johnston (2012), analysed cell phone usage among the general population. This usage data indicated that around 15 percent of the usual population of Christchurch probably left the city over the first week after the 2011 earthquake. It is not known whether those with high health needs such as T1DM were more likely to self-evacuate and were therefore under-represented in the current questionnaire of Youth still based in Canterbury. Also, self-evacuation may have influenced the number of Youth presenting to local services with DKA.

The resilience shown by the respondents with T1DM in the immediate post-quake period largely reflects use of their own resources and support systems. This is because the local health system was severely strained and could only offer limited diabetes-specific support. The diabetes community, as with many other

local communities, self-organised their own immediate disaster response. This included micro-distribution of diabetes supplies including insulin (Ceismic, 2016). Access to diabetes supplies was difficult at times but there appeared to be no prolonged barriers to access.

We consider that the future focus of disaster preparedness should move beyond generalised health system support to specific national, regional and local preparedness that includes those with chronic medical conditions, as outlined in the Sendai Framework for Disaster Risk Reduction 2015-2030 (United Nations Office for Disaster Risk Reduction, 2016). This approach encompasses the potential to provide rapid, co-ordinated support for patients whose life depends on continuous treatments.

In conclusion, a disaster event typically produces a hostile, life threatening environment for those with T1DM. However, Youth with T1DM, participating in the current study, showed adaptive diabetes self-management skills following the Canterbury earthquakes. These skills allowed them to cope, at least from a metabolic perspective. For individual, insulin-dependent patients, education concerning disaster preparedness should be an extension of sick day management and an extension of how to manage everyday diabetes emergencies. We also welcome any co-ordinated initiatives that extend general population disaster preparedness into preparedness for those with chronic diseases.

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Building Resilience Through Post-Disaster Community Projects: Responses to the 2010 and 2011 Christchurch Earthquakes and 2011 Tōhoku Tsunami

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Abstract

The 2010 and 2011 earthquakes in Christchurch, New Zealand resulted in severe damage and human injury, and an unfolding process of social and economic disruption across the city and region. The 2011 Tōhoku North-Eastern Japan Earthquake and Tsunami caused unparalleled destruction and loss of life. Japan and New Zealand have taken distinct cultural approaches to environmental disasters and resilience. However, both events prompted significant community responses, from which we can learn a lot about recovery, reconstruction and resilience processes. The current paper provides an overview of the two disasters, their contexts and key issues, and analyses community-driven projects. The governmental response in driving recovery and reconstruction in both cases has often marginalised community engagement in decision-making processes. There is nonetheless widespread evidence of locally driven, dynamic approaches to community and environmental needs, as illustrated by the examples discussed herein. The paper concludes with a set of lessons for community resilience before discussing implications, including challenges to top-down planning.

Keywords: *community resilience; earthquake recovery; community-driven projects; Christchurch; Tōhoku*

Introduction: The Story of Two Disasters

In 2010 and 2011, New Zealand and Japan were particularly affected by environmental disasters, the impacts of which have been ongoing. The Christchurch earthquake sequence was causing human loss and damage throughout the city and Canterbury region (Pawson, 2016; Potter, Becker, Johnston & Rossiter, 2014). The communities of north-eastern Japan experienced an unparalleled combination of earthquake and tsunami events (Shaw, 2015). The current paper aims to examine post-disaster community-driven projects in both places. This includes a focus on the relevance of these projects to *resilience* which, according to Berke and Campanella (2006) and Cutter et al. (2008), is fundamental in shaping recovery and reconstruction processes. In the terms of this research paper, resilience refers to the capacity of communities to recover and thrive during and after a disaster or sudden change. After a discussion of each event, and the contexts in which they occurred, questions are posed to shape an analysis of the relationship between community-driven projects and top-down reconstruction planning.

The 2010 and 2011 Christchurch Earthquakes

The Christchurch Earthquakes began on 4 September 2010 with a Mw 7.1 event. This was followed by a sequence of strong shakes that prolonged and interrupted recovery processes. The most severe, on the 22 February 2011 (magnitude Mw 6.3), caused 185 deaths, significant injury, and unparalleled damage across the Canterbury region (Potter et al., 2014). Urban infrastructure, housing and commercial buildings, and large areas of land were severely affected by ground movement or consequent liquefaction, flooding, rock fall, and cliff-face failure. Approximately 75 percent of all homes in Christchurch suffered some degree of damage, where 7.5 percent collapsed or required demolition in this city of 366,000 people (Dionisio, Kingham, Banwell, & Neville, 2015; Parker & Steenkamp, 2012). The Eastern suburbs were the most affected with severe road and ground infrastructure

damage. Approximately 7,700 homes located on both sides of the Avon River were later demolished due to the impacts of liquefaction and lateral spread close to the riverbanks. These properties were acquired by the New Zealand government, with compensation for the owners, as it is unlikely that the land will be suitable for rebuilding (Canterbury Earthquake Recovery Authority, 2011). Many people have had to move elsewhere as a result, dislocating families and disrupting social connections in the Eastern suburb communities (Dionisio et al., 2015). Many other homeowners throughout the city have been facing prolonged negotiations with insurers for home repairs.

Initially, there was widespread public engagement and volunteer activity during and after the major events, showing capacities and self-organisation for timely action to support people in the most damaged areas of the city (Dionisio et al., 2015; Mamula-Seadon & McLean, 2015; Pawson, 2016). However, community resilience has since been compromised by delayed housing reconstruction due to the complexity of insurance claims. Additionally, there has been little alignment and synergy between community-led initiatives and government-led decision-making (Dionisio et al., 2015; Kingham, Dionisio, & Newman, 2015; Swaffield, 2013).

The 2011 North-Eastern Japan Earthquake and Tsunami

On 11 March 2011, Japan suffered the most extensive environmental disaster in its modern history with a large tsunami caused by a Mw 9.0 megathrust earthquake (Shaw, 2015). The tsunami affected twelve prefectures from Hokkaido to Chiba, along 500 kilometres of coastline (Puppim de Oliveira & Fra.Paleo, 2016). The tsunami wave reached 10 to 15 metres above sea level in some areas (Stimpson, 2011) and triggered multiple additional hazards including landslides, fires, and the Fukushima nuclear accident. It was responsible for about 18,600 deaths, with 6,150 people injured and 2,650 missing (Ranghieri & Ishiwatari, 2014). About 470,000 people had to evacuate as the result of 121,803 homes being destroyed across the Tōhoku region (Murao, 2015).

Japan and the North-Eastern region of Honshu Island demonstrated significant resilience through support campaigns such as *Ganbaro Nippon* and *Ganbaro Tōhoku*, meaning Try Your Best Japan, Tōhoku, and the Kizuna project which had a critical role in connecting volunteering, civil society, and social media with affected communities in the region (Shaw, 2015). A strong national movement to assist generated an upsurge of public engagement across the country. However, complications posed by the subsequent nuclear crisis, the regional scale of the disaster, and declining populations in remote towns and cities affected has prolonged the recovery process, compared to recovery from other recent disasters in Japan. Furthermore, central and regional governments have led recovery and reconstruction planning with few local opportunities for public participation. Consequently, the local knowledge held by communities has been largely excluded from decision-making (Puppim De Oliveira & Fra.Paleo, 2016; Shaw, 2015).

Contexts and Questions

These two event clusters occurred in very different political and cultural contexts, in which nature, community and the possibilities for collective action are understood in quite distinct ways. These differences arose despite a number of similarities between the two countries. Both sit astride tectonic plate boundaries around the edge of the Pacific, the so-called Pacific Rim of Fire. They share active, mountainous landscapes as a result. Both are also island countries, with the majority of their populations and urban facilities focused on the coastlines. They are both modern states, the product of industrial capitalism, which in turn is reflected in very high levels of urbanization, energy intensive economic activities and huge investment in fixed types of infrastructure, both above and below ground. Both countries are also strikingly different to how they were a century or two ago. Japan has since become one of the world's most industrialized, and New Zealand has since developed intensive industrial agriculture (Pawson & Brooking, 2013; Totman, 2014).

There are also big differences. One is of scale: The Japanese economy dwarfs that of New Zealand and its population, at nearly 130 million, is thirty times larger. Consequently, Japan has a lot of cities and very extensive coastal development. By contrast, the New Zealand population is concentrated in a very small number of urban centres. This brings a different profile of vulnerability to significant natural events. In Japan, many urban areas are earthquake prone or open to the effects of tsunami. In New Zealand, most earthquakes affect rural or remote areas but when an urban centre is impacted, it has a disproportionate effect on the

national economy and society. A further difference is that Japanese industrialization has been dependent on fossil fuels and heavy investment in nuclear power from the 1950s to the 1980s, in which "the longer-term costs of nuclear-fuel use have never been honestly confronted" (Totman, 2005, p. 564). New Zealand however has a strong anti-nuclear tradition and most of its electricity generating capacity is from low-risk, renewable sources.

Japanese society has long understood, and furthermore valued, a certain impermanence, celebrating the fleeting beauty of seasonal change as well as respecting the unpredictable movements of nature (Sorensen, 2002). This has resulted in lightweight housing construction, and even permanent material structures are frequently replaced in a never-ending cycle of renewal. Although New Zealand's housing stock is also wooden-framed, this reflects resource availability when brick, stone and steel are commonly regarded as *permanent materials* in a recently colonised landscape where people stand against nature (Pawson & Brooking, 2013). High levels of home insurance are a norm to protect such assets, and are reinforced by a form of socialised risk cover provided by the New Zealand state. If insurance has less penetration in Japan, there is still an expectation that the state will intervene in large-scale disasters as the most effective source of action. In both countries, it has other reasons to do so, not least to protect assets, to minimise further risk to life and livelihoods, and to enhance recovery through what has been called disaster capitalism (Pawson, 2016). These approaches nonetheless leave various questions, which are explored in the remainder of this article:

- In what ways do the actions of the state, through its involvement in centralised recovery planning, condition the expression of community action and resilience after disaster?
- What forms can post-disaster community-driven projects take as a result, and how have these been shaped in the two case study areas?
- How then might spaces for community action be enlarged or enabled?
- What has been achieved by a combination of centralised and community-driven actions five years on from these disasters?

Community-Driven Rebuilding in Christchurch and North-Eastern Japan

Public participation is vital for embedding local knowledge and community narratives within decision-making processes for urban development (Burby, 2003; Innes, 1996). Trust and hope for the future can be fostered through participation, engagement and empowerment of communities in the processes of transforming their livelihoods (Brody, Godschalk & Burby, 2003; Glackin & Dionisio, 2016). This involvement of communities in urban planning enhances the quality of plans and the chances of successful implementation (Burke, 1979). Public participation and engagement are equally fundamental for social resilience (Berkes & Ross, 2012).

Response and recovery stages both in Christchurch and Tōhoku have shown strong community participation, engagement, and initiative. Public experience of the Christchurch Earthquakes, initially at least, gave new meaning to civil society, for example through the actions of local organisations, volunteerism and marae, which are communal places that serve as meeting and support centres of Māori communities (Johnson & Mamula-Seadon, 2014). These actions were fundamental in helping people cope with repetitive disturbances caused by the shakes, and in providing care and connecting people in the recovery (Mamula-Seadon & McLean, 2015; Vallance, 2011). In Tōhoku, volunteerism, local organisations, and community leaders also had an important role in the disaster response, providing help and support for the restoration of livelihoods. Later, scholars and professionals also played a role in the recovery, by connecting with communities to build empowerment.

To answer the questions outlined in section 2 above, the following sections focus on examining several community-driven projects in Christchurch and Tōhoku after the disasters. They include an analysis of connections between community action and government-led planning, the types of community-actions in both places, and what has been achieved by the combination of centralised and community-driven actions.

Projects and interventions in Christchurch

The Christchurch rebuild has featured two divergent processes in the transformation of the city. One process has been exemplified by a centralised governmental authority, the Canterbury Earthquake Recovery Authority (CERA), established under legislation for a fixed term of five years. CERA primarily focused on the physical rebuild. There has also been a community-driven debate about the transitional potential of the city and community aspirations (Kingham et al., 2016; Wesener, 2015). This debate was initiated by a consultation campaign promoted by the Christchurch City Council (CCC) in May 2011, called Share an Idea, which collected about 106,000 responses concerning the future of the city. Despite the latter efforts, CERA's Central City Recovery Plan (CCRP) did not include public consultation or engagement actions (Bennett, 2014, Kingham et al., 2016). Instead, this plan argued that Share an Idea outcomes had already been interpreted by planning experts while creating the CCRP.

The community debate emerging in the city after the 2010 and 2011 earthquakes has nonetheless been expressed through a substantial number of projects and interventions focusing on temporary uses of vacant spaces, following the widespread demolition of downtown buildings (Wesener, 2015). A number of these projects have been undertaken by resident communities or community champions, to address local post-disaster needs (Vallance & Carlton, 2015). Others have been initiated by small groups of like-minded people with a community drive to attain broader social objectives and improve the quality of life in Christchurch (Wesener, 2015). The development of many projects has been advanced with the support of volunteerism initiatives, for example: the Student Volunteer Army, established after the first earthquake to coordinate on-street help from thousands of university students; and sponsorship by local stakeholders such as the CCC. These types of initiatives have been critical for community resilience because they have provided opportunities for people to self-organise disaster responses, while building social interconnections (Cretney, 2015).

Greening the Rubble Trust is another good example, initiated in late 2010 to create temporary gardens and small parks in spaces vacated after the earthquakes. This trust brings people with skills in landscape architecture, ecology, health, and project management together. It operates through sponsorships and donations, volunteer work, cooperation with landowners, and through collaborating with local organisations and public authorities (Greening the Rubble Trust, 2016). In building and maintaining temporary green spaces throughout the city, the Greening the Rubble Trust has had a significant role in adding environmental and social value to several central city and suburban sites throughout Christchurch.

In 2013, in collaboration with the state Department of Conservation (DoC), Greening the Rubble developed the Nature Play Park, *Papatākaro Ao Tūroa*, shown in figure 1. The park was developed to enhance recreation in the city centre (Greening the Rubble Trust, 2016). The park, which was put in place for a period of three years, had a number of water features and offered an interactive experience to visitors through diverse landscape environments (DoC, 2013; Life in Vacant Spaces, 2016). This intervention is a good example of Greening the Rubble's work, drawing on vigorous community and stakeholder engagement to deliver a new social and natural amenity in Christchurch (DoC, 2013). However, CERA only consented to the temporary existence of such projects, without integration with the CCRP Blueprint, and did not promote similar collaborative partnerships.

Figure 1. Nature Play Park *(Papatākaro Ao Tūroa)*, 203 Hereford Street, Central Christchurch, with surviving buildings behind, April 2016. [1]

A second example is the Gap Filler Trust. This is a creative-led urban regeneration initiative focusing on "temporary projects, events, installations and amenities" (Gap Filler Trust, 2016, para 1). It was also founded shortly after the first Christchurch Earthquake. This group of artists, scholars and activists has had a pioneering role in defining transitional space through

1 This photo and all other photos appearing in the current paper were produced by the first author.

its focus on imaginative social and cultural activities that reinvent urban conviviality (Gap Filler Trust, 2016; Wesener, 2015). In collaboration with other community groups, Gap Filler pioneered the utilisation of transitional spaces through the emphasis given to the ephemeral, short-term, transitory and temporary features of each intervention (Bowring & Swaffield, 2013; Wesener, 2015). Initial projects included: the Pallet Pavilion which was a short-term venue for cultural and social events; and small projects throughout the city, such as a painted piano for public use, the Dance-o-Mat, and an old refrigerator transformed into a public book exchange point.

In 2013, the Gap Filler Trust inaugurated The Commons, shown in figure 2, in the vacant centre of the city. This was a community hub for collaborative work on different projects and public events (Gap Filler Trust, 2016). The site belongs to the CCC, and currently lodges food trucks, several community groups, and space for other initiatives. The role of The Commons is to empower and involve local communities, citizens, and stakeholders in the continuous transformation of the city (Gap Filler Trust, 2016). It has been a focus of new connections between local government and local groups, supporting educational, recreational, and cultural activities that enhance street life and public engagement in Christchurch.

In recognition of the value created by these initiatives, for the social life of the city, and in reconnecting residents and visitors with the city centre, the CCC and a wide variety of local stakeholders offered support and sponsorship to Gap Filler initiatives, including The Commons. However, the CCRP Blueprint does not integrate any of these open spaces as they are currently being used, nor does it dedicate alternative land for their continuation.

Figure 2. The Commons and their emblematic arcades, 70 Kilmore Street, Central Christchurch, April 2016.

The project Life in Vacant Spaces (LiVS) began in 2012, to address a need to link temporary urban users with landowners. Successful initiatives from the Greening the Rubble and Gap Filler trusts had raised awareness of the economic and social opportunities of using vacant open spaces for communal uses. As a result, other community groups and local businesses had expressed an interest in developing similar interventions. The LiVS team integrates people with a diverse set of skills to create a facilitation platform between community groups and landowners, while assisting the development and implementation of projects in vacant open spaces (LiVS, 2016).

Over the past four years, LiVS has facilitated the creation of a number of events, temporary spaces, and small businesses in Christchurch, enhancing urban life and connectedness between communities, local authorities, and landowners. Additionally, LiVS performs an important role in the organisation and dissemination of local events with educational, recreational, artistic and communitarian purposes. In collaboration with the CCC, LiVS has been a key facilitator for the creation of new transitional projects on vacant land throughout the city centre. However, once the rebuild is advanced, there will be less vacant land available, compromising the active continuation of LiVS initiatives in the city.

Projects and Interventions in North-Eastern Japan

The rebuild in Tōhoku also features two distinct dynamics separating centralised planning from the community-driven debate. Soon after the tsunami, the Japanese government announced a plan to build sea walls in the most affected prefectures. While central government and some local governments remain confident that such walls can protect villages and towns, communities argue that they will have negative impacts on local marine ecology and scenery, while obstructing the connection between fishing villages and the sea. Also, many sea walls failed to protect land, property, and lives across Tōhoku in the 2011 Tsunami event. Some communities are more hopeful about using the rubble to raise the level of the ground, improving evacuation routes, and restricting the land use around harbours to fishery activities and public amenities, while reallocating housing to higher ground.

In contrast to the engineering-led approach embraced by the government, a new debate emerged in Japan after the 2011 Tsunami. This debate was focused on community empowerment and the need to reinforce the socio-cultural landscape of Tōhoku. Local communities and stakeholders, scholars, and professionals have been leading projects which focus on the day-to-day needs of communities. Their contributions have illustrated the strength of this community-focused debate. Resulting initiatives have advanced with the support of nationwide sponsors, volunteerism, and pro bono support.

These initiatives include Imagining Shibitachi which was a project that ran until 2013 to assist the community to imagine the reconstruction of their village, after the 2011 Tsunami, as shown in figure 3. Imagining Shibitachi was driven by scholars from three different universities, forming a research team with expertise in urban design, architecture, history, and disaster risk management. Shibitachi is a small village of about 800 inhabitants, so it was feasible to consult the entire community about their vision for the future. Through a series of workshops and semi-structured focus groups with the community and one-on-one interviews with key informants, it was possible to identify the main aspirations of the residents, and to determine reconstruction scenarios.

Figure 3. Shibitachi Harbour, June 2011.

Shibitachi and other communities in the Karakuwa Peninsula have a long history of oyster farming in the Oshimaseto Strait and fishing for bonito in open sea in the Pacific Ocean. Opposed to the construction of a 10 metre high sea wall in Shibitachi, the community's main motivation in leading this project was to envision reconstruction scenarios promoting a more accessible relationship between local livelihoods and the sea.

The project outcomes comprised a plan for evacuation routes across Shibitachi and a series of diagrams and artist impressions, maps, and plans illustrating the main reconstruction scenarios envisioned by the community. These scenarios are shown in figure 4. The Imagining Shibitachi project was important because it promoted an evidence-based debate between the community and local government, supporting the community's opposition to the sea wall while providing alternative reconstruction scenarios. To the present day, the Shibitachi community continues to use the outcomes of this project to negotiate with the local government.

Figure 4. The future Shibitachi Harbour imagined by the community, March 2012.

The project Home-for-All, *Minna No Ie,* was initiated shortly after the 2011 Tōhoku Tsunami to help affected communities recover and rebuild. It is a non-profit organisation for the architectural design and construction of small community houses, undertaken by architects and builders together with the communities who have lived in temporary housing since the tsunami. All interventions comprise small buildings, up to 60 square metres, that can be built rapidly without consent requirements, providing common space where people can feel at home and reconnect with others. This approach has been fundamental to support communities during recovery, and many Home-for-All projects have emerged in different cities and towns across Tōhoku. The Home-for-All for Rikuzentakata is an outstanding exemplar of the initiative. According to Delicado & Marcos (2012), the construction of this building involved a strong collaboration between architects, local stakeholders, builders, community and volunteers. The structural wooden pillars of the building were provided from a local cedar forest that resisted salt exposure in the tsunami (Home-for-All, 2012). The cedar pillars, their resilience and strength to sustain the community house,

represent the community of Rikuzentakata, emerging stronger and more connected after the tsunami.

The positive experiences achieved through the project Home-for-All have been inspiring other projects to support the daily life of affected communities, as encouragement for recovery and rebuilding. Tōhoku Small Projects is also a design-led initiative. It started in late 2012 in collaboration with Home-for-All and focused on the construction of small public buildings such as community shelters, recreation centres, and firefighting centres. These construction projects are helpful because they bring people together in the design and construction of small community facilities, inspiring them to reconnect and thrive in the recovery process. Despite the scarce support offered by governments to such initiatives, local stakeholders and landowners seem likely to maintain the buildings throughout the rebuilding, until new public facilities are available.

The project Tōhoku Planning Forum, TPFsquare or TPF2, was initiated in 2012 by a group of scholars and professionals who aimed to debate, map, and connect community-driven initiatives in the affected areas of North-Eastern Japan (TPF2, 2016). In a similar way to LiVS in Christchurch, the TPF2 has provided a platform to support the revitalisation of Tōhoku by linking organisations, communities, and projects across the region. The TPF2 currently offers project developers the opportunity to connect with a wide network of community-driven projects to leverage the impact of combined interventions. To this end, the TPF2 includes forums to facilitate multidisciplinary debates between organisations, sponsors, stakeholders, communities, and projects in Tōhoku together with wider international networks. This promotes the exchange of lessons and encouraging collaborations. In four years, the TPF2 facilitated new links between 170 organisations, community groups, NGOs, not-for-profits, and the academic community (TPF2, 2016). While documenting the progress of Tōhoku's revitalisation, this initiative has also been relevant for expanding debate and reflection about community-driven initiatives, allowing the continuous review of projects and encouraging the reinforcement of community capabilities as part of community resilience.

Lessons from Community-Driven Rebuilding Projects

The previous section outlined widespread evidence of community-based post-recovery activity in both Christchurch and Tōhoku. These examples seem to support a proposition from Solnit (2009), that new communities of action emerge in the wake of disaster, and new bonds of social capital are created as people self-organise to meet immediate needs. However it has also been observed that there is little alignment between such initiatives and the centralised forms of emergency response and rebuild planning favoured by the state. The Japanese government's preference for constructing tsunami defence walls, rather than drawing on local environmental knowledge of safe building sites and practices, is matched by the New Zealand government's blueprint for the downtown rebuild of Christchurch. Both examples appear to override any genuine form of ongoing public involvement.

As modern urban living has become more complex, and cities have become both more corporatised and more bureaucratised, there has been a narrowing of spaces for community action. Professionalised bureaucracy can even attempt to constrict community-based action during and following disaster events. For example, the efforts of the nascent Student Volunteer Army in Christchurch were initially side-lined by CCC staff after the September 2010 earthquake, for fear of legal or safety repercussions. Communities in North-Eastern Japan likewise faced challenges in the wake of the tsunami because official organisations were interlinked through intricate contractual relations, without authority to proceed in a more autonomous and timely manner (Shaw, 2015). Official responses also appear to have equated recovery with investment in fixed structures in a way that, bizarrely, creates "an illusion that keeps deferring the future. They push change over the horizon to some future time when the big things are fixed and the little things will follow" (Westbury, 2015, p. 70). That smaller, more locally driven, initiatives may of themselves contribute to, or even lead the planning process, seems outside a frame of reference that understands recovery as serving the interests of financial capital as much as or more than the interests of people.

This is not to decry the benefits of top-down recovery. These benefits are evident in Japan, where roads, railways, and ground infrastructure in major Tōhoku

cities were restored within a year. Engineered and often technological solutions were promptly developed and implemented, adding to the reputation of the Japanese as fast, smart, and efficient builders. However at the same time, it appears that "local knowledge has been overlooked in land use planning and risk governance" (Puppim de Oliveira & Fra.Paleo, 2016, p. 1). Five years after the 2011 Tsunami, the real challenging issues, such as the nuclear crisis, the reallocation of housing throughout the region, and the relation between the sea and waterfront land-use, remain government-led with little or no opportunity for public participation or community engagement.

In Christchurch, when an architectural forum sought to evaluate recovery at the five-year mark, there were some considerable differences of opinion. A prominent member of the official CCRP Blueprint team described how building activity "is underway on nine" of the thirteen inner city blocks of the replanned CBD, observing without irony that "Given the almost complete demolition of the CBD [which was called for by the blueprint] this is an extraordinary achievement" (cited in Marshall 2016, p. 38). A colleague from another practice reportedly agreed that "Yes, the city is being rebuilt, and at quite an astounding pace now" (cited in Marshall, 2016, p.40) but he also questioned if it is the place that the public envisioned during the CCC Share an Idea forums. The same architect stated that "we will achieve a city that is up to date in terms of earthquake resistance, the latest building codes and maximum bang for the buck for building owners … will we still be on the New York Times list of 16 cities to be watched over the next few years? Somehow I don't think so …" (Sheppard, 2016, p. 40).

This warning alludes to the importance of recognising the contribution of transitional activities such as Greening the Rubble and Gap Filler, Home-for-All and smaller projects in Tōhoku, alongside mechanisms designed to facilitate community-based contributions, such as LiVS and the TPF2. This is how the hackneyed phrase "building back smarter" should capture not just the desire to rebuild infrastructure. It must also make space for community and stakeholder engagement, as a conduit for community resilience through the creation, development, and implementation of post-disaster community projects. Permanence does not need to be a prerequisite for generating value (Westbury, 2015), just as being transitional is not only about filling empty urban spaces until something better comes along. Rather it is important to recognise that places are always in the process of transformation. People can experience the fleeting, the ephemeral, the ever changing as vibrant and lively. On the other hand, when planning is done to, rather than with, the community, it does little to promote well-being (Blundell, 2015).

The resilience of cities will therefore be enhanced by the capacity to adapt urban planning mechanisms to encourage, enable, and validate community-led initiatives. The community bonds emerging after disasters and the obliteration of built form resulting from such events provide openings for more inclusive planning and organisational structures. The post-disaster experiences of both Christchurch and Tōhoku indicate that there are real opportunities to consider more dynamic approaches to land-use, taking account of the needs of both people and nature. The rupturing of the landscape, as Pickles (2016, p. 169) observed, "has shown that being open to continual change is the best way forward." In the case of the Christchurch Earthquakes, there has been some official recognition of this through the replacement of CERA, after the conclusion of its five year term, with several new agencies. One of these agencies, Regenerate Christchurch (2016), is responsible to the central government and to the CCC for working with communities and business organisations to enhance further recovery. In Japan, the reconciliation of the two dynamics of centralised planning and local development has rested with particular local governments, and continues to depend on their commitment to this cause.

Conclusion

This paper has discussed the manner in which resilience has been fostered through community-driven projects in the wake of the 2010 and 2011 Christchurch Earthquakes and the 2011 North-Eastern Japan Tsunami. It has aimed to record the forms that these projects have taken and the ways they have contributed to recovery. Several years on from both disasters, much remains to be done in terms of formal rebuilding, social and environmental revitalisation. We have argued that this cannot be the preserve of formal, top-down approaches alone. The persistence of community-driven initiatives shows how this is the case, despite the fact that often centralised planning and community actions have followed parallel rather than integrated tracks. The findings of this research support the need for a better alignment and synergy between

communities and governments, providing evidence for urban planners, policy makers, and decision-makers about how community-led interventions can enhance the life, recovery and self-empowerment of communities.

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Ripples of Recovery and Resilience: Tracking the Effects of the Canterbury Earthquakes on Older New Zealanders

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Abstract

Participants from the longitudinal Health, Work and Retirement study of older New Zealanders (N=1,970), were surveyed in 2010, before the 2010 and 2011 Canterbury earthquake events, and again in 2012 and 2014. A variety of direct and indirect effects of the earthquakes were reported by older people across all of New Zealand and these persisted over three years. Although over a quarter of the study's participants reported effects of the earthquakes, these effects reduced with both physical and temporal distance from the earthquake events. Provision of social support to family and friends was widely reported, but decreased over time. Emotional and economic impacts were more likely to be reported in the longer term. After taking into account general changes in the health and wellbeing of older people over time, there was no effect of exposure to earthquake effects on health. However, there was a short term benefit on emotional loneliness for those affected by the earthquakes, with those who had experienced the earthquakes more likely to report reduced loneliness in 2012. This study is a reminder that through family and social connectedness, older people in New Zealand can be part of post-disaster recovery and resilience, in ways that are not simply related to immediate exposure.

Keywords: *older people, longitudinal study, reported earthquake effects*

The investigation of the psychosocial and physical health effects of earthquakes, and the recovery process from a major natural disaster, poses considerable research challenges. In particular, the point in time at which outcomes are measured becomes a critical factor. Since the major Canterbury earthquakes occurred, a number of investigations have been undertaken into the impacts of the events on older people in particular (Annear, Wilkinson, & Keeling, 2013; Davey & Neale, 2013; Morgan et al., 2015; Tuohy, Stephens, & Johnston, 2014a). An understanding of the longer term effects of such events is also important. In addition, post-event investigations are often limited by a lack of understanding of the pre-existing psychosocial and socioeconomic experiences of individuals in an affected region. This limits the extent to which observations of the impact of adverse events can be made. However, there are cases where a pre-existing study provides a before and after picture of a defined population cohort. The current paper is based on such an opportunity, using longitudinal data from the New Zealand Health, Work and Retirement (HWR) study.

Several years after the start of the earthquake sequence in September 2010, many households in Christchurch continue to live in difficult circumstances. Policies for housing repair or rebuild are being developed and enacted, communities are fighting to recover and adapt, as schools change and community members relocate, and some parts of the city are subjected to additional events such as flooding as a result of the earthquakes. There has been continuous, centralised planning through the work of both the Christchurch City Council and Canterbury Earthquake Recovery Authority (CERA). CERA also conducted a six monthly Wellbeing Survey, to monitor quality of life, social connectedness, health and wellbeing, along with impacts of the earthquakes, both positive and negative. This was conducted with an electoral-roll based sample of the population in Christchurch City, Selwyn, and Waimakariri Districts (CERA, 2014). However, there has been a limited focus on identifying ways in which particular age cohorts of the population might have been differentially affected, apart from the Christchurch study by Spittlehouse, Joyce, Vierck, Schluter, and Pearson (2014), which refers to

participants in *middle age*, between 49 and 51 years of age, as at 2011.

The World Health Organisation (WHO) has identified older adults as a vulnerable population, and older adults are more likely to experience greater risks in a disaster (Bolin & Klenow, 1988; Cutter, Boruff, & Shirley, 2003; Perry & Lindell, 1997; WHO, 2008). The need to improve psychosocial and health outcomes for this age group has been driven by concern about the growing numbers of adults over 60. This population will increase globally from 810 million in 2012 to a projected 2 billion by 2050 (United Nations Population Fund, Help Age International, 2012). By 2021, 90 percent of New Zealand adults over 65 years are expected to be living at home, and 28 percent are expected to be living alone (Statistics New Zealand, 2004).

Community recovery from the major Christchurch earthquake in 2011 is expected to take at least another decade (Stevenson, Humphrey, & Brinsdon, 2014). Although immediate outcomes of a disaster are often recorded in terms of mortality and injury or economic costs, the significance of the long term effects may be lost over this kind of period. Al-rousan, Rubenstein, and Wallace (2014) noted that there are few studies of any long term effects for older people. Studies concerning the outcomes or downstream effects of such major events must also take into account the upstream factors; the status of the individuals and their community before the disaster event. In addition to well established notions such as individual preparedness, there are other important aspects of a population and the environment which contribute to individual and community resilience and improved recovery. Rodriguez, Quarantelli, and Dynes (2006) suggest that, "the best way to understand disaster effects is to know what the community was like before the event" (p. xviii). In this way, the framing of disaster effects can be situated within a social context that explores how existing social factors impacts human lives and outcomes in a disaster. These social influences can be traced to more distant causes produced by social, economic and political processes, rather than the hazard threat alone (Tuohy, Stephens, & Johnston, 2014b; Wisner, Blaikie, Cannon, & Davis, 2004). For example, people earning lower incomes are more likely to be vulnerable to flood related hazards; this settlement pattern often arises because housing is more affordable near flood prone land (Tuohy & Stephens, 2011).

Such upstream factors may be conceptualised in terms of pre-disaster resilience. However, the term resilience is also used in critical gerontology, meaning that these two research fields should not be combined without clarification (Wild, Wiles, & Allen, 2013). A resilience approach to traumatic stress such as that experienced in a disaster, recognizes the widespread impact of major trauma, attends to *ripple effects*, or outcomes extending across time and space, through relational networks and other supporters, and aims to strengthen family and community resources for optimal recovery (Eyre, 2004; Walsh, 2007). These recognitions within the disaster literature may be drawn upon to understand the vulnerability and resilience of older people in the general population including those beyond the earthquake zone, and taking into account other age-related changes which may also occur over the same period.

Preliminary data from the 2012 HWR study (Keeling, Alpass, Stephens, & Stevenson, 2014) showed that of the 2,986 older people surveyed in 2012, 15 percent were living in Canterbury and 11 percent directly experienced one or more earthquake events. Of this population sample, 30 percent reported some effects, ranging from significant direct personal effects, loss of life or injury within family, through relocation effects or housing consequences, to financial and other effects. In particular, aspects of control and self-realisation within a quality of life measure showed different trends based on location and exposure to earthquake effects. Other psychosocial measures of loneliness and depression also showed regional differences. Considerations of three dimensions of time, place and socio-cultural location, plus longer term and broader post disaster outcomes, led us to take note of the importance of the social context as a focus for investigation into resilience for older people. These initial results based on a small set of available items were the basis for the more focused study undertaken in 2014 and reported here.

The aims of the 2014 study were to: (1) explore the reported ripple effects, or ongoing impacts, from the earthquakes; (2) identify any groups whose health and wellbeing changed over the four years from the beginning of these events; (3) identify what factors have been most protective to those directly affected by the earthquakes; and (4) analyse subgroups affected in different ways, taking pre-existing circumstances into account.

Method

The current study uses the existing HWR longitudinal cohort. For the full methodology used in this study

see Alpass et al (2007), Alpass et al (2013), and Towers and Stevenson (2014). The HWR study is a population-level study which aims to identify the health and social factors underpinning successful ageing in New Zealand's community dwelling population aged 55 to 70 as at 2006. This means participants were aged 63 to 78 when surveyed in 2014. Participants were initially sampled in 2006 using equal probability random sampling from the New Zealand Electoral Roll to achieve a nationally-representative sample of New Zealanders aged 55 to 70 (N = 6,662). Over-sampling for Māori was specifically undertaken during participant selection for the HWR cohort to combat the historically poor research participation rates found in older ethnic minority populations (Moreno-John et al., 2004) and the lower life expectancy for Māori (Ministry of Health, 2011).

Participants have been surveyed biennially since, with an additional off-cycle survey in 2013. Surveys to date have covered many aspects of ageing including physical and mental health, quality of life, social support and network affiliations, work/retirement status, work stress and commitment, caregiving commitments, travel and safety issues, and various demographic characteristics. Since the 2011 Canterbury earthquakes, the 2012 and 2014 surveys included items addressing the effects of the earthquake.

Measures

Demographic variables. Basic demographic information such as age, gender, ethnicity, marital status, education, work status and home ownership status were collected.

Economic status. The Economic Living Standards Index short form (ELSI-SF) (Jensen, Spittal, & Krishnan, 2005) was used to measure individuals' economic standard of living. The scale measures four different areas: restrictions in social participation, restrictions in ownership of assets, the extent to which respondents economise, and self-rated standard of living. Resulting scores were combined to categorise individuals into three ordinal groups: hardship, comfortable, and good.

Mental and physical health. Health measures were derived from the SF-12 Health Survey (Ware, Kosinski, & Dewey, 2000). This is a short health survey measure from which eight raw scales are generated: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. These eight scales are then standardized into z-scores using means and standard deviations calculated from the 2006 data wave of the HWR study (Stephens, Alpass, Baars, Towers, & Stevenson, 2010) and the two primary scales, physical health and mental health, generated using New Zealand Health Survey factor coefficients, where the mean is set to 50 and the standard deviation to 10. Higher scores indicate better health.

Social support. The Social Provisions Scale (Cutrona, Russell, & Rose, 1986) is a 24 item additive measure which provides a total social provisions score containing six sub-scales or *provisions*: attachment, a sense of emotional closeness and security and usually provided by a spouse or lover; social integration, a sense of belonging to a group of people who share common interests and recreational activities and usually obtained from friends; reassurance of worth, acknowledgement of one's competence and skill and usually obtained from co-workers; reliable alliance, the assurance that one can count on others for assistance under any circumstances and usually obtained from family members; guidance, advice and information and usually obtained from teachers, mentors, or parent figures; opportunity for nurturance, a sense of responsibility for the well-being of another and usually obtained from one's children. A higher score indicates more support or provision of these social functions.

Loneliness. The de Jong Gierveld Loneliness scale (de Jong Gierveld, van Groenou, Hoogendoorn, & Smit, 2009) is a six item additive measure and includes two sub-scales: emotional loneliness (from 0 to 3) and social loneliness (from 0 to 3). A higher score indicates higher loneliness. The main loneliness scale (from 0 to 6) can also be categorised into: not lonely, moderately lonely, severely lonely, and very severely lonely.

Earthquake experiences and effects. In the 2012 collection of HWR data, the survey included a number of questions relating to the Christchurch and greater Canterbury region earthquakes. Questions included whether participants were living in the Canterbury region following each earthquake event, whether they had suffered direct or indirect effects of the earthquakes, and the nature of any effects they had experienced. In the 2014 survey, the HWR study repeated these questions and also included similar questions relating to the series of earthquake events centred on Seddon, in August 2013, because these may have also affected people in the wider Cook Strait and Wellington areas.

Event exposure. A binary indicator of whether participants were exposed to a Canterbury region earthquake event, yes or no, was computed by combining the Canterbury earthquake questions, "Were you living in Canterbury during the following (earthquake) events: 4/9/2010; 22/2/2011; 15/6/2011; 23/12/2011", into a single 'experienced a Canterbury earthquake' variable. The Seddon earthquakes question, "Were you living in the Marlborough or Wellington region during the Seddon/Wellington earthquake on 16 August 2013" was asked as a yes or no question.

Event effects. A binary response variable, yes or no, was used in 2012 and 2014: "Have you suffered direct or indirect effects in the last year as a result of the Canterbury earthquakes of 2010 and 2011?" An additional question asked only in 2014 was "Have you suffered direct or indirect effects in the last year as a result of the Seddon/Wellington earthquake on 16 August 2013?"

For those reporting that they had suffered direct or indirect effects in the last year as a result of an earthquake, a set of specific response options was provided in relation to the effects of each earthquake: suffered significant direct personal effects; loss of life or injury within my family/whānau or networks; provided personal support to family/whānau and friends; experienced direct housing consequences; experienced direct business or employment consequences; experienced financial consequences through any of the above; affected by relocation of self, or family/whānau and/or friends; experienced physical or emotional distress; and other effects. These response options were provided concerning the Christchurch earthquakes in 2012 and 2014 data collection, and for the Wellington/Seddon earthquakes in 2014. Each item was scored on a five point Likert scale with anchors at 1, not true for me at all, and 5, definitely true for me.

A weighting variable for analyses was calculated based on the initial design weights, adjusting for the oversampling of Māori descent, and adjusted further to account for attrition. Weighting groups were formed based on Māori descent, gender, age, and NZ deprivation indices associated with area of residence when first sampled. These weights were adjusted for attrition at each successive sampling wave using a fair shares method: Responding participants with the same characteristics as non-responding participants are weighted up to compensate for non-responders. Where it is known that the participant is deceased or too unwell to continue in the study, their corresponding weights were not re-distributed among responding participants in the same weighting group.

Results

Sample

Demographic, economic and health information for respondents in 2012 and 2014 are presented in table 1. A decrease in proportion of persons working between 2012 and 2014 may be expected as the cohort ages. Overall, the population health and social indices were within normal ranges. The exposure to the Seddon earthquakes of 2013 was included in later models as a covariate to control for impacts on health conditions which may be attributable to this event. In 2014, 13 percent of the sample reported residing in Seddon and Wellington areas, directly affected by this event, and 5.4 percent of the sample reported experiencing impacts of this event in the past year.

Table 2 shows the distribution of respondents according to their location of residence in 2012 and 2014. These effects were highest for Christchurch residents, then reducing over both both time and distance across the country as a whole.

The participants in 2012 (29%) and 2014 (25%) who reported experiencing effects of the Canterbury region earthquakes went on to answer more detailed questions about what impact the earthquakes had on aspects

Table 1. *Participant Demographic and Health Status over the Post-Event Period (Unweighted Results)*

	2012	2014
Demographic Groups		
Age	66.3 (SD 7.8)	67.4 (SD 6.1)
Female	54.8%	55.0%
Māori Descent	36.3%	34.5%
12+ Years of Education	25.6%	28.1%
Partnered/Married	72.7%	72.9%
Working	48.1%	25.2%
Own Home vs. Not	89.6%	88.9%
Health & Social Indices		
SF 12 Physical Health	49.4 (SD 10.9)	48.5 (SD 10.4)
SF 12 Mental Health	49.3 (SD 8.0)	49.6 (SD 7.7)
Emotional Loneliness	0.6 (SD 0.9)	0.6 (SD 0.7)
Social Loneliness	1.2 (SD 1.2)	1.2 (SD 1.2)
Social Support	not included	79.3 (SD 9.8)
Seddon/Wellington Earthquake		
Residing in Region in 2013	not included	13.0%
Impacted by Earthquake in Last Year	not included	5.4%

Table 2. *Canterbury Region Earthquake Effects by Area for 2012 and 2014.*

	Sample %	Area % reporting having suffered effects of Canterbury earthquake in the past year	
Area of residence in 2012		2012	2014
Christchurch	8.6	90.0	80.7
Wider Canterbury (excluding Christchurch)	6.7	64.2	49.1
Wider South Island (excluding Canterbury)	14.2	32.0	25.6
North Island	70.5	19.0	16.2
Total	100.0	29.4	25.1

of their lives. To assess how different impacts were described in 2012 and 2014, we combined the two levels of effect recorded as levels 4, true, and 5, definitely true for me, and considered whether the rate of reporting over this two year interval was increasing, decreasing or stable, as shown in table 3.

These results indicate that specific effects experienced in the past year differed over time. The proportion of persons reporting economic impacts, such as direct housing consequences, direct financial consequences, and affected by relocation increased over time while reporting of loss of life, provision of social support and other effects decreased. The proportion of impacted persons reporting business and employment impacts as well as distress were stable.

Table 3. *Increase, Decrease, and Stability of Types of Effects Reported between 2012 and 2014.*

	% Impacted		Change* in Impact
% True for me (4 or 5)	2012	2014	
Suffered significant direct personal effects	17.1	21.1	I
Loss of life or injury within my family or networks	11.8	8.0	D
Provided personal support to family and friends	55.8	46.9	D
Experienced direct housing consequences	20.1	28.4	I
Direct business or employment consequences	18.8	18.5	S
Experienced financial consequences through above	27.2	35.0	I
Affected by relocation of self, or family and/ or friends	23.5	27.4	I
Experienced physical or emotional distress	25.3	26.6	S
Other	56.8	37.4	D

* Change defined as a movement greater than +/- 3%; I = increase; D = decrease; S = stable rate of reporting.

To assess the impacts of these earthquake effects on health and wellbeing, multivariate multi-level models (MLM) were conducted to predict key outcomes: Economic Living Standards (ELSI), physical health, mental health, social integration and loneliness. Demographic indices and reported earthquake effects were included and interaction terms for reporting effects in the past 12 months were included for all factors. A bivariate effect of whether health and wellbeing varied before versus after the earthquake events in Christchurch was also included. There were no significant differences in living standards, physical and mental health, social loneliness or social support between those who reported effects and those who did not. Overall, emotional loneliness increased from 2012 to 2014 (β = -0.071, t = -2.468, p = .014). As shown in figure 1, there was also a significant difference in emotional loneliness between those exposed and not exposed to the earthquakes (β = -.121, t = -2.364 , p = .018), suggesting those exposed to the earthquakes were less lonely. There was also an interaction of exposure to earthquake effects on emotional loneliness before (2010) compared to after (2012 to 2014) the events. This may reflect the sharp drop in emotional loneliness in 2012 which returned to pre-earthquake levels in 2014.

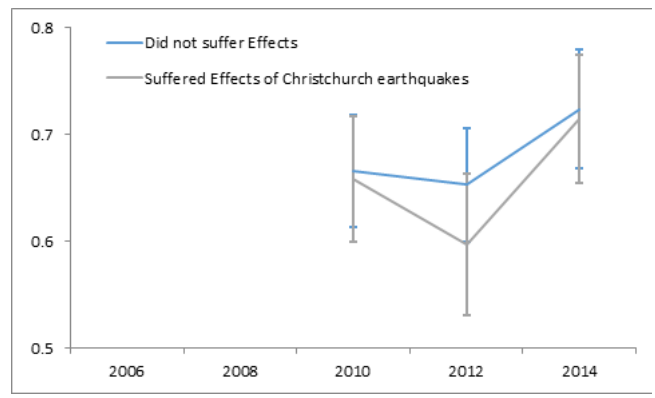

Figure 1. Emotional loneliness over time by earthquake exposure.

To identify groups who were most affected by the events, multi-level models assessing the association of demographic, earthquake exposure and time were used to predict reporting of earthquake related impacts in 2012 and 2014 HWR surveys. Overall, residing within the most impacted areas accounted for the greatest proportion of the model variance, with those living in and around Christchurch more likely than those living in the north island to report being impacted by the earthquake

in the past year. When controlling for geographic location, there were few subgroups that were more likely to report these impacts. Being affected by the Seddon earthquake (odds ratio = 11.735, β = 2.463, p=.002) and being divorced/separated compared to partnered (odds ratio = 1.117, β = .111, p = .028) were associated with increased likelihood of reporting impacts from the Canterbury earthquake in the previous year.

In summary, the proportion of 2014 survey participants reporting impacts from the Canterbury earthquakes had both reduced and changed in terms of types of effects reported, when compared to 2012 results. Participants in the 2014 survey still reported loss of life or injury, to family, friends or others, and providing social support, but these reports appeared to decrease over time. Emotional and economic impacts were more likely to be reported in the longer term context of 2014.

Discussion

This paper presents findings from the HWR study of self-reported impacts of the Canterbury earthquakes, their national distribution among older people, and their change over time in a national sample of older people. The relationships of these effects to earthquake exposure, and demographic differences, such as socioeconomic status, were taken into account. The analysis utilised measures repeated from data waves obtained in 2010, 2012, and 2014. The ability to locate participants geographically, and to describe their circumstances across a range of psychosocial domains of wellbeing, and social and economic circumstances, has enabled an assessment of the continuing ripple effects from the Canterbury earthquakes.

In 2014, three years following the initial event, 25 percent of the whole sample reported that they had still been affected by the Canterbury earthquakes in the last year. This amounted to 81 percent of those living in Christchurch, 50 percent of those living in Canterbury and 16 percent of those living in the North Island. These results indicate that ripple effects from such a major event have an ongoing impact including an impact on older New Zealanders living outside of the affected area. These reported effects of the Canterbury earthquakes generally decreased over time and with greater distance from the most affected areas. However, by 2014, a large proportion of Christchurch dwelling participants (81%) continued to report being affected by the earthquakes in the previous year. Three years post-quake is less than a third of the time predicted for community recovery (Stevenson et al., 2014). With this in mind, these effects can be expected to continue for some time. Importantly, some specific types of effects are more likely to diminish and some effects are reported by a higher percentage of respondents.

Being affected by providing support to family and friends decreased across time, however, after four years from the initial event, a third of the affected national participants continued to provide such support, demonstrating an enduring and indirect effect. There was an increase in reports of personal impacts including distress and problems related to housing and financial areas over time. These findings show the need for on-going attention to these important aspects of older people's lives. The reports of an increase in those who reported that they "experienced direct housing consequences" and were "affected by relocation" is consistent with other findings (CERA, 2014) illustrating secondary impacts from the lengthy time period for resolution of residential housing claims, and continuing disturbances from housing movement within the city throughout 2013 and 2014. The pressure on temporary and alternative accommodation while repairs are conducted has been focused in the city. However, wider-ranging disturbances are a reminder that older people outside Christchurch have also been affected by these issues (CERA, 2014).

The proportion of those reporting business or employment consequences remained stable and this may reflect the economic impact of the rebuild in Christchurch city. The proportion of the sample reporting financial consequences rose to over a third of the sample over the two year period. From the comments made in the 2012 survey, the rising cost of house insurance is likely to be a primary factor. This factor has affected all New Zealand home-owners, due to the changes to sum insured policies introduced in 2013 by all the major insurance companies.

These results point to the need for ongoing consideration of personal and emotional distress experienced by older people. In particular, issues arising from housing problems need to become an important focus of support. Alongside this need, we can consider a benefit observed in the short term for diminished emotional loneliness among those impacted upon by the earthquake. This appears to reflect the considerable increase in the provision of social support that occurred in the immediate aftermath of the earthquake events.

Older adults have been identified as a vulnerable population and are more likely to experience greater risks in a disaster due to these vulnerabilities (Bolin & Klenow, 1988; Cutter et al., 2003; Perry & Lindell, 1997; WHO, 2008). The current research data did not include longitudinal impacts from the earthquake on key outcome measures of health and quality of life. It could be that the worst affected Canterbury residents are not being reached by the HWR population survey and that more focused data collection is needed.

It is also possible that Christchurch residents were well supported and resilient to many impacts of the 2010 and 2011 earthquakes. The decrease in reports of loneliness directly following the earthquakes suggests that there were high levels of social support available at the time. There were no differential effects for different demographic groups when accounting for residence within the most affected areas. Previous research has found social factors such as class, gender, ethnicity, socio-economic status, and age can contribute to potentials for adverse, individual and group, outcomes in a disaster (Bankoff, Frerks & Hilhorst, 2004; Bolin & Klenow, 1988; Enarson, Fothergill & Peek, 2006).

In any case, as outlined above, the survey method may not have reached the most affected portions of the population and this must be considered in more detail. The current study provides an overview of the effects of the earthquakes in the New Zealand older population. Further work examining particular predictors and consequences within Christchurch and the Canterbury region may now be necessary to identify socio-demographic risk factors for health and welling impacts.

By focusing on resilience and the contribution of older people in New Zealand communities, the current study shows that regional disasters also have national impacts. In particular, the continuing connections of older people to family, friends and communities of interest across the country means that disaster preparedness and recovery will ideally incorporate all levels from local to regional to national, for maximum effectiveness. For older people in particular, it is important to note how social ties appear to surround the provision of support, in the ways that they manage continuing relocation effects, decisions about housing and maintain overall wellbeing.

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Thriving After Trauma: Posttraumatic Growth Following the Canterbury Earthquake Sequence

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Abstract

Existing theoretical models of posttraumatic growth hold that distress and struggle are necessary, to produce the challenges to world views believed essential for psychological growth. Such models do not incorporate the construct of psychological resilience, and existing research has not examined posttraumatic growth among resilient individuals. The current study explores the association of resilience and posttraumatic growth in a group of individuals coping well after moderate-to-high exposure to earthquake-related events in Canterbury, New Zealand, following an extended earthquake sequence, including four earthquakes of magnitude greater than 6.0 Mw that caused 185 deaths, thousands of injuries, and substantial damage to residential and commercial buildings and infrastructure. Posttraumatic growth, severity of trauma exposure, distress in response to earthquake-related events, and stressful life events were assessed in 101 Canterbury residents, aged 18 to 72 years of both genders, who were coping well after moderate-to-high exposure to earthquake-related events. Higher levels of posttraumatic growth were associated with higher levels of ongoing earthquake-related distress, and greater difficulty with life events over the previous five years. Women reported greater posttraumatic growth than men, particularly in the posttraumatic growth domains of appreciation of life, personal strength, and relating to others. Women reported higher levels of distress related to their earthquake experiences and more difficulty with stressful life events than men. Both distress and difficulty with life events appeared to mediate the association between gender and posttraumatic growth. Results indicate that higher levels of resilience were not associated with posttraumatic growth, and posttraumatic growth may therefore not be an aspect of resilience. Such findings are important for extricating the constructs of resilience and posttraumatic growth after trauma, and understanding that posttraumatic growth can exist in resilient individuals. This is because resilience does not appear to prevent an individual from processing an event to find positive significance in a traumatic event and to develop posttraumatic growth.

Keywords: *posttraumatic growth, resilience, gender, earthquake*

Good can come from bad. The concept of struggle producing strength is millennia old. Confucius is reputed to have said, “The gem cannot be polished without friction, nor man perfected without trials” (cited in Ji, 2008, p. 614). In the last three decades social science has broadened its focus from the negative aftermath of trauma to explore positive changes that individuals report as a result of their experiences with adversity (Joseph & Linley, 2005; Park, Cohen, & Murch, 1996; Tedeschi & Calhoun, 1996). Such positive change has been termed posttraumatic growth (Tedeschi & Calhoun, 1996).

Models of posttraumatic growth posit that a traumatic experience produces a distress response and challenges prior assumptive worldviews, thereby triggering coping strategies such as rumination, seeking social support, and taking action (Calhoun, Cann, & Tedeschi, 2010; Janoff-Bulman, 2004). An individual may then reflect on the experience, making sense of that experience

and finding positive outcomes as a result. It follows that trauma can lead to posttraumatic growth.

The psychological construct of resilience has been conceptualised in various ways, including a response to adversity in childhood (Masten & Tellegen, 2012), a character trait (Funder & Block, 1989), a function of biology (Kim-Cohen, Moffitt, Caspi, & Taylor, 2004), a process of positive coping after trauma (Mancini & Bonanno, 2010), and an ability to cope with stress in the face of adversity (Connor, 2006). It has also been debated whether posttraumatic growth is related to these understandings of resilience, is separate from resilience (Westphal & Bonanno, 2007), or whether it reflects one facet of resilience, such as the absence of pathology after high-risk circumstances (Lepore & Revenson, 2006). The current paper defines resilience as the subjective experience of coping well after moderate to high exposure to earthquake-related events, such as physical injury or illness, death of a loved one, witnessing falling buildings, seeing bodies, property loss, income loss, problems with housing caused by earthquake related events, not having sought treatment for earthquake-related distress, and assessed to be without psychiatric diagnoses, including posttraumatic stress disorder, major depression, or other anxiety disorders.

Little research has examined the association between such characteristics of psychological resilience and posttraumatic growth, including the effect of resilience on the posttraumatic growth process. Theories of posttraumatic growth imply that those with higher resilience may have less cause to reflect, and are less therefore likely to exhibit posttraumatic growth (Westphal & Bonanno, 2007). A psychologically resilient individual may be less disrupted or distressed by a traumatic event than a less resilient individual. Existing research has included those with varying levels of distress after traumatic events and has typically not measured resilience. This means it is not known whether resilient individuals may have different correlates of posttraumatic growth compared to those with trauma-related psychopathology.

Existing research has shown that posttraumatic growth can co-exist with symptoms of posttraumatic stress disorder and negative affect, including anxiety. Higher levels of peritraumatic distress and more posttraumatic stress disorder symptoms have been found to relate to greater posttraumatic growth in varied populations (Cadell, Regehr, & Hemsworth, 2003; Wild & Paivio, 2004). In these contexts, *peritraumatic distress* has referred to distress experienced at the time of and immediately after the potentially traumatic events. Some studies have found a curvilinear association between posttraumatic stress disorder symptoms and posttraumatic growth, with posttraumatic growth correlating positively with posttraumatic stress disorder symptoms up to a certain level of symptom severity, after which posttraumatic growth declines (Kunst, 2010). It has therefore been concluded that distress may produce posttraumatic growth until the level of distress becomes less manageable, after which stage an individual is less likely to exhibit posttraumatic growth.

Women have often been found to have higher levels of posttraumatic growth than men (Jin, Xu, & Liu, 2014; Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010) although it is unclear exactly why this may be. Women are more likely to engage in some coping strategies than men (Tamres, Janicki, & Helgeson, 2002), specifically using positive self-talk, seeking emotional social support (Vingerhoets & Vanheck, 1990), and religious coping (Prati & Pietrantoni, 2009), all of which are associated with posttraumatic growth (Helgeson, Reynolds, & Tomich, 2006) and which may provide a framework for understanding trauma and the world surrounding it. Some posit that women may show more growth because they ruminate more than men, both deliberately, in the form of reflection, and negatively, in the form of brooding (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Higher levels of rumination, which has largely been conceptualised neutrally in posttraumatic growth research and is therefore similar to reflection, appear associated with greater posttraumatic growth (Calhoun et al., 2000; Cann et al., 2011; Taku et al., 2008). Posttraumatic growth has also been found to relate to personality traits such as extraversion, optimism, openness to experience, conscientiousness, and religiosity (Linley & Joseph, 2004). Women report more distress in response to traumatic events (Fergusson, Boden, Horwood, & Mulder, 2014) while some associations may exist among gender, aspects of distress, and posttraumatic growth.

The current research examined postraumatic growth among resilient individuals exposed to a major disaster in the Canterbury region of New Zealand. Four major (Mw > 6.0), and thousands of more minor, earthquakes occurred in this region over the years 2010-2011. They resulted in 185 deaths, thousands of injuries, major property and infrastructure damage throughout the city,

and loss of the majority of the central business district. Considering the severity of related trauma, associations among posttraumatic growth and resilience, severity of trauma exposure, peritraumatic distress, ongoing earthquake-related distress, stressful life events, gender, and age were explored among an identifiably resilient sample of individuals exposed to the 2010-2011 Canterbury earthquake sequence.

The following hypotheses were proposed: 1. That posttraumatic growth will show a negative association with resilience, such that higher resilience will relate to lower levels of posttraumatic growth; 2. That moderate levels of distress will be associated with more posttraumatic growth than low or high levels of distress; 3. That objective severity of threat exposure will relate positively to posttraumatic growth; 4. That women will score more highly than men on the Posttraumatic Growth Inventory, particularly on the subscales of relating to others, new possibilities, personal strength, and spiritual change; 5. That women will score more highly than men on measures of distress, specifically reporting higher levels of peritraumatic distress, distress associated with exposure to earthquake events and difficulty with life events; and 6. That gender and age will interact, such that age will not influence posttraumatic growth in men, but older women will show higher levels of posttraumatic growth.

Given the previously mixed findings concerning associations between prior life stressors and posttraumatic growth, a further exploratory question was included: Whether the number of life stressors in the 5 years and 6 months prior to assessment will relate to levels of posttraumatic growth.

Method

Participants

Participants were Canterbury residents, who were resilient in spite of moderate to high exposure to earthquake-related events such as physical injury or illness, death of a loved one, witnessing falling buildings, seeing bodies, property loss, income loss, or problems with housing caused by earthquake related events. Resilience was defined as: the subjective experience of coping well, not having sought treatment for earthquake-related distress, and assessed to be without psychiatric diagnoses, including posttraumatic stress disorder, major depression, or other anxiety disorders. Participants were recruited in response to articles, opinion pieces and community notices in local newspapers, and via word of mouth.

Procedure

Potential participants were screened by telephone to determine that they had moderate to high exposure to earthquake-related events, and were coping well. Screened participants then attended the Clinical Research Unit of the University of Otago, Christchurch, where it was confirmed that inclusion criteria were met and, once the project was explained, written consent was obtained. Assessments were conducted by assessors trained in all aspects of the research protocol. Each participant completed the full assessment protocol with one assessor, usually on a single occasion, with the structured diagnostic interview followed by the self-report questionnaires. Recruitment occurred over the course of 13 months, from January 2013 to February 2014, which was two to three years after the September 2010 and February 2011 earthquakes.

Posttraumatic growth. The Posttraumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996) is a 21-item self-report scale that measures aspects of positive psychological consequences after potentially traumatic or stressful experiences, including motor vehicle accidents, assault, terrorism, and disasters including earthquakes. Responses are on a 0-5 Likert-type scale with scores ranging from 0-105 for the total scale. Domains of growth and subscale ranges include: relating to others (0-35), new possibilities (0-25), personal strength (0-20), spiritual change (0-10), and appreciation of life (0-15).

Resilience. The Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003) assesses characteristics of resilient individuals such as commitment, viewing change as a challenge, strong self-confidence, adaptability to change, stress having a strengthening effect, social problem-solving skills, sense of humour in the face of adversity, patience, ability to withstand stress or pain, responding to tasks using action, having a realistic sense of control and recognising the limits to one's control, and developing goals to meet difficulties (Kobasa, 1979; Lyons, 1991; Rutter, 1985). Respondents rate the 25 items on a five-point Likert-type scale, with total scores ranging from 25 to 95, higher scores indicating greater resilience.

Severity of trauma exposure. The Traumatic Exposure Severity Scale (TESS) (Elal & Slade, 2005) is a 24-item self-report scale measuring potentially traumatic events

and distress in response to earthquakes. It has two parts, the first measuring the occurrence of a range of potentially traumatic events or experiences, yielding an occurrence score from 0 to 24. Types of trauma assessed fall under five subscales: Resource loss/ being in need, damage to home and goods, personal harm, concern for significant others, and exposure to the grotesque. The second part measures distress associated with these experiences on a five-point Likert-type scale, with 1 signifying no distress at all, and 5 signifying extreme distress, producing a distress score from 0 to 120.

Level of peritraumatic distress. The Peritraumatic Distress Inventory (PDI) (Brunet et al., 2001) is a 13-item questionnaire that uses a 5-point Likert-type scale to assess the level of distress during and immediately after a potentially traumatic event. Focusing particularly on the experience of distress in response to an event, items tap two factors, negative feelings, and perceived life threat and bodily arousal. In the current study the total scale score is the mean of all items, with the score range from 0 to 5. A score of 1.77 or more predicts likelihood of developing post-traumatic stress disorder (PTSD) (Guardia et al., 2013).

Stressful life events. The Crisis in Family Systems Scale (CRISYS) (Shalowitz, Berry, Rasinski, & Dannhausen-Brun, 1998) is a 63-item self-report scale, modified for the current study with three additional items, that measures the number of life events experienced in the six months prior to assessment and the difficulty perceived from experiencing each of these events. All items are rated on a 5-point Likert-type scale. For the purposes of the current study, participants were also asked whether they had experienced these stressful life events in the previous five years. Stressful event response options included: financial events, legal events, career events, relationship events, medical events pertaining to self, medical events pertaining to others, safety in the community, safety at home, home issues, difficulty with authority, and prejudice. Scores for occurrence of current life events and for the past five years can range from 0 to 63. Difficulty scores were given for each life event, ranging from 1 to 5 where 1 represents no difficulty at all and 5 represents extreme difficulty. The mean difficulty score was calculated by dividing the sum of the ratings by the number of stressors reported.

Psychiatric comorbidity. Participants were assessed for the presence of psychiatric disorders using the Mini International Neuropsychiatric Interview (MINI) (Sheehan et al., 1998). This interview yields diagnoses for PTSD, other anxiety disorders, mood and other disorders corresponding to DSM diagnoses.

Data analyses

Pearson's correlation coefficients tested the association of posttraumatic growth scores and measures of resilience, distress, and the number of potentially traumatic events experienced during the earthquakes. Student's t-tests compared the scores of males and females for normally distributed subscales of the PTGI, measures of distress, and severity of earthquake exposure, and Mann-Whitney tests were applied to non-normally distributed subscales. General linear models were constructed to test for an interaction between age and gender to ascertain whether age affected posttraumatic growth for males and females, respectively.

Hierarchical regression analysis tested for linear and curvilinear associations between posttraumatic growth and distress during and since the earthquakes, and due to stressful life events in the previous five years. To test for the possibility of a curvilinear association between each distress measure and posttraumatic growth, a hierarchical regression was conducted with posttraumatic growth as the dependent variable. A new predictor variable was generated to test for a curvilinear association by mean-centring and squaring distress scores (Cohen, Cohen, West, & Aiken, 2013). The original distress score was entered in step one of the hierarchical regression, and the squared distress score was entered in step two. The linear regression and curvilinear regression were compared to ascertain goodness of fit for each regression model. Hierarchical regression was also used, to examine the mediating effect of gender on the association between earthquake-related distress and posttraumatic growth.

Power analysis: The final sample of 101 provided sufficient power (80%): to detect statistically significant ($p < .05$) correlation coefficients greater than 0.27. Sufficient power was also predicted for a 2:1 gender ratio, to detect statistically significant ($p < .05$), moderate effect sizes (> 0.6) between genders. All power analyses assumed a two-tailed test for statistical significance.

Results

The sample comprised 101 residents, 34 males and 67 females, of Canterbury, New Zealand, aged 18 to 72 years, with an average age of 50.1 years (SD = 11.02 years). Seventy-nine participants were of New Zealand European descent, with one participant of Māori descent, one of Cook Island Māori descent, one Indian, and others from German, Chinese, Irish, Celtic, and other European descent. Median education level was a university degree (bachelor's degree or diploma).

Posttraumatic growth, resilience, distress, and events

Means and standard deviations for scores on PTGI, CD-RISC, TESS, PDI and CRISYS scales are reported in table 1. PTGI scores were normally distributed, with a mean score of 37.44 (*SD* = 22.58), ranging from 0 to 93, of a maximum possible score of 105. Mean subscale scores were converted to percentages in order to compare a percentage of endorsement for each subscale. These calculations produced average endorsements of 43 percent for personal strength, 42 percent for appreciation of life, 37 percent for relating to others, 31 percent for new possibilities, and 16 percent for spiritual change. Resilience scores from the CD-RISC were also normally distributed, with a mean score of 75.92 (*SD* = 12.01) of a possible 100. The mean resilience score for the current study is comparable to means from USA-based research (*M* = 75.7, *SD* = 13.0, to *M* = 83.0, *SD* = 13.4) and from Australia-based research (*M* = 71.3, *SD* = 10.8, to *M* = 73.4, *SD* = 13.6) (Connor & Davidson, 2015).

Table 1. *Means and Standard Deviations for Posttraumatic Growth, Resilience, Distress, and Stressful Life Events Measures*

Scale or subscale	Scale Range	Mean	SD
Posttraumatic Growth Inventory total score	0-105	37.44	22.58
Subscales			
Relating to Others	0-35	12.99	8.40
New Possibilities	0-25	7.75	6.08
Personal Strength	0-20	8.65	5.21
Spiritual Change	0-10	1.60	2.56
Appreciation of Life	0-15	6.34	3.78
Connor Davidson Resilience Scale	25-95	75.92	12.05
Traumatic Exposure Severity Scale			
Subscales			
Occurrence (number of stressful elements of earthquake experiences)	0-24	5.15	2.56
Distress (distress related to stressful elements of earthquake experiences)	0-120	15.42	10.80
Peritraumatic Distress Inventory total score	0-5	1.03	.63
Crisis in Family Systems Scale			
Subscales			
Life events in last 5 years	0-63	8.47	4.90
Life events in last 6 months	0-63	3.56	2.81
Difficulty with life events in last 5 years	1-5	2.05	.69

Scores on the CD-RISC resilience scale and the PTGI posttraumatic growth inventory were not significantly correlated ($r(99) = .10$, $p = .35$). A linear association was identified between the level of distress experienced during the earthquakes, as measured by the PDI, and posttraumatic growth, as measured by the PTGI. Greater distress predicted higher levels of reported posttraumatic growth. Peritraumatic distress explained 18% of the variance in post-traumatic growth ($R^2 = .18$, $F(1, 97) = 21.7$, $p < .001$; $\beta = .43$, $p < .001$). Curvilinear regression was not associated with a significant improvement in model fit compared to the linear model ($R^2 = .00$, $F(1, 91) = .02$, $p = .90$). This indicated that there was no significant reduction in posttraumatic growth, for participants experiencing higher levels of distress during the earthquakes. Instead as reported distress levels increased, so did reported levels of posttraumatic growth.

There was a significant positive correlation of medium magnitude between scores on the TESS distress subscale and scores on the PTGI inventory for posttraumatic growth ($r(100) = .44$, $p < .001$) with higher levels of posttraumatic growth associated with higher reported distress during and since the earthquakes. A linear association was found between difficulty with life events and posttraumatic growth, such that greater difficulty predicted higher levels of reported posttraumatic growth. Difficulty explained 20 percent of the variance in post-traumatic growth ($R^2 = .20$, $F(1, 98) = 24.91$, $p < .001$). Curvilinear regression showed no significant improvement in model fit from the linear model ($R^2 = .02$, $F(1, 97) = 2.68$, $p = .11$). This indicated that as difficulty with life events increased, so did posttraumatic growth.

A significant positive correlation of medium magnitude ($r = .33$, $p < .01$) was found between the number of earthquake-related traumatic events experienced and the level of posttraumatic growth. This indicated that a higher number of traumatic events experienced by

participants related to greater posttraumatic growth. No association was found between posttraumatic growth and stressful general life events.

Gender differences

Females had higher PTGI posttraumatic growth scores than males ($t(98) = -2.18$, $p = .03$). Females had higher scores than males on the appreciation of life subscale ($t(99) = -2.00$, $p = .05$) and relating to others subscale ($t(98) = -2.16$, $p = .03$) and personal strength subscale ($t(99) = -2.45$, $p = .02$). A Mann-Whitney test found no significant difference between males and females for the Spiritual Change subscale ($U = -0.87$, $n_1 = 34$, $n_2 = 67$, $p = .39$). Age and gender were entered into a general linear model and an interaction between age and gender was tested to ascertain whether older women showed more posttraumatic growth than younger women. This also tested whether age was related to posttraumatic growth in men. However, no significant interaction was found between gender and age for posttraumatic growth ($R^2 = .07$, $F(1, 96) = .56$, $p = .46$).

A significant difference was found between men and women in the level of distress reported during the earthquake sequence on the PDI ($t(98) = -2.07$, $p = .04$), with males' mean score ($M = .85$, $SD = .60$) lower than that of females ($M = 1.12$, $SD = .64$). However the magnitude of the difference between means ($M = -.27$, 95% CI: -.53 to -.01) was small to moderate ($\eta_2 = -0.045$). No significant difference was found between genders on distress related to the severity of trauma exposure ($t(96) = -.73$, $p = .47$). Nor was there a significant difference between genders in the incidence of trauma exposure ($t(99) = -.09$, $p = .93$). This indicated that male and female participants reported comparable numbers of stressful events during and since the earthquakes, and reported comparable distress about traumatic earthquake-related events, but that women had higher distress at the time of the earthquakes.

No difference was found between men and women in the number of stressful life events reported over the last five years ($t(99) = .05$, $p = .96$), however women reported significantly more difficulty associated with stressful life events ($M = 2.17$, $SD = .67$) than men ($M = 1.84$, $SD = .70$) ($t(99) = -2.3$, $p < .05$). The magnitude of the difference between the means (95% CI [-.61 -.05]) was small to moderate ($\eta_2 = -0.05$).

Given the associations between gender and distress, distress and posttraumatic growth, and gender and posttraumatic growth, a mediation analysis (hierarchical regression) was conducted to examine the possibility that distress during the earthquakes mediated the association of gender and posttraumatic growth. Gender was entered at step one, explaining five percent of the variance in posttraumatic growth. After the distress variable was entered at step two, the total variance of posttraumatic growth explained by gender and distress was 20 percent ($R^2 = .20$, $F(2, 96) = 11.97$, $p < .001$). Distress explained an additional 16% of the variance in posttraumatic growth change ($R^2 = .16$, $F(1,96) = 18.55$, $p < .001$). The Sobel test examined the significance of the mediation effect, indicating that the mediation was almost statistically significant ($p = .052$). As illustrated in figure 1, the sum of these results suggest that the association of gender and posttraumatic growth may be mediated by peritraumatic distress.

A second hierarchical regression was conducted to ascertain whether the reported difficulty of life events in the last five years mediated the association between gender and posttraumatic growth. Gender was entered at Step one, explaining five percent of the variance in posttraumatic growth. After difficulty with life events was entered at step two, the total variance of posttraumatic growth explained by gender and life event difficulty was 22 percent ($R^2 = .22$, $F(2,97) = 13.5$, $p < .001$). Life event difficulty explained an additional 17 percent of the variance in posttraumatic growth change ($R^2 = .17$, $F(1,97) = 21.25$, $p < .001$). A Sobel test indicated that

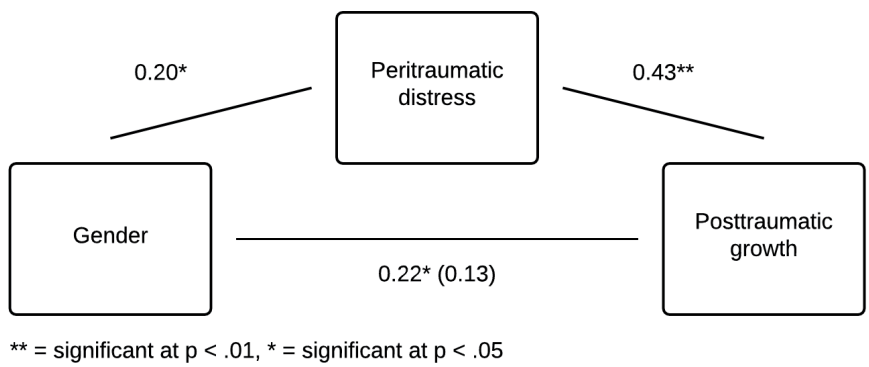

Figure 1. Mediating effect of peritraumatic distress on the association between gender and posttraumatic growth.

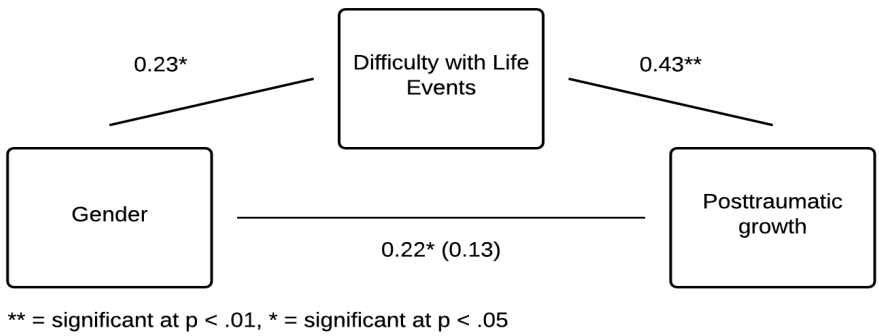

Figure 2. Mediating effect of difficulty with life events on the association between gender and posttraumatic growth.

the mediation was significant (p = .049). The association between gender and posttraumatic growth was mediated by reported difficulty with life events, as shown in figure 2.

Discussion

Results of the current study did not support hypothesis 1, that posttraumatic growth would be negatively associated with resilience, such that higher resilience would relate to lower levels of posttraumatic growth. In the current sample of individuals coping well, the level of resilience was not associated with levels of posttraumatic growth. Hypothesis 2 was not supported: Contrary to the hypothesis, moderate levels of distress were not associated with more posttraumatic growth than low or high levels of distress. In the current study, a linear association was found, with higher levels of distress related to higher levels of posttraumatic growth. Hypothesis 3 was supported: Objective severity of threat exposure was related positively to posttraumatic growth, with exposure to more earthquake-related traumatic events associated with greater posttraumatic growth. Hypothesis 4 was partially supported: Women scored more highly than men on the Posttraumatic Growth Inventory, and on the subscales of relating to others and personal strength. In addition women scored more highly on the subscale of appreciation of life. However, contrary to this hypothesis, women did not score significantly differently than men on the subscales of new possibilities and spiritual change. Results partially supported Hypothesis 5: Women reported higher levels of peritraumatic distress, and more difficulty with life events. However women reported levels of distress about traumatic earthquake-related events, such as damage to housing, loss of services, injury, concern about others and needing to relocate due to unsafe homes comparable to those reported by men. Hypothesis 6 was not supported: Gender and age did not interact; age did not influence levels of posttraumatic growth for women or men. The number of life stressors in the 5 years and 6 months prior to assessment did not relate to levels of posttraumatic growth.

Conclusion

Results from the current study indicate that variations in levels of resilience in a sample coping well after trauma are not associated with levels of posttraumatic growth. This finding is important for extricating the constructs of resilience and posttraumatic growth after trauma, and understanding that posttraumatic growth can occur for resilient individuals. Resilience does not appear to prevent an individual from processing and finding positive significance in a traumatic event and thereby developing posttraumatic growth. This resilient sample reported peritraumatic distress and difficulty with earthquake-related events, but did not exhibit psychopathology, indicating that these individuals experienced distress and managed it, contributing to the process of posttraumatic growth. It has been assumed that not experiencing distress prevents the erosion of assumptive worldviews, and the triggering of coping strategies, and thereby the reconstruction of revised worldviews and the posttraumatic growth that ensues (Calhoun et al., 2010; Janoff-Bulman, 2004). The current study's findings suggest that resilient individuals, in addition to coping with adversity and maintaining equilibrium, experience and manage distress that contributes to posttraumatic growth.

Among individuals coping well, higher levels of posttraumatic growth were associated with higher levels of peritraumatic distress, higher ongoing earthquake-related exposure, and greater difficulty with life events over the five years prior to assessment, which included events up to three years before the Canterbury earthquake sequence. The associations were linear in the current study, not curvilinear with growth declining above a certain level of posttraumatic stress, as previously reported by Kunst (2010). It is possible that

levels of peritraumatic distress were not sufficiently high for this curvilinear association to be demonstrated, or that the growth-distress association is linear in this population. Further, whereas the number of potentially traumatic earthquake-related events was related to levels of posttraumatic growth, with higher posttraumatic growth occurring for individuals with more earthquake related exposure, number of life events was not related to posttraumatic growth.

Further, Janoff-Bulman (2004) suggested that some domains of posttraumatic growth, such as viewing the self as stronger, can emerge when worldviews are challenged without the distress or psychological dysfunction following trauma. This may partially account for a finding from the current study, that resilient individuals experienced posttraumatic growth. However, resilient participants in the current study showed growth in domains of posttraumatic growth other than personal strength, such as relationships with others, seeing new possibilities, and greater appreciation of life.

These findings may indicate that worldviews were challenged for resilient individuals in the current study, and that this triggered a rebuilding of perspectives to bring about posttraumatic growth. Alternatively, they may indicate that posttraumatic growth can happen without worldviews being challenged. Future research is needed with resilient populations to explore the extent that the challenge to worldviews contributes to posttraumatic growth. Relatively high resilience scores observed in the current study nonetheless support the recruitment process for participants, which aimed to encompass the subjective experience of coping well in the post-earthquake period after moderate to high earthquake exposure.

Women reported higher levels of posttraumatic growth than men, particularly in appreciation of life, personal strength, and relating to others. Women experienced higher peritraumatic distress than men and more difficulty with stressful life events than men. It also appears that distress concerning earthquake-related events and difficulty with life events in general may have mediated the association between gender and posttraumatic growth. Fergusson et al. (2014) found the same positive linear association between recalled distress associated with the Christchurch earthquakes and positive changes after the earthquakes, using a different methodology and a sample representative of the general Christchurch population. Considered alongside Fergusson et al. (2014), the current study's findings suggest that the distress and difficulty of dealing with trauma-related or general life events may be an important influence on the development of posttraumatic growth. For resilient individuals in the current study, degree of resilience did not relate to posttraumatic growth, whereas degree of distress and difficulty did relate to posttraumatic growth. This is comparable to previous studies, by Cadell et al. (2003) and Wild and Paivio (2004), which found the severity of distress and posttraumatic symptoms was related to posttraumatic growth.

Limitations of the current study include its cross-sectional design, which does not allow the observation of causal associations across various stages of a longitudinal timeframe. Future research could use longitudinal designs to clarify associations among traumatic exposure, peritraumatic distress, life events, gender, and posttraumatic growth. The current participants were resilient by definition and this has not allowed a full exploration of the association between resilience and other constructs of interest. The current sample also had a higher level of educational attainment than the general population. This means that results may not generalise to the wider earthquake-affected population.

The current study also has a number of strengths. It appears to be the first study to provide a focused examination of posttraumatic growth in a group of individuals coping well after a major community-wide trauma. The current findings contribute to understanding growth in resilient individuals after earthquakes in Western populations. They are also likely to contribute to understanding responses to other trauma and in other populations. The current findings have also highlighted a potential for further research to explore the associations among gender, distress, and posttraumatic growth in more detail. Most importantly, associations between posttraumatic growth and different types of distress and difficulty, identified by the current research, lend support and add to pre-existing models of how emotional distress can lead to posttraumatic growth.

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