

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

Emergency Preparedness and Response in New Zealand Schools

A thesis presented in partial fulfilment of the requirements for the
degree of

Doctor of Philosophy
in
Emergency Management

at Massey University, Wellington,
New Zealand.

Karlene Susan Tipler

2017

Abstract

International disaster risk reduction efforts prioritise school safety. Providing a safe learning environment for students and ensuring their continued access to education after an emergency has a positive influence on student, family, and community resilience. Existing school-based emergency management literature is limited. The project aimed to investigate current emergency preparedness and response activities in New Zealand schools, and identify key practices that support efforts to keep students safe during emergencies. A multiphase mixed methods research design, underpinned by a pragmatic philosophical approach, was employed to conduct three separate but linked studies that investigated: Emergency preparedness in schools (Study 1); Emergency management requirements and expectations of schools (Study 2); and Emergency response in schools (Study 3).

Study 1 employed a survey to collect quantitative (n=355) and qualitative (n=514) data from schools throughout New Zealand about their experiences participating in the nationwide 2012 New Zealand ShakeOut earthquake drill, and the types of emergency preparedness activities undertaken. Findings identified lessons learned, and presented ways in which drills can be linked to other aspects of school preparedness. Schools were also found to undertake a range of preparedness activities (e.g., develop emergency plans, conduct frequent drills, and provide students with hazards education). However, differences in preparedness levels were identified, suggesting that some schools may be under-prepared to keep students safe in emergencies. A lack of clarity in the legislative requirements for school-based emergency management was proposed as a possible reason for differences in preparedness.

Study 2 combined interviews of three emergency management practitioners with a review of New Zealand legislation, policy, and guidelines to identify the preparedness activities New Zealand schools are required to undertake to ensure the safety of the students in their care. The legislation was found to be generic, at times ambiguous, and schools were not provided with clear guidance. As a result, it was recommended that preparedness benchmarks be established and that standard operating procedures for core emergency response actions (i.e., shelter-in-place, lockdown, building evacuation, relocation, and family reunification) be developed to provide a consistent approach to school-based preparedness efforts.

Studies 1 and 2 discussed emergency preparedness in New Zealand schools. However, there remained a need to investigate the link between preparing for and responding to emergencies by investigating how schools responded to real emergency events. Study 3 used three case studies to explore how three schools responded in a range of emergency events. Findings included the identification of generic, recurring response activities across a selection of emergency types, which were used to develop a six-stage school-based emergency response model. The lessons learned from participant's first hand experiences of various emergency events enabled the identification of factors that contribute to an effective emergency response, including activities undertaken before, during, and after an emergency.

Research exploring emergency management in New Zealand schools is still in its infancy. This project has contributed significant knowledge to understanding how New Zealand schools prepare for and respond to emergencies to keep their students safe. Findings from the research may also have relevance for an international audience.

Acknowledgements

In completing this thesis, I would like to thank all the schools who took part in the research. I appreciate that time is a precious commodity in schools, so thank you for your contributions.

I would like to thank my supervisors. First and foremost, Ruth Tarrant who has been a wonderful mentor, counsellor and confidante throughout this adventure. Also thanks to David Johnston and Keith Tuffin who have provided ongoing encouragement, support, and the odd coffee.

To my fellow PhD students, staff in the JCDR and School of Psychology, thank you for your unstinting kindness and assistance.

To my long suffering family, thank you for the laughter and tears that have helped me get to the end of what has been a very challenging journey.

Finally, to my most ardent supporter and biggest cheerleader, thanks Mum, I couldn't have done it without you.

This thesis is dedicated to Gerard Neilson (1947 – 2017)

A wonderful parent, inspiration, and friend.

Personal Statement

Before you begin reading this thesis, it seems appropriate to shed some light on what this research experience was like for me. In hindsight, my thesis topic was simply a natural progression of the path I was already following. I have always had an interest in earth sciences demonstrated by a BSc in Geography, and a MSc in Physical Geography. Therefore, an investigation of hazards and disasters made sense. Between my BSc and MSc, I trained as a secondary school teacher and spent a few years teaching geography. This experience as a teacher provided me with insights into how schools operate and what factors they need to consider to keep students safe when at school or on field trips. Therefore, schools provided a relevant and appropriate setting for my research. As a consequence of the 2010 Darfield and 2011 Christchurch earthquakes, I was able to assume a newly created role as an emergency management advisor within the Wellington City Council. A major component of this role was assisting schools in preparing for emergencies and disasters. As a result, I became familiar with the type of information and support that schools consistently requested, such as advice on developing emergency plans and conducting response drills. Therefore, an investigation of emergency preparedness and response in schools seemed fitting. As with all researchers, my background influenced my approach to the project by helping me identify what I wanted to achieve with the research, which was to create practical outputs for schools, government, researchers, and practitioners, to enhance emergency preparedness and response efforts in schools. However, knowing what I wanted to investigate was only the first step in a challenging but fulfilling adventure.

My natural instinct was to stand back and view the research process as something totally independent of myself. This has meant that I have avoided including a first person account of the research process within the thesis. Such an approach may suggest that perhaps I did not engage fully with the research process in a way that would allow me to develop as a researcher. However, this was not the case. Throughout the research literature, especially within the qualitative methodologies, there is discussion of how research is a reflexive process. Often this reflexivity takes the form of a research journal, or in my case a notebook, in which I recorded notes from discussions with my supervisors, lists of to do tasks, questions to follow up as I progressed through the project, ideas from workshops I attended, and feedback from presentations of my research findings. While my approach to reflexivity was not

undertaken as formally as some of the literature recommends, it still resulted in my research improving as I progressed, both in how I was conducting my studies and also in the outputs produced.

All data requires interpretation and this is especially so within qualitative research, as it reflects the values, biases, and judgements of the researcher. By recognising and acknowledging my own background, potential biases, those of my participants, and limitations of the research methods employed, the trustworthiness of the research and robustness of the research process is increased.

Now here I am at the end of this journey, about to share with you, the reader, the details and results of my adventure, and I ponder what I learnt about myself. Before this process I had always seen myself as a teacher, others did the research and I helped share it with people (whether children or adults). But I now see myself as both a researcher and a teacher. Furthermore, I have learnt that I have a perspective of my field of research that is both valid and valued. So if I had to do this all again (god forbid!) would I change anything? Yes, I would perhaps I would make different decisions about some aspects of the research like how many case study schools or whether I should have included more questions in my survey to get additional details about school preparedness activities. However, for the most part, I am pleased with the research I conducted, and proud of the difference that my research can make in keeping students safe in school-based emergencies both in New Zealand and internationally. And as a researcher, I can't ask for more than that.

Karlene

Table of Contents

Abstract	i
Acknowledgements	iii
Personal Statement	iv
Table of Contents	vi
List of Figures	xi
List of Tables	xii
List of Appendices	xii
Chapter 1. Introduction and Overview	1
1.1. Schools in Disasters and Emergencies	1
1.2. Definition of Key Terms	4
1.3. Thesis Structure	5
Chapter 2. School Preparedness and Response Literature Review	7
2.1. School Safety in Emergencies	7
2.1.1. School safety in New Zealand	10
2.2. Emergency Preparedness in Schools	12
2.2.1. Plans and procedures	13
2.2.2. Hazards education and response training	17
2.2.3. Evaluation of preparedness efforts	20
2.2.4. Stakeholder engagement	21
2.2.5. New Zealand school preparedness research	22
2.2.6. Overview of the emergency preparedness literature	24
2.3. Emergency Drills in Schools	25
2.4. Learning Lessons: Emergency Experience and Response in Schools	28
2.5. Limitations of Previous Research	31
2.6. Summary of Research Gaps and Future Directions	33

Chapter 3. Research Design	35
3.1. Project Aim and Research Questions	35
3.2. Theoretical Framework	36
3.2.1. The Strengthening Systems 4R Prevention model.....	37
3.2.2. Comprehensive School Safety framework	40
3.2.3. Theoretical Rationale.....	42
3.3. Mixed Methods Research	43
3.3.1. Pragmatism research philosophy.....	45
3.3.2. Project design.....	46
3.4. Method	50
3.4.1. Study 1: New Zealand ShakeOut school participation survey (Paper 1 and Paper 2).....	50
3.4.2. Study 2: Legislative requirements and practitioners expectations of emergency management in New Zealand schools (Paper 3)	59
3.4.3. Study 3: Emergency response experiences in schools (Paper 4).....	62
3.5. Integration of Mixed Methods Research.....	66
3.6. Link to Paper 1 (Chapter 4).....	67
Chapter 4. Paper 1: New Zealand ShakeOut exercise: Lessons learned by schools	68
Abstract.....	68
4.1. 2012 NZ ShakeOut Earthquake Drill	70
4.2. Method	71
4.2.1. Participants.....	71
4.2.2. Questionnaire	71
4.2.3. Procedure.....	72
4.2.4. Analysis.....	72
4.3. Results and Discussion.....	72
4.3.1. 'Drop, cover, hold' practice	73
4.3.2. Building evacuation.....	74
4.3.3. Participants in school drills.....	77

4.3.4.	Linking drills to education and preparedness	78
4.3.5.	ShakeOut resources	78
4.3.6.	Evaluating the ShakeOut exercise	79
4.3.7.	The influence of emergency experience and preparedness research	80
4.4.	Conclusions	82
4.5.	Recommendations.....	82
4.6.	Future Research	84
	References.....	84
4.7.	Link to Paper 2 (Chapter 5).....	88

Chapter 5. Paper 2: Are you ready? Emergency preparedness in New Zealand schools.....89

5.1.	Introduction.....	89
5.1.1.	Emergency management in New Zealand schools	92
5.1.2.	Research questions	93
5.2.	Method.....	94
5.2.1.	Background to the present study	94
5.2.2.	Participants.....	94
5.2.3.	Questionnaire – New Zealand Shakeout school participation survey	95
5.2.4.	Procedure	95
5.2.5.	Analysis	95
5.3.	Results.....	96
5.3.1.	Types of emergencies experienced in schools.....	96
5.3.2.	Emergency preparedness activities undertaken in schools	97
5.3.3.	Methods used to evaluate school emergency preparedness.....	101
5.3.4.	Stakeholder engagement to assist school emergency preparedness...	102
5.4.	Discussion	104
5.4.1.	Types of emergencies experienced in schools.....	104
5.4.2.	Emergency preparedness activities undertaken in schools	105
5.4.3.	Methods used to evaluate school emergency preparedness.....	108

5.4.4. Stakeholder engagement to assist school emergency preparedness...	110
5.5. Conclusions.....	111
References.....	112
5.6. Link to Chapter 6 (Paper 3).....	120
Chapter 6. Paper 3: Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools	122
Abstract.....	122
6.1. Introduction.....	123
6.2. Method	124
6.3. Findings and Discussion.....	125
6.3.1. Legislation directing emergency management efforts in schools.....	125
6.3.2. School legislative responsibilities.....	127
6.3.3. Monitoring and compliance of school-based emergency management	134
6.4. Conclusions.....	134
References.....	135
6.5. Link to Chapter 7 (Paper 4).....	140
Chapter 7. Paper 4: Learning lessons from experience: Emergency response in schools	142
7.1. Introduction.....	142
7.1.1. Defining ‘Response’.....	143
7.1.2. Learning lessons from response experiences	144
7.2. Method: Case Studies	145
7.2.1. Settings, participants, and emergency types.....	146
7.2.2. Interviews	147
7.2.3. Analysis.....	147
7.3. Findings and Discussion	148
7.3.1. Stages of an emergency response	148
7.3.2. Factors contributing to an effective response.....	154

7.4. Conclusions	165
7.4.1. Limitations and future research.....	165
References.....	166
Chapter 8. Conclusions.....	172
8.1. Summary of the Research Undertaken	172
8.1.1. Emergency preparedness in schools (Study 1).....	172
8.1.2. Emergency management requirements and expectations of schools (Study 2).....	175
8.1.3. Emergency response in schools (Study 3).....	177
8.2. Preparedness and Response: A Cyclic Relationship and Recurring Themes....	178
8.2.1. Emergency planning and preparation	178
8.2.2. Emergency drills	179
8.2.3. Evaluation of preparedness and response efforts	179
8.2.4. Engaging with stakeholders	180
8.3. The Contribution of the Research Project to Our Understanding of Emergency Preparedness and Response in Schools	180
8.3.1. The field of school-based emergency management.....	180
8.3.2. The SS4R Prevention model.....	182
8.4. Recommendations.....	183
8.4.1. Recommendations for New Zealand schools	183
8.4.2. Recommendations for Practitioners and Researchers	184
8.5. Limitations and Opportunities for Future Research	185
References	187
Appendices	203

List of Figures

Figure 3.1 Conceptual diagram of the Strengthening Systems 4R Prevention model, developed from Ronan and Johnston (2005). Shaded areas represent those concepts deemed to have a direct, or potential, relationship to school-based emergency management.	39
Figure 3.2 Comprehensive School Safety framework. Source: GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector), 2017.	41
Figure 3.3 Multiphase mixed methods research strategy. Adapted from Creswell (2009), <i>Research design: Qualitative, quantitative, and mixed methods approaches</i> . Notations included in the figure have been developed within the field of mixed methods research: ‘Quan’ and ‘Qual’ stand for qualitative and quantitative, respectively; capitalisation indicates the weighting or priority given to the type of data to be collected; the black arrows represent the sequence in which data will be collected; and the vertical grey lines link each phase of the project with its related data collection and analysis methods.....	49
Figure 3.4 School types of participants in Study 1 (Part 1 and Part 2).	56
Figure 3.5 School decile ratings of participants in Study 1 (Part 1 and Part 2).	57
Figure 3.6 Geographic location of schools in Study 1 (Part 1 and Part 2).	58
Figure 5.1 Types of emergencies experienced in all schools, and in individual schools by type (2010-2012).	97
Figure 5.2 Emergency drill types practised annually in schools.	101
Figure 5.3 Methods for evaluating school preparedness.	102
Figure 6.1 Students and staff receive hazards education and emergency response training so they understand what to do in an emergency. Image: David Johnston.	132
Figure 6.2 School children practice the ‘turtle’ as an alternative safety behaviour for when they cannot ‘drop, cover, [hold]’. Image: David Johnston.	133
Figure 7.1 Six-stage model of a school-based emergency response.	149
Figure 7.2 An overview of factors that contribute to an effective school emergency response.	155
Figure 8.1 Overview of the relationship between the three studies and the research papers.	173

List of Tables

Table 2.1	New Zealand’s progress implementing Hyogo Framework for Action education sector priorities	11
Table 3.1	Survey questions, topics and analysis overview.....	53
Table 3.2	Overview of case study schools, participants, and emergency types investigated	64
Table 5.1	Emergency preparedness activities undertaken in total and by school type	98
Table 5.2	Types of stakeholder engagement in school emergency preparedness .	103
Table 6.1	Emergency management legislation and requirements of schools	125
Table 7.1	Overview of Case Study Schools, Participants, and Emergency Types Examined.....	147

List of Appendices

Appendix 1:	Study 1 – Emergency Preparedness in Schools	204
Appendix 2:	Study 2 – Emergency management requirements and expectations of schools	214
Appendix 3:	Study 3 – Emergency response in schools	226
Appendix 4:	Statement of Contribution sheets for submitted journal papers	260
Appendix 5:	Additional relevant reports	265

Chapter 1. Introduction and Overview

This chapter introduces the project, defines the key terms used in the project, and ends with an overview of the thesis structure.

1.1. Schools in Disasters and Emergencies

Children are a vulnerable group within society, often reliant on adults for their safety, and are identified as being disproportionately affected in disasters and emergencies (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES), 2015). However, children can also be resilient when empowered to engage in preparedness and response activities before and during disasters (Peek, 2008). Furthermore, children can be supported and coached at home and school to aid in their own psychological and emotional recovery efforts (Mooney, Tarrant, Paton, Johal & Johnston, 2017).

In addition to the physical, psychological, and economic impacts of disasters on children, their access to education is also often disrupted. In 2012, 1.26 billion children and youth were enrolled in primary and secondary school education (United Nations Educational, Scientific and Cultural Organization, n.d.). Every child attending school has the right to education continuity, in a safe learning environment, in which they are protected as much as possible from the impacts of hazards (GADRRRES, 2017). However, children are frequently affected by hazards, particularly earthquakes, while at school. Recent examples include:

- Hurricane Katrina, US (2005) – 700 school buildings closed due to damage from flooding, with the cost of educating displaced students exceeding US\$2.8 billion in the first year (GADRRRES, 2015);
- Sichuan earthquake, China (2008) – 10,000 students were crushed to death in classrooms, and 14,000 schools damaged across 159 counties within the Sichuan province (Ng & Sim, 2012);
- Chilean earthquake and tsunami (2010) – over 3,000 schools destroyed or damaged, affecting 1.25 million students (GADRRRES, 2015);
- The Tōhoku earthquake and tsunami, Japan (2011) – 659 students and teachers were killed, 262 were injured, nearly 200 school buildings destroyed

and more than 700 significantly damaged (Shiwaku, Ueda, Oikawa, & Shaw, 2016);

- Gorkha earthquake, Nepal (2015) – over 10,000 classrooms destroyed, in some districts 90% of schools damaged (GADRRRES, 2015).

New Zealand children have also been impacted by hazards while at school, most recently in the 2010-2012 Canterbury earthquakes. At 4.35am on Saturday September 4th 2010, a moment magnitude (M_w) 7.1 earthquake occurred near Darfield, a small South Island town 40km west of Christchurch, causing widespread damage and disruption to infrastructure across the region (Potter, Becker, Johnston & Rossiter, 2015). The earthquake triggered a series of aftershocks, the most damaging of which was the Christchurch earthquake. On Tuesday February 22nd 2011, a M_w 6.3 aftershock struck under the city of Christchurch at 12.51pm. As this earthquake had occurred during lunchtime, many people were in the central business district where damage to buildings and infrastructure was extensive. As a consequence, 185 people lost their lives and several thousand more required treatment for a range of injuries (Potter et al., 2015).

At the time the February 2011 earthquake occurred, “150,000 students and 10,000 staff were engaged in education” (e.g., early childhood education centres, schools, universities, private training establishments) in the region (Education Review Office, 2013, p. 3). At school, many children were out in the playground during the lunch hour. To ensure the ongoing safety of students, and due to severe damage to buildings in some instances, all schools in Canterbury closed immediately. In the weeks following the February earthquake, the Ministry of Education provided support to more than 180 schools across the Canterbury region that had suffered damage, ranging from minor through to extensive damage requiring substantial rebuilding. The Ministry assisted schools by: assessing the safety of school sites and arranging repairs where possible; securing unsafe buildings; arranging re-locatable classrooms; providing water, sewerage and toilet facilities; relocating students; and helping staff and students cope with the psychological impacts of the ongoing aftershocks (Education Review Office, 2013; Ministry of Education, 2011b). Thousands of students were displaced by the Christchurch earthquake, and by August 2011, “11,800 students had enrolled in a different school from [the one they were at] in February 2011, 6,700 students had returned to their original school, and 4,700 students were still at a different school” (Education Review Office, 2013, p. 3).

Historically, preparing for emergencies has had a relatively low profile in New Zealand schools, with much of the focus on fire drills. Due in part to the response required following the Canterbury earthquakes, emergency management, in particular preparedness, has experienced a renaissance in schools. The earthquakes have brought a new reality to many New Zealanders regarding the threat large-scale emergencies pose, and reinforced the importance of schools being adequately prepared to keep their students safe in a range of emergency situations.

Because of their direct link to children and their families, schools are focal points and can support communities before, during and after disasters and emergencies. Schools can assist community preparedness efforts, and provide emergency shelters and support-centres after emergency events (e.g., Anderson, 2005; GADRRRES, 2015; Ronan & Johnston, 2005). For example, schools can provide a safe, familiar place for children while their parents are needed to organise recovery efforts for their family, including returning to work. Returning to school also helps children re-establish their own routines (Cahill, Beadle, Mitch, Coffey & Crofts, 2010), which can assist in moderating the disruption to their lives caused by the disaster or emergency (Masten & Osofsky, 2010), and contribute to restoring the health and emotional wellbeing of children and their families (Fothergill & Peek, 2006).

Where access to education is disrupted after a disaster or emergency, this can have a detrimental effect on children. For example, children's academic performance and long-term educational outcomes can be adversely affected through extended absences, or may result in students dropping out of school (International Finance Corporation, 2010), especially where there are pre-existing or additional challenges such as family instability and displacement (Peek, 2008). Adolescents may be more likely to have their education disrupted after an emergency than younger children, due to family (e.g., needing to mind younger siblings) or economic responsibilities (Cahill et al., 2010).

In acknowledgment of the vulnerability of children and the important role schools can play in supporting communities prepare for, respond to, and recover from disasters and emergencies, global disaster risk reduction efforts have prioritised school safety as a means to reduce deaths and injuries due to the impacts of hazards on children attending school (GADRRRES, 2017). To that end, all schools are encouraged to undertake a range of emergency management activities, such as developing emergency plans and procedures, and conducting drills to enhance their response capabilities (e.g., International Finance Corporation, 2010; US Department of Education, 2013).

Presently very little research has explored emergency management efforts in New Zealand schools. International research is also limited, with much of the scholarly literature based in the USA, often at district and state level rather than in respect of individual schools, thus representing a gap in New Zealand and international research. To contribute to the understanding of emergency management in schools, this project aims to investigate current emergency preparedness and response activities in New Zealand schools, and identify key practices that support efforts to keep students safe during emergencies.

1.2. Definition of Key Terms

The following terms are used throughout the thesis and describe the ideas and concepts that underpin the research project. The terms are defined in a New Zealand context, as reflects the research location.

Emergency

In the context of this research, an emergency is “an unexpected occurrence or sudden situation that requires immediate action” (Porfiriev, 1995, p. 291). This term is used to cover large and small emergencies that may result from a range of hazard types.

Disaster

This project uses the following definition for disaster, “a serious disruption of the functioning of a community or a society that involves widespread human, material, economic or environmental losses and impacts, and which exceeds the ability of the affected community or society to cope using its own resources” (GADRRRES, 2015, p. III).

The 4Rs

The Comprehensive Emergency Management model identifies the four phases within the lifecycle of a disaster or emergency. In New Zealand, these four phases are collectively referred to as the 4Rs, and civil defence and emergency management (CDEM) agencies use the following definitions (Department of the Prime Minister and Cabinet, 2015, Appendix 2 page 2 of 12) for each phase:

- **Reduction** – involves identifying and analysing risks to life and property from hazards, taking steps to eliminate those risks if practicable, and, if not, reducing the magnitude of their impact and the likelihood of their occurrence to an acceptable level;

- **Readiness** – involves developing operational systems and capabilities before an emergency happens;
- **Response** – involves actions taken immediately before, during, or directly after an emergency to save lives and property, and to help communities recover; and
- **Recovery** – involves the coordinated efforts and processes used to bring about the immediate, medium-term, and long-term holistic regeneration and enhancement of a community following an emergency.

Preparedness

Preparedness is used in its broadest sense, encompassing risk reduction and readiness, and may include any activities or actions taken prior to an emergency to reduce the impacts and assist in response and recovery.

Response

When discussing emergency response in schools, response refers to the 'initial response' phase of an emergency, in particular the time from when an emergency alert or alarm is given, through to the time when it is safe for students to return to class or students are reunited with their families.

Students

The term student is used to describe any children, adolescents and youth attending school.

1.3. Thesis Structure

This thesis consists of conventional chapters (1, 2, 3, & 8) and four research papers (Chapters 4, 5, 6, 7), two of which have been published (Papers 1 & 3) and two that are under review (Papers 2 & 4). The papers are formatted in the style of the thesis (e.g., quotations are indented), to allow consistency for the reader. As the papers need to be self-contained, there is some necessary repetition throughout the thesis (e.g. description of research methods).

Chapter 1 introduces the research and describes key terms.

Chapter 2 reviews the existing school preparedness and response literature both internationally and in New Zealand, and identifies gaps in previous research that will be addressed in the present project.

Chapter 3 presents the theoretical framework for the project, describes the mixed methods research design employed, and provides an overview of the data collection methods used in each of the three studies:

- Study 1: New Zealand ShakeOut school participation survey (Papers 1 & 2);
- Study 2: Legislative requirements and practitioners expectations of emergency management in New Zealand schools (Paper 3); and
- Study 3: Emergency response experiences in schools (Paper 4).

Chapters 4 – 7 discuss the findings of the three studies. Paper 1 (Tipler, Tarrant, Johnston & Tuffin, 2016) describes the lessons learned from schools' experiences of participating in the 2012 New Zealand ShakeOut earthquake drill. Paper 2 (Tipler, Tarrant, Johnston & Tuffin, 2017a) identifies the current preparedness levels in New Zealand schools. Paper 3 (Tipler, Tarrant, Tuffin & Johnston, 2017b) establishes the New Zealand statutory requirements and emergency management practitioner expectations of emergency preparedness efforts in schools. Paper 4 (Tipler, Tarrant, Tuffin & Johnston, 2017c) utilises lessons learned from case studies exploring how schools responded during real life emergency events to develop a six-stage school-based emergency response model.

Chapter 8 summarises the project by drawing together findings of the three studies. The implications of the research are identified and the contributions the research has made to the field of school-based emergency management are discussed.

Chapter 2. School Preparedness and Response Literature Review

The following chapter reviews the school-based emergency and response literature, beginning with an overview of school safety in emergencies. Emergency preparedness in schools and drills are discussed. Finally, emergency events in schools are considered in relation to schools' responses and lessons learned from their experiences. The chapter concludes with a summary of the research gaps and proposed future research.

2.1. School Safety in Emergencies

Children are identified as among the most vulnerable populations during a disaster, particularly if they are attending school at the time (e.g., GADRRRES, 2015; United Nations International Strategy for Disaster Reduction (UNISDR), 2006). As a result, the well-being of children at school has been a focus of global disaster risk reduction (DRR) efforts within the education sector.

The *Hyogo Framework for Action (HFA) 2005-2015* (UNISDR, 2005a) was a 10 year blueprint to global DRR efforts, with an aim of reducing “disaster losses, in lives and in the social, economic and environmental assets of communities and countries” (UNISDR, 2005b, p.1). The HFA prioritised the safety of school sites and children’s continued access to education (Shiwaku & Shaw, 2016). The HFA identified five priorities for action within the education sector: (1) Ensure that DRR and resilience are prioritised with a strong institutional basis within education authorities nationwide (e.g., having policy and legal framework for DRR, ensuring appropriate resources are available within the sector to implement DRR plans); (2) Identify, assess, and monitor the threats to schools presented by hazards; (3) Inclusion of hazard education within the curricula and co-curricular activities of schools; (4) Reduce the underlying risk factors to schools (e.g., safe buildings, disaster and emergency management policies and plans implemented, education continuity plans developed to reduce disruption to learning, the enforcement of building codes); and (5) Strengthen disaster preparedness throughout the education sector to enable an effective response (e.g., plans in place and tested regularly, insurance and contingencies in place for response and recovery, communications procedures in place to share and exchange information) (GADRRRES, 2014).

In an effort to reinforce the HFA's highlighting of schools and education, several frameworks and international DRR campaigns have been instituted since 2005. For example, the *Disaster Risk Reduction begins at School campaign* (UNISDR, 2006) was developed to promote the integration of DRR into school curricula and facilitate the development of schools that were resistant to disasters, including through the retrofitting of buildings where necessary. An integral element of the campaign was the engagement of key stakeholders at local, regional, national, and international levels to achieve its desired outcomes. In a further example, the 2011 UNICEF report, *Children and Disasters: Building Resilience through Education*, recommended that Ministries of Education within countries, should embrace DRR in the relevant areas within the school curriculum to help children become more resilient and self-reliant in disasters and emergencies. In addition, the report recommended that authorities at all levels of government should support research assessing vulnerability and the impact of hazards on schools. An update of progress on the HFA priorities for action within the education sector, as at 2012, can be found in *Assessing School Safety from Disasters a Global Baseline Report* (Bastidas & Petal, 2012), which reviewed existing reports about all aspects of school safety, gathered from 81 countries, to reflect on HFA progress.

The *Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030* (UNISDR, 2015a) is the successor instrument to the HFA. As with its predecessor, the SFDRR aims to result in a "substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries" (UNISDR, 2015b). The SFDRR reiterated many of the priorities for action established within the HFA, including specific priorities for the education sector: (1) Understanding disaster risk; (2) Strengthening disaster risk governance to manage disaster risk; (3) investing in disaster risk reduction for resilience; and (4) enhancing disaster preparedness for effective response (GADRRRES, 2017). Furthermore, the Sendai Framework identified schools as critical infrastructure, and recognised the positive role that education can have in helping countries in achieving the DRR priorities within the framework (Shiwaku & Shaw 2016).

In preparation for the *2015 Disaster Risk Reduction Conference in Sendai*, Japan (which resulted in the SFDRR), international research from within the education sector was integrated by the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES) and The Worldwide Initiative for Safe Schools. As a result, the *Comprehensive School Safety (CSS) framework* (GADRRRES, 2014) was established, an updated version of which was published in 2017. The CSS framework has provided the global education sector with guidance on disaster risk reduction by

identifying strategic goals and priorities, linked to both the HFA and SFDRR, to consider when planning for the safety of students at school and children's continued access to education after disasters. The CSS framework aims to:

Protect students and educators from death, injury, and harm in schools; plan for continuity of action through all expected hazards and threats; safeguard education sector investments; and strengthen risk reduction and resilience through education (GADRRRES, 2017, p. 2).

Three interlinked pillars (see Figure 3.2 in next Chapter) provide the foundation for the CSS framework: (1) safe school facilities; (2) school disaster management; and (3) risk reduction and resilience education. Each pillar includes a range of preparedness activities that can be undertaken prior to disasters and emergencies to ensure the safety of students (e.g., retrofitting buildings to make them earthquake safe, developing emergency plans, and integrating hazards education into school curricula), while also identifying areas of crossover between the pillars (e.g., school drills are within both the school disaster management and the risk reduction and resilience education pillars). There is an expectation within the CSS framework that government, at all levels, will play a role in assisting schools in developing plans for responding to emergencies and also the continuation of operations once the emergency is over.

The onus for governments, specifically Ministries of Education, to take the lead in assisting school preparedness efforts has been recognised since the late-1990s. Burling and Hyle (1997) identified a need for US state education departments to establish preparedness plan parameters and specific components for schools. Governments continue to be seen as effective mechanisms to promote and support school-based preparedness. For example, the American Academy of Paediatrics (2008a) saw government involvement as beneficial, as this meant each school didn't have to 'reinvent the wheel', while also recognising that schools need resources and expertise to develop and implement emergency response plans. The US Department of Education in their Guide for Developing High-Quality School Emergency Operations Plans (2013) promotes 'model' plans as a means to help achieve consistency across schools in their preparedness efforts. An additional reason cited for governments driving school safety efforts is due to their ability to enforce building codes (UNISDR, 2006), and monitor school preparedness efforts to promote accountability (GADRRRES, 2017). Without consistent monitoring of all aspects of school emergency management efforts based on specific benchmarks (Chung, Danielson & Shannon, 2009), schools may have limited preparedness programmes or may lack them completely, while also making it difficult for governments to assess whether schools

have the capabilities to cope in emergencies (Brock, 2000), to ensure the safety of their students.

2.1.1. School safety in New Zealand

As a signatory to both the HFA and SFDRR, successive New Zealand governments have agreed to integrate the principles of DRR and resilience into civil defence and emergency management (CDEM) policy and planning at all levels of government (Department of the Prime Minister and Cabinet, 2015). The Ministry of Civil Defence and Emergency Management (MCDEM) is working with central and local government to develop a new *National Disaster Resilience Strategy*, which will advance an all of government approach to “demonstrate over time New Zealand’s progress towards the priorities of the Sendai Framework” (Ministry of Civil Defence and Emergency Management, n.d.). It is currently too soon to begin assessing progress in achieving the Sendai priorities. However, New Zealand’s progress to date within the Hyogo Framework has been summarised in the National progress report on the *Implementation of the Hyogo Framework for Action (2013-2015)* (MCDEM, 2015), which indicates where DRR principles have been adopted, with input from eleven government organisations, departments, and institutions. The Ministry of Education was not a contributor to the report. However, several references to schools are included within the national progress report, in particular, related to the safety of school buildings and hazards education inclusion in the curriculum. Table 2.1 provides an overview of New Zealand’s progress implementing HFA education sector priorities.

New Zealand schools exist in a decentralised environment in which individual schools are governed by boards of trustees (BoT). These boards are responsible for the safety and welfare of all students, staff and visitors (e.g., parents, volunteers, contractors) on site or engaged in school-related business (e.g., field trips or after hours activities) within workplace health and safety legislation (MoE, 2016a). In particular, schools have a duty-of-care obligation to their students requiring they undertake appropriate emergency management activities to ensure the safety of students, until they can be reunited with their families. Exactly what that entails of BoT remains uncertain, as the legislative requirements and expectations of school-based emergency management are not currently well-defined. As a result, school BoT may not be adequately prepared to keep students safe during an emergency.

Table 2.1 New Zealand's progress implementing Hyogo Framework for Action education sector priorities

Priority for Action	Core Indicator	New Zealand Progress (as at 2015)
Identify, assess and monitor disaster risks and enhance early warning	National and local risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors.	<i>Following the Canterbury earthquakes, all public schools have been re-assessed against existing stringent seismic safety codes and in some circumstances additional retrofitting or strengthening work is being conducted.</i> (MCDEM, 2015, p. 19)
Use knowledge, innovation and education to build a culture of safety and resilience at all levels	School curricula, education material and relevant trainings include disaster risk reduction and recovery concepts and practices.	<p>Primary School Curriculum</p> <ul style="list-style-type: none"> ▪ <i>A comprehensive package for teachers and schoolchildren enables civil defence emergency related learning across all areas of the New Zealand curriculum for students aged 5–12 years. Called "What's the Plan Stan" it covers what to do before, during and after six types of emergency events: earthquakes, tsunami, volcanoes, storms, floods and non-natural disasters. Recognised potentially as "international best practice", "What's the Plan Stan" was subject to a Fulbright scholar's research in 2011, and evaluation by the Department of Internal Affairs in 2012. The research highlighted the important role of relationships between schools and their local emergency managers, and outreach to the wider community.</i> (MCDEM, 2015, p. 27) <p>Secondary School Curriculum</p> <ul style="list-style-type: none"> ▪ <i>Learning about hazards management may also form part of social studies and geography programmes at the secondary school level in line with national curricula requirements.</i> (MCDEM, 2015, p. 27)
Reduce the underlying risk factors	Planning and management of human settlements incorporate disaster risk reduction elements, including enforcement of building codes.	5★ rating, which indicates, " <i>comprehensive achievement attained with commitment and capacities to sustain efforts at all levels. E.g., Nationwide, every new school is constructed according to building codes and construction is monitored and safe</i> " (Bastidas & Petal, 2012, p. 75).
Strengthen disaster preparedness for effective response at all levels	Strong policy, technical and institutional capacities and mechanisms for disaster risk management, with a disaster risk reduction perspective are in place.	<ul style="list-style-type: none"> ▪ Policies and programmes for school safety ▪ Training and mock drills in school for emergency preparedness

Sources: MCDEM (2015) *National progress report on the Implementation of the Hyogo Framework for Action (2013-2015)*, and Bastidas and Petal (2012) *Assessing School Safety from Disasters a Global Baseline Report: ISDR Thematic Platform for Knowledge and Education*.

An examination of the legislation directing school-based emergency management, and review of the policies and guidelines available to support schools, would assist in reducing the uncertainty for BoT as to exactly what is required of schools when preparing for emergencies. Furthermore, such a review would assist in determining progress within the education sector toward meeting New Zealand's responsibilities within the SFDRR Framework, particularly in the area of school disaster management (e.g., emergency preparedness and education continuity planning).

In sum, school safety is a focus of global DRR efforts. The HFA, SFDRR, and CSS Frameworks provide three inter-related instruments to guide government policy and planning within the education sector. Governments are seen as essential in promoting and supporting school safety initiatives through the provision of legislation, policy, and guidance to schools. Successive New Zealand governments have made progress in their obligations, as signatories to the HFA and SFDRR, to implement DRR principles within all levels of government, particularly in the areas of safe school buildings and the inclusion of DRR in the school curriculum. However, it remains uncertain what legislative requirements and expectations exist for New Zealand schools with regard to school disaster management. It is important therefore, that the legislation underpinning emergency management in New Zealand schools is examined, and that the emergency requirements and expectations of schools are determined to safeguard the safety of students.

Having established school safety as a priority globally and in New Zealand, the next section discusses how schools prepare for emergencies.

2.2. Emergency Preparedness in Schools

The foundation of an effective emergency response is to “maintain a steady state of preparedness during non-crisis times” (Kano & Bourque, 2007, p. 202). Prior planning and preparation can potentially reduce damage to the school environment, injuries to staff and students, and assist schools in returning to some degree of normalcy in the aftermath of an emergency event or large scale disaster (American Academy of Paediatrics, 2008a).

Many different types of emergencies occur in schools. For example, a study of 157 public schools in California, US (Kano & Bourque, 2007), identified 25 different types of emergency events experienced by the schools in the preceding six years. ‘Angry parents’ and ‘animals/insects on campus’ incidents had occurred in more than 90% of the schools, while at the other end of the spectrum a small proportion (<10%) of

schools had experienced school shootings, epidemics, terrorist threats, and a plane crash. In another example, a survey of 80 Australian schools (Boon, Brown, & Pagliano, 2014) reported 78% of schools had experienced at least one emergency in the past. Building fires (50%), violent intruders (39%), bush fires (36%), heat emergencies (29%), and pandemics/disease outbreaks (18%) were the most commonly occurring emergency types in respondent schools.

With emergencies common in schools, it is essential that they are prepared to respond effectively to events they may experience. This necessitates undertaking a range of preparedness activities: plans and procedures; hazards education and response training; evaluation of preparedness efforts; and stakeholder engagement. The following section discusses these preparedness activities in turn, followed by an overview of New Zealand school preparedness research.

2.2.1. Plans and procedures

The importance of having developed plans and procedures in preparation for future emergencies, to ensure the welfare of students and staff (Smith, Kress, Fenstermaker, Ballard & Hyder, 2001) is echoed throughout the school preparedness literature (e.g., American Academy of Pediatrics, 2008a; International Finance Corporation, 2010). Plans need to be living documents that include actions to be taken before, during and after an emergency event (Burling & Hyle, 1997) and that are reviewed in an ongoing basis (RiskRED, 2009) to ensure they reflect changes (social, economic, psychological) to the school and wider community (Stuart, Patterson, Johnston, and Peace, 2013). In addition, any emergency plans must remain functional when alternative personnel are fulfilling key roles (MacNeil & Topping, 2007).

While there is no 'one size fits all', ideal plan type for schools (American Academy of Pediatrics, 2008a), there are core aspects that should be included in every plan, and be considered in combination with the unique requirements of each school. Primarily, school plans need to meet the requirements of various emergency situations, not just those that seem most likely. However, that does not necessitate having to develop individual plans for each emergency type. Best practice advice within the school preparedness literature (e.g., American Academy of Pediatrics, 2008a; Chung et al., 2009; GADRRRES, 2017; International Finance Corporation, 2010; US Department of Education, 2013) advocates for schools to focus their emergency preparedness efforts on developing plans for four core response procedures (i.e., shelter-in-place, lockdown, building evacuation, relocation). The rationale behind this approach is that when implemented in conjunction with appropriate safety behaviours (e.g., drop, cover, hold

for earthquakes), the four response procedures will cover the majority of response requirements that schools may have, irrespective of the hazard or emergency type, as each response procedure can be used for several emergency situations. For example, building evacuation may be the appropriate response in a fire, earthquake, chemical spill or gas leak, depending on the specific event.

As well as having plans for the four core response procedures, the importance of schools having plans and procedures in place for reunifying families is also recognised (e.g., GADRRRES, 2017; International Finance Corporation, 2010; Ronan & Johnston, 2005). Family reunification has the potential to be one of the most problematic areas of an emergency response (RiskRED, 2009), and for this reason it is essential that schools have detailed, and well-established plans for reunifying families after emergencies (American Academy of Pediatrics, 2008a). Furthermore, having parents familiar with the school's reunification procedures can reduce anxiety and confusion of students and parents (e.g., Johnson, Johnston, Ronan & Peace, 2014a; Ronan & Johnston, 2005), thereby limiting the chance they will hinder the response efforts of staff (e.g., RiskRED, 2009).

Overall, studies from the US and Australia indicate most school districts and individual schools had developed emergency plans (e.g., 96% – Boon et al., 2014; 95% – US Government Accountability Office, 2007; 98% – Petal, Green, Wood, & Nguyen, 2011; 95% – Smith et al., 2001), but when asked about plans for specific emergency procedures, response rates varied. For example, Graham et al. (2006) found that 96% of US schools had plans for relocating students to an alternate site in an emergency, 92% had plans for lockdowns, 86% had developed plans for mass casualty events, and 75% had procedures for family reunification.

Specific plan elements have also been identified as being beneficial for an effective response, and therefore, require inclusion in planning and preparation efforts. First and foremost, is the need to include clear, pre-defined roles and responsibilities for all stakeholders (e.g., school leaders, staff, and parents) to avoid a chaotic response (American Academy of Pediatrics, 2008a; Smith et al., 2001). In addition, it is essential to include specific details about communications and information sharing with staff, students, and parents during an emergency, in particular what methods (e.g., texting, email, and social media) of communication will be used (American Academy of Pediatrics, 2008a; Kano, Ramirez, Ybarra, Frias & Bourque, 2007; RiskRED, 2009). Communications are the foundation of an effective response but also the element most likely to fail (Chung et al., 2009), due to limited or misinformation. Another plan element

recommended in the literature is the need to develop maps of the school layout, evacuation routes, and relocation sites (Chung et al., 2009; International Finance Corporation, 2010; Smith et al., 2001), which can be shared with parents to aid family reunification efforts, and also provided to emergency services that may be required to respond to emergencies (Crichton, Ramsay & Kelly, 2009) at the school. Information on what elements schools include in their plans is limited; with the data available indicating schools vary in the contents of their plans. For example, Kano et al. (2007), in their study of Los Angeles schools, reported that in 92% of schools' staff were aware of their emergency response roles and responsibilities. In another study based in Southern California (RiskRED, 2009), only 23% of schools had identified staff members that needed to be released early in the event of an emergency (e.g., due to family commitments such as young children in other schools or childcare). A further example that compares schools from the Central US (Petal et al., 2011) and Southern California (RiskRED, 2009) found site maps had been developed in 79% and 48% of schools, respectively.

One area of school-based emergency planning that has been identified as requiring attention is the need to consider the response requirements of students and staff with disabilities or special needs (e.g., American Academy of Pediatrics, 2008b; Boon et al., 2014; Clarke, Embury, Jones & Yssel, 2014; US Government Accountability Office, 2007), in particular, the accessibility of evacuation routes and any additional support necessary in the assembly area. As with other aspects of planning, rates of schools with plans for students with disabilities or special needs varied across the US-based studies. Petal et al. (2011) in their survey of Central Southern US states schools reported the highest number of schools with plans for disabled or special needs students (89%). Rates were lower in three additional US studies: Graham et al. (2006 – 78%); RiskRED (2009 – 74%); and the US Government Accountability Office (2007 – 67%). An Australian study (Boon et al., 2014) of 80 schools, which looked specifically at the preparations for students with disabilities by hazard type, found that less than one-third of schools had plans that specifically addressed the needs of students with disabilities, with rates dropping to as low as ten-percent for some hazards. Boon et al. (2014) also raised concern about the limited engagement between schools and their stakeholders (especially parents and care workers) when developing their emergency plans for students with disabilities or special needs. Such a lack of consultation seems short-sighted considering that parents (and carers) would be in the best position to offer advice about the response capabilities and specific requirements of individual students, whether or not they have a registered disability. Preparing for students with

special needs and disabilities has long been recognised, but little progress has been made, indicating that these students remain at increased risk during emergencies.

Often linked to planning efforts within the literature, is the expectation that schools will have supplies on site for use in emergencies. Supplies such as food, water, and first aid materials are recommended. The three California-based studies (Kano & Bourque, 2007¹; Kano et al., 2007; RiskRED, 2009) reported levels of emergency supplies in schools: first aid equipment (94%, 90%, 90%, respectively); food (51%, 50%, 75%); and water (74%, 72%, no percentage available for Kano et al.). It is also recommended that each classroom has go-bags or get away kits (Chung et al., 2009; Petal et al., 2011; RiskRED, 2009) which contain basic supplies that may be needed in an emergency (e.g., class lists, first aid kit, essential medication, copies of emergency procedures, etc.), and which can be taken with the class if they need to evacuate or relocate to an alternative site. Burling and Hyle (1997) suggested that schools may have to shelter staff and students for up to 72 hours after an emergency, and it may be possible that the wider community will also seek assistance at schools (Kano & Bourque, 2007). Therefore, the supplies available should reflect these possibilities. Irrespective of what supplies are on-site, they should be up-to-date and in good condition (Kano et al., 2007).

A final aspect of school-based planning to be considered, is the need to prioritise the development of plans for the continuity of school operations (e.g., alternative learning spaces and modes of instruction) after a disaster or emergency, to enable students ongoing access to education (e.g., American Academy of Pediatrics, 2008a; GADRRRES, 2017; US Department of Education, 2013). Ensuring continued access to education is beneficial for the ongoing welfare of students after an emergency and assisting in family and community recovery (e.g., Peek, 2008). The interruption of education after an emergency or disaster can adversely impact student academic performance and long-term educational outcomes, through extended absences or dropping out of school, which can in turn result in negative impacts for students, their families and the wider community (e.g. International Finance Corporation, 2010), especially where there are pre-existing challenges (e.g. displacement, family instability) (Peek, 2008). Three studies make specific reference to education continuity planning efforts. In a nation-wide survey of US school districts (US Government Accountability Office, 2007), only 44% reported having developed education continuity plans. Schools

¹ Kano & Bourque (2007) provided results by school type (i.e., elementary, middle, and high schools). Therefore, an average percentage score for the schools in this study has been included to allow for comparison.

in the Central US (Petal et al., 2011) reported higher rates than their Californian counterparts (RiskRED, 2009) for three comparable variables: identified alternate sites for learning (64% and 32%, respectively); off-site back up of important information (60% and 40%); and developed alternative schedules and methods for student instruction (51% and 26%). In the US-based studies discussed, much of the variation in preparedness levels may be due to differing statutory requirements of school-based emergency preparedness activities in each state.

Schools may also be required to temporarily close in response to an emergency event (e.g., Awofisayo, Ibbotson, Smith, Janmohamed, Mohamed, & Olowokure, 2013; Convery, Carroll & Balogh, 2014; Kayman et al., 2015). Therefore, it is necessary to have plans in place for how schools will close with little or no prior warning, including how they will inform parents, and care for students until they can be collected. A review of preparedness efforts in US schools (US Government Accountability Office, 2007) suggested that many may already have plans for temporary school closure and education continuity in their existing pandemic response plans, which could provide a starting point for schools.

In sum, planning for emergencies is recommended throughout the school preparedness literature. However, little is known about whether schools are undertaking all or any of the specific plans and procedures endorsed. Where researchers have collected data on preparedness levels in schools, findings indicate variations in the levels of planning and plan content within and between the schools in the studies discussed. What remains certain is that where schools do not have adequate emergency plans, including comprehensive procedures for family reunification, they may be failing in their duty-of-care obligations, which requires that students be kept safe during and after emergency events until they can be reunited with their families.

A well-developed emergency plan can influence how school officials manage a crisis in the short-term and can affect how schools recover in the long-term (Smith et al. 2001). However, developing emergency plans is only part of an effective response. Students and staff need hazards education and emergency response training to effectively implement the schools' plans (Heath, Ryan, Dean & Bingham, 2007).

2.2.2. *Hazards education and response training*

Educating individuals, especially children, about hazard risks and how to respond to them can save lives (e.g., Ronan & Johnston, 2005; UNICEF, 2011). The inclusion of

hazards education within the formal school system is seen as an effective mechanism for the dissemination of hazards information into the broader community to increase resilience (e.g., GADRRRES, 2017), as schools provide a link between children, families, and communities (e.g., Ronan & Johnston, 2005). Incorporating hazards education material in school curricula is an efficient means to empower children and increase their preparedness by: promoting more realistic risk perceptions; increasing hazard knowledge; reducing hazard related fears; and increasing home-based preparedness efforts (e.g., Peek, 2008; Ronan et al., 2016).

Two recent international reviews have provided the current understanding of hazards education programmes and their effectiveness. Johnson et al. (2014c), is a methodological review of 35 evaluations of school-based hazards education programmes. The study found major gaps in the evidence base used to evaluate the effectiveness of education programmes, due to significant methodological limitations (e.g., sample sizes, lack of baseline data and control groups). Ronan et al. (2015) provides a critical review of the international research on preparedness for children in disasters with a focus on education programmes. For the most part, the review findings were positive. However, it was noted that in spite of a dramatic increase in the child-centred disaster research available over the last 15 years more work needs to be done. For example, in addition to the issues related to methodological rigour recognised by Johnson et al. (2014c), Ronan and colleagues identify a need for programme content and delivery issues to be addressed, thereby ensuring physical and psychosocial preparedness components of programmes are evidence-based. Finally, the Ronan et al. review asks whether “programs actually do decrease risk and increase resilience when intended, including saving lives, reducing impacts (e.g., injuries, psychosocial consequences, property damage; DRR costs), and helping children and families get back on their feet and bounce back more resiliently when disaster strikes” (p. 58).

It is not known how many school children have access to education programmes, as this is not often asked by researchers. Much of the information available is based upon research conducted with students asking about their preparedness knowledge (e.g., safety behaviours) and in some cases, what preparedness activities had been undertaken in their homes (see Johnson et al., 2014c for an overview of these studies). Two of the studies introduced in the previous section, provide some small insights. For example, the RiskRED (2009) survey of Californian schools found 20% of students were aware of some basic information such as how to turn off flames and isolate hazardous material in science laboratories, and 69% knew the ‘4 rules for building evacuations’ (i.e., don’t talk; don’t push; don’t run; and don’t turn back). In their survey

of schools in the Central US states, Petal et al. (2011) reported 25% of students had been provided with information about how communities can build and plan to reduce disaster impacts, and 22% of students had participated in projects or activities to learn how to reduce disaster impacts. What remains unclear is what proportion of schools provide their students with access to hazards education and home-based preparedness material that can increase their individual safety and family resilience to disasters and emergencies.

In addition to providing hazards education programmes and response training to students, school staff also require training. Staff are often first responders to emergency events occurring at school, and as such they require training to support their response efforts. School leaders and staff need the skills and resources to develop emergency response and preparedness plans (Alba & Gable, 2012; Burling & Hyle, 1997). To assist in ensuring the necessary skills and resources are available, schools are encouraged to establish crisis management teams (e.g., Chung et al., 2009; GADRRRES, 2017; Pitcher & Poland, 1992), with the responsibility of overseeing preparedness and response efforts in the school. In addition to school leaders, it is recommended that where available, crisis management teams include other school-based professionals, with the relevant skills and knowledge to contribute to school emergency management, such as: nurses (e.g., Rebmann, Elliott, Artman, VanNatta & Wakefield, 2015); social workers (e.g., Werner, 2014); and psychologists (e.g., Adamson & Peacock, 2007).

It is also recognised as beneficial (e.g., Chung et al., 2009; Kano & Bourque, 2007; Momani & Salmi, 2012) that school leaders (and staff) receive training in managing crisis situations, to help when making decisions in stressful situations where information, time and resources may be limited (MacNeil & Topping, 2007). Children look to significant adults to guide how they will respond during and after an emergency (Lazarus, Jimerson & Brock, 2003). Consequently, the need to prepare school staff to respond to the emotional and cognitive needs of their students and colleagues during and after an emergency has become a focus in school preparedness literature since the mid-2000s (e.g., Adamson & Peacock, 2007; American Academy of Pediatrics, 2008a; Heath et al. 2007). As a result, the emphasis has moved away from staff only responding to the physical requirements of students in emergencies, to a more inclusive approach which also considers students psychological needs, usually as a result of staff being trained in some form of psychological first aid or crisis management training (e.g., Elangovan & Kasi, 2015; Ramirez et al., 2013; Trethowan & Nurse, 2015). Such an approach acknowledges that psychological preparedness is seen as

being as important to response and recovery efforts as physical preparedness (Ronan & Johnston, 2005).

In sum, there is a consensus that providing students and staff with education and training ensures that they have the necessary knowledge and skills to respond appropriately during an emergency. However, there is little research available identifying current levels of students' access to hazards education programmes, and students and staff training for emergency response.

2.2.3. Evaluation of preparedness efforts

Regular evaluation and review of all aspects of school-based emergency management activities including plans and procedures (e.g., American Academy of Pediatrics, 2008a; Chung et al., 2009), and education programmes (Johnson et al., 2014c), and response drills (e.g., Ramirez et al., 2009), is required to ensure preparedness efforts are appropriate and effective. Existing research indicates that generally evaluation efforts in schools are limited (e.g., Johnson et al., 2014c; RiskRED, 2009), and in some cases only occur after an emergency event (Burling & Hyle, 1997). For example, only 57% of Californian schools that had taken part in a ShakeOut earthquake drill (RiskRED, 2009) reported evaluating their performance in the drill. However, those schools that did evaluate indicated having used a range of methods for those evaluations including: staff meetings (72%), 'informally' (57%); in class with students (41%), using self-evaluating forms (23%); written reports (22%); and outside observers (12%).

Arguably, schools are the ideal location for evaluation and assessment, so why are school leaders not evaluating their preparedness efforts with the same rigour they use when evaluating their students in other areas of learning? The answer may be as simple as not knowing what they need to evaluate, and what the benchmarks are for success. In an effort to address low rates of evaluation Hosseini and Izadkhah (2006), in their review of emergency planning in Iranian schools, recommended that school leaders' monitoring, reviewing, and updating of emergency plans be assessed through the schools' key performance indicators. Emergency drills provide a useful starting point to encourage schools to evaluate their preparedness efforts, as has been demonstrated in the US ShakeOut earthquake drill studies (Petal et al., 2011; RiskRED, 2009).

In sum, evaluating school preparedness efforts is essential to ensure plans and procedures are effective and appropriate. To-date very little research has investigated whether schools conduct any form of evaluation or review.

2.2.4. Stakeholder engagement

Schools have a variety of stakeholders, both internal (i.e., staff, students, parents, families) and external (e.g., emergency services, emergency management agencies, health organisations, community), who have an interest in school-based emergency preparedness efforts. Therefore, it is necessary that schools engage with these stakeholders when planning and preparing for emergencies (e.g., Chung et al., 2009). Furthermore, schools should share details about their emergency plans with stakeholders to enable them to be familiar with what the plans entail, and any specific roles and responsibilities stakeholders may have in the schools' response (Chung et al., 2009; Liu, Murray-Tuite & Schweitzer, 2012; Ronan & Johnston, 2005). It is essential that staff in their role as first responders, are familiar with school response plans and procedures. By involving staff in planning and preparation efforts, such as inclusion in school crisis management teams (e.g., Chung et al., 2009) and participating in frequent emergency drills (e.g., Ronan & Johnston, 2005), school leaders can encourage staff to be fully cognisant of all aspects of emergency preparedness in the school.

Involving parents in preparedness efforts and keeping them informed and up-to-date with the school's plans and procedures is seen as particularly important, with research suggesting this can help reduce the likelihood that parents will behave in a way that is detrimental to the efforts of staff undertaking emergency response activities (American Academy of Pediatrics, 2008a), especially where parents are unfamiliar with, or lacking confidence in, the school's response capabilities (RiskRED, 2009). Parental involvement was also found to be a key indicator of successful preparedness in an audit of terrorism preparedness levels in 20 US school districts (Phinney, Brill & Ferraro, 2004). However, even in the best performing district, where parents were inundated with information about the school's preparedness efforts (including having information available in seven languages), a quarter of parents were unaware the school had a plan. In response to such findings, the authors believed that at some point, the responsibility of schools to keep parents informed ends, and parents' duty to be informed begins.

Working with external stakeholders can assist school emergency management efforts (e.g., Chung et al., 2009) by improving preparedness (Graham et al., 2006), and aiding

response efforts (Kano & Bourque, 2007). For example, public health officials in the West Midlands (England) were able to advise schools about temporary closures and containment during an influenza outbreak in 2009 (Awofisayo et al., 2013). However, schools often find such collaborations to be challenging (e.g., Alba & Gable, 2012; Kano & Bourque, 2007). For example: external stakeholders not responding to school's requests for collaboration; shortage of time, funding, equipment, and expertise; staff are already overworked; and efforts at collaborations not appreciated (US Government Accountability Office, 2007; O'Keefe, Arrington, Prelip & Shoaf, 2015). As a result, engagement levels are often low (e.g., 39% – US Government Accountability Office, 2007), which has the potential to negatively impact response capabilities where prior relationships have not been established.

In sum, collaboration with stakeholders about emergency preparedness in schools is generally low, with most studies indicating the need for further cooperation with stakeholders, especially parents and external stakeholders, to assist schools in both preparing for and responding to emergencies.

2.2.5. *New Zealand school preparedness research*

The Ministry of Education (2016a) reports that New Zealand schools have extensive plans in place to ensure the safety of children in emergency events. However, to date, there is a somewhat incomplete picture of preparedness levels in schools. Only a single study (Johnston et al., 2016) is known to have specifically investigated emergency management in New Zealand schools to identify current preparedness levels. The study was conducted with participants from 17 Wellington schools, located in potential tsunami inundation zones. Although the sample size was small, the study did provide some preliminary insights into tsunami-related preparedness activities undertaken by schools. Most schools reported a range of preparedness activities including: creating earthquake response plans (100% of schools); developing procedures for how staff and students with special needs or disabilities will get to tsunami evacuation point (100%); creating tsunami response plans (94%); developing procedures for communicating and reuniting families at the tsunami evacuation site (94%); preparing 'get-away' kits (e.g., first aid kit, contact lists for students, important documents, portable radio, student's medicines) to take during an evacuation (94%); and having maps that show school evacuation routes to tsunami evacuation point (82%). The study also found limited inclusion of stakeholders' input to preparedness efforts. For example, when developing tsunami response plans parents were consulted in 35% of schools, and emergency services personnel in 18%. Parents take part in

tsunami evacuation drills in 35% of the schools, with rates slightly higher (41%) for family reunification drills in which parents are required to collect their children from the tsunami evacuation point.

Two additional studies (Coomer, Johnston, Edmonson, Monks, Pedersen & Rodger, 2008; Renwick, 2012) have explored aspects of school preparedness (e.g., provision of emergency supplies, hazards education programme evaluation, and stakeholder engagement) as part of broader projects. Coomer and colleagues (2008) surveyed 101 school principals in the Wellington region about hazards education programmes conducted in their schools. In addition, the authors used the opportunity to ask respondents about other aspects of school preparedness. The majority of schools had undertaken preparedness activities, and many schools had also made attempts to engage with stakeholders about school preparedness. The second study (Renwick, 2012) was an evaluation of the use of the 'What's the plan Stan' (WTPS) hazards education teaching resource issued to 1020 primary and intermediate schools in 2006, and updated in 2009. Renwick provides the only known New Zealand data available about the traumatic incident training for school staff provided by the Ministry of Education. The majority of respondents (71%) indicated they had a traumatic incident plan in their schools. Additionally, staff in a quarter of schools had been invited to participate in training for traumatic incidents, with 18% having taken up this offer. Findings from the three New Zealand studies (Coomer et al., 2008; Johnston et al., 2016; Renwick, 2012) echo what is seen throughout the international literature, that schools vary in the extent and type of planning and preparations they undertake for emergencies, and as a result may be under-prepared to keep their students safe in an emergency.

New Zealand studies have been well represented in the school-based hazards education literature since the late-1990s, including some of the earliest studies in the field to focus on students' access to and participation in school-based hazards education programmes (e.g., Finnis, Standring, Johnston & Ronan, 2004; Johnston & Benton, 1998; Ronan, 1997; Ronan et al., 2001; Ronan, Crellin, & Johnston, 2012; Tarrant & Johnston, 2010). The findings of these studies suggest that students benefit from participation in hazards education programmes through increased awareness and understanding of hazards, knowledge of safety behaviours, and psychological coping, and that the benefits increased with the more programmes children attended. Research investigating the influence of the Canterbury earthquakes (2010-2012) on hazards education in schools is gradually becoming evident in the literature (Johnson & Ronan, 2014; Taylor & Moeed, 2013).

There is no curriculum requirement for New Zealand schools to provide education specifically about hazards to their students, so the number of students who have access to hazards education programmes at school is not clear. However, three preparedness-related studies discussed above offer some limited indications of participation levels. In the Wellington tsunami study (Johnston et al., 2016), students were taught about earthquakes in 94% of schools, but only 41% discussed tsunami (e.g., getting to higher ground). Students in half of the schools, and staff in a quarter of the schools, were given information about preparing for a tsunami at home. Coomer and colleagues (2008) found 86% of schools include hazards education within the curriculum (either within a single subject or across the curriculum), and cover a range of hazard types (e.g., earthquake – 99%; fire – 97%; flood – 61%; storms – 53%; tsunami – 43%). In addition, three-quarters of the schools evaluated their education programmes, including the usefulness of information (73%) and whether material needed updating (81%). In Renwick's (2012) evaluation of WTPS, 31% of schools reported being aware of and using the resource; of those 70% found the resource 'useful' or 'very useful'. If WTPS was used by schools, in the majority of cases, it was included within the social studies or health/physical education stands of the curriculum. Although hazards education is not compulsory, it is likely that schools include discussions of hazards with students because of the window of opportunity afforded by frequent disasters in both New Zealand (e.g., Canterbury earthquakes) and internationally (e.g., Japanese earthquake and tsunami, Hurricane Matthew in Haiti; Australian bushfires).

New Zealand preparedness research focuses almost exclusively on hazards education, with little investigation of other aspects of emergency preparedness in schools.

2.2.6. *Overview of the emergency preparedness literature*

There is consensus within the literature reinforcing the importance of schools undertaking emergency preparedness activities, such as: developing emergency response plans and procedures; providing hazards education to students; and providing staff with preparedness and response training. Currently, much of the evidence available to support the understanding of existing school-based emergency management practices is provided by a small, but growing, pool of studies.

The international research to date has identified common weaknesses relating to preparedness across schools and school districts including: content of emergency plans varying greatly between schools, districts, and states; very little data available reflecting students' access to education programmes; limited evidence of schools

evaluating their preparedness efforts; and a lack of collaboration between schools and their stakeholders (e.g., parents, emergency management agencies) when preparing for emergencies. A possible effect of these weaknesses, is that schools may be overconfident in how prepared they are for emergencies, and as a consequence are under-preparing, resulting in them failing in their duty-of-care to students. Schools have indicated that they have difficulty balancing their priorities of educating students, school administrative responsibilities, and emergency management requirements.

The limited number of studies examining preparedness in New Zealand schools indicates a need for further research, utilising a larger sample that is representative of schools nation-wide, to investigate the types of preparedness activities undertaken, and the current preparedness levels in schools.

2.3. Emergency Drills in Schools

This section discusses emergency drills which have been included separately from other preparedness activities due to their importance in bridging the gap between preparing for and responding to emergencies.

It is acknowledged that the ultimate test of prior preparations is their effectiveness during an emergency response (e.g., American Academy of Pediatrics, 2008a). However, it is not necessary to wait for an emergency, as drills provide excellent opportunities to review the efficacy of plans and procedures. Implementing plans effectively during an emergency response requires a clear understanding of what needs to happen, when it needs to happen, and who needs to do it (MacNeil & Topping, 2009). This is where drills come in, as they provide a low risk opportunity to test plans and procedures, thereby ensuring staff, students, and families are aware of their response roles and responsibilities before an emergency. Evacuation drills originated as a response to the unnecessary deaths of children in fires and other school-based emergencies in the US dating back to the mid-nineteenth century (Heath et al., 2007). The primary argument for participating in drills is because it fosters a sense of preparedness that results in a quick response during an emergency (Pitcher & Poland, 1992; Johnston, Tarrant, Tipler, Coomer, Pedersen & Garside, 2011), by reinforcing training and providing an opportunity to test alternative scenarios, roles, and locations (Johnson et al., 2014). However, for drills to be most effective, participants must already have a clear understanding of correct safety behaviours, evacuation procedures and routes (Ronan & Johnston, 2005).

Only a small number of studies have examined how schools conduct emergency response drills. Five studies from the US (Johnson et al., 2014a; Petal et al., 2011; Ramirez et al., 2009; RiskRED, 2009; Zhe & Nickerson, 2007) and two New Zealand studies (Johnston et al., 2011; Orchiston, Manuel, Coomer, Becker & Johnston, 2013) provide much of the school drill data available, with each offering insights into different aspects of response drills. For example, Johnston et al. (2011) point out the value of practising family reunification procedures, and Zhe & Nickerson (2007) consider the need for students to be psychologically prepared for drills to reduce their anxiety.

Although emergency drills are common, they do not occur in all schools (e.g., Graham et al., 2006; Kano et al., 2007; RiskRED, 2009; Smith et al., 2001), and in many cases may consist of no more than practising a safety behaviour (e.g., drop, cover, hold), evacuating the building, and recording attendance in an assembly area (Ramirez et al., 2009). As a result, one of the primary criticisms of drills has been their tendency to be routine activities (Johnson et al., 2014a), that are nothing more than compulsory box ticking exercises, holding little real benefit for improving preparedness (Ramirez et al., 2009). Whereas drills can provide a means by which participants can learn safety skills that could be adapted for use in a range of scenarios and also allow school plans and procedures to be tested (e.g., Smith et al., 2001). For example, potential problems with evacuation routes and the suitability of assembly areas have been considered in previous studies (Johnston et al., 2011; Ramirez et al., 2009), with recommendations that building evacuation drills be used as opportunities to identify such problems prior to an emergency.

Furthermore, drills can provide experiential learning opportunities for students (Ramirez et al., 2009; RiskRED, 2009), by presenting openings for the inclusion of disaster education within the curriculum (Ronan, Alisic, Towers, Johnson, & Johnston, 2015), and answering questions about preparing for and responding to emergencies (Orchiston et al., 2013). By increasing students' understanding of how they can protect themselves in a range of emergency scenarios, and clarifying why they should undertake certain response actions, this knowledge can then be extrapolated into new or unfamiliar situations both inside and outside school to increase the overall resilience of students (Johnson et al., 2014a).

Two of the studies (Petal et al., 2011; RiskRED, 2009) were able to access participants by leveraging off ShakeOut earthquake drill exercises in California (2008) and the Central US states (2011). The ShakeOut exercises encourage communities to prepare for future earthquakes by taking part in a community-wide earthquake drill to practise

safety behaviours at a specific time and date, and also to review their earthquake preparedness plans at work and home. Both the ShakeOut-related studies (Petal et al., 2011; RiskRED, 2009) found that large-scale drills, with pre-identified activities (e.g., including students with special needs, evaluating drills, engaging with external stakeholders), had been well supported and successful in enhancing school-based earthquake preparedness activities, while also providing opportunities for researchers to engage with schools about general preparedness. Identifying specific tasks that can be used when evaluating drill effectiveness is also supported in other drill studies (Johnson et al., 2014a; Johnston et al., 2011; Ramirez et al., 2009) which recommend: involving everyone at the school in drills, identifying potential hazards along evacuation routes, accounting for everyone on site at the time of the drill; providing opportunities for participant feedback; practising family reunification procedures as part of drills at least once annually; linking drills to classroom learning; and providing a formal conclusion to drills where participants efforts during the drill can be recognised, and allowing the seriousness and benefit of practising emergency response actions to be acknowledged.

Two New Zealand drill-related studies augment the limited literature available by expanding their investigation beyond observing students taking part in a 'drop, cover, hold' earthquake drill. In the study of a Wellington primary schools (elementary) conducting an earthquake response and family reunification drill, Johnston and colleagues (2011) were able to witness the logistical challenges of conducting a school-wide family reunification practice, and also participate in a debriefing session with staff after the drill, both activities identifying useful lessons for schools conducting response drills, irrespective of emergency type. The second study (Orchiston et al., 2013) was conducted as part of a small pilot study of the ShakeOut drill concept on the West Coast of New Zealand. After having observed students in three schools conduct an earthquake drill, the research team were able to join students for discussions on earthquake issues and impacts, and possible implications of a major earthquake in the area. To date, no nation-wide investigation of schools participating in emergency drills has been undertaken. New Zealand's size would allow for such a study to be conducted, the findings of which would build on the two large-scale US ShakeOut-linked studies (Petal et al., 2011; RiskRED, 2009) to provide reference data for New Zealand researchers and practitioners supporting school preparedness efforts.

Emergency drills are a fine balancing act of providing the potentially lifesaving information necessary to respond effectively in an emergency (Ramirez et al., 2009), in a realistic way that enables staff, students and school visitors to know what risks they

may face (Kano et al., 2007; RiskRED, 2009), without increasing anxiety (Johnson et al., 2014a; Zhe & Nickerson, 2007).

In sum, few studies have investigated emergency response drills in schools. Each of the studies has contributed to furthering the understanding of how drills can be used to: test the effectiveness of plans and procedures; provide opportunities to practise safety behaviours and response actions; and enhance the overall efficacy of school-based preparedness efforts. A large-scale, nation-wide drill would provide an excellent opportunity for researchers to collect school data about their experiences participating in the drill, and general school preparedness.

2.4. Learning Lessons: Emergency Experience and Response in Schools

Emergency events experienced in schools provide opportunities to learn lessons, that assist in improving future preparedness efforts, by evaluating the effectiveness of the response (Crepeau-Hobson & Summers, 2011), in particular the usefulness of school plans and procedures (MacNeil & Topping, 2009). Since the mid-2000s, school-based experiences of emergencies and disasters have gained the attention of researchers. While the pool of studies remains relatively small, scholarly publications include research exploring how schools respond to disasters and emergencies including: large-scale events such as Hurricanes Katrina and Rita (e.g., Clettenberg, Gentry, Held & Mock, 2011), and the Japanese earthquake, tsunami, and nuclear crisis of 2011 (e.g., Shiwaku et al., 2016); major events that have regional impacts such as flooding (e.g., Convery et al., 2014), and influenza outbreaks (e.g., Awofisayo et al., 2013; Kayman et al., 2015); and the more frequently occurring, small-scale emergencies that have affected individual schools such as violent intruders (e.g., Borum, Cornell, Modzeleski & Jimerson, 2010), and the deaths of students (e.g., Crepeau-Hobson & Summers, 2011). New Zealand researchers have produced several studies investigating emergency experiences in schools, the majority of which share lessons learned as schools recover from the Canterbury earthquakes (e.g., ERO, 2013; Mooney et al., 2017; Mutch, 2015b; Pine, Tarrant, Lyons & Leathem, 2015, 2015; Ronoh, Gaillard, & Marlowe, 2015). Two additional studies (Stuart et al., 2013; Tarrant, 2011a) offer specific insights into managing an emergency response from the perspective of school principals.

When large-scale disasters occur, they tend to result in an increase in research outputs identifying lessons learned from the event. Two major disasters that occurred within

weeks of each other, the February 2011 Christchurch (New Zealand) earthquake and the March 2011 East Japanese earthquake and tsunami, have produced lessons for schools due to their timing, which was during lunchtime and at the end of the school day, respectively. Lessons for schools from the Christchurch earthquake include: the importance of having alternative methods for communication; the challenges of reunifying families, especially if emergency contact details were not up-to-date; and the difficulty of retrieving information if computers were inaccessible or unusable (ERO, 2013). The personal impacts for teachers who were required to remain at school supervising students when they were unsure of the safety of their own families was also acknowledged (Mutch, 2015b). In the case of the East Japanese earthquake and tsunami, one of the major lessons identified was the importance of students having practised earthquake response procedures in frequent emergency drills. For example, all children at school during the earthquake and tsunami in Kamisha City (Shiwaku & Shaw, 2016) and Kesenuma City (Shiwaku et al., 2016) survived, and this was attributed to learnings from participating in emergency drills.

However, large disasters and emergencies are not the only events that enable lessons to be learned. In fact, Borum and colleague's (2010) review of school shootings in the US, found that while lessons can be learned from big and small events, the lessons from smaller emergencies that may only impact one or more schools in an area (e.g., lockdowns, small fires, minor floods) are better able to be generalised across all schools, because these types of minor, more common emergencies are more likely to occur in schools. Furthermore, where schools have planned for these smaller, more commonly occurring emergencies, it is suggested (American Academy of Pediatrics, 2008a) that they were more likely to be prepared for larger, more complex community emergencies. However, there is a paucity of research exploring small-scale school-based emergency events.

Studies investigating school-based experiences of multiple emergency types are also very rare. Such studies are useful as they allow comparisons across emergency events to identify similarities, differences, and recurring themes in the response requirements for different emergency types. Cornell and Sheras' (1998) US study identified common errors in responses to five school-related emergency events (i.e., alcohol-related fatality; self-injurious behaviour; school homicide; racial/ethnic conflict; and community violence), and Stuart et al.'s (2013) review of lessons learned from two emergency events in New Zealand schools that resulted in temporary school closures (i.e., Auckland H1N1 influenza outbreak, 2009; severe snowstorm in Canterbury, 2006), providing two of the few known examples in the school response literature. Two further

studies, from the wider disaster and emergency management field that provide suitable examples of comparing multiple emergencies and disasters, are Donahue and Tuohy's (2006) investigation of common lessons identified across four US disasters (i.e., Hurricane Katrina; September 11 attack; Oklahoma City bombing; and Hurricane Andrew), and Crichton et al.'s (2009) examination of lessons learned from seven cross-sectoral emergency incidents (i.e., Kings Cross Underground fire, UK; Texaco Refinery explosion and fires, UK; BSE crisis, UK; Auckland power outage, New Zealand; Ladbroke Grove rail crash, UK; Enschede Fireworks explosion, Netherlands; and Carlisle floods, UK). All four studies found recurring, generic lessons, irrespective of emergency type or sector, including: the need for confident, decisive leadership; the importance of reliable and effective communications; and how common it was that lessons were not learned from emergency experiences). This suggests that similar problems are common to emergency responses, and that school-based experiences may not necessarily be any different.

It is not always possible to learn lessons from direct experience, as the frequency of actual emergencies in some schools may be limited. Nor is it always necessary to learn lessons first hand, especially when lessons can be learned from the experiences of others (Stuart et al., 2013). Furthermore, Crichton et al. (2009) consider not learning from others' experiences as lost opportunities to improve preparedness efforts. In addition to learning lessons for their own school, two New Zealand studies (Stuart et al., 2013; Tarrant, 2011a) encourage school leaders to share their lessons with colleagues in other schools, to assist in enhancing the emergency preparedness and response capabilities of all schools. Initiatives encouraging schools to share their emergency response lessons with colleagues in other schools should be applauded, and promoted by practitioners and researchers.

Very little research is available investigating the 'initial response phase' of school-based emergencies, in particular, the period from when the emergency begins (e.g., warnings or alerts sounded) through to when the physical threat presented by the emergency has ended (e.g., fire put out, chemical leak cleared away), and when students are safely able to return to class or, if necessary, reunited with their families. This dearth of response research may be due to a need for clarification as to what constitutes the response phase of an emergency event. For example, existing studies that use the term 'response' in their article titles (e.g., Clettenberg et al., 2011; Cornell & Sheras, 1998; Mutch, 2014), while providing beneficial insights into school emergency management research as a whole, often include little discussion, if any, of actions *during* responses (e.g., safety behaviours, evacuation procedures, student

supervision, or the requirements associated with family reunification). Instead, the focus tends to be on the response *after* the emergency. For example, what was involved in helping students and staff cope, especially once they have returned to school after the emergency (e.g., Convery et al., 2014), which may be several weeks or months after the initial response phase of the emergency, as was the case for many schools after the 2011 Christchurch earthquake (Education Review Office, 2013). By not recognising, at the very least, the steps undertaken to ensure the physical safety of students during an emergency response, researchers are missing opportunities to identify lessons that can improve future school-based preparedness and response efforts.

One final aspect of responding to emergencies in schools in need of attention is the link between preparedness and response. As discussed, schools are encouraged to undertake a range of activities to keep students safe in emergencies, but the literature contains little explanation of how schools implement those same preparedness efforts to keep students safe during the response to emergency events, and whether specific preparedness efforts were beneficial to those response efforts. This gap in the research has been acknowledged before. In their review of crisis management in schools MacNeil and Topping (2009) identified a need for future research to investigate whether emergency plans were used during responses, and if such plans actually worked. Unfortunately, almost a decade later, we are no closer to providing answers to these and other questions about the relationship between school-based preparedness and response efforts during emergencies.

In sum, emergency experiences provide opportunities to learn lessons that can be used to improve future school-based preparedness and response capabilities. While research exploring school experiences of major emergencies is relatively common, few studies are known to have investigated smaller, more commonly occurring events. Furthermore, where such studies exist they rarely examine the 'initial response', which may require the adoption of safety behaviour, evacuations, and/or family reunification. Studies comparing multiple emergency types, to enable any commonalities or differences to be identified, are also scarce. As a result, there is a dearth of evidence supporting or contradicting the advice currently available to schools about how to prepare for and respond to emergencies.

2.5. Limitations of Previous Research

Several limitations in the understanding of how schools prepare for and respond to emergencies have been identified within this literature review. School safety has been

recognised as a priority within international disaster risk reduction (DRR) efforts. Governments, in particular Ministries of Education, have been identified as effective drivers of school safety efforts within countries. Successive New Zealand governments have made inroads in the adoption of DRR principles within the education sector, most notably in the area of safe school facilities, and to a lesser extent through efforts to promote risk reduction and resilience education in the school curriculum. However, to date it remains uncertain what, if any, progress has been made in gauging whether school disaster management activities (e.g., developing emergency plans, conducting drills, planning for education continuity) are undertaken. New Zealand schools currently lack a clear framework outlining the legislative requirements of school-based emergency management, on which to base their preparedness efforts. As a result, it is doubtful that all schools are adequately prepared to keep their students safe before, during and after emergencies.

There is consensus among researchers and practitioners for the need to ensure schools are prepared to respond to any emergencies that may occur. Currently only a small pool of studies, the majority of which are from the US, provide much of our knowledge about the current preparedness levels in schools, necessitating further research to build a more comprehensive understanding of emergency preparedness in schools. New Zealand research is well represented in the relatively limited school-based emergency management literature available, particularly in the area of hazards education programmes in schools. However, only three studies provide data on how New Zealand schools prepare for emergencies. Just one of these studies (Johnston et al., 2016), explores emergency preparedness to any significant degree, and even that study is limited in location (includes only Wellington schools), hazard type investigated (tsunami preparedness focused), and sample size (17 schools). A much broader investigation of the extent of emergency preparedness activities undertaken in New Zealand schools is needed, to more accurately reflect the overall preparedness, and by extension the response capabilities of schools.

School preparedness efforts should include emergency drills to test, practice, and evaluate school emergency plans and procedures. However, very few studies have investigated how schools conduct emergency drills. Therefore, further research is needed to increase our understanding of how drills contribute to school preparedness and response efforts. Within the existing literature, studies don't necessarily link basic drill activities (e.g., practising safety behaviours, building evacuations, accounting for all) with other aspects of school preparedness, in particular the use of drills as a means to test the effectiveness of plans and procedures (e.g., relocation, family reunification).

Large-scale community-wide events, such as ShakeOut earthquake drills, provide excellent opportunities for gathering data from schools on their drill participation experiences and general preparedness, and can be further extended to enable schools to share their lessons learned to enhance preparedness efforts and response capabilities in all schools.

Research identifying lessons from school-based experiences of emergencies have tended to focus on the larger, more extreme emergency and disaster events, when smaller, more commonly occurring events allow lessons to be more readily generalised to all schools. Furthermore, existing studies have been inclined to focus on individual emergency types, with little research investigating multiple emergency events, which allow comparisons to be made between different events to identify similarities, differences, and recurring lessons. How schools respond in the initial response phase of an emergency is arguably the least researched area within school-based emergency management. How schools keep students safe during emergencies is rarely mentioned within the literature. Such a lack of focus on response activities is somewhat surprising, given the attention preparedness efforts gets from researchers and practitioners, and may be due to a need to clarify what constitutes the response phase of an emergency event. What is evident in the literature is that there is a disconnect between the activities that are undertaken in preparing for emergencies (e.g., planning, drills, training) and how those activities are relevant in a response. We know what the research tells us is involved in a response (e.g., safety behaviours, evacuations, and reunification) but we don't have the evidence supporting or contradicting these expectations.

2.6. Summary of Research Gaps and Future Directions

To address research gaps in emergency preparedness and response in New Zealand schools, the following investigations will comprise the present research project:

- A review of the legislation, guidance and support underpinning school-based emergency management, to clarify requirements of New Zealand schools, and establish what assistance is available to support schools in meeting their statutory obligations;
- A study targeting school preparedness in New Zealand schools to establish current preparedness levels, to assist in gauging the effectiveness of school preparedness efforts;

- A large-scale investigation of lessons learned from school participation in emergency drills to identify what drill activities are practised, and how drills link to other aspects of school preparedness; and
- A study that explores emergency experiences and response in schools, focusing on multiple, small, commonly occurring school emergencies to identify strengths and weaknesses in preparedness efforts and response capabilities.

Consequently, this study aims to investigate how New Zealand schools prepare for and respond to emergency events to ensure the safety of students in their care. Chapter 3 (Research Design) discusses how the research was designed and conducted.

Chapter 3. Research Design

Chapter 2 provided a review of the school emergency preparedness and response literature, in which a lack of emergency management research available for New Zealand schools was identified. Chapter 3 discusses the research design and methods that will address this gap.

3.1. Project Aim and Research Questions

The unpredictability of future disaster events occurring, and the responsibility of schools to ensure the safety of the students in their care, requires that every effort be made to support schools in their emergency preparedness and response activities. To date school emergency management research is limited, but what is known from international research is that schools vary in the aspects of emergency management they undertake, and in the degree to which practices are implemented (e.g., Burling & Hyle, 1997; Graham et al., 2006; Petal et al., 2011; Kano & Bourque, 2007; Kano et al, 2007; RiskRED, 2009; Smith et al, 2001). Such findings are also echoed in the limited research available in New Zealand schools (Coomer et al., 2008; Johnston et al., 2016; Renwick, 2012). With little empirical evidence available to provide a picture of the strengths, weaknesses, and gaps in current New Zealand school-based preparedness efforts, researchers and practitioners are unable to accurately identify priorities to assist schools, or gauge the degree of support schools require to ensure student safety.

The aim of this research is to investigate current emergency preparedness and response activities in New Zealand schools, and identify key practices that support efforts to keep students safe during emergencies.

The primary research question for the project is:

How do New Zealand schools prepare for and respond to emergencies?

Additional research questions:

Preparedness

- What types of emergencies have schools experienced?
- What emergency preparedness activities are undertaken in schools?

- What methods do schools use to evaluate their emergency preparedness?
- To what extent do schools engage with stakeholders to assist their emergency preparedness?
- What lessons did schools learn from their participation in the 2012 New Zealand ShakeOut earthquake drill?

Legislative requirements and practitioner expectations

- What legislation directs emergency management efforts in schools?
- What are schools expected to do to meet their legislative responsibilities?
- What resources and support are available to assist school emergency management efforts?
- What monitoring and compliance requirements exist for school-based emergency management efforts?

Response

- What lessons are learned from school's emergency experiences?
- What stages are involved in an emergency response?
- What factors contribute to an effective emergency response?

3.2. Theoretical Framework

In order to design a research project that would address these research questions it was important to have a theoretical framework recognised within the field of emergency management, with pre-established roles for schools, to provide a starting point for the investigation. The parameters of this research project were guided by the *Strengthening Systems 4R (Risk Reduction, Readiness, Response, Recovery) Prevention model* (SS4R Prevention model) (Ronan & Johnston, 2005) and to a lesser extent the *Comprehensive School Safety (CSS) framework* (GADRRRES, 2014).

The SS4R Prevention model established a starting point for the research and guided the initial development of the project, while also providing a preliminary focus for the literature search. At the time the project commenced (2011), the SS4R Prevention model was the only known example of an emergency management model that

identified a specific role for schools in enhancing community resilience. The CSS framework further refined the focus of the project by identifying key school preparedness themes that allowed a reassessment of ideas that should be addressed in the research, and ensured no major themes or school emergency management elements as currently understood had been excluded. The CSS framework (introduced in Chapter 2) was developed in preparation for the 2015 Disaster Risk Reduction (DRR) Conference in Sendai, Japan, as a means by which international research from within the education sector could be brought together, to guide decision-making about school safety priorities. The SS4R Prevention model is 'functional', in that it describes the dynamic processes within the model (e.g., the 4Rs) and is focused on relationships and interactions, and the CSS framework is an example of a 'structural' model, as it describes the static structure of the framework (e.g., education policies and plans) and is focused on components of school safety (Johansson & Hassel, 2010). The SS4R model and the CSS Framework are outlined below.

3.2.1. *The Strengthening Systems 4R Prevention model*

In an effort to bring together research and practice linking schools, youth, and families in community resilience, Ronan and Johnston (2005) developed the SS4R Prevention model. The overriding philosophy of the model is one of prevention, where by undertaking steps to prepare prior to disasters, communities can increase their ability to effectively respond and recover from these events. Through the strengthening of the systems that already exist in communities, the model aims to increase resilience and reduce vulnerability.

The SS4R Prevention model incorporates elements of various natural hazard and disaster models from within the disaster theory literature. In particular, the SS4R Prevention model employs the Comprehensive Emergency Management model (Federal Emergency Management Agency, 2006) as a framework for a review of the literature around hazards and disasters, and also for the themes and recommended actions throughout the model. The Comprehensive Emergency Management model identifies the four phases within the lifecycle of a disaster or emergency (i.e., the 4Rs – risk reduction; readiness; response; and recovery) as defined in Chapter 1. The 4Rs underpin many of the research and practitioner approaches within the disaster and emergency management field.

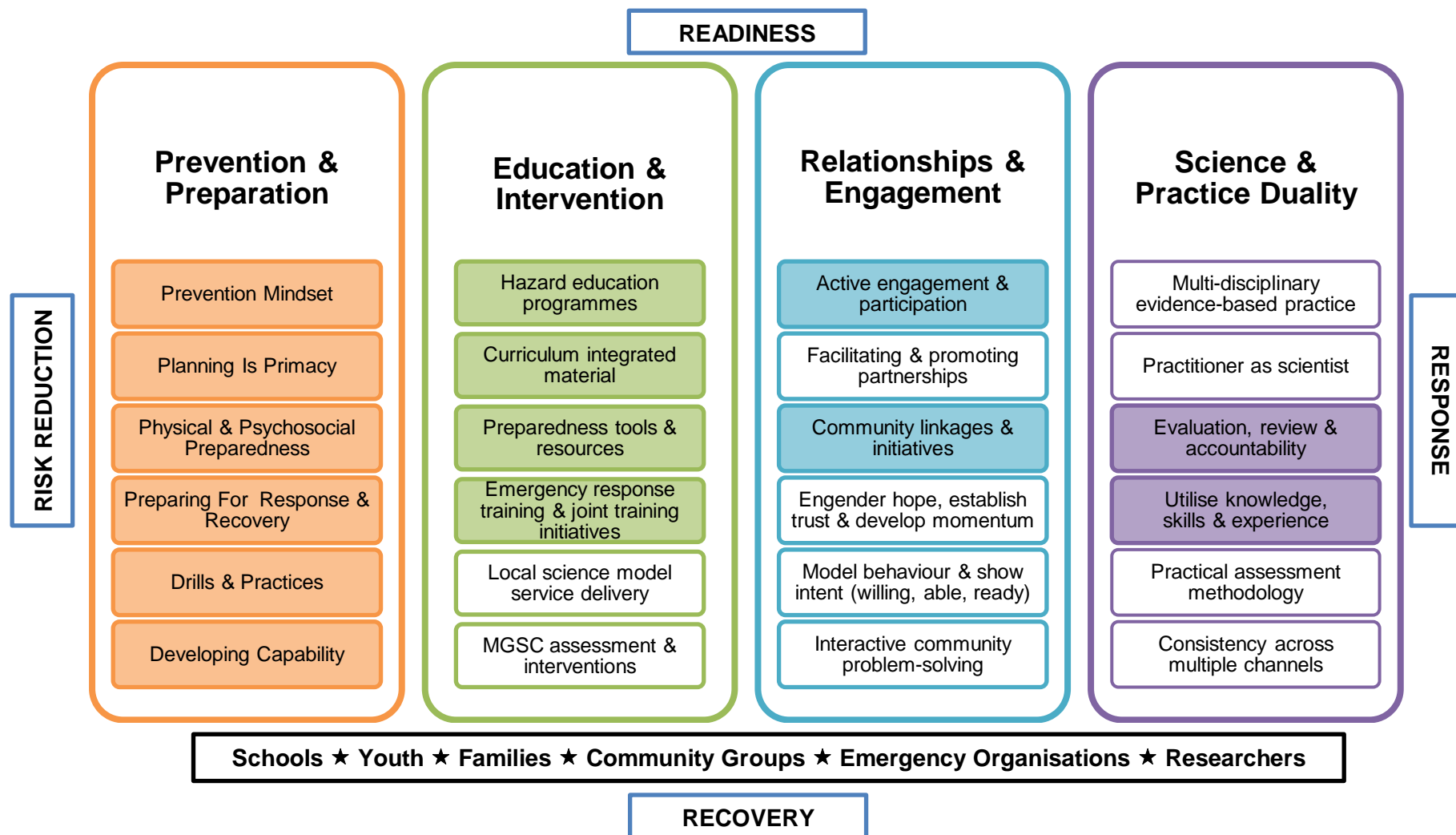
The need to pay special attention to youth and families within a disaster context is acknowledged throughout the SS4R Prevention model. In addition, schools are recognised as an untapped resource for enhancing the resilience of communities. In

particular, schools are identified as a central mechanism by which many of the key concepts within the model can be initiated and championed. Due to their existing relationships with youth and their families, schools have the potential to influence not only these specific groups but also extend that influence into the wider community by enhancing community resilience before, during, and after a disaster or emergency.

The model provides a range of ways in which schools can contribute to community resilience at the various stages of the 4R cycle, including acting as a role-model to communities as they undertake preparedness activities. The model provides the theoretical background to support the role of schools in community resilience, and provides the foundation for many activities that are now recognised as essential within school-based emergency management (e.g., family reunification planning, emotional support for students). The model addressed an obvious need in schools for research into school-based emergency management, as very little literature was available in this area when the model was developed in 2005.

The SS4R Prevention model provided a starting point for investigating emergency management in schools, and the research project builds upon many of the ideas and themes identified within the model. To clarify key components of the model, which is explained only in text in Ronan and Johnston (2005), a conceptual diagram (Figure 3.1) was developed. The conceptual diagram was sent to Ronan and Johnston for confirmation that the visual representation accurately reflected the concepts as presented and discussed in their book: *Promoting community resilience in disasters: The role for schools, youth, and families* (Ronan & Johnston, 2005).

The diagram shows the various ways in which schools can contribute to community resilience both within schools to keep students safe (e.g., planning and preparing for emergencies, conducting drills, providing hazards education and response training), and within the wider community by engaging with internal and external stakeholders to promote and support the 4Rs. Once the model had been displayed graphically, the components in the model that had a direct, or potential, relationship to school-based emergency management were selected as the focus for the literature search and development of the present research project (see highlighted blocks on Fig 3.1).



By having a focus on schools and the tasks they need to prepare for emergencies, the SS4R Prevention model provided a framework around which this research project could be structured because the model: is grounded in theory but has yet to be verified in real world situations, thus having the potential to produce new knowledge; and incorporates the themes identified in the existing literature as requiring further investigation.

The SS4R Prevention model is broad in that it covers roles that various stakeholders can have in community resilience, including schools. The CSS framework narrows down the focus to school safety, and as such specifies the types of activities to be considered in school-based emergency management efforts.

3.2.2. *Comprehensive School Safety framework*

The CSS framework (GADRRRES, 2014) advocates for school safety and education continuity, and rests upon three core pillars: (1) safe learning environments; (2) school disaster management; and (3) risk reduction and resilience education. Within each pillar are a range of preparedness components to be considered when developing school safety policies and practices within the education sector (Figure 3.2). The timely development of the CSS framework in 2014 (and later updated in 2017) provided an excellent opportunity to confirm that key aspects of school preparedness had been addressed within this research project. Themes within Pillar 2 (school disaster management), and Pillar 3 (risk reduction and resilience education), were pertinent to the project. The themes within Pillar 1 were outside the scope of the present project.

Gaps and priorities for improving future school safety and education continuity efforts are also identified within the framework. Those of particular relevance to the present study are the need to develop and promote:

- “guidance for education authorities on policies and practices of conducting multi-hazard risk analysis for school-based disaster risk reduction, preparedness, including standard operating procedures, simulation drills, contingency and educational continuity plans;
- discussion and guidance for planned and limited use of schools as temporary post-disaster shelters, while protecting educational continuity and education development investments; and
- corresponding monitoring and evaluation tools for accountability” (GADRRRES, 2014, p. 6).

All three priorities were addressed in the present research project.

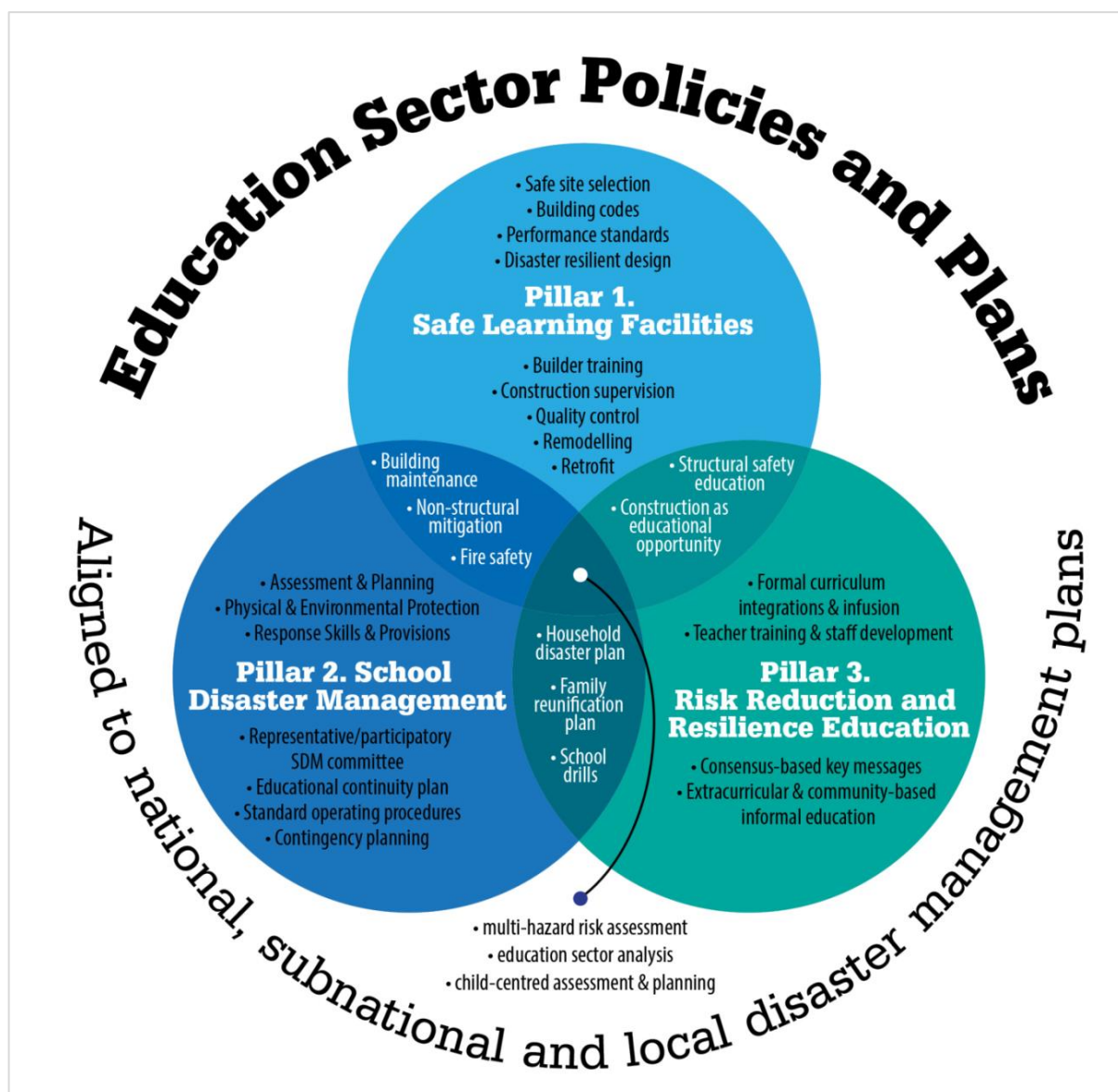


Figure 3.2 Comprehensive School Safety framework. Source: GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector), 2017.

The key school-based emergency management themes initially identified within the SS4R Prevention model, and subsequently reinforced in the CSS framework, provided the basis for the theoretical framework of the project. The CSS framework acts as a supporting structure to the model by identifying key concepts within the field of school safety. However, the CSS framework as published (GADRRRES, 2017) lacks details of the theory underpinning the framework, which is available within the SS4R Prevention model.

3.2.3. *Theoretical Rationale*

The SS4R Prevention model is grounded in theory, through a combination of disaster research across various disciplines and the principles of emergency management (i.e., comprehensive, progressive, risk-driven, integrated, collaborative, coordinated, flexible, and professional – Federal Emergency Management Agency, 2006), and as such provides a comprehensive foundation for the research project. Throughout the model, the authors use these principles and theoretical concepts to identify what schools can do to promote community resilience through their actions and activities before, during and after disasters.

When considering the important role of schools in community resilience identified in the model it seemed prudent to ask, do the theories and principles on which the model is based accurately represent emergency management in schools? In particular, are the preparedness and response concepts within the model reflective of actual practices in schools? To that end, the research project was guided by research questions targeted at an investigation of how schools prepare for and respond to emergencies (Section 3.1). The multiphase mixed methods design employed (Section 3.3), presented an opportunity to investigate both preparedness and response within a single research project, allowing for the relationships between these two stages of the comprehensive emergency management cycle, central to the SS4R Prevention model, to be explored individually and in relation to one another. Within the model and the existing literature, different methods, both quantitative and qualitative, have been utilised to collect and analyse data about how schools prepare for and respond to emergencies. For example, studies investigating emergency preparedness in schools often employ quantitative methods such as surveys (e.g., Boon et al., 2014), quasi-experimental (e.g., Ronan et al., 2012), or meta-analyses (e.g., Johnson et al., 2014c), and are conducive to various forms of statistical analyses to test existing theory. Whereas, school response studies are more likely to utilise qualitative data such as interviews (e.g., Stuart et al., 2013), observations (e.g., Zhe & Nickerson, 2007), or case studies (e.g., Cornell & Sheras, 1998), and commonly employ thematic analysis to organise, code, and discuss data. Such an approach is similar to the after action reports used by emergency management practitioners to learn lessons from their emergency response experiences (e.g., Alba & Gable, 2011).

The use of the model as the foundation of the research enabled the individual studies to test the underlying theoretical assumptions that schools would be meeting their responsibilities when preparing for emergencies (e.g., developing plans; providing

students and staff with education and training; conducting drills; and engaging with stakeholders), and that such preparations would result in an effective response. While such assumptions seem rational, it was unclear from the limited research available, if this was the case in New Zealand schools. In addition, the research project was able to strengthen the theory and practical applications of the model by providing evidence to support the role schools can play in increasing community resilience for several of the core concepts within the model (e.g., linking school and home preparedness with community resilience).

3.3. Mixed Methods Research

This research project employed mixed methods research design, aligned with a pragmatism research philosophy. (Pragmatism is discussed below.) A mixed methods research inquiry combines both quantitative and qualitative approaches for the purpose of enabling breadth and depth of understanding (Johnson, Onwuegbuzie & Turner, 2007), as using both quantitative and qualitative approaches provides a more complete appreciation of phenomena (Onwuegbuzie & Leech, 2004), thereby resulting in a superior research product (e.g., Creswell & Plano Clark, 2011; Johnson & Onwuegbuzie, 2004).

The “intellectual roots” (Denscombe, 2008, p. 271) of mixed methods research can be traced to the pioneering work of Campbell and Fiske (1959), advocating for a multi-trait, multi-method research approach to enhance validity. Other early links to a mixed methods approach included the promotion of triangulation (Denzin, 1973; Jick, 1979), compatibility of quantitative and qualitative paradigms (Cook & Reichardt, 1979), and the development of a conceptual framework for mixed methods design (Greene, Caracelli & Graham, 1989).

As a research paradigm mixed methods have tended to be placed against a background of the ‘paradigm wars’, which saw the positivist paradigm (linked with a deductive research approach, objective ontology, and quantitative methodologies) dominant from the 1950s to mid-1970s, followed by an era (mid-1970s to 1990s) in which the constructivist paradigm (linked with an inductive research approach subjective ontology, and qualitative methodologies) also became a viable option for researchers (Denscombe, 2008). Mixed methods emerged as an alternative research paradigm from the 1990s onwards and is promoted as the third research paradigm (Johnson & Onwuegbuzie, 2004), due to its ability to bridge the gap between the quantitative and qualitative paradigms (Onwuegbuzie & Leech, 2005), by allowing both deductive and inductive research approaches, objective and subjective ontologies, and

combining quantitative and qualitative research methodologies (e.g., Creswell, 2009; Ihuah & Eaton, 2013). The mixed methods paradigm does not aim to replace either the quantitative or qualitative approaches but rather to draw from the strengths, and minimize the weaknesses, of both within single research studies and across studies (e.g., Creswell & Plano Clark, 2011; Johnson & Onwuegbuzie, 2004).

Nevertheless, the mixed methods paradigm is not a panacea for researchers, and just like both quantitative and qualitative paradigms, it contains its own strengths and weaknesses. The strengths of a mixed methods approach are the versatility it affords by promoting multiple methodologies and data collection methods, and the ability to provide stronger evidence for a conclusion through convergence and corroboration of findings. Johnson and Onwuegbuzie (2004) provide a helpful summary of the weaknesses inherent to a mixed methods approach, predominant amongst them being the challenge that a mixed methods approach can have for a single researcher. The present research project addresses the challenge for a single researcher and other weaknesses of using a mixed method design (e.g., limited resources; requires knowledge of multiple research approaches) by: using a multiphase design which allows for one type of data collection and analysis at a time; seeking advice from senior academics and other experts with experience in quantitative and qualitative research methods; reducing costs by locating case studies within a single region; and utilising the extended timeframe available in the doctoral process to conduct the research.

Mixed methods research focuses on what is required to answer the research question(s), rather than on a specific philosophical approach, and some research questions require a combination of methods to answer them (Ihuah & Eaton, 2013). However, mixed methods are more than just a research methodology, and as such should seek to achieve purposes beyond simply providing a research design (e.g., Greene et al., 1989; Venkatesh et al., 2013). To that end, three additional purposes have been identified for the use of mixed methods in this research project: (1) Completeness – to develop a complete picture of how schools prepare for and respond to emergencies by using surveys for breadth and interviews and case studies for depth; (2) Expansion – to explain or expand upon the emergency preparedness activities identified in Study 1, and to use case studies to illuminate how preparedness can influence response efforts; and (3) Complementarity – to gain complementary views about how schools respond to emergency events from the perspectives of school leaders, staff, and parents.

Denscombe (2008, p. 272) provides a useful summary of the determining characteristics of the mixed methods approach, which reflects how mixed methods will be utilised in the present project (also see Figure 3.3):

- combine both “quantitative (QUAN) and qualitative (QUAL) methods within the same research project”;
- employ a multiphase research design that “clearly specifies the sequencing and priority that is given to the QUAN and QUAL elements of data collection and analysis”, across multiple studies;
- provide an account of how the “QUAN and QUAL aspects of the research relate to each other “by identifying “the manner in which triangulation“ is to be used; and
- use “pragmatism as the philosophical underpinning for the study”.

3.3.1. *Pragmatism research philosophy*

The philosophical perspective adopted by the researcher guides the design of the project and the procedures used to carry it out. Patton (2002, p. 135) suggests that “researchers must make their own decisions about the relative value of any given perspective. Each has its strengths. Each has its limitations”. Ormerod (2006, p. 907) supports this viewpoint and contends that “the only way to judge various philosophical positions [is to ask]: do they make sense, what affect would adopting them be likely to have, are they useful?” In answer to Ormerod’s questions, a pragmatic research philosophy is appropriate for the present research project, as it makes sense due to its flexibility and practical focus, and the effect of adopting pragmatism enables both deductive and inductive approaches to be utilised by employing quantitative and qualitative methods to answer the research questions.

Pragmatism can be defined as both, “a pragmatic attitude or procedure, and a philosophy...that evaluates assertions solely by their practical consequences and bearing on human interests” (Ormerod, 2006, p. 894). It is this workable approach to problem-solving that Morgan (2014) believes complements a mixed methods research approach. Mixed methods advocates believe pragmatism provides an underlying philosophical framework that is suited to a mixed method approach (Tashakkori & Teddlie, 2003), that offers a useful middle position both philosophically and methodologically (Johnson & Onwuegbuzie, 2004), by allowing for “multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis” (Creswell, 2003, p. 12).

3.3.2. Project design

“Practical, but creative, data collection consists of using whatever resources are available to do the best job possible” (Patton, 2002, p. 401).

The research project will employ a multiphase design, which allows for multiple studies within the same project that build upon what is learnt in previous phases (Creswell & Plano Clark, 2011). Each study will address a specific set of research questions that evolve to address the larger project aim (as set out in section 3.1 of this chapter). The multiphase design can be challenging for a single researcher, due to the resources required. However, the flexibility to address inter-connected research questions and the ability to publish results from individual studies, while at the same time contributing to the overall research programme, outweigh potential challenges. In discussing mixed methods research, Creswell (2009) reinforces the importance of providing a visual representation of the research process. In particular, the sequencing and priority (weighting) given to the quantitative and qualitative data collection and analysis procedures need to be specified, as does the point in the project where data integration (i.e., triangulation) will occur. Figure 3.3 provides an overview of the multiphase design employed in the project.

The integration of data-driven (inductive) and theory-driven (deductive) thematic analysis (e.g., Fereday & Muir-Cochrane, 2006) was employed across the three studies and complemented the multiphase mixed methods research design and pragmatic philosophy underpinning the project. The analysis was inductive through the use of insights and ideas from the examination of the data (i.e., survey responses; legislation, policy, guidelines and resources documents; interview transcripts) and deductive by using the established theory within the SS4R Prevention model and existing school emergency management literature. In addition, as the project progressed, learnings from the previous studies were also used to guide analysis. For example, the sequence of events identified for emergency drills in Study 1 provided a beneficial starting point when analysing the stages of an emergency response in Study 3. The combined approach allowed codes and themes within the data to be identified, and also allowed for existing theory to be supported and/or contradicted.

The thematic analysis process followed the six stages described by Braun and Clarke (2006): (1) familiarising self with the data (e.g., pre-coding through notes from interviews, initial read through of transcripts, documents, and survey responses); (2) generating initial codes (e.g., identifying what was interesting in the data, beginning to organise into meaningful groups from the data, theory, and learnings from preceding

studies); (3) searching for themes and sub-themes (e.g., refocusing at the broader level, overarching themes, creating thematic maps); (4) reviewing themes (e.g., to identify how they fit together and the story they tell about emergency preparedness and response in schools); (5) defining and naming themes (e.g., describing and refining the themes and sub-themes, whether recurring throughout the project or new to a specific study); and (6) producing the reports (e.g., writing up the studies as research papers and relating back to the research questions and aim of the broader research project).

In all three studies, Microsoft Excel was used to organise the data with coding undertaken manually. Codes were then mapped allowing themes, sub-themes, and relationships to be identified, these then became the basis for the findings and discussion within and across the three studies. Further details of the thematic analysis process for each study are included in the links to the relevant papers between chapters.

Triangulation is a common feature employed within mixed methods research (e.g., Patton, 2002) as a strategy to get closer to the 'truth' by improving the validity and reliability of a project (e.g., Venkatesh et al., 2013), as engaging multiple methods will "lead to more valid, reliable and diverse constructions of reality" (Golafshani, 2003, p. 604). The use of triangulation assists in overcoming potential bias as it facilitates validation through cross verification by combining multiple philosophies, methods, data sources, and investigators (Denzin, 1973) to study a phenomenon, entity, or event. Triangulation thereby adds breadth and depth to an investigation, by building on the strengths of each type of data collection while minimising the weaknesses of any single approach (e.g., Flyvbjerg, 2006).

In the present research, data collection methods are triangulated across the three studies through the use of both qualitative and quantitative approaches (i.e., a survey, document review, expert interviews, and case studies), and also within Study 1, where a quantitative and qualitative questionnaire was employed. Triangulated methods enable comparative analysis, in which areas of convergence increase the confidence of the research findings, and areas of divergence provide opportunities to better understand the phenomenon (Patton, 2002). In addition, data sources are triangulated in Study 2, where both document reviews and expert interviews are employed, and in Study 3, where multiple participants are interviewed in each case study. Triangulating the data sources strengthened the studies (Denzin, 1973) by allowing for the comparison of perspectives, cross-checking the consistency of information, therefore

contributing to the verification and validation of the qualitative analysis (Patton 2002), and also reducing potential bias.

Finally, as the data collection, analysis, and interpretation was conducted by a single researcher (the author) several steps were undertaken to increase the trustworthiness of the research, such as: debriefing with supervisor(s) before, during and after data collection (e.g., survey and interviews), and throughout the research process to discuss how the data had been analysed, interpreted, and the conclusions drawn; discussing research analysis procedures with experienced qualitative researchers; and presenting the research findings at workshops and conferences to allow emergency management researchers and practitioners to question the research findings and conclusions.

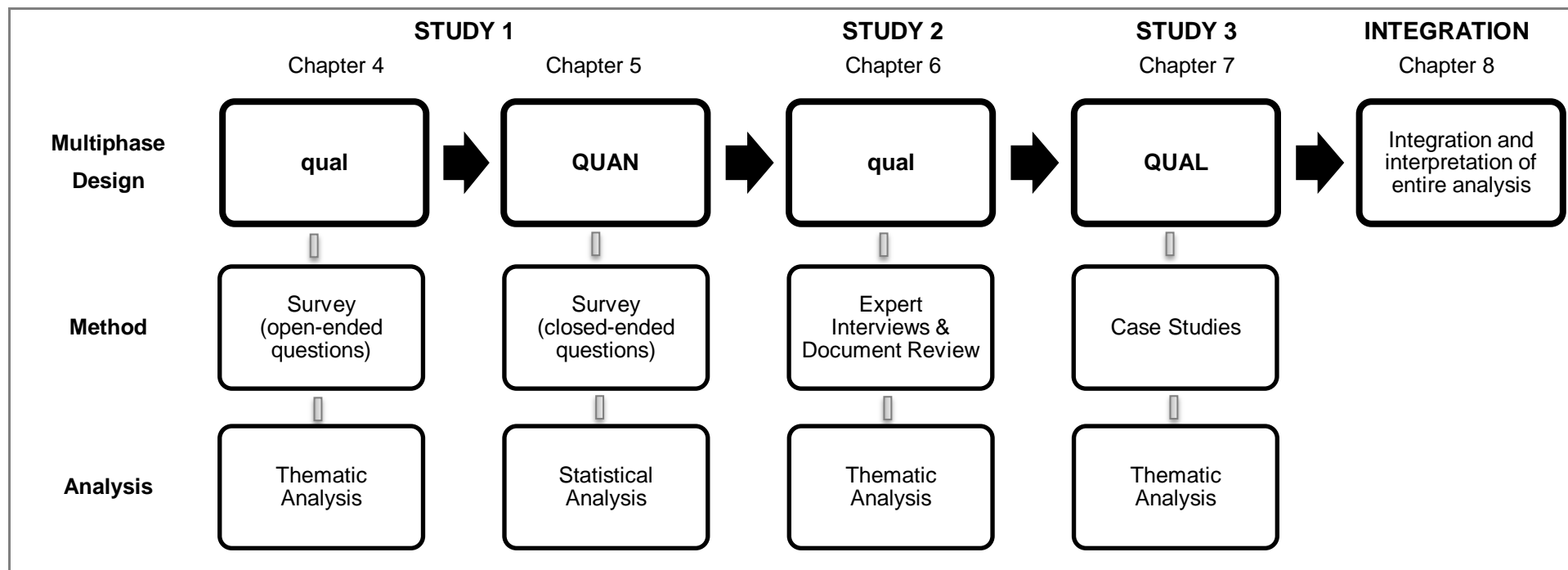


Figure 3.3 Multiphase mixed methods research strategy. Adapted from Creswell (2009), *Research design: Qualitative, quantitative, and mixed methods approaches*. Notations included in the figure have been developed within the field of mixed methods research: 'Quan' and 'Qual' stand for qualitative and quantitative, respectively; capitalisation indicates the weighting or priority given to the type of data to be collected; the black arrows represent the sequence in which data will be collected; and the vertical grey lines link each phase of the project with its related data collection and analysis methods.

3.4. Method

The research project comprises three separate, but linked studies. The studies are presented as four papers in subsequent chapters. However, broad methods for all studies are described below.

3.4.1. Study 1: New Zealand ShakeOut school participation survey (Paper 1 and Paper 2)

Study 1 was the first phase of the mixed methods research strategy in which a survey was used to collect quantitative and qualitative data from schools throughout New Zealand about participating in an earthquake drill, and emergency preparedness activities undertaken in schools.

Background

The 2012 New Zealand ShakeOut earthquake drill was organised and facilitated by the Ministry of Civil Defence and Emergency Management (MCDEM) and GNS Science². The ShakeOut provided an opportunity via schools to gather data on participating in the earthquake drill and preparing for emergencies. MCDEM and GNS Science allowed the researcher access to participating schools, and as a consequence, the author adapted questionnaires employed in US shakeouts for use in New Zealand schools for the present study.

The 2012 ShakeOut earthquake drill was conducted on September 26th to enhance preparedness and response capabilities across communities nationwide (NZ ShakeOut, n.d.b). The New Zealand ShakeOut was based on the very successful 2008 Great Southern California ShakeOut earthquake drill, the precursor to what has become an international phenomenon in which millions of people globally participate in annual community-wide earthquake drills (ShakeOut, n.d.). The New Zealand ShakeOut exercise was promoted to businesses, schools and individuals through an extensive multi-media campaign including mainstream and social media, paid advertising, government communication networks, and a dedicated ShakeOut website. As a result, more than 1.3 million people took part, almost one-third of the nation's population (New Zealand population: 4.43 million – Statistics New Zealand, 2012).

Schools in particular were targeted by organisers, and encouraged to register their participation on the official New Zealand ShakeOut website. By registering, schools

² GNS Science is a Crown Research Institute. The Institute's research focuses on geological sciences in New Zealand, Antarctica and the Pacific.

received regular ShakeOut updates and tips to help them prepare for the drill. In excess of 2000 schools (80% of all New Zealand schools) representing more than 650,000 staff and students participated in ShakeOut (MCDEM, 2013). When registering on the website, schools were asked if they would be willing to be contacted by a researcher after the drill, as the ShakeOut exercise provided an unprecedented opportunity to gather survey data from schools throughout New Zealand about their emergency preparedness activities.

Survey theory

Cross-sectional surveys are a common research method employed within the social sciences as a means to gather quantitative and qualitative data from 'populations of interest' at a single point in time, establishing a 'snapshot of how things are', and thereby enabling inferences to be made about the wider population (Kelley, Clark, Brown, & Sitzia, 2003). Dillman (2000, p. 400) contends "no other method of collecting data...offers so much potential for so little cost", and as such, a survey was identified as the ideal data collection method for Study 1.

Electronic questionnaires have become popular data collection instruments, as the advancement of technology has led to an explosion in the tools and resources available to develop, send, and administer surveys (e.g., Alam, Khusro, Rauf & Zaman, 2014; Hochheimer, Sabo, Krist, Day, Cyrus & Woolf, 2016; Weber & Bradley, 2006). For example: faster transmission and response times mean survey invitations can be delivered within seconds and responses sent as soon as the survey is completed; responses can be tracked in real-time, with non-responses easily followed up; and survey data can be easily collated and exported to other products for analysis (e.g. SPSS). While electronic surveys have many benefits for researchers, there are also challenges. In Study 1, several steps were taken to limit the weaknesses inherent in using electronic surveys. For example: ensuring the email was sent to the point of contact identified when the school registered online to participate in the ShakeOut exercise, confirming the respondent had computer access; guaranteeing privacy, which can be difficult in an electronic environment (e.g., email addresses often identified the name of the school), and assuring participants of confidentiality rather than anonymity; seeking expert advice in constructing an online survey to compensate for the authors limited knowledge; using a simplified design, testing usability, and incorporating feedback into the design; and verifying links to the survey prior to implementation and distribution. However, the advantages of electronic surveys offset the challenges of conducting a large survey-based study with a single researcher.

A primary consideration when designing survey research is the identification of existing survey instruments that can be used either in part or in their entirety, thus making the design of a new survey unnecessary or at the very least reducing the number of questions the researcher has to develop (Kelley et al., 2003; Siniscalco & Auriat, 2005). To that end, contact was established with the facilitators (RiskRED, 2009; Petal et al., 2011) of the previous ShakeOut school surveys in the US who authorised use of their questionnaires and offered assistance and advice if required.

In addition to the strengths and weaknesses identified, surveys also tend to be strong on reliability and weak on validity (Babbie, 2001). A survey questionnaire that is well designed, reflecting empirical and theoretical concepts from the literature can increase the validity of the data collection instrument (Hochheimer et al., 2016; McKinney, 2007; Nandi, 2003). The validity of the survey instrument was increased by adapting a questionnaire that had been successfully used in similar scenarios in the USA, and by pre-testing with experts (Bolarinwa, 2017).

Survey design

The present study used a self-administered, electronic questionnaire, developed and administered using SurveyMonkey.com, which provided an online facility to create surveys, collect, and analyse data. This was the same survey design programme used in previous ShakeOut-related studies in the US (Petal et al., 2011; RiskRED, 2008). The questionnaire developed for Study 1 (Appendix 1) included questions from the US surveys that were modified to reflect a New Zealand context, including: removal of US specific questions (e.g., those relating to incident command systems not used in New Zealand schools); minor changes to terminology (e.g., 'select' all that apply – not 'check'); and several questions had extra response options included to ensure the data collected would answer the research questions for the present study.

To allow survey respondents to describe the lessons learned from their experiences participating in the ShakeOut drill, and also to gather descriptive data about school preparedness efforts, a combination of qualitative (open-ended) and quantitative (closed-ended) questions were included in the questionnaire, both types of questions having advantages and disadvantages for the researcher.

Open-ended questions allow for a greater variety of responses from participants but are difficult to analyze statistically because the data must be coded or reduced in some manner. Closed-ended questions are easy to analyze statistically, but they seriously limit the responses that participants can give. (Jackson, 2009, p. 89)

The questionnaire, summarised in Table 3.1, consisted of two parts: Part A, school participation in the ShakeOut drill itself (people involved; drill types; performance of drill elements; evaluation methods; and lessons learned); and Part B, school preparedness (emergencies experienced; emergency planning; preparation measures; hazard education and training; emergency drills; preparedness evaluation methods; and stakeholder engagement.).

Table 3.1 Survey questions, topics and analysis overview

	Question	Topic	Analysis Type	Findings Reported
Demographic Information	1 – 5	School type, decile ³ , regional local, number of staff and students	Descriptive Chi-square (for school type)	Within each report / paper
Part A: Quantitative	6 – 10	ShakeOut activities	Descriptive	McBride, Becker, Coomer, Tipler, & Johnston (2014)
Part A: Qualitative	11 – 12	Lessons learned	Thematic analysis	Chapter 4 / Paper 1
Part B: Quantitative	13 – 20	School preparedness	Descriptive Chi-square	Tipler, Tarrant, Johnston & Tuffin (2015) Chapter 5 / Paper 2

The survey provided both quantitative and qualitative data. In exchange for MCDEM and GNS Science allowing the researcher access to school drill and preparedness data, it was acknowledge that MCDEM, GNS Science, and the author shared the data collaboratively. As such, the quantitative data from Parts A and B of the survey were presented as frequency tables in two GNS Science reports (McBride et al., 2014; Tipler et al., 2015). The author was provided with free access to the qualitative data from Part A, and was able to use the quantitative data from Part B for further analysis to answer the research questions as set out in section 3.1 of this chapter.

The need to test any survey instrument to gauge the effectiveness of the survey design (e.g., usability) and to identify any strengths or weaknesses prior to real world usage is reinforced throughout the literature (e.g., Andrews, Nonnecke & Preece, 2003; McKinney, 2007). Siniscalco and Auriat (2005) note the importance of also including

³ School decile ratings reflect the socio-economic status (SES) of the surrounding community, and influence government funding to the school. In decile one schools a higher proportion of the students come from low SES backgrounds, while decile 10 schools have a lower proportion (Ministry of Education n.d.).

any questions from existing surveys in pre-testing to ensure they work within the context of the new survey. The survey instrument for the present study was provided to emergency management practitioners and researchers from Massey University, the Ministry of Education, and MCDEM for pre-testing and feedback. Although opinions vary in the literature on who should test the instrument (e.g., McKinney, 2007; Siniscalco & Auriat, 2005), the cross-section of testers provided feedback on the survey design and usability, as well as the relevance of the questions to the research aim and objectives. In most cases, tester's comments were associated with terminology and the layout of questions. The feedback provided was useful and implemented into the survey design.

Ethical considerations

The survey instrument was approved by the University Ethics Committee (Appendix 1), and followed the basic principles of ethical research (e.g., Andrews et al, 2003; Kelley et al, 2003 Roberts & Allen, 2015) in which: participation was optional (with implied consent assumed for any participants who completed the survey); participants were able to withdraw from the study at any point without penalty; participants were assured of confidentiality; and participants were able to access the research findings.

Procedure

Once the national 2012 ShakeOut drill had taken place, the ShakeOut organisers provided the researcher with a list of 1918 schools that had indicated during their ShakeOut registration that they would be willing to be contacted by a researcher. The list was then screened to identify any schools that were not primary, intermediate, or secondary schools (e.g., English language schools; adult literacy services) culminating in a sample of 1878 schools. An email invitation was sent to the point of contact at each of the 1878 schools, identified when registering on the ShakeOut website. The invitation contained a weblink to the survey and an overview of the study. Information was also provided on participant requirements, data security, ethics, and contact details for the research team (Appendix 1). The survey was available to participants for one month during September and October 2012. A reminder email was sent to non-responders a week before the survey was closed.

Participants

The study used convenience sampling as the ShakeOut drill provided a readily available population. In total, representatives from 514 schools answered questions in Part A of the survey, representing 20 percent of all New Zealand schools (Education

Counts, 2012) and more than 170,000 students and staff. Three-hundred and fifty-five (355) schools (14% of all New Zealand schools), representing more than 120,000 students and adults (i.e., school staff, parents, and visitors) answered questions in Part B. Non-response was common in surveys conducted with US schools (Kano, Franke, Afifi & Bourque, 2008), with reasons for not responding including time and policy constraints (e.g., not permitted to reply to surveys that had not been authorised by superintendents or district supervisors); lack of knowledge or expertise to respond; and a lack of motivation to respond.

Two limitations were identified for the survey: (1) study participants were self-selecting and had already displayed motivation to improve school-based emergency management efforts by registering to participate in the ShakeOut exercise; and (2) the invitation to participate in the study was sent to the point of contact in each school identified in the ShakeOut registration process. Consequently, it is unclear whether the person that completed the survey questionnaire was in fact the person with complete knowledge about the school's emergency management processes.

For the most part, the sample is representative of national statistical data for the three descriptive indices used (i.e., school type; decile rating; and geographic location), with a few minor exceptions: secondary schools were over-represented, and intermediate schools were under-represented (Figure 3.4); decile 1 schools were underrepresented and decile 2 schools were over-represented (Figure 3.5); and the Wellington region was over-represented and the Canterbury region under-represented (Figure 3.6). The demographic data collected in the survey was used primarily to assess how well the sample reflected the total population of New Zealand schools. In addition, school type data was used to add an additional dimension to the statistical analysis of the survey results in Paper 2.

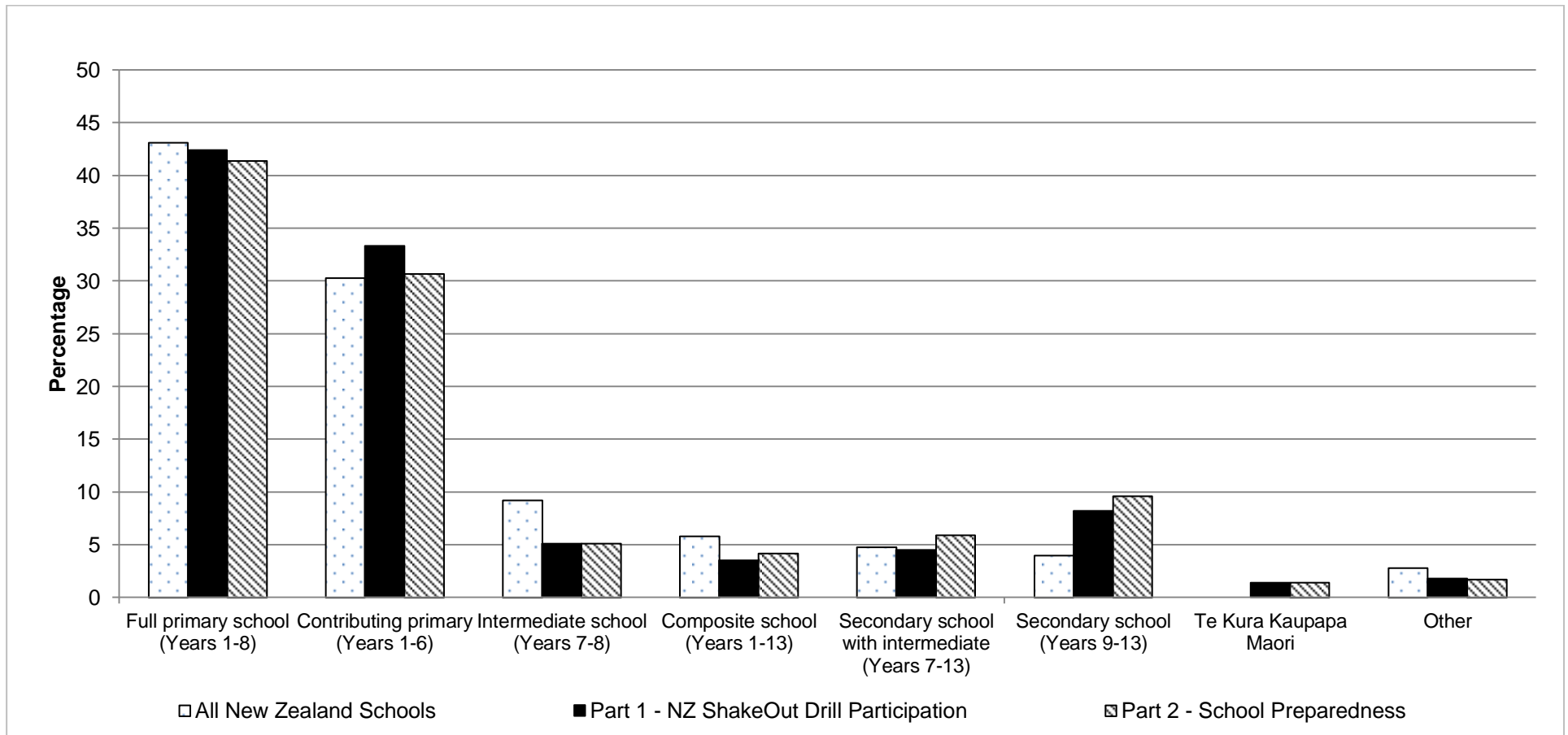


Figure 3.4 School types of participants in Study 1 (Part 1 and Part 2).

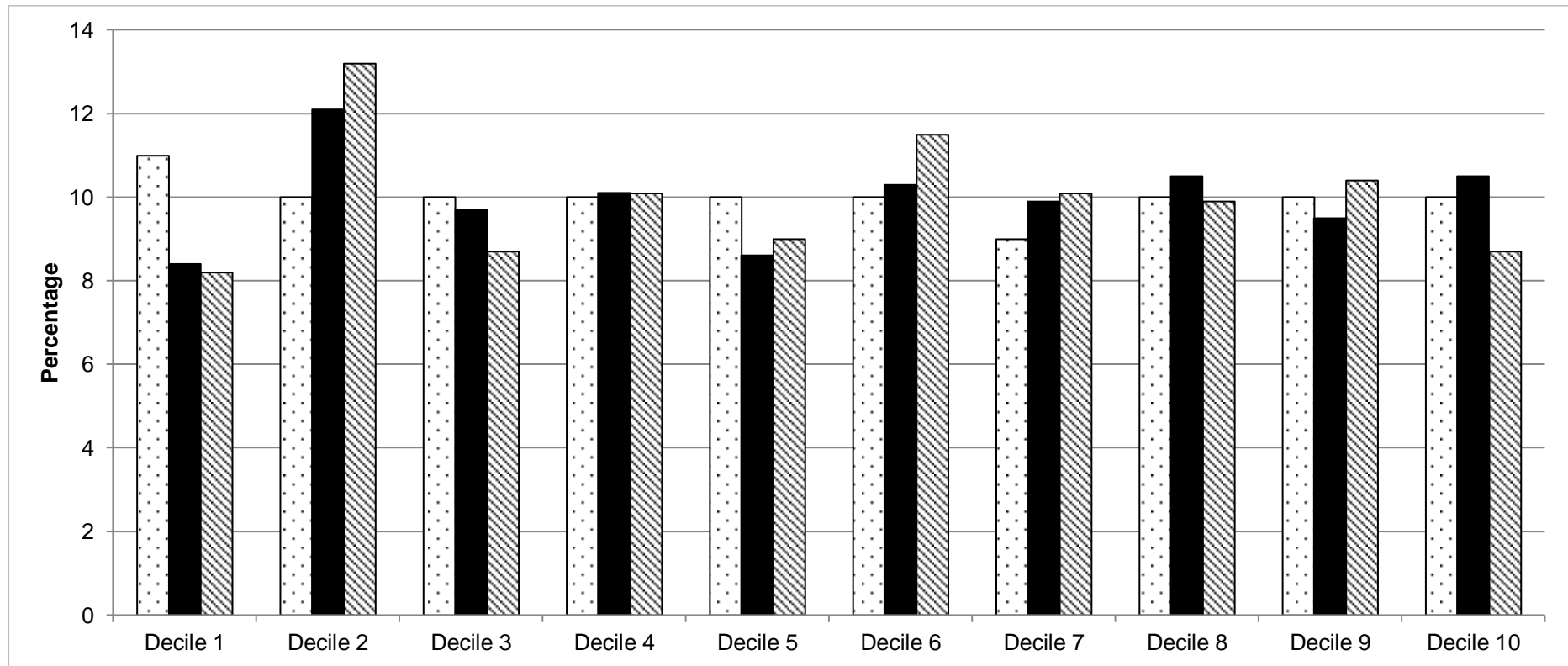


Figure 3.5 School decile ratings of participants in Study 1 (Part 1 and Part 2).

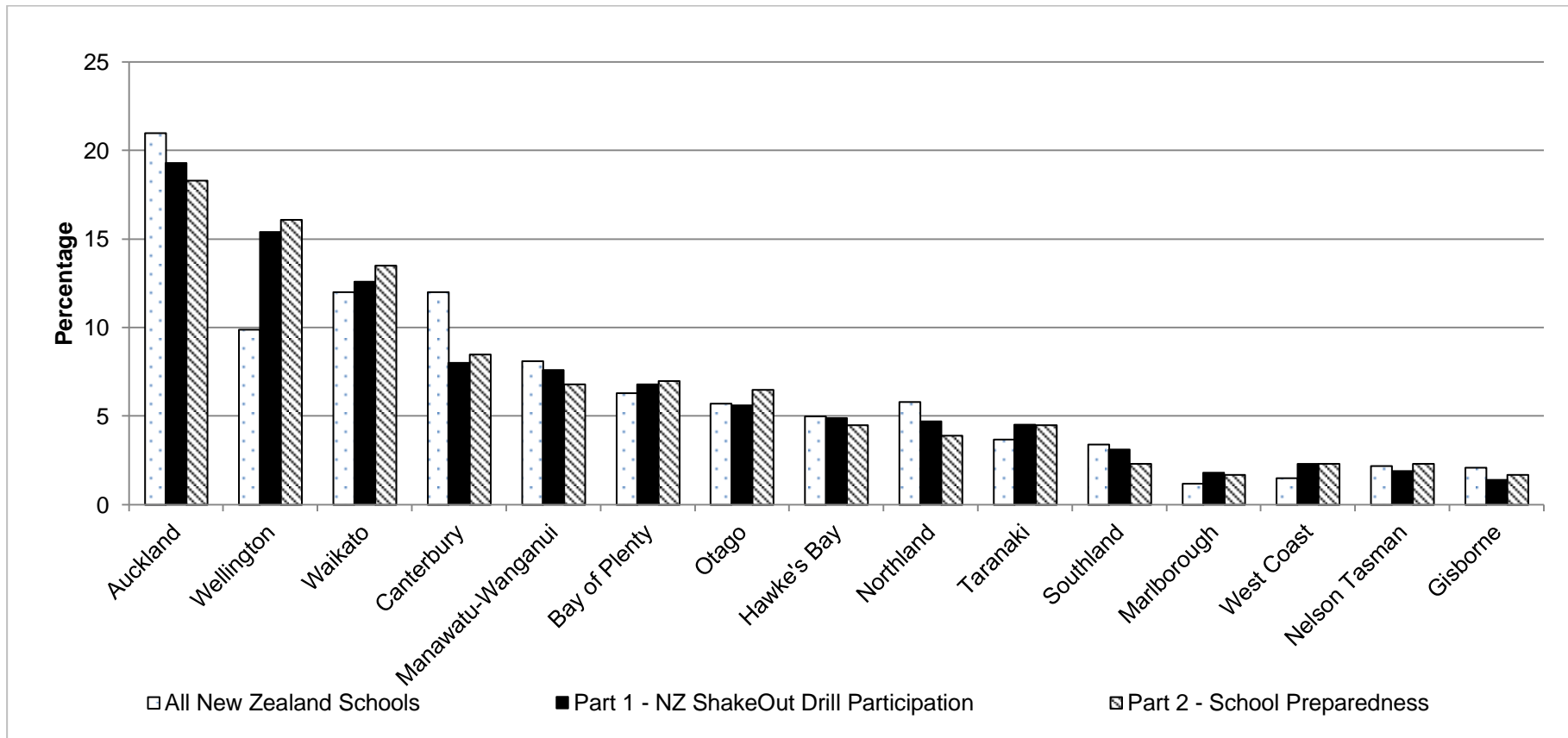


Figure 3.6 Geographic location of schools in Study 1 (Part 1 and Part 2).

Analysis

The qualitative data from Part A of the survey was collated in Microsoft Excel and then analysed using thematic analysis. Thematic analysis is a foundational method for qualitative analysis due to its flexibility and thematic freedoms and has the potential to, “provide a rich and detailed, yet complex account of data” (Braun & Clarke, 2006, p. 5), making it compatible with a mixed methods research design. Themes were identified at a semantic level to gather meaning and were used to describe the lessons schools had learned from their experiences of the ShakeOut exercise. The results of the thematic analysis are presented in Chapter 4.

Part B of the survey contained quantitative questions. The results were collated and analysed by school type using Statistical Package for Social Sciences (SPSS) 23. Chi-square tests for independence were performed to identify whether previous experience of emergencies and/or school type influenced whether or not schools had undertaken selected preparedness activities. The decision to analyse the results by school type (i.e., Primary, Secondary, and Other) allowed the varying nature of school type to be considered. For example: ages and level of independence of students; time available within the curriculum; and emergency types experienced. A p-value of 0.05 was established as the criterion for a statistically significant relationship. Post hoc testing using adjusted residuals, as described by Sharpe (2015), were employed to indicate where the significant relationships (+/- 2.0) occurred within the contingency tables. The results of the analysis by school type are presented in Chapter 5.

3.4.2. Study 2: Legislative requirements and practitioners expectations of emergency management in New Zealand schools (Paper 3)

The second phase of the mixed methods research strategy, a qualitative study, is described in Study 2. The study combined a review of relevant government legislative documents, and semi-structured interviews with emergency management experts.

A review was conducted of legislation, policies and guidelines related to safety and emergency management in schools available on the Ministry of Education’s website. This review established the statutory requirements of schools, and also identified the government resources available to assist schools in their emergency management efforts. In addition, interviews were undertaken with school emergency management experts. Interviews are useful for gathering detailed information from participants in their own words (Patton, 2002), and can be used to corroborate and expand upon

findings established from other sources (Tansey, 2007), in this case the document review. Such corroboration increases the credibility of the research findings through the triangulation of data sources (Denzin, 1973). Where such interviews are conducted with experts, the findings add further credibility to the study due to the experts' familiarity with the subject area (Bhattacharjee, 2012).

Interviews as a data collection method can present challenges for the researcher. For example, interviews can be time intensive in nature and, as such, appropriate timeframes need to be scheduled into an interview-based study to allow for interviews to be conducted, transcribed, and analysed. Furthermore, the findings from individual interviews are not necessarily generalisable (Bhattacharjee, 2012). However, in the context of the present study, generalisability was not required, but rather the expert opinions were used for clarity and to extend understanding of the requirements and expectations of schools identified in the document review.

Criteria for selecting experts

Expertise in school-based emergency management is limited in New Zealand, and can be found, predominantly, within government agencies at national (e.g., Ministry of Education) and regional (Civil Defence and Emergency Management Groups) level. The experts in the present study were selected for their experience and expertise within the education sector and emergency management field. The three practitioners interviewed (two from the Ministry of Education [MoE] and one from the Wellington Region Emergency Management Office [WREMO]) were responsible within their organisations for ensuring that schools are advised and supported in their emergency management efforts. The representatives provided both national and regional perspectives on the emergency management requirements and expectations of New Zealand schools. The MoE has oversight within the education sector, and is responsible for strategic leadership. The Ministry provides advice and resources to assist schools in preparing for and responding to emergencies. To promote and enhance community resilience, civil defence and emergency management (CDEM) groups across the country engage with schools through large-scale exercises such as ShakeOut (as described in Study 1), and within regions by interacting with individual and/or groups of schools. WREMO, established in 2012, has responsibility for supporting the nine local councils in the Wellington region in their CDEM efforts, and was selected as the setting for a regional perspective on school-based emergency management due to their recognised efforts (Doyle, Becker, Neely, Johnston, & Pepperell, 2015) to promote research, learning, and partnerships with schools in the

region to encourage individual, family and community resilience. The Wellington region was also the setting for Study 3.

Interviews

Once the study had received ethics approval (Appendix 2), the three practitioners were approached and they consented to participate in the research (see Appendix 2 for participant invitations, information sheets, and consent forms). Two semi-structured, face-to-face recorded interviews were conducted. The first was a joint interview, lasting approximately 45 minutes, with two practitioners from the MoE. The second interview was with the practitioner from WREMO, and lasted approximately 30 minutes. The interviews provided opportunities for the practitioners to share their professional expertise, understanding, and opinions about emergency management in New Zealand schools, and covered the following themes: their understanding of statutory requirements and expectations of schools; the resources and support available to schools when preparing for emergencies; engaging with schools about preparedness; current preparedness practices in schools; and advice to schools about emergency preparedness. The design for the interview guide (Appendix 2) was based on the findings of the document review, in particular relating to the legislation directing school emergency management requirements, and the ways in which schools are assisted when preparing for emergencies. The interviews were transcribed verbatim, checked twice against the recorded interview and returned to participants for checking, editing and accuracy. Respondent validation through member checking of transcripts enabled the participants to confirm the credibility of the information provided in their interviews (as recommended by Creswell & Miller, 2000).

Analysis

The analysis process combined qualitative description and thematic analysis. A qualitative descriptive approach, as advocated by Sandelowski (2000), recognises there are times when the audience simply requires a straight description of the phenomena being investigated. The approach focuses on basics such as the 'who, what, and where' of events or experiences. As a result, the use of qualitative description was consistent with the study objective of identifying the legislative requirements and practitioner expectations of school-based emergency management. Thematic analysis, as described by Braun and Clarke (2006), was used to organise the descriptive data. The principles of thematic analysis allowed for the data to be viewed in a semantic way to identify and describe patterns and ideas in the data. Data were manually coded and mapped to enable the categorisation of identified relationships

allowing themes and sub-themes to be recognised. The findings of the two interviews and the document review allowed data triangulation, thereby strengthening the study (Denzin, 1973) by cross-checking the consistency of the information. As the interviews, analysis, and interpretation were conducted by a single researcher (the author), the processes were supervised by senior academics to reduce potential investigator bias.

The results of Study 2 are presented in Chapter 6. Studies 1 and 2 established a picture of what New Zealand schools are doing, and should be doing to prepare for emergencies. It remained, however, to identify the strengths and weaknesses in school-based preparedness efforts by exploring how schools responded during real life emergency events (explored in Study 3).

3.4.3. Study 3: Emergency response experiences in schools (Paper 4)

The third phase of the mixed methods research strategy, qualitative case studies, is described in Study 3. Semi-structured interviews with staff and parents were used to explore their experiences during school-based emergency events in which they had been personally involved. Due to the operational nature of the case studies, students' perspectives were not included.

Case study theory

A case study approach, employing interviews for data collection, is consistent with a qualitative research paradigm, and research investigating emergency events naturally lends itself to the use of case studies.

Case study is often used as an approach to teach others through the illustration of one detailed event. The question the researchers ask is, 'what can be learned from this situation...that we would rather not see happen again?' But, if it were to happen, how might the crisis response be better managed as a result of the data collected and analyzed through this study (Crepeau-Hobson & Summers, 2011, p. 283)?

A multiple-case study approach (Yin, 2003) permits several emergency events, set in a similar context (e.g., schools), to be viewed from different perspectives, while also allowing for similarities and differences within and between the cases to be explored. In such an approach, "comparable data points from each interviewee" (Miles & Huberman, 1994, p. 29), about how the emergency event unfolded, are collected within each case, enabling each participant to identify the strengths and weaknesses of the emergency response from their viewpoint.

In order to meet the expectations of professional and academically sound research design requirements, a degree of structure is needed within the case study research process. It is therefore necessary to determine what the 'case' will be, and to place boundaries on the case(s) selected (Simons, 2009). As comparisons will also be made between cases, it is important that each case is chosen and analysed carefully, allowing for the potential that findings may be generalised (Miles & Huberman, 1994). The emergency events being investigated in the present study each represent a discrete unit which can be defined and set within a specific context (i.e., the three schools).

Setting, emergency types, and participants

The three case study schools were located within the Wellington region. The reasons for selecting this region were three-fold: (1) the region has a complex hazardscape, with several hazard types having a high (i.e., flood, tsunami, pandemic, and landslide) or very high (i.e., earthquake) risk of occurring (Wellington Region Emergency Management Office, 2014). Although many of these hazards occur frequently, in most cases, the impacts are limited. However, these and other emergency events (e.g., fire, threats from individuals) do provide opportunities to explore how schools in the region respond to regularly occurring, relatively minor emergencies; (2) the experts interviewed in Study 2 were from Wellington, with the WREMO representative having identified engagement with schools in the region as a priority within his organisation; and (3) the Wellington region provided a readily accessible location.

Three key emergency types were the initial focus of the case study investigation: a bomb threat (School A); a flood (School B); and an earthquake (School C). In addition, study participations were encouraged to share their experiences of any other emergency events that had occurred in the school, especially if those events identified useful lessons on preparing for or responding to emergencies.

Purposive sampling (Teddlie & Yu, 2007) was employed to achieve both representativeness and comparability across the cases. Criteria used for case study selection ensured participating schools demonstrated:

- three different (one per school) emergency types experienced;
- a combination of school type (primary and secondary); and
- a range of school deciles.

Once the study had received ethics approval (Appendix 2), schools that met the selection criteria were approached, through the principal, and invited to take part in the

study (see Appendix 3 for school invitation, information sheet and consent form). Table 3.2 provides an overview of the case study schools and participants. Once the school's participation was confirmed, the principal was asked to identify school staff and parents that may be willing to be interviewed about their experiences of the emergency being investigated. Such an approach had the potential to introduce selection bias, but it was deemed to be necessary to encourage schools to agree to participate, which had been challenging for the researcher.

Potential participants were then approached by the researcher (see Appendix 3 for individual participant invitation, information sheet and consent form). Twelve individuals with different roles, across the three schools, agreed to be interviewed for the research. Often in school-based emergency management research, a single individual (usually the principal) represents the 'perspective' of the school (e.g., Cornell & Sheras, 1998; Stuart et al., 2013). However, by including a selection of stakeholders (e.g., school leaders, staff, and parents) aspects of the emergency event could be described depending on the role of the participant during the emergency. This approach allowed for a more comprehensive picture of the event to be developed than could be provided by just interviewing one representative from the school.

Table 3.2 Overview of case study schools, participants, and emergency types investigated

School Demographics	Case Study 1 (School A)	Case Study 2 (School B)	Case Study 3 (School C)
Emergency Types	Bomb threats	Flood	Earthquake
School Type	Secondary (Years 9-15)	Contributing Primary (Years 1-6)	Full Primary (Years 1-8)
Decile	9	3	10
Number of Students	1,200	143	450
Age of Students	13-18 Years	5-10 Years	5-12 Years
Interviewees	Receptionist Technology Teacher Science Teacher Parent	Principal Administrator Teacher (Year 6) Teacher (Year 4/5) Parent	Principal Office Manager Teacher (Year 2)

Interviews

“The fundamental principle of qualitative interviews is to provide a framework within which the respondent can express their own understandings in their own terms”

(Patton, 2002, p. 348), and as a result, are able to provide lengthy, and in-depth explanations. Such an approach was ideal when exploring participants' perceptions of their experiences of emergency events. However, as identified in Study 2, interviews also have their limitations, in particular the time requirements associated with conducting, transcribing, and analysing the interview. In addition, there is also potential for recall bias, resulting in the possibility that more information is collected from some participants than others. As the case studies combined multiple perspectives to depict each emergency event, recall bias was not identified as a major threat to the validity of the study.

The semi-structured individual interviews lasted between 25-55 minutes, and were conducted at the case study school or in participants' home, as chosen by the interviewee. Interview questions were related to five main topics: knowledge of the school's emergency plans and procedures; details recalled about the specific emergency event being investigated; details recalled from any other emergency events experienced at the school; lessons learned from emergency events experienced; and advice to counterparts in other schools about responding to emergency events. The design for the interview guides (Appendix 3) were shaped by a review of the literature (e.g., Crepeau-Hobson & Summers, 2011; Stuart et al., 2013; Tarrant, 2011a) and the themes identified in the SS4R Prevention model, which provided the theoretical framework for the overall research project. The interviews were transcribed verbatim, checked twice against the recorded interview, and returned to participants for checking, editing, and accuracy. Respondent validation through member checking of transcripts enhances the credibility of the information provided by participants (Creswell & Miller, 2000).

Analysis

The six steps of thematic analysis (Braun & Clarke, 2006) were used to organise and analyse the data. The flexibility inherent in a thematic approach allowed for the data to be interpreted in a semantic way, enabling the identification and description of patterns and ideas in the data, without the need to conform to any particular philosophical approach. Each interview transcript was coded manually, and mapped individually, thereby doing justice to each participant's experience, and adding to the credibility of the overall findings, as recommended by Patton (2002). Each 'map' was then collated with those of others from the same case to identify themes, sub-themes, and relationships within the data for each case. When individual cases had been analysed, cross-case analysis (as described by Patton, 2002) provided an opportunity to identify

patterns and interconnecting themes that cut across individual cases, thereby enabling a degree of generalisation (Simons, 2009) across the three cases. As with Study 2, triangulation was used to strengthen Study 3 (Denzin, 1973) and reduce potential bias, with data triangulation in the use of multiple sources, and investigator triangulation in which the data collection, analysis and interpretation were supervised by senior academics.

Limitations

The roles of participants varied between the case study schools. While an attempt was made to include principals, teachers, administrators, and parents in each case study, this was not always possible. Selection of participants was at the sole discretion of the principal, and this meant it was necessary to proceed without the full range of participants at times (School A – no principal, and School C – no parent). It was anticipated that multiple parents would participate in each school; however, it was not possible to engage more in the time available for data collection. Although not all roles were represented in all schools, the experiences of the twelve people interviewed, allowed for multiple perspectives across the three case studies. While it is acknowledged that children can add a valuable perspective to disaster risk reduction practices (e.g., Peek, 2008; Ronan et al., 2016) no students were invited to participate in the present study. This is because the overall research project, of which this study is one part, is focused at an operational level (e.g., plans, procedures, and response capabilities of schools). However, students' experiences could be included in future research to provide an alternative perspective to that of school staff and parents of emergency events.

The findings of Study 3 are presented in Chapter 7.

3.5. Integration of Mixed Methods Research

The final phase of the mixed methods research strategy employed in this project is the integration and interpretation of the findings from the three studies, which will be presented in Chapter 8 (Conclusions).

3.6. Link to Paper 1 (Chapter 4)

Chapters 1 and 2 provided an overview of the research project and identified current levels of school-based preparedness and response in the school emergency management literature. Chapter 3 discussed the theoretical framework used in the research and also described the methods employed for each of the studies in the project. Chapters 4-7 present the research papers produced from the three studies outlined in Chapter 3. In Study 1, a survey was used to collect quantitative and qualitative data from schools throughout New Zealand about participating in a nationwide response drill, and also emergency preparedness activities undertaken in schools. Chapter 4 presents the first of two papers produced from Study 1.

Paper 1 (Tipler et al., 2016) reports the lessons learned from the experiences of schools participating in the nationwide 2012 New Zealand ShakeOut earthquake drill. The more than 1,100 lessons identified by the 514 survey participants were collated using Microsoft Excel. The study utilised the six stages of thematic analysis as described by Braun and Clarke (2006) to identify and describe patterns and ideas within the data. Coding and theme development combined both inductive (e.g., insights and ideas from an examination of the survey data) and deductive (e.g., established theory within the SS4R Prevention model and existing literature) approaches. The codes were mapped, which allowed two broad categories to be established to guide the remainder of the analysis: (1) drill procedures (sequence of events); and (2) other lessons. Themes were then identified within the two categories and used to describe the lessons learned by schools.

Paper 1 was published in *Disaster Prevention and Management*, an international journal that bridges the gap between academic disciplines and stakeholders, including policy makers, practitioners, representatives of the civil society and local communities within the field of disaster risk reduction.

Chapter 4. Paper 1: New Zealand ShakeOut exercise: Lessons learned by schools

Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2016). New Zealand Shakeout Exercise: Lessons Learned By Schools. *Disaster Prevention and Management: An International Journal*, 25(4). pp. 550 – 563. DOI: <https://doi.org/10.1108/DPM-01-2016-0018>⁴

Abstract

Purpose – The purpose of this paper is to identify lessons learned by schools from their involvement in the 2012 New Zealand ShakeOut nationwide earthquake drill.

Design/methodology/approach – The results from a survey conducted with 514 schools were collated to identify the emergency preparedness lessons learned by schools through their participation in the ShakeOut exercise.

Findings – Key findings indicated that: schools were likely to do more than the minimum when presented with a range of specific emergency preparedness activities; drills for emergency events require specific achievement objectives to be identified in order to be most effective in preparing schools; and large-scale initiatives, such as the ShakeOut exercise, encourage schools and students to engage in emergency preparedness activities.

Practical implications – Based on the findings, six recommendations are made to assist schools to develop effective emergency response procedures.

Originality/value – The present study contributes to the ongoing efforts of emergency management practitioners and academics to enhance the efficacy of school-based preparedness activities and to, ultimately, increase overall community resilience.

Keywords Lessons learned, New Zealand, Schools, Emergency preparedness, Earthquake drill, ShakeOut

Paper type Research paper

⁴ This article is © Emerald Group Publishing and permission has been granted for this version to appear here. Emerald does not grant permission for this article to be further copied/distributed or hosted elsewhere without the express permission from Emerald Group Publishing Limited. The published version is available at: <http://www.emeraldinsight.com/doi/abs/10.1108/DPM-01-2016-0018?journalCode=dpm>

Many emergency preparedness activities undertaken daily around the world have their beginnings in schools. Evacuation drills originated as a response to the unnecessary deaths of children in fires and other school-based emergencies in the USA dating back to the mid-nineteenth century (Heath et al., 2007). Although emergency drills are common in schools globally, there is little research examining the benefits of participation. Existing research suggests that drills are often simple like practising a safety behaviour, evacuating the building, and taking attendance in an assembly area (Ramirez et al., 2009). This may be, in part, due to a long held assumption that by participating in school drills children will automatically absorb the required knowledge about how to respond in emergencies. This assumption has little support in the literature, and has recently prompted researchers to ask the question: “Are drills effective exercises or rote-based routines?” The findings of Johnson et al. (2014) suggested that there is little value to individuals in participating in emergency response drills without also receiving supporting education and training. In particular, the implementation of school emergency response plans requires that staff and students also have the knowledge, resources, and skills to respond appropriately to the range of emergencies they may face (American Academy of Pediatrics, Council on School Health, 2008; Ronan & Johnston, 2005).

In New Zealand (NZ), the complex hazardscape means that both natural (e.g. earthquakes) and technological (e.g. infrastructure) hazards pose a daily risk to individuals and communities. Though large-scale emergencies are relatively rare when they do occur there is the potential for the whole country to be impacted. In 2010 and 2011 a series of large damaging earthquakes occurred in the Canterbury region of NZ. On 4 September 2010, a moment magnitude (M_w) 7.1 earthquake occurred during the night near Darfield, a small South Island town, that caused widespread damage and disruption to infrastructure across the region but resulted in no major injuries or deaths (Potter et al., 2015). Unfortunately, this was not the case for the devastating M_w 6.3 aftershock under the city of Christchurch on 22 February 2011. The aftershock occurred during lunchtime when many people were in the CBD, and as a consequence 185 people lost their lives and several thousand more required treatment for a range of injuries (Potter et al., 2015). The damage to buildings and infrastructure was extensive.

The February 2011 earthquake required all schools and early childhood education services in Canterbury to close immediately and family reunification processes to begin. In the weeks following the earthquake, the Ministry of Education (2011) provided support to more than 180 schools and 250 early childhood education providers across

the Canterbury region. The Ministry supported schools by: assessing the safety of school sites and arranging repairs where possible; arranging re-locatable classrooms; providing water, sewerage, and toilet facilities; and helping staff and students cope with the psychological impacts of the ongoing aftershocks. The earthquake response required by schools, and the scale of the assistance provided by the Ministry of Education, reinforces the importance of all schools having access to the expertise and resources necessary to respond appropriately in emergency events, thereby ensuring the safety of students. The 2010-2011 Canterbury earthquakes brought a new reality to many New Zealanders regarding the threat large-scale emergencies pose and the need to be prepared for future events.

4.1. 2012 NZ ShakeOut Earthquake Drill

In part as a response to the Canterbury earthquakes and as a means to enhance the earthquake preparedness and response capabilities of NZ communities, the Ministry of Civil Defence and Emergency Management (MCDEM) administered the first nationwide earthquake response drill in NZ. The exercise was based on the successful 2008 Great Southern California ShakeOut earthquake drill which is now an annual event across the USA, with millions participating (ShakeOut.org, n.d.).

Following a small pilot study of the ShakeOut concept in 2009 (Orchiston et al., 2013), MCDEM partnered with GNS Science, emergency response organisations, and government agencies to promote and support the 2012 NZ ShakeOut event. A national multi-media campaign combining mainstream media, social media, advertising, and government communication networks publicised the ShakeOut drill and the supporting website. The website recommended actions that participants could take in the lead up to the drill and included a variety of resources such as the correct “drop, cover, hold” procedures and resources that could be used to increase earthquake preparedness at work and home (NZ ShakeOut, n.d.a).

The ShakeOut organisers recognised the benefits of encouraging schools to be involved due to their relatively large numbers and links into homes. The Ministry of Education promoted the ShakeOut exercise prompting schools to register their participation on the NZ ShakeOut website. In addition to the earthquake response practice, schools were encouraged to review their existing emergency procedures and promote the ShakeOut drill within their community. In the lead up to the exercise, 80 per cent of schools registered as participants on the ShakeOut website and received the information necessary to take part in the drill including regular ShakeOut news

updates and preparedness tips (NZ ShakeOut, n.d.b). In total, more than 2,000 schools, representing 650,960 staff and students, participated in the ShakeOut exercise (Ministry of Civil Defence and Emergency Management (MCDEM), 2013).

Research examining emergency preparedness and response experiences in NZ schools has been limited. The study of a Wellington primary school conducting an earthquake response and family reunification exercise (Johnston et al., 2011) provides one of the few examples of earthquake drill best practice protocols for schools. Where the experiences of schools have been investigated (e.g. Stuart et al., 2013; Tarrant, 2011a), recommendations have encouraged the sharing of lessons learned to assist all schools in improving their preparedness efforts and response capabilities.

On 26 September 2012 more than 1.3 million people (of a total NZ population of 4.43 million; Statistics New Zealand, 2012) in homes, schools, and businesses throughout NZ took part in the ShakeOut exercise (NZ ShakeOut, n.d.b). The present study leveraged off this event by contributing to the MCDEM evaluation programme aimed at determining the effectiveness of ShakeOut in increasing the earthquake preparedness of NZ communities (MCDEM, 2013). The aim of the present study was to identify the lessons learned by schools during their participating in the 2012 ShakeOut earthquake drill.

4.2. Method

4.2.1. Participants

With the approval of the University Ethics Committee, invitations to participate were sent to 1,878 schools registered on the NZ ShakeOut website that had also indicated a willingness to be contacted by a researcher. In total, 514 agreed to participate representing 20 per cent of all NZ schools and more than 170,000 students and staff. The participating schools were representative of schools nationwide, with the study sample corresponding to national statistics for school type, decile (a socio-economic measure), and regional distribution according to figures available from the Ministry of Education (Education Counts, 2012).

4.2.2. Questionnaire

The study used a self-administered, electronic questionnaire based on questionnaires developed for use in the 2008 Great Southern California ShakeOut (RiskRED, 2009) and the 2011 Great Central United States ShakeOut (Petal et al., 2011). Minor

modifications were made to reflect a NZ context such as: the addition of extra NZ-specific response options for some questions; and the removal of questions specific to American schools. The survey was then piloted with emergency management practitioners and researchers from Massey University, the Ministry of Education, and MCDEM, who provided feedback. The questions covered the following ShakeOut-related themes: people involved; drill types; performance of drill elements; evaluation methods; and lessons learned.

4.2.3. Procedure

The SurveyMonkey website was used to facilitate data collection. A list of participating schools was provided by the NZ ShakeOut organisers. An e-mail invitation containing a weblink to the survey was sent to the school point of contact identified when the school registered on the NZ ShakeOut website. The e-mail invitation included a cover letter describing the study, requirements of participants, data security and anonymity, ethics information, and contact details for the researchers. The survey was accessible to participants from 27 September to 26 October 2012.

4.2.4. Analysis

Thematic analysis was used in the present study due to the flexibility and thematic freedoms it provides as pointed out by Braun and Clarke (2006). Themes were identified at a semantic level to gather meaning and were used to describe the lessons schools had learned from their experiences of the ShakeOut exercise.

4.3. Results and Discussion

Participation in the 2012 NZ ShakeOut earthquake drill provided an opportunity for schools to plan, conduct, and evaluate an earthquake response drill. The drop, cover, hold (DCH) practice enabled students and staff to learn and rehearse the correct safety actions to take when an earthquake occurs. Participating schools were encouraged to combine their DCH practice with a building evacuation drill. All participating schools completed a DCH practice, but less than half (44 per cent) also conducted a building evacuation drill. Respondents reported a range of lessons learned from their participation, the lessons falling into seven broad categories: DCH practice; building evacuation; participants in school drills; linking drills to education and preparedness; ShakeOut resources; evaluating the ShakeOut exercise; and the influence of emergency experience and preparedness research. The seven categories are

discussed below, and in some cases several lessons are reported within each category.

4.3.1. 'Drop, cover, hold' practice

Lesson: consider the effectiveness, and alternatives types, of alert systems. Most survey respondents reported the use of some form of alert (e.g. bell, siren, or alarm) to begin the earthquake drill. For the most part, alert systems worked well; however, some schools did identify problems. Most common amongst these were the inability to hear the alert in all areas of the school and the need to be able to differentiate between the alert signals used for different emergency types (i.e. fire, earthquake, lockdown). A few respondents also considered what they would need to do if alerts did not operate in an actual emergency, with one school choosing to try an alternative method that did not require electricity, to announce the beginning of their drill. A US study of emergency drills in schools found that faulty or inadequate emergency alert systems were a commonly reported challenge when conducting drills (Ramirez et al., 2009). Such findings reinforce the need to consider the effectiveness of alert systems and alternatives.

Lesson: identify alternatives to DCH if cover is unavailable or not suitable. Once the alert had sounded participants were expected to adopt the DCH safety behaviour. A small number of respondents identified concerns with staff and students not being able to DCH, often due to the size or mobility of the person, or the cover available. In a few cases, respondents reported children became anxious if they could not get to cover, or others spending too long looking for cover rather than just adopting an alternative position. Some schools had considered this possibility prior to the drill and had encouraged children to identify other options such as using the turtle safe technique, as recommended on the ShakeOut website (NZ ShakeOut, n.d.a). The "turtle" is a safety behaviour in which the individual crouches down on the ground and covers his or her head and neck with their arms, like a turtle. The "turtle" is recognised as the appropriate earthquake safety behaviour in NZ pre-schools where cover may be limited, but can be used by anyone who cannot DCH. Ensuring that children have knowledge about safety actions they can take in an emergency, including alternatives, can help reduce their vulnerability (Finnis et al., 2004).

Lesson: dispel myths around inappropriate safety behaviours. In a few schools respondents reported participants questioned the use of DCH. The NZ ShakeOut website (NZ ShakeOut, n.d.b) provided advice on the efficacy of DCH, or suitable

alternative actions, as well as dispelling myths such as the “triangle of life”, where individuals place themselves beside a table (or bed) during an earthquake so falling objects hit the table at an angle resulting in a triangle shaped space in which they are kept safe. The triangle of life myth persists despite being discredited (Lopes, 2004). Ensuring individuals have access to consistent and credible information about how to respond in an emergency can reduce their reliance on unsubstantiated myths and rumours.

4.3.2. Building evacuation

Lesson: establish criteria that would determine if and when building evacuations will occur. Once the DCH practice was completed, almost half of schools conducted a building evacuation, prompting many to consider various aspects of their evacuation processes. In particular, schools identified the need to formalise procedures about if and when they would evacuate buildings, with several asking if an evacuation is always necessary after an earthquake. Some schools indicated that they would automatically evacuate once the shaking has stopped, while others were more circumspect suggesting that decisions would need to be made at the time, dependent on severity of the earthquake and potential damage to the building. A few schools also recognised the need to have a method to trigger a building evacuation, especially if they were unable to use existing alert systems due to power failure or damage. Establishing guidelines prior to an emergency, about if and when to evacuate buildings, can reduce uncertainty and increase the effectiveness of the response.

Lesson: identify potential hazards and risks along evacuation routes and in the assembly area. On the way to their designated assembly areas several schools identified potential hazards along their evacuation route, with a few recognising the importance of having alternative routes to the assembly area. Potential issues with evacuation routes and the suitability of assembly areas have been considered in previous studies (e.g. Johnston et al., 2011; Ramirez et al., 2009), with recommendations that building evacuation drills be used as opportunities to identify such problems prior to an emergency. Many respondents also considered the need to have staff and students familiar with particular procedures to follow if they are not in their own classroom (e.g. in the bathroom, hall, or outside) when an emergency occurred.

Schools require a safe place for students and staff to assemble when a building evacuation is necessary. The area must be free from further threats, with enough

space for everyone, and in a location that allows the emergency response, or drill, to be managed effectively (e.g. accessible to emergency response agencies and for family reunification). Several respondents identified potential risks in their assembly areas, such as power lines or the possibility of liquefaction, and indicated they would be addressing these risks in future planning activities. The drill also provided an opportunity for participants to test alternative assembly areas, such as “higher ground” assembly points for schools located in tsunami inundation zones. Feedback from respondents suggested that testing alternate locations for assembling after an emergency was a useful component of the ShakeOut exercise. When planning and preparing for emergencies, time must be given to the identification, and where possible removal, of any hazards and risks on evacuation routes and in assembly areas.

Lesson: establish procedures to ensure all students, staff, and visitors are accounted for in the assembly area. The importance of accounting for everyone on site during an emergency, or a drill, was acknowledged by most schools that completed a building evacuation. The benefit of having readily accessible copies of all class rolls and student contact details was acknowledged by many, especially as schools may currently only have this information in electronic form. Most schools were confident they had appropriate procedures to account for teachers and students, with some reinforcing the importance of considering all the school staff including non-teaching personnel (e.g. librarians, administrators, caretakers) and visitors (e.g. parents, contractors, guest speakers) that may be present during an emergency. The inclusion of any on-site visitors in the drill was seen as a useful lesson for schools, with many having not considered them in their prior planning or having not involved them in previous emergency drills. In addition, some schools considered the need to have backup replacements for any staff that may be absent during an emergency, especially those that had specific response roles (e.g. wardens, first-aiders, media, or emergency services contact). To avoid unnecessary confusion in an emergency, procedures need to be developed to ensure everyone on site is able to be accounted for in the assembly area.

Lesson: establish procedures for the supervision and care of students and staff in the assembly area. The ongoing safety and management of students and staff in the assembly area was considered by many participants, with several indicating they had discussed the type of physical and psychological support that may be necessary for those requiring attention following an emergency. The need to support potentially distressed students prompted some respondents to comment on processes they had

put in place to help when communicating with and accounting for students. For example, having children sit in class and/or year groups for easier information sharing and supervision. The Wellington primary school earthquake drill (Johnston et al., 2011) recommended encouraging older children to be involved in providing support to younger students during an emergency. In particular, the study suggests reuniting siblings from other classes, thus providing comfort for these children and also making reunification easier. When planning for emergencies, consideration needs to be given to communication, supervision, and the emotional support of students and staff in the assembly area.

Lesson: plan for family reunification. There was no requirement for schools to conduct a family reunification drill as part of the ShakeOut exercise. However, many respondents acknowledged the importance of having prior plans in place to reunite families after an emergency. Several schools identified a need to review existing plans to ensure they could quickly and safely return children to their families. A key component of any reunification plan is ensuring all contact and emergency-related information is kept up-to-date. One school indicated they should also include: “[...] processes to follow if other members of the family pick up children - aunts and nanny’s mark off on [the] roll”. Encouraging schools and families to plan for reunification should be prioritised as it can provide reassurance to children and assist in bringing families together more promptly after an emergency (Johnston et al., 2011; Ronan and Johnston, 2005).

Lesson: establish formal endings to drills. Very few schools in the present study mentioned the need to have a recognisable ending to the drill. Just as emergency drills require a clear beginning, they also need a distinct end. Providing a formal conclusion to the drill affords an opportunity to recognise the role participants have played (Johnston et al., 2011), and reinforce the importance, seriousness and benefit of practising emergency response actions (Ramirez et al., 2009).

Lesson: participation in large-scale drills can help engage schools and students in preparedness activities. Overall, schools found participating in the NZ ShakeOut earthquake drill beneficial for emergency preparedness. Many schools identified areas on which to focus their future planning and preparation activities. Several respondents identified the advantage of participating in a nationwide event: “Students had a greater feeling of ownership of this exercise when they knew that thousands of others were doing the same things throughout the country, unity of purpose” and “Good to have [an] opportunity to be part of NZ-wide experience. Students & parents [were] aware that it

was happening because of [the] extensive advertising campaign". As in the present study, previous ShakeOut-related surveys of schools found that large-scale drills, with pre-identified objectives have been well supported and successful in enhancing school-based emergency management activities (Petal et al., 2011; RiskRED, 2009). Large-scale community, national and international preparedness initiatives provide opportunities to engage schools, students, and families in preparing for future emergency events.

4.3.3. Participants in school drills

Lesson: involve everyone on site in school drills. In addition to 170,000 students and staff, one quarter of participating schools had parents present during the ShakeOut drill. In most cases respondents indicated that everyone at the school at the time of the drill was expected to participate. Visitors may have included temporary staff, students visiting from other schools, contractors, and emergency or civil defence personnel present expressly as part of the ShakeOut exercise. By encouraging everyone to be involved, many schools used the opportunity to identify the different people they should consider when planning for emergencies. Encouraging everyone to participate in emergency drills provides opportunities to discover gaps in existing processes and to share the school's response plans with visitors.

Lesson: plan for those with disabilities and special needs. In more than half of schools (57 per cent), staff and students with disabilities participated in the earthquake drill, prompting many schools to consider, and potentially reassess, the requirements of those with special needs. In particular, the types of difficulties that were identified for children with disabilities that are reliant on wheelchairs, as was the need to have alternative response plans in place to support those students. A few schools also recognised that students with other special needs or health-related conditions may require additional support and assistance, including, for example, specialist support due to behavioural problems. Graham et al. (2006) found almost a quarter of schools had no provision for children with special needs in their emergency response plans. In the last decade consideration of people with disabilities or special needs has become a focus for school-based emergency management efforts (e.g. Boon et al., 2014). When planning for emergencies schools must consider the specific response requirements of those with special needs, in particular, the accessibility of evacuation routes and any additional support necessary in the assembly area.

4.3.4. Linking drills to education and preparedness

Lesson: link drills to learning opportunities for students. Many schools linked the ShakeOut drill to their classroom-based learning and found this had a positive influence on student’s knowledge and understanding of earthquakes and other hazards. Before, during, and after the drill, students: learnt about different types of hazards and the appropriate safety behaviours and response actions to take; had discussions about different emergency scenarios; identified commonalities and differences in school plans for different emergency events; and learnt about how civil defence can help in emergencies. Classroom discussions with students provided opportunities to answer questions, such as: “what [if] school leaders [are] off site?”, or “in the event of a real earthquake I would [...]”. In addition to teacher-led discussions, some schools reported students taking an active role in their peers’ learning.

Emergency response drills provide training and experiential learning opportunities for students (Ramirez et al., 2009; Wood & Glik, 2013) and present openings for the inclusion of disaster education across the curriculum (Ronan et al., 2015). Students (and staff) need to understand the “why” so they can extrapolate that out into new or unfamiliar situations (Johnson et al., 2014). Emergency drills are opportunities to engage students in learning about hazards and increasing their knowledge of how they can protect themselves by understanding appropriate response actions.

Lesson: use drills to engage with families and encourage home-based preparedness. An added benefit of the 2012 NZ ShakeOut was the opportunity the exercise provided to link the drill with the promotion of earthquake preparedness at home. Several schools indicated they had actively involved families in the drill by providing students with information about earthquakes and encouraging them to discuss this material at home. The potential benefit of using children to promote home-based preparedness has been supported in previous research investigating school hazard education programmes (e.g. Finnis et al., 2004; Ronan et al., 2008). Engaging with families about the school’s emergency plans and encouraging them to develop family plans may reduce hazards-anxiety and assist schools in responding more effectively.

4.3.5. ShakeOut resources

Lesson: improve school’s accessibility to emergency preparedness and response resources. In total, 91 per cent of respondents used resources from the NZ ShakeOut website to assist in their preparation for the earthquake drill, with the

consensus being that it was a useful tool. One quarter of schools reported using the civil defence “sting” (the NZ emergency broadcast signal that was available on the ShakeOut website and selected radio stations) to begin their DCH practice. The “sting” was the only ShakeOut resource that proved to be problematic for participants, in particular the way it was broadcast on some radio stations with one school suggesting that: “If CD alert is to be broadcast on radio it needs to be done thoughtfully. One radio station we had on in a classroom started being silly about alternative earthquake [responses] immediately after drill time and while radio still on in classroom. Kind of undermined the importance and lesson we were trying to teach”.

In addition to the ShakeOut website, schools reported using one or more of the resources available from both MCDEM (i.e. 36 per cent used the “What’s the Plan Stan?” school teaching resource; n.d.) and the Ministry of Education (i.e. 24 per cent used the emergency plans and guidelines; n.d.). One school described how they had adapted the resources to make them appropriate for their school: “[We] used our own detailed plan for emergency response and traumatic incidents, initially based on Ministry [of Education] templates but much more detailed to fit our circumstances and community”.

It would be helpful if there were a central point, similar to the ShakeOut website, where emergency management resources from the various providers (e.g. government, practitioners, and researchers) could be accessed to assist schools when planning for and responding to emergency events.

4.3.6. *Evaluating the ShakeOut exercise*

Lesson: use drills as an opportunity to evaluate the effectiveness of plans and procedures. In combination with the promotion of the earthquake drill, the NZ ShakeOut website also encouraged schools to review and evaluate their participation to assist them in gauging the effectiveness of their existing response plans and procedures. In total, 93 per cent of participants reported evaluating their school’s experience of the ShakeOut exercise. The most common evaluation methods were discussion in staff meetings (75 per cent) and in classrooms with students (71 per cent), with more than half (54 per cent) using both. One in five schools reported having produced a written report of their evaluation results, with 12 indicating they share their evaluations with the school’s Board of Trustees (school governing bodies) and in some cases with the families of students. Further research is needed to establish the extent

to which schools use any lessons identified from evaluations to improve their future emergency planning and drill procedures.

Most respondents indicated preparedness discussions with students and staff occurred both before and after the ShakeOut exercise. Discussions were not only about the earthquake drill, but also the effectiveness of the school's existing emergency plans and procedures. Examples of the types of improvements and adjustments identified by respondents included: the need to have plans readily accessible; having clear and effective leadership; regularly reviewing emergency supplies; and having effective internal and external communication plans and processes in place to assist during an emergency.

The literature (e.g. American Academy of Pediatrics, Council on School Health, 2008; Johnson et al., 2014) stresses the importance of schools evaluating their preparedness efforts, including education programmes and emergency drill performance. However, exactly what schools should be evaluating and how, requires further clarification by researchers and practitioners. In order to assess the future effectiveness of school's response capabilities, emergency plans and procedures needed to be tested and evaluated regularly in drills. After real life emergencies, it is critically important that schools evaluate their responses.

4.3.7. *The influence of emergency experience and preparedness research*

Lesson: use experience of emergency events as opportunities to promote and improve school preparedness. The 2010-2011 earthquakes in the Canterbury region have increased public awareness about earthquakes and reinforced the need for schools to be prepared for emergency events. Several Christchurch-based schools in the present study indicated how their own direct experiences of the Canterbury earthquakes had influenced their preparedness and response capabilities, in particular how the hundreds of aftershocks they had experienced had provided them with the opportunity to perfect their emergency response plans and procedures. However, a few Christchurch schools also indicated they did not want to add to anxieties children had from the previous earthquakes by making a "big deal" of the NZ ShakeOut drill. Drills require a balancing act between not scaring participants (Johnson et al., 2014) while providing the potentially lifesaving information necessary to respond effectively in an emergency (Ramirez et al., 2009).

The Canterbury earthquakes also had an influence on schools throughout NZ by providing a real world context to use while preparing for and conducting the ShakeOut drill. Several schools outside the region indicated they had sought advice from Christchurch colleagues, which they found very beneficial. In addition, many reported that their school had reviewed their existing emergency plans and procedures after the earthquakes in light of the stories they had heard from their contemporaries in Canterbury schools. Emergency events provide practical opportunities for schools to share their experiences and lessons learned to improve preparedness efforts and response capabilities in all schools.

Lesson: participating in research about emergency management can increase awareness about school-based preparedness activities. Several schools reported that completing the questionnaire made them aware of preparedness activities they had not previously considered, with comments such as: “Now I have seen this [questionnaire] I know what to do to prepare our school and we will get organised”. Such responses indicate that schools are not necessarily aware of all aspects of emergency preparedness. Guidelines on the preparedness activities schools should undertake will assist in clarifying their understanding of what is required, to meet their statutory obligations and to keep students and staff safe. It can be suggested that, by participating in the ShakeOut exercise and the present study, some schools may have considered the effectiveness of their emergency preparedness for the first time. Participation in research can be beneficial to participants, as aspects of taking part in the research can raise awareness of specific, potentially relevant or useful ideas and actions.

Some caution is required when interpreting the results of the present study. First, the study participants were self-selecting and had already displayed motivation to improve school-based emergency management efforts by registering to participate in the ShakeOut exercise. Second, the invitation to participate in the study was sent to the point of contact in each school identified in the ShakeOut registration process. Consequently, it is unclear whether the person that completed the survey questionnaire was in fact the person with complete knowledge about the school's emergency management processes. Third, the study had a response rate of 20 per cent of all NZ schools. However, it should be noted that the 514 schools in the study were representative of the range of school types in NZ, as well as school decile ratings, and their regional distribution.

4.4. Conclusions

The many encouraging comments provided by respondents in the present study demonstrate that participation in large-scale exercises like the NZ ShakeOut earthquake drill can have positive outcomes for schools. For example, through an increased understanding of the risks presented by earthquakes, improvements can be made to school emergency plans and more realistic perceptions of emergency response capabilities can be established. The present study has also demonstrated that when schools are encouraged to undertake earthquake preparedness activities, they are likely to do more than the minimum requirement of a “Drop, Cover, Hold” practice, reinforcing the effectiveness of community-based initiatives such as ShakeOut on overall school preparedness and emergency management.

4.5. Recommendations

Establish clear, specific objectives for emergency drills

Arguably, a core component of the success of the ShakeOut exercise related to the variety of ways in which schools could participate. The NZ ShakeOut website provided specific objectives schools could meet by participating. By undertaking some or all of these activities many schools identified aspects of emergency preparedness they had not previously considered. Research indicates that participants are usually happy to engage in emergency response drills (Ramirez et al., 2009), with the potential for further buy-in possible by establishing specific objectives to be achieved during the drill. Therefore, to ensure emergency drills are effective, consideration must be given to specific elements to be tested, for example: alert systems, safety behaviours, evacuation routes, assembly areas, accounting for everyone, and ending the drill.

Involve everyone in emergency drills

Participation in the NZ ShakeOut drill encouraged and, in some cases, helped establish relationships between schools and their stakeholders, in particular with the children’s families and CDEM agencies. The relationships established and the success of the 2012 NZ ShakeOut drill may act as a catalyst for future stakeholder engagement by schools. Many schools acknowledged the benefit of including everyone on site in the ShakeOut drill. In particular, the requirements of those with special needs were identified, as was considerations for parents, visitors, or guests in the school that may not be familiar with emergency plans and procedures. Initiatives like the NZ ShakeOut drill provide opportunities for communities to be involved in schools’ emergency

management efforts, while having the potential to increase home-based preparedness and, by extension, overall community resilience (Wood & Glik, 2013).

Use drills as opportunities to test alternatives and add realism

Many schools recognised the importance of regularly participating in emergency drills. Such activities were seen to aid in preparing staff and students for emergencies by reinforcing emergency training, increasing the likelihood participants would respond appropriately in an actual emergency, and providing an opportunity to test alternative scenarios, roles, and locations (Johnson et al., 2014; Johnston et al., 2011). Drills need realism and variety to maximise their effectiveness (Ramirez et al., 2009; Wood & Glik, 2013). Variety could include, for example, providing opportunities to practice alternative safety actions outside the classroom.

Link drills to learning

Emergency response drills provide opportunities to engage students in learning about hazards and disasters. By linking drills and hazard education programmes students can learn how to respond appropriately to different emergency situations, whether at school or home. Hazard education can assist in reinforcing correct safety behaviours while also providing opportunities to challenge assumptions and dispel myths. Increasing knowledge and understanding of hazards and disasters can have benefits not only for individuals, but also having the potential to increase family and community resilience (Ronan & Johnston, 2005).

Evaluate the effectiveness of emergency drills

Evaluation is a component of emergency management that is endorsed throughout the literature as critical to fine tuning plans and procedures (e.g. Johnston et al., 2011; Ramirez et al., 2009), but not always included in response drills. While most schools evaluated the ShakeOut exercise, it is unclear whether lessons learned were shared with stakeholders or implemented into ongoing planning efforts. It is important schools are encouraged to include evaluation as an element of their emergency drill procedures, through both formal reporting processes and informally in feedback from participants and stakeholders. In addition, strengths, weaknesses, and gaps identified through the evaluation process need to be considered when schools are reviewing and revising their emergency plans and procedures.

Provide opportunities for schools to share their emergency experiences

The schools in the present study were extremely forthcoming in sharing their experiences of the ShakeOut exercise with the researchers. This willingness to share the lessons they learned can be utilised to contribute to our understanding of school-based emergency management best practice and also to provide insights into how schools respond to both drills and real world emergencies. A website, such as that developed for the NZ ShakeOut, has the potential to offer schools a centralised point from which they can access school-based emergency management resources. In addition, the website could act as a forum for schools to seek advice from CDEM professionals and also to share their own emergency experiences (e.g. the Canterbury 2010-2011 earthquakes, temporary school closures, and lockdowns).

4.6. Future Research

The present study has identified the following three key areas that would benefit from further investigation: first, ongoing evaluation of emergency response drills to measure specific learning and benefits to students from participation; second, further examination of how schools use the lessons they identify in evaluations to improve their ongoing emergency preparedness efforts; and finally, exploration of school's real life experiences of emergency events in which they have been involved, to establish strengths, weaknesses and gaps in current preparedness and response efforts.

References

- American Academy of Pediatrics, Council on School Health. (2008). Disaster planning for schools. *Pediatrics* 122(4). DOI: 10.1542/peds.2008-2170.
- Boon, H., Brown, L., & Pagliano, P. (2014). Emergency planning for students with disabilities: a survey of Australian schools. *Australian Journal of Emergency Management*, 29(1), 45-49.
- Braun, V., & Clarke, V. (2006), Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Education Counts (2012). *Number of Schools*. Retrieved from: <https://www.educationcounts.govt.nz/statistics/schooling/number-of-schools>.
- Finnis, K., Standring, S., Johnston, D., & Ronan, K. (2004). Children's understanding of natural hazards in Christchurch, NZ. *Australian Journal of Emergency Management*, 19(2), 11-20.

- Graham, J., Shirm S., Ligin R., Aitken M., & Dick R. (2006). Mass-casualty events at schools: a national preparedness survey. *Pediatrics*, 117(1), e8-15. doi:10.1542/peds.2005-0927
- Heath, M.A., Ryan, K., Dean, B., & Bingham, R. (2007). History of School Safety and Psychological First Aid for Children. *Brief Treatment and Crisis Intervention*, 7(3) pp. 206-223.
- Johnson, V.A., Johnston, D.M., Ronan, K.R., & Peace, R. (2014). Evaluating children's learning of adaptive response capacities from ShakeOut, an earthquake and tsunami drill in two Washington State school districts. *Journal of Homeland Security & Emergency Management*, 11(3), 347-373. <https://doi.org/10.1515/jhsem-2014-0012>
- Johnston, D., Tarrant, R., Tipler, K., Coomer, M., Pedersen, S., & Garside, R. (2011). Preparing schools for future earthquakes in New Zealand: Lessons from an evaluation of a Wellington school exercise. *Australian Journal of Emergency Management*, 26(1), 24-30.
- Lopes, R. (2004). American Red Cross Response to 'Triangle of Life. Retrieved from: <http://www2.bpaonline.org/Emergencyprep/arc-on-doug-copp.html> (accessed November 2, 2015).
- Ministry of Civil Defence and Emergency Management. (2013). *New Zealand ShakeOut 2012: Final Report*. Ministry of Civil Defence and Emergency Management, Wellington. Retrieved from: <http://www.civildefence.govt.nz/assets/Uploads/Shakeout/NZShakeOut2012Report.pdf>.
- Ministry of Education. (2011b). *Ministry of Education annual report*. Retrieved from: www.education.govt.nz/assets/Documents/Ministry/Publications/Annual-Reports/MOEAnnualReport2011Full.pdf (accessed 20 October 2015).
- NZ ShakeOut. (n.d.a). *ShakeOut Resources*. Ministry of Civil Defence and Emergency Management, Wellington. Retrieved from: <http://www.shakeout.govt.nz/resources/>.
- NZ ShakeOut. (n.d.b). *Website home page*. Retrieved from: <http://www.shakeout.govt.nz/index.html> (accessed June 11, 2015).
- Orchiston, C., Manuel, C., Coomer, M., Becker, J. & Johnston, D. (2013). The 2009 New Zealand West Coast ShakeOut: Improving earthquake preparedness in a region of high seismic risk. *Australasian Journal of Disaster and Trauma Studies*, Vol. 2013, No. 2, pp. 56-61. Retrieved from: http://www.massey.ac.nz/~trauma/issues/2013-2/AJDTS_2013-2_Orchiston.pdf (accessed June 11, 2015).

- Petal, M., Green, R., Wood, M., & Nguyen, A. (2011). *Central United States ShakeOut Survey Report*. Retrieved from: http://www.cusec.org/documents/shakeout/2011_ShakeOut_Participant_Survey.pdf (accessed June 11, 2015).
- Potter, S. H., Becker, J. S., Johnston, D. M., & Rossiter, K. P. (2015). An overview of the impacts of the 2010-2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction*, 14, 6-14. <https://doi.org/10.1016/j.ijdrr.2015.01.014>
- Ramirez, M., Kubicek, K., Peek-Asa, C. & Wong, M. (2009). Accountability and assessment of emergency drill performance at schools. *Family and Community Health*, 32(2), 105-114. doi: 10.1097/FCH.0b013e3181994662
- RiskRED. (2009). *School Disaster Readiness in California: Lessons from the first Great Southern California ShakeOut*. Earthquake Country Alliance, Los Angeles. Retrieved from: <http://www.riskred.org/schools/shakeout2008.pdf>.
- Ronan, K.R. & Johnston, D. M. (2005). *Promoting community resilience in disasters: The role for schools, youth and families*. Springer, New York.
- Ronan, K.R., Alisic, E., Towers, B., Johnson, V.A, and Johnston, D.M. (2015), "Disaster Preparedness for Children and Families: A Critical Review", *Current Psychiatry Reports*, 17(7), pp. 1-9, DOI: 10.1007/s11920-015-0589-6.
- Ronan, K.R., Crellin, K., Johnston, D.M., Finnis, K., Paton, D., & Becker, J. (2008). Promoting Child and Family Resilience to Disasters: Effects, Interventions, and Prevention Effectiveness. *Children, Youth and Environments*, 18(1), 332-353. Retrieved from: <http://www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0332>
- ShakeOut. (n.d.). *ShakeOut Regions and Current Registration Levels*. Southern California Earthquake Centre, USA. Retrieved from: <http://www.shakeout.org/index.html>.
- Statistics New Zealand. (2012). *National Population Estimates: March 2012 quarter*. Department of Statistics, Wellington. Retrieved from: <file:///C:/Users/Jack/Desktop/Downloads/NationalPopulationEstimatesMar12qtrHOTP.pdf>.
- Stuart, K.L., Patterson, L.G., Johnston, D.M., & Peace, R. (2013). Managing temporary school closure due to environmental hazard: Lessons from New Zealand. *Management in Education*, 27(1), 25-31. doi/abs/10.1177/0892020612468928
- Tarrant, R. (2011a). Leadership through a School Tragedy: A Case Study (Part 1-The First Week). *Australasian Journal of Disaster and Trauma Studies*, 2011(3), 65-77. Retrieved from: http://trauma.massey.ac.nz/issues/2011-3/AJDTS_2011-3_01_Tarrant.pdf

Wood, M. & M., Glik, D. (2013). *Engaging Californians in a Shared Vision for Resiliency: Practical Lessons Learned from the Great California ShakeOut*. California. Retrieved from: http://www.seismic.ca.gov/pub/CSSC_13-02_ShakeOutRecommendations.pdf (accessed November 2, 2015).

4.7. Link to Paper 2 (Chapter 5)

Paper 1 (Tipler et al., 2016) identified the lessons learned by schools from their participation in a large-scale, nation-wide earthquake drill. A key finding of the paper was the need to establish specific achievement objectives when conducting drills in order for them to be most effective in preparing schools to respond effectively in emergencies. In addition, six recommendations are made to assist schools in developing effective emergency response procedures. Also within the study findings, it was noted that schools differed in the drill activities they completed as part of their participation in the ShakeOut exercise, suggesting that these differences may extend into other aspects of school preparations for emergencies.

Although essential to school preparedness efforts, emergency drills are only one aspect of school preparedness that Study 1 investigated. Paper 2 (Tipler et al., 2017a) presents the quantitative results from the survey which explored emergency preparedness in New Zealand schools. The aim of the paper was to determine if schools are ready to keep their students safe in emergencies by investigating current preparedness levels, as such an examination would assist in identifying gaps and weaknesses in existing practices. The number of survey respondents vary between Paper 1 (n=514) and Paper 2 (n=355) as less participants were willing to complete the preparedness-related questions, the reasons for which remain unclear. However, even with a reduce sample the study represents one of the largest known surveys of its kind available within the existing literature. The invitation to participate in the study was sent to the point of contact in each school identified in the ShakeOut registration process. Consequently, it is unclear whether the person that completed the survey questionnaire was in fact the person with complete knowledge about the school's emergency management processes. In addition to reporting descriptive data for all schools, Paper 2 employed chi-square statistical analysis with post hoc testing to identify significant relationships between school types, providing an additional dimension to the results and discussion.

Paper 2 was published in the *International Journal of Disaster Risk Reduction*, a United States-based journal for researchers, policymakers and practitioners across diverse disciplines. The journal publishes fundamental and applied research, critical reviews, policy papers and case studies focusing on multidisciplinary research aiming to reduce the impact of natural and technological hazards.

Chapter 5. Paper 2: Are you ready? Emergency preparedness in New Zealand schools

Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2017a). Are you ready? Emergency preparedness in New Zealand schools. *International Journal of Disaster Risk Reduction*, 25, 324-333. DOI: <https://doi.org/10.1016/j.ijdrr.2017.09.035>

Abstract

Schools have a responsibility to ensure that students in their care are kept safe during and after emergency events. This paper describes the results from a survey that explored the emergency preparedness activities of 355 New Zealand schools. The survey identified current preparedness levels for schools, the majority of which had undertaken a range of emergency preparedness activities such as developing plans, conducting drills, and providing hazards education to students. However, differences exist between schools in the extent of their emergency preparedness efforts, suggesting that many schools may be under-prepared to respond to future emergencies, especially if that response requires family reunification. The study also provided evidence to support the premise that previous emergency experience increases preparedness. The findings identified a need for clarification of the legislative requirements of schools, and also support the establishment of benchmarks and standard operating procedures for emergency preparedness activities to ensure consistency across schools. In addition, increased engagement with stakeholders, both parents and emergency management practitioners, is suggested to enhance school preparedness efforts. The present study is expected to inform policy decisions relating to school safety in New Zealand, suggest priorities for future school-based emergency management efforts, and contribute to international school safety research.

Keywords: New Zealand, schools, emergency preparedness, plans, drills

5.1. Introduction

Children are identified as among the most vulnerable populations during a disaster, particularly if they are attending school at the time (UNISDR, 2006). As a result, the

well-being of children at school has been a focus of global safety efforts. The Hyogo Framework for Action 2005-2015 (UNISDR, 2005a) and the Sendai Framework for Disaster Risk Reduction 2015-2030 (UNISDR, 2015a), have prioritised the safety of school sites, children's continued access to education, and the use of education to assist countries in improving their disaster risk reduction efforts (Shiwaku & Shaw, 2016).

School safety efforts have been further enhanced by the Comprehensive School Safety framework (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector, 2014), which has integrated international research from within the education sector. The Comprehensive School Safety framework has provided the global education sector with guidance on disaster risk reduction by identifying strategic goals and priorities to consider when planning for the safety of students at school, and children's continued access to education after disasters. Three pillars provide the foundation for the Comprehensive School Safety framework: (1) safe school facilities; (2) school disaster management; and (3) risk reduction and resilience education. Each pillar includes a range of preparedness activities that can be undertaken prior to disasters and emergencies to ensure the safety of students (e.g., retrofitting buildings to make them earthquake safe, developing emergency plans and testing them in drills, and integrating hazards education into school curricula). The Comprehensive School Safety framework reflects the priorities of both the HFA and SFDRR. All three frameworks provide inter-related instruments to guide government policy and planning within the education sector.

Schools are focal points within communities as they provide a direct link with children and families (Ronan & Johnston, 2005). In addition to their primary role as education providers, school leaders also have responsibilities to ensure that students are provided with a safe learning environment and protection should an emergency occur while students are at school (e.g., Bastidas & Petal, 2012; UNISDR, 2006). This duty-of-care responsibility necessitates that schools develop emergency plans safeguarding student (and staff) safety (e.g., Chung, Danielson & Shannon, 2009), including having student release and family reunification procedures in place that ensure children are returned to their custodial parent in an emergency (Graham, Shirm, Liggin, Aitken & Dick, 2006). Schools can also have a significant role in helping students, their families, and the community recover from emergencies and disasters by providing a stable and familiar environment for students, allowing them to re-establish some of their core routines (e.g., Peek, 2008; Ronan, 2015).

A vast amount of information is accessible on the internet to aid schools with their emergency preparedness efforts, most commonly in the form of checklists and templates, often with little or no supporting evidence. Less common, but arguably more useful to schools are the guidelines and advice provided by government agencies (e.g., US Department of Education, 2013) or United Nations affiliated organisations (e.g., International Finance Corporation, 2010). For the most part, preparedness advice to schools encourages the development of emergency plans, response training to staff, frequent emergency drills, and the evaluation of school-based preparedness efforts.

In contrast to the plethora of information available on what schools should be doing to prepare for emergencies, the research examining the nature and levels of emergency preparedness efforts in schools is limited. The majority of research has been conducted in the USA. However, since the mid-2000s more of an international perspective has developed with studies available from: the UK and Europe (e.g., MacNeil & Topping, 2009; Zantal-Wiener & Horwood, 2010); the Middle East (e.g., Hosseini & Izadkhah, 2006; Momani & Salmi, 2012); Asia (e.g., Elangovan & Kasi, 2015; Shiwaku, Ueda, Oikawa & Shaw, 2016); and Australasia (e.g., Boon, Brown, & Pagliano, 2014, Johnston et al., 2016). In addition, researchers in the US have moved their attention from a focus on school preparedness at a state or district level (e.g., Brock, 2000; Burling & Hyle, 1997; Smith, Kress, Fenstemaker, Ballard & Hyder, 2001) to collecting data from individual schools (e.g., Kano, Ramirez, Ybarra, Frias & Bourque, 2007; Ramirez, Kubicek, Peek-Asa & Wong, 2009) in an effort to more accurately reflect actual school-based preparedness levels.

The international research to date, has identified common weaknesses relating to preparedness across schools and school districts including: content of emergency plans varying greatly between schools, districts, and states (e.g., Boon et al., 2014; US Government Accountability Office, 2007); limited testing of plans through emergency response drills (e.g., Graham et al., 2006; Ramirez et al., 2009); little evaluation of emergency preparedness activities (e.g., Hosseini & Izadkhah, 2006; Johnson, Ronan, Johnston & Peace, 2014c); and a lack of collaboration between schools and their stakeholders (e.g., parents, emergency management agencies) when preparing for emergencies (e.g., Awofisayo, Ibbotson, Smith, Janmohamed, Mohamed, & Olowokure, 2013; Alba & Gable, 2012). As a result of these variations in preparedness, it is possible that not all schools have the capabilities to respond effectively to an emergency event, to ensure student safety.

5.1.1. *Emergency management in New Zealand schools*

In New Zealand, historically school-based emergency management has had a relatively low profile. Early research focused on students' access to and participation in school-based hazards education programmes (summarised in Ronan, Crellin, Johnston, Finnis, Paton & Becker, 2008). Due in part to the 2010-2012 Canterbury New Zealand earthquakes, attention given to emergency preparedness in New Zealand schools has experienced somewhat of a renaissance. The Canterbury earthquakes reinforced the importance of ensuring schools are adequately prepared to respond to both large and small-scale emergency events. As a result, school leaders throughout the country sought advice from their colleagues in Canterbury about preparing for and responding to emergencies (Education Review Office, 2013; Tipler, Tarrant, Johnston & Tuffin, 2016).

The earthquakes also acted as a catalyst for researchers wanting to gain insights into how schools could be better prepared to respond and recover from future emergencies. There have been several studies undertaken with Canterbury schools exploring: preparedness for students with special needs (Ronoh, Gaillard & Marlowe, 2015a, 2015b); the influence of the earthquakes on curriculum-content (Johnson & Ronan, 2014; Taylor & Moeed, 2013); and how staff and students responded to and recovered from the earthquakes (e.g., Gibbs, Mutch, O'Connor & MacDougall, 2013; Mooney, Tarrant, Paton, Johal & Johnston, 2017; Mutch, 2015a; 2015b; Pine, Tarrant, Lyons & Leathem, 2015).

In parallel with research undertaken in Canterbury, another small group of researchers has looked at New Zealand school-based emergency management efforts outside the Canterbury region. Several of the studies have examined preparedness, in particular hazards education programmes (e.g., Johnson, Ronan, Johnston & Peace, 2014b; Ronan, Crellin & Johnston, 2012), and emergency drills (e.g., Johnston, Tarrant, Tipler, Coomer, Pedersen & Garside, 2011; Tipler et al., 2016). In addition, two studies have explored how schools responded to specific emergency events, in an effort to learn lessons from their experiences. Stuart, Patterson, Johnston, and Peace (2013) investigated the experiences of eleven school principals who were required to temporarily close their schools in response to an emergency (i.e., H1N1 influenza outbreak – 4 schools; a winter snow storm – 7 schools). Tarrant (2011a; 2011b, 2014) has produced a series of articles exploring leadership, and faith in a school tragedy where six students and a teacher died during an outdoor adventure fieldtrip.

There is no doubt that schools care for the welfare of their students on a daily basis, but it is uncertain whether schools are also adequately prepared to respond effectively in an emergency event. To date, only two small studies, both set in the Wellington region, have explored aspects of school preparedness in New Zealand. Coomer, Johnston, Edmonson, Monks, Pedersen and Rodger (2008) surveyed 101 school principals regarding hazards education programmes conducted in their schools. The survey also included general preparedness questions. For example, principals were asked if they: discussed emergency procedures with students; conducted emergency drills; had emergency supplies (e.g., food and water) on site; and engaged with external stakeholders (e.g., Civil Defence and Emergency Management practitioners). The second more recent survey (Johnston et al., 2016) conducted with principals and teachers from 17 schools located in potential tsunami inundation zones around the Wellington region, explored what tsunami preparedness activities were undertaken in their schools. Findings from both Wellington-based surveys echo what is seen throughout the international literature – schools vary in the extent and type of their preparations for emergencies, and as a result may be under-prepared to keep their students safe in an emergency.

These two Wellington studies have provided some insights into potential response capabilities of the schools surveyed, but more information is needed. Therefore, the aim of the present study was to determine if New Zealand schools were ready to keep their students safe in emergencies by investigating current preparedness levels. Such an investigation was expected to identify gaps and weaknesses in existing practices. In addition, knowledge of existing preparedness levels could be used to inform policy decisions and suggest priorities for future school-based emergency management efforts.

5.1.2. Research questions

- What types of emergencies have schools experienced?
- What emergency preparedness activities are undertaken in schools?
- What methods do schools use to evaluate their emergency preparedness?
- To what extent do schools engage with stakeholders to assist their emergency preparedness?

5.2. Method

5.2.1. *Background to the present study*

On September 26th 2012, a nationwide earthquake drill, the '2012 New Zealand ShakeOut', coordinated by the Ministry of Civil Defence and Emergency Management (MCDEM), was conducted to enhance preparedness and response capabilities of New Zealand communities (NZ ShakeOut, n.d.b). The New Zealand ShakeOut was based on the very successful 2008 Great Southern California ShakeOut earthquake drill, which has subsequently resulted in millions of people globally participating in annual community-wide earthquake drills (ShakeOut, n.d.). The New Zealand ShakeOut exercise was promoted to businesses, schools and individuals through an extensive multi-media campaign including mainstream and social media, paid advertising, government communication networks, and a dedicated ShakeOut website. As a result, more than 1.3 million people took part, almost one-third of the country's population (New Zealand population: 4.43 million – Statistics New Zealand, 2012).

Schools in particular were targeted by organisers, and encouraged to register their participation on the official New Zealand ShakeOut website. By registering, schools received regular ShakeOut updates and tips to help them prepare for the exercise. When registering, schools were asked if they would be willing to be contacted by a researcher after the exercise. The 2012 ShakeOut exercise, involved in excess of 2000 schools (<80% of all New Zealand schools), representing more than 650,000 staff and students (Ministry of Civil Defence and Emergency Management, 2013). The exercise provided an unprecedented opportunity to gather survey data from throughout New Zealand to investigate the emergency preparedness activities currently undertaken in schools. Approval for the present study was granted by the Massey University Human Ethics Committee.

5.2.2. *Participants*

Representatives from three-hundred and fifty-five (355) schools (14% of all New Zealand schools), representing more than 120,000 students and adults (i.e., school staff, parents, and visitors) completed the school survey following the ShakeOut exercise. Comparison with school-based demographic data for 2012, available from the Ministry of Education (Education Counts, 2012), showed the sample for the present study was nationally representative for school type, decile rating (a socio-economic measure used to allocate government funding), and regional distribution. Response options for school type are categorised in three groups: Primary (Years 0-8; n=274);

Secondary (Years 9-13; n=55); and Other (Years 0-13; n=26). Schools identified as Other included Māori immersion, special needs, and composite Primary/Secondary.

5.2.3. Questionnaire – New Zealand Shakeout school participation survey

The present study used a self-administered, electronic school preparedness questionnaire adapted from the questionnaire originally developed for use in the 2008 Great Southern California ShakeOut exercise (RiskRED, 2009). The questionnaire for the present study was a simplified version of the original, enabling it to be reduced from 49 questions to 20 (including demographic information). The reduction in size allowed the survey to be focused, while still answering the research questions. Modifications to the questionnaire included changes to the question layout (e.g., allowed multiple response options in all questions, excluding demographics) and changes to content (e.g., removal of a number of questions relating to incident command systems). A draft of the New Zealand questionnaire was provided to emergency management practitioners and researchers from Massey University, the Ministry of Education, and MCDEM, for comment. Feedback on the survey layout, usability, and relevance of questions, was implemented into the survey design. The final survey included questions on seven preparedness-related topics: emergencies experienced; emergency planning; preparation measures; hazards education and training; emergency drills; preparedness evaluation methods; and stakeholder engagement.

5.2.4. Procedure

Data collection was facilitated through the SurveyMonkey website. An email invitation was sent to the point of contact at individual schools, identified when the school was registered on the New Zealand ShakeOut website. The invitation also contained a weblink to the survey and an overview of the study, participant requirements, data security information, ethics information, and contact details for the research team. The survey was available to participants for one month during September and October 2012. A reminder email was sent to non-responders a week before the survey was closed.

5.2.5. Analysis

Chi-square analyses (standard significance level of $p < .05$) were used to identify if previous experience of emergencies and/or school type influenced whether or not schools had undertaken selected preparedness activities. Post hoc tests based on

adjusted residuals (AR) with significance levels +/- 2.0, as described by Sharpe (2015), were used to determine which cells made the greatest contribution to the chi-square test results.

5.3. Results

The results represent an overview of school preparedness levels 18 months after the February 2011 Christchurch (New Zealand) earthquake. To answer the four research questions, results are presented under the following four emergency preparedness-related themes: (1) Types of emergencies experienced in schools; (2) Emergency preparedness activities undertaken in schools; (3) Methods used to evaluate school emergency preparedness efforts; and (4) Stakeholder engagement to assist school emergency preparedness efforts. Results are presented for all schools, and by school type (i.e., Primary, Secondary, and Other), as the nature of school type can vary. For example: ages and level of independence of students; time available within the curriculum; and emergency types experienced.

5.3.1. *Types of emergencies experienced in schools*

Almost two-thirds (62%) of schools had experienced at least one emergency event in the three years from 2010 to 2012, as shown in Figure 1. The most common emergencies were weather-related events (44%), fires (33%), and earthquakes (28%). A significant relationship was revealed between school type and incidents of staff or student deaths out of hours (χ^2 (2, N=220) = 21.446, $p < .001$), with Secondary schools reporting higher frequencies of deaths (AR 4.6). Furthermore, Secondary schools also reported higher percentages of violence/bomb threats (23%), compared with Primary (7%) and Other schools (no incidents reported). Emergency events had required 42% of the schools to close temporarily.

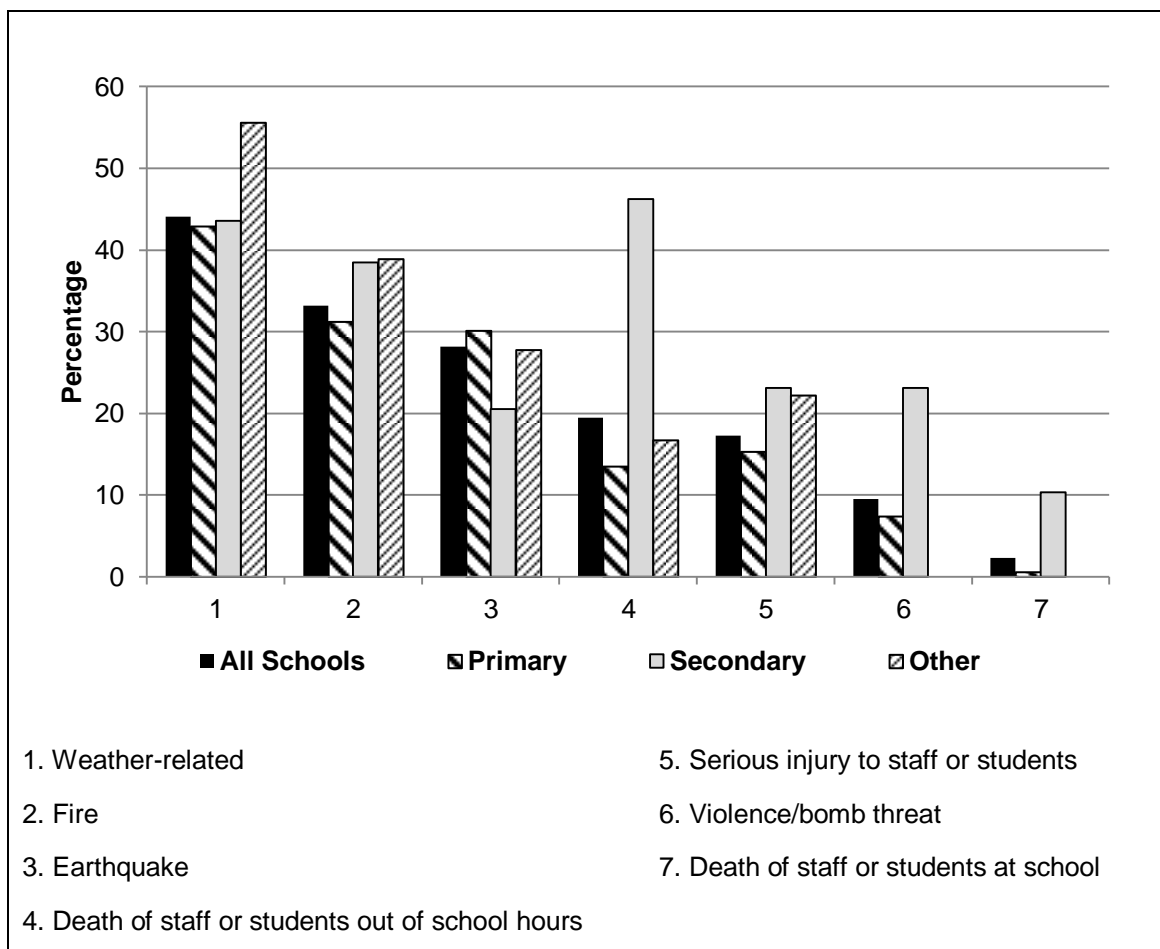


Figure 5.1 Types of emergencies experienced in all schools, and in individual schools by type (2010-2012).

5.3.2. *Emergency preparedness activities undertaken in schools*

Respondents were asked if they undertook a selection of emergency preparedness activities in their school. Table 5.1 shows participant responses to questions about 19 specific emergency preparedness activities, divided into three subgroups: Emergency planning (comprising 8 activities); Preparation measures (6 activities); and Hazards education and training (5 activities).

Table 5.1 Emergency preparedness activities undertaken in total and by school type

PREPAREDNESS ACTIVITIES	School Types				p-value	
	All Schools	Primary	Secondary	Other	School Type	Experience
Emergency Planning						
Developed an emergency plan	91%	92%	93%	76%	.056	.613
Identified roles and responsibilities of staff	93%	92%	98%	92%	.246	.049
Staff aware they need to remain at school to supervise students in an emergency	77%	80%	61%	80%	.009	.658
Established emergency communication plans	73%	74%	72%	64%	.566	.797
Planned for staff or students with disabilities	63%	61%	70%	60%	.441	.263
Identified staff who may need to be released early	45%	48%	32%	40%	.081	.001
Established plans for continuity of school operations	41%	40%	43%	40%	.945	.398
Developed maps identifying evacuation routes and locations (e.g., tsunami)	34%	33%	33%	36%	.964	.768
Preparation Measures	All Schools	Primary	Secondary	Other	School Type	Experience
Ensured emergency exits have signage and kept clear	93%	94%	87%	96%	.168	.704
Ensured emergency equipment is in place and maintained regularly	74%	76%	75%	60%	.230	.828
Established the earthquake risk of school buildings	70%	67%	78%	72%	.276	.173
Secured tall or heavy furniture and equipment to walls	51%	52%	51%	48%	.938	.875
Provided emergency supplies (e.g., food, water)	43%	46%	29%	38%	.068	.040
Provided emergency 'grab bags/get away kits' in each work area / classroom	20%	22%	14%	13%	.253	.041
Hazards Education and Training	All Schools	Primary	Secondary	Other	School Type	Experience
Provided first aid training to all or some staff	94%	94%	98%	92%	.388	.002
Encouraged staff and students to prepare for disasters at home	72%	77%	50%	67%	.001	.858
Provided classroom teaching on disaster preparedness to students every year	62%	64%	50%	67%	.142	.176
Provided support material staff and students about preparing for disasters at home	51%	55%	35%	38%	.011	.458
Provided psychological first aid or crisis counselling to all or some staff	15%	8%	39%	29%	.001	.236

Emergency planning

The majority of schools (91%) reported having emergency plans, with Other schools (e.g., Māori immersion, special needs: 76%) the least likely to have developed a plan. School type was revealed to have a statistically significant influence on whether staff were aware they needed to stay at school after an emergency to supervise students (X^2 (2, N=343) = 9.514, $p < .001$), with Primary school staff having an increased awareness of the need to remain (AR 2.5). Similarities and differences were also identified between schools for other planning elements. For example, more than a quarter of schools, irrespective of type, had not developed emergency communication plans. Furthermore, previous experience resulted in higher incidences of schools having identified the roles and responsibilities of staff in an emergency (X^2 (1, N=343) = 3.887, $p < .049$), and also of having identified staff who may need to be released early in an emergency (X^2 (1, N=343) = 10.634, $p < .001$). The needs of staff and students with disabilities had been included in plans in less than two-thirds of Primary (61%) and Other (60%) schools, with rates slightly higher in Secondary schools (70%). Reported rates of planning for the continuation of school operations after an emergency were low in all schools (41%). One-third of schools (34%) had developed site and neighbourhood maps indicating evacuation routes and alternate sites for relocation.

Preparation measures

Preparation measures are put in place to reduce damage and injuries, while also assisting the response effort. Significant relationships were revealed between schools that had experienced emergencies, and higher incidences of having grab bags and/or get away kits in classrooms and offices (X^2 (1, N=338) = 4.164, $p < .041$), and having emergency supplies (e.g., food, water and shelter) on hand for staff and students after an emergency (X^2 (1, N=338) = 4.226, $p < .040$). Having emergency supplies on site was reported more often in Primary schools (46%), than in either Other (38%) or Secondary schools (29%). In addition, most schools had ensured that emergency exits had signage and were kept clear for use in emergencies, with rates of compliance slightly higher in Primary (94%) and Other (96%) schools than in Secondary schools (87%). Only half of schools (51%) indicated they had secured tall or heavy furnishings and equipment.

Hazards education and training

Some form of hazard education programme and/or emergency response training was undertaken in all schools. Primary schools reported higher incidences of encouraging

staff and students to prepare at home for disasters (X^2 (2, N=338) = 15.677, $p < .001$; AR 3.7), and of providing material to support home preparedness efforts (X^2 (2, N=338) = 8.957, $p < .011$; AR 3.0). School type was also revealed to have had a statistically significant influence on whether staff were trained in psychological first aid⁵ (X^2 (2, N=338) = 36.124, $p < .001$), with both Secondary (AR 5.3), and to a lesser extent Other schools (AR 2.1), reporting higher incidences than expected. Where schools had previous emergency experience, they were more likely to have staff trained in physical first aid (X^2 (1, N=338) = 5.267, $p < .002$). Other (67%) and Primary schools (64%) reported higher incidences than Secondary schools (50%) of providing their students with annual access to classroom-based hazard education programmes.

Emergency drills

In addition to the specific preparedness activities identified above, respondents were also asked about emergency drills conducted annually in their own school (see Figure 5.2). Where schools had previous emergency experience, chi-square analysis revealed higher rates of having conducted drills for severe weather and/or tornados (X^2 (1, N=274) = 7.333, $p < .007$), and family reunification (X^2 (1, N=272) = 6.367, $p < .012$). However, overall rates for weather-related and reunification drills were comparatively low compared with drills for fire and earthquakes. Fire evacuation drills are compulsory in all New Zealand schools and as such resulted in the one-hundred percent compliance rate. Additionally, most schools (88%) also conducted earthquake drills, with rates substantially higher in Primary (92%) and Other schools (81%) than in Secondary schools (68%). Half of all schools also reported having conducted lockdown drills. Primary and Other schools (both 10%) were more than twice as likely as Secondary schools (4%) to have practised family reunification procedures in drills.

⁵ Psychological first aid is an international, evidence-based model that supports coping in the immediate aftermath of an emergency or traumatic incident (Ministry of Education, 2016a).

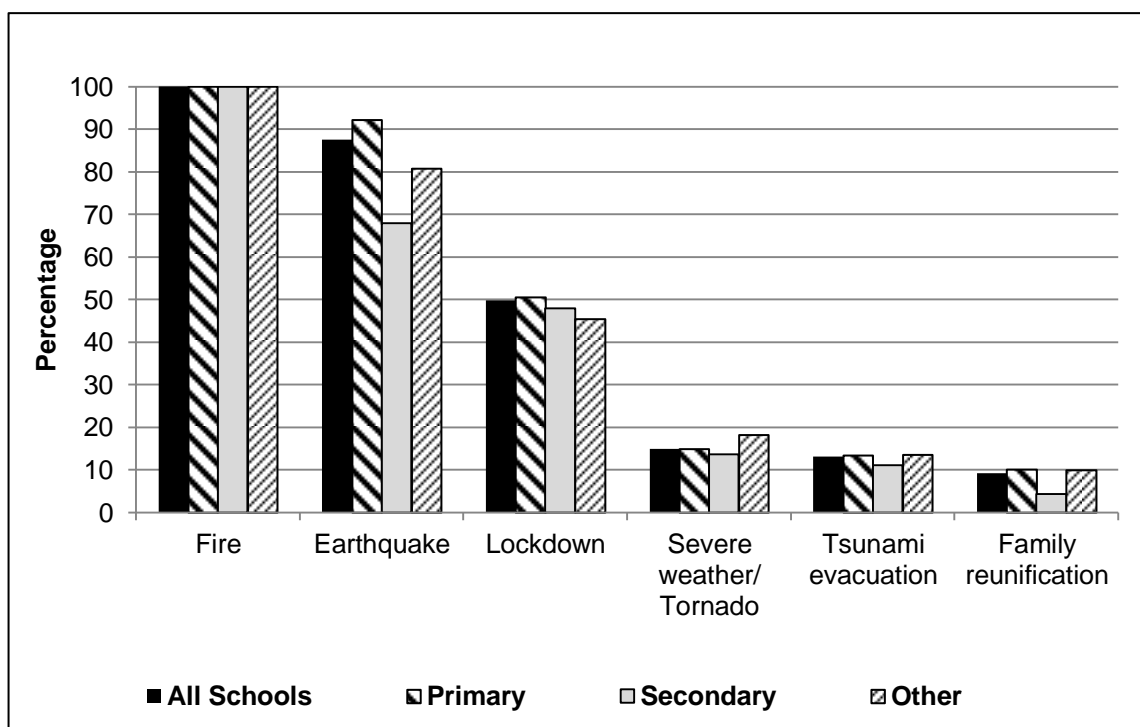
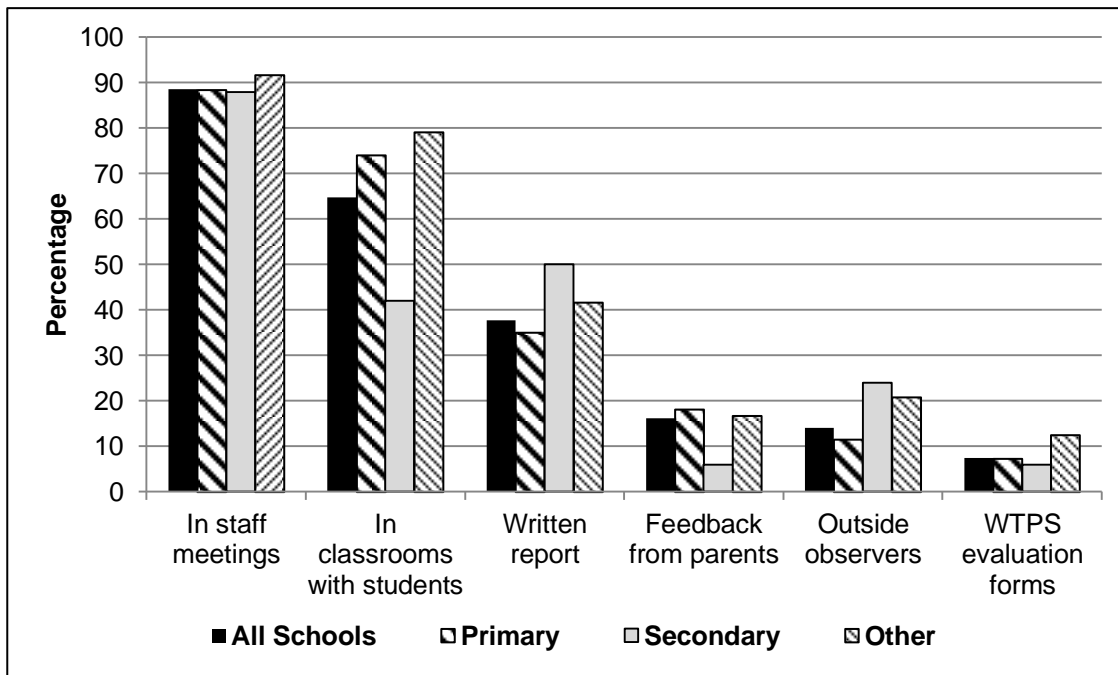


Figure 5.2 Emergency drill types practised annually in schools.

5.3.3. *Methods used to evaluate school emergency preparedness*

Schools used a variety of methods to evaluate their own emergency preparedness efforts (e.g., plans, hazard education, and emergency drills) as shown in Figure 5.3. The most common evaluation methods were discussions in staff meetings (89%) and in classrooms with students (65%), with three-quarters of schools using both methods. Primary schools were statistically more likely to evaluate their preparedness efforts with students in class ($X^2(2, N=333) = 21.580, p < .001$; AR 3.3) than either Secondary or Other schools. In addition, where schools had previous experience of emergencies they reported higher incidences of evaluating their preparedness efforts in staff meetings ($X^2(1, N=333) = 5.332, p < .021$). Written evaluation reports were created in half of Secondary schools (50.0%), but were less common in Other (42%) and Primary schools (35%). Use of the evaluation forms from the Ministry of Civil Defence and Emergency Management (2009) school preparedness resource '*What's The Plan Stan?* (WTPS)' were low overall; rates of use in Other schools (13%) were almost twice as high as in either Primary (7%) or Secondary schools (6%).



Note: What's the plan Stan? (WTPS) is a hazards education resource available for use in New Zealand schools.

Figure 5.3 Methods for evaluating school preparedness.

5.3.4. Stakeholder engagement to assist school emergency preparedness

Schools engaged with stakeholders (e.g., staff, families, and emergency management agencies) about their emergency preparedness activities in a variety of ways, as shown in Table 2. Reported incidences of encouraging parents to participate in their child's hazards education programmes and homework activities were significantly higher in Primary schools than in Secondary schools ($X^2(2, N=330) = 24.632, p < .001$; AR 3.8). School type also influenced whether school emergency plans were discussed in parent teacher meetings ($X^2(2, N=330) = 6.559, p < .038$). However, no cells reached the adjusted residual significance level of ± 2.0 . In addition, where schools had previous emergency experience, they reported higher incidences of linking their emergency preparedness efforts to community initiatives ($X^2(1, N=338) = 8.033, p < .005$). Overall, the most common methods schools used to engage with families were by requiring that emergency contact details be updated annually (89%), and including regular updates about the school's preparedness activities in newsletters (65%).

Despite the majority of schools reporting having shared preparedness information regularly in newsletters, staff and parents were familiar with school emergency plans in

just over half of Primary (59%) and Other schools (56%) and less than half of Secondary schools (43%). Rates were even lower in relation to staff and parents' familiarity with the school's student release procedures (Primary 43%, Other 36%, and Secondary 26%). Generally, schools reported low levels of engagement with external stakeholders, with a minority (42%) having engaged with Civil Defence about any response role the school may have, and only 39% having invited emergency preparedness professionals into the school annually.

Table 5.2 Types of stakeholder engagement in school emergency preparedness

TYPES OF STAKEHOLDER ENGAGEMENT	School Types				p-value	
	All Schools	Primary	Secondary	Other	School Type	Experience
Staff and Parents						
Ensured staff and parents are familiar with school's emergency plan	56%	59%	43%	56%	.094	.345
Ensured staff and parents are familiar with school's family reunification procedures	40%	43%	26%	36%	.057	.138
Families						
Required emergency contact information be updated annually	89%	90%	89%	85%	.779	.572
Regularly included updates in school newsletters	65%	65%	60%	65%	.786	.448
Encouraged parent participation in hazard education programmes and homework activities	36%	41%	6%	45%	.001	.969
Discussed emergency plans in parent teacher meetings	19%	20%	9%	35%	.038	.731
Used social media (e.g., Facebook, Twitter, school website) or texting prior to emergency drills	13%	14%	13%	5%	.544	.067
Practised family reunification procedures during emergency drills annually	5%	5%	0%	5%	.221	.192
External Stakeholders						
Discussed any civil defence response role the school may have (e.g., civil defence centre or community emergency shelter)	42%	42%	40%	42%	.965	.329
Invited emergency preparedness professionals (i.e., civil defence, police, fire) into the school annually	39%	41%	37%	25%	.289	.123
Linked emergency preparedness programmes to other community initiatives	30%	31%	29%	21%	.577	.005

5.4. Discussion

5.4.1. *Types of emergencies experienced in schools*

Emergency events are a common occurrence in schools, with almost two-thirds of the schools in the present study having experienced at least one emergency event in the preceding three years. This finding is consistent with results from a study of 157 schools in California, US (Kano & Bourque, 2007) which reported a similar proportion (<60%) of schools having experienced a natural hazard-related emergency in the period 2002-2005. Rates were higher in a study of 80 Australian schools (Boon et al, 2014) that reported more than three-quarters had experienced an emergency event in the past (no timeframe was specified). Although the number of school-based emergencies varies between countries, in part due to the use of different measures, what these studies are telling us is that at least half of all schools can expect to experience emergencies in the future. Therefore, every school needs to ensure they are adequately prepared to respond. In addition, it is noteworthy that over 40% of schools in the present study were required to temporarily close in response to emergency events. Consequently, any school planning efforts should include requirements for having to close the school with little or no advanced warning (i.e., no time to pre-inform parents or to practise student release and family reunification procedures).

Secondary schools in the present study reported higher levels of violence or threat-related emergencies than other school types. This is similar to the findings from Kano & Bourque's (2007) California study that identified differences between school types for violence-related emergencies. In particular, high schools (secondary) reported higher incidences of having experienced bomb threats, strangers on campus, and terrorism threats, than either elementary (primary) or middle (intermediate) schools. In addition, New Zealand Secondary schools also reported more occurrences of deaths of staff or students out of hours. This may be due to the risky behaviour often associated with adolescence, such as excessive alcohol use (e.g., Fergusson & Boden, 2011), that may result in injury or death to themselves and/or their peers. As a result, the higher rates of staff trained in psychological first aid in Secondary schools may be a reflection of the increased need to provide guidance and emotional support to their students that is not required to the same extent with Primary school children.

Past experience of emergency events can be a motivator for increased preparedness efforts (e.g., Education Review Office, 2013; Smith et al., 2001). Schools in the present

study that had previously experienced an emergency reported higher incidences of undertaking selected emergency preparedness actions (e.g., having emergency supplies and grab-bags on hand; having staff trained in physical first aid; and linking school preparedness efforts to community initiatives) than their counterparts in schools with no previous emergency experience. This supports the findings of several studies both in New Zealand (e.g., Mutch & Gawith, 2014) and internationally (e.g., Kano et al., 2007), which have found a link between emergency experience and increased uptake of school-based preparedness activities. Examples within the literature indicate that direct experiences of disaster can result in some school districts (e.g., Burling & Hyle, 1997) and individual schools (e.g., Education Review Office, 2013) refining and improving their plans and procedures after an emergency or disaster.

5.4.2. *Emergency preparedness activities undertaken in schools*

It is essential to ensure that schools are prepared to respond effectively to emergencies they may experience. The foundation of an effective emergency response is to “*maintain a steady state of preparedness during non-crisis times*” (Kano & Bourque, 2007, pg. 202). This necessitates developing emergency plans and procedures, undertaking preparation measures, providing students and staff with hazards education and response training, and conducting frequent emergency response drills to test planning and training. It is assumed by education sector authorities (Ministry of Education, 2016a) that New Zealand schools have extensive plans in place to ensure the safety of children in emergency events. However, as the findings in the present study indicate, this is not necessarily the case, and policy makers may be over-confident in how prepared schools are to respond to future emergencies (Brock, 2000), reflecting similar research from the US (e.g., US Government Accountability Office, 2007; Kano et al., 2007).

The present study revealed that schools varied greatly as to the extent of their preparedness efforts. These differences were most clearly demonstrated in the high number of schools that had not undertaken some basic and necessary emergency preparedness activities (see Table 5.1). It can be argued that all eight of the ‘planning activities’ that schools were asked about are essential for an effective emergency response. For example, communications have the potential to be challenging during an emergency response, often because of limited or inaccurate information sharing (Chung et al., 2009). However, more than a quarter of schools in the present study had not developed plans for how they would communicate with staff, students, and parents during an emergency. Furthermore, only a third of schools had developed site and

neighbourhood maps showing the location of school buildings, emergency exits, evacuation routes, and assembly areas. In addition to being useful to staff and students during an emergency, having site maps available for emergency services personnel responding to an incident at the school can assist in locating and neutralising the threat or emergency (Crichton, Ramsay & Kelly, 2009). That less than half of schools had developed plans for the continuity of operations is a concern, as ongoing access to education after an emergency is beneficial for student welfare and can assist in family and community recovery (e.g., GADRRRES, 2014; Peek, 2008). Only 10% of schools in the present study had undertaken all eight planning activities, possibly due to ambiguity in the New Zealand legislation related to school-based emergency management (Tipler, Tarrant, Tuffin & Johnston, 2017). As a result, schools leaders are not aware of the specifics of what emergency plans should include.

The six 'preparation measures' show further variation. For example, having emergency exit signage and keeping exits clear are statutory requirements for all New Zealand buildings (New Zealand Government, 2004), yet not all schools are complying. It was also surprising that only half of schools, irrespective of type, had secured tall or heavy furniture against walls. Findings from a study undertaken after the 2010-2012 Canterbury, New Zealand, earthquakes (Johnston et al., 2014) found that flying and/or falling objects posed significant risks to individuals in the earthquakes. Emergency planning efforts lose some of their relevance if staff and students do not survive the emergency because they are hit by flying or falling debris, or are trapped due to blocked exits. To avoid such an outcome it is essential that all schools are monitored to ensure they are adhering to their statutory obligations, and that they are undertaking basic low cost protection actions (e.g., securing furniture and equipment).

Access to hazards education for students, particularly those in Secondary schools, and response training for staff, are both areas where more attention is required. For example, with more than one-third of schools not providing students with classroom teaching about disaster preparedness annually, it is possible that some students may not have access to any hazards education during their formal schooling. As such, students could potentially be missing out on information that may save their lives and assist them and their families to become more resilient in emergencies. One possibility for schools not providing hazards education could be that, in previous surveys of New Zealand schools, teachers have cited the intense competition for time in the curriculum as being a reason that hazard education may be side-lined or limited in its inclusion (e.g., Johnson et al., 2014b; Taylor & Moeed, 2013).

An area of concern in the present study was the low number of schools (especially Primary schools) that had staff members trained in psychological first aid or crisis management. This may be explained in part by the comparatively low rates of violence, serious injuries and deaths experienced in Primary schools. However, the need to prepare school staff to respond to the emotional and cognitive needs of their students and colleagues during and after an emergency is recognised throughout the literature (e.g., American Academy of Pediatrics, 2008; Mutch, 2015a). In addition, the literature both in New Zealand (e.g., Stuart et al., 2013; Tarrant, 2011a) and internationally (e.g., Elangovan & Kasi, 2015; MacNeil & Topping, 2009), also recognises the need for school leaders (and staff) to receive training in managing crisis situations.

The majority of primary schools reported that they encourage staff and students to prepare for disasters at home, with many providing support material to assist home-preparedness efforts. However, previous studies undertaken with school children in New Zealand (e.g., Finnis, Standing, Johnston & Ronan, 2004; Johnston et al., 2011) have shown limited family preparedness for emergencies. Generally, these studies report low rates of families having emergency plans, practising emergency drills at home, and students knowing who would collect them from school after an emergency. Encouraging home-based preparedness can assist response efforts by urging parents and students to be aware of school reunification plans (e.g., Education Review Office, 2013). Staff should also be urged to develop plans for their own families, so staff know their children will be safe and cared for while they are required to remain at school to supervise students.

Implementing response plans requires a clear understanding of what needs to happen, when it needs to happen, and who needs to do it (MacNeil & Topping, 2009). This is where drills come in, by providing a low consequence opportunity to test plans and procedures, thereby ensuring staff, students and families are aware of any roles and responsibilities they may have during an emergency response. Surveys of school preparedness in the US (e.g., Graham et al., 2006; Kano et al., 2007) have found that fire, earthquake, and lockdowns are the drill types most commonly practised in schools. This is consistent with the findings in the present study. However, New Zealand schools reported lower incidences of conducting lockdown drills than their US counterparts. An emergency requiring a lockdown (e.g., dangerous dog, intruder, or threat in the community) could occur at any school at any time. Lockdown situations can be frightening for students, which may explain why only half of the schools reported practising them. However, research by Zhe & Nickerson (2007) found that if lockdown drills are well planned, students are unlikely to experience undue upset.

A further area of concern in the present study was the limited number of schools conducting family reunification drills, as familiarity with the school's reunification procedures can reduce anxiety and confusion during an actual emergency (e.g., American Academy of Paediatrics, 2008; Johnson, Johnston, Ronan & Peace, 2014a). In addition, schools' duty-of-care obligations require that they have procedures in place to return students to the custodial parent (Graham et al., 2006). It is in the best interests of the school to reunite families as soon as possible after an emergency. However, actual emergencies allowing schools to measure the effectiveness of their reunification procedures are limited; therefore, it is necessary to test reunification procedures in drills. The logistics of conducting such drills however, can be challenging due to the requirement that parents collect their child, often during working hours. In this case, small scale practices (e.g., a single class) can be used to assess the school's plans and procedures, without requiring every parent to participate. All parents should be made aware of the school's reunification procedures and the school's expectations of parents during an emergency response (e.g., the need to remain calm and patient as reunification procedures take time).

In most cases, school type did not influence whether drills for different emergency types were practised, with the exception of fewer earthquake drills occurring in secondary schools. This may be due, in part, to a reluctance to take time away from an already full curriculum (e.g., Renwick, 2012), or simply schools not being located in regions that experience earthquakes. Surprisingly, Secondary schools were no more likely than either Primary or Other schools to conduct lockdown drills, in spite of Secondary schools reporting more than twice as many instances of violent or threat-related emergencies as Primary schools, while Other schools reported no incidents of violent or threatening situations.

Variations in preparedness activities between schools are evident throughout the international literature (e.g., Boon et al., 2014; Rebmann, Elliott, Artman, VanNatta, & Wakefield, 2015; RiskRED, 2009), and may indicate that schools are under-prepared, resulting in them failing in their duty-of-care to students (MacNeil & Topping, 2009). This is even more likely when considering school leaders' obligations to provide a safe work place under New Zealand health and safety legislation (see Ministry of Education, 2016b, and Tipler et al., 2017b for an overview of school requirements).

5.4.3. *Methods used to evaluate school emergency preparedness*

As identified above, drills provide excellent opportunities to evaluate school-based preparedness efforts. Regular evaluation and review of all aspects of school-based

emergency management activities is required to ensure plans and procedures are effective and appropriate (e.g., American Academy of Pediatrics, 2008; Johnson et al., 2014a), while also providing opportunities to identify and share best practice. However, research indicates that generally, evaluation efforts in schools are limited (e.g., Johnson et al., 2014c; RiskRED, 2009). Arguably, schools are the ideal location for evaluation and assessment, so why are school leaders not evaluating their preparedness efforts with the same rigour they use when evaluating their students in other areas? The answer may be as simple as not knowing what they need to evaluate, and what the benchmarks are for success (e.g., what are the appropriate types and levels of preparedness).

Identifying the evaluation methods used by schools is only a preliminary step in examining how schools effectively review and assess their emergency response capabilities. However, knowing the methods schools currently use can still offer insights. Most schools in the present study reported evaluating their preparedness efforts in some way. For example, the majority of schools kept their evaluation efforts 'in-house' (i.e., staff meeting and in class with students). Such an approach means schools are missing out on the valuable perspective of other stakeholders and, in particular, the perspective of parents. Johnston et al. (2011), in their observation of a school completing an earthquake drill, recommended the need for allocating time after an emergency drill to gather feedback from participants, including parents and students. Therefore, it may be useful that any guidance to schools, from government and emergency management practitioners, targets the main methods used and also identifies ways in which other stakeholders can participate in evaluations.

Where schools reported evaluating their preparedness efforts, it was unclear how any lessons they identified were incorporated into future planning efforts or shared with stakeholders. More than a third of schools in the present study indicated they produced a written report. Findings from Tipler et al. (2016) suggest these reports may in some cases be shared with the school's Board of Trustees (governing body) and families. In addition to learning lessons for their own school, two New Zealand studies (Stuart et al., 2013; Tarrant, 2011a) encourage school leaders to share their lessons with colleagues in other schools, to assist in enhancing emergency preparedness and response capabilities. Partnerships with external stakeholders allow the lesson-learning to move outside the specific school and into the wider school community (Gibbs et al., 2013).

5.4.4. Stakeholder engagement to assist school emergency preparedness

Schools have a variety of stakeholders, both internal (i.e., staff, students, parents, families) and external (e.g., emergency services, CDEM agencies, community), who have an interest in the school's emergency preparedness efforts. Therefore, it is necessary that schools engage with these stakeholders when planning and preparing for emergencies. In the present study, where parents were encouraged to actively participate in preparedness activities (e.g., hazards education programmes and homework activities, reunification drills), schools reported low rates of parental engagement. However, parental involvement was found to be a key indicator of successful preparedness in Phinney, Brill and Ferraro's (2004) audit of 20 US school districts' terrorism preparedness efforts. Phinney et al. also found that even in the best performing district, where parents were inundated with information about the school's preparedness efforts (including having information available in seven languages), a quarter of parents were unaware the school had a plan. In response to such findings, the authors believed that at some point the responsibility of schools to provide information ends, and parent's duty to ensure they are informed, begins.

Once plans and procedures have been developed, it is essential that staff and parents are aware of any roles and responsibilities they may have during an emergency response. For example, staff have legal obligations to ensure students are kept safe and are reunited with their families as soon as practicable after an emergency event. Parents can reduce their concern and anxiety for their own children by knowing the school's procedures, and can also avoid being a hindrance to the school's response efforts by not making unrealistic demands of school staff (e.g., RiskRED, 2009). In addition to traditional methods (e.g., newsletters), modern technology (e.g., apps, social media, and websites) provides school leaders with a variety of ways to share the school's emergency plans and procedures with stakeholders. By sharing their plans, schools can keep stakeholders informed and also manage their expectations of the school's response capabilities. The usage of social media in school-based emergencies is becoming more common, and as a result, there is a need for school leaders to have established guidelines in advance of emergencies to ensure information provided is accurate and appropriate (Mazer et al., 2015). Where stakeholders are not kept informed, research (e.g., Hutton, 2011) indicates they may make up the facts for themselves.

Schools in the present study reported relatively-low rates of engagement with external stakeholders (e.g., CDEM agencies, emergency services), which mirrors findings from other New Zealand (Renwick, 2012) and international studies (e.g., US Government Accountability Office, 2007; Graham et al., 2006). Responsibility for low engagement rates can be attributed to the schools and external stakeholders themselves (e.g., Tipler et al., 2016), which is unfortunate as such engagement is mutually beneficial. For example, schools can access advice and support from emergency management practitioners to enhance school planning and preparation activities, while in return schools can be used to disseminate safety and preparedness messages into homes, to increase community resilience.

5.5. Conclusions

Emergencies are common in schools, and therefore it is essential that plans and procedures are in place to respond to such events. The present study asks if New Zealand schools are ready to keep their students safe should an emergency occur. Findings indicate that differences exist between schools as to the types of preparedness activities they undertake, and the extent to which they have planned for future emergency events. As such, this suggests that some schools may be under-prepared to respond effectively to keep students safe. These variations in preparedness levels are considered to be due, in part, to ambiguity in the legislative requirements for school emergency management efforts, and this has led to school leaders lacking clarity in which preparedness activities they are expected to undertake. Therefore, the findings support the establishment of benchmarks and standard operating procedures for emergency preparedness activities to ensure consistency across schools, and ongoing monitoring of schools to ensure they are adhering to their statutory obligations. In addition, schools would benefit from increased engagement with their stakeholders, both internal and external, to improve sharing of emergency response plans and procedures with families, and also to enable schools to access preparedness advice and support from emergency management practitioners.

This study has identified areas in which improvements can be made to assist school preparedness efforts, and provides a starting point for gauging ongoing preparedness levels in New Zealand schools. Furthermore, the analysis of results by school type determines areas in which resources and support can be targeted to schools reflecting the needs and emergency response requirements of their students. Although the research was conducted in a New Zealand context, many of the learnings are also relevant to school preparedness efforts internationally.

Research exploring emergency management in New Zealand schools is still in its infancy. The present study provides a practical beginning for New Zealand-based school preparedness research, but much more work is needed. A review of New Zealand school-based emergency management legislative requirements and practitioner expectations is also needed to provide clarity to school preparedness efforts. Finally, it would be beneficial to investigate actual emergency experiences of New Zealand schools to identify links between preparedness efforts and response requirements, to determine strengths, weaknesses and gaps in existing practices.

References

- Alba, D.J., & Gable, R.K. (2012). *School Safety Planning: Barriers to Implementation Perceived by District Leadership and First Responders*.
- American Academy of Pediatrics, Council on School Health. (2008). Disaster planning for schools. *Pediatrics*, 122(4). DOI: 10.1542/peds.2008-2170.
- Awofisayo, A., Ibbotson, S., Smith, G. E., Janmohamed, K., Mohamed, H., & Olowokure, B. (2013). Challenges and lessons learned from implementing a risk-based approach to school advice and closure during the containment phase of the 2009 influenza pandemic in the West Midlands, England. *Public health*, 127(7), 637-643.
- Bastidas, P. & Petal, M. (2012). *Assessing School Safety from Disasters a Global Baseline Report: ISDR Thematic Platform for Knowledge and Education*. United Nations Office for Disaster Risk Reduction, Geneva. Retrieved from: http://www.unisdr.org/files/35274_2012schoolsafetyglobalbaseline.pdf.
- Boon, H., Brown, L., & Pagliano, P. (2014). Emergency planning for students with disabilities: a survey of Australian schools. *Australian Journal of Emergency Management*, 29(1), 45-49.
- Brock, S. E. (2000). Development of a school district crisis intervention policy. *The California School Psychologist*, 5(1), 53-64. DOI:10.1007/BF03340876
- Burling, W. K., & Hyle, A. E. (1997). Disaster preparedness planning: Policy and leadership issues. *Disaster Prevention and Management: An International Journal*, 6(4), 234-244. <http://dx.doi.org/10.1108/09653569710179075>
- Chung, S., Danielson, J., & Shannon, M. (2009). *School-based emergency preparedness: a national analysis and recommended protocol*. Agency for Healthcare Research and Quality. Rockville, MD.
- Coomer, M., Johnston, D., Edmonson, L., Monks, D., Pedersen, S., & Rodger, A. (2008). *Emergency Management in Schools: Wellington Survey. (Report No. 2008/04)*. Wellington: GNS Science.

- Crichton, M. T., Ramsay, C. G., & Kelly, T. (2009). Enhancing organizational resilience through emergency planning: Learnings from cross-sectoral lessons. *Journal of Contingencies and Crisis Management*, 17(1), 24-37. DOI: 10.1111/j.1468-5973.2009.00556.x
- Education Counts (2012). *Number of Schools*. Retrieved from: <https://www.educationcounts.govt.nz/statistics/schooling/number-of-schools>.
- Education Review Office. (2013). *Stories of resilience and innovation in schools and early childhood services*. Wellington, New Zealand: Education Review Office.
- Elangovan, A. R., & Kasi, S. (2015). Psychosocial disaster preparedness for school children by teachers. *International journal of disaster risk reduction*, 12, 119-124. <http://doi.org/10.1016/j.ijdr.2014.12.007>
- Fergusson, D.M & Boden, J. (2011). *Alcohol use in adolescence*. OPMSAC (Ed.), Improving the transition: Reducing social and psychological morbidity during adolescence (pp. 235-255). Wellington: Office of the Prime Minister's Science Advisory Committee.
- Finnis, K., Standring, S., Johnston, D., & Ronan, K. (2004). Children's understanding of natural hazards in Christchurch, NZ. *Australian Journal of Emergency Management*, 19(2), 11-20.
- Gibbs, L., Mutch, C., O'Connor, P., & MacDougall, C. (2013). Research with, by, for and about children: Lessons from disaster contexts. *Global Studies of Childhood*, 3(2), 129-141. <http://dx.doi.org/10.2304/gsch.2013.3.2.129>
- GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector). (2014). *Comprehensive school safety*. Retrieved from: <http://preventionweb.net/go/31059>
- Graham, J., Shirm S., Liggin R., Aitken M., & Dick R. (2006). Mass-casualty events at schools: a national preparedness survey. *Pediatrics*, 117(1), e8-15. doi:10.1542/peds.2005-0927
- Hosseini, M., & Izadkhah, Y. O. (2006). Earthquake disaster risk management planning in schools. *Disaster Prevention and Management: An International Journal*, 15(4), 649-661. <http://dx.doi.org/10.1108/09653560610686595>
- Hutton, D. (2011). *Lessons Unlearned: The (Human) Nature of Disaster Management, Emergency Management*. Burak Eksioğlu (Ed.), ISBN: 978-953-307-989-9, InTech. Retrieved from: <http://www.intechopen.com/books/emergency-management/lessons-unlearned-the-human-nature-of-disastermanagement>.
- International Finance Corporation. (2010). *Disaster and Emergency Preparedness: Guidance for Schools*. Washington, DC: International Finance Corporation.

- Johnson, V. A., & Ronan, K. R. (2014). Classroom responses of New Zealand school teachers following the 2011 Christchurch earthquake. *Natural Hazards*, 72(2), 1075-1092.
- Johnson, V. A., Ronan, K. R., Johnston, D. M., & Peace, R. (2014c). Evaluations of disaster education programs for children: A methodological review. *International journal of disaster risk reduction*, 9, 107-123. <http://doi.org/10.1016/j.ijdr.2014.04.001>
- Johnson, V.A., Johnston, D.M., Ronan, K.R., & Peace, R. (2014a). Evaluating children's learning of adaptive response capacities from ShakeOut, an earthquake and tsunami drill in two Washington State school districts. *Journal of Homeland Security & Emergency Management*, 11(3), 347-373. <https://doi.org/10.1515/jhsem-2014-0012>
- Johnson, V.A., Ronan, K.R., Johnston, D.M., & Peace, R. (2014b). Implementing disaster preparedness education in New Zealand primary schools. *Disaster Prevention and Management: An International Journal*, 23(4), 370 – 380. <http://dx.doi.org/10.1108/DPM-09-2013-0151>.
- Johnston, D., Standring, S., Ronan, K., Lindell, M., Wilson, T., Cousins, J., ... & Kirsch, T. (2014). The 2010/2011 Canterbury earthquakes: context and cause of injury. *Natural hazards*, 73(2), 627-637. doi:10.1007/s11069-014-1094-7
- Johnston, D., Tarrant, R., Tipler, K., Coomer, M., Pedersen, S., & Garside, R. (2011). Preparing schools for future earthquakes in New Zealand: Lessons from an evaluation of a Wellington school exercise. *Australian Journal of Emergency Management*, 26(1), 24-30.
- Johnston, D., Tarrant, R., Tipler, K., Lambie, E., Crawford, M., Johnson, V., Becker, J., & Ronan, K. (2016). Toward tsunami-safer schools in the Wellington region of New Zealand: evaluating drills and awareness programs. *Australian Journal of Emergency Management*, 31(3), 59-66.
- Kano, M. & Bourque, L. B. (2007). *School Emergency Preparedness Survey Report: Improving Coordination is Vital for School Districts*. Southern California Injury Prevention Research Center, UCLA, Los Angeles. doi/abs/10.1177/0192636507305102
- Kano, M., Ramirez, M., Ybarra, W. J., Frias, G., & Bourque, L. B. (2007). Are schools prepared for emergencies? A baseline assessment of emergency preparedness at school sites in three Los Angeles County school districts. *Education and Urban Society*, 39(3), 399-422. doi/abs/10.1177/0013124506298130
- MacNeil, W., & Topping, K. (2009). Crisis management in schools: evidence based. *The Journal of Educational Enquiry*, 7(2).

- Mazer, J. P., Thompson, B., Cherry, J., Russell, M., Payne, H. J., Kirby, E. G., & Pfohl, W. (2015). Communication in the face of a school crisis: Examining the volume and content of social media mentions during active shooter incidents. *Computers in Human Behavior*, *53*, 238-248. <http://doi.org/10.1016/j.chb.2015.06.040>
- Ministry of Civil Defence and Emergency Management. (2009). *What's the Plan Stan? Simulation and practice activities*. Ministry of Civil Defence and Emergency Management, Wellington. Retrieved from: <http://www.whatstheplanstan.govt.nz/themes/whats-the-plan/pdf/Simulation%20and%20practice%20activities.pdf>.
- Ministry of Civil Defence and Emergency Management. (2013). *New Zealand ShakeOut 2012: Final Report*. Ministry of Civil Defence and Emergency Management, Wellington. Retrieved from: <http://www.civildefence.govt.nz/assets/Uploads/Shakeout/NZShakeOut2012Report.pdf>.
- Ministry of Education. (2016a). *Traumatic Incidents – Managing Student and Staff Well-Being guide for school crisis teams*. Ministry of Education, Wellington. Retrieved from: <http://www.education.govt.nz/assets/Uploads/Traumatic-incidents-schools-Guidelines-for-wellbeing.pdf>.
- Ministry of Education. (2016b). *Health and Safety Practical Guide for Boards of Trustees and School Leaders*. Ministry of Education, Wellington. Retrieved from: <http://www.education.govt.nz/assets/Documents/Ministry/Initiatives/Health-and-safety/Tools/Health-and-Safety-at-Work-Act-2015.pdf>.
- Momani, N. M., & Salmi, A. (2012). Preparedness of schools in the Province of Jeddah to deal with earthquakes risks. *Disaster Prevention and Management: An International Journal*, *21*(4), 463-473. <http://dx.doi.org/10.1108/09653561211256161>
- Mooney, M., Tarrant, R., Paton, D., Johal, S. & Johnston, D. (2017). Getting through: Children's effective coping and adaptation in the context of the Canterbury, New Zealand, Earthquakes of 2010-2012. *Australasian Journal of Disaster and Trauma Studies*, *21*(1), 19-30. Retrieved from: http://trauma.massey.ac.nz/issues/2017-1/AJDTS_21_1_Mooney.pdf
- Mutch, C. (2015a). The role of schools in disaster settings: Learning from the 2010–2011 New Zealand earthquakes. *International Journal of Educational Development*, *41*, 283-291. <http://doi.org/10.1016/j.ijedudev.2014.06.008>
- Mutch, C. (2015b). Quiet heroes: Teachers and the Canterbury, New Zealand, earthquakes. *Australasian Journal of Disaster and Trauma Studies*, *19*(2).

Retrieved from: http://trauma.massey.ac.nz/issues/2015-2/AJDTS_19_2_Mutch.pdf

- Mutch, C., & Gawith, E. (2014). The New Zealand earthquakes and the role of schools in engaging children in emotional processing of disaster experiences. *Pastoral Care in Education*, 32(1), 54-67. <http://dx.doi.org/10.1080/02643944.2013.857363>
- New Zealand ShakeOut . (n.d.). *ShakeOut Resources*. Ministry of Civil Defence and Emergency Management , Wellington. Retrieved from: <http://www.shakeout.govt.nz/resources/>.
- NZ Government. (2004). *Building Act 2004*. Wellington, New Zealand. Retrieved from <http://www.legislation.govt.nz/act/public/2004/0072/latest/whole.html>.
- Peek, L. (2008). Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience: An Introduction. *Children, Youth and Environments*, 18(1), 371-388. Retrieved from: <http://www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0001>
- Phinney, A., Brill, S., & Ferraro, M. (2004). *Preparedness in America's schools: A comprehensive look at terrorism preparedness in America's twenty largest school districts*. America Prepared Campaign, Incorporated.
- Pine, N. S., Tarrant, R. A., Lyons, A. C., & Leathem, J. M. (2015). Rolling with the shakes: an insight into teenagers' perceptions of recovery after the Canterbury earthquakes. *Kōtuitui: New Zealand Journal of Social Sciences Online*, 10(2), 116-125. <http://dx.doi.org/10.1080/1177083X.2015.1068183>
- Ramirez, M., Kubicek, K., Peek-Asa, C. & Wong, M. (2009). Accountability and assessment of emergency drill performance at schools. *Family and Community Health*, 32(2), 105-114. doi: 10.1097/FCH.0b013e3181994662
- Rebmann, T., Elliott, M. B., Artman, D., VanNatta, M., & Wakefield, M. (2015). Missouri K-12 school disaster and biological event preparedness and seasonal influenza vaccination among school nurses. *American journal of infection control*, 43(10), 1028-1034.
- Renwick, J. (2012). *Report of the 2012 What's The Plan Stan survey of New Zealand primary schools*. Department of Internal Affairs, Wellington. Retrieved from: <http://www.civildefence.govt.nz/cdem-sector/public-education/research-and-evaluation/>.
- RiskRED. (2009). *School Disaster Readiness in California: Lessons from the first Great Southern California ShakeOut*. Earthquake Country Alliance, Los Angeles. Retrieved from: <http://www.riskred.org/schools/shakeout2008.pdf>.

- Ronan, K.R. & Johnston, D. M. (2005). *Promoting community resilience in disasters: The role for schools, youth and families*. Springer, New York.
- Ronan, K.R. (2015). *Many advances, continuing challenges towards HFA2 and Post-2015: Policy-practice-research summary and recommendations*. Hyogo Framework for Action Thematic Review: Priority for Action 3 – Core Indicator (CI) 2: School curricula, education material and relevant training including disaster risk reduction and recovery concepts and practices. Background Chapter prepared for United Nations Office for Disaster Risk Reduction and the Global Assessment Report on Disaster Risk Reduction, 2015. UNESCO/UNICEF: Paris/Geneva.
- Ronan, K.R., Crellin, K., & Johnston, D. M. (2012). Community readiness for a new tsunami warning system: quasi-experimental and benchmarking evaluation of a school education component. *Natural hazards*, 61(3), 1411-1425. doi:10.1007/s11069-011-0070-8
- Ronan, K.R., Crellin, K., Johnston, D.M., Finnis, K., Paton, D., & Becker, J. (2008). Promoting Child and Family Resilience to Disasters: Effects, Interventions, and Prevention Effectiveness. *Children, Youth and Environments*, 18(1), 332-353. Retrieved from: <http://www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0332>
- Ronoh, S., Gaillard, J. C., & Marlowe, J. (2015a). Children with disabilities and disaster risk reduction: A review. *International Journal of Disaster Risk Science*, 6(1), 38-48. doi:10.1007/s13753-015-0042-9
- Ronoh, S., Gaillard, J. C., & Marlowe, J. (2015b). Children with disabilities and disaster preparedness: a case study of Christchurch. *Kōtuitui: New Zealand Journal of Social Sciences Online*, 10(2), 91-102. Retrieved from: <http://dx.doi.org/10.1080/1177083X.2015.1068185>
- ShakeOut. (n.d.). *ShakeOut Regions and Current Registration Levels*. Southern California Earthquake Centre, USA. Retrieved from: <http://www.shakeout.org/index.html>.
- Sharpe, D. (2015). Your Chi-Square Test is Statistically Significant: Now What? *Practical Assessment, Research & Evaluation*, 20(8), 2-10. Retrieved from: <http://pareonline.net/getvn.asp?v=20&n=8>
- Shiwaku, K., & Shaw, R. (2016). Introduction: Disaster Risk Reduction and Education System. In *Disaster Resilience of Education Systems* (pp. 1-10). Springer Japan. DOI: 10.1007/978-4-431-55982-5_1
- Shiwaku, K., Ueda, Y., Oikawa, Y., & Shaw, R. (2016). School disaster resilience assessment: an assessment tool. In *Disaster Resilience of Education Systems* (pp. 105-130). Springer Japan. DOI: 10.1007/978-4-431-55982-5_8

- Smith, S., Kress, T., Fenstermaker, E., Ballard, M., Hyder, G. (2001). Crisis Management Preparedness of School Districts in Three Southern States in the USA. *Safety Science*, 39, 83-92. [http://doi.org/10.1016/S0925-7535\(01\)00028-5](http://doi.org/10.1016/S0925-7535(01)00028-5)
- Statistics New Zealand. (2012). *National Population Estimates: March 2012 quarter*. Department of Statistics, Wellington. Retrieved from: <file:///C:/Users/Jack/Desktop/Downloads/NationalPopulationEstimatesMar12qtrHOTP.pdf>.
- Stuart, K.L., Patterson, L.G., Johnston, D.M., & Peace, R. (2013). Managing temporary school closure due to environmental hazard: Lessons from New Zealand. *Management in Education*, 27(1), 25-31. doi/abs/10.1177/0892020612468928
- Tarrant, R. (2011a). Leadership through a School Tragedy: A Case Study (Part 1-The First Week). *Australasian Journal of Disaster and Trauma Studies*, 2011(3), 65-77. Retrieved from: http://trauma.massey.ac.nz/issues/2011-3/AJDTTS_2011-3_01_Tarrant.pdf
- Tarrant, R. (2011b). Leadership through a school tragedy: A case study (Part 2-The next two years). *Australasian Journal of Disaster and Trauma Studies*, 2011(3), 77-87. Retrieved from: http://trauma.massey.ac.nz/issues/2011-3/AJDTTS_2011-3_02_Tarrant.pdf
- Tarrant, R. (2014). Leadership and Faith in a School Tragedy: A School Principal's Perspective. *Psychology*, 2014. DOI:10.4236/psych.2014.55051
- Taylor, M., & Moeed, A. (2013). The 2010 Canterbury earthquake: curriculum shockwaves. *International Research in Geographical and Environmental Education*, 22(1), 57-70. <http://dx.doi.org/10.1080/10382046.2012.759693>
- Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2016). New Zealand ShakeOut exercise: Lessons learned by schools. *Disaster Prevention and Management: An International Journal*, 25(4), 550-563. DOI: <http://dx.doi.org/10.1108/DPM-01-2016-0018>
- Tipler, K.S., Tarrant, R.A., Tuffin, K.F. & Johnston, D.M. (2017b). Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools. *Australian Journal of Emergency Management*, 32(1), 32-39.
- United Nations International Strategy for Disaster Reduction. (2006). *Disaster risk reduction begins at school*. Retrieved from: <http://www.unisdr.org/2007/campaign/wdrc-2006-2007.htm>.
- United Nations International Strategy for Disaster Reduction. (2005). *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and*

Communities to Disasters. Retrieved from:
<https://www.unisdr.org/we/coordinate/hfa>.

United Nations International Strategy for Disaster Reduction. (2015). *Sendai Framework for Disaster Risk Reduction 2015-2030*. Retrieved from:
<http://www.unisdr.org/we/inform/publications/43291>.

US Department of Education (Office of Elementary and Secondary Education, Office of Safe and Healthy Students). (2013). *Guide for Developing High-Quality School Emergency Operations Plans*. Washington, DC.

US Government Accountability Office. (2007). *Most School Districts Have Developed Emergency Management Plans, but Would Benefit from Additional Federal Guidance*. GAO-07-609. Government Accountability Office.

Zantal-Wiener, K., & Horwood, T. J. (2010). Logic modeling as a tool to prepare to evaluate disaster and emergency preparedness, response, and recovery in schools. *New Directions for Evaluation*, 2010(126), 51-64. DOI: 10.1002/ev.329

Zhe, E. J., & Nickerson, A. B. (2007). The effects of an intruder crisis drill on children's self-perceptions of anxiety, school safety, and knowledge. *School Psychology Review*, 36, 501-508.

5.6. Link to Chapter 6 (Paper 3)

Paper 2 established emergency preparedness levels in New Zealand schools, with the majority of schools having undertaken a range of preparation activities such as developing plans, conducting drills, and providing hazards education to students. However, differences between schools were identified as to the extent of their emergency preparedness efforts, suggesting that many schools may be under-prepared to respond to future emergencies, especially if that response requires family reunification. Study 1 explored preparedness in New Zealand schools by identifying lessons learned from schools participating in a nationwide earthquake drill (Tipler et al., 2016) and establishing current preparedness activities undertaken in schools (Tipler et al., 2017a). Both papers suggested that the legislative requirements for emergency management in New Zealand schools lacked clarity and their implications for practice were poorly understood.

Paper 3 (Tipler et al., 2017b) builds on the themes and insights reported in Study 1 through an exploration of the legislative requirements and practitioner expectations of school-based emergency management efforts to identify which preparedness activities schools should take to keep students physically and emotionally safe in emergencies. The study combined a review of New Zealand legislation, policy, guidelines and resources related to school safety available on the Ministry of Education website and interviews with three emergency management practitioners. The documents were reviewed to identify if they included specific references to school emergency management requirements or expectations. The expert interviews with school emergency management practitioners were directed by interview guides with questions related to four main topics: statutory requirements of schools; resources and support available to assist schools in meeting their obligations; advice to schools; and engagement with schools. Qualitative description and integrated inductive and deductive thematic analysis (e.g., Fereday & Muir-Cochrane, 2006) were employed to analyse the data. Coding and theme development was both data-driven (e.g., insights and ideas from an examination of the document review and interview data) and theory-driven (e.g., established theory within the SS4R Prevention model and existing literature). In addition, the findings from Study 1 were also used to guide the analysis. The codes were then mapped allowing themes, sub-themes, and relationships to be identified, which were subsequently used to describe the requirements and expectations of emergency preparedness in New Zealand schools as detailed in Paper 3.

Paper 3 was published in the *Australian Journal of Emergency Management*, an official publication of the Australian Government Attorney-General's Department. The Journal is scholarly yet practical in its orientation and includes a balance of academic and practitioner papers as well as other associated content, with a readership of professionals, academics, researchers, policy makers, planners, and response personnel.

Chapter 6. Paper 3: Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools

Tipler, K.S., Tarrant, R.A., Tuffin, K.F. and Johnston, D.M. (2017b). Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools. *Australian Journal of Emergency Management*, 32(1), pp. 32-39⁶

Abstract

School safety is a priority within international disaster risk reduction efforts. Providing a safe learning environment and continued access to education after an emergency can limit impacts on students, their families and the community. This study explores New Zealand legislative requirements and emergency management practitioners' expectations of school-based emergency management efforts to identify what preparedness activities schools are expected to undertake to ensure the physical and emotional safety of their students in emergencies. The study combines a review of New Zealand legislation, policy, guidelines and resources related to school safety and emergency management with interview data from three emergency management practitioners. The key finding was that legislation was mostly generic for New Zealand workplaces. It was broad and, at times ambiguous, and schools are not provided with clear disaster risk reduction guidance. The establishment of clear emergency preparedness benchmarks for schools would help address deficiencies and ambiguities identified within the existing legislation. In addition, the development of standard operating procedures for core emergency response actions, such as lockdowns, evacuations and family reunification could provide a consistent approach to school-based preparedness efforts, thereby ensuring student safety.

⁶ This is an open access Article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license. The published version is available at: <https://ajem.infoservices.com.au/items/AJEM-32-01-09>

6.1. Introduction

A school links into families through their students and can be used to build a culture of disaster resilience within communities (Ronan et al., 2016). One of the main ways schools can support community resilience is by ensuring they provide students and staff with safe facilities in which to learn (e.g. Peek, 2008). In the decade since the initial introduction of the *Hyogo Framework for Action 2005-2015* (HFA), disaster risk reduction efforts have prioritised the safety of school sites and children's continued access to education. A review of global disaster risk management within the education sector resulted in the establishment of the Comprehensive School Safety (CSS) framework (GADRRRES, 2014). The CSS framework includes core strategic goals, priorities and indicators from the HFA. It has provided the education sector with an overview of what should be considered when planning for physical safety at schools and ongoing access to education. The CSS framework is built around three pillars:

- safe school facilities
- school disaster management
- risk reduction and resilience education.

Schools are identified as critical infrastructure within the *Sendai Framework for Disaster Risk Reduction 2015-2030* and education is recognised as having a role in achieving the disaster risk reduction (DRR) priorities within the Sendai framework (Shiwaku & Shaw, 2016).

New Zealand has agreed, as a signatory to both the Hyogo and Sendai frameworks, to integrate where applicable the principles of DRR and resilience (UNISDR, 2005; 2015) into policy and planning at all levels of government. To date, successive governments have undertaken steps towards this goal within the education sector, most prominently in ensuring that schools are physically safe learning environments (e.g. earthquake-resilient school buildings).

The aim of the present study was to explore the legislative requirements and practitioner expectations of school-based emergency management efforts and to identify what preparedness activities schools should take to keep students physically and emotionally safe in emergencies. The study investigated three research questions:

- What legislation directs emergency management efforts in schools?
- What are schools expected to do to meet their legislative responsibilities?

- What monitoring and compliance requirements exist for school-based emergency management efforts?

This research builds on an earlier study examining emergency preparedness in 355 New Zealand schools (Tipler et al., 2015), which found that preparedness levels varied considerably between schools, due in part to an absence of clarification within existing emergency management requirements and expectations. For example, under the *Health and Safety at Work Act 2015* (NZ Government, 2015), schools are required to develop emergency response plans, but the details of what those plans should contain are up to individual school leaders to determine.

6.2. Method

The study combined two data collection methods:

- A review of legislation, policies and guidelines related to safety and emergency management in schools to establish the statutory requirements, and a review of resources available to assist schools in their emergency management efforts.
- Expert interviews with three emergency management practitioners (two from the Ministry of Education [MoE] and one from the Wellington Region Emergency Management Office [WREMO]). The three practitioners interviewed were responsible within their organisations for ensuring that schools were advised and supported in their emergency management efforts. The semi-structured interviews lasted between 30-45 minutes. The interviews were transcribed verbatim, checked twice against the recorded interview and returned to participants for checking, editing and accuracy.

The analysis process combined qualitative description and thematic analysis. A qualitative descriptive approach, as advocated by Sandelowski (2000), recognises there are times when the audience simply requires a straight description of the phenomena. The approach tends to focus on basics such as the who, what, and where of events or experiences. This approach is consistent with the study aim of identifying the requirements and expectations of school-based emergency management. Thematic analysis, as described by Braun and Clarke (2006), was used to organise the descriptive data. The principles of thematic analysis allowed for the data to be viewed in a semantic way to identify and describe patterns and ideas in the data. Data were manually coded and mapped to enable the categorisation of identified relationships allowing themes and sub-themes to be recognised.

Approval for the research was granted by the Massey University Human Ethics Committee.

6.3. Findings and Discussion

Findings are presented under the three research questions.

6.3.1. *Legislation directing emergency management efforts in schools*

New Zealand schools exist in a decentralised environment in which individual schools are governed by boards of trustees. These boards are responsible for the safety and welfare of all students, staff and visitors (e.g. parents, volunteers, contractors) on site or engaged in school-related business (e.g. field trips or after hours activities) (MoE, 2016a). In particular, schools have a duty of care that requires they undertake appropriate emergency management activities to ensure the safety of students until they can be reunited with their families.

Four pieces of legislation guide school emergency management efforts. Table 6.1 provides an overview of the requirements of boards of trustees within each piece of legislation.

Table 6.1 Emergency management legislation and requirements of schools

Legislation	Requirements of boards of trustees
Education Act 1989	Must provide a safe physical and emotional environment for their students. May temporarily close the school in an emergency (e.g. flood, fire, epidemic). Must exclude staff and students with an infectious disease.
Building Act 2004	Must ensure that all school buildings are safe and can be used without jeopardising the health of staff and students. Must ensure buildings can be safely evacuated in the event of fire (and other hazards). Must develop an evacuation plan and procedures for all school buildings.
Fire Safety and Evacuation of Buildings Regulations 2006	Must have building evacuation procedures in place. Must test evacuation procedures in emergency drills at least once each school term.
Health and Safety at Work Act 2015	Must develop plans and procedures for all foreseeable emergencies including earthquakes and other natural events. Must ensure all staff, students and visitors are provided with the training and education necessary to implement the emergency plans. Must test emergency plans and procedures in regular emergency drills.

The following list identifies the known resources available to assist schools in meeting their legislative obligations. With the exception of the requirements within the *Education Act 1989* (NZ Government, 1989), the legislation is generic for all buildings and workplaces.

Safe learning facilities

- Building Warrant of Fitness (MoE, n.d.a)
- Fire and safety design requirements for schools (MoE, 2008)
- Health and Safety at Work Act 2015 – A practical guide for Boards of Trustees and school leaders (MoE, 2016a)

School emergency management

- Emergency Management Plan Template (MoE, 2012)
- Managing Emergencies and Traumatic Incidents - 9 Point Checklist (MoE, 2009)
- Pandemic Planning Kit (MoE, n.d.b)
- Traumatic Incidents: Managing Student And Staff Wellbeing (MoE, 2016b)

Disaster resilience education

- EOTC Guidelines – Bringing the Curriculum Alive (outdoor education resource) (MoE, 2016c)
- What's the Plan Stan? (teaching resource for disaster education) (MCDEM, 2009)

The MoE practitioners acknowledged the absence of specific details identifying what emergency management activities schools must undertake under the legislation. For example, the health and safety legislation is:

...very ambiguous in the wording, stating 'all foreseeable hazards', 'best efforts', type wording. It has really just left it open to interpretation. (MoE, 1)

The absence of well-defined expectations is a weakness of the legislation and has resulted in schools not having comprehensive frameworks on which to base emergency management efforts. Similar research undertaken in the USA (Chung, Danielson & Shannon, 2009) identified that governments need to provide clear emergency management benchmarks and expectations of school-based efforts.

6.3.2. School legislative responsibilities

In order to meet legislative responsibilities of keeping students safe in emergencies it is necessary for schools to:

- undertake emergency planning that details how the school will respond in emergencies
- provide staff and students with hazards education and emergency response training to ensure they can implement the emergency plans
- regularly conduct emergency response drills to test plans, education, and training.

Emergency planning

All practitioners identified three aspects of emergency planning as being important: emergency plans, the MoE emergency management plan template and education continuity.

Emergency plans

Emergency plans are essential for the welfare of staff and students (Smith et al., 2001). By having plans schools send a message to families that they are prepared to keep students safe (Johnston et al., 2011). School plans need to meet the requirements of various emergency situations, not just those that seem most likely. Plans should include actions to be taken before, during and after an emergency event (Burling & Hyle, 1997). The MoE practitioners recognised that development of comprehensive emergency response plans may get unwieldy and schools should create plans that are:

...succinct, very direct, brief, operationalised, and easy to read. More like a checklist rather than pages and pages of information. You can get caught, especially in the education area, of becoming too wordy, too lengthy and [*providing*] too many options. (MoE, 1)

The importance of planning for reuniting families after an emergency cannot be overstated. Schools should develop procedures for reunification. Such procedures are a part of the 'contract' schools establish with parents and caregivers when students are enrolled. The study by Tipler and colleagues (2015) investigated preparedness in New Zealand schools and found that while the majority of schools (91 per cent) reported having emergency plans, only 40 per cent had ensured that staff, parents and caregivers were familiar with family reunification procedures. In an emergency, parents

need to know how to collect their children and where from (Chung et al., 2009; Johnson et al., 2014), thereby avoiding confusion or additional anxiety (Ronan & Johnston, 2005). Emergencies can occur at any time in any school and, where reunification plans are not in place, schools risk not meeting their duty-of-care obligations.

Emergency management plan template

In 2010 the MoE produced an emergency management plan template (MoE, 2012) to assist schools in their planning. The template combines bullet-point suggestions of what schools should consider (e.g. how the school advises parents and caregivers in the event of an emergency) and checklists for hazard types (e.g. Fire - ring fire alarm, call 111, if safe to do so extinguish the fire, etc.). Use of the template is voluntary.

We offer the tools and resources on our website. The template is a great example. But it's a horse-to-water situation. We can provide as much water [as we like] but we can't make them drink. And that's the same with these templates. We've made a really good template available to [schools] but it's up to them whether they adopt it. (MoE, 1)

The template is formatted to address individual emergency situations (e.g. earthquake, gas leak, violent intruder) and can be modified, allowing schools to develop individualised response plans for emergency events they may face. Planning for individual hazard types is common within the emergency management literature. However, some research (e.g. Chung et al., 2009, International Finance Corporation, 2010) advocates focusing on five core response requirements (i.e. shelter-in-place, lockdown, building evacuation, relocation and family reunification) irrespective of the hazard or emergency as each response action can be used for several emergency situations. For example, building evacuation may be the appropriate response in a fire, earthquake, chemical spill or gas leak. By focusing on the five core response requirements schools can have plans in place for any emergency they may face, without the need to develop individual plans for every hazard type.

The MoE template, in its current form, does not provide specific advice or guidance on any of the five core response requirements. Nor does it include information about planning for education continuity. Gaps within the plan template may be addressed by using other guides and documents. For example, a best practice emergency planning guide was developed by the Ministry of Civil Defence and Emergency Management (MCDEM) and the MoE (2011) for use in early childhood education services. The guide includes advice on developing plans, case study examples, checklists, templates and frequently asked questions. Much of the material in the guide is relevant for schools. In

addition, the MoE practitioners suggested, where appropriate, schools get advice from other emergency management professionals (e.g. emergency services, CDEM staff in local and regional councils or private security companies). Engaging such professionals to assist schools' emergency management efforts was encouraged by Chung and colleagues (2009) in their recommendations for US schools. However, not all schools are in a position, either financially or geographically, to access external professional expertise. It is necessary for the MoE (or other agencies, e.g. CDEM) to provide schools with access to basic information to meet legislative and duty-of-care obligations.

Education continuity

International school preparedness literature (e.g. International Finance Corporation, 2010) indicates that the interruption of education after an emergency or disaster can lead to students having extended absences or dropping out of school, which can have negative implications for students, their families and the community. Furthermore, the re-establishment of children's routines after an emergency, in particular returning to school, can help the recovery process (e.g. Peek, 2008). The MoE practitioners acknowledged the importance for family and community recovery of re-opening schools as soon as possible after an emergency event.

[*Until*] parents have some place to put the kids into school they're not going to be able to go back to work. And so there's a flow-on effect, financial and social implications... the functioning of the community as a whole. (MoE, 1)

It is also important for children to get back into their normal routines. (MoE, 2)

To that end, it is essential that schools plan for what will be required for them to operate, even if at a reduced capacity, after a large-scale or prolonged emergency event. Although the importance of schools planning for ongoing operations after an emergency was recognised by the MoE practitioners, no specific education continuity resources or guidelines are available from the MoE (or elsewhere) to help schools prepare. Research suggests (e.g. Peek, 2008) that failure to provide for ongoing education needs after an emergency can negatively impact student academic performance and long-term educational outcomes, especially those suffering from additional or pre-existing challenges (e.g. displacement, family instability).

One aspect of education continuity planning discussed by the MoE practitioners was the implication of using school sites to provide interim accommodation for the community after a major emergency event. A lesson learnt from the 2010-2012

Canterbury earthquakes was that when emergency accommodation becomes temporary community accommodation for an extended period it may impact on a school's capability to educate students. For example, using school buildings for community shelters means parts of the school are inaccessible to students and can create potential physical risks to students of 'unknown' people on the school grounds. In consideration of this, the MoE engaged with MCDEM to clarify how school sites may be used in the aftermath of a large-scale emergency (e.g. accommodation or welfare centres) and for how long such use might continue before schools can return to 'normal' activity. The importance of schools returning to the core business of education after a disaster or large-scale emergency is a priority within the CSS literature (GADRRRES, 2014). Clarification by the MoE of how schools may be used after an emergency will aid schools in planning for the continuity of education.

A well-developed emergency plan can influence how school officials manage a crisis in the short-term and can affect how schools recover in the long-term (Smith et al., 2001). However, developing emergency plans is only part of an effective response. Students and staff need hazards education and emergency response training to implement the plans (Heath et al., 2007).

Hazards education and emergency response training

Hazards education

In-roads have been made within the New Zealand education system for the inclusion of hazards education programs in schools. These local efforts have been recognised in the international disaster resilience education literature (e.g. Ronan, 2014). The 'What's the plan Stan?' (WTPS) teaching resource was developed in 2006 by MCDEM (updated in 2009) to incorporate hazards education in primary and intermediate school curricula. The WTPS resource contains lesson plans, fact sheets and classroom activities. In addition, WTPS includes basic information about the emergency management obligations of school boards of trustees and offers simple guidelines for conducting emergency drills and practices.

To date no complementary resource has been created for use in secondary schools. Hazards education is not specified within the New Zealand secondary school curriculum and though opportunities exist for the inclusion of disaster-related education within the social sciences (i.e. Years 9 and 10 social studies and Years 11 and 12 geography) and in science (i.e. Years 9 and 10 geology) (Taylor & Moeed, 2013). However, inclusion is at the discretion of individual teachers and as such, it is possible

for students to complete their secondary school education without exposure to hazards education programs. It was a recommendation of the WREMO practitioner that every student receives some hazards education:

... just some very basic education around natural hazards and what they could do to get prepared in their own household. Just one lesson a year would be sufficient. You could get enough into one lesson I think. (WREMO)

In addition to providing students with information that allows them to take an active role in their own safety, hazards education research (e.g. Ronan et al. 2015) has identified positive benefits for families. By promoting home-based preparedness with students and staff, schools can encourage the development of family response plans that support the school's emergency management efforts and community-wide resilience.

Emergency response training

Schools are required to ensure staff and students are provided with the information and training necessary to implement the school's emergency response plans (MoE 2016a). As part of their health and safety professional development program (MoE 2016d) schools must provide staff and students with training in emergency procedures (e.g. identifying types of emergencies, evacuation procedures, location and use of emergency equipment). The health and safety guide for schools provides limited information identifying what should be covered in training programs, potential penalties for non-compliance and which external agencies (e.g. WorkSafe New Zealand) can provide further advice. As with other aspects of school-based emergency management (e.g. plans and drills) specific guidance and standard operating procedures ensure all schools have the training elements in place to meet their legal obligations.

New Zealand research examining school experiences of emergency events recognises the important role that the principal (Tarrant, 2011) and staff (Education Review Office, 2013) play in helping students and families respond to and recover from traumatic incidents and emergency events. To assist schools in managing traumatic incidents the MoE developed a guide for crisis management teams within schools (MoE, 2016b). In addition, the MoE traumatic incident team offer incident management training. The only New Zealand study to ask schools about the use of the traumatic incident training (Renwick, 2012) found that only a quarter of schools (255 out of 1020) had been invited to participate in MoE training programs on managing traumatic incidents. However, 'many' schools did indicate a desire to access additional support including professional development or training in managing emergencies and traumatic incidents.

School hazards education programs are invaluable in providing students with information about how to prepare at home and keep themselves safe in emergencies. Supporting such programs with regular emergency response training in drills reinforces learnings and allows schools to test response procedures, as shown in Figure 6.1.



Figure 6.1 Students and staff receive hazards education and emergency response training so they understand what to do in an emergency. Image: David Johnston.

Emergency response drills

All New Zealand schools are legally required to conduct fire evacuation drills (NZ Government, 2006). Drills for other emergencies (e.g. earthquakes, lockdowns) are also recommended (MoE, 2016a). All three practitioners interviewed acknowledged the importance of schools conducting regular (at least once per term) emergency drills as a way of helping staff and students to respond effectively in real emergencies. The MoE practitioners indicated that internal surveys conducted by the Ministry asking schools about the drills found that some schools were undertaking additional drills to those required (e.g. drills for someone suffering from anaphylactic shock or school bus accidents).

Lockdowns are events on which schools most often seek advice from the MoE. To help prepare, the Ministry practitioners recommended schools undertake lockdown drills, but that those drills do not necessarily need to include students, for fear of distressing them. However, research on intruder crisis drills (Zhe & Nickerson, 2007) found that well-designed drills in which students are provided with support information about why they are practising such a scenario do not cause undue upset to students. Emergency drills are a fine balancing act of providing a realistic simulation that enables staff, students and visitors to know what risks they may face (Kano et al., 2007) without

increasing anxiety (Johnson et al., 2014). In all cases calm and responsible school staff are vital to an effective response (Smith et al., 2001).

The WREMO practitioner recommended that schools regularly conduct emergency drills for the hazards that are most likely to affect them. However, when asked about what specific elements drills should contain he was uncertain.

I don't think we've thought that through actually... From an earthquake point of view, there is the drop-cover-hold aspect, carefully-exiting aspect, and evacuation-if-necessary aspect. I think that's all we've put to it for schools. But if there are other points, it would be good to know...if we are missing something. (WREMO)

As a result of previous studies (e.g. Johnson et al., 2014, Johnston et al., 2011, Tipler et al., 2016), authors have recommended specific activities be considered when planning and conducting emergency drills. For example, practising alternative safety behaviours in locations outside the classroom, requiring everyone at the school to participate in drills, identifying potential hazards along evacuation routes, accounting for everyone on site at the time of the drill and evaluating the drill including feedback from participants. Figure 6.2 shows students demonstrating an alternative earthquake safety behaviour. Such advice would be useful for New Zealand emergency management practitioners to consider when developing standard operating procedures for response drills in schools.

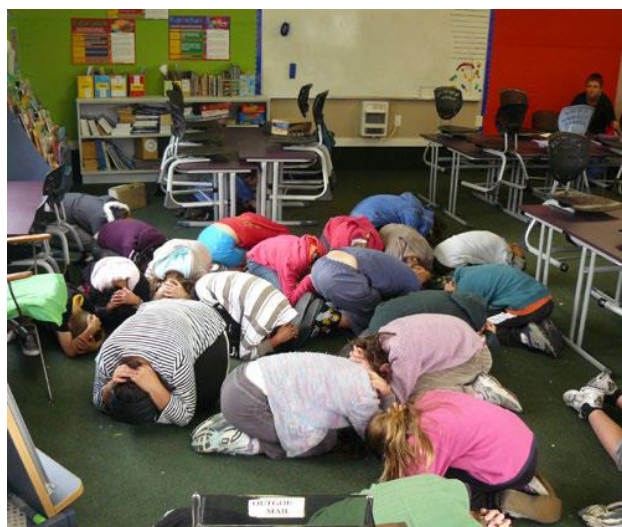


Figure 6.2 School children practice the 'turtle' as an alternative safety behaviour for when they cannot 'drop, cover, [hold]'. Image: David Johnston.

The only resource available to schools to assist them plan and conduct emergency drills is a seven-page overview of simulations and drills within the WTPS teaching resources (MCDEM 2009). Renwick's (2012) review of WTPS found that 73 per cent of schools (462 out of 633) that used the emergency simulation and drills section found it to be 'useful' or 'very useful'. As the WTPS resource was only distributed to primary and intermediate schools it is uncertain what resources or guidelines, if any, are used within secondary schools when planning and conducting emergency drills.

6.3.3. *Monitoring and compliance of school-based emergency management*

Evidence of monitoring of school compliance with emergency management obligations is limited. Requirements related to school building safety are monitored through a Building Warrant of Fitness, which is renewed annually (MoE, n.d.a). In addition, school leaders may be asked about the health and safety and emergency management efforts in education reviews (MoE, 2016a). The MoE practitioners identified a need for preparedness benchmarks for schools (e.g. specific content to be included in emergency plans) and that any benchmarks be monitored and regularly audited. However, the absence of measures in place to monitor the effectiveness of school-based emergency management efforts is common within the education sector globally. This was recognised as a priority within DRR research (e.g. GADRRRES, 2014). Without consistent monitoring of all aspects of school emergency management efforts it is difficult for governments to assess whether schools have the capabilities to cope in emergencies (Brock, 2000), to ensure the safety of their students.

6.4. Conclusions

In New Zealand, school boards of trustees are responsible for the safety of the students in their care before, during, and after an emergency. Existing legislation provides the general emergency management requirements schools must meet. However, due to the ambiguity and generic nature of the legislation, there is variation in the extent of emergency preparedness activities schools undertake. Planning for both an effective emergency response and education continuity after an emergency can help reduce impacts on student safety and learning. The establishment of emergency preparedness benchmarks that schools must meet could help address deficiencies and ambiguities within the legislation. It is unrealistic to expect that every school would have access to the expertise needed to develop effective emergency response plans and procedures without additional advice and support from the MoE and, where

appropriate, from other emergency management professionals. Providing schools with guidance and standard operating procedures, especially for the five core response actions (i.e. shelter-in-place, lockdown, building evacuation, relocation, and family reunification) could build consistency in school preparedness and maximise potential safety for students. Finally, the development of specific emergency management criteria within the regular school review process to monitor compliance of school legislative requirements would help schools plan for the safety of their students in any emergency event.

School emergency response capabilities are a test of preparedness activities. There is a need to investigate the experiences of how schools respond to real emergencies to determine the effectiveness of their emergency management preparedness and response.

References

- Braun, V., & Clarke, V. (2006), Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Brock, S. E. (2000). Development of a school district crisis intervention policy. *The California School Psychologist*, 5(1), 53-64. DOI:10.1007/BF03340876
- Burling, W. K., & Hyle, A. E. (1997). Disaster preparedness planning: Policy and leadership issues. *Disaster Prevention and Management: An International Journal*, 6(4), 234-244. <http://dx.doi.org/10.1108/09653569710179075>
- Chung, S., Danielson, J., & Shannon, M. (2009). *School-based emergency preparedness: a national analysis and recommended protocol*. Agency for Healthcare Research and Quality. Rockville, MD.
- Education Review Office. (2013). *Stories of resilience and innovation in schools and early childhood services*. Wellington, New Zealand: Education Review Office.
- GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector). (2014). *Comprehensive school safety*. Retrieved from: <http://preventionweb.net/go/31059>
- Heath, M.A., Ryan, K., Dean, B., & Bingham, R. (2007). History of School Safety and Psychological First Aid for Children. *Brief Treatment and Crisis Intervention*, 7(3), pp. 206-223.
- International Finance Corporation. (2010). *Disaster and Emergency Preparedness: Guidance for Schools*. Washington, DC: International Finance Corporation.
- Johnson, V.A., Johnston, D.M., Ronan, K.R., & Peace, R. (2014a). Evaluating children's learning of adaptive response capacities from ShakeOut, an

earthquake and tsunami drill in two Washington State school districts. *Journal of Homeland Security & Emergency Management*, 11(3), 347-373. <https://doi.org/10.1515/jhsem-2014-0012>

Johnston, D., Tarrant, R., Tipler, K., Coomer, M., Pedersen, S., & Garside, R. (2011). Preparing schools for future earthquakes in New Zealand: Lessons from an evaluation of a Wellington school exercise. *Australian Journal of Emergency Management*, 26(1), 24-30.

Kano, M., Ramirez, M., Ybarra, W. J., Frias, G., & Bourque, L. B. (2007). Are schools prepared for emergencies? A baseline assessment of emergency preparedness at school sites in three Los Angeles County school districts. *Education and Urban Society*, 39(3), 399-422. doi/abs/10.1177/0013124506298130

MCDEM (Ministry of Civil Defence and Emergency Management) & MoE (Ministry of Education). (2011). *Early Childhood Education Services: Emergency Planning Guidance. Civil Defence Emergency Management Best Practice Guide (BPG 6/11)*. Retrieved from: www.civildefence.govt.nz/assets/Uploads/publications/bpg-06-11-early-childhood-education-emergency-planning-guidance.pdf [3 September 2016].

MCDEM (Ministry of Civil Defence and Emergency Management). (2009). *What's the Plan Stan? Simulation and practice activities*. Ministry of Civil Defence and Emergency Management, Wellington. Retrieved from: <http://www.whatstheplanstan.govt.nz/themes/whats-the-plan/pdf/Simulation%20and%20practice%20activities.pdf>.

MoE (Ministry of Education). (2008). *Fire and Safety Design Requirements for Schools*. Retrieved from <http://www.education.govt.nz/assets/Documents/Primary-Secondary/Property/School-property-design/FireAndSafetyDesignRequirements.doc>.

MoE (Ministry of Education). (n.d.b). *Influenza pandemic planning guide for early childhood education services, schools and tertiary organisations*. Retrieved from <http://www.education.govt.nz/ministry-of-education/specific-initiatives/health-and-safety/work-place-management/pandemic-planning-kit/pandemic-planning-guide/>.

MoE (Ministry of Education). (2016b). *Traumatic Incidents – Managing Student and Staff Well-Being guide for school crisis teams*. Ministry of Education, Wellington. Retrieved from: <http://www.education.govt.nz/assets/Uploads/Traumatic-incidents-schools-Guidelines-for-wellbeing.pdf>.

MoE (Ministry of Education). (2016a). *Health and Safety Practical Guide for Boards of Trustees and School Leaders*. Ministry of Education, Wellington. Retrieved from:

- <http://www.education.govt.nz/assets/Documents/Ministry/Initiatives/Health-and-safety/Tools/Health-and-Safety-at-Work-Act-2015.pdf>.
- MoE (Ministry of Education). (2016c). *EOTC Guidelines 2016 – Bringing the Curriculum Alive*. Retrieved from: <http://eotc.tki.org.nz/content/download/2752/11123/file/EOTC%20Guidelines%202016.pdf>.
- MoE (Ministry of Education). (n.d.a). *Building warrants of fitness for school facilities*. Retrieved from: <http://www.education.govt.nz/school/property/state-schools/day-to-day-management/building-warrants-of-fitness/>.
- MoE (Ministry of Education). (2009). *Managing emergencies and traumatic incidents – Nine-step checklist*. Retrieved from: www.education.govt.nz/assets/Documents/School/Traumatic-incidents-and-emergencies/NinePointChecklist.pdf [26 October 2016].
- MoE (Ministry of Education). (2012). *Emergency Plan Template*. Retrieved from: www.education.govt.nz/assets/Documents/School/Traumatic-incidents-and-emergencies/EmergencyMPlanTemplateWordFeb12.doc [10 June 2016].
- MoE (Ministry of Education) 2016d, *Professional Development, Health and Safety at Work Act 2015*. Retrieved from: www.education.govt.nz/assets/Documents/Ministry/Initiatives/Health-and-safety/Factsheets/HS-Factsheet-10-Professional-Development.pdf.
- NZ Government. (1989). *Education Act 1989*. Retrieved from http://www.legislation.govt.nz/act/public/1989/0080/latest/DLM175959.html?search=ts_act_education_rese&p=1&sr=1.
- NZ Government. (2004). *Building Act 2004*. Wellington, New Zealand. Retrieved from <http://www.legislation.govt.nz/act/public/2004/0072/latest/whole.html>.
- NZ Government. (2006). *Fire Safety and Evacuation of Buildings Regulations 2006*. Retrieved from: http://www.legislation.govt.nz/regulation/public/2006/0123/latest/whole.html?search=qs_act%40bill%40regulation%40deemedreg_Fire+Safety+and+Evacuation+of+Buildings+Regulations+2006_rese_25_h&p=1#DLM382016.
- NZ Government. (2015). *Health and Safety at Work Act 2015*. Retrieved from: <http://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976660.html>.
- Peek, L. (2008). Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience: An Introduction. *Children, Youth and Environments*, 18(1), 371-388. Retrieved from: <http://www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0001>

- Renwick, J. (2012). *Report of the 2012 What's The Plan Stan survey of New Zealand primary schools*. Department of Internal Affairs, Wellington. Retrieved from: <http://www.civildefence.govt.nz/cdem-sector/public-education/research-and-evaluation/>.
- Ronan, K. R., Haynes, K., Towers, B., Alisic, E., Ireland, N., Amri, A. ... & Petal, M. (2016). Child-centred disaster risk reduction: Can disaster resilience programs reduce risk and increase the resilience of children and households?. *Australian Journal of Emergency Management*, 31(3), p. 49.
- Ronan, K.R. & Johnston, D. M. (2005). *Promoting community resilience in disasters: The role for schools, youth and families*. Springer, New York.
- Ronan, K.R. (2014). *Many advances, continuing challenges towards HFA2 and Post-2015: Policy-practice-research summary and recommendations*. Hyogo Framework for Action Thematic Review: Priority for Action 3 – Core Indicator (CI) 2: School curricula, education material and relevant training including disaster risk reduction and recovery concepts and practices. Background Chapter prepared for United Nations Office for Disaster Risk Reduction and the Global Assessment Report on Disaster Risk Reduction, 2015. UNESCO/UNICEF: Paris/Geneva.
- Ronan, K.R., Alisic, E., Towers, B., Johnson, V.A, and Johnston, D.M. (2015). Disaster Preparedness for Children and Families: A Critical Review. *Current Psychiatry Reports*, 17(7), pp. 1-9, DOI: 10.1007/s11920-015-0589-6.
- Sandelowski, M. (2000). Focus on research methods: Whatever happened to qualitative description? *Research in nursing and health*, 23(4), pp. 334-340.
- Shiwaku, K., & Shaw, R. (2016). Introduction: Disaster Risk Reduction and Education System. In *Disaster Resilience of Education Systems* (pp. 1-10). Springer Japan. DOI: 10.1007/978-4-431-55982-5_1
- Smith, S., Kress, T., Fenstemaker, E., Ballard, M., Hyder, G. (2001). Crisis Management Preparedness of School Districts in Three Southern States in the USA. *Safety Science*, 39, 83-92. [http://doi.org/10.1016/S0925-7535\(01\)00028-5](http://doi.org/10.1016/S0925-7535(01)00028-5)
- Tarrant, R. (2011). Leadership through a School Tragedy: A Case Study (Part 1-The First Week). *Australasian Journal of Disaster and Trauma Studies*, 2011(3), 65-77. Retrieved from: http://trauma.massey.ac.nz/issues/2011-3/AJDTS_2011-3_01_Tarrant.pdf
- Taylor, M., & Moeed, A. (2013). The 2010 Canterbury earthquake: curriculum shockwaves. *International Research in Geographical and Environmental Education*, 22(1), 57-70. <http://dx.doi.org/10.1080/10382046.2012.759693>

- Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2015). Emergency Preparedness in New Zealand Schools: A Summary of Survey Results. *GNS Science Report 2015/48*. 24 p.
- Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2016). New Zealand ShakeOut exercise: Lessons learned by schools. *Disaster Prevention and Management: An International Journal*, 25(4), 550-563. DOI: <http://dx.doi.org/10.1108/DPM-01-2016-0018>
- UNISDR (United Nations International Strategy for Disaster Reduction). (2005). *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*. Retrieved from: <https://www.unisdr.org/we/coordinate/hfa>.
- UNISDR (United Nations International Strategy for Disaster Reduction). (2015). *Sendai Framework for Disaster Risk Reduction 2015-2030*. Retrieved from: <http://www.unisdr.org/we/inform/publications/43291>.
- Zhe, E. J., & Nickerson, A. B. (2007). The effects of an intruder crisis drill on children's self-perceptions of anxiety, school safety, and knowledge. *School Psychology Review*, 36, 501-508.

6.5. Link to Chapter 7 (Paper 4)

The findings of Study 2 were reported in Paper 3 (Tipler et al., 2017b) which described the legislative requirements and practitioner expectations of emergency management in New Zealand schools, the necessity for which was revealed in Study 1 (Papers 1 and 2). As hypothesised, the legislation was found to be generic to most New Zealand workplaces, broad and at times ambiguous. The need for further disaster risk reduction guidance for schools was also determined. The paper proposed several ways to address the shortcomings of the legislation, in particular, recommending the establishment of clear emergency preparedness benchmarks for schools to help address deficiencies and ambiguities identified. Furthermore, the development of standard operating procedures for core emergency response actions (e.g., lockdowns, evacuations, family reunification) was suggested as a means of enabling a consistent approach to school-based preparedness efforts. Paper 3 also supported the assumption in Paper 2 that the differences in preparedness levels across schools were due, in part, to a lack of clarity in the legislative requirements and expectations of schools.

However, there remained a need to investigate how schools respond to real emergencies, to explore the relationship between school preparedness and response efforts. To that end, Study 3 employed case studies to explore how three schools responded in a range of emergency events. Data was collected in semi-structured interviews with 12 school leaders, teachers, and parents addressing four main topics: prior planning, preparation, and training; the emergency event; lessons learned; and advice to other schools. As in the previous studies, Study 3 integrated inductive (data-driven) and deductive (theory-driven) thematic analysis (e.g., Fereday & Muir-Cochrane, 2006) was used, with the six stages of thematic analysis described by Braun and Clarke (2006) providing a structured approach to the identification and description of patterns and ideas within the data. The findings and themes discussed within Studies 1 and 2 also contributed to the coding and theme development. Excel was used to organise and code the interview data. Individual interviews were mapped and then each map was collated with others from the same case, allowing comparison within and across cases. Paper 4 (Tipler et al., 2017c) utilises lessons learned from school responses during emergencies to identify the factors before, during, and after an emergency that contribute to an effective response. The contributing factors and lessons learned provide the basis for a six-stage model of a school-based emergency response.

Paper 4 was published in *Natural Hazards*, the United States-based journal of the International Society for the Prevention and Mitigation of Natural Hazards. The journal is devoted to original research work on all aspects of natural, man-made, and technological hazards. Additional discussion between the paper's authors and feedback from the journal reviewers resulted in two key revisions to the paper. First, additional details about the research design (e.g., methodology, ethics, and thematic analysis process) were included. Second, the two main themes within the Findings and Discussion section were reversed so the factors contributing to an effective response were presented prior to the stages of an emergency response model. This change was made to provide a stronger theoretical and data-driven foundation for the model. These revisions were made after the thesis was submitted for examination so are not included in the following draft of Paper 4.

Chapter 7. Paper 4: Learning lessons from experience: Emergency response in schools

Tipler, K.S., Tarrant, R.A., Tuffin, K.F., & Johnston, D.M. (2017c). Learning lessons from experience: Emergency response in schools. *Natural Hazards*, 1-21. DOI 10.1007/s11069-017-3094-x

Abstract

In an emergency response, schools have responsibility for the safety of students until they can be reunited with their families. This study explored a range of small, commonly occurring emergencies in three case study schools in New Zealand. Within each school, a selection of stakeholders (i.e., school leader, staff, parent) shared their experiences of responding to emergency events in the school. Lessons learned from participants' experiences were used to identify recurring response activities, irrespective of emergency type, which enabled the development of the six-stage model of an emergency response. The six stages are: (1) Alerts; (2) Safety behaviours; (3) Response actions; (4) Student release / Family reunification; (5) Temporary school closure; and (6) Business as usual. In addition, participants' first hand experiences enabled the identification of factors that contribute to an effective response before, during, and after an emergency. Foremost amongst those factors being the essential role played by prior preparation. The present study is expected to contribute to the small pool of research investigating how schools respond to emergencies to ensure student safety, and to enhance global school safety efforts.

Key words: Schools, emergency, response, lessons, experience, New Zealand

7.1. Introduction

Children are identified as being among the most vulnerable populations during a disaster (e.g., GADRRRES, 2015). The decade to 2016 has seen researchers focusing on school-based experiences of a range of disasters and emergency events. Examples include: large-scale disasters like Hurricanes Rita and Katrina (e.g., Clettenberg et al., 2011) and the Japanese earthquake, tsunami, and nuclear crisis of 2011 (e.g., Shiwaku et al., 2016); regional events (e.g., floods, storms, influenza outbreaks) that

have required temporary school closures (e.g., Awofisayo, Ibbotson, Smith, Janmohamed, Mohamed & Olowokure, 2013; Convery et al., 2014; Stuart et al., 2013); and more frequently occurring, smaller emergencies that have affected individual schools (e.g., Crepeau-Hobson & Summers, 2011; Tarrant, 2011a).

A well-coordinated response can mitigate a certain amount of the stress, injury, and damage sustained, and may also assist schools, families, and communities in returning to a degree of normality after a disaster. However, the literature generally pays little attention to how students were kept safe *during* the response to emergency events. Previous studies often include little discussion, if any, around safety behaviours, evacuation procedures, student supervision, or the requirements associated with family reunification. Instead studies tend to focus on what was involved in helping students and staff cope once they have returned to school after the emergency (e.g., Convery et al., 2014), which may be several weeks or months later, as was the case for many schools in Christchurch, New Zealand, after the February 2011 earthquake (Education Review Office, 2013).

7.1.1. Defining ‘Response’

However, before an examination of how schools respond in emergencies can begin, it is necessary to focus the discussion by establishing the boundaries for what constitutes the ‘*response*’ phase of an emergency event. Research investigating school-based emergency responses often blurs the line between what comprises the response and recovery phases of the emergency. Therefore, in an effort to clarify what is meant by *response* in a school-based emergency context, a useful starting point is the definition used in New Zealand civil defence and emergency management agencies (Department of the Prime Minister and Cabinet, 2015, Section 24, pg. 2):

Response involves actions taken immediately before, during, or directly after an emergency to save lives and property.

However, this definition is broad and can be further refined:

Response is the immediate reaction to a disaster. It may occur as the disaster is anticipated, as well as soon after it begins (Federal Emergency Management Agency, 2006, p. 3).

With these definitions in mind, it can be argued that in a school-based emergency, the response phase is the period from when the emergency begins (e.g., warnings or alerts sounded) through to when the physical threat presented by the emergency has ended (e.g., fire put out, chemical leak cleared away). This may be when students are safely

able to return to class or, if necessary, are reunited with their families. Therefore, what many studies describe as the response phase of an emergency is in fact the early stages of recovery. For example, helping students and staff cope especially once they have returned to school after an emergency (e.g., Convery et al., 2014). Furthermore, by not recognising, at the very least, the steps undertaken to ensure the physical safety of students *during* an emergency response, researchers are missing opportunities to identify lessons that can improve future school-based preparedness and response efforts. Having established the boundaries of what constitutes the response phase of an emergency, it becomes much easier to distinguish which activities to consider when investigating how schools respond to emergency events.

7.1.2. Learning lessons from response experiences

Lessons learned from school response to emergency events are somewhat limited in the literature, with much of the focus on large-scale disasters. However, lessons can also be learnt from experiences of smaller events, near misses, or negative events (Borum et al., 2010; Labib & Read, 2013). In fact, Borum et al. (2010) in their review of shootings in US schools, found that lessons can be learned from big and small events, but suggested that lessons from smaller emergencies are better able to be generalised across all schools, because these types of minor emergencies are relatively common in schools. Furthermore, policy advice from the American Academy of Pediatrics (2008) suggests when schools have planned for small-scale, commonly occurring emergencies; they are more likely to be prepared for larger more complex community emergencies.

The scarcity of research exploring smaller events may be due to an assumption that because no one was injured and ‘everything turned out okay’ there is no perceived need to learn lessons. Another possibility is that school leaders may be reluctant to discuss mistakes or failures. However, this should not be the case, with research from Cornell and Sheras (1998), which examined several school-based emergency events, indicating that by analysing and learning from mistakes, schools can be better prepared to respond in future emergencies. Therefore, schools should be encouraged to evaluate their response experiences (both positive and negative) without fear of reprisal (e.g., censure, lawsuits), which has been identified as a barrier to learning lessons across a range of organisations and sectors within the US (Labib & Read, 2013). In New Zealand, school boards of trustees (school governing bodies) are responsible for the health and safety of staff, students, and visitors, and can be prosecuted and face penalties (fines and/or imprisonment) if they are found to have not

undertaken all 'reasonably practicable' steps to limit risks, including those presented by natural hazards (Ministry of Education, 2016b). It can be rationally assumed that 'reasonably practicable' steps includes the evaluation of emergency response efforts to learn lessons that can be used to improve future safety efforts

In acknowledgement of the limited research available investigating how schools respond during emergencies, the aim of the present study was to explore the lessons that can be learned from schools' experiences of smaller, more commonly occurring emergencies to:

- Establish the stages involved in an emergency response; and
- Identify the factors that contribute to an effective emergency response.

By considering how schools respond in emergencies to ensure the safety of students, it was expected that findings from the present study would offer insights into what could be considered 'key preparedness and response practices' that could inform school-based emergency management efforts.

7.2. Method: Case Studies

A case study research method naturally lends itself to the investigation of disasters and emergency events:

A case study is often used as an approach to teach others through the illustration of one detailed event... researchers ask is, "what can be learned from this situation...that we would rather not see happen again?" But, if it were to happen, how might the crisis response be better managed as a result of the data collected and analyzed through this study (Crepeau-Hobson & Summers, 2011, p. 283)?

In the present study, a multiple-case study approach (Yin, 2003) was used to examine responses to different emergency events in three schools. Using such an approach allowed for the similarities and differences within and between the cases to be explored. By comparing the experiences of multiple interviewees within each school (as suggested by Miles & Huberman, 1994), it was possible to build a picture of how the emergency events unfolded, while also enabling each participant to identify the strengths and weaknesses of the emergency response from their perspective.

Approval for the present study was granted by the Massey University Human Ethics Committee.

7.2.1. Settings, participants, and emergency types

The three case study schools were located within the Wellington region of New Zealand. The region has a complex hazardscape, with several hazard types having a high (i.e., flood, tsunami, pandemic, landslide) or very high (i.e., earthquake) risk of occurring (Wellington Region Emergency Management Office, 2014). Although many of these hazards occur frequently, in most cases, the impacts are limited. However, these and other emergency events (e.g., fire, threats from individuals) do provide opportunities to explore how schools in the region respond to regularly occurring, relatively minor emergencies.

Purposive sampling was employed to achieve both representativeness and comparability across the cases (as endorsed in Teddlie & Yu, 2007). Criteria used for case study selection ensured participating schools demonstrated:

- A selection of emergency types experienced;
- A combination of school type (primary and secondary); and
- A range of school deciles⁷.

Schools that met the selection criteria were approached, through the principal, and invited to take part in the study. Table 7.1 provides an overview of the case study schools, participants, and emergency types examined. Once the school's participation was confirmed, the principal was asked to identify staff and parents that may be willing to be interviewed about their experiences of the emergency being investigated. Such an approach had the potential to introduce selection bias, but it was deemed to be necessary to encourage schools to agree to participate, which had been challenging for the researcher. Potential participants were then approached by the researcher. Twelve individuals with different roles, across the three schools, agreed to be interviewed for the study. Often in school-based emergency management research, a single individual (usually the principal) represents the 'perspective' of the school (e.g., Cornell & Sheras, 1998; Stuart et al., 2013). However, by including a selection of stakeholders (e.g., school leaders, staff, and parents) aspects of the emergency event could be described depending on the role of the participant during the emergency. Due to the operational nature of the case studies, students' perspectives were not included.

⁷ School decile ratings reflect the socio-economic status (SES) of the surrounding community, and influence government funding to the school. In decile one schools a higher proportion of the students come from low SES backgrounds, while decile 10 schools have a lower proportion (Ministry of Education, n.d.c).

In addition to the three key emergency types investigated (i.e., bomb threat, flood, earthquake), all case study participants were also encouraged to share their experiences of any other emergency events that had occurred in the school, especially if those events identified useful lessons. As a result, interviewee's experiences of five different emergency types were included in the study.

Table 7.1 Overview of Case Study Schools, Participants, and Emergency Types Examined

School Demographics	Case Study 1	Case Study 2	Case Study 3
Emergency Types	Bomb threats	Flood	Earthquake
School Type	Secondary (Years 9-15)	Contributing Primary (Years 1-6)	Full Primary (Years 1-8)
Decile	9	3	10
Number of Students	1,200	143	450
Age of Students	13-18 Years	5-10 Years	5-12 Years
Interviewees	<ul style="list-style-type: none"> ▪ Receptionist ▪ Technology Teacher ▪ Science Teacher ▪ Parent 	<ul style="list-style-type: none"> ▪ Principal ▪ Administrator ▪ Teacher (Year 6) ▪ Teacher (Year 4/5) ▪ Parent 	<ul style="list-style-type: none"> ▪ Principal ▪ Office Manager ▪ Teacher (Year 2)

7.2.2. Interviews

The semi-structured individual interviews lasted between 25-55 minutes, and were conducted at the case study school or in participant's home. Interview questions were related to five main topics: knowledge of the school's emergency plans and procedures; details recalled about the specific emergency event being investigated; details recalled from other emergency events experienced at the school; lessons learned from emergency events experienced; and advice to counterparts in other schools about responding to emergency events.

7.2.3. Analysis

The interviews were transcribed verbatim, checked twice against the recorded interview, and returned to participants for checking, editing, and accuracy. The six steps of thematic analysis, as described by Braun and Clarke (2006), were used to organise the data. The flexibility inherent to a thematic approach allowed for the data to be interpreted in a semantic way, enabling the identification and description of patterns

and ideas in the data, without the need to conform to any particular philosophical approach. Each interview transcript was coded manually, and mapped individually, thereby doing justice to each participant's experience, and adding to the credibility of the overall findings, as recommended by Patton (2002). Each 'map' was then collated with those of others from the same case to identify themes, sub-themes, and relationships within the data for each case. Cross-case analysis (as described by Patton, 2002) provided an opportunity to identify patterns and interconnecting themes that cut across individual cases, thereby enabling a degree of generalisation (Simons, 2009).

7.3. Findings and Discussion

There is little doubt that schools care for their students' welfare on a daily basis, but what is less certain is the extent to which schools are aware of what is necessary to keep their students safe during emergencies. The following presentation of findings and discussion uses the lessons collected from the case study schools' experiences of emergencies to establish a picture of school-based emergency response efforts. The findings are discussed under two main themes: Stages of an emergency response; and Factors contributing to an effective response.

7.3.1. *Stages of an emergency response*

Every emergency event is different due to the specific circumstances of the incident, and the individual characteristics of the school. However, Labib and Read (2013) assert that generic lessons can be derived from experiences of emergencies to identify recurring themes across incidents. By comparing how the emergency events examined within the case studies unfolded, together with material integrated from the literature (e.g., International Finance Corporation, 2010; Johnston, Tarrant, Tipler, Coomer, Pedersen & Garside, 2011; US Department of Education, 2013), it was possible to identify components common to an emergency response, irrespective of emergency type. As a result, the authors have developed a six-stage model of a school-based emergency response (Figure 7.1).

The six stages of the model are: (1) Alerts; (2) Safety behaviours; (3) Response actions; (4) Student release / Family reunification; (5) Temporary school closure; and (6) Business as usual. While not every emergency event will include all stages, it is recommended that school-based preparation and planning efforts consider all six.

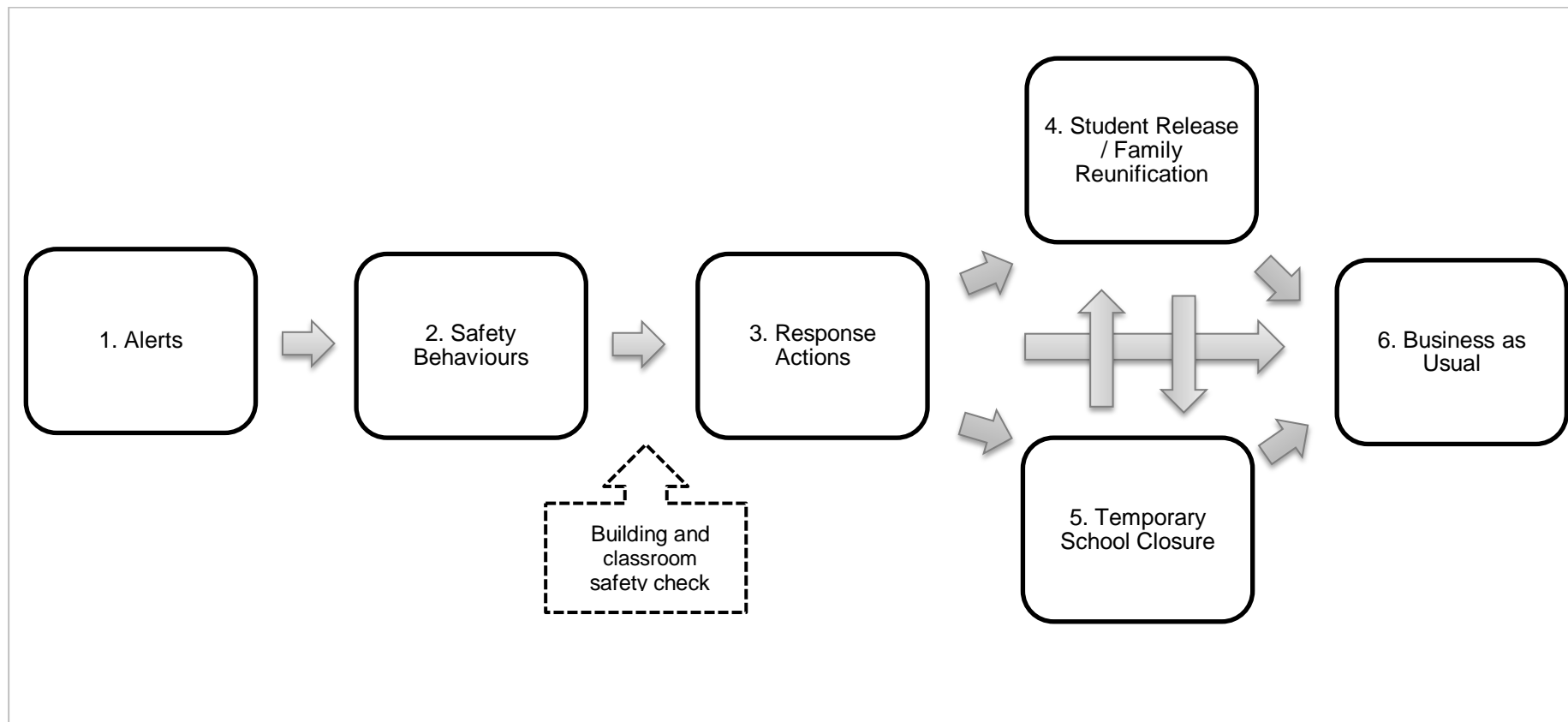


Figure 7.1 Six-stage model of a school-based emergency response.

Stage 1: Alerts

An emergency response begins with some form of alert, such as an alarm (e.g., fire), official warning (e.g., flood), or a natural sign (e.g., shaking in an earthquake). Alert systems require regular testing to ensure: they are in working order; they can be heard throughout the school; and that students and staff are familiar with the appropriately response when they hear the alert (Tipler et al., 2016). The type of alert used may also be a signal to adopt a specific type of learned safety behaviour. However, faulty or inadequate alert systems were found to be common in a study of 19 Californian schools conducting emergency response drills (Ramirez et al., 2009).

Stage 2: Safety behaviours

In some types of emergencies, it may be necessary to adopt a safety behaviour or protective action. For example, when the shaking of an earthquake is felt, it is appropriate to either 'drop, cover, hold', or adopt the 'turtle'⁸. Therefore, students and staff must be aware of what safety behaviours or protective actions they can use to keep themselves safe before an emergency occurs. Emergency drills are an excellent way to allow students to practise safety behaviours so they are familiar with their use in an emergency, and can respond without the need for prompting. By practising safety behaviours inside and outside the classroom, students that may be alone or out of class are able to keep themselves safe until they can return to their classmates and teachers.

In certain emergencies (e.g., earthquake), a visual inspection of buildings and classrooms can be undertaken, once it is safe to do so. Initial and informal checking of buildings and classrooms can identify any ongoing threats to students, and may indicate what response actions are required.

Stage 3: Response actions

Research using best practice advice (e.g., American Academy of Pediatrics, 2008; GADRRRES, 2017; International Finance Corporation, 2010) identifies four response actions as being central to any school-based emergency response efforts (i.e., shelter-in-place, lockdown, building evacuation, relocation), and as such should be the focus of school emergency planning and preparation efforts. The thinking behind this approach is that when implemented in conjunction with emergency appropriate safety behaviours (e.g., drop, cover, hold for earthquakes), the four response actions will cover the

⁸ The "turtle" is a safety behaviour in which the individual crouches down on the ground and covers his or her head and neck with their arms, like a turtle (NZ ShakeOut, n.d.a).

majority of response requirements that schools may have, making it unnecessary to develop individual plans for every conceivable type of emergency or hazard. In addition to knowing what is required to implement each response action, staff and students must be aware in advance of which emergency signals will be used to indicate a particular response action. For example: a continuous bell may indicate an evacuation, and five short bells a lockdown.

Shelter-in-place. Sheltering-in-place is the appropriate response when an emergency situation requires that students be confined, but where a direct threat is not posed to their safety (e.g., emergency in the vicinity of the school) or when an evacuation is not necessary (International Finance Corporation, 2010). Two of the case study schools had used the shelter-in-place response action during emergencies (i.e., in an earthquake, and a minor flood). There is little information within the literature about sheltering-in-place. This may be due to a perception that it is really just a safety precaution rather than an actual emergency response action. However, a shelter-in-place response still requires: some form of alert to be issued; communication with students and staff about the situation necessitating the shelter-in-place response; students be accounted for (especially if the emergency occurred during a break); and as in any emergency event occurring at school, parents be informed, either at the time or in a note sent home with students.

Lockdown. In contrast to sheltering-in-place, lockdowns tend to get a lot more attention, both in schools and within the literature (e.g., Graham et al., 2006; Zhe & Nickerson, 2007), and for good reason. A lockdown requires that students and staff secure themselves in classrooms and offices to avoid the attention of a threat within the school (e.g., armed intruder). An emergency necessitating a lockdown may occur at any time, in any school, with the events precipitating the lockdown having the potential to result in injury or death to students and staff. Therefore, it is essential that all schools have planned and practised for lockdown incidents. One of the case study schools had experienced three incidents requiring lockdowns, and as a result, the principal encouraged leaders in other schools to conduct regular lockdown drills in preparation for actual events.

I would definitely say...all schools should be doing lockdown practices. Because you don't want to go into lockdown and...have no idea and...have panicking children. (Principal)

As well as acknowledging the importance of practising for lockdowns, the principal reinforced the challenges in communicating with staff during a lockdown, especially

when the incident promoting the lockdown occurred on the school site. The difficulties of communicating both internally (within the school) and externally (e.g., with emergency services) during lockdowns are acknowledged by Chung et al. (2009), who suggest the use of mobile phones and signs placed in windows to help communication efforts.

Building evacuation. In some cases (e.g., fire, earthquake damage), a building evacuation may be required. Students and staff need to be familiar with the location of emergency exits and have multiple evacuation routes prepared, including those suitable for students (or staff) with disabilities or special needs (American Academy of Pediatrics, 2008). In one of the case study schools, a building evacuation was required in response to a bomb threat, and the buildings were cleared using the school's fire and earthquake evacuation procedures.

We all meet in our designated areas and then...we go down to the field. But we wait till we're told because [*surrounding streets have*] got all those bus cables, so someone has to check that they haven't fallen on the road. (Technology Teacher)

The quotation above illustrates the need to ensure that evacuation routes do not place students (and staff) in additional danger, and that such checks should also extend to the safety of the assembly area (Johnston et al., 2011). Once at the assembly area, everyone must be accounted for including all non-teaching staff, visitors, and any classes off-site. Furthermore, response planning needs to consider how students will be supervised and supported in the assembly area.

Relocation. If the school site is no longer deemed safe (e.g., located in a tsunami inundation zone), relocation to an alternate site may be required, using pre-identified evacuation routes. It is also essential that parents are informed of where students will be taken if an evacuation of the school site is necessary (Chung et al., 2009). The first priority of parents in an emergency is getting to their child (Johnston et al., 2016), and if they are not aware of where to collect them, parents may put themselves at unnecessary risk by going to the school rather than to the alternate site (Johnson et al., 2014).

Stage 4: Student release / Family reunification

As part of an emergency response, it may be necessary to release students from school early and/or reunify families. Reunification is identified as having the potential to be one of the most problematic areas of an emergency response (RiskRED, 2009), and for this reason it is important that schools have detailed, and well-established plans for

reunifying families after emergencies (e.g., International Finance Corporation, 2010). Because of potential or ongoing risks related to the emergency, students should be released to a legal guardian (e.g., Graham et al., 2006). However, parents are not always able to get to the school quickly after an emergency and therefore it would be beneficial for parents to provide one or more alternative, locally-based adults (e.g., extended family member, neighbour) who can collect their child from school in an emergency (e.g., Education Review Office, 2013). Having a sign-out system in place ensures students are released only to someone who is authorised to take them.

We've got quite a strict procedure in place...because parents will always say, "Oh I'll just take so and so as well". But that's not who the parents have nominated. [...] So we will stick to [*people*]...who have been nominated. (Principal)

Furthermore, in an emergency event, emotions and the concern parents have for their child may override their willingness to follow school procedures, even when they are aware of what those procedures are. Keeping parents informed and up-to-date with the school's plans and procedures can help reduce unnecessary anxiety for parents and students, and also limit disruption of response efforts by parents unfamiliar with or lacking confidence in the school's response capabilities (American Academy of Pediatrics, 2008; RiskRED, 2009). Regularly reviewing the school's student release and family reunification procedures and, where possible, practising those procedures, even with a small number of parents, can help encourage staff and parents to be cognisant of the school's plans, thereby increasing the likelihood of an effective emergency reunification response.

Stage 5: Temporary school closure

Where the school has sustained damage or is unsafe for student occupation, it may be necessary to temporarily close the school. Therefore, plans need to consider what is required when closing the school in an emergency (Stuart et al., 2013), including: how closure information will be communicated to parents; how students will be supervised and supported until they are able to be collected by their parents; what challenges may delay or prevent parents from arriving promptly to collect their children; the personal situations of staff members (e.g., dependent children or, dependent parents); and what legislative and/or administrative requirements must be met (e.g., Ministry of Education authorisation for temporary closure).

Stage 6: Business as usual

Once the emergency is over and no additional emergency response action is required, then the school will be able to return to educating students, or 'business as usual'. In some cases, it may be necessary for the school to re-open with limited operational capacity (e.g., reduced hours or use of only selected parts of the school). School preparedness literature (e.g., International Finance Corporation, 2010) indicates that when students' access to education is interrupted for extended periods, it can have a detrimental impact, especially if this results in students dropping out of school. In contrast, enabling students to return to school after a large emergency or disaster, assists in restoring routines, and facilitates family recovery (e.g., Peek, 2008). Therefore, identifying what may be required for schools to return to operations after an emergency, even if at a reduced capacity, needs to be a central aspect of any schools' education continuity planning efforts (e.g., Tipler et al., 2017b).

The present study corroborates the six-stage model of a school-based emergency response as outlined in Figure 7.1. To support the model it is necessary that schools adopt additional activities to enhance their emergency response efforts. The next section discusses the factors identified by study participants that contribute to an effective school response, irrespective of emergency type.

7.3.2. Factors contributing to an effective response

Factors are discussed in three phases: before; during; and after emergencies. Figure 7.2 provides an overview of the factors contributing to an effective response.

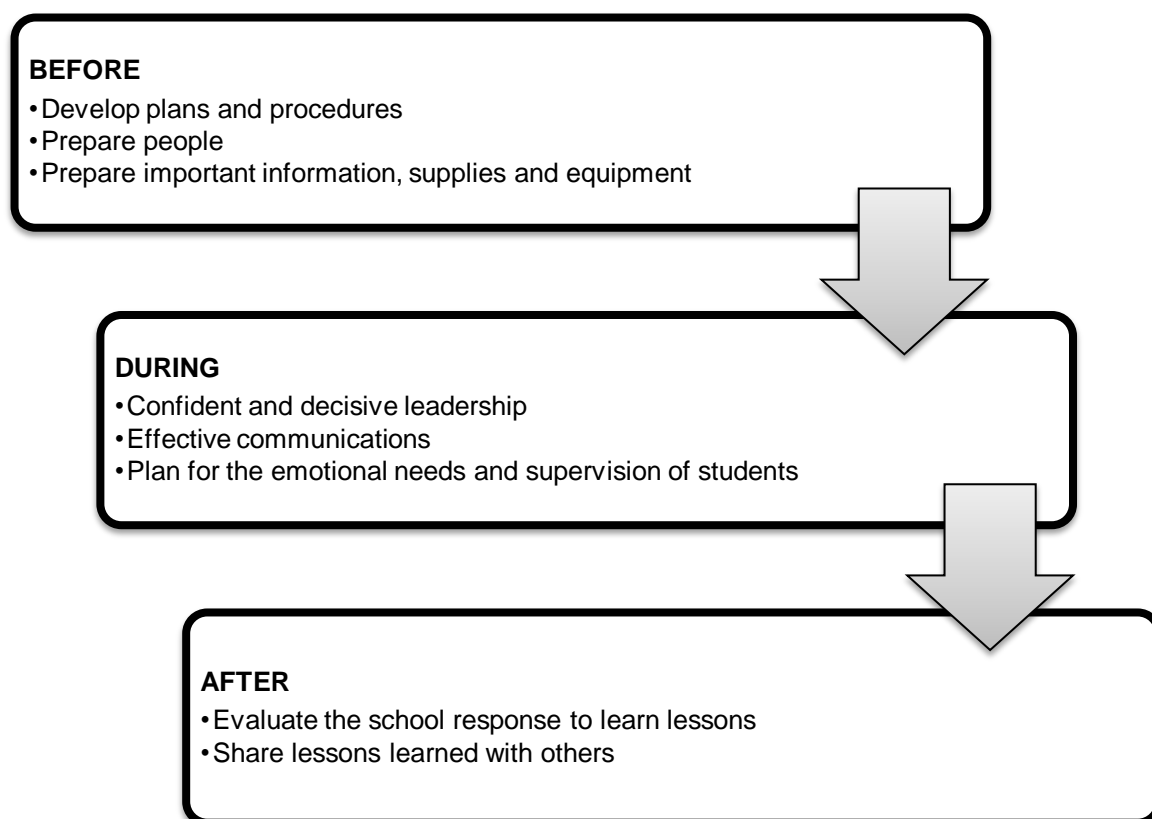


Figure 7.2 An overview of factors that contribute to an effective school emergency response.

Before

The overarching lesson recognised by the participants in all three case studies was that preparation was the foundation of an effective response. Three broad aspects of emergency preparedness are discussed in this sub-section: Develop plans and procedures; Prepare people; and Prepare important information, supplies and equipment.

Develop plans and procedures. The importance of having developed plans and procedures in preparation for future emergencies is echoed throughout the school preparedness literature (e.g., American Academy of Pediatrics, 2008; Johnston et al., 2016; Rebmann, Elliott, Artman, VanNatta & Wakefield, 2015). In addition to reinforcing the need for many of the planning and preparation activities cited in the literature (e.g., identifying roles and responsibilities, having communications plans, conducting frequent drills), participants in the present study acknowledged the importance of considering how an emergency response would be managed if students were on their way to or from school, an idea also recommended by Boon et al. (2014).

Two of the emergency events discussed in the case studies had occurred at the beginning (i.e., fire) and end (i.e., earthquake) of the school day. In the first example, a small fire was detected just before school was due to start. While preventing people entering the school grounds during the response to the fire, it was also necessary to account for everyone already on-site and those possibly on their way to school. In the second example, a M_w 6.6 magnitude earthquake occurred approximately half an hour before the end of the school day, and because the primary school (elementary) suffered only minimal damage (e.g., items falling off shelves, etc.), some students were released to walk home alone as normal at 3 o'clock. However, in hindsight it was recognised that this may have not been the best option.

[We] didn't ask the question... "If you usually walk home, who is home when you get home? [...] And we didn't say, "If nobody is at home, come back." (Office Manager)

When an emergency occurs near the end of the school day, even when the school itself has not sustained damage, consideration needs to be given to implementing the school's reunification procedures as damage may be more extensive elsewhere in the community, potentially preventing parents from being able to get home, as well as putting student safety at risk.

Prepare people. School leaders, staff (including part-time and relief staff), students and parents have a vested interest in ensuring an effective response to any emergencies at school or in the environs. Therefore, it is vital that these stakeholders are involved in planning and preparing for emergencies (e.g., Chung et al., 2009).

In the majority of school-based emergencies, the principal will lead the response. However, it is essential that schools have other staff trained and ready to manage an emergency response if the principal is unavailable, off-site or incapacitated (Kano & Bourque, 2007). Moreover, school staff would benefit from opportunities to train in different emergency roles to broaden their own understanding of the school's emergency procedures, to enable the principal (or response coordinator) to delegate tasks during an emergency response, and also to allow staff to 'step-up' into alternative roles when people are absent or unavailable.

School leaders have a responsibility to ensure that all stakeholders are aware of the school's emergency plans and procedures by providing frequent updates and ensuring details of plans and procedures are readily accessible (e.g., on the school website, in newsletters, via social media), to encourage stakeholders to be familiar with how the school will respond in an emergency, and also to raise awareness of what may be

required of them in an emergency response. In particular, keeping parents informed of the school's emergency plans and procedures can help reduce the likelihood that parents will behave in a way that is detrimental to the response actions being undertaken by staff during an emergency (American Academy of Pediatrics, 2008). The requirement that schools keep parents informed only goes so far, as parents also have a shared responsibility to keep themselves up-to-date with the school's plans and procedures affecting their child (Phinney et al., 2004). However, this can be challenging as not all parents are willing to engage with the school about emergency preparedness.

In addition to sharing school plans and procedures, staff, students, and parents need to be provided with opportunities to practise response plans in frequent drills that test various emergency scenarios. The importance and benefit of having participated in emergency drills was also highlighted by several case study participants. For example:

I feel comfortable in myself [*and*] I know that because we've had so many drills...we are all prepared and we know exactly what our role is, and that helps. If I was somewhere where it was all very higgledy-piggledy...I wouldn't feel that safe – but I feel safe here. (Receptionist)

The principal in School C recognised that frequent emergency drills were beneficial in preparing students for emergencies.

[*Drills*] make sure that everybody knows what to do and it's just routine – because if it's routine, children don't tend to panic when it's real. (Principal)

A teacher also appreciated the benefit of having smaller surprise practices or 'micro drills', outside of the school's normal emergency drill programme.

Generally, you have one a term – but it's actually quite good to do them more than that. The kids become much more confident...they [*know*] exactly what to do because we [*have*] done lots of practices – whether it was school-wide or within class. (Year 2 Teacher)

In order for students to know how to respond appropriately in an emergency situation, they need to participate in well planned drills that reflect best practice advice. This ensures they are not experiencing unnecessary upset, such as can occur in lockdown simulations (Zhe & Nickerson, 2007), for example, if appropriate explanations and reassurances are not given to students before the drill. It is also important to include students with disabilities or special needs in drills to help prepare them for responding in actual emergencies (Clarke et al., 2014), and so staff and other students know how to assist those with disabilities. Additionally, it is beneficial for students (and staff) to be

provided with opportunities to participate in drills that vary the scenarios they normally practice. For example:

Sometimes we would put in a different route that children can't go...[or vary] the time of day...[or] have it on a Thursday when we have a lot of part-time teachers in. So we try and alternate when [drills] happen...where it happens, and how it happens, so that it's not always consistent – because in a real emergency it's not going to be. (Principal)

One of the primary criticisms of response drills has been their tendency to be a compulsory box ticking exercise holding little real benefit (Ramirez et al., 2009), rather than a medium in which participants could learn safety skills that could be adapted for use in a range of scenarios. By using drills as opportunities to test alternative actions, such as those described in the quotation above, students and staff can extrapolate what they have learnt into new or unfamiliar situations (Johnson et al., 2014).

School staff, students, and parents should be encouraged to develop emergency plans at home to support school-based preparedness and response efforts. In the case of staff, having their own family plans will ensure they know their family members are safe if staff need to remain at school to supervise students (Mutch, 2015a). Staff family plans may include collecting their own children and then returning to school to help supervise students. Furthermore, by urging students and their families to develop plans at home, schools can encourage discussions around what will happen if an emergency occurs when students are at school, including who will collect them (e.g., Education Review Office, 2013).

Schools would benefit from engaging with external stakeholders (e.g., CDEM agencies, emergency services) to enhance school preparedness efforts and response capabilities (e.g., Johnston et al., 2016). For example, school leaders should, wherever possible, take opportunities to invite external stakeholders into the school. Not only is this a great opportunity to complement the curriculum by allowing students to ask questions and build positive relationships with these agencies, but by extending a visit into an after-school meeting, staff are able to get advice on planning for and responding to emergencies in the school and in their own homes. However, research in New Zealand (Renwick, 2012) and internationally (e.g., US Government Accountability Office, 2007) recognises that interactions between schools and external stakeholders (e.g., CDEM agencies) can be challenging given time constraints, often resulting in low levels of engagement, which is a situation that needs to be addressed. A useful first step may be for principals to invite external stakeholders into schools to observe and provide feedback on emergency response drills (Johnston et al., 2011).

Prepare important information, supplies and equipment. In an emergency, important information must be up-to-date, accessible, and portable. Maintaining up-to-date contact details for students can be a challenge for some schools and requires an ongoing effort. Parents need to be reminded frequently of the importance of the school being able to contact them if their child is injured, or if there is some other type of emergency. For example:

[*Make*] sure you've got really up to date emergency contact information for every child in the school, because that changes quite frequently. You've got a lot of custody issues as well with separated families nowadays. And it's really important that you don't let children go home with parents that don't have custody rights and on occasions like [*an emergency*], it would be so easy for that to happen. (Parent⁹)

In addition, it is essential that important information about students (e.g., emergency contacts, allergies) is available in an emergency. Consideration should be given to having hard copies of information available should electronic systems be inaccessible (Education Review Office, 2013). Also, where possible, information needs to be portable, especially if a building evacuation or relocation to an alternative site is required.

Schools would benefit from investing in emergency equipment and supplies, which are routinely checked to ensure they are in good condition and within their expiry dates (Kano et al., 2007). If funds are limited, schools may choose to gradually build up their equipment and supplies over time. Schools can also establish memorandums of understanding with local businesses (e.g., supermarkets) to provide supplies in an emergency (Coomer et al., 2008), or seek donations of supplies and equipment from their community. Furthermore, it is useful for each classroom to have a grab bag or get away kit (Chung et al., 2009) which contains basic supplies that may be needed in an emergency (e.g., class lists, first aid kit, essential medication, copies of emergency procedures, etc.) that can be taken with the class if they need to evacuate or relocate in an emergency. Grab bags can also be taken on class trips or any other activities where the students are away from their classroom. The time and resources allocated to preparedness efforts can be a reflection of how high a priority emergency management is given in the school (e.g., RiskRED, 2009).

⁹ This parent is also a principal in another school, and as such, she was more aware of the need for up-to-date contact details than other parents may be.

During

When an emergency occurs prompt action is required to keep students and staff safe (e.g., the adoption of safety behaviours). As schools progress through the six-stage emergency response model (Figure 7.1), three factors can assist during the response: Confident and decisive leadership; Effective communications; and having a Plan for the emotional needs and supervision of students.

Confident and decisive leadership. Emergency events are unpredictable and challenging situations, with leaders often required to make decisions using incomplete information, in an uncertain and changing environment (Tarrant, 2011a). Therefore, it is necessary that leaders display confidence and measured decisiveness when managing an emergency response. Such characteristics can provide reassurance to staff, parents, and students during an emergency (e.g., Stuart et al., 2013). However, school leaders may have limited experience of emergencies to develop these skills. For that reason, it is beneficial for principals and other senior staff to have access to training in leadership and crisis management (e.g., MacNeil & Topping, 2009; Momani & Salmi, 2012).

In an emergency, principals (or response coordinators) are generally guided by the school's emergency plans, but also need to respond to the particular circumstances of the event, which may require a degree of flexibility (Stuart et al., 2013). For example,

I work on the principle that you have your procedures in place which are...really important. But I do believe any systems and procedures are only as good as the people...So I say to the teachers, "You're in charge of the class, you're professional, you have to use your common sense – if the systems and procedures don't apply in this particular context then don't religiously follow them – do what you think is best to keep those children and yourself safe." (Principal)

In one of the case study schools, the principal was off-site during the emergency. Therefore, the member of the senior management team, who was next in line after the principal, took the lead role in managing the response. Having pre-identified people ready to step-up into leadership roles is essential, as the principal cannot always be counted on to be available to manage an emergency response. Response drills provide an excellent opportunity to train backup leaders by enabling them to manage the drill, while also being able to seek advice or support where necessary.

Effective communications. Communications can be the foundation of an effective response, but they are also the component most likely to fail, due in part to limited or inaccurate information sharing (Chung et al., 2009). Potential communication failures

during an emergency response can be reduced by ensuring that information communicated is accurate (e.g., Mazer et al., 2015) and shared using multiple methods (e.g., American Academy of Pediatrics, 2008). A lack of information to staff, students, and parents during an emergency can cause unnecessary anxiety, as can the dissemination of misinformation. Managing the flow of information is vital (Tarrant, 2011a), and this is especially important with the role social media (e.g., Facebook, Twitter) now plays in information sharing during emergencies and disasters (Mazer et al., 2015). Therefore, it is important that school leaders proactively plan how they will manage all aspects of their emergency communications efforts, including ensuring that shared information is accurate. Schools also need to have internal communications methods that allow them to keep staff and students informed about what is happening, especially in situations where it may not be possible to speak to staff and students directly (e.g., during a lockdown).

The concern of parents in a school-based emergency is the safety of their child. Therefore, any communications to parents need to reassure them that the school leadership has the situation under control, that the appropriate emergency services are on site, and that all students are safe, provided this is in fact the case. Calls to the school from parents should be expected in an emergency. When parents make contact with the school, it is vital that the information communicated is accurate and appropriate (Ronan & Johnston, 2005), and that staff remain calm (e.g., Mutch, 2014). A parent described how she was reassured by the initial response when she phoned the school:

It was the fact that [*the administrator*] wasn't panicked...so I knew that, in general, that would go across the board...that was the best response for me as a parent...they were in control. (Parent)

Another aspect of emergency communications to consider is the messages sent from students to their parents during an emergency. Students' messages may reassure parents that they are safe, describe the emergency event, or display concern for themselves or others (Mazer et al., 2015), and as a result can add to the anxiety of parents. Furthermore, the sharing of incorrect or misinformation is a distinct possibility if students are communicating with their parents with only limited information. One possible way to limit confusion and inaccurate information is to keep students informed during an emergency, and also, where appropriate, include students in communications sent out from the school (e.g., texts, emails, social media posts). Such an approach would help to ensure consistency of messaging and also potentially reduce parent and student distress.

Plan for the emotional needs and supervision of students. Students' responses to an emergency will vary. Therefore, as well as the physical safety of students, when planning for emergencies consideration needs to be given to providing students with emotional support (e.g., Heath et al., 2007). Children look to significant adults to guide how they will respond during and after an emergency (Lazarus, Jimerson & Brock, 2003). Consequently, it is important that school staff appear calm (e.g., Smith et al., 2001), and that teachers maintain contact with students to offer reassurance that there are adults to care for and support them until they are collected by their parents (Johnston et al., 2011). In addition, having staff members trained in psychological first aid or other forms of crisis counselling (e.g., Chung et al., 2009) can help identify the types of support students may need, and trained staff can also provide actual support in an emergency (Elangovan & Kasi, 2015; Trethowan & Nurse, 2015). Actions such as considering how students are seated in the assembly area may be a useful first step. For example:

We used to sit in lines [*but*] ...we felt that [*children could only talk to*] the person next to them...now each class sits in a circle...[and] you can easily see which class is missing. [...] We take the roll in the circle and...the kids...can see all their friends – so you're feeling like a community. (Year 2 Teacher)

As expected, some students get more upset than others do in an emergency situation. A novel way of supporting upset students in one of the schools was to give them a role in the response:

If we have a child that perhaps is not coping very well...we put them in a [*child-size hi-viz vest*]...and give them a little task to do and we can all just keep an eye on that [*child*]. (Office Manager)

A similar idea was suggested by Johnston et al. (2011), who encourage staff to actively involve their students in drills as both a means of enhancing students' understanding of the ramifications of emergencies and also so that students may develop the skills to support one-another in an actual emergency.

Teachers and other staff are required to remain at school to care for and supervise students after an emergency until they can be reunited with their families, and in a school-based emergency, staff are required to prioritise the needs of their students over those of their own families. A teacher with children reflected on how his role impacts his own family in an emergency:

My priority is the kids here and then [*my own*] kids...because I'm responsible for the kids here... and hopefully the teachers at the schools that they're at will also be responsible for them. (Science Teacher)

Often much of the focus is on teachers being familiar with the emergency plans in the school where they work. But, consideration must also be given to ensuring that teachers are aware of the emergency plans in their own children's schools, as all parents should be. Trusting the plans in place in their children's schools allows teachers to remain at their own workplace and look after other people's children in an emergency.

In a further example, a parent, who was also a principal at another school, described how she had made her children aware from a young age what her responsibilities would have to be in an emergency:

My children have always [*known*] that they will be the last person at their school if there was an earthquake because [...] I can't leave until the last kid at my school has gone – so they'll be the last kid at their school too. (Parent)

However, once the response is underway staff members appreciate when school leaders acknowledge the personal needs of staff, especially those with children or other family commitments:

[*The principal*] was really understanding about people's own situations. [...] She just said, "Don't worry about it, I've got it here...go home to your families". That was definitely a good thing. (Administrator)

After

Once the emergency event has been resolved and schools have returned to business as usual (stage six of the emergency response model), an opportunity exists to review the school's performance during the emergency to: Evaluate the school response to learn lessons; and Share lessons learned with others.

Evaluate the school response to learn lessons. The importance of evaluating the effectiveness of school-based emergency preparedness and response efforts, to fine tune plans and procedures, is evident in the literature (e.g., Crepeau-Hobson & Summers, 2011; Johnston et al., 2016; Stuart et al., 2013). Two useful examples of evaluation of school response efforts were provided by study participants. The first illustrates what to consider when evaluating emergency preparedness and response procedures, and the second shows how beneficial evaluation can be.

We have done a lot of review of our evacuation plans...they are always evolving and improving. Every time we have an evacuation...we ask, "What could we have done better? Who was slow? Who didn't close their doors?...Which class ran?...Was there a problem with the direction that you went down to the evacuation area on the field?...Or what about the children that weren't in your

class at that time?”... We are also open to suggestions – always open to listening and improving things. (Principal)

The second example of beneficial evaluation was demonstrated when one of the case study schools was required to respond to two bomb threats within a month of each other. After the first bomb threat, the school’s emergency response procedures were clarified in a staff meeting. Experiencing two similar events in relatively quick succession allowed the school to improve their response plans after the first bomb threat and then test the effectiveness of those plans in the second bomb threat. By reviewing and learning lessons from recurring events, schools are able to benefit from what Mutch (2014, pg. 7) refers to as “cumulative learning”. For example, principals from Canterbury (New Zealand) schools reported being better prepared for the February 2011 Christchurch earthquake due to lessons they had learned from the September 2010 Canterbury earthquake, including having developed alternative methods for communicating (e.g., social media), reunifying families, and accessing information when computers were inaccessible or unusable (Education Review Office, 2013).

Share lessons learned with others. It is not always possible to learn lessons first hand as the frequency of actual emergencies in some schools may be limited; nor is it always necessary to learn lessons first hand; when lessons can be learned from others’ experience (Stuart et al., 2013). When asked, school representatives are generally happy to share their experiences (Tipler et al., 2016), knowing that the information they provide will be beneficial in helping to make other schools better prepared. Many of the case study participants indicated that they had sought advice or shared experiences with staff in other schools. For example, one principal referred to having learned lessons from others’ experiences of the 2010-2012 Canterbury (New Zealand) earthquakes:

The Principals Association...brought principals from Christchurch [to] talk at different conferences, and tell us about their experiences. [...] It was the communication with parents that [*principals*] found the most challenging. (Principal)

In fact, Crichton et al. (2009) consider not learning from others’ experiences as lost opportunities to improve preparedness efforts. Such efforts to share lessons should be applauded, and a concrete first step in such an endeavour would be to encourage researchers to direct their attention to telling schools’ emergency response stories.

7.4. Conclusions

The response to an emergency event is when prior planning is put to the test (American Academy of Pediatrics, 2008). The aim of any school emergency response effort is to ensure the physical and emotional safety of students until they can be reunited with their families. Research exploring how schools respond in emergencies is necessary to enable the identification of strengths, weaknesses and gaps in existing school-based emergency preparedness and response practices. Even small-scale emergency events can provide opportunities to learn lessons (e.g., Borum et al., 2010) that can improve future planning and response efforts.

By exploring a range of small, commonly occurring emergencies in three case study schools, the present study was able to contribute to our understanding of how New Zealand schools respond in emergency events in three ways:

- The study identified recurring response activities across a selection of emergency types, which have resulted in the development of the six-stage model of an emergency response. The six stages are: (1) Alerts; (2) Safety behaviours; (3) Response actions; (4) Student release / Family reunification; (5) Temporary school closure; and (6) Business as usual:
- By using first hand experiences of participants to identify factors that contribute to an effective emergency response, including activities undertaken before, during, and after an emergency; and
- By providing empirical evidence to support the assumption that prior preparation is essential for an effective emergency response.

The present study is one of a small pool of research exploring schools' experiences of emergency events, and one of the few to include the perspectives of school leaders, staff, and parents. Having identified some key elements common to emergency responses, the authors anticipate that the present study will act as a stimulus for further discussion among researchers and practitioners regarding best practice response to emergency events in schools. Importantly, the present study suggests considerations for how schools can be supported in their future emergency preparedness and response efforts.

7.4.1. *Limitations and future research*

Two limitations have been identified in the present study, both related to study participants. Participants varied between the case study schools. While an attempt was

made to include principals, teachers, administrators, and parents in each case study, this was not possible in every case. Selection of study participants was at the sole discretion of the principal, and for reasons beyond the control of the researchers, this meant it was necessary to proceed without the full range of participants at times. However, the experiences of the twelve people interviewed, allowed for multiple perspectives across the three case studies. A second limitation is that even though it is acknowledged that children can add a valuable perspective to disaster risk reduction practices (e.g., Peek, 2008; Ronan et al., 2016), students were not invited to participate in the present study. The reason children did not participate is that this investigation was focused at an operational level (e.g., plans, procedures, and response capabilities of schools). Future research could investigate children's perspectives of actual emergencies in their schools to assist in our understanding of psychosocial impacts on children.

References

- American Academy of Pediatrics, Council on School Health. (2008a). Disaster planning for schools. *Pediatrics*, *122*(4). DOI: 10.1542/peds.2008-2170.
- Awofisayo, A., Ibbotson, S., Smith, G. E., Janmohamed, K., Mohamed, H., & Olowokure, B. (2013). Challenges and lessons learned from implementing a risk-based approach to school advice and closure during the containment phase of the 2009 influenza pandemic in the West Midlands, England. *Public health*, *127*(7), 637-643.
- Boon, H., Brown, L., & Pagliano, P. (2014). Emergency planning for students with disabilities: a survey of Australian schools. *Australian Journal of Emergency Management*, *29*(1), 45-49.
- Borum, R., Cornell, D. G., Modzeleski, W., & Jimerson, S. R. (2010). What can be done about school shootings? A review of the evidence. *Educational Researcher*, *39*(1), 27-37.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.
- Chung, S., Danielson, J., & Shannon, M. (2009). *School-based emergency preparedness: a national analysis and recommended protocol*. Agency for Healthcare Research and Quality. Rockville, MD.
- Clarke, L. S., Embury, D. C., Jones, R. E., & Yssel, N. (2014). Supporting Students With Disabilities During School Crises A Teacher's Guide. *TEACHING Exceptional Children*, *46*(6), 169-178.

- Clettenberg, S., Gentry, J., Held, M., & Mock, L. A. (2011). Traumatic loss and natural disaster: A case study of a school-based response to Hurricanes Katrina and Rita. *School psychology international*, 32(5), 553-566.
- Convery, I., Carroll, B., & Balogh, R. (2014). Flooding and schools: experiences in Hull in 2007. *Disasters*, 39(1), 146-165.
- Coomer, M., Johnston, D., Edmonson, L., Monks, D., Pedersen, S., & Rodger, A. (2008). *Emergency Management in Schools: Wellington Survey. (Report No. 2008/04)*. Wellington: GNS Science.
- Cornell, D. G., & Sheras, P. L. (1998). Common errors in school crisis response: Learning from our mistakes. *Psychology in the Schools*, 35(3), 297-307.
- Crepeau-Hobson, F., & Summers, L. L. (2011). The crisis response to a school-based hostage event: A case study. *Journal of School Violence*, 10(3), 281-298.
- Crichton, M. T., Ramsay, C. G., & Kelly, T. (2009). Enhancing organizational resilience through emergency planning: Learnings from cross-sectoral lessons. *Journal of Contingencies and Crisis Management*, 17(1), 24-37. DOI: 10.1111/j.1468-5973.2009.00556.x
- Department of the Prime Minister and Cabinet. (2015). *The Guide to the National CDEM Plan*. Retrieved from: <http://www.civildefence.govt.nz/assets/guide-to-the-national-cdem-plan/Guide-to-the-National-CDEM-Plan-2015.pdf>. (Accessed 28.07.2016).
- Education Review Office. (2013). *Stories of resilience and innovation in schools and early childhood services*. Wellington, New Zealand: Education Review Office.
- Elangovan, A. R., & Kasi, S. (2015). Psychosocial disaster preparedness for school children by teachers. *International journal of disaster risk reduction*, 12, 119-124. <http://doi.org/10.1016/j.ijdr.2014.12.007>
- Federal Emergency Management Agency. (2006). Principles of Emergency Management, Independent Study, IS230, Washington. (Supplement)
- GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector). (2017). *Comprehensive school safety*. Retrieved from: <http://gadrrres.net/resources/comprehensive-school-safety-framework>
- GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector). (2015). *Towards safer school construction: A community-based approach*. Retrieved from: https://www.gfdrr.org/sites/default/files/publication/45179_towardsaiferschoolconstruction2015_0.pdf

- Graham, J., Shirm S., Liggin R., Aitken M., & Dick R. (2006). Mass-casualty events at schools: a national preparedness survey. *Pediatrics*, 117(1), e8-15. doi:10.1542/peds.2005-0927
- Heath, M.A., Ryan, K., Dean, B., & Bingham, R. (2007). History of School Safety and Psychological First Aid for Children. *Brief Treatment and Crisis Intervention*, 7(3), pp. 206-223.
- International Finance Corporation. (2010). *Disaster and Emergency Preparedness: Guidance for Schools*. Washington, DC: International Finance Corporation.
- Johnson, V.A., Johnston, D.M., Ronan, K.R., & Peace, R. (2014a). Evaluating children's learning of adaptive response capacities from ShakeOut, an earthquake and tsunami drill in two Washington State school districts. *Journal of Homeland Security & Emergency Management*, 11(3), 347-373. <https://doi.org/10.1515/jhsem-2014-0012>
- Johnston, D., Tarrant, R., Tipler, K., Coomer, M., Pedersen, S., & Garside, R. (2011). Preparing schools for future earthquakes in New Zealand: Lessons from an evaluation of a Wellington school exercise. *Australian Journal of Emergency Management*, 26(1), 24-30.
- Johnston, D., Tarrant, R., Tipler, K., Lambie, E., Crawford, M., Johnson, V., Becker, J., & Ronan, K. (2016). Toward tsunami-safer schools in the Wellington region of New Zealand: evaluating drills and awareness programs. *Australian Journal of Emergency Management*, 31(3), 59-66.
- Kano, M. & Bourque, L. B. (2007). *School Emergency Preparedness Survey Report: Improving Coordination is Vital for School Districts*. Southern California Injury Prevention Research Center, UCLA, Los Angeles. doi/abs/10.1177/0192636507305102
- Kano, M., Ramirez, M., Ybarra, W. J., Frias, G., & Bourque, L. B. (2007). Are schools prepared for emergencies? A baseline assessment of emergency preparedness at school sites in three Los Angeles County school districts. *Education and Urban Society*, 39(3), 399-422. doi/abs/10.1177/0013124506298130
- Labib, A., & Read, M. (2013). Not just rearranging the deckchairs on the Titanic: Learning from failures through Risk and Reliability Analysis. *Safety science*, 51(1), 397-413.
- Lazarus, P. J., Jimerson, S. R., & Brock, S. E. (2003). Helping children after a natural disaster: Information for parents and teachers. *National Association of School Psychologists*.
- MacNeil, W., & Topping, K. (2009). Crisis management in schools: evidence based. *The Journal of Educational Enquiry*, 7(2).

- Mazer, J. P., Thompson, B., Cherry, J., Russell, M., Payne, H. J., Kirby, E. G., & Pfohl, W. (2015). Communication in the face of a school crisis: Examining the volume and content of social media mentions during active shooter incidents. *Computers in Human Behavior, 53*, 238-248. <http://doi.org/10.1016/j.chb.2015.06.040>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: A sourcebook. Beverly Hills: Sage Publications.*
- Ministry of Education. (n.d.c). *Deciles.* Retrieved from: <http://www.education.govt.nz/school/running-a-school/resourcing/operational-funding/schooldecile-ratings/>.
- Momani, N. M., & Salmi, A. (2012). Preparedness of schools in the Province of Jeddah to deal with earthquakes risks. *Disaster Prevention and Management: An International Journal, 21*(4), 463-473. <http://dx.doi.org/10.1108/09653561211256161>
- Mutch, C. (2014). The role of schools in disaster preparedness, response and recovery: what can we learn from the literature?. *Pastoral Care in Education, 32*(1), 5-22.
- Mutch, C. (2015a). The role of schools in disaster settings: Learning from the 2010–2011 New Zealand earthquakes. *International Journal of Educational Development, 41*, 283-291. <http://doi.org/10.1016/j.ijedudev.2014.06.008>
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Peek, L. (2008). Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience: An Introduction. *Children, Youth and Environments, 18*(1), 371-388. Retrieved from: <http://www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0001>
- Petal, M., Green, R., Wood, M., & Nguyen, A. (2011). *Central United States ShakeOut Survey Report.* Retrieved from: http://www.cusec.org/documents/shakeout/2011_ShakeOut_Participant_Survey.pdf (accessed June 11, 2015).
- Phinney, A., Brill, S., & Ferraro, M. (2004). *Preparedness in America's schools: A comprehensive look at terrorism preparedness in America's twenty largest school districts.* America Prepared Campaign, Incorporated.
- Ramirez, M., Kubicek, K., Peek-Asa, C. & Wong, M. (2009). Accountability and assessment of emergency drill performance at schools. *Family and Community Health, 32*(2), 105-114. doi: 10.1097/FCH.0b013e3181994662
- Rebmann, T., Elliott, M. B., Artman, D., VanNatta, M., & Wakefield, M. (2015). Missouri K-12 school disaster and biological event preparedness and seasonal influenza

vaccination among school nurses. *American journal of infection control*, 43(10), 1028-1034.

Renwick, J. (2012). *Report of the 2012 What's The Plan Stan survey of New Zealand primary schools*. Department of Internal Affairs, Wellington. Retrieved from: <http://www.civildefence.govt.nz/cdem-sector/public-education/research-and-evaluation/>.

RiskRED. (2009). *School Disaster Readiness in California: Lessons from the first Great Southern California ShakeOut*. Earthquake Country Alliance, Los Angeles. Retrieved from: <http://www.riskred.org/schools/shakeout2008.pdf>.

Ronan, K. R., Haynes, K., Towers, B., Alisic, E., Ireland, N., Amri, A. ... & Petal, M. (2016). Child-centred disaster risk reduction: Can disaster resilience programs reduce risk and increase the resilience of children and households?. *Australian Journal of Emergency Management*, 31(3), p. 49.

Ronan, K.R. & Johnston, D. M. (2005). *Promoting community resilience in disasters: The role for schools, youth and families*. Springer, New York.

Shiwaku, K., Ueda, Y., Oikawa, Y., & Shaw, R. (2016). School disaster resilience assessment: an assessment tool. In *Disaster Resilience of Education Systems* (pp. 105-130). Springer Japan. DOI: 10.1007/978-4-431-55982-5_8

Simons, H. (2009). *Case study research in practice*. SAGE publications.

Smith, S., Kress, T., Fenstemaker, E., Ballard, M., Hyder, G. (2001). Crisis Management Preparedness of School Districts in Three Southern States in the USA. *Safety Science*, 39, 83-92. [http://doi.org/10.1016/S0925-7535\(01\)00028-5](http://doi.org/10.1016/S0925-7535(01)00028-5)

Stuart, K.L., Patterson, L.G., Johnston, D.M., & Peace, R. (2013). Managing temporary school closure due to environmental hazard: Lessons from New Zealand. *Management in Education*, 27(1), 25-31. doi/abs/10.1177/0892020612468928

Tarrant, R. (2011a). Leadership through a School Tragedy: A Case Study (Part 1-The First Week). *Australasian Journal of Disaster and Trauma Studies*, 2011(3), 65-77. Retrieved from: http://trauma.massey.ac.nz/issues/2011-3/AJDTS_2011-3_01_Tarrant.pdf

Teddlie, C., & Yu, F. (2007). Mixed methods sampling: A typology with examples. *Journal of mixed methods research*, 1(1), 77-100.

Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2016). New Zealand ShakeOut exercise: Lessons learned by schools. *Disaster Prevention and Management: An International Journal*, 25(4), 550-563. DOI: <http://dx.doi.org/10.1108/DPM-01-2016-0018>

Tipler, K.S., Tarrant, R.A., Tuffin, K.F. & Johnston, D.M. (2017b). Legislative requirements and emergency management practitioner expectations of

- preparedness in New Zealand schools. *Australian Journal of Emergency Management*, 32(1), 32-39.
- Trethowan, V., & Nursey, J. (2015). Helping children and adolescents recover from disaster: A review of teacher-based support programs in Victorian schools. *Australian Journal of Emergency Management*, 30(4), 17.
- UNISDR (United Nations International Strategy for Disaster Reduction). (2006). *Disaster risk reduction begins at school*. Retrieved from: <http://www.unisdr.org/2007/campaign/wdrc-2006-2007.htm>.
- US Department of Education (Office of Elementary and Secondary Education, Office of Safe and Healthy Students). (2013). *Guide for Developing High-Quality School Emergency Operations Plans*. Washington, DC.
- US Government Accountability Office. (2007). *Most School Districts Have Developed Emergency Management Plans, but Would Benefit from Additional Federal Guidance*. GAO-07-609. Government Accountability Office.
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Zhe, E. J., & Nickerson, A. B. (2007). The effects of an intruder crisis drill on children's self-perceptions of anxiety, school safety, and knowledge. *School Psychology Review*, 36, 501-508.

Chapter 8. Conclusions

This chapter summarises the research undertaken by drawing together the findings and implications of the three studies. Recurring themes identified within the research are reviewed and the contributions the research has made to the field of school-based emergency management and the SS4R Prevention model are discussed. The chapter concludes with the project limitations and suggestions for future research.

8.1. Summary of the Research Undertaken

The project aim was to investigate current emergency preparedness and response activities in New Zealand schools, and identify key practices that support efforts to keep students safe during emergencies.

The primary research question was:

How do New Zealand schools prepare for and respond to emergencies?

The project consisted of three separate but linked studies that investigated: Emergency preparedness in schools (Study 1); Emergency management requirements and expectations of schools (Study 2); and Emergency response in schools (Study 3). Figure 8.1 provides an overview of the relationship between the three studies and the research papers.

8.1.1. *Emergency preparedness in schools (Study 1)*

The 2012 New Zealand ShakeOut exercise was being conducted at the time that the present project was beginning, and it made sense to gather initial data during the exercise. Study 1 employed a survey to collect quantitative and qualitative data from schools throughout New Zealand about their experiences participating in the nationwide earthquake drill, and the types of emergency preparedness activities undertaken. The findings were reported in two research papers. The qualitative findings were published in Paper 1, *New Zealand ShakeOut exercise: Lessons learned by schools* (Tipler et al., 2016), and the quantitative findings were presented in Paper 2, *Are you ready? Emergency preparedness in New Zealand schools* (Tipler et al., 2017a).

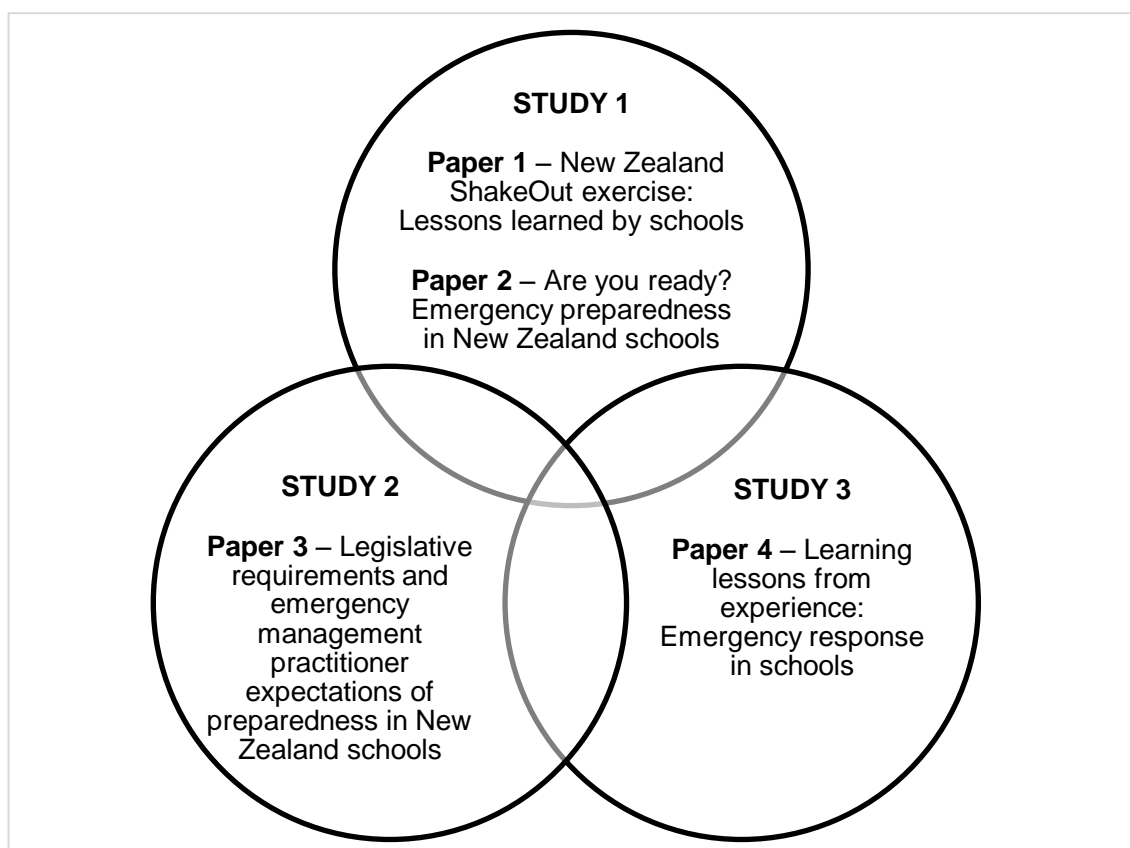


Figure 8.1 Overview of the relationship between the three studies and the research papers.

Paper 1: New Zealand ShakeOut exercise: Lessons learned by schools

By promoting the drill as more than simply a 'drop, cover, hold' practice, and providing supporting resources on the ShakeOut website, the drill facilitators encouraged schools to broaden their understanding of how drills could be utilised, thereby expanding their capacity to learn lessons to enhance future preparedness efforts. As a consequence of participating in the ShakeOut drill schools identified a variety of lessons on conducting response drills and preparing for emergencies. Those lessons covered key drill elements including: alerts systems; safety behaviours; signalling a building evacuation; hazards on evacuation routes and in the assembly area; supervising and supporting students; communication systems; and family reunification. Further lessons were identified relating to other aspects of school preparedness. For example, participants reported using the drill to evaluate school emergency plans and procedures, and linking the drill to classroom learning (e.g., answering student questions about earthquakes and preparing for emergencies at home).

This part of the project also raised an interesting question. Why did so many schools identify lessons that could reasonably be assumed to have already been learnt in previous drills? For example, in some schools, problems with the alert systems were reported (e.g., the alert could not be heard in all parts of the school). It may be that schools had not included certain elements or scenarios in previous drills, or that schools did not necessarily know how to best utilise drills to test other aspects of preparedness. Whatever the reasons emergency response drills in schools is an area that warrants further investigation.

A strength of Paper 1, was that instead of the authors identifying what they considered to be the lessons schools had learned from participating in the drill, the study asked participants themselves to choose three lessons they had learned, thus gaining a school's perspective of what they perceived to be the important aspects of the drill for their own learning and improvement of future preparedness efforts. Previous drill studies, have combined researcher's observations with participants' perspectives, for example in focus groups (Ramirez et al., 2009), a staff debrief (Johnston et al., 2011), or question and answer sessions with students (Orchiston et al., 2013).

Paper 2 – Are you ready? Emergency preparedness in New Zealand schools

Emergencies are relatively common in schools, and school leaders have a responsibility to have plans and procedures in place to keep their students safe during and after such events, as the consequences have the potential to be catastrophic. Until it is clear what schools are currently doing to prepare for emergencies, it is not possible to effectively support them in strengthening their preparedness efforts. To that end, Paper 2 explored the emergency preparation efforts in 355 schools that took part in the ShakeOut exercise, establishing current preparedness levels, and identifying the extent to which schools were ready to keep their students safe in emergencies.

The majority of schools had undertaken basic emergency preparedness activities such as developing plans, conducting drills, and providing hazards education to students. However, differences existed between schools in the extent of their emergency preparedness efforts, in particular with regard to the content of plans, suggesting that many schools may be under-prepared to keep students safe in emergencies. This finding mirrors international research. In the case of New Zealand schools, these variations in preparedness levels were considered to be due, in part, to ambiguity in the legislative requirements for school emergency management efforts, and this lack of clarity may have accounted for school leaders being unclear as to what preparedness activities they were expected to undertake.

A strength of Study 1, was the breadth (Paper 2) and depth (Paper 1) of enquiry that quantitative and qualitative perspectives contributed to our understanding of current preparedness in New Zealand schools.

Study 1 revealed that many of the lessons learned in the ShakeOut exercise had not been learned in previous drills (Paper 1), and that differences existed in the extent of the preparedness activities undertaken in schools (Paper 2), suggesting that legislative requirements and their implications for practice in New Zealand schools were unclear or poorly understood.

8.1.2. *Emergency management requirements and expectations of schools (Study 2)*

The next step of the project was to investigate school-based emergency management requirements and expectations. Study 2 combined semi-structured interviews with school emergency management experts and a review of legislation, policies, and guidelines, to establish which preparedness activities schools were required to undertake, and what government support and resources were available to assist schools in their emergency preparation efforts. The findings of Study 2 were published in Paper 3, *Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools* (Tipler et al., 2017b).

Four pieces of legislation were found to direct emergency management efforts in New Zealand schools, much of the legislation being generic to all workplaces and/or public buildings. As a result, the legislation was found to be broad and, at times ambiguous, and therefore schools were not provided with clear disaster risk reduction guidance. Furthermore, no formal monitoring of school compliance to the legislation was identified. As a consequence of the ambiguity of the legislation and lack of monitoring, preparedness levels vary across schools and students may be at risk if schools are under-prepared to respond appropriately during an emergency.

Study 2, proposed several ways in which the shortcomings of the legislation and lack of consistency in preparedness levels could be addressed. Overall, a more systematic approach to school emergency management is required. To that end, Study 2 recommends that the Ministry of Education, in consultation with practitioners, establish clear benchmarks for schools specifying exactly what emergency preparedness activities they are required to undertake. In addition, the development of detailed standard operating procedures (SOPs) for core emergency response actions (i.e. shelter-in-place, lockdown, building evacuation, relocation, and family reunification)

would enable a consistent and effective approach to school-based preparedness and response efforts. Finally, the development of specific emergency management criteria to monitor compliance of school legislative requirements, within the regular school audit and review programme, would ensure that schools are meeting their statutory obligations, and assist schools in planning appropriately for the safety of their students.

Since the publication of Paper 3, a new Ministry of Education (2016d) resource has been released (i.e., *Planning and preparing for emergencies and traumatic incidents: Practical information and guidance for schools*), which addresses some of the limitations in the existing resources available to assist school preparedness efforts. However, the new resource does not establish preparedness benchmarks for schools, nor include detailed SOPs for key response action, or determine criteria for monitoring school compliance.

A strength of Study 2, was that by interviewing experts from the Ministry of Education and Wellington Region Emergency Management Office, and providing them with copies of the published articles (Papers 1 & 3), the research findings have the potential to influence school preparedness efforts and response capabilities at practitioner level. In addition, Study 2 provided a legislative context for the preparedness activities identified in Study 1, and reiterated the need for planning, education, training, drills, and monitoring to ensure compliance and consistency. Study 2 also supported the assumption in Paper 2 that the differences in preparedness levels across schools were due, in part, to a lack of clarity in the legislative requirements and expectations of schools.

The first two studies provided an overview of current preparedness levels and activities in schools, and identified New Zealand legislative requirements for safety in schools. Interviews with expert emergency management practitioners added a further layer of understanding in terms of how emergency preparedness should be implemented in schools. However, there remained a need to investigate the link between preparing for and responding to emergencies by investigating how schools *responded* to real emergency events; the response to emergencies is when preparation efforts are put to the test (American Academy of Paediatrics, 2008a). Additionally, real emergencies contain elements that could not be investigated in Studies 1 or 2, such as emotional, decision-making, and behavioural reactions that may be a result of, for example, student or staff fears and concerns for themselves and their own families, misunderstandings of which parent would be collecting children or relocation sites

being damaged and unusable. Study 3 investigated how schools responded to real life emergencies in which they had been involved.

8.1.3. Emergency response in schools (Study 3)

By exploring school-based emergency events, Study 3 was able to identify the relationship between preparedness and response activities, and also to compare similarities and differences between drills and a selection of real emergency events. Semi-structured interviews were conducted with staff who held various roles in the school, and parents to explore their experiences during school-based emergencies in which they had been personally involved. The findings of Study 3 were presented in Paper 4, *Learning lessons from experience: Emergency response in schools* (Tipler et al., 2017c).

Emergency response was found to be interconnected with preparedness, with all case study participants acknowledging the importance of preparedness efforts to ensure an effective response. Generally, schools undertake the same sorts of response actions (e.g., safety behaviours, evacuations, family reunification), irrespective of the emergency type. Where differences existed between the case study schools, it was predominantly in the extent of their prior preparation and planning for those response actions.

The core response actions identified in Study 3 were, for the most part, congruent with the elements practised in the ShakeOut drill (Paper 1). This suggests that well planned drills can assist in preparing schools for responding in real emergencies. However, schools require advice and guidance on how to optimise the effectiveness of drills in improving preparedness. For example, some of the lessons identified by the case study schools during their emergency response (e.g., having hard copies of all important information) could have been learned previously in drills, if the drills had been more comprehensive (e.g., based on SOPs or with specific learning objectives) as recommended in Study 2.

A strength of Study 3 was the case study approach, which enabled participants to share in-depth details of their experiences of responding to emergency events. The perspectives of multiple participants provided a more comprehensive picture of the emergency response experiences than would have been possible with only that of a single individual in each school. This approach also allowed similarities and differences in response requirements to different emergencies to be identified.

Across the entire project, the mixed methods research design enabled various aspects of emergency preparedness and response in New Zealand schools to be investigated. Through surveys, interviews, and case studies, participants in a range of emergency management roles contributed to the identification of key practices that support efforts to keep students safe in emergencies. Furthermore, the mixed methods approach enabled the links between emergency preparedness activities and the actions required during a response to be clearly established within and across the studies, a relationship that has not been demonstrated to the same extent in the existing literature.

8.2. Preparedness and Response: A Cyclic Relationship and Recurring Themes

In addition to the overarching links between the three studies, the cyclic relationship between preparedness and response was reiterated throughout the research. There is evidence for the continuous process in which drills and emergency experiences act as opportunities to learn lessons, which are then implemented in plans and procedures, and then tested in drills and emergency experiences. Furthermore, recurring preparedness and response themes produced common threads throughout each stage of the project. The following examples of recurring themes (outlined below) demonstrate how preparedness efforts influenced, and were influenced by, response actions, while also illustrating inconsistencies and gaps in current practices.

8.2.1. *Emergency planning and preparation*

The need for plans and procedures to be developed prior to emergencies was reinforced by participants within each of the studies, but this was not necessarily reflected in actual preparedness levels of schools (Paper 2). For example, the importance of supporting students emotionally during an emergency was recognised, with Paper 4 identifying the need for emotional support of students as a factor that contributes to an effective response. However, while Paper 3 indicated that supporting students during traumatic incidents was important, the practitioners were not familiar with what specific training was available to schools. This may be an indication of why so few schools reported having staff trained in psychological first aid or crisis counselling. In another example, the need for schools to have developed comprehensive plans and procedures for releasing students and reunifying families was repeatedly acknowledged by research participants. In particular, Paper 4 identified not having fully developed reunification procedures prior to emergencies was a weakness that resulted in challenges during the response. Yet results in Paper 2

indicated that schools were not planning for reunification, sharing those plans with staff and parents, and testing plans in drills. In a final planning and preparation example, education continuity planning in schools was an expectation of emergency management practitioners in Paper 3, although not prioritised within the guidance provided to schools. Therefore, it is perhaps not surprising that findings from Paper 2 indicated that less than half of schools' emergency plans include an education continuity component. The six-stage school-based response model identified family reunification and education continuity as core response actions, and as such, it is essential that they are included in planning and preparation efforts.

8.2.2. *Emergency drills*

Emergency response drills are recognised in all three studies as essential in ensuring students and staff know how to respond appropriately during an emergency. The emergency management practitioners in Paper 3 appeared to be somewhat unclear as to what should be included in drills, other than practising safety behaviours, evacuating the building, and checking students are accounted for. This uncertainty is also indicated by the limited advice and guidelines from the MoE to assist schools when planning and conducting drills. This seems somewhat illogical in that the elements of drills (Paper 1) reflect the components of a response (Paper 4), and therefore should make up a key aspect of school preparedness efforts. To that end, the need for SOPs for core response actions (i.e., shelter-in-place, lockdown, building evacuation, relocation) is recommended across the three studies.

8.2.3. *Evaluation of preparedness and response efforts*

The need for, and benefits of, evaluation was a common theme in all three studies, where evaluation was recognised as having the potential to: improve preparation, support an effective response, and keep students safe. Paper 2 found that much of the evaluation of school preparedness efforts was undertaken internally (i.e., in staff meetings, with students in class). By not extending their evaluation efforts to other stakeholders, schools may be missing out on beneficial feedback and insights that can strengthen response plans and procedures. How learning from evaluations are used by schools was raised in Paper 2, where almost all schools reported evaluating their preparedness efforts to some extent. Evidence from Paper 4 indicated that the case study schools implemented learning from evaluations into their planning for future emergencies, but this may not be the case for all schools, and as such requires further investigation.

8.2.4. *Engaging with stakeholders*

Overall, schools varied as to the extent of their engagement with stakeholders. Engaging with stakeholders was identified as being beneficial for schools preparing for (e.g., emergency management practitioners can provide advice) and responding to emergencies (e.g., parents working with school response efforts rather than hampering them) in all three studies. However, such engagement tended to be perceived as an ideal, rather than a reflection of actual practice, with Paper 2 reporting consistently low levels of engagement with parents and external stakeholders. This presents a challenge to schools, as Paper 4 recognised how important it is that staff and parents are familiar with the school's response plans, as a lack of familiarity can hinder the response efforts and increase anxiety, particularly for parents and students. In an effort to promote engagement, Paper 4 suggests encouraging schools to involve stakeholders in activities such as home-based preparedness to promote the development of family response plans that include who will collect children from school, and by inviting stakeholders (internal and external) to observe, participate in, and/or provide feedback on drills.

As the examples from the three studies indicate, school preparedness activities and response actions are directly linked, and this relationship should be promoted in all efforts to support schools as they prepare for and respond to emergencies.

8.3. The Contribution of the Research Project to Our Understanding of Emergency Preparedness and Response in Schools

The research project's contribution to emergency management in schools is considered within the field of school-based emergency management, and in relation to the SS4R Prevention model that provided the theoretical framework for the project (Ronan & Johnston, 2005), as discussed in Chapter 3.

8.3.1. *The field of school-based emergency management*

The project contributes to the limited literature available and ongoing efforts of school-based emergency management practitioners and researchers in the following ways:

Study 1

- presented empirical evidence to support the premise that previous emergency experience increases preparedness;

- presented a nationwide survey of school preparedness analysed by school type, enabling the targeting of support and resources to schools that reflect the age and levels of independence of students;
- demonstrated how drills can be linked to other preparedness activities;

Study 2

- reviewed and collated the requirements and expectations of emergency management in New Zealand schools into a concise format that provided an overview of the key components of school-based emergency management;
- established a need for monitoring, which is not known to have been previously linked to New Zealand school emergency management requirements and expectations;
- provided a useful starting point when gauging New Zealand's progress in achieving its obligations within the Sendai Framework for Disaster Risk Reduction 2015-2030 (UNISDR, 2015a);

Study 3

- presented the only known study to detail the response phase of school-based emergencies;
- identified generic, recurring response activities across a selection of emergency types, which were used to develop a six-stage school-based emergency response model;
- presented lessons learned from participant's first hand experiences of various emergency events, enabling the identification of factors that contribute to an effective emergency response, including activities undertaken before, during, and after an emergency;
- linked response actions with preparedness activities, providing empirical evidence to supporting the assumption that prior preparation is essential for an effective emergency response;

Overall

- drill elements discussed in Study 1 and response components within the six-stage school-based emergency response model in Study 3, providing a means by which emergency drills and response requirements can be compared to improve how schools prepare for emergencies; and

- themes discussed, and examples presented, in the three studies provide suitable criteria to be considered when developing emergency preparedness benchmarks for schools and SOPs for core emergency response actions.

8.3.2. The SS4R Prevention model

The SS4R Prevention model (Ronan & Johnston, 2005) was utilised as the theoretical framework for the project. At the time the present study was begun, the SS4R Prevention model was the only known model that identified a significant role for schools in community resilience, and succinctly represented accepted school-based emergency management theory at that time. On the basis of research since 2005, and this project, Ronan and Johnston's model is supported as still being relevant to current emergency management practice, as many of the ideas put forward in the model are recognised as accepted current practice within the emergency management field. The Comprehensive School Safety (CSS) framework (GADRRRES, 2014), which contributed to the theoretical framework of the project, supports the essential role hazards education plays within the SS4R Prevention model. Furthermore, the CSS framework extends the SS4R Prevention model by specifying core components for school safety (e.g., the requirement to develop plans and SOPs; provision for education continuity planning) and providing a safe learning environment (e.g., building codes), themes initially addressed in the model.

The use of the model as the foundation of the research enabled the individual studies to be built on the theory already established within the model, while also providing an opportunity to test and expand upon the understanding of emergency management in schools, central to the model. Furthermore, the research project as a whole was able to strengthen the theory and practical applications of the model by providing support for several of the school-based preparedness and response concepts underpinning the model (e.g., linking school and home preparedness with community resilience). The research project contributes to the SS4R Prevention model and expands its potential for informing future school-based emergency management efforts in the following ways:

- The conceptual diagram of the model produced in Chapter 3 (Figure 3.1) is the first visual representation of the model, in which the main concepts and their overarching relationships are clarified. Until now, the model has only been presented in writing;
- When the model was first published in 2005, there was little school-based research available to test the underlying theory. The review of the literature in

Chapter 2 can be used to update and supplement the theory, and provides examples that apply within the model;

- The research papers within this thesis link many of the themes within the model. For example, Paper 1 combined an emergency response drill, prioritised within the SS4R Prevention model, with community and joint training initiatives, all recognised as key components of community resilience and, as demonstrated in the paper, were effective in engaging schools and students in earthquake preparedness efforts;
- The findings of Paper 3 reinforced the need for government and practitioners to work with schools to clarify emergency management expectations and enhance preparedness and response capabilities. Such relationships are a fundamental concept within the model;
- The nationwide school preparedness survey in Paper 2 extends the hazards education focus of readiness themes within the model to include other key preparedness activities (e.g., education continuity planning and preparing for the needs of students and staff with disabilities and special needs); and
- Paper 4's unique approach to emergency response in schools, which focuses on how students are kept safe during the initial response phase of a real life emergency, reinforces the important role schools have in supporting school and community resilience before, during and after emergencies and disasters.

In sum, this research project used the SS4R Prevention model as a theoretical framework, and was able to build on the model to provide new knowledge to enrich the theoretical and practical applications of the model and thus to increase our understanding of effective school-based emergency management.

8.4. Recommendations

The recommendations are based on the findings and conclusions of the research project, and are divided into two sections. The first presents recommendations to enhance emergency management efforts in New Zealand schools. The second section offers recommendations for researchers and practitioners in the field of school-based emergency management.

8.4.1. Recommendations for New Zealand schools

To achieve the best outcomes for school emergency management efforts a combined top down (Ministry of Education) and bottom up (schools) approach is required.

- The MoE should take the lead in developing best practice-based guidelines and supporting resources, with clearly defined benchmarks and standard operating procedures, to direct and assist school emergency management efforts. Such an approach is recommended within the literature and promoted within this thesis as a means to promote consistency, while avoiding the need for every school to have to reinvent the wheel.
- School leaders, as part of their obligations within Health and Safety legislation to keep students and staff safe in emergencies, should be actively prioritising emergency preparedness activities, including: planning and preparation; training and education; conducting response drills; evaluating preparedness and response efforts; and engaging with stakeholders.
- The MoE should develop criteria which school emergency management efforts can be measured against to ensure compliance to statutory requirements for student and staff safety. Monitoring of compliance may be undertaken by Ministry personnel or in concert with regular school audits conducted by the Education Review Office.
- In accordance with New Zealand's obligations as a signatory to the Sendai Framework for Disaster Risk Reduction the MoE should ensure any emergency management directives to schools conform to education sector priorities within the Sendai Framework.

8.4.2. Recommendations for Practitioners and Researchers

When engaging with schools about emergency management and/or undertaking research in this area consideration of the following recommendations would be beneficial.

- The cyclic relationship between preparedness and response has been corroborated throughout this thesis, and should be recognised and promoted as a means to enhance school-based emergency management efforts.
- School preparedness efforts should focus on core response actions (i.e., shelter-in-place, lockdown, evacuation, relocation, and family reunification). Such an approach reduces the need to develop individual plans for every conceivable emergency type, and when applied in conjunction with the six-stage model of a school-based emergency response developed in Chapter 7 will enhance schools' emergency response capabilities.

- Emergency response drills are an essential tool in preparing students, staff, and families to respond effectively in emergencies, and should be used to strengthen the link between school preparedness and response efforts.
- All aspects of school preparedness and response efforts should contain an evaluation component that allows for lessons learned to be incorporated into future planning efforts and to be shared with internal and external stakeholders to enhance overall community resilience.

8.5. Limitations and Opportunities for Future Research

The mixed methods approach employed in this research project enabled many of the potential limitations associated with different research methods to be addressed. Limitations are acknowledged in the relevant research paper, as are study specific recommendations for future research. Three further overarching limitations from the project are identified below with suggestions for how they may be addressed in future research.

The quantitative data collected in the survey (Paper 2) was suited to its intended purpose, yet as the project progressed, unanswered questions arose from the survey, specifically in relation to the type and level of details within schools' emergency plans, and how lessons identified by schools when evaluating their preparedness efforts were used to improve planning and response capabilities. Therefore, it is suggested that future surveys of school preparedness are followed by a small number of qualitative interviews with a selection of school participants to allow them to expand on their survey answers to provide a greater level of specific details and examples.

The nature and operational perspective of the research project, and time in which to undertake a doctoral study, did not make it feasible to include the perspective of students; therefore, the voices of the students are not heard. Children can add a valuable perspective to disaster risk reduction practices (e.g., Peek, 2008; Ronan et al., 2016). Future research could investigate students' perspectives of the school preparedness activities they take part in, including drills, and students' experiences in actual emergencies to increase understanding about the needs of students during an emergency response.

The lack of a cultural perspective in the research is acknowledged. The survey for Study 1 was nationwide and modelled on questionnaires used in US ShakeOut exercises, although a small number of surveys were received from kura kaupapa Māori (immersion) schools. However, the quantitative nature of much of the survey did not

provide any specific cultural insights. Furthermore, the selection of the emergency response case studies schools (Study 3) did not include a cultural diversity criterion. Future research could target schools that follow mātauranga Māori (knowledge/understanding from a Māori perspective) to identify any differences and requirements for preparedness and response that are influenced by and pertinent to the cultural foundations of the school.

Research exploring emergency management in New Zealand schools is still in its infancy. The present project has contributed significant knowledge to understanding how New Zealand schools prepare for and respond to emergencies to keep their students safe. Findings from the present study may also have relevance for an international audience.

References

- Adamson, A.D., & Peacock, G.G. (2007). Crisis response in the public schools: A survey of school psychologists' experiences and perceptions. *Psychology in the Schools, 44*(8), 749-764. DOI:10.1002/pits.20263
- Alam, I., Khusro, S., Rauf, A., & Zaman, Q. (2014). Conducting surveys and data collection: From traditional to mobile and SMS-based surveys. *Pakistan Journal of Statistics and Operation Research, 10*(2).
- Alba, D. J., & Gable, R. K. (2011). *Crisis Preparedness: Do School Administrators and First Responders Feel Ready to Act?*
- Alba, D.J., & Gable, R.K. (2012). *School Safety Planning: Barriers to Implementation Perceived by District Leadership and First Responders.*
- American Academy of Pediatrics, Council on School Health. (2008a). Disaster planning for schools. *Pediatrics, 122*(4). DOI: 10.1542/peds.2008-2170.
- American Academy of Pediatrics, Council on School Health. (2008b). Medical emergencies occurring at school, *Pediatrics, 122*(4), 887–894. DOI: 10.1542/peds.2008-2171
- Anderson, W. (2005). Bringing Children into Focus on the Social Science Disaster Research Agenda. *International Journal of Mass Emergencies and Disasters, 23*(3), 159-175.
- Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic survey methodology: A case study in reaching hard-to-involve Internet users. *International Journal of Human-Computer Interaction, 16*(2), 185-210.
- Awofisayo, A., Ibbotson, S., Smith, G. E., Janmohamed, K., Mohamed, H., & Olowokure, B. (2013). Challenges and lessons learned from implementing a risk-based approach to school advice and closure during the containment phase of the 2009 influenza pandemic in the West Midlands, England. *Public health, 127*(7), 637-643.
- Babbie, E. (2001). *The practice of social research* (9th Ed). Wadsworth/Thomson Learning. Inc, Belmont.
- Bastidas, P. & Petal, M. (2012). *Assessing School Safety from Disasters a Global Baseline Report: ISDR Thematic Platform for Knowledge and Education.* United Nations Office for Disaster Risk Reduction, Geneva. Retrieved from: http://www.unisdr.org/files/35274_2012schoolsafetyglobalbaseline.pdf.

- Bhattacharjee, A. (2012). *Social science research: principles, methods and practices*. Textbooks Collection. Book 3.
- Boon, H., Brown, L., & Pagliano, P. (2014). Emergency planning for students with disabilities: a survey of Australian schools. *Australian Journal of Emergency Management*, 29(1), 45-49.
- Borum, R., Cornell, D. G., Modzeleski, W., & Jimerson, S. R. (2010). What can be done about school shootings? A review of the evidence. *Educational Researcher*, 39(1), 27-37.
- Braun, V., & Clarke, V. (2006), Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Brock, S. E. (2000). Development of a school district crisis intervention policy. *The California School Psychologist*, 5(1), 53-64. DOI:10.1007/BF03340876
- Burling, W. K., & Hyle, A. E. (1997). Disaster preparedness planning: Policy and leadership issues. *Disaster Prevention and Management: An International Journal*, 6(4), 234-244. <http://dx.doi.org/10.1108/09653569710179075>
- Cahill, H., Beadle, S., Mitch, J., Coffey, J., & Crofts, J. (2010). Adolescents in emergencies. *Youth Research Centre, The University of Melbourne, Parkville, Vic., Australia*.
- Chung, S., Danielson, J., & Shannon, M. (2009). *School-based emergency preparedness: a national analysis and recommended protocol*. Agency for Healthcare Research and Quality. Rockville, MD.
- Clarke, L. S., Embury, D. C., Jones, R. E., & Yssel, N. (2014). Supporting Students With Disabilities During School Crises A Teacher's Guide. *TEACHING Exceptional Children*, 46(6), 169-178.
- Clettenberg, S., Gentry, J., Held, M., & Mock, L. A. (2011). Traumatic loss and natural disaster: A case study of a school-based response to Hurricanes Katrina and Rita. *School psychology international*, 32(5), 553-566.
- Convery, I., Carroll, B., & Balogh, R. (2014). Flooding and schools: experiences in Hull in 2007. *Disasters*, 39(1), 146-165.
- Coomer, M., Johnston, D., Edmonson, L., Monks, D., Pedersen, S., & Rodger, A. (2008). *Emergency Management in Schools: Wellington Survey. (Report No. 2008/04)*. Wellington: GNS Science.
- Cornell, D. G., & Sheras, P. L. (1998). Common errors in school crisis response: Learning from our mistakes. *Psychology in the Schools*, 35(3), 297-307.
- Crepeau-Hobson, F., & Summers, L. L. (2011). The crisis response to a school-based hostage event: A case study. *Journal of School Violence*, 10(3), 281-298.

- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches*. (2nd ed.) Thousand Oaks, Sage
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. (3rd ed.) Sage publications. California.
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. (4th ed.) Sage publications.
- Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into practice*, 39(3), 124-130.
- Creswell, J.W & Plano Clark, V.L. (2011). *Designing and conducting mixed methods research* (2nd ed.) Sage Publications, Thousand Oaks, California.
- Crichton, M. T., Ramsay, C. G., & Kelly, T. (2009). Enhancing organizational resilience through emergency planning: Learnings from cross-sectoral lessons. *Journal of Contingencies and Crisis Management*, 17(1), 24-37. DOI: 10.1111/j.1468-5973.2009.00556.x
- Denzin, N. K. (1973). *The research act: A theoretical introduction to sociological methods*. Transaction publishers.
- Department of the Prime Minister and Cabinet. (2015). *The Guide to the National CDEM Plan*. Retrieved from: <http://www.civildefence.govt.nz/assets/guide-to-the-national-cdem-plan/Guide-to-the-National-CDEM-Plan-2015.pdf>. (Accessed 28.07.2016).
- Dillman, D. A. (2000.) *Mail and web-based survey: The tailored design method*. New York: Wiley.
- Donahue, A., & Tuohy, R. (2006). Lessons we don't learn: A study of the lessons of disasters, why we repeat them, and how we can learn them. *Homeland Security Affairs*, 2(2).
- Education Counts (2012). *Number of Schools*. Retrieved from: <https://www.educationcounts.govt.nz/statistics/schooling/number-of-schools>.
- Education Review Office. (2013). *Stories of resilience and innovation in schools and early childhood services*. Wellington, New Zealand: Education Review Office.
- Elangovan, A. R., & Kasi, S. (2015). Psychosocial disaster preparedness for school children by teachers. *International journal of disaster risk reduction*, 12, 119-124. <http://doi.org/10.1016/j.ijdrr.2014.12.007>
- Federal Emergency Management Agency. (2006). *Principles of Emergency Management, Independent Study, IS230, Washington. (Supplement)*
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme

- development. *International journal of qualitative methods*, 5(1), 80-92.
<https://doi.org/10.1177/160940690600500107>
- Fergusson, D.M & Boden, J. (2011). *Alcohol use in adolescence*. OPMSAC (Ed.), Improving the transition: Reducing social and psychological morbidity during adolescence (pp. 235-255). Wellington: Office of the Prime Minister's Science Advisory Committee.
- Finnis, K., Standring, S., Johnston, D., & Ronan, K. (2004). Children's understanding of natural hazards in Christchurch, NZ. *Australian Journal of Emergency Management*, 19(2), 11-20.
- Fothergill, A., & Peek, L. (2006). Surviving catastrophe: A study of children in Hurricane Katrina. *Learning from catastrophe: Quick response research in the wake of Hurricane Katrina*, 97-129.
- GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector). (2014). *Comprehensive school safety*. Retrieved from: <http://preventionweb.net/go/31059>
- GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector). (2017). *Comprehensive school safety*. Retrieved from: <http://gadrrres.net/resources/comprehensive-school-safety-framework>
- GADRRRES (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector). (2015). *Towards safer school construction: A community-based approach*. Retrieved from: https://www.gfdr.org/sites/default/files/publication/45179_towardssafterschoolconstruction2015_0.pdf
- Gibbs, L., Mutch, C., O'Connor, P., & MacDougall, C. (2013). Research with, by, for and about children: Lessons from disaster contexts. *Global Studies of Childhood*, 3(2), 129-141. <http://dx.doi.org/10.2304/gsch.2013.3.2.129>
- Graham, J., Shirm S., Liggin R., Aitken M., & Dick R. (2006). Mass-casualty events at schools: a national preparedness survey. *Pediatrics*, 117(1), e8-15. doi:10.1542/peds.2005-0927
- Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational evaluation and policy analysis*, 11(3), 255-274.
- Heath, M.A., Ryan, K., Dean, B., & Bingham, R. (2007). History of School Safety and Psychological First Aid for Children. *Brief Treatment and Crisis Intervention*, 7(3), pp. 206-223.

- Hochheimer, C. J., Sabo, R. T., Krist, A. H., Day, T., Cyrus, J., & Woolf, S. H. (2016). Methods for Evaluating Respondent Attrition in Web-Based Surveys. *Journal of Medical Internet Research*, 18(11). doi: 10.2196/jmir.6342
- Hosseini, M., & Izadkhah, Y. O. (2006). Earthquake disaster risk management planning in schools. *Disaster Prevention and Management: An International Journal*, 15(4), 649-661. <http://dx.doi.org/10.1108/09653560610686595>
- Hutton, D. (2011). *Lessons Unlearned: The (Human) Nature of Disaster Management, Emergency Management*. Burak Eksioglu (Ed.), ISBN: 978-953-307-989-9, InTech. Retrieved from: <http://www.intechopen.com/books/emergency-management/lessons-unlearned-the-human-nature-of-disastermanagement>.
- Ihuah, P. W., & Eaton, D. (2013). The pragmatic research approach: A framework for sustainable management of public housing estates in Nigeria. *Journal of US-China Public Administration*, 10(10), 933-944.
- International Finance Corporation. (2010). *Disaster and Emergency Preparedness: Guidance for Schools*. Washington, DC: International Finance Corporation.
- Jackson, S.L. (2009). *Research Methods and Statistics: A Critical Thinking Approach 3rd edition*. Belmont, CA: Wadsworth.
- Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative science quarterly*, 24(4), 602-611.
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, 33(7), 14-26.
- Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of mixed methods research*, 1(2), 112-133.
- Johnson, V. A., & Ronan, K. R. (2014). Classroom responses of New Zealand school teachers following the 2011 Christchurch earthquake. *Natural Hazards*, 72(2), 1075-1092.
- Johnson, V. A., Ronan, K. R., Johnston, D. M., & Peace, R. (2014c). Evaluations of disaster education programs for children: A methodological review. *International journal of disaster risk reduction*, 9, 107-123. <http://doi.org/10.1016/j.ijdr.2014.04.001>
- Johnson, V.A., Johnston, D.M., Ronan, K.R., & Peace, R. (2014a). Evaluating children's learning of adaptive response capacities from ShakeOut, an earthquake and tsunami drill in two Washington State school districts. *Journal of Homeland Security & Emergency Management*, 11(3), 347-373. <https://doi.org/10.1515/jhsem-2014-0012>
- Johnson, V.A., Ronan, K.R., Johnston, D.M., & Peace, R. (2014b). Implementing disaster preparedness education in New Zealand primary schools. *Disaster*

- Prevention and Management: An International Journal*, 23(4), 370 – 380.
<http://dx.doi.org/10.1108/DPM-09-2013-0151>.
- Johnston, D., Standing, S., Ronan, K., Lindell, M., Wilson, T., Cousins, J., ... & Kirsch, T. (2014). The 2010/2011 Canterbury earthquakes: context and cause of injury. *Natural hazards*, 73(2), 627-637. doi:10.1007/s11069-014-1094-7
- Johnston, D., Tarrant, R., Tipler, K., Coomer, M., Pedersen, S., & Garside, R. (2011). Preparing schools for future earthquakes in New Zealand: Lessons from an evaluation of a Wellington school exercise. *Australian Journal of Emergency Management*, 26(1), 24-30.
- Johnston, D., Tarrant, R., Tipler, K., Lambie, E., Crawford, M., Johnson, V., Becker, J., & Ronan, K. (2016). Toward tsunami-safer schools in the Wellington region of New Zealand: evaluating drills and awareness programs. *Australian Journal of Emergency Management*, 31(3), 59-66.
- Kano, M. & Bourque, L. B. (2007). *School Emergency Preparedness Survey Report: Improving Coordination is Vital for School Districts*. Southern California Injury Prevention Research Center, UCLA, Los Angeles. doi/abs/10.1177/0192636507305102
- Kano, M., Franke, T., Afifi, A. A., & Bourque, L. B. (2008). Adequacy of reporting results of school surveys and nonresponse effects: A review of the literature and a case study. *Educational Researcher*, 37(8), 480-490.
- Kano, M., Ramirez, M., Ybarra, W. J., Frias, G., & Bourque, L. B. (2007). Are schools prepared for emergencies? A baseline assessment of emergency preparedness at school sites in three Los Angeles County school districts. *Education and Urban Society*, 39(3), 399-422. doi/abs/10.1177/0013124506298130
- Kayman, H., Salter, S., Mittal, M., Scott, W., Santos, N., Tran, D., & Ma, R. (2015). School Closure Decisions Made by Local Health Department Officials During the 2009 H1N1 Influenza Outbreak. *Disaster medicine and public health preparedness*, 9(04), 464-471.
- Kelley, K., Clark, B., Brown, V., & Sitzia, J. (2003). Good practice in the conduct and reporting of survey research. *International Journal for Quality in health care*, 15(3), 261-266.
- Labib, A., & Read, M. (2013). Not just rearranging the deckchairs on the Titanic: Learning from failures through Risk and Reliability Analysis. *Safety science*, 51(1), 397-413.
- Lazarus, P. J., Jimerson, S. R., & Brock, S. E. (2003). Helping children after a natural disaster: Information for parents and teachers. *National Association of School Psychologists*.

- Liu, S., Murray-Tuite, P., & Schweitzer, L. (2012). Analysis of child pick-up during daily routines and for daytime no-notice evacuations. *Transportation research part A: policy and practice*, 46(1), 48-67.
- Lopes, R. (2004). American Red Cross Response to 'Triangle of Life. Retrieved from: <http://www2.bpaonline.org/Emergencyprep/arc-on-doug-copp.html> (accessed November 2, 2015).
- MacNeil, W., & Topping, K. (2009). Crisis management in schools: evidence based. *The Journal of Educational Enquiry*, 7(2).
- Masten, A. S., & Osofsky, J. D. (2010). Disasters and their impact on child development: Introduction to the special section. *Child development*, 81(4), 1029-1039. DOI: 10.1111/j.1467-8624.2010.01452.x
- Mazer, J. P., Thompson, B., Cherry, J., Russell, M., Payne, H. J., Kirby, E. G., & Pfohl, W. (2015). Communication in the face of a school crisis: Examining the volume and content of social media mentions during active shooter incidents. *Computers in Human Behavior*, 53, 238-248. <http://doi.org/10.1016/j.chb.2015.06.040>
- McBride, S. K, Becker, J. M, Coomer, M, Tipler, K, Johnston, D.M. (2014). New Zealand ShakeOut Observation Evaluation Report: A summary of initial findings. (Report No. 2013/61). Wellington: GNS Science.
- Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis: A sourcebook. *Beverly Hills: Sage Publications*.
- MCDEM (Ministry of Civil Defence and Emergency Management) & MoE (Ministry of Education). (2011). *Early Childhood Education Services: Emergency Planning Guidance. Civil Defence Emergency Management Best Practice Guide (BPG 6/11)*. Retrieved from: www.civildefence.govt.nz/assets/Uploads/publications/bpg-06-11-early-childhood-education-emergency-planning-guidance.pdf [3 September 2016].
- Ministry of Civil Defence and Emergency Management. (2009). *What's the Plan Stan? Simulation and practice activities*. Ministry of Civil Defence and Emergency Management, Wellington. Retrieved from: <http://www.whatstheplanstan.govt.nz/themes/whats-the-plan/pdf/Simulation%20and%20practice%20activities.pdf>.
- Ministry of Civil Defence and Emergency Management. (2013). *New Zealand ShakeOut 2012: Final Report*. Ministry of Civil Defence and Emergency Management, Wellington. Retrieved from: <http://www.civildefence.govt.nz/assets/Uploads/Shakeout/NZShakeOut2012Report.pdf>.

- Ministry of Civil Defence and Emergency Management. (n.d.). *National Disaster Resilience Strategy development*. Retrieved from: <http://www.civildefence.govt.nz/cdem-sector/national-disaster-resilience-strategy-development/>
- Ministry of Education. (2008). *Fire and Safety Design Requirements for Schools*. Retrieved from <http://www.education.govt.nz/assets/Documents/Primary-Secondary/Property/School-property-design/FireAndSafetyDesignRequirements.doc>.
- Ministry of Education. (2009). *Managing emergencies and traumatic incidents – Nine-step checklist*. Retrieved from: www.education.govt.nz/assets/Documents/School/Traumatic-incident-and-emergencies/NinePointChecklist.pdf [26 October 2016].
- Ministry of Education. (2011b). *Ministry of Education annual report*. Retrieved from: www.education.govt.nz/assets/Documents/Ministry/Publications/Annual-Reports/MOEAnnualReport2011Full.pdf (accessed 20 October 2015).
- Ministry of Education. (2011a). *Influenza pandemic planning guide for early childhood education services, schools and tertiary organisations*. Retrieved from <http://www.education.govt.nz/ministry-of-education/specific-initiatives/health-and-safety/work-place-management/pandemic-planning-kit/pandemic-planning-guide/>.
- Ministry of Education. (2012). *Emergency Plan Template*. Retrieved from: www.education.govt.nz/assets/Documents/School/Traumatic-incident-and-emergencies/EmergencyMPlanTemplateWordFeb12.doc.
- Ministry of Education. (2016a). *Traumatic Incidents – Managing Student and Staff Well-Being guide for school crisis teams*. Ministry of Education, Wellington. Retrieved from: <http://www.education.govt.nz/assets/Uploads/Traumatic-incident-schools-Guidelines-for-wellbeing.pdf>.
- Ministry of Education. (2016b). *Health and Safety Practical Guide for Boards of Trustees and School Leaders*. Ministry of Education, Wellington. Retrieved from: <http://www.education.govt.nz/assets/Documents/Ministry/Initiatives/Health-and-safety/Tools/Health-and-Safety-at-Work-Act-2015.pdf>.
- Ministry of Education. (2016c). *EOTC Guidelines 2016 – Bringing the Curriculum Alive*. Retrieved from: <http://eotc.tki.org.nz/content/download/2752/11123/file/EOTC%20Guidelines%202016.pdf>.
- Ministry of Education. (2016d). *Planning and preparing for emergencies and traumatic incident: Practical information and guidance for schools*. Retrieved from:

<https://education.govt.nz/assets/Documents/School/Supporting-students/Emergencies-and-traumatic-incidents/Emergency-Planning-Guidance.pdf>.

Ministry of Education. (n.d.a). *Building warrants of fitness for school facilities*. Retrieved from: <http://www.education.govt.nz/school/property/state-schools/day-to-day-management/building-warrants-of-fitness/>.

Ministry of Education. (n.d.c). *Deciles*. Retrieved from: <http://www.education.govt.nz/school/running-a-school/resourcing/operational-funding/schooldecile-ratings/>.

Momani, N. M., & Salmi, A. (2012). Preparedness of schools in the Province of Jeddah to deal with earthquakes risks. *Disaster Prevention and Management: An International Journal*, 21(4), 463-473. <http://dx.doi.org/10.1108/09653561211256161>

Mooney, M., Tarrant, R., Paton, D., Johal, S. & Johnston, D. (2017). Getting through: Children's effective coping and adaptation in the context of the Canterbury, New Zealand, Earthquakes of 2010-2012. *Australasian Journal of Disaster and Trauma Studies*, 21(1), 19-30. Retrieved from: http://trauma.massey.ac.nz/issues/2017-1/AJDTS_21_1_Mooney.pdf

Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry*, 20(8), 1045-1053. DOI: 10.1177/1077800413513733.

Mutch, C. (2014). The role of schools in disaster preparedness, response and recovery: what can we learn from the literature?. *Pastoral Care in Education*, 32(1), 5-22.

Mutch, C. (2015a). The role of schools in disaster settings: Learning from the 2010–2011 New Zealand earthquakes. *International Journal of Educational Development*, 41, 283-291. <http://doi.org/10.1016/j.ijedudev.2014.06.008>

Mutch, C. (2015b). Quiet heroes: Teachers and the Canterbury, New Zealand, earthquakes. *Australasian Journal of Disaster and Trauma Studies*, 19(2). Retrieved from: http://trauma.massey.ac.nz/issues/2015-2/AJDTS_19_2_Mutch.pdf

Mutch, C., & Gawith, E. (2014). The New Zealand earthquakes and the role of schools in engaging children in emotional processing of disaster experiences. *Pastoral Care in Education*, 32(1), 54-67. <http://dx.doi.org/10.1080/02643944.2013.857363>

- Ng, G. T., & Sim, T. (2012). Post-disaster school relocation: A case study of Chinese students' adjustment after the Wenchuan earthquake. *International social work*, 58(1), 7-22. DOI: 10.1177/0020872812456051
- NZ Government. (1989). *Education Act 1989*. Retrieved from http://www.legislation.govt.nz/act/public/1989/0080/latest/DLM175959.html?search=ts_act_education_rese&p=1&sr=1.
- NZ Government. (2004). *Building Act 2004*. Wellington, New Zealand. Retrieved from <http://www.legislation.govt.nz/act/public/2004/0072/latest/whole.html>.
- NZ Government. (2006). *Fire Safety and Evacuation of Buildings Regulations 2006*. Retrieved from: http://www.legislation.govt.nz/regulation/public/2006/0123/latest/whole.html?search=qs_act%40bill%40regulation%40deemedreg_Fire+Safety+and+Evacuation+of+Buildings+Regulations+2006_rese_25_h&p=1#DLM382016.
- NZ Government. (2015). *Health and Safety at Work Act 2015*. Retrieved from: <http://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976660.html>.
- NZ ShakeOut. (n.d.a). *ShakeOut Resources*. Ministry of Civil Defence and Emergency Management, Wellington. Retrieved from: <http://www.shakeout.govt.nz/resources/>.
- NZ ShakeOut. (n.d.b). *Website home page*. Retrieved from: <http://www.shakeout.govt.nz/index.html> (accessed June 11, 2015).
- O'Keefe, K. A., Arrington, K. D., Prelip, M., & Shoaf, K. I. (2015). Perceptions of school and health department emergency preparedness collaboration. *Frontiers in public health services and systems research*, 4(1), 22-28.
- Onwuegbuzie, A. J., & Leech, N. L. (2005). On becoming a pragmatic researcher: The importance of combining quantitative and qualitative research methodologies. *International journal of social research methodology*, 8(5), 375-387.
- Orchiston, C., Manuel, C., Coomer, M., Becker, J. & Johnston, D. (2013). The 2009 New Zealand West Coast ShakeOut: Improving earthquake preparedness in a region of high seismic risk. *Australasian Journal of Disaster and Trauma Studies*, Vol. 2013, No. 2, pp. 56-61. Retrieved from: http://www.massey.ac.nz/~trauma/issues/2013-2/AJDTS_2013-2_Orchiston.pdf (accessed June 11, 2015).
- Ormerod, R. (2006). The history and ideas of pragmatism. *Journal of the Operational Research Society*, 57(8), 892-909.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

- Peek, L. (2008). Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience: An Introduction. *Children, Youth and Environments*, 18(1), 371-388. Retrieved from: <http://www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0001>
- Petal, M., Green, R., Wood, M., & Nguyen, A. (2011). *Central United States ShakeOut Survey Report*. Retrieved from: http://www.cusec.org/documents/shakeout/2011_ShakeOut_Participant_Survey.pdf (accessed June 11, 2015).
- Phinney, A., Brill, S., & Ferraro, M. (2004). *Preparedness in America's schools: A comprehensive look at terrorism preparedness in America's twenty largest school districts*. America Prepared Campaign, Incorporated.
- Pine, N. S., Tarrant, R. A., Lyons, A. C., & Leathem, J. M. (2015). Rolling with the shakes: an insight into teenagers' perceptions of recovery after the Canterbury earthquakes. *Kōtuitui: New Zealand Journal of Social Sciences Online*, 10(2), 116-125. <http://dx.doi.org/10.1080/1177083X.2015.1068183>
- Porfiriev, B. N. (1995). Disaster and disaster areas: methodological issues of definition and delineation. *International Journal of Mass Emergencies and Disasters*, 13(3), 285-304.
- Potter, S. H., Becker, J. S., Johnston, D. M., & Rossiter, K. P. (2015). An overview of the impacts of the 2010-2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction*, 14, 6-14. <https://doi.org/10.1016/j.ijdrr.2015.01.014>
- Ramirez, M., Harland, K., Frederick, M., Shepherd, R., Wong, M., & Cavanaugh, J. E. (2013). Listen protect connect for traumatized schoolchildren: a pilot study of psychological first aid. *BMC psychology*, 1(1), 1.
- Ramirez, M., Kubicek, K., Peek-Asa, C. & Wong, M. (2009). Accountability and assessment of emergency drill performance at schools. *Family and Community Health*, 32(2), 105-114. doi: 10.1097/FCH.0b013e3181994662
- Rebmann, T., Elliott, M. B., Artman, D., VanNatta, M., & Wakefield, M. (2015). Missouri K-12 school disaster and biological event preparedness and seasonal influenza vaccination among school nurses. *American journal of infection control*, 43(10), 1028-1034.
- Renwick, J. (2012). *Report of the 2012 What's The Plan Stan survey of New Zealand primary schools*. Department of Internal Affairs, Wellington. Retrieved from: <http://www.civildefence.govt.nz/cdem-sector/public-education/research-and-evaluation/>.

- RiskRED. (2009). *School Disaster Readiness in California: Lessons from the first Great Southern California ShakeOut*. Earthquake Country Alliance, Los Angeles. Retrieved from: <http://www.riskred.org/schools/shakeout2008.pdf>.
- Roberts, L. D., & Allen, P. J. (2015). Exploring ethical issues associated with using online surveys in educational research. *Educational Research and Evaluation, 21*(2), 95-108. <http://dx.doi.org/10.1080/13803611.2015.1024421>
- Ronan, K. (2014). Solving 'wicked problems' linked to disasters, risk and uncertainty-children are truly our future. *Australian Journal of Emergency Management, 29*(1), 8.
- Ronan, K. R., Haynes, K., Towers, B., Alisic, E., Ireland, N., Amri, A. ... & Petal, M. (2016). Child-centred disaster risk reduction: Can disaster resilience programs reduce risk and increase the resilience of children and households?. *Australian Journal of Emergency Management, 31*(3), p. 49.
- Ronan, K.R. & Johnston, D. M. (2005). *Promoting community resilience in disasters: The role for schools, youth and families*. Springer, New York.
- Ronan, K.R. (2015). *Many advances, continuing challenges towards HFA2 and Post-2015: Policy-practice-research summary and recommendations*. Hyogo Framework for Action Thematic Review: Priority for Action 3 – Core Indicator (CI) 2: School curricula, education material and relevant training including disaster risk reduction and recovery concepts and practices. Background Chapter prepared for United Nations Office for Disaster Risk Reduction and the Global Assessment Report on Disaster Risk Reduction, 2015. UNESCO/UNICEF: Paris/Geneva.
- Ronan, K.R., Alisic, E., Towers, B., Johnson, V.A, and Johnston, D.M. (2015). Disaster Preparedness for Children and Families: A Critical Review. *Current Psychiatry Reports, 17*(7), pp. 1-9, DOI: 10.1007/s11920-015-0589-6.
- Ronan, K.R., Crellin, K., & Johnston, D. M. (2012). Community readiness for a new tsunami warning system: quasi-experimental and benchmarking evaluation of a school education component. *Natural hazards, 61*(3), 1411-1425. doi:10.1007/s11069-011-0070-8
- Ronan, K.R., Crellin, K., Johnston, D.M., Finnis, K., Paton, D., & Becker, J. (2008). Promoting Child and Family Resilience to Disasters: Effects, Interventions, and Prevention Effectiveness. *Children, Youth and Environments, 18*(1), 332-353. Retrieved from: <http://www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0332>
- Ronoh, S., Gaillard, J. C., & Marlowe, J. (2015a). Children with disabilities and disaster risk reduction: A review. *International Journal of Disaster Risk Science, 6*(1), 38-48. doi:10.1007/s13753-015-0042-9

- Ronoh, S., Gaillard, J. C., & Marlowe, J. (2015b). Children with disabilities and disaster preparedness: a case study of Christchurch. *Kōtuitui: New Zealand Journal of Social Sciences Online*, 10(2), 91-102. Retrieved from: <http://dx.doi.org/10.1080/1177083X.2015.1068185>
- Sandelowski, M. (2000). Focus on research methods: Whatever happened to qualitative description? *Research in nursing and health*, 23(4), pp. 334-340.
- ShakeOut. (n.d.). *ShakeOut Regions and Current Registration Levels*. Southern California Earthquake Centre, USA. Retrieved from: <http://www.shakeout.org/index.html>.
- Sharpe, D. (2015). Your Chi-Square Test is Statistically Significant: Now What? *Practical Assessment, Research & Evaluation*, 20(8), 2-10. Retrieved from: <http://pareonline.net/getvn.asp?v=20&n=8>
- Shiwaku, K., & Shaw, R. (2016). Introduction: Disaster Risk Reduction and Education System. In *Disaster Resilience of Education Systems* (pp. 1-10). Springer Japan. DOI: 10.1007/978-4-431-55982-5_1
- Shiwaku, K., Ueda, Y., Oikawa, Y., & Shaw, R. (2016). School disaster resilience assessment: an assessment tool. In *Disaster Resilience of Education Systems* (pp. 105-130). Springer Japan. DOI: 10.1007/978-4-431-55982-5_8
- Simons, H. (2009). *Case study research in practice*. SAGE publications.
- Siniscalco, M. T., & Auriat, N. (2005). *Questionnaire design*. Quantitative research methods in educational planning. International Institute for Educational Planning/UNESCO: Paris.
- Smith, S., Kress, T., Fenstemaker, E., Ballard, M., Hyder, G. (2001). Crisis Management Preparedness of School Districts in Three Southern States in the USA. *Safety Science*, 39, 83-92. [http://doi.org/10.1016/S0925-7535\(01\)00028-5](http://doi.org/10.1016/S0925-7535(01)00028-5)
- Statistics New Zealand. (2012). *National Population Estimates: March 2012 quarter*. Department of Statistics, Wellington. Retrieved from: <file:///C:/Users/Jack/Desktop/Downloads/NationalPopulationEstimatesMar12qtrHOTP.pdf>.
- Stuart, K.L., Patterson, L.G., Johnston, D.M., & Peace, R. (2013). Managing temporary school closure due to environmental hazard: Lessons from New Zealand. *Management in Education*, 27(1), 25-31. doi/abs/10.1177/0892020612468928
- Tansey, O. (2007). Process tracing and elite interviewing: a case for non-probability sampling. *PS: Political Science & Politics*, 40(04), 765-772.
- Tarrant, R. (2011a). Leadership through a School Tragedy: A Case Study (Part 1-The First Week). *Australasian Journal of Disaster and Trauma Studies*, 2011(3), 65-

77. Retrieved from: http://trauma.massey.ac.nz/issues/2011-3/AJDTS_2011-3_01_Tarrant.pdf
- Tarrant, R. (2011b). Leadership through a school tragedy: A case study (Part 2-The next two years). *Australasian Journal of Disaster and Trauma Studies*, 2011(3), 77-87. Retrieved from: http://trauma.massey.ac.nz/issues/2011-3/AJDTS_2011-3_02_Tarrant.pdf
- Tarrant, R. (2014). Leadership and Faith in a School Tragedy: A School Principal's Perspective. *Psychology*, 2014. DOI:10.4236/psych.2014.55051
- Tashakkori, A., & Teddlie, C. (2003). *Handbook on mixed methods in the behavioral and social sciences*. Thousand Oaks, CA: Sage
- Taylor, M., & Moeed, A. (2013). The 2010 Canterbury earthquake: curriculum shockwaves. *International Research in Geographical and Environmental Education*, 22(1), 57-70. <http://dx.doi.org/10.1080/10382046.2012.759693>
- Teddlie, C., & Yu, F. (2007). Mixed methods sampling: A typology with examples. *Journal of mixed methods research*, 1(1), 77-100.
- Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2015). Emergency Preparedness in New Zealand Schools: A Summary of Survey Results. *GNS Science Report 2015/48*. 24 p.
- Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2016). New Zealand ShakeOut exercise: Lessons learned by schools. *Disaster Prevention and Management: An International Journal*, 25(4), 550-563. DOI: <http://dx.doi.org/10.1108/DPM-01-2016-0018>
- Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2017a). Are you ready? Emergency preparedness in New Zealand schools. *International Journal of Disaster Risk Reduction*, 25, 324-333. DOI: <https://doi.org/10.1016/j.ijdr.2017.09.035>
- Tipler, K.S., Tarrant, R.A., Tuffin, K.F., & Johnston, D.M. (2017b). Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools. *Australian Journal of Emergency Management*, 32(1), 32-39.
- Tipler, K.S., Tarrant, R.A., Tuffin, K.F., & Johnston, D.M. (2017c). Learning lessons from experience: Emergency response in schools. *Natural Hazards*, 1-21. DOI 10.1007/s11069-017-3094-x
- Trethowan, V., & Nursey, J. (2015). Helping children and adolescents recover from disaster: A review of teacher-based support programs in Victorian schools. *Australian Journal of Emergency Management*, 30(4), 17.

- US Department of Education (Office of Elementary and Secondary Education, Office of Safe and Healthy Students). (2013). *Guide for Developing High-Quality School Emergency Operations Plans*. Washington, DC.
- United Nations Educational, Scientific and Cultural Organization (Institute for Statistics Database). (n.d.). *Education Statistics for year 2012*. Retrieved from: <http://www.uis.unesco.org/Education/Pages/default.aspx>.
- UNICEF. (2011). Children and disasters: Building resilience through education. *Children and disasters: Building resilience through education*. UNICEF; UNISDR, 2011.
- UNISDR (United Nations International Strategy for Disaster Reduction). (2006). *Disaster risk reduction begins at school*. Retrieved from: <http://www.unisdr.org/2007/campaign/wdrc-2006-2007.htm>.
- UNISDR (United Nations International Strategy for Disaster Reduction). (2005a). *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*. Retrieved from: <https://www.unisdr.org/we/coordinate/hfa>.
- UNISDR (United Nations International Strategy for Disaster Reduction). (2005b). *Summary of the Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters (Hyogo Framework)*. Retrieved from: <https://www.unisdr.org/we/inform/publications/8720>
- UNISDR (United Nations International Strategy for Disaster Reduction). (2015a). *Sendai Framework for Disaster Risk Reduction 2015-2030*. Retrieved from: <http://www.unisdr.org/we/inform/publications/43291>.
- UNISDR (United Nations International Strategy for Disaster Reduction). (2015b). *Chart of the Sendai Framework for Disaster Risk Reduction 2015-2030*. Retrieved from: <http://www.preventionweb.net/publications/view/44983>
- US Government Accountability Office. (2007). *Most School Districts Have Developed Emergency Management Plans, but Would Benefit from Additional Federal Guidance*. GAO-07-609. Government Accountability Office.
- Weber, J. A., & Bradley, K. D. (2006). Strengths and weaknesses of conducting web-based surveys: A review of the literature. In *Mid-Western Educational Research Association annual meeting*.
- WREMO (Wellington Region Emergency Management Office). (2014). *Community Resilience Strategy (2nd Edition)*. Wellington, New Zealand.
- Werner, D. (2014). Are school social workers prepared for a major school crisis? Indicators of individual and school environment preparedness. *Children & Schools*, cdu031.

- Wood, M. & M., Glik, D. (2013). *Engaging Californians in a Shared Vision for Resiliency: Practical Lessons Learned from the Great California ShakeOut*. California. Retrieved from: http://www.seismic.ca.gov/pub/CSSC_13-02_ShakeOutRecommendations.pdf (accessed November 2, 2015).
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Zantal-Wiener, K., & Horwood, T. J. (2010). Logic modeling as a tool to prepare to evaluate disaster and emergency preparedness, response, and recovery in schools. *New Directions for Evaluation*, 2010(126), 51-64. DOI: 10.1002/ev.329
- Zhe, E. J., & Nickerson, A. B. (2007). The effects of an intruder crisis drill on children's self-perceptions of anxiety, school safety, and knowledge. *School Psychology Review*, 36, 501-508.

Appendices

Appendix 1: Study 1 – Emergency Preparedness in Schools

Appendix 2: Study 2 – Emergency management requirements and expectations of schools

Appendix 3: Study 3 – Emergency response in schools

Appendix 4: Statement of Contribution sheets for submitted journal papers

Appendix 5: Additional relevant reports

Appendix 1: Study 1 – Emergency Preparedness in Schools

- New Zealand ShakeOut school participation survey

- Low risk ethics approval

New Zealand ShakeOut school participation survey

New Zealand ShakeOut Earthquake Drill School Participation

1. ABOUT THIS SURVEY

Massey University and GNS Science are carrying out a survey of school participation in the New Zealand ShakeOut earthquake drill. The aim is to improve future New Zealand ShakeOut drills and also provide information about emergency preparedness in New Zealand schools.

The first part of the survey will collect feedback about your school's experience of the New Zealand ShakeOut earthquake drill with the aim of improving future ShakeOut drills. The second part of the survey will gather information about current emergency preparedness practices in schools with the aim of identifying areas where assistance may be required to better support schools in their future preparedness efforts.

The survey will be available between September 27th and October 21st and will take between 15 and 20 minutes to complete. Participation in the survey is voluntary and any identifying information you provide will only be available to the researchers identified below and will not be included in any published reports. You are under no obligation to complete this survey. If you decide to participate, you have the right to:

- * decline to answer any particular question;
- * withdraw from the study at any time before the results are sent for publication;
- * ask any questions about the study at any time during participation;
- * provide information on the understanding that the name of your school will only be used for regional comparisons;
- * be given access to a summary of the project findings when it is concluded.

You can move through the survey using the "prev" and "next" prompts at the bottom of each page. Your survey will be submitted once you have selected the "done" prompt on the final page.

If you have any questions or comments about this survey, please feel free to contact: Karlene Tipler, Ph: 04 801 5799 ext 62552, email: K.S.Tipler@massey.ac.nz or Dr Ruth Tarrant, Ph: 04 801 5799 Ext 6754, email: R.A.Tarrant@massey.ac.nz.

*This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researchers, please contact Professor John O'Neill, Director (Research Ethics), telephone 06 350 5249, email humanethics@massey.ac.nz.

Thank you.

2. SURVEY REFUSAL

1. Would you like to proceed with the survey?

- Yes, I would like to proceed to the survey
- No, I do not want to complete the survey

3. DESCRIPTIVE INFORMATION

This section asks some basic information about your school.

New Zealand ShakeOut Earthquake Drill School Participation

2. Approximate numbers in our school:

Management

Teachers

Students

All other staff

3. School type: (please select the school type you identify with the most)

- Full primary school (Years 1-8) Secondary school (Years 9-13)
- Contributing primary (Years 1-6) Composite school (Years 1-13)
- Intermediate school (Years 7-8) Te kura kaupapa Maori
- Secondary school with intermediate (Years 7-13)

Other (please specify)

4. School decile: (optional)

5. School name: (optional - this will remain confidential and will be used for regional comparison only)

4. SHAKEOUT DRILL PARTICIPATION

The following questions are about the participation of your school in the New Zealand ShakeOut earthquake drill.

6. In our school the following people participated in the New Zealand ShakeOut earthquake drill: (select all that apply)

- Staff Students or staff with disabilities
- Students Parents

Other (please specify)

New Zealand ShakeOut Earthquake Drill School Participation

7. Our school participated in the New Zealand ShakeOut earthquake drill in the following ways: (select all that apply)

- Drop, cover, hold
- School evacuation (i.e., parents collected their children)
- Building evacuation
- Full simulation exercise (which included one or more outside agencies e.g., civil defence, police, fire)

Other (please specify)

SHAKEOUT DRILL PARTICIPATION

8. Our school's performance of the New Zealand ShakeOut earthquake drill elements: (select one response in each row)

	Excellent	Very good	Good	Fair	Poor	Not practiced
Emergency 'alert' systems were appropriate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participants adopted the "drop, cover, hold" position during the drill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participants safely evacuated the building in a quiet and orderly manner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participants assembled promptly in a safe area outside following the building evacuation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participants moved to higher ground in case of a "tsunami"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
All participants were accounted for in the assembly area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staff provided leadership to students and each other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Procedures for family reunification were followed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

SHAKEOUT DRILL PARTICIPATION

New Zealand ShakeOut Earthquake Drill School Participation

9. Our school used the following resources for our New Zealand ShakeOut earthquake drill: (select all that apply)

- | | |
|---|--|
| <input type="checkbox"/> Resources from the ShakeOut website | <input type="checkbox"/> Ministry of Education guidelines or templates |
| <input type="checkbox"/> Civil defence 'sting' to begin the drill | <input type="checkbox"/> None - we did not use any resources |
| <input type="checkbox"/> "What's the plan Stan?" educational resource | |

Other (please specify)

10. Our school did (or will) evaluate the New Zealand ShakeOut earthquake drill in the following ways: (select all that apply)

- | | |
|---|---|
| <input type="checkbox"/> Written report | <input type="checkbox"/> In classroom with students |
| <input type="checkbox"/> "What's the plan Stan?" evaluation forms | <input type="checkbox"/> We are not planning to evaluate the ShakeOut drill |
| <input type="checkbox"/> In a staff meeting | |

Other (please specify)

SHAKEOUT DRILL PARTICIPATION

11. Our top three (3) lessons learned during the New Zealand ShakeOut earthquake drill were:

1.
2.
3.

12. Any other comments or suggestions regarding the New Zealand ShakeOut earthquake drill:

Thank you for completing the New Zealand ShakeOut earthquake drill participation section of the survey.

The next page has some questions about school emergency preparedness activities.

New Zealand ShakeOut Earthquake Drill School Participation

13. Are you willing to answer the additional preparedness questions for your school?

- Yes, I will answer the preparedness questions.
- No, thank you.

5. SCHOOL PREPAREDNESS

The following questions are about emergency preparedness in your school.

14. Our school has taken the following physical protection measures against earthquakes and other hazards: (select all that apply)

- We know the state of school buildings with regard to earthquake risk
- All or most tall or heavy furnishings and equipment are secured to wall studs
- Exit routes have signage and are kept clear
- Emergency equipment is in place and maintained regularly

Other (please specify)

SCHOOL PREPAREDNESS

15. Our school has taken the following assessment and planning measures against earthquakes and other hazards (select all that apply)

- Developed an emergency response plan
- Identified the roles and responsibilities of staff in an emergency
- Established communication plans in the case of an emergency
- Established plans for continuity of school operations after an emergency
- Developed site and neighbourhood maps that identify evacuation routes and locations (e.g., in case of tsunami)
- Identified and planned for the needs of staff or students with disabilities
- Ensured staff members are aware that they may be asked to remain at school to supervise children who cannot be collected after an emergency or disaster event
- Identified individual staff who may need to be released in advance of other staff
- Ensured all staff and parents are familiar with the school's emergency plan
- Ensured all staff and parents are familiar with the school's student release procedures

Other (please specify)

New Zealand ShakeOut Earthquake Drill School Participation

SCHOOL PREPAREDNESS

16. Our school has taken the following measures to develop response skills and provisions against earthquakes and other hazards: (select all that apply)

- Staff and students are encouraged to prepare at home
- Support material has been provided to staff and students about preparing for disasters at home
- First aid training has been provided to all or some staff
- Psychological first aid or crisis counselling has been provided to all or some staff
- Classroom teaching on disaster preparedness is provided to students every year
- Emergency 'grab bags/get away kits' are available in each work area and/or classroom
- Emergency supplies (e.g., food, water, shelter) are provided for staff and students who must remain at school after an emergency or disaster event
- We have discussed with civil defence our role (if any) as a civil defence centre or a community emergency shelter
- We invite emergency preparedness professionals (i.e., civil defence, police, fire) into our school annually
- We link our emergency preparedness programmes to other community initiatives

Other (please specify)

SCHOOL PREPAREDNESS

17. Our school involves parents in learning about our emergency plans and drills by: (select all that apply)

- Requiring parents to update emergency contact information at the beginning of each school year or more often
- Practising family reunification procedures during emergency drills at least once a year
- Encouraging parent participation in hazard education programmes and homework activities
- Discussing emergency plans in parent teacher meetings
- Social media messages (e.g., Facebook, Twitter, school website) or texting prior to emergency drills
- Regular updates in school newsletters
- We do not involve parents in our emergency plans or drills

Other (please specify)

SCHOOL PREPAREDNESS

New Zealand ShakeOut Earthquake Drill School Participation

**18. Our school participates in the following types of emergency drills:
(select one response in each row)**

	Every term	More than once per year	Annually	Every few years	Never
Fire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earthquake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tsunami evacuation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tornado or severe weather	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lockdown or shelter in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family reunification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Full simulation including outside emergency response agencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

SCHOOL PREPAREDNESS

**19. Our school evaluates our emergency preparedness efforts (i.e., planning, hazard education, emergency drills) in the following ways:
(select all that apply)**

- Written report
- "What's the plan Stan?" evaluation forms
- In staff meetings
- In classrooms with students
- Outside observers (e.g., civil defence)
- Feedback from parents
- We do not evaluate our emergency preparedness

Other (please specify)

SCHOOL PREPAREDNESS

New Zealand ShakeOut Earthquake Drill School Participation

20. Our school has had the following emergencies in the last three (3) years: (select all that apply)

- Fire
- Earthquake
- Weather related emergency
- Violence or bomb threat
- Temporary school closure
- Serious injury involving staff or students
- Death involving staff or students (on campus/fieldtrips)
- Death involving staff or students (off campus/out of school hours)

Other emergencies (please specify). Please add any other comments you have about emergency preparedness in your school in this space.

6. THANK YOU

Thank you very much for your time.

By sharing your experiences you have played a part in improving future New Zealand ShakeOut earthquake drills and contributed to a better understanding of emergency preparedness in schools.

We hope that participation in this survey may also assist you in your future school preparedness efforts.

Group results (no school will be named) from this survey will be available when the analysis is complete. It is expected that the results will be available from the end of June 2013 and can be accessed on the Joint Centre for Disaster Research website (<http://disasters.massey.ac.nz>) or by emailing me directly at K.S.Tipler@massey.ac.nz after that date.

If your school would be interested in participating in any additional studies investigating how schools prepare for or respond to emergency events please feel free to email me at the address above.

Low risk ethics approval



MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA

29 August 2012

Karlene Tipler
6 The Marlinspike
Whitby
PORIRUA 5024

Dear Karlene

Re: Preparedness for and Response to Emergency Events in New Zealand Schools: Implications for Future Preparedness and Response Activities

Thank you for your Low Risk Notification which was received on 21 August 2012.

Your project has been recorded on the Low Risk Database which is reported in the Annual Report of the Massey University Human Ethics Committees.

The low risk notification for this project is valid for a maximum of three years.

Please notify me if situations subsequently occur which cause you to reconsider your initial ethical analysis that it is safe to proceed without approval by one of the University's Human Ethics Committees.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents:

"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor John O'Neill, Director (Research Ethics), telephone 06 350 5249, e-mail humanethics@massey.ac.nz".

Please note that if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to provide a full application to one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely

A handwritten signature in black ink that reads "J. O'Neill".

John G O'Neill (Professor)
**Chair, Human Ethics Chairs' Committee and
Director (Research Ethics)**

cc Dr Ruth Tarrant
School of Psychology
Wellington

Assoc Prof Mandy Morgan, HoS
School of Psychology
PN320

Massey University Human Ethics Committee
Accredited by the Health Research Council

Research Ethics Office, Massey University, Private Bag 11222, Palmerston North 4442, New Zealand
T +64 6 350 5573 +64 6 350 5575 F +64 6 350 5622
E humanethics@massey.ac.nz animaethics@massey.ac.nz gtc@massey.ac.nz
www.massey.ac.nz

Appendix 2: Study 2 – Emergency management requirements and expectations of schools

- High risk ethics approval
- Emergency management practitioner invitation
- Emergency management practitioner participant information sheet
- Emergency management practitioner consent form
- Emergency management practitioner interview guide

High risk ethics approval



MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA

3 September 2015

Karlene Tipler
6 The Marlinspike
Whitby
PORIRUA 5024

Dear Karlene

Re: HEC: Southern B Application – 15/53
Emergency management in schools: Preparing for and responding to emergency events

Thank you for your letter dated 3 September 2015.

On behalf of the Massey University Human Ethics Committee: Southern B I am pleased to advise you that the ethics of your application are now approved. Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

A handwritten signature in black ink, appearing to be 'Rochelle Stewart-Withers'.

Dr Rochelle Stewart-Withers, Chair
Massey University Human Ethics Committee: Southern B

cc Dr Ruth Tarrant
School of Psychology
WELLINGTON

Dr Keith Tuffin
School of Psychology
WELLINGTON

Prof David Johnston
JCDR
WELLINGTON

Prof James Liu, HoS
School of Psychology
PN320

Massey University Human Ethics Committee
Accredited by the Health Research Council

Research Ethics, Research and Enterprise

Massey University, Private Bag 11222, Palmerston North 4442, New Zealand. T 06 351 6941; 06 351 6848
E humanethics@massey.ac.nz; animalethics@massey.ac.nz; pe@massey.ac.nz; www.massey.ac.nz

Emergency management practitioner invitation



SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Tena koe _____,

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have worked part time for a year in the Wellington City Council emergency management office.

I am writing to invite you to participate in a study which aims to clarify the statutory requirements and practitioner expectations of emergency management in New Zealand schools.

This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The data collected in this study will be combined with the results from a prior survey conducted about school preparedness, in particular the 2012 ShakeOut earthquake drill, and case studies examining emergency response experiences to provide an overall perspective of emergency management in schools. The combined findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

Your knowledge and experience will contribute to an understanding of requirements and practice of school-based emergency management in New Zealand. I have included an information sheet explaining the research and your rights as a participant.

Thank you for your time and consideration. If you would like to participate in this study would you please complete the enclosed consent form and return it to me in the reply-paid envelope. I will then contact you to arrange a suitable time and place for our interview.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:
R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Emergency management practitioner participant information sheet



SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Tena koe _____,

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have worked part time for a year in the Wellington City Council emergency management office.

What is the research about?

New Zealand schools have a responsibility to ensure the safety of the children in their care during an emergency. The 2010-2011 Canterbury earthquakes reinforced the importance of all schools being adequately prepared to respond to a range of small and large scale emergency events. To that end, this study aims to clarify the requirements and expectations for schools by interviewing two emergency management practitioners responsible for engaging and supporting schools in their emergency preparedness and response activities. Your knowledge and experience will provide a [*national/regional*] perspective of school-based emergency management. The findings of this research will assist in establishing emergency response best practice guidelines for schools and suggest priorities for future emergency preparedness efforts.

What will the participants be asked to do?

Your participation would involve a recorded interview that will take approximately an hour. I am interested in [*MinEdu / WREMO*] perspective on three main themes:

- What emergency preparedness activities should schools undertake?
- How do [*MinEdu / WREMO*] monitor existing preparedness activities schools are already undertaking?

- How can [*MinEdu / WREMO*] help schools prepare for and respond to emergencies?

The information collected will be used to develop a detailed understanding of emergency management requirements and expectations in schools from the perspectives of emergency management practitioners.

What will happen to the data collected?

After the interview the recordings will be transcribed. A copy of the transcript will be provided to you so you can check that you are satisfied with the accuracy and content. At the conclusion of the study (expected finish date June 2016), I will send you a summary of the study findings. In addition, a summary of findings from the research will also be accessible on the Joint Centre for Disaster Research website (www.massey.ac.nz/massey/learning/departments/school-of-psychology/research/disaster-research/publications-and-research-updates/publications-and-research-updates_home.cfm).

All information collected will be stored securely to ensure the safety of the data and your confidentiality. As required by the Massey University Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants, all data will be destroyed five years after the completion of the research.

What are my rights as a participant?

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question;
- Ask for the recorder to be turned off at any time during the interview;
- Withdraw from the study before the results are sent for publication;
- Ask any questions about the study at any time during participation;
- Be given access to a summary of the study findings when it is concluded; and
- Your responses remaining confidential to the researcher and her supervisor. The [*MinEdu/WREMO*] will be named in the study only as a resource for school-based emergency management efforts. However, neither you personally nor your specific role will be identifiable and you will be referred to by a pseudonym.

In appreciation for your time and contribution to this study you will receive a \$20 petrol voucher.

Thank you for your time and consideration.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:

R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email

Emergency management practitioner consent form



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

I have read the Emergency Management Practitioner Participant Information Sheet and have had the details of the study fully explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

As a participant in this research I understand that:

- I am free to withdraw from the study at any time without any disadvantage;
- I may decline to answer any particular questions;
- I will participate in an interview with the researcher and that the interview will be recorded and transcribed;
- A copy of the interview transcription will be provided to me so I can check I am satisfied with the accuracy and content; and
- Anything I say will remain confidential to the researcher and her supervisor. My employer will be named in the study only as a resource for school-based emergency management efforts. However, neither I nor my specific role will be identifiable. I will be referred to by a pseudonym.

The study has ethical approval from the Massey University Human Ethics Committee (Application 15/53).

I agree to participate in this study under the conditions set out above and in the Emergency Management Practitioner Participant Information Sheet.

[MINEDU / WREMO]

Full Name (printed)

Signature **Date:**

Email

Phone number

Emergency management practitioner interview guides

Ministry Of Education

Introductions

- Hi _____, thank you very much for agreeing to meet with me ☺
- Before we begin the interview, I just wanted to check whether you had any questions?

Background

Great, let's begin with a little background...

- Can I get you to introduce yourself including your role (confidential) and time in that role.
- How would you describe your interactions with schools?

Statutory Requirements & Expectations

Thank you, I would now like to ask you about the statutory requirements for schools...

From my own experience both as an academic and as a practitioner working directly with schools, I have found that schools in NZ and internationally seem to be unclear about what preparedness activities they are required to undertake...

- In an effort to clarify what schools should be doing can you explain to me what legislative requirements schools need to meet?
- I have identified five pieces of legislation that have a connection to school-based emergency management, would you like to comment on these? [legislation summary sheet]
- Is there any other relevant legislation or statutory requirements that I should be aware of?
- Do schools have any specific reporting requirements associated with their statutory obligations?
- Are schools monitored in any way to ensure they are complying with the statutory requirements?

Resources & Support For Schools

Thank you, having discussed the statutory requirements of schools I would now like to ask you about the resources & support available to assist schools...

- What resources are available to assist schools with their emergency preparedness efforts?
- What support is available to assist schools when preparing for or responding to an emergency?

Current Practices

Thank you, having identified what schools should be doing and the assistance available to them I would now like to ask you about current emergency management practices in schools...

- How would you describe the current state of emergency preparedness in NZ schools?
- What are schools doing?
- What are schools not doing?
- Why do you think some schools may be reluctant or unwilling to undertake emergency preparedness activities?

Advice To Schools

Thank you, now I would like you to consider the experiences of your colleagues and your own expert opinion...

- In addition to the legislative requirements you have discussed, what other emergency management activities would you recommend schools undertake?
- What advice would you give to schools to help improve their overall emergency management efforts?
- Do you have any suggestions on how schools can engage with their stakeholders?
Staff – Students – Families - EM practitioners – Māori / Iwi

Any Last Thoughts

Thank you; I just need a moment to see if we have covered everything...

- Is there anything about school-based emergency management that I should have asked you and didn't?
- Is there anything else about emergency management in schools that you would like to comment on?
- Do you have any other questions about the interview or the research?

Conclusion Of Interview...

Thank you very much for your time, you have given me a lot to think about, if I have any follow up questions can I contact you by email?

- I will transcribe the interview and send you a copy to review.
- I will also send you a summary of the findings at the end of the study...
- Here is a list of agencies that can offer advice and support about coping with emergencies.
- In appreciation for your time and contribution to this study here is a \$20 petrol voucher.

Wellington Regional Emergency Management Office

Introductions

- Hi _____, thanks heaps for agreeing to meet with me ☺
- Before we begin the interview, I just wanted to check whether you had any questions?
- Ok, can I get you to introduce yourself including your role (confidential) and time in that role.

Background

Great, let's begin with a little background...

- How big an area do WREMO's responsibilities cover?
- How many schools are in that area?
- How would you describe the current state of emergency management in Wellington schools?
- Do you know how this would compare to schools in other regions?

Engaging With Schools

Now I would like to ask you about WREMO's engagement with schools...

- How much of a priority is school emergency management to WREMO? Reasons for this?
- How do WREMO personnel interact and engage with schools about EM?
- What would you consider to be the minimum emergency management activities schools should undertake?
- Do you have any suggestions on how schools can engage with their stakeholders?
Staff – Students – Families - EM practitioners – Māori

Resources & Support For Schools

Having discussed WREMO's engagement with schools I would now like to know about the resources & support available to assist schools...

- What resources are available to schools to assist with emergency preparedness?
WREMO & others
- What support is available to assist schools when responding to an emergency event? WREMO & others

Advice To Schools

Now I would like you to consider the experiences of your colleagues and your own expert opinion...

- What advice would you give to schools to improve their emergency management efforts?

Any Last Thoughts

Finally, I just need a moment to see if we have covered everything...

- Is there anything about school-based emergency management that I should have asked you and didn't?
- Is there anything else about emergency management in schools that you would like to comment on?
- Great, you have given me a lot to think about, if I have any follow up questions can I contact you by email?

Conclusion of Interview...

Thank you very much for your time.

I will transcribe the interview and send you a copy to review.

I will also send you a summary of the findings at the end of the study...

- Do you have any other questions about the interview or the research?

Here is a list of agencies that can offer advice and support about copying with emergencies.

In appreciation for your time and contribution to this study here is a \$20 petrol voucher.

Appendix 3: Study 3 – Emergency response in schools

- Case study school invitation
- Case study school information sheet
- Case study school consent form

- Principal invitation
- Principal information sheet
- Principal consent form

- Staff invitation
- Staff information sheet
- Staff consent form

- Parent invitation
- Parent information sheet
- Parent consent form

- Principal interview guide
- Administration / Office staff interview guide
- Teacher interview guide
- Parent interview guide

Case study school invitation



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Tena koe (___*principal's name*___) and Board of Trustees

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have a particular interest in how schools manage emergencies.

I am writing to invite you and your school to participate in a study exploring how New Zealand schools respond to different emergency events.

This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The data collected in this study will be combined with the results from a prior survey conducted about school preparedness, in particular the 2012 ShakeOut earthquake drill, and discussions with emergency management practitioners from the Ministry of Education and the Wellington Regional Emergency Management Office. The collective findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

If you agree to participate, yours will be one of three case study schools in the Wellington region sharing their experiences of different emergency events. Having three case study schools allows different emergency events to be examined within the same study, such as the [**emergency event**] experienced by your school and the [**emergency event**] experienced by other schools in the Wellington region.

Overall, the study aims to gather a variety of perspectives to help develop a deeper understanding of the emergency response experiences of schools. Each case study will combine interviews with school principals, staff and caregivers. Therefore, in addition to interviewing you, I would also like to interview three staff members who had

specific roles during the emergency response (e.g., office manager/administrator, classroom teacher, senior teacher, member of the management team, counsellor, or caretaker) and two caregivers that had children attending the school at the time of the [**emergency event**]. Interviews will be conducted in English. Therefore any participants will need to have sufficient command of English to allow them to fully engage in the interview process.

Each participant will be asked to share their experiences of the [**emergency event**] that affected your school. In particular, I am keen learn about how your school responded to the [**emergency event**] including: prior planning, preparation and training; how the [**emergency event**] unfolded for your school; any lessons you learned from your experience; and any advice you have for other schools and families that may be in a similar situation in the future. These experiences will assist in establishing a more comprehensive picture of emergency response actions in New Zealand schools.

With your permission, I would also like to look at any school emergency management documents or reports related to the [**emergency event**] event (e.g., emergency response plans, post-emergency evaluations, MinEdu reporting requirements). Looking at these documents will ultimately assist in our understanding of the kind of reporting methods schools use (formal and informal), and will help to identify any lessons that can be learnt from your experience.

What next...?

If you are willing to allow your school to participate in this study would you please complete the enclosed Case Study School Consent Form and return it to me in the reply-paid envelope. I will then contact you to arrange a suitable time to conduct the case study in your school.

In order to facilitate the identification of potential study participants, could you please provide the names and contact details of three staff members and two caregivers that are willing to be contacted by me about participating in the study.

For your information, I have enclosed copies of the invitations, information sheets and consent forms that I will send to all the study participants, including yourself, if you approve of your school taking part in the study.

Thank you for your time and consideration of this study and invitation to participate.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:
R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Case study school information sheet



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have a particular interest in how schools manage emergencies.

What is the research about?

New Zealand schools have a responsibility to ensure the safety of the children in their care during an emergency. The 2010-2011 Canterbury earthquakes reinforced the importance of all schools being adequately prepared to respond to a range of small and large scale emergency events. This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The data collected in this study will be combined with the results from a prior survey conducted about school preparedness, in particular the 2012 ShakeOut earthquake drill, and discussions with emergency management practitioners from the Ministry of Education and the Wellington Regional Emergency Management Office. The collective findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

What will the participants be asked to do?

You as principal, three staff members, and two caregivers will be asked to share your experiences of the [**emergency event**]. The information provided will be used to develop an understanding of how your school responded to the [**emergency event**]. A particular focus of the study will be any lessons your school learnt from the [**emergency event**], and how your school's experiences can assist in providing advice to other schools and families responding to similar types of emergencies in the future.

What will happen to the data collected?

After the interview the recordings will be transcribed. A copy of each participant's transcript will be returned to them to review and ensure they are satisfied with the accuracy and content. At the conclusion of the study (expected finish date June 2016), I will send each participant a summary of the findings for the study. Neither participants nor the school will be identifiable in any write-ups or oral presentations of the study findings. In addition, a summary of the results from the study will also be accessible on the Joint Centre for Disaster Research website

(www.massey.ac.nz/massey/learning/departments/school-of-psychology/research/disaster-research/publications-and-research-updates/publications-and-research-updates_home.cfm).

All information collected will be stored securely to ensure the safety of the data and your confidentiality. All data will be destroyed five years after the completion of the research as required by the Massey University Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants.

What are the rights of participants?

No participant is under any obligation to accept the invitation to be part of the study. Anyone who agrees to participate will have the right to:

- Decline to answer any particular question;
- Ask for the recorder to be turned off at any time during the interview;
- Withdraw from the study up to 14 days after you have received your interview transcript;
- Ask any questions about the study at any time during participation;
- Be given access to a summary of the study findings when it is concluded; and
- Know that their responses will remain confidential to the researcher and her supervisor and will not be shared with any other participants in the study.

In appreciation for the time and contribution participants make to the study each will receive a \$20 petrol voucher.

Thank you for your time and consideration.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:
R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Case study school consent form



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

I have read the Case Study School Information Sheet and have had the details of the study fully explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree / do not agree to allow the researcher to conduct interviews with: myself as principal or a designated representative; three staff members; and two parents/caregivers.

I agree / do not agree to allow the researcher to read any school documents related to the [**emergency event**] that I choose to make available to her.

I agree / do not agree to allow the researcher to copy any particular documents that I approve for copying.

I agree, on behalf of name of school, to participate in this study under the conditions set out above and in the Case Study School Information Sheet.

The study has ethical approval from the Massey University Human Ethics Committee (Application 15/53).

[__ CASE STUDY SCHOOL [A, B, C]__]

Signature Date:

Full Name (printed)

Email Phone:

Principal invitation



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Kia ora (__principal's name__),

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have a particular interest in how schools manage emergencies.

I would like to invite you to participate in a study exploring how New Zealand schools respond to different emergency events, to gain your perspective in your role as school principal during the [**emergency event**].

This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The combined findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

If you agree to participate, you will be asked to share your experiences of the [**emergency event**] that affected your school in an interview, lasting no more than 60 minutes. In particular, I am keen to learn about how you responded to the [**emergency event**]; any lessons you learned from your experience; and any advice you have for principals in other schools that may be in a similar situation in the future. These experiences will assist in establishing a more comprehensive understanding of emergency response requirements in New Zealand schools.

To further explain the study I have included an information sheet about the research and your rights as a participant, and also a copy of the consent form you will be asked to sign before the interview. In appreciation for your time and contribution to this study you will receive a \$20 petrol voucher.

What next...?

If you are willing to participate in this study would you please complete the enclosed consent form and return it to me in the reply-paid envelope. I will then contact you to arrange a suitable time and place for our interview.

[If participant contacted by email the above will instead read – “If you are willing to participate in this study would you please reply to this email or contact me on the number below to arrange a suitable time for our interview.”]

Thank you for your time and consideration of this study and invitation to participate.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:

R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Principal information sheet



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Kia ora (principal's name),

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have a particular interest in how schools manage emergencies.

What is the research about?

New Zealand schools have a responsibility to ensure the safety of the children in their care during an emergency. The 2010-2011 Canterbury earthquakes reinforced the importance of all schools being adequately prepared to respond to a range of small and large scale emergency events. This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The data collected in this study will be combined with the results from a prior survey conducted about school preparedness, in particular the 2012 ShakeOut earthquake drill, and discussions with emergency management practitioners from the Ministry of Education and the Wellington Regional Emergency Management Office. The collective findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

What will the participants be asked to do?

Your participation would involve a recorded interview that will take up to 60 minutes. You will be asked to share your experiences of the [**emergency event**]. The information you provide will be used to develop an understanding of how your school responded to the [**emergency event**]. A particular focus of the study will be the any lessons you have learnt from the [**emergency event**], and how your experience can assist in providing advice to other schools responding to similar types of emergencies in the future.

What will happen to the data collected?

After the interview the recordings will be transcribed. A copy of the transcription will be provided to you so you can check that you are satisfied with the accuracy and content. At the conclusion of the study (expected finish date June 2016), I will send you a summary of the findings for the study. You will not be identifiable in any write-ups or oral presentations of the study findings. In addition, a summary of the results from the study will also be accessible on the Joint Centre for Disaster Research website (www.massey.ac.nz/massey/learning/departments/school-of-psychology/research/disaster-research/publications-and-research-updates/publications-and-research-updates_home.cfm).

All information collected will be stored securely to ensure the safety of the data and your confidentiality. All data will be destroyed five years after the completion of the research as required by the Massey University Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants.

What are my rights as a participant?

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question;
- Ask for the recorder to be turned off at any time during the interview;
- Withdraw from the study up to 14 days after you have received your interview transcript;
- Ask any questions about the study at any time during participation;
- Be given access to a summary of the study findings when it is concluded; and
- Your responses remaining confidential to the researcher and her supervisor. Other participants may know about your involvement in the study. However, what you say in the interview will remain confidential.

In appreciation for your time and contribution to this study you will receive a \$20 petrol voucher.

Thank you for your time and consideration.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:

R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Principal consent form



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

I have read the School Principal Participant Information Sheet and have had the details of the study fully explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree / do not agree to the interview being sound recorded.

I wish / do not wish to have my recordings returned to me.

I agree to participate in this study under the conditions set out above and in the School Principal Participant Information Sheet.

The study has ethical approval from the Massey University Human Ethics Committee (Application 15/53).

[__ CASE STUDY SCHOOL [A, B, C]__]

Signature Date:

Full Name (printed)

Email Phone:

Staff invitation



SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Kia ora (*__participant's name__*),

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have a particular interest in how schools manage emergencies.

Principal _____ gave me your name as a possible study participant. I would like to invite you to participate in a study exploring how New Zealand schools respond to different emergency events, as I understand you were on the school staff during the [**emergency event**].

This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The combined findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

If you agree to participate, you will be asked to share your experiences of the [**emergency event**] that affected your school in an interview, lasting 20-30 minutes. In particular, I am keen to learn about how you responded to the [**emergency event**]; any lessons you learned from your experience; and any advice you have for staff in other schools that may be in a similar situation in the future. These experiences will assist in establishing a more comprehensive understanding of emergency response requirements in New Zealand schools.

To further explain the study I have included an information sheet about the research and your rights as a participant, and also a copy of the consent form you will be asked

to sign before the interview. In appreciation for your time and contribution to this study you will receive a \$20 petrol voucher.

What next...?

If you are willing to participate in this study would you please complete the enclosed consent form and return it to me in the reply-paid envelope. I will then contact you to arrange a suitable time and place for our interview.

[If participant contacted by email the above will instead read – “If you are willing to participate in this study would you please reply to this email or contact me on the number below to arrange a suitable time for our interview.”]

Thank you for your time and consideration of this study and invitation to participate.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:

R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Staff information sheet



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Kia ora (participant's name),

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have a particular interest in how schools manage emergencies.

What is the research about?

New Zealand schools have a responsibility to ensure the safety of the children in their care during an emergency. The 2010-2011 Canterbury earthquakes reinforced the importance of all schools being adequately prepared to respond to a range of small and large scale emergency events. This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The data collected in this study will be combined with the results from a prior survey conducted about school preparedness, in particular the 2012 ShakeOut earthquake drill, and discussions with emergency management practitioners from the Ministry of Education and the Wellington Regional Emergency Management Office. The collective findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

What will the participants be asked to do?

Your participation would involve a recorded interview that will take 20-30 minutes. You will be asked to share your experiences of the [**emergency event**]. The information you provide will be used to develop an understanding of how your school responded to the [**emergency event**]. A particular focus of the study will be any lessons you have learnt from the [**emergency event**], and how your experience can assist in providing advice to other schools responding to similar types of emergencies in the future.

What will happen to the data collected?

After the interview the recordings will be transcribed. A copy of the transcription will be provided to you so you can check that you are satisfied with the accuracy and content. At the conclusion of the study (expected finish date June 2016), I will send you a summary of the findings for the study. You will not be identifiable in any write-ups or oral presentations of the study findings. In addition, a summary of the results from the study will also be accessible on the Joint Centre for Disaster Research website (www.massey.ac.nz/massey/learning/departments/school-of-psychology/research/disaster-research/publications-and-research-updates/publications-and-research-updates_home.cfm).

All information collected will be stored securely to ensure the safety of the data and your confidentiality. All data will be destroyed five years after the completion of the research as required by the Massey University Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants.

What are my rights as a participant?

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question;
- Ask for the recorder to be turned off at any time during the interview;
- Withdraw from the study up to 14 days after you have received your interview transcript;
- Ask any questions about the study at any time during participation;
- Be given access to a summary of the study findings when it is concluded; and
- Your responses remaining confidential to the researcher and her supervisor. The principal has given permission for access to the school site and thus may know about your involvement in the study. However, what you say in the interview will remain confidential.

In appreciation for your time and contribution to this study you will receive a \$20 petrol voucher.

Thank you for your time and consideration.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:
R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Staff consent form



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

I have read the School Staff Participant Information Sheet and have had the details of the study fully explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree / do not agree to the interview being sound recorded.

I wish / do not wish to have my recordings returned to me.

I agree to participate in this study under the conditions set out above and in the School Staff Participant Information Sheet.

The study has ethical approval from the Massey University Human Ethics Committee (Application 15/53).

[CASE STUDY SCHOOL [A, B, C]]

Signature

Date:

Full Name (printed)

Email

Phone:

Parent invitation



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Kia ora (__*participant's name*__),

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have a particular interest in how schools manage emergencies.

Principal _____ gave me your name as a possible study participant. Therefore, I would like to invite you to participate in a study exploring how schools respond to different emergency events, as I understand you had a child at the school at the time of the [**emergency event**].

This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The combined findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

If you agree to participate, you will be asked to share your experiences of the [**emergency event**] that affected your child's school in an interview, lasting 20-30 minutes. In particular, I am keen to learn about how you as a caregiver found the school's response to the [**emergency event**], any lessons you and your family learned from your experience; and any advice you have for other families that may be in a similar situation in the future. These experiences will assist in establishing a better understanding of emergency response requirements in New Zealand schools.

To further explain the study I have included an information sheet about the research and your rights as a participant, and also a copy of the consent form you will be asked to sign before the interview. In appreciation for your time and contribution to this study you will receive a \$20 petrol voucher.

What next...?

If you are willing to participate in this study would you please complete the enclosed consent form and return it to me in the reply-paid envelope. I will then contact you to arrange a suitable time and place for our interview.

[If participant contacted by email the above will instead read – “If you are willing to participate in this study would you please reply to this email or contact me on the number below to arrange a suitable time for our interview.”]

Thank you for your time and consideration of this study and invitation to participate.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:

R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Parent information sheet



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

Kia ora (__*participant's name*__),

My name is Karlene Tipler and I am currently undertaking a doctoral study in emergency management through the Joint Centre for Disaster Research (JCDR) at Massey University, Wellington. The JCDR is a joint venture between Massey University and GNS Science. I have a background in teaching and have a particular interest in how schools manage emergencies.

What is the research about?

New Zealand schools have a responsibility to ensure the safety of the children in their care during an emergency. The 2010-2011 Canterbury earthquakes reinforced the importance of all schools being adequately prepared to respond to a range of small and large scale emergency events. This study is part of a larger research project examining emergency preparedness and response capabilities in New Zealand schools. The data collected in this study will be combined with the results from a prior survey conducted about school preparedness, in particular the 2012 ShakeOut earthquake drill, and discussions with emergency management practitioners from the Ministry of Education and the Wellington Regional Emergency Management Office. The collective findings of this research will assist in establishing emergency response best practice guidelines for schools, and suggest priorities for future emergency preparedness efforts.

What will the participants be asked to do?

Your participation would involve a recorded interview that will take 20- 30 minutes. You will be asked to share your experiences of the [**emergency event**]. The information you provide will be used to develop an understanding of how your child's school responded to the [**emergency event**], from your perspective as a caregiver. A particular focus of the study will be on any lessons you and your family have learnt from the [**emergency**

event], and how these lessons and your suggestions can assist in providing advice to other schools and families responding to similar types of emergencies in the future.

What will happen to the data collected?

After the interview the recordings will be transcribed. A copy of the transcription will be provided to you so you can check that you are satisfied with the accuracy and content. At the conclusion of the study (expected finish date June 2016), I will send you a summary of the findings for the study. You will not be identifiable in any write-ups or oral presentations of the study findings. In addition, a summary of the results from the study will also be accessible on the Joint Centre for Disaster Research website (www.massey.ac.nz/massey/learning/departments/school-of-psychology/research/disaster-research/publications-and-research-updates/publications-and-research-updates_home.cfm).

All information collected will be stored securely to ensure the safety of the data and your confidentiality. All data will be destroyed five years after the completion of the research as required by the Massey University Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants.

What are my rights as a participant?

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question;
- Ask for the recorder to be turned off at any time during the interview;
- Withdraw from the study up to 14 days after you have received your interview transcript;
- Ask any questions about the study at any time during participation;
- Be given access to a summary of the study findings when it is concluded; and
- Your responses remaining confidential to the researcher and her supervisor. The principal has given permission for access to the school site and thus may know about your involvement in the study. However, what you say in the interview will remain confidential.

In appreciation for your time and contribution to this study you will receive a \$20 petrol voucher.

Thank you for your time and consideration.

Nga mihi / Kind regards

Karlene Tipler (PhD student)

Joint Centre for Disaster Research, School of Psychology, Massey University,
Wellington

Research Contacts

If you have any further questions about this study please feel free to contact either:

Karlene Tipler (PhD student) Ph: 027 363 4649, email: K.S.Tipler@massey.ac.nz; or

Dr Ruth Tarrant (Supervisor) Ph: 04 801 5799 Ext 63411, email:
R.A.Tarrant@massey.ac.nz.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 15/53. If you have any concerns about the conduct of this research, please contact Dr Rochelle Stewart-Withers, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83657, email humanethicsouthb@massey.ac.nz

Parent consent form



Massey University
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Te Kura Pūkenga Tangata

SCHOOL OF PSYCHOLOGY
Te Kura Hinengaro Tangata
Private Bag 11 222
Palmerston North 4442
New Zealand
T 64 6 356 9099 extn 2040
F 64 6 350 5673
www.massey.ac.nz
<http://psychology.massey.ac.nz>

I have read the Parent/Caregivers Participant Information Sheet and have had the details of the study fully explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree / do not agree to the interview being sound recorded.

I wish / do not wish to have my recordings returned to me.

I agree to participate in this study under the conditions set out above and in the Parent/Caregivers Participant Information Sheet.

The study has ethical approval from the Massey University Human Ethics Committee (Application 15/53).

[__ CASE STUDY SCHOOL [A, B, C]__]

Signature Date:

Full Name (printed)

Email Phone:

Principal interview guide

Introductions

- Hi _____, thank you very much for agreeing to talk with me ☺
- Before we begin the interview, I just wanted to check whether you had any questions?

Background To The (*Emergency Event*)

Great, let's begin with a little background...

- Can I get you to introduce yourself including your role (confidential) and time in that role.
- How would you describe your school and its community?

Prior Planning, Preparation & Training

Due to your role as principal, I think you would in the best position to provide an overview of emergency preparedness in your school...

- Can you describe any emergency planning and preparation your school had undertaken prior to the *emergency event*?
- What stakeholders do you involve in your emergency preparedness?
Staff – Students – Families - EM practitioners – MinEdu – Māori / local iwi

The *Emergency Event*

Thank you, now I would like you to cast your mind back to the day of the *emergency event*. I have a few specific questions but basically I am going to ask you to walk me through the event...

- What were you doing when the *emergency event* began?
- What did you do once it started?
- What did you do once the shaking had stopped?
 - Did you evacuate?
 - How did you let staff and students know what they needed to do?
- What was your specific role during the response to the *emergency event*?
 - Who else was involved in the decision making?
- Was there any damage to your school?
- Did you have to contact any of the following:
 - Parents / families? Emergency services? Civil defence / WREMO?
MinEdu?
- Did you or your school receive any assistance or support during or after your response?
- How did the *emergency event* end for you?
- Did you notice any effects from the *emergency event* on your staff, students and families?

Lessons Learned & Advice to Other Schools

Thank you, now I would like you to consider your overall experience of the *emergency event*...

- What went well in your schools response to the *emergency event*?
- What challenges or surprises did you find in your schools response to the *emergency event*?
- How useful do you think the school's prior preparation was in helping respond to the *emergency event*?
- What advice would you give a principal in another school responding to an *emergency event* or other emergency?

Any Last Thoughts

Thank you; I just need a moment to see if we have covered everything...

- Is there anything about your experience of the *emergency event* that I should have asked you that I didn't?
- Is there anything else about preparing for or responding to emergencies that you would like to comment on?
- Do you have any other questions about the interview or the research?

Conclusion Of Interview...

Thank you very much for your time, you have given me a lot to think about, if I have any follow up questions can I contact you by email?

- I will transcribe the interview and send you a copy to review.
- I will also send you a summary of the findings at the end of the study...
- Sometimes talking about emergencies can bring up feelings or emotions that can be upsetting for adults or children; or can raise questions about how to be better prepared for emergencies this information sheet has a list of agencies that can offer advice or support.
- Finally, in appreciation for your time and contribution to this study here is a \$20 petrol voucher.

Administrator / Office staff interview guide

Introductions

- Hi _____, thank you very much for agreeing to meet with me ☺
- Before we begin the interview, I just wanted to check whether you had any questions?

Background To The *Emergency Event*

Great, let's begin with a little background...

- Can I get you to introduce yourself including your role (confidential) and time in that role.
- How would you describe your school and its community?
- What emergency planning and preparation you had been involved in the school prior to the *emergency event*?
Developing plans – emergency drills – family reunification practices

The *Emergency Event*

Due to your role as _____, I think your experience would provide an interesting perspective on how your school responded to the *emergency event*. Now I would like you to cast your mind back to the day of the *emergency event*. I have a few specific questions but basically I am going to ask you to walk me through the event...

- What were you doing when the *emergency event* started?
- What did you do once it started?
- What did you do once the shaking had stopped?
- What was your specific role during the response to the *emergency event*?
- How did the *emergency event* end for you?
- What were the effects of the *emergency event* on you, your colleagues, students and families?
- What support and assistance did you receive during and after the *emergency event*?
From your school - Ministry of Education - Emergency Services - Civil Defence - Other Schools

Lessons Learned & Advice To Other Schools

Thank you, now I would like you to consider your overall experience of the *emergency event*...

- What went well in your schools response to the *emergency event*?
- What challenges or surprises did you find in your schools response to the *emergency event*?
- How useful do you think the school's prior preparation was in helping respond to the *emergency event*?
- What advice would you give to someone in a similar role in another school responding to an *emergency event* or other emergency?

Any Last Thoughts

Thank you; I just need a moment to see if we have covered everything...

- Is there anything about your experience of the *emergency event* that I should have asked you that I didn't?
- Is there anything else about preparing for or responding to emergencies that you would like to comment on?
- Do you have any other questions about the interview or the research?

Conclusion Of Interview...

Thank you very much for your time, you have given me a lot to think about, if I have any follow up questions can I contact you by email?

- I will transcribe the interview and send you a copy to review.
- I will also send you a summary of the findings at the end of the study.
- Sometimes talking about emergencies can bring up feelings or emotions that can be upsetting for adults or children; or can raise questions about how to be better prepared for emergencies this information sheet has a list of agencies that can offer advice or support.
- Finally, in appreciation for your time and contribution to this study here is a \$20 petrol voucher.

Teacher interview guide

Introductions

- Hi _____, thank you very much for agreeing to meet with me ☺
- Before we begin the interview, I just wanted to check whether you had any questions?

Background To The *Emergency Event*

Great, let's begin with a little background...

- Can I get you to introduce yourself including your role (confidential) and time in that role.
- How would you describe your school and its community?
- What emergency planning and preparation you had been involved in the school prior to the *emergency event*?
Developing plans – emergency drills – family reunification practices

The *Emergency Event*

Due to your role as **TEACHER**, I think your experience would provide an interesting perspective on how your school responded to the *emergency event*. Now I would like you to cast your mind back to the day of the *emergency event*. I have a few specific questions but basically I am going to ask you to walk me through the event...

- What were you doing when the *emergency event* started?
- What did you do once it started?
- What did you do once the shaking had stopped?
- What was your specific role during the response to the *emergency event*?
- How did the *emergency event* end for you?
- What were the effects of the *emergency event* on you, your colleagues, students and families?
- What support and assistance did you receive during and after the *emergency event*?
From your school - Ministry of Education - Emergency Services - Civil Defence - Other Schools

Lessons Learned & Advice To Other Schools

Thank you, now I would like you to consider your overall experience of the *emergency event*...

- What went well in your schools response to the *emergency event*?
- What challenges or surprises did you find in your schools response to the *emergency event*?
- How useful do you think the school's prior preparation was in helping respond to the *emergency event*?
- What advice would you give to someone in a similar role in another school responding to an *emergency event* or other emergency?

Any Last Thoughts

Thank you; I just need a moment to see if we have covered everything...

- Is there anything about your experience of the *emergency event* that I should have asked you that I didn't?
- Is there anything else about preparing for or responding to emergencies that you would like to comment on?
- Do you have any other questions about the interview or the research?

Conclusion Of Interview...

Thank you very much for your time, you have given me a lot to think about, if I have any follow up questions can I contact you by email?

- I will transcribe the interview and send you a copy to review.
- I will also send you a summary of the findings at the end of the study.
- Sometimes talking about emergencies can bring up feelings or emotions that can be upsetting for adults or children; or can raise questions about how to be better prepared for emergencies this information sheet has a list of agencies that can offer advice or support.
- Finally, in appreciation for your time and contribution to this study here is a \$20 petrol voucher.

Parent interview guide

Introductions

- Hi _____, thank you very much for agreeing to meet with me ☺
- Before we begin the interview, I wanted to check whether you had any questions? I just want to reassure you that nothing you say will cast the school in a negative light – rather anything you share about your experience will help us understand what it is like for schools and families when they are responding to emergencies so we can better help all schools in the future.

Background To The *Emergency Event*

Great, let's begin with a little background...

- Please introduce yourself and the age of your child(ren) (confidential).
- Do you have any roles in the school? E.g., coach, parent helper, BoT
- How would you describe your school and its community?
- What emergency planning and preparation you had been involved in the school prior to the *emergency event*?
Developing plans – emergency drills – family reunification practices

The *Emergency Event*

Due to your role as a **PARENT**, I think your experience would provide an interesting and unique perspective on how the school responded to the *emergency event*... Now I would like you to cast your mind back to the day of the *emergency event*. I have a few specific questions but basically I am going to ask you to walk me through the event...

- How did the school communicate with you about the *emergency event*?
- What information did the school give you about the *emergency event*?
Closing the school – collecting your child(ren) – the safety of your child(ren) – other
- What were the effects of the *emergency event* on you and your family?
- What support and assistance did you receive from the school during and after the *emergency event*?

Lessons Learned & Advice To Other Families

Thank you, now I would like you to think about what you and your family learnt from the *emergency event*...

- What went really well for you and your family when responding to the *emergency event*?
- What challenges or surprises did you and your family find in when responding to the *emergency event*?
- What advice would you give to other families if they had to respond to an *emergency event* or other emergencies?

Any Last Thoughts

Thank you; I just need a moment to see if we have covered everything...

- Is there anything about your experience of the *emergency event* that I should have asked you that I didn't?
- Is there anything else about preparing for or responding to emergencies that you would like to say?
- Do you have any other questions about the interview or the research?

Conclusion Of Interview...

Thank you very much for your time, you have given me a lot to think about, if I have any follow up questions can I contact you by email?

- I will transcribe the interview and send you a copy to review.
- I will also send you a summary of the findings at the end of the study.
- Sometimes talking about emergencies can bring up feelings or emotions that can sometimes be upsetting for adults or children; or can raise questions about how to be better prepared for emergencies this information sheet has a list of agencies that can offer advice or support.
- Finally, in appreciation for your time and contribution to this study here is a \$20 petrol voucher.

Appendix 4: Statement of Contribution sheets for submitted journal papers

Chapter 4

Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2016). New Zealand ShakeOut exercise: Lessons learned by schools. *Disaster Prevention and Management: An International Journal*, 25(4), 550-563. DOI: <http://dx.doi.org/10.1108/DPM-01-2016-0018>

Chapter 5

Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2017a). Are you ready? Emergency preparedness in New Zealand schools. *International Journal of Disaster Risk Reduction*, 25, 324-333. DOI: <https://doi.org/10.1016/j.ijdr.2017.09.035>

Chapter 6

Tipler, K.S., Tarrant, R.A., Tuffin, K.F., & Johnston, D.M. (2017b). Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools. *Australian Journal of Emergency Management*, 32(1), 32-39.

Chapter 7

Tipler, K.S., Tarrant, R.A., Tuffin, K.F., & Johnston, D.M. (2017c). Learning lessons from experience: Emergency response in schools. *Natural Hazards*, 1-21. DOI 10.1007/s11069-017-3094-x



MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Karlene Susan Tipler

Name/Title of Principal Supervisor: Dr Ruth Tarrant

Name of Published Research Output and full reference:

New Zealand Shakeout Exercise: Lessons Learned By Schools

Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2016). New Zealand Shakeout Exercise: Lessons Learned By Schools. *Disaster Prevention and Management: An International Journal*, 25(4). pp. 550 – 563. <http://dx.doi.org/10.1108/DPM-01-2016-0018>

In which Chapter is the Published Work: Chapter 4

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:
and / or
- Describe the contribution that the candidate has made to the Published Work:

The candidate designed the study, completed the analysis, and wrote the article. Supervisors provided feedback and the candidate made minor revisions.

Karlene Susan Tipler
Digitally signed by Karlene Susan Tipler
Date: 2017.06.20 13:03:23 +1200
Candidate's Signature

20.06.2017
Date

Ruth Tarrant
Digitally signed by Ruth Tarrant
Date: 2017.06.20 14:14:33 +1200
Principal Supervisor's signature

20.6.2017
Date



MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Karlene Susan Tipler

Name/Title of Principal Supervisor: Dr Ruth Tarrant

Name of Published Research Output and full reference:

Are you ready? Emergency preparedness in New Zealand schools

Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F.
(under review) International Journal of Disaster Risk Reduction

In which Chapter is the Published Work: Chapter 5

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:
and / or
- Describe the contribution that the candidate has made to the Published Work:

The candidate designed the study, completed the analysis, and wrote the article. Feedback was provided by the supervisors and the candidate made the necessary revisions.

Karlene Susan Tipler
Digitally signed by Karlene Susan Tipler
Date: 2017.06.20 13:13:48 +1200
Candidate's signature

20.06.2017
Date

Ruth Tarrant
Digitally signed by Ruth Tarrant
Date: 2017.06.20 14:15:59 +1200
Principal Supervisor's signature

20.6.2017
Date



MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

**STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS**

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Karlene Susan Tipler

Name/Title of Principal Supervisor: Dr Ruth Tarrant

Name of Published Research Output and full reference:

Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools

Tipler, K.S., Tarrant, R.A., Tuffin, K.F. and Johnston, D.M. (2017). Legislative requirements and emergency management practitioner expectations of preparedness in New Zealand schools. *Australian Journal of Emergency Management*, 32(1), pp. 32-39.

In which Chapter is the Published Work: Chapter 6

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:
and / or
- Describe the contribution that the candidate has made to the Published Work:

The candidate designed the study, completed the analysis, and wrote the article. Feedback was provided by the supervisors and the candidate made the necessary revisions.

Karlene Susan Tipler
Digitally signed by Karlene Susan Tipler
 Date: 2017.06.20 13:16:58 +1200
 Candidate's Signature

20.06.2017
 Date

Ruth Tarrant
Digitally signed by Ruth Tarrant
 Date: 2017.06.20 14:18:31 +1200
 Principal Supervisor's signature

20.06.2017
 Date



MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Karlene Susan Tipler

Name/Title of Principal Supervisor: Dr Ruth Tarrant

Name of Published Research Output and full reference:

Learning lessons from experience: Emergency response in schools

Tipler, K.S., Tarrant, R.A., Tuffin, K.F. and Johnston, D.M.
(under review) Natural Hazards

In which Chapter is the Published Work: Chapter 7

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:
and / or
- Describe the contribution that the candidate has made to the Published Work:

The candidate designed the study, completed the analysis, and wrote the article.
Supervisors provided feedback and the candidate made minor revisions.

Karlene Susan Tipler
Digitally signed by Karlene Susan Tipler
Date: 2017.06.20 13:17:17 +1200
Candidate's Signature

20.06.2017
Date

Ruth Tarrant
Digitally signed by Ruth Tarrant
Date: 2017.06.20 14:17:55 +1200
Principal Supervisor's signature

20.06.2017
Date

Appendix 5: Additional relevant reports

McBride, S. K, Becker, J. M, Coomer, M, Tipler, K, Johnston, D.M. (2014). New Zealand ShakeOut Observation Evaluation Report: A summary of initial findings, *GNS Science Report 2013*. <http://www.gns.cri.nz/static/pubs/2013/SR%202013-061.pdf>. Retrieved 11.06.2015.

Tipler, K.S., Tarrant, R.A., Johnston, D.M., & Tuffin, K.F. (2015). Emergency Preparedness in New Zealand Schools: A Summary of Survey Results. *GNS Science Report 2015/48*. 24 p.