



Australian Government
Attorney-General's Department
Emergency Management Australia

AUSTRALIAN JOURNAL OF EMERGENCY MANAGEMENT

ISSN: 1324 1540

Australian Emergency Management Institute

Volume 29 | No. 2 | April 2014



 **DISASTER
RESILIENT
AUSTRALIA**
GET READY

NATIONAL VOLUNTEER WEEK

12 TO 18 MAY 2014



Some contributions to the Australian Journal of Emergency Management are reviewed. Academic papers (denoted by **R**) are peer reviewed to appropriate academic standards by independent, qualified experts.



Foreword

4

By The Honourable Tony Abbott MP, Prime Minister of Australia



Out of uniform: building community resilience through non-traditional emergency volunteering

5

By David Bruce, Communications Manager Bushfire and Natural Hazards CRC

Increasing the cultural diversity of volunteering organisations

7

SES community information sessions help boost local volunteer numbers.



OPINION: Promoting resilience: a contemporary and integrated policy and funding framework for disaster management

8

Jim McGowan AM, Adjunct Professor, Griffith University, argues there are new imperatives to drive policy reform for better funding for disaster management.

Bushfire survival preparations by householders in at-risk areas of south-eastern Australia

11

Dr Jim McLennan, La Trobe University, Glenn Elliott, RMIT, and Lyndsey Wright, Bushfire CRC, describe the continuing generally low levels of bushfire safety planning and preparation by residents of at-risk communities in Australia. **R**



Using existing social networks to improve emergency preparedness of supported community members

18

Kate Mora and Dr Jared Thomas, Opus Research, Katherine Nankivell, Wellington Region Emergency Management Office, and Stephen Flude, Wellington City Council, present results from research into community-based organisations in Wellington, NZ. **R**



Disaster survivors: a narrative approach towards emotional recovery

25

Dr Christina Kargillis, Dr Mayumi Kako and Associate Professor David Gillham, Flinders University, discuss the contexts and range of emotional impacts stemming from disaster events and explore the use of narrative for recovery. **R**

The frontline: a new focus for learning about leadership

31

Dr Nita L Cherry, Swinburne University of Technology, examines aspects of effective frontline leadership under conditions of complexity and its value in developing the understanding of contemporary leadership. **R**

AUSTRALIAN JOURNAL OF EMERGENCY MANAGEMENT

Vol. 29 No. 2, April 2014, ISSN: 1324 1540

PUBLISHER

The Australian Journal of Emergency Management is published by the Australian Government's Attorney-General's Department. The Journal is published on the Australian Emergency Management website at www.em.gov.au.

COVER

Gabriel Atem and Manyok Ajak are SES volunteer with the Riverland SES in South Australia. The pair fled war-torn South Sudan almost a decade ago. They were both volunteer firefighters in their African homeland.

ABOUT THE JOURNAL

The Australian Journal of Emergency Management is Australia's premier Journal in emergency management. Its format and content is developed with reference to peak emergency management organisations and the emergency management sectors—nationally and internationally. The Journal focuses on both the academic and practitioner reader and its aim is to strengthen capabilities in the sector by documenting, growing and disseminating an emergency management body of knowledge. The Journal strongly supports the roles of Emergency Management Australia (EMA) and the Australian Emergency Management Institute (AEMI) as a national centre of excellence for knowledge and skills development in the emergency management sector. Papers are published in all areas of emergency management. The Journal emphasises empirical reports but may include specialised theoretical, methodological, case study and review papers and opinion pieces. The views in this journal are not necessarily the views of the Attorney-General's Department.

EXECUTIVE EDITOR

The Editor-in-Chief of the Journal with responsibility for the Journal's operations and policies is Mark Crossweller, Director-General, Emergency Management Australia.

EDITORIAL ADVISORY COMMITTEE

- Andrew Coghlan, Australian Red Cross, Melbourne
- Michael Eburn, Australian National University College of Law
- Chas Keys, formerly of NSW State Emergency Service
- Prof Jennifer McKay, University of South Australia
- David Parsons, Sydney Water Corporation
- Raelene Thompson, AEMI, Attorney-General's Department

EDITORIAL TEAM

Contract Manager: Mark Hilgert, AEMI.
Managing Editor: Christine Belcher, Grey Canberra.
Design, typesetting: Biotext, Canberra.

CIRCULATION

Approximate circulation (print and electronic): 5 500.



From silos to flows: spatial metaphor and communication responses to the Christchurch earthquakes

35

Dr Michael Bourk, University of Otago, and Dr Kate Holland, University of Canberra, discuss some of the challenges faced by key organisations involved in public information management after the Christchurch earthquake.



Earthquake preparedness in South Australia: recommendations based on previous earthquakes in Australia, New Zealand and the United States of America

42

Dr Olga Anikeeva, Dr Malinda Steenkamp and Professor Paul Arbon from the Torrens Resilience Institute consider some of the short and long-term health consequences of earthquakes.



Development of pharmacy emergency management guidelines

49

Wendy Walker, Vice-President of the Military and Emergency Pharmacy Section of the International Pharmaceutical Federation, outlines what that organisation is doing to create and share standardised emergency management guides.



Lessons from Louisiana, and a new normal in disasters

53

Journalist Kate Lahey talks to U.S. Colonel Joey Booth about sharing the lessons we learn from major disasters in the USA and Australia.



From a message in a bottle to best practice in communications

57

As Australian states and federal bodies work to improve emergency communications, journalist Kate Lahey speaks with Louisiana's Brant Mitchell about the radio network he helped build after *Hurricane Katrina*.

Graduate education in the planning and management of natural hazards

61

Notes from the Field

62

Coober Pedy Mine Rescue Squad / State Emergency Service

Rare atmosphere: introducing the National Meteorological Library

64

Rosa Serratore, Chief Librarian, gives an insight into the Bureau of Meteorology's Library.

EMPA 2014 conference: collaboration in communication – a shared responsibility.

66

“Everybody can be great...because anybody can serve.”

Martin Luther King Jr.

PUBLICATION DEADLINE

The Journal is published on the last day of January, April, July and October, each year. Copies of the Journal are distributed quarterly without charge to subscribers throughout Australia and overseas.

COPYRIGHT

Material in the Australian Journal of Emergency Management is provided under a Creative Commons Attribution 3.0 Australia license (www.creativecommons.org/licenses). For the avoidance of doubt, this means this licence only applies to material as set out in this document.

Relevant licence conditions are available on the Creative Commons website, www.creativecommons.org/licenses.

SUBMISSIONS

The *Australian Journal of Emergency Management* welcomes submissions. The Contributors' Guidelines are available at www.em.gov.au/ajem. In brief, contributions should be no longer than 3 000 words, be submitted as a Word file and contain photographs, graphs and tables in their original software applications as separate files. All articles must contain an abstract and a small biographical paragraph about each author. A Copyright Release form and the Editorial Policy are available on the website. Authors should familiarise themselves with the Journal before making a submission. Contributions should be forwarded electronically to ajem@ag.gov.au. All academic papers are peer reviewed. Please note that the Australian Journal of Emergency Management is indexed by several indexing organisations throughout the world, please visit our website for details.

SUBSCRIPTIONS

For new subscriptions please visit us online at <https://ema.infoservices.com.au/member/new>.

Changes to current subscription details can also be made by visiting us online at <https://ema.infoservices.com.au/member>.

CONTACT US

Mail: Australian Journal of Emergency Management
Australian Emergency Management Institute
Main Road, MT. MACEDON VIC 3441
Email: ajem@ag.gov.au
Phone: 0409 823 344 (editorial enquiries only)



Foreword

By The Honourable Tony Abbott MP, Prime Minister of Australia



This edition of the *Australian Journal of Emergency Management* coincides with National Volunteer Week, so it is timely to reflect on the important role that emergency services volunteers play in our community.

Volunteering is a great Australian tradition. About 6 million of us volunteer every year – on our beaches, along fire fronts and helping in our communities. I have

found participating in the Rural Fire Service and the surf lifesaving movement a very satisfying way to give back to our community.

We don't have to look very far to find examples of volunteers helping to make our country more resilient – the 'Mud Army' during the Queensland floods, the Rural Fire Service fighting from backyards in the Blue Mountains in 2013, or the St John Ambulance first responders who are always there for people in trouble.

It is important that volunteers have the skills they need to undertake their duties. The Government has signed a new *National Partnership Agreement for Natural Disaster Resilience* with states and territories to help provide better equipment, training and support.

I respect the professionalism of our volunteer emergency services organisations and those who volunteer to support them. Community groups like the Australian Red Cross, Salvation Army, BlazeAid, Guides and Scouts Australia, Rotary and Lions lend a hand and help make our communities stronger.

Australia has long been a nation of volunteers. Their work, each and every day, makes our country an even better place.

The Hon Tony Abbott MP

Prime Minister of Australia

**NATIONAL
VOLUNTEER WEEK**

12 TO 18 MAY 2014



**25 YEARS OF NATIONAL VOLUNTEER WEEK
12-18 MAY 2014**

Out of uniform: building community resilience through non-traditional emergency volunteering

By David Bruce, Communications Manager Bushfire and Natural Hazards CRC

A familiar sight at the scene of a natural hazard emergency is the arrival of highly motivated individuals ready to assist in whatever way they can. There is nothing new in that. Our volunteer fire and emergency services organisations were founded in communities of local volunteers.

Over many decades, as the official emergency services agencies have become more professional, accredited and organised, the role of the unofficial and informal volunteer has sat uneasily with the official response.

A project in the new Bushfire and Natural Hazards Cooperative Research Centre (CRC) will develop new approaches to deal with the reality of volunteering today. It is an integration of the formal and the informal volunteer into the full spectrum of incident prevention, preparation, response and recovery.

Project leader, Professor John Handmer of RMIT University, said that although this issue has been widespread for a long time, it has been the subject of little research.

‘We know that very large numbers of people quickly converge on incidents saying they want to help. And no one has really looked at this in a research sense in Australia or New Zealand. These people are willing and usually able to help but they don’t want to be a part of the formal response organisations.

‘There is a significant and largely untapped opportunity for emergency management agencies to contribute to building community resilience to natural hazards by supporting and engaging with non-traditional emergency volunteers—and volunteering organisations—in new ways,’ he said.

The traditional model of emergency volunteering employed in Australia and New Zealand is based on formal, accredited volunteers who are affiliated with state emergency management agencies and have been involved in response and recovery roles. While this form of volunteering is crucial and has many strengths, it excludes the potentially large number of people who are motivated to volunteer before, during and after emergencies in a less ongoing and formal way.

‘One thing that has changed in recent times is that spontaneous volunteering is now not necessarily place-specific. It used to be just about turning up at the incident site. But agencies are now dealing with networks of remote and mostly online volunteers harnessing resources and people to respond. Many of these people maybe nowhere near the actual incident site but they are having an impact on the response, often over an extended period. They could be organising people or donations, or connecting people with resources, for example’, Professor Handmer said.

Fellow RMIT University researcher Dr Joshua Whittaker notes that almost everyone in society has the potential to be a volunteer in a crisis.

‘In many cases the first people on the scene of an emergency or a disaster are the local volunteers. The initial response is often spontaneous at the local level by untrained people. Then later, the emergency services teams arrive and these initial efforts are often sidelined or stifled. At the other end of the incident, when the formal relief and recovery services have finished, the community is still there dealing with these problems, largely through its volunteers,’ he said.

The role of volunteers in increasing community resilience to disasters is recognised in both the priority actions of the UN Office of Disaster Risk Reduction’s *Hyogo Framework for Action* and the priority outcomes of the *Australian National Strategy for Disaster Resilience*.

‘It is pretty hard to implement these strategies if we are saying that everyone should just wait for the emergency agencies to turn up. It is actually about well-prepared and self-sufficient communities. And in a lot of communities that capacity already exists. That may be a group that forms with a specific intent like Blaze Aid, or it might be an existing sporting or community organisation that responds by drawing on its established resources and networks,’ said Dr Whittaker.

Given the growing exposure of people to natural hazards due to rapidly expanding settlements in rural, coastal and fringe areas over recent years, it is likely that non-traditional volunteers will provide the bulk of

the additional surge capacity needed to deal with the more frequent natural hazard events occurring under climate change. At the same time, there are more and more examples of government and non-government organisations, as well as motivated individuals and groups, finding new ways to harness the capacities of non-traditional emergency volunteers. However, these examples are isolated and have not yet been integrated into new and more inclusive models of volunteering for the emergency management sector. The development of new, co-ordinated models is needed to provide a framework for engaging further with this potential additional workforce.

Dr Whittaker acknowledges that this type of volunteering is not new. 'But what is new is the acknowledgement by the emergency services that these people are out there and they are doing good things. How can we best work with them?

'This is really an acknowledgement of the importance of these people right through from the 80-year-old sandwich maker, to the bloke with a shovel, the person who rushes to free people from the rubble, or the distant internet fund raiser,' he said.

This project will select case studies to illustrate both the benefits and the problems with non-traditional volunteering. Dr Whittaker explains: 'It's not always positive. Sometimes it can create problems for the emergency services agencies.

'One of the examples that is often discussed is the huge convergence of people on the scene of ground zero after 9/11. They had tens of thousands of people descend on New York City; locals but also people from all around America, all wanting to help. And that became a major logistical challenge for the emergency services organisations that had to manage this. It created real problems. Many people turned up wanting to help, but they didn't know how to help. They couldn't really help. The best thing they could do was not be there, but this created all sorts of tensions and problems from the agencies' points of view,' Dr Whittaker said.

Professor Handmer said the project will develop a model for agencies to better work with non-traditional volunteers. 'But that is a high-level goal. The benefits are not just for the agencies. It will benefit communities because they are the ones most affected. Community resilience is about involving communities in emergency management. It is about them taking responsibility for their risk, and preparing and responding in the best way and to ensure that when they are doing good things on the ground the formal system supports and facilitates the community.'

The project has three key objectives:

- To identify how non-traditional emergency volunteering contributes to building community resilience to disasters throughout different phases of emergency management.
- To identify ways the emergency management sector in Australia and New Zealand can promote community resilience through support of non-traditional emergency volunteering.
- To develop and evaluate alternative models for emergency volunteering in Australia and New Zealand that are inclusive of non-traditional volunteering and volunteering organisations.



Student Volunteer Army in Christchurch, September 2010.

A related project the CRC is focussing on is improving the retention and engagement of volunteers in emergency services agencies. The NSW State Emergency Service estimates that the attrition rate of active volunteers is around 20 per cent each year. High attrition rates create high operating costs (recruiting, training and equipping volunteers) and it reduces organisational effectiveness by leaving a small, overworked core of experienced and trained volunteers. This phenomenon of high turnover in the volunteer sector is not restricted to the SES, it is a common problem in most volunteer organisations.

This project, led by Dr Michael Jones at the University of Wollongong, will help volunteer-based organisations better use and manage their resources and volunteer workforce. Findings from this project can be used by organisations across Australia to optimise their workforce and financial strategies to better serve their communities.

For more details on both projects visit www.bnhcrc.com.au.

Increasing the cultural diversity of volunteering organisations

SES community information sessions help boost local volunteer numbers.

In 2012 the South Australian Volunteer Services Branch (VSB) ran a pilot program to attract recruits from culturally and linguistically diverse backgrounds for the state's State Emergency Service (SASES) and the Country Fire Service (CFS). The program was launched in the Riverland area, east of Adelaide, and involved working closely with Multicultural SA to create networks with their local communities. An introduction to emergency services session was then held in Renmark with the assistance of local SASES and CFS volunteers.

During February 2013, Edinburgh SASES approached VSB with an exciting opportunity to extend the program and an information session was held for members of the local South Sudanese community. As a result, four new and enthusiastic members from the Sudanese community joined the Edinburgh SASES ranks.

Manyok Ajak and Gabriel Atem come from South Sudan and have shared their experiences of walking 90 days with little food or water to a United Nations refugee camp in Kenya. Both men were volunteer firefighters in their African homeland and spent 10 years in the camp where they married and started families before immigrating to Australia to start new lives in Adelaide's northern suburbs.

All four new recruits explained their motivation for joining the SASES as an opportunity to serve their community and give something back to the country that took them in. They also hope to prove positive role models for Adelaide's 5 000 South Sudanese community as well as their own children.

Edinburgh SASES Unit Manager, John Lawrence and the volunteers created a welcoming and supportive environment for new members entering the unit. Crews are involved in search and rescue, emergency aid and road accident assistance.



Image: Matt Turner, News Limited, Adelaide.

Left to right: John Lawrence, Edinburgh Unit Manager, Gabriel Atem, Hieu Van Le, Chair Mutlicultural SA, and Manyok Ajak.

OPINION: Promoting resilience: a contemporary and integrated policy and funding framework for disaster management

Jim McGowan AM, Adjunct Professor, Griffith University, argues there are new imperatives to drive policy reform for better funding for disaster management.



The Federal Government's announcement of a Productivity Commission inquiry into disaster management arrangements is welcomed. This provides a once-in-a-generation opportunity to build a resilience-based policy framework. A purposeful and methodical review of the policy and funding frameworks would facilitate the development of a contemporary and integrated model for disaster management across Australia. The current frameworks need to be reframed in a manner consistent with the strategic policy objective of promoting greater individual and community resilience. Rather than tinker with existing funding arrangements, a 'root and branch' review of the policy and funding frameworks for the prevention, preparedness, response and recovery phases of a cost effective regime for the management of natural disasters is required.

The August 2013 report from the Regional Australia Institute (RAI) entitled *From Disaster to Renewal: The Centrality of Business Recovery to Community Resilience*¹ presents a major challenge for policy makers. It argues that recovery from a natural disaster needs to be viewed within a broader framework of resilience, moving beyond the traditional focus on relief and reconstruction to incorporate local renewal and adaptation strategies so that affected communities can adapt to their post disaster circumstances.

The *From Disaster to Renewal* report draws on the experiences of four towns, Cardwell and Emerald in Queensland and Carisbrook and Marysville in Victoria, recovering from natural disasters.

The report highlights the inconsistency between many of the strategies to assist communities to recover from a natural disaster event and the objective shared by all tiers of government—to build an Australia that is more resilient to natural disaster events that are expected to become both more frequent and more severe. COAG adopted the *National Strategy for Disaster Resilience* (NSDR) in February 2011. The NSDR advocates 'a whole-of-nation resilience-based approach to disaster management, which recognises that a national, coordinated and cooperative effort is needed to enhance Australia's capacity to withstand and recover from emergencies and disasters'.²

It provides not only an aspirational framework for disaster management but also reflects the outcome of a co-operative approach to natural disasters involving Commonwealth, state and territory and local governments.

1 *From Disaster to Renewal: The Centrality of Business Recovery to Community Resilience*, Regional Australian Institute, August 2013. The research was conducted in collaboration with Griffith University and affected towns and communities. Reports and other material from the project are available at www.regionalaustralia.org.au.

2 Full report available at www.em.gov.au/Documents/1National%20Strategy%20for%20Disaster%20Resilience%20-%20pdf.PDF.

However, if the policy imperatives are 'Resilience' and improving individual and community understanding of risk, reframing the policy and funding frameworks for disaster management is critical. Building resilience requires the integration of all the prevention, preparedness, response and recovery (PPRR) phases. Each of the four phases should provide feedback loops to improve performance, policy development and resourcing priorities. Currently these feedback loops are poorly developed, as evidenced by the disproportionate funding allocations between the response and recovery phases and the prevention and preparation phases. The policy implications of the policy and funding gaps have long-term implications. Currently they not only create significant demands on Federal and State budgets, but also have long-term impacts on national productivity and economic performance.

'In 2012 alone, the total economic cost of natural disasters in Australia is estimated to have exceeded \$6 billion. Further, these costs are expected to double by 2030 and to rise to an average of \$23 billion per year by 2050, even without any consideration of the potential impact of climate.'

*Each year an estimated \$560 million is spent on post disaster relief and recovery by the Australian Government compared with an estimated consistent annual expenditure of \$50 million on pre-disaster resilience: a ratio of more than \$10 post-disaster for every \$1 spent pre-disaster.'*³

The commitment to and investment in prevention and mitigation has been miserly in comparison to the expenditure of response and reconstruction, despite evidence of the economic returns and resilience benefits that can be expected from such investments. Research from the Bureau of Transport Economics in 2002 showed that flood mitigation can provide a

3:1 return on investment through the avoidance of response and recovery costs. In the USA there is research which shows a 5:1 average return on flood mitigation investment.

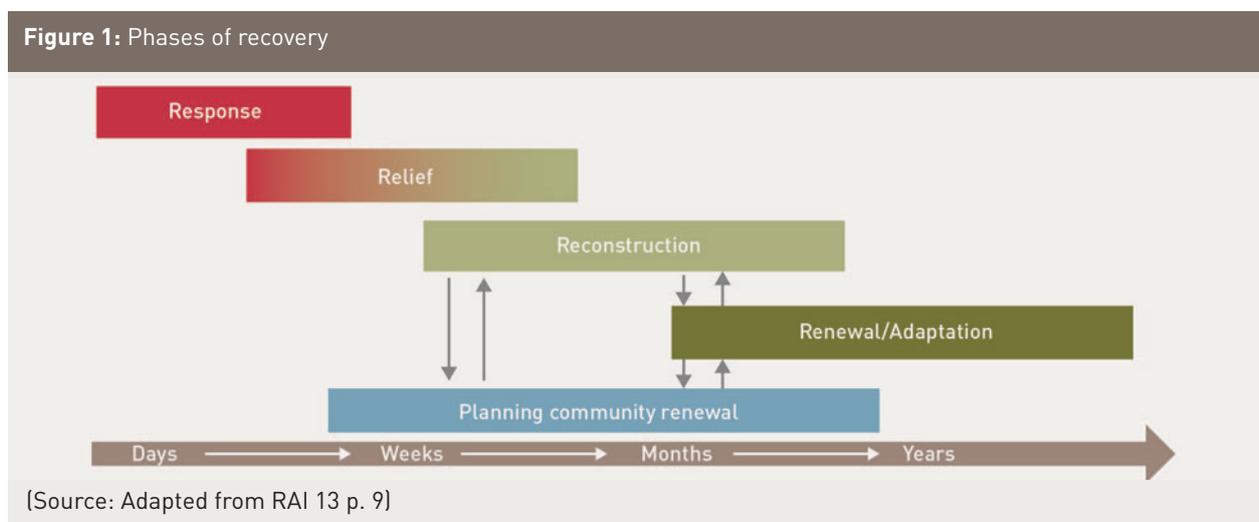
The interest by the private sector in the policy frameworks for disaster management is a welcome development. The Australian Business Roundtable for Disaster Resilience and Safer Communities has also called for a commitment 'to long term annual consolidated funding for pre-disaster resilience and to identify and prioritise pre-disaster investment activities that deliver a positive net impact on future budget outlays.' In advocating for a more formal involvement by the private sector it recommends the appointment a National Resilience Advisor and the establishment of a Business and Community Advisory Group (Deloitte p. 51).

The RAI report also challenges the traditional narrow focus of 'Recovery' from natural disasters. Although community recovery is dependent on business recovery, experiences in Australia and internationally often treat the recovery phase as having too short a time horizon, focusing predominantly on relief and reconstruction (RAI 2013 p. 21).

Policy and funding frameworks for recovery need to be rethought with a much longer-term focus. The RAI report argues that:

'Recovery arrangements need to be viewed within a resilience framework, which moves beyond relief and reconstruction to incorporating local renewal and adaption to the post disaster environment.' (RAI 2013 p. 2)

Figure 1 attempts to highlight the different phases of recovery, the relative timing, and the relationships between them.



3 Deloitte Access Economics 2013, Building our nation's resilience to natural disasters - a paper for Australian Business Roundtable for Disaster Resilience and Safer Communities, p8. At: www.australianbusinessroundtable.com.au.

The origins of this policy and funding incoherence, in part at least can be attributed to the overwhelming focus by all three levels of government on the National Disaster Relief and Recovery Arrangements (NDDRA) and the Australian Government Disaster Recovery Payments (AGDRP) to affected individuals ('hardship grants'). The NDDRA had its origins in Commonwealth and state negotiations dating back to *Cyclone Tracy* in 1974.

In addition to these Commonwealth 'hardship grants' state governments provide cash grants to impacted individuals and families. Generally these national arrangements served communities affected by natural disasters well by providing certainty and clarity as to the type and extent of the support from the various levels of government.

However these arrangements were developed in an era in which the number and impact of disasters was considerably less than has occurred in the last decade. They are reactive in that they are triggered by an event and are consequently focussed on response and the initial recovery. This also reflects when political and media attention is strongest.

There are also policy and operational limitations for the NDRRA. The arrangements are administratively complex. The RAI report notes that the NDRRA

'generally covers restoration of public infrastructure, (but) does not provide funding for the restoration of the natural environment. This reflects a lack of recognition of the importance of the natural environment component of business recovery. Environmental restoration works were seen as important as the reconstruction of hard assets to business. This is particularly the case where tourism based on the natural environment is a significant contributor to the local economy. Businesses in Cardwell and Marysville rely on the natural environment as the regional "drawcard".' (RAI 2013 p. 13)

There are examples where roads, bridges and other critical infrastructure have been repaired using NDRRA funds only to be swept away in the next flood. Current arrangements involve the restoration of those assets. This is shortsighted and ultimately more expensive. The 'betterment provisions' were included in the NDRRA in 2007. However,

'Despite multi-billion dollar recovery bills, it appears that the betterment provisions ...have not been widely accessed. Government infrastructure and assets are still being rebuilt like for like and, notwithstanding incremental improvements in design, this misses the opportunity to fundamentally rethink the vulnerability of key infrastructure and plan accordingly.' (RAI 2013 p. 11)

'Betterment' arrangements are consistent with building resilience. Engineered properly, they constitute a more cost effective investment strategy through the avoidance of future response and recovery costs. After a disaster event, the default position should be to rebuild the infrastructure so that it is better able



The report summaries the finding from research in communities recovering from and adapting to the impact of disasters.

to withstand the next event rather than the current predisposition to restore assets to their previous state.

In relation to the AGDRP, the Report notes

'Hardship grants, unless carefully structured and targeted, have the potential to undermine the community resilience that sits as the core objective of the National Strategy on Disaster Resilience.' (RAI 2013 p. 16)

To re-iterate, the NDRRA and AGDRP have been beneficial, particularly to individuals but they preceded the NSDR. It is timely to revisit these arrangements, given the findings and recommendations of the *From Disaster to Renewal* and the *Building our nation's resilience to natural disasters* reports.

The policy, support and funding arrangements need to be derived from the NSDR and based on the interaction of the prevention, preparedness, response and recovery obligations of all levels of government, local communities, the private sector and individuals. In these times of economic austerity, the imperative of a coherent and comprehensive approach to natural disasters is even more pressing. This is not a cry for additional resources to support the response to and recovery from a natural disaster but rather the redirection of some of these resources to promote community resilience through mitigation strategies and more focused approach to community recovery that recognises business recovery as a pre-condition for that recovery.

Having developed the NSDR, the new imperative is to drive the policy reform processes to give effect to its noble aspirations of building a resilient Australia. Policy and funding frameworks can promote the greater personal and community resilience through the development of a more cost effective and robust approach to how all Australian jurisdictions can respond to current and future challenges caused by the inevitable natural disasters which will impact on the nation.

Bushfire survival preparations by householders in at-risk areas of south-eastern Australia

Dr Jim McLennan, La Trobe University, Glenn Elliott, RMIT, and Lyndsey Wright, Bushfire CRC, describe the continuing generally low levels of bushfire safety planning and preparation by residents of at-risk communities in Australia. [®]

ABSTRACT

While Australian state and territory governments devote considerable resources to combating bushfires, landowners and householders are increasingly expected to take responsibility for protecting their property and for their personal safety. All Australian states and territories have community bushfire safety programs in place which provide information and advice to householders about bushfire survival. This paper describes findings from a 2012 survey of 584 residents in at-risk areas of south-eastern Australia and describes generally low levels of planning and preparation for bushfires. Householder lack of planning and preparation for safe evacuation if threatened was especially concerning¹.

Introduction

Over recent decades bushfires (or wildfires) have proved to be a serious natural hazard threatening communities in many countries (Gill, Stephens & Cary 2013). In Australia, Victoria's 2009 Black Saturday bushfires caused 173 deaths and destroyed more than 2 000 homes. These fires were followed by destructive bushfires in Western Australia in 2011 and 2012, and in Tasmania, NSW, South Australia and Victoria in 2013. There is considerable agreement among bushfire scientists that there will be more frequent serious bushfires in some locations in future, for three reasons:

- climate change is resulting in lower rainfall and higher temperatures in many areas

- more people are choosing to live in areas of high bushfire risk—especially in bushland-urban interfaces, and
- land use and land management policies and practices are changing (Cary *et al.* 2012, Hennesey *et al.* 2006, Liu, Stanturf & Goodrick 2010).

State and territory governments devote considerable resources so fire and land management agencies can combat bushfires. However, there is a general expectation that landowners and householders will have to take greater responsibility for their personal safety and property protection in order to minimise the impacts of future bushfires on communities (Council of Australian Governments 2011, Fire Services Commissioner of Victoria 2012).

Before February 2009 Australian fire agencies advised residents to prepare to stay and defend their homes in the event of bushfire or to leave well before a fire threatened their property:

'...By extinguishing small initial ignitions, people of adequate mental, emotional, and physical fitness, equipped with appropriate skills, and basic resources, can save a building that would otherwise be lost in a fire...People should decide well in advance of a bushfire whether they will stay to defend them or leave if a bushfire threatens.' (Australian Fire Authorities Council 2005, p. 6).

This position came to be summarized as the 'prepare, stay and defend, or leave early' policy (Tibbits *et al.* 2008). The policy was developed following investigations into multi-fatality bushfires in Victoria, South Australia and Tasmania in the period 1967 to 1983. Australian fire agencies concluded that:

- civilians were most likely to die because of either the effects of radiant heat or as a result of a motor vehicle accident while fleeing at the last moment, and
- suitably prepared homes could be defended against bushfires while providing a safe refuge for people during the passage of the main fire front (Tibbits *et al.* 2008).

¹ The present study was part of a larger Bushfire CRC program of community bushfire safety research. Reports of previous study findings are at: www.bushfirecrc.com/category/bushfiretopic/community-safety.

However, following the 2009 Victorian fires, in which 113 people are believed to have died inside their homes (Whittaker *et al.* 2013), the Australasian Fire and Emergency Services Authorities Council revised aspects of its official community bushfire safety position to give more weight to the 'leave early' option:

'People usually have two safe options when threatened by bushfire: leaving early or staying and defending adequately prepared properties. Leaving early is always the safest option' (Australasian Fire and Emergency Services Authorities Council 2010, p. 1).

In all Australian states and territories there are community bushfire safety education, information, and advice programs intended to promote householder bushfire survival planning and preparation. Considerable research (mostly North American) has been published about community safety, much of which investigated determinants of householder intentions to better-prepare their properties to survive wildfire (bushfire) attack (e.g. McCaffrey *et al.* 2013, McFarlane, McGee & Faulkner 2011, Paton, Burgelt & Prior 2008). However, to date, there has been only limited information published about levels of Australian householder planning and preparation for possible bushfires.

Method

The study was part of a larger Bushfire Cooperative Research Centre project investigating householder decision-making under imminent bushfire threat (Bushfire Cooperative Research Centre 2010). Community bushfire safety staff in the ACT Rural Fire Service, the NSW Rural Fire Service, the Tasmania Fire Service, and the Victorian Country Fire Authority were asked to nominate six locations regarded as being notably at-risk of serious bushfire attack and which had not experienced a serious bushfire within the previous 10 years. Each agency was invited to select two locations on the bushland-urban fringes of regional centres or a capital city, two locations where most householders resided in small rural towns, and two locations where most residences had isolated dwellings on farms or other large rural properties².

Information published by the Australian Bureau of Statistics (2011) indicated that there were approximately 28 500 occupied dwellings in the locations proposed. Only a relatively small percentage of those dwellings would be significantly at risk of bushfire because of distance from bushland, house construction and landscaping (Chen & McAneney 2004, Wilson & Ferguson 1986).

Accordingly, a procedure was adopted where householders could participate by completing an online survey or requesting a reply-paid printed questionnaire

from the researchers if they considered that their homes were at risk of bushfire attack. The invitations were issued by several means. Residents of small towns and bushland-urban suburbs were mailed an invitation brochure and posters were displayed in community gathering points such as libraries and community centres. Researchers gave interviews describing the research on local radio stations and wrote news stories for local newspapers. Participants were encouraged to bring the research to the attention of neighbours. Data collection took place between February and May 2012.

Survey questionnaire

A survey instrument was constructed in two formats, online and reply-paid postal questionnaire, with identical substantive content but different instructions for completion. Both versions specified that only one member of a household should take part. The survey asked for basic demographic information and then presented participants with the following scenario and response options:

Now imagine that during the fire season you and all those who normally reside with you are at home. It has been declared a day of 'Extreme Fire Danger', and there is a Total Fire Ban for your Region of the State/Territory. At about 3 pm you become aware of a warning (on the radio, or a web site, or by email, or text, or telephone) that there is a large bushfire burning out of control and that it will probably hit your location in 1–2 hours. You look outside and see a large plume of smoke being blown toward your property.

What do you think you would most likely decide to do?

- a. Leave as soon as you can
- b. Stay to defend the home
- c. Wait and see what develops, before finally deciding whether or not to leave, or to stay and defend.

The questionnaire asked about reasons for making the choice (reported in McLennan, Elliott & Beatson 2012) and then asked householders to complete the Householder Preparations for Bushfires checklist (McLennan & Elliott 2011), specific instructions were:

Below is a list of things that people who live in a place that could be at-risk of bushfire can do to make themselves safer. For each one say whether you or a member of your household has: already done, partially done, definitely will do, intend to do, may do, or will not do, to prepare for a bushfire this fire season.—If an item does not apply (for example, it is about pets or livestock and you not have any, then choose N/A).

² Locations ACT: Bonython, Duffy, Fisher, Hackett, Holder, Tharwa, Weston. NSW: Captains Flat, Diggers Camp, Hornsby Heights, Kandos, Leura, Nelson Bay, Walla Walla. Tasmania: Bothwell, Deloraine, Dover, Mount Nelson, New Norfolk, Ouse, Port Sorell/Shearwater. Victoria: Beechworth, Delatite, Warrandyte, West Wodonga, Wonga Park, Yackandandah.

McLennan and Elliott (2011) note that there did not appear to be a comprehensive tool readily available for researchers to assess levels of householder preparation for bushfires, and described construction



Destruction after the 2009 Victorian bushfires.

of their Householder Preparations for Bushfires research checklist³. The items were based on those proposed by Paton *et al.* (2006) and those used by Whittaker *et al.* (2010) in their postal survey of residents impacted by the 2009 Victorian Black Saturday bushfires. Several draft versions of the checklist were evaluated by an eight-member panel with expertise in bushfire behaviour, house construction, and bushfire safety. The resulting checklist comprised:

- two items concerning household bushfire safety plans, first for a predicted day of severe (or worse) fire danger weather, and second in the event of a bushfire threat warning, and
- 21 preparation activity items covering
 - preparations to leave safely (four items)
 - active house defence (eight items)
 - reducing danger to the house (four items)
 - reducing house vulnerability (five items), and
 - seven items concerning last-minute preparations on a day of severe or worse fire danger (these items were not used in the present study).

³ Subsequently, researchers at the Centre for Environmental Risk Management of Bushfires, University of Wollongong, have independently developed criteria for effective householder defence of a dwelling under bushfire attack (Penman *et al.* 2013).

Results and discussion

Participants

A total of 584 residents of bushfire-prone areas in south-eastern Australia responded to the invitation to take part in the survey. The respondents were 274 men (47 per cent) and 310 women (53 per cent). The mean age of the men was 56.6 years (SD = 13.42), the mean age of the women was 53 years (SD = 13.93). The majority of these householders (46 per cent) described their property as being located on urban-bushland fringes of regional centres or capital cities. A further 34 per cent described their location as a small rural town. The remaining 20 per cent described their location as being an isolated dwelling on a farm or other large rural property. The average length of residence was 16.4 years (SD = 4.8 years) and five per cent of those surveyed had lived in their communities for less than 12 months.

Of the 584 participants, the majority (273, 47 per cent) responded to the bushfire threat scenario by choosing the 'leave as soon as possible' option, 139 (24 per cent) chose the 'stay and defend' option, and 172 (29 per cent) chose the 'wait and see' option. Table 1 shows that householders intending to leave were more likely to reside in an urban-bushland fringe home (48 per cent) and least likely to reside in an isolated rural dwelling (19 per cent). Those intending to stay and

defend were somewhat more likely to reside in a small rural town (37 per cent). Those intending to wait and see were more likely to reside in an urban-bushland fringe home (56 per cent) and least likely to reside in an isolated rural dwelling (13 per cent).

Table 1: Percentage of householders in each intention group residing in an isolated rural dwelling, a small rural town, or an urban-bushland fringe.

Location of Residence	Leave (n = 273)	Stay & Defend (N = 139)	Wait and See (n = 172)
Isolated rural dwelling (n = 117)	19%	31%	13%
Small rural town (n = 196)	33%	37%	31%
Urban-bushland fringe (271)	48%	32%	56%
Total (N = 584)	100%	100%	100%

It should be noted that the sample of householders is unlikely to be truly representative of residents in the communities surveyed in some important respects. Overall, participants were almost certainly more engaged with issues of bushfire threat and safety than many of their neighbours. This is because of the methodology employed in which, unlike a telephone or individually addressed postal questionnaire survey, participating required motivation to actively 'opt-in' to the study by typing or pasting a link into an internet search engine, or telephoning or emailing the researchers to request a questionnaire. A likely consequence of this is that overall levels of bushfire planning and preparation in the communities studied are probably appreciably lower than those described here.

Table 2 shows the percentage of householders in the three intention groups (leave, stay and defend, wait and see) who reported having completed the 21 bushfire safety preparation activities. An exploratory factor analysis of preparation activity item score inter-correlations, followed by an item-homogeneity analysis indicated that the 21-item checklist comprised four subscales as proposed⁴:

- Leave - four items ($\alpha = .61$)
- Active House Defence - eight items ($\alpha = .82$)
- Reduce Danger to House - four items ($\alpha = .79$), and
- Reduce House Vulnerability - five items ($\alpha = .69$).

Bushfire safety planning

Having a bushfire safety plan is considered by fire agencies to be an essential ingredient of householder bushfire safety. Examination of Table 2 indicates rather

low levels of household bushfire safety planning. For those intending to leave, the percentages of households with a bushfire safety plan were 34 per cent for a day of severe weather or worse and 39 per cent for when there was a warning that bushfire was threatening homes. For those who intended to stay and defend the figure was 56 per cent for both situations. For those intending to wait and see what developed the figure was 24 per cent for both situations⁵.

Preparations for active house defence and reducing danger to the house

There is good evidence that houses which are defended against bushfire attack are more likely to survive compared with undefended houses (Blanchi & Leonard 2008). However, in the 2009 Victorian bushfires, 113 of the 173 deaths occurred in houses. In their analysis of transcripts of interviews with residents impacted by the 2009 Victorian Black Saturday bushfires, McLennan, Elliott and Omodei (2012a) proposed a definition of a 'high' level of preparation for staying and defending, based on field observations, analysis of interview transcripts, and expert opinion:

'...vegetation clearing, independent water supply and independent power source; plus two or more of: sprinklers, implements, water containers, protective clothing' (p. 919).

Inspection of Table 2 suggests levels of preparation reported by an appreciable percentage of those intending to stay and defend were probably inadequate for safe defence of a home under severe or extreme fire danger weather conditions. A supplementary analysis showed that 54 per cent of householders who intended to stay and defend property would warrant a 'high' level of preparation rating using the above definition.

Preparations for leaving

Several studies have found that many householders who leave following a bushfire threat warning do so late, potentially under conditions in which lives are in jeopardy (McLennan, Elliott & Omodei 2012b, Tibbits & Whittaker 2007, Whittaker *et al.* 2013). Several reports have documented the dangers associated with late evacuations (Handmer, O'Neill & Killalea 2010, McLennan, Elliott & Omodei 2012b, Proudley 2008, Wilson & Ferguson 1984). An analysis of bushfire fatalities in Australia during the period 1900 to 2008 (Haynes *et al.* 2010) showed that late evacuation was the circumstance most often associated with bushfire deaths, accounting for 32 per cent of all fatalities. McLennan, Elliott and Omodei (2012a) proposed the following definition of a 'high' level of preparation for leaving following a bushfire threat:

'...detailed evacuation plan including three or more of: safety of documents and valuables, arrangements for pets/livestock, destination, evacuation routes, necessities for family needs for 24 hours or more' (p. 919).

⁴ Principal Components Analysis was used, four components with eigenvalues > 1.0 were extracted, Varimax rotation was employed: (1) Active Defence, eigenvalue = 5.90; (2) Reducing Danger to the House, eigenvalue = 1.83; (3) Reducing House Vulnerability, eigenvalue = 1.45; (4) Leaving, eigenvalue = 1.23. All four subscales had Cronbach's alpha (α) reliability values > .6.

⁵ In Table 2, responses have been collapsed to two alternatives, 'completed', 'not completed' (N/A was treated as a missing value). For the factor analysis and item-homogeneity analyses the original six-valued response scales were used, where Already Done = 5 and Will not do = 0.

Table 2: Percentage of householders in each intention group reporting preparatory actions completed.

Preparation Type	Preparation Action	Leave (n = 273)	Stay and Defend (N = 139)	Wait and See (n = 172)
Bushfire Safety Planning:	Prepared a plan involving all members of the household for what to do when a day of severe or worse fire danger weather is forecast or declared for your region	35%	56%	24%
	Prepared a plan involving all members of the household for what to do when there is a warning that there is a bushfire threatening your home	39%	56%	24%
Preparations For Leaving	Planned what to do if you decided to leave your home because of the risk of a bushfire (e.g., where to go and stay; the route to take; what to do about pets/livestock)	52%	62%	41%
	Identified a location nearby where you, or other family members, could shelter safely if you had to leave your home because of a bushfire	61%	74%	61%
	Checked that you have enough home contents and building insurances	87%	89%	86%
	Stored important documents and possessions safely elsewhere, or in a fire-proof location on site, or have them packed ready to take with you when you leave.	40%	38%	37%
Preparations For Active House Defense:	Installed a pump that does not depend on mains electric power (i.e. petrol, diesel-driven or electrically powered by a generator)	20%	59%	19%
	Installed a water tank for firefighting purposes and/or to supply a sprinkler system	32%	68%	30%
	Obtained and prepared firefighting equipment such as ladders, buckets and mops	27%	75%	35%
	Prepared a kit of protective clothing and gear (boots, smoke masks, goggles for members of the household)	21%	63%	22%
	Obtained and prepared hoses long enough to reach all parts of the house	41%	75%	49%
	Installed a sprinkler system on or around the house	8%	34%	14%
	Obtained a battery-powered radio with fresh batteries	53%	76%	51%
Preparations For Reducing Danger to the House:	Installed or constructed a fire shelter or bunker in which to take refuge if necessary	2%	12%	4%
	Removed bushes close to the house and cut back overhanging tree branches	39%	68%	42%
	Cleared leaves, twigs, long grass from around the house to a distance of 20-30 metres	46%	69%	49%
	Moved combustible material such as firewood, garden furniture, lawn mower fuel, paint tins, old cars or tyres away from the house	46%	69%	49%
Preparations For Reducing House Vulnerability:	Used landscaping, tree planting, or the layout of the garden to protect the house from bushfires	29%	59%	39%
	Enclosed under-floor spaces to prevent embers or flames from entering	48%	62%	60%
	Covered gaps and vents to reduce the risk of embers entering the house through openings under the roof or in walls	30%	48%	30%
	Installed seals and/or draft protectors around windows and doors	32%	46%	52%
	Installed roof gutter protection	26%	40%	26%
	Installed shutters for windows	1%	3%	3%

Examination of Table 2 shows a minority of householders intending to leave if threatened (39 per cent) had planned and prepared to leave safely. Overall levels of preparing to leave safely among this group were no greater than those reported by householders intending to stay and defend and those intending to wait and see. A supplementary analysis showed that 30 per cent of those who intended to leave would warrant a 'high' level of preparation rating using the above definition.

It is noteworthy that relatively few of those intending to leave reported undertaking actions to reduce danger to their house or to reduce vulnerability of their house in order to increase the likelihood of the property surviving in their absence. Recent reviews of (mostly) North American research concerning failure of householders to take preparatory wildfire mitigation activities suggests that perceived low probability of their home being threatened by a wildfire is a major determinant (McCaffrey *et al.* 2013, McFarlane, McGee & Faulkner 2011). While many bushfires occur during each fire season few fires result in property loss. Even in high bushfire risk areas the probability that a given house will be seriously threatened by a bushfire during the life of a household is vanishingly small (McAneney, Chan & Pitman, 2009). Fire agencies thus have a difficult task in persuading householders to take precautions against a threat which will never be experienced by most residents.

Interviews conducted by Bushfire CRC research teams with 238 residents affected by January 2013 bushfires in NSW (McLennan, Wright & Mackie. 2013)⁶ suggested that householders who had not planned to stay and defend their property were likely to be relatively less engaged with bushfire safety as an issue. Before the January 2013 bushfires a typical perspective of those residents who had never previously been threatened by a bushfire could perhaps be expressed as 'bushfires happen elsewhere and to other people'. To the extent that potential bushfire threat had ever been considered, most had believed previously that evacuation would be a simple matter in the unlikely event it was ever necessary. Actually being threatened by an imminent bushfire was a frightening, confusing and difficult experience for some. In their community bushfire safety messages to householders fire agencies could perhaps use house and contents insurance as an analogy: few houses catch fire but if they do adequate insurance is a godsend. Likewise, few households are threatened seriously by a bushfire, but if such a threat occurs having planned and prepared for it may prove a lifesaver.

Limitations of space preclude discussion of respondents who chose the 'wait and see' option. To summarise, these householders did not view their waiting as involving additional risk. They were reluctant to commit to a final decision because they feared making the wrong choice: leaving unnecessarily and being exposed to danger on roads and perhaps losing a house which could have been defended safely, or staying and having to survive a worse than expected

bushfire attack. A detailed account of the findings about why householders intend to 'wait and see' following a bushfire warning is in McLennan and Elliott (2013).

Note: the survey was conducted in 2012, following what had been three relatively quiet bushfire seasons in south-eastern Australia. The calendar year 2013 was the worst in the region since 2009, with scores of houses destroyed in New South Wales, South Australia, Tasmania and Victoria. It remains to be seen whether these bushfire events have led to higher levels of householder preparation for possible future bushfire threats.

Acknowledgements

The research was funded by a Bushfire Cooperative Research Centre (CRC) Extension Grant. The views expressed here are those of the authors and do not necessarily represent the views of the Bushfire CRC Board. We are grateful for the assistance provided by Andrew Stark and Rohan Samara (ACT Rural Fire Service), Tanyia Tuckey and Ruby Gamble (NSW Rural Fire Service), Damien Killalea (Tasmania Fire Service), Max Garner (North Warrandyte Community Fireguard), and Heidi Cochrane (La Trobe University School of Psychological Science, Albury-Wodonga campus) in carrying out the survey.

References

- Australian Bureau of Statistics 2011, *Community profiles*. Canberra: ABS. At: www.abs.gov.au/websitedbs/censushome.nsf/home/communityprofiles.
- Australian Fire Authorities Council 2005, *Position paper on bushfires and community safety*. (AFAC: East Melbourne). T: www.royalcommission.vic.gov.au/Documents/Document-files/Exhibits/TEN-001-001-0077.
- Australasian Fire and Emergency Services Authorities Council 2010, *Bushfires and community safety: position; version 4.1*. East Melbourne: AFAC. At: http://knowledgeweb.afac.com.au/positions/documents/AFAC_Position_Bushfires_Community_Safety_v4.1.pdf.
- Blanchi, R & Leonard. J 2008, *Property safety: Judging structural safety*. In: J Handmer & K Haynes (Eds.). *Community bushfire safety* pp. 77-85. Melbourne: CSIRO Publishing.
- Bushfire Cooperative Research Centre 2010, *Bushfire CRC – Communicating risk*. Melbourne: Bushfire CRC. At: www.bushfirecrc.com/research/program-2.
- Cary, GJ, Collett, G, Gill, MA, Clayton, H & Dovers, S 2012, *Future scenarios and Australian bushfires: Report on a Bushfire CRC workshop*. The Australian Journal of Emergency Management, Vol. 27, No. 3, pp. 34-40.
- Chen, K & McAneney, J 2004, *Quantifying bushfire penetration into urban areas in Australia*. *Geophysical Research Letters*, Vol. 1, No. 12, L12212. doi:10.1029/2004GL020244.
- Council of Australian Governments 2011, *National Strategy for Disaster Resilience*. Canberra: COAG. At: www.coag.gov.au/sites/default/files/national_strategy_disaster_resilience.pdf.
- Fire Services Commissioner of Victoria 2012, *Bushfire safety policy framework*. Melbourne: FSCV. At: www.firecommissioner.vic.gov.au/wp-content/uploads/Bushfire_Safety_2012.pdf.

⁶ The 238 interviews were conducted with residents of bushfire affected areas near Coonabarabran (n = 83), Shoalhaven (n = 75), and Yass (n = 80), NSW.

- Gill, AM & Stephens, SL 2009, *Scientific and social challenges for the management of fire-prone wildland-urban interfaces*. *Environmental Research Letters*, Vol. 4: 034014. doi:10.1088/1748-9326/4/3/034014.
- Gill, AM, Stephens, SL & Cary, GJ 2013, *The worldwide "wildfire" problem*. *Ecological Applications*, Vol. 23, pp. 438-454. doi.org/10.1890/10-2213.1.
- Handmer, J, O'Neil, S & Killalea, D 2010, *Review of fatalities in the February 7, 2009, bushfires*. Melbourne: Centre For Risk and Community Safety RMIT University and Bushfire CRC: Melbourne. At: www.bushfirecrc.com/managed/resource/review-fatalities-february-7.pdf.
- Haynes, K, Handmer, J, McAneney, J, Tibbits, A & Coates, L 2010, *Australian bushfire fatalities 1900-2008: Exploring trends in relation to the 'Prepare, stay and defend or leave early' policy*. *Environmental Science & Policy*, Vol. 13, pp. 185-194. doi: 10.1016/j.envsci.2010.03.002.
- Hennessy, K, Lucas, C, Nicholls, N, Bathols, J, Suppiah, R & Ricketts, J 2006, *Climate change impacts on fire-weather in south-east Australia*. *Aspenvale Victoria: CSIRO*. At: http://laptop.deh.gov.au/soe/2006/publications/drs/pubs/334/ld/ld_24_climate_change_impacts_on_fire_weather.pdf.
- Liu, Y, Stanturf, J & Goodrick, S 2010, *Trends in global wildfire potential in a changing climate*. *Forest Ecology and Management*, Vol. 259, pp. 685-697. doi.org/10.1016/j.foreco.2009.09.002.
- McAneney, J, Chen, K, & Pitman, A 2009, *100-years of Australian bushfire property losses: Is the risk significant and is it increasing?*. *Journal of Environmental Management*, Vol. 90, pp. 2819-2822. doi: 10.1016/j.jenvman.2009.03.013.
- McCaffrey, S, Toman, E, Stidham, M & Shindler, B 2013, *Social science research related to wildfire management: An overview of recent findings and future research needs*. *International Journal of Wildland Fire*, Vol. 22, pp. 15-24. doi: 10.1071/WF11115.
- McFarlane, BL, McGee, TK & Faulkner, H 2011, *Complexity of homeowner wildfire risk mitigation: an integration of hazard theories*. *International Journal of Wildland Fire*, Vol. 20, pp. 921-931. doi: 10.1071/WF10096.
- McLennan, J & Elliott, G. 2011, *Checklist items for researchers: Householder preparations for bushfires*. Melbourne: School of Psychological Science La Trobe University and Bushfire CRC. At: www.bushfirecrc.com/managed/resource/checklist_items_for_researchers_occasional_report_2011.pdf.
- McLennan, J & Elliott, G 2013, 'Wait and see': the elephant in the community bushfire safety room? In R. P. Thornton & L. J. Wright (Eds.), *Proceedings of Bushfire CRC & AFAC 2012 Conference Research Forum 28 August 2012 Perth Convention and Exhibition Centre* (pp. 56-69). East Melbourne: Bushfire CRC. At: www.bushfirecrc.com/sites/default/files/managed/resource/final_mclennan_j.pdf.
- McLennan, J, Elliott, G & Beatson, R 2012, *Householders' stated bushfire survival intentions under hypothetical threat: Factors associated with choosing to leave, or stay and defend, or wait and see*. Melbourne: School of Psychological Science La Trobe University and Bushfire Cooperative Research Centre. At: <http://bushfirecrc.com/publications>.
- McLennan, J, Elliott, G & Omodei, M 2012a, *Householder decision making under imminent wildfire threat: stay and defend or leave?* *International Journal of Wildland Fire*, Vol. 21, pp. 915-925. doi: 10.1071/WF1106.
- McLennan, J, Elliott, G & Omodei, M 2012b, *Issues in community bushfire safety: Analyses of interviews conducted by the 2009 Victorian bushfires research task force*. Melbourne: School of Psychological Science La Trobe University and Bushfire Cooperative Research Centre. At: www.bushfirecrc.com/sites/default/files/managed/resource/issues_in_community_bushfire_safety-analyses_of_interviews_conducted_by_the_2009_victorian_bushfires_research_task_force.pdf.
- McLennan, J, Wright, L & Mackie, B 2013, *Community understanding and awareness of bushfire safety: January 2013 NSW bushfires*. Melbourne: School of Psychological Science La Trobe University and Bushfire Cooperative Research Centre. At: <http://bushfirecrc.com/publications>.
- Paton, D, Burgelt, P & Prior, T 2008, *Living with bushfire risk: Social and environmental influences on preparedness*. *The Australian Journal of Emergency Management*, Vol 23, No. 3, pp. 41-48.
- Paton, D, Kelly, G, Burgelt, P & Doherty, M 2006, *Preparing for bushfires: Understanding intentions*. *Disaster Prevention and Management*, Vol. 15, pp. 566-575.
- Penman, TD, Eriksen, C, Bianchi, R, Chladil, M, Gill, AM, Haynes, K, Leonard, J, McLennan, J & Bradstock, RA 2013, *Defining adequate means of wildfire preparation for property protection*. Centre for Environmental Risk Management of Bushfires. University of Wollongong (under review).
- Proudley, M 2008, *Fire, families and decisions*. *The Australian Journal of Emergency Management*, Vol. 23, No. 1, pp. 37-43.
- Tibbits, A, Handmer, J, Haynes, K, Lowe, T & Whittaker, J 2008, *Prepare, stay and defend or leave early*. In J. Handmer & K. Haynes (Eds). *Community bushfire safety* (pp. 59-71). Melbourne: CSIRO Publishing.
- Tibbits, A & Whittaker, J 2007, *Stay and defend or leave early: Policy, problems and experiences during the 2003 Victorian bushfires*. *Environmental Hazards*, Vol. 7, pp. 283-290.
- Whittaker, J, Haynes, K, Handmer, J & McLennan, J 2013, *Community safety during the 2009 Australian 'Black Saturday' bushfires: an analysis of household preparedness and response*. *International Journal of Wildland Fire* (published online). doi: 10.1071/WF12010.
- Whittaker, J, Haynes, K, McLennan, J, Handmer, J & Towers B 2010, *Victorian 2009 bushfire research response: Household mail survey*. Melbourne: Bushfire Cooperative Research Centre. At: www.bushfirecrc.com/research/vicfires-taskforce/Victorian-fires-mail-survey.
- Wilson, AAG. & Ferguson, IS 1986, *Predicting the probability of house survival during bushfires*. *Journal of Environmental Management*, Vol. 23, pp. 259-270.
- Wilson, AAG & Ferguson, IS 1984, *Fight or flee? A case study of the Mount Macedon bushfire*. *Australian Forestry*, Vol. 47, pp. 230-236.

About the authors

Dr Jim McLennan is an adjunct professor in the School of Psychological Science at La Trobe University. He was Research Leader for a Bushfire CRC project investigating householder behaviour during bushfires. Contact: j.mclennan@latrobe.edu.au.

Glenn Elliott is a research officer at the Centre for Sustainable Organisations and Work, Royal Melbourne Institute of Technology (RMIT). He was previously in the School of Psychological Science at La Trobe University working on Bushfire CRC projects.

Lyndsey Wright is research manager at the Bushfire Cooperative Research Centre.

Using existing social networks to improve emergency preparedness of supported community members

Kate Mora and Dr Jared Thomas, Opus Research, Katherine Nankivell, Wellington Region Emergency Management Office, and Stephen Flude, Wellington City Council, present results from research into community-based organisations in Wellington, NZ. ®

ABSTRACT

Populations with increased vulnerabilities (such as those with disabilities, the elderly and others with personal support needs) are generally considered difficult to reach with emergency preparedness messages, while being a high priority to emergency management agencies. This paper presents the results of a project working with community-based organisations to improve the preparedness of their clients. Surveys of clients, support workers and community organisation management in the Wellington region of New Zealand were completed that examined the needs and issues of these groups and the match (or mismatch) in expectations between them in an emergency situation. Based on the results of this research, a guide was developed for emergency management advisors engaging with community-based organisations to work with community members who require everyday personal support.

Introduction

Providing for vulnerable people in communities during a disaster is a concern for New Zealand Civil Defence Emergency Management (CDEM) as these groups are both harder to reach with preparedness messages and are likely to need additional assistance in a disaster. Recent disaster events have shown there is a greater risk of death and injury for these groups. For example, in New Orleans during *Hurricane Katrina*, over three quarters of those killed were aged over 60, despite this group making up only 15 per cent of the population (AARP 2006). As vulnerable community members can be difficult for CDEM to identify, this study aimed to examine the ways community-based organisations

could work with CDEM to provide special needs groups with the support they need, and increase emergency preparedness.

Previous attempts to identify vulnerable community members have focussed on geographical mapping of vulnerability (e.g. Morrow 1999), however this study focuses on using social networks already present in the community through community support workers. The rationale for using these existing social networks is that support workers have strong connections to their clients and understand their needs. Social support for vulnerable communities has proven benefits for resilience both in an emergency and prior to an emergency occurring. Staley, Alemagno & Shaffer-King (2011) found a relationship between reduced social isolation and emergency preparedness. Norris & Kaniasty (1996) previously reported that both perceived and received social support are important to resilience in disasters; the amount of support older people believe they will receive in a disaster may be more important to their resilience than how much support they actually receive. Like most organisations, community-based organisations will take time to restart after an emergency, but they can work with clients to improve preparedness and reduce the impact of their absence immediately after an event. In addition to formal support through community-based organisations, the majority of people have other social networks they can draw on for support including family, friends, neighbours and social groups such as churches, sport and hobby groups. The Statistics New Zealand Quality of Life Survey (2008) indicates that 97 per cent of New Zealanders belong to some form of social network. Community-based organisation staff can therefore work with clients to use these social networks as 'back-ups' in the case of emergency.

Experience from the Canterbury earthquakes in 2010 and 2011 emphasised the benefits of using these networks. For example, when vulnerable community members were identified as needing extra support in the Waimakariri district, social service groups in the area formed an interagency network to provide for their clients (S. James, personal communication,

April 20 2012). Therefore there is evidence to suggest that community groups and agencies are a good way to contact and engage with vulnerable members of the community, such as the elderly, people with physical or mental disability, refugees and migrants. In a previous review of preparedness research, Finnis (2004) suggests developing relationships with such groups is an important step in developing mitigation measures. Following the Loma Prieta earthquake in California in 1989, community-based organisations developed a formal collaborative framework, known as CARD (Collaborating Agencies Responding to Disasters, www.cardcanhelp.org 2012). CARD works as a link agency between community-based groups and emergency management and ensures community agencies can support their functioning after an event. It has proven to be a successful model for improving community-based organisation preparedness by providing resources and training to those working with vulnerable groups. This paper includes the results of a project conducted with community-based organisations in the greater Wellington region that aimed to establish a model for engagement with vulnerable community members.

Some definitions

For the purposes of the study, the term ‘community-based organisation’ (referred to as CBO) refers to agencies that provide support to clients in their everyday life, in most cases in the client’s home. These groups include (but are not limited to) groups that work with the elderly, those with physical disabilities, and those with mental health conditions. It is difficult to define what constitutes a vulnerable person or community. Definitions may be wide as all people are vulnerable in different situations or at different times in their lives (Handmer 2003, Norris *et al.* 2008, Bird *et al.* 2012). For this research vulnerable is defined as ‘Any person whose daily living is supported in some way by a CBO’. This research focusses primarily on communities identified as having daily support needs, rather than all those vulnerable. Therefore, the population studied may not necessarily all be vulnerable in a disaster, and likewise will not represent all those who will be vulnerable.

The research examines the connections between CBOs and their clients, and how these connections can be used to increase emergency preparedness in vulnerable populations. As a result, a guide for Emergency Management Advisors working with CBOs was developed to implement a programme for improving their clients’ emergency preparedness. The results of a survey of clients, staff and management of a number of CBOs are presented examining the needs of each group, the expectations they have of others and their understanding of processes in place for an emergency event. The implications of these results to inform practical solutions are discussed.

Method

Materials

Three surveys were created for each of the key groups being clients, support workers, and management of CBOs. The main focus of the surveys was to identify gaps in expectations between the different groups. The main topics included:

- the support needs of clients
- workloads of support workers, and
- issues around business continuity planning and the additional resource needed for CBOs to support the CDEM in increasing emergency preparedness.

Participants

An invitation to participate in the survey was distributed to the management of a number of CBOs. A snowballing technique was used to recruit further CBOs to take part in the project. The survey was completed in either a web-based or paper-based version (both using Survey Crafter Professional 4.0). The method of distribution to staff was up to the individual organisation and staff were asked to distribute the survey to a selection of their own clients. The number of each survey type completed is included in Table 1.

Table 1. Number of survey participants for each survey type.

Survey type	Frequency	Percentage of sample
Client	70	50.7%
Support worker	53	38.4%
Management	15	10.9%
Total	138	

A sample of participating organisations was also invited to a workshop to discuss the results and develop solutions for the issues raised.

Results

Connections between clients and CBOs

On average, clients identified 2.19 agencies that they received regular support from. Table 2 shows the frequency of client visits based on client and support worker reports. Overall, most receive visits from CBOs once a week.

Table 2. Frequency of client visits.

	How often would you have a visit from someone from any community-based organisation?	What is the most often you would visit any of your clients?	What is the least often you would visit any of your clients?
Every day	17.0%	11.4%	2.8%
4-6 times a week	24.5%	12.9%	5.8%
2-3 times a week	22.6%	25.7%	15.4%
Once a week	18.9%	27.1%	30.8%
Once a fortnight	1.9%	4.3%	9.6%
Once a month	0%	8.6%	11.5%
Other	15.1%	10.0%	21.2%

Clients were also asked if they had ever missed an appointment with a CBO and the impact that would have on their daily living. Fourteen per cent had missed an appointment in the past, and over half of respondents indicated that missing an appointment would have some or a large impact on their daily living.

Support workers were also asked how many clients they personally support. On average, support workers were supporting 14 clients. This result suggests that support workers are probably unable to provide support to all their clients in an emergency situation as this is a high workload, particularly as there could be constraints to their ability to travel easily.

Client connections to other support networks

For an understanding of the level of social connectedness of the clients (and therefore the potential for support networks outside the CBOs), participants were asked the questions presented in Figure 1. As can be seen in the figure, only a small number of participants talk to their neighbours on a regular basis, but most have contact with friends or family outside the home regularly. Around half also participated in activities in their community. These results suggest there are wider social networks available to most clients, but there could be improvement to relationships with neighbours, particularly due to their close proximity in a disaster.

Client preparedness for emergencies

Clients were asked what preparedness measures they currently had in place (see Figure 2). Overall, clients were reasonably well prepared. However given the likelihood of needing assistance from others, the main concern is that only 35 per cent have an emergency plan which includes the contact details of support network members.

The majority of participants also indicated that their medications would last for a week or more, suggesting they had planned for their medication needs. However, almost 40 per cent of participants also suggested they could not stay in their own home for the recommended three days without assistance.

Figure 1: Social connectedness of clients outside community-based organisations.

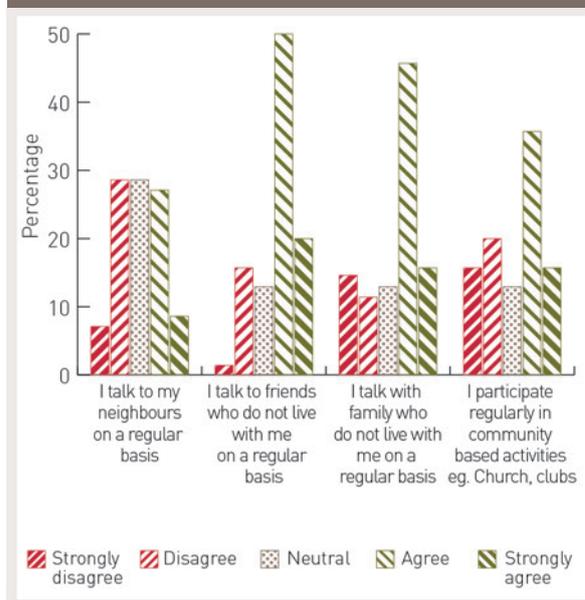
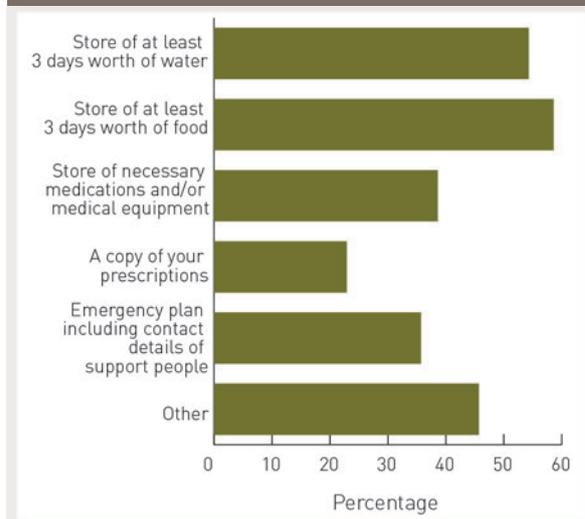


Figure 2: Preparedness measures clients had in place.



Client needs in emergencies

Participants in the client sample were asked for some information about the needs they would have in an emergency situation and the support they would have available. The majority of clients surveyed lived alone (57 per cent), 7 per cent with family, 7 per cent with friends, 13 per cent with flatmates and 15.7 per cent in another living situation (including residential care facilities). The majority believed that those with whom they lived could provide most of the support they would need in an emergency (53 per cent), however 18.6 per cent believed they would get none of the support they would need from those they lived with.

Table 3 presents client expectations of whom they believed would help them in a disaster if they needed to evacuate. Of those who indicated they would need help, 37 per cent indicated emergency services or CDEM would help them, and 23 per cent identified a CBO.

Table 3. Sources of help for vulnerable clients if assistance was needed to evacuate.

Source of assistance	Percentage of sample ¹
I wouldn't need help, I could evacuate myself	41.4%
People living in my home with me	28.6%
My neighbours	17.1%
Family or friends	28.6%
Emergency services/civil defence	37.1%
This or another CBO	22.9%
I don't know who would help me	7.1%

Participants were asked how easily they would survive without CBO contact in an emergency, as presented in Figure 3. The majority of respondents believed (e.g. agreed or strongly agreed) they could cook their own meals (55.7 per cent), but a large number (42.8 per cent) were concerned that missing an appointment would have a large impact on their daily living. Most (56.5 per cent) thought a family member or friend would check on them in an emergency, but fewer believed this about their neighbours (40.6 per cent).

Client and support worker expectations

Clients were asked how likely they thought it would be to receive a phone call or a home visit from a support worker after a disaster. These responses were compared with support worker expectations. Figure 4 presents the mean rating of the participants in each group, with scores closer to 5 indicating a high likelihood. Support workers indicated they would be significantly more likely to attempt to call their clients than the clients expected, $t(114) = -2.18, p < .05$. There was no significant difference in the rating of likelihood of a visit.

Figure 3: Client attitudes to emergency needs in absence of community-based organisation support.

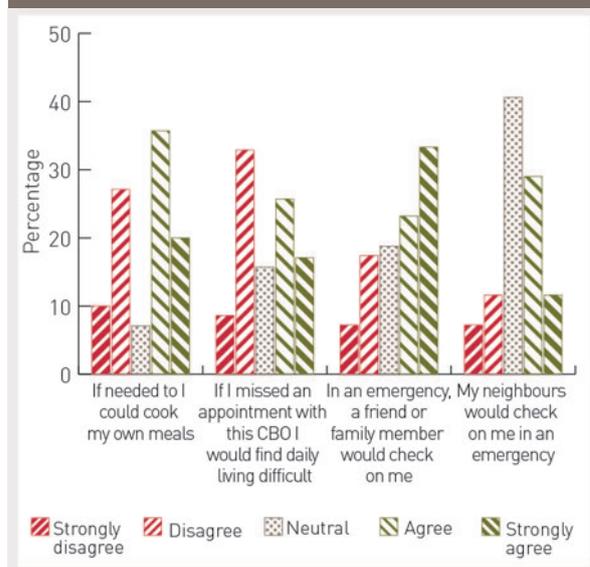
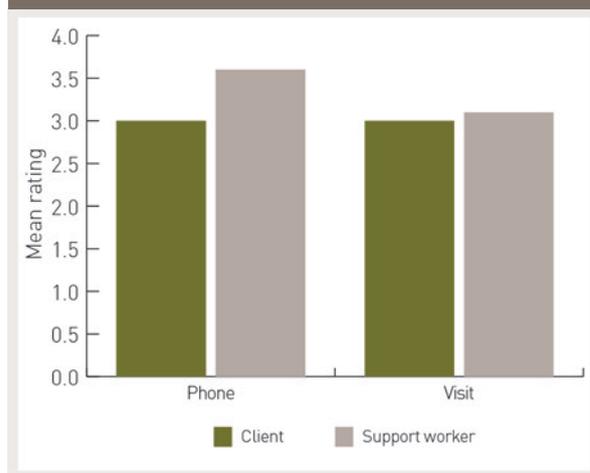


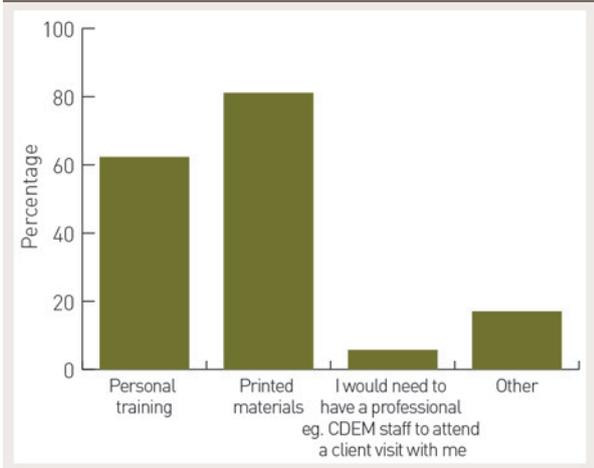
Figure 4: Client and support worker expectations of contact after a disaster.



Improvement of client preparedness

Support workers were asked about their own preparedness for a disaster; 73.1 per cent rated their preparedness as 'good' or 'very good', with another 23.1 per cent rating it as 'average'. Over 60 per cent indicated that it would be 'easy' or 'very easy' for them to incorporate emergency preparedness messages into the work they already do with their clients if they were provided with the right resources; outlined in Figure 5. The most popular suggestions were printed materials and training.

Figure 5: Identified resource needs for support workers to deliver preparedness messages.



Support worker and management expectations

Both support workers and CBO management were asked about the post-disaster plans and processes in place in their organisation to identify any gaps or miscommunications between these groups. The majority (64.2 per cent) of support workers were aware of some policy within the organisation for restarting operations after a disaster, and the majority believed there were systems in place within their organisation for prioritising clients (56.9 per cent). Even in the absence of any formal organisation systems, 62.3 per cent suggested they would have their own prioritisation system.

However, despite the majority of support workers being aware of the existence of policies for business continuity, there was room for improvement shown in the communication of what these plans meant to staff in a practical sense. For example, Figure 6 shows that 26.7 per cent of managers anticipate staff would not wait to be contacted before they returned to work, however only 17.3 per cent of staff anticipated this would be the case. Overall the vast majority of both staff and management expected that managers would contact staff. Therefore a process needs to be established within CBOs to ensure this will occur.

A large number of CBO clients deal with multiple agencies. Figure 7 and Figure 8 outline the expectations of support workers and management around the care of shared clients with other agencies. Overall, staff generally believed there were more arrangements in place than there actually were (based on management responses) in both non-emergency and emergency periods.

Finally, both support workers and their managers were asked about their attitudes to providing support to their clients in an emergency. For the questions shown in Figure 9, support workers were asked how much they agreed with each of the statements for themselves. Those responding from management were asked how much they agreed these statements would be true for their support workers.

Figure 6: Support worker and management expectations around returning to work after a disaster.

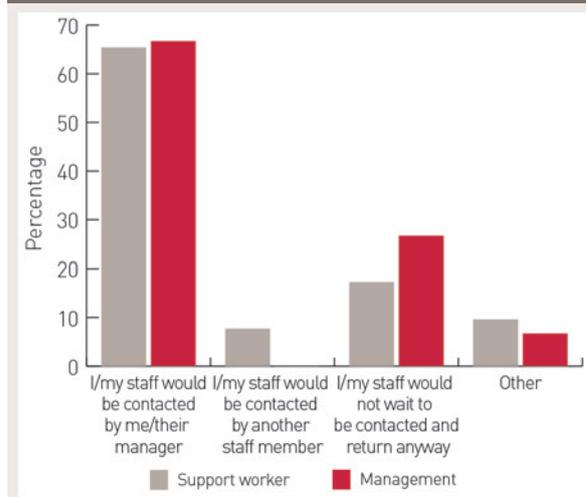


Figure 7: Support worker and management expectations of arrangements with other agencies in peacetime.

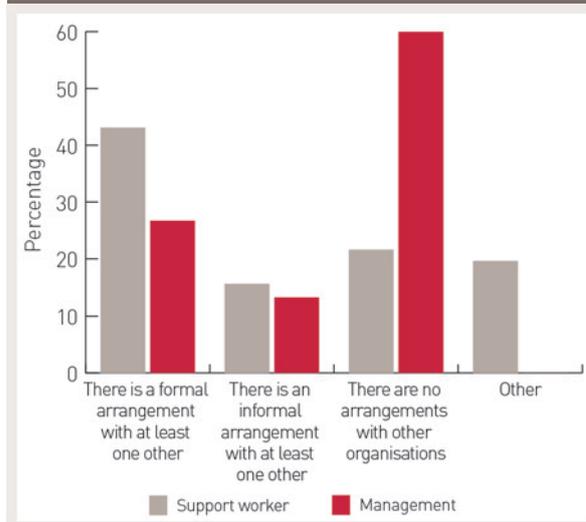


Figure 8: Support worker and management expectations of arrangements with other agencies in emergency.

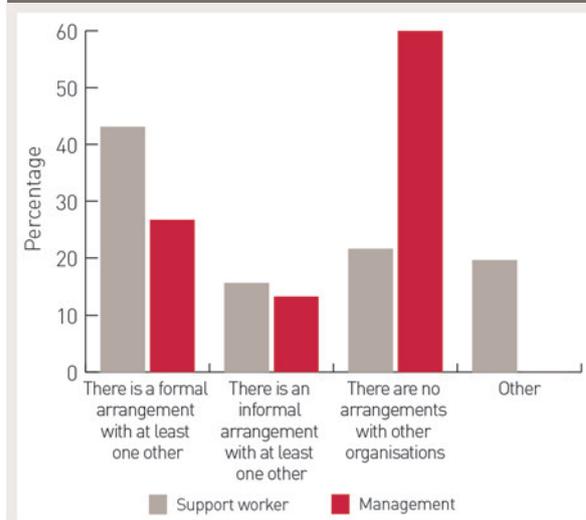
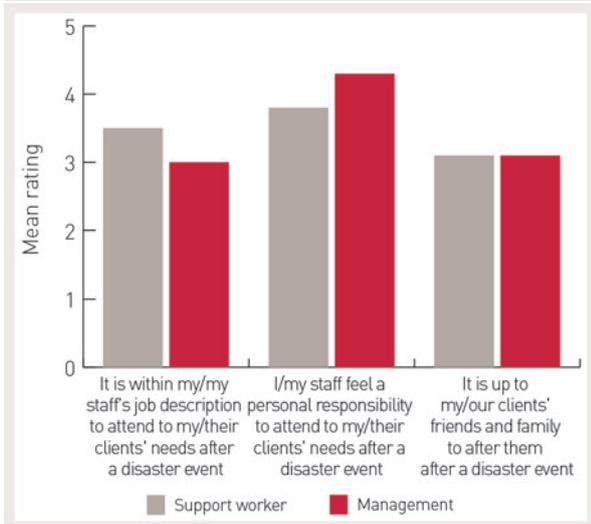


Figure 9: Support worker and management attitudes to providing care after a disaster



Discussion

Lessons from the Canterbury earthquakes indicate that support workers are well-placed to engage with vulnerable communities because of their existing, trusted relationships with their clients (S. James, personal communication, April 20 2012). Support workers are unlikely to provide direct support to all their clients in an emergency due to the high number of clients on average per worker (M = 14.09), in addition to having their own personal priorities to deal with. This finding emphasises the need for CBOs to engage

with their clients to improve personal support networks and other emergency preparedness activities. The key preparedness concern for vulnerable groups is improving planning for support during an emergency. Their reported levels of physical resource preparedness is similar, or better than, the general population, but the amount of planning for support networks is poor.

While not formalised through planning for an emergency situation, the perceived support of family, friend and CBO networks was high for those surveyed. This indicates that vulnerable community members will have the positive effects on their resilience indicated by previous research (e.g. Norris & Kaniasty 1996). One area that could be improved is their connections to neighbours as very few participants indicated a close relationship. This contact should be encouraged as those in closest proximity in a disaster will have better immediate capacity to assist.

In addition to personal support back-ups, CBOs need good business continuity planning to provide support as soon as possible after a disaster. One way this planning could be improved that was identified through this research is through improved communication of existing plans to staff. It was found that staff are aware of the planning being in place, but are unaware of how the plans affect them directly, particularly around their return to work.

The research also established a willingness of organisations to work together, as well as confirming there is a strong overlap between the organisations and the clients they care for. Therefore there may be scope in New Zealand in the future to establish formal



Image: George Armstrong, FEMA

Many volunteer agencies bring disaster aid to victims.

relationships between agencies providing support to vulnerable community members, such as is undertaken by the CARD project in the United States. However such an arrangement will first require a number of barriers to be overcome. The key issues identified within the workshop process were related to client privacy and identifying and resourcing an agency to manage the co-ordination of information. Some information sharing does occur reactively in an emergency event, but there is still a need for proactive, pre-event co-ordination.

A guide for Emergency Management Advisors was developed based on this research to engage with CBOs to help improve the emergency preparedness of their vulnerable clients (Wellington Region Emergency Management Office 2013). The findings presented form an evidence base for a programme of training and resources for support workers in the community. One such resource was an emergency checklist for ensuring planning is done with vulnerable community members and communicated to all members of their support network. It allows a clear method of communication between support workers as many vulnerable clients will be supported by multiple agencies. This removes the concern that preparedness messages are repeated unnecessarily and possibly upsetting clients.

This research shows that CBOs and their staff are willing and able to assist emergency management organisations in engaging with vulnerable community members who may not be reached by standard preparedness messages and campaigns, despite their increased need for that support. However this assistance needs to be given in context of their everyday work with clients on often limited timetables and budgets, so efficient training and resources are required. The Emergency Management Advisor's guide provides the resources based on this research in a way that works within the current support worker's role.

Acknowledgement

This research was funded by the Ministry of Civil Defence and Emergency Management CDEM Resilience Fund. The authors would also like to acknowledge Wellington Region Emergency Management Office and Wellington City Council for their involvement, as well as all the community-based organisations and stakeholders that took part in the survey and workshop.

References

- AARP 2006, *We can do better: Lessons learned for protecting older persons in disasters*. Washington, D.C. AARP.
- Bird, D, King, D, Haynes, K, Box, P, Okada, T & Nairn, K 2013, *Impact of the 2010–11 floods and the factors that inhibit and enable household adaptation strategies*, National Climate Change Adaptation Research Facility, Gold Coast.
- Collaborating Agencies Responding to Disasters 2012, At: www.cardcanhelp.org [16 January 2012].
- Finnis, K 2004, *Creating a resilient New Zealand: Can public education and community development campaigns create prepared communities? An examination of preparedness motivation strategies*. Report for the Ministry of Civil Defence and Emergency Management. MCDEM: Wellington.
- Handmer, J 2003, *We are all vulnerable*. *Australian Journal of Emergency Management*, 18(3), pp. 55–60.
- Morrow, BH 1999, *Identifying and mapping community vulnerability*. *Disasters*, 23(1), pp. 1–18.
- Norris, FH & Kaniasty, K 1996, *Received and perceived social support in times of stress: A test of the social support deterioration deterrence model*. *Journal of Personality and Social Psychology*, 71(3), pp. 498–511.
- Staley, JA, Alemagno, S & Shaffer-King, P 2011, *Senior adult emergency preparedness: What does it really mean?* *Journal of Emergency Management*, 9(6), pp. 47–55.
- Statistics New Zealand 2008, *Quality of Life Survey*. Wellington: Statistics New Zealand.
- Wellington Region Emergency Management Office 2013, *Working with social agencies to support vulnerable communities*. Wellington Region CDEM Group: Wellington. At: www.getprepared.org.nz/publications.

About the authors

Kate Mora is a Senior Researcher in the Behavioural Sciences team at Opus Research, a unit of Opus International Consultants. She has particular interest in using an applied psychological approach to studying behavioural responses following natural hazard events, and developing methods to predict future behaviour.

Dr Jared Thomas is Research Manager of the Behavioural Sciences team at Opus Research. He has over a decade of experience in applied psychology, in particular research methods, scale development and attitude shift, including responses to natural hazard events.

Kathryn Nankivell was formerly an Emergency Management Advisor at the Wellington Region Emergency Management Office. She has a particular interest in working with vulnerable community members and engagement with community-based organisations.

Stephen Flude was formerly the Community Resilience Adviser at Wellington City Council. In this role, he worked closely with a range of community-based organisations on improving resilience in the community.

Disaster survivors: a narrative approach towards emotional recovery

Dr Christina Kargillis, Dr Mayumi Kako and Associate Professor David Gillham, Flinders University, discuss the contexts and range of emotional impacts stemming from disaster events and explore the use of narrative for recovery. 

ABSTRACT

This paper explores the use of narrative practice in relation to emotional recovery from disaster events. Narrative could provide a useful way to understand, acknowledge and convey the emotional impact on disaster survivors in order to help build resilience for the affected community, and potentially for other communities. Importantly, such an approach may also reveal developments which have assisted in social recovery following the event. The emotional impact of disaster is not well understood and is often discounted in recovery activities in favour of a purely economic approach. Further research is required in order to understand its scope and to better inform future recovery policy. The article firstly discusses the contexts and range of emotional impacts stemming from disaster events before exploring a rationale for the use of narrative in such a setting. This is contextualised within the realm of social capital and disaster resilience and an appropriate form of narrative for inclusion within a recovery strategy is proposed.

Introduction

This paper offers a discussion on narrative approach and methodology in relation to assisting in the emotional recovery of disaster survivors. The use of narrative and storytelling is proposed, which may be applied to address individual recovery through the construction of stories as well as assisting social community recovery through the sharing of these stories. By consolidating an understanding of survivor experiences factors can be retrospectively identified, which have helped or hindered the capacity of individuals and the communities to heal.

As literature suggests (Cox & Perry 2011, Diaz & Dayal 2008), survivors of disasters such as fire and flood may face extended periods of ensuing psychological suffering stemming from their experiences, which may include loss, disorientation and grief. In the context of social capital, the communities to which they belong may also endure affective dysfunction for an extended period of time (O'Brien *et al.* 2010, Aldrich 2012). The California Department of Mental Health (2011) maps the collective reactions of disaster. It suggests that community holds strong cohesion immediately after impact which is followed by a severe and extended period of disillusionment. This is followed by a gradual rise towards reconstruction which commences after one year. Within the reconstruction phase there exists a range of variables. It is within this phase that narrative work can potentially assist to promote progression through to recovery. Narrative can be used to understand and identify actions that may help individuals and communities to heal. This knowledge may build community resilience in the face of future disruption (Eyre 1999, Mooney 2011).

Contexts of emotional impact

Various studies have offered an exploration of the emotional effects and considerations of disaster, as well as the political construction behind their impact. Early studies recognised that the strength of communities can change from a position of solidarity to a position of uncaring, following disaster (Erikson 1976), once reliable support systems cease to function. This argues for a focus on rebuilding systems. However, Cox & Perry (2011) claim that current recovery scenarios typically demand unquestioning obedience of community in the recreation of pre-existing power structures, which, according to Mooney (2011) neglect emotional need. This social denial exacerbates the impact and the psychological distress becomes individualised and privatised (Cox & Perry 2011) as the urgency driving the recovery and rebuilding process obscures the social-psychological processes. This can have severe consequences where unmet emotional needs can 'undermine long-term sustainability and community resilience needs' (p. 408).

Diaz & Dayal (2008) claim individual loss of sense of place constitutes the most catastrophic impact of natural disasters, compounded by the observation that people's emotions are 'catching' (Kelham 2012) in a community. It is this observation which may also support the use of narrative as a cohesive device. Narrative is explored further on but entails an investigation into the actions and identity of the individual or community in order to develop a preferred or more useful story from which a new culture may be nurtured through the sharing of the narratives with the broader community.

Eyre's work on disaster recovery has identified complexities around post-traumatic stress disorder and bereavement and loss (1998), while displacement has been identified as a possible cause of 'profound feelings of grief and anxiety' (Erikson in Cox & Perry 2011, p. 396). These effects can be long-term or even permanent, emphasising the need for attention to this often-ignored aspect of recovery. Narrative practice has the potential to help reconstruct a positive and healing culture within this context.

In their study of Britain's foot and mouth epidemic, Mort *et al.* (2005) conclude that 'The use of a rural citizens panel allowed data capture from a wide spectrum of the rural population and showed that a greater number of workers and residents had traumatic experiences than has previously been reported.' This finding supports the value of undertaking a person-centred approach in the recovery process. In this study, the human impact was characterised by distress and feelings of bereavement as well as fear of a new disaster. Political mechanisms in the recovery process engendered a loss of trust in authority and governing systems by the affected community, along with a devaluing of local knowledge.

The study identified four key themes which effectively capture the range of emotional impact from the disaster. These themes are:

- **Altered lifescapes** concern the radical change in place during the crisis and its relationship towards health.
- **Trauma and recovery** largely concern the feeling of being trapped in a situation which one is powerless to change, involving distress, anguish, horror and re-traumatisation. Importantly in narrative work, it is within this category that qualities of endurance and sources of support were expressed by participants.
- **Trust in governance** echoes the inability to take control and make positive changes where chaos, loss of personal security, and powerlessness in the face of conflicting advice was evidenced.
- **Knowledge and place** Characterises a void between types of knowledge, from local experience and centralised sources.

While a narrative approach would likely address each theme area, it could further provide a frame for emotional and political investigation, yielding potential for policy improvement around recovery. It is an effective approach to help strengthen engagement, supporting Aldrich's view that strategic activities to deepen trust between authority groups and community members are a key area for potentially enhancing cohesion during and after the event; where social infrastructure through reconnecting, rather than fragmenting existing ties, 'may determine viability and resilience of communities hit by disaster' (2012, p. 24).

In her exploration of post-disaster rituals and symbols, Eyre (1999) suggests that unresolved issues relating to the political conditions around responsibility and justice in relation to disaster can potentially create ongoing trauma, where anniversaries may serve as a sore reminder of the little that has been achieved. She distinguishes this type of emotional reaction from grief stemming from the actual event, adding that the grief created may further be exacerbated when it is dismissed as unresolved grief stemming from the actual event. In contrast, she has found that event-based grief expressed through ritual can influence feelings of community solidarity (p. 25). Therefore it is important to understand the context of the grief and how ritual may assist with the emotional recovery process.

The rationale for storytelling in disaster

In 1999, Eyre posited: '...to whom will the distressed turn should the tenth, twentieth or thirtieth anniversary be the occasion of the first feelings of flashback and other symptoms of post-traumatic response?' (p. 26). However there is still a gap in contemporary recovery processes. This is evidenced by the continuing culture of recovery policy, which is focused on infrastructure and economics (Cox & Perry 2011). Largely, social counseling only occurs in an 'ad hoc response' (National Rural Health Alliance 2004). While 'psychological first aid' (Taylor *et al.* 2012) is provided to disaster sufferers in an immediate response, the emotional impact of disaster is not well understood and is often discounted in recovery activities. It is however gaining momentum in the literature as a significant impact with potentially long-term effects. Mooney *et al.* (2011) discuss the need for addressing individual recovery as part of a community recovery approach, where evidence suggests that the psychosocial recovery needs to build a supportive culture that engages and empowers individuals and communities.

Whittle *et al.* (2010) examine the aftermath of the 2007 floods in Hull, UK, noting that 'we need to keep hold of the ways in which forms of resilience and vulnerability were created, revealed and disrupted during the flood and, significantly, the flood recovery process. And we need to learn from these...' (p. 131). They follow with a recommendation to examine and evaluate the norms, practices and disputes around the recovery of the built environment. This paper extends

that recommendation into the sphere of emotional recovery where narrative practices are well-placed to unveil relevant actions and reactions. It is a hypothesis that by constructing and, importantly, communicating narratives around useful elements of the recovery story that may remain unidentified in part until the narrative is woven together. Emotional recovery may be aided both on an individual and a community level. The sharing of positively constructed narratives would then inform understanding of the elements involved in the landscapes of action and identity experienced by individuals and communities. As such they would demonstrate the useful functioning of social networks, norms and trust and assist recovery and the building of social capital.

It is anticipated that a narrative approach could potentially influence disaster recovery policy and funding towards a more holistic approach. This approach is based on what is found to be important to the individual in the first year following a disaster, when the immediacy of the trauma has subsided and the less extreme effects stemming from the event are revealed. Cox and Perry (2011) suggest that 'reorientation, the individual and collective negotiation of identity and belonging in the wake of disasters can be painful, stressful and confusing, but it can also be transformative' (p. 409). This is a key point for disaster afflicted communities to gain a richer understanding of their changing literal and metaphorical landscape(s). The subjective nature of the story assists in a transfer of learning through its empathetic quality. This could benefit communities at risk in acknowledging lessons learnt. Such an experience-based investigation would be well-placed to potentially influence policy, where the clarity of transfer along with the theoretical argument supporting the findings could be considered holistically.

Social capital and disaster resilience

O'Brien *et al.* (2010) explore disaster management through social learning in order to provide insight into coping and adjustment towards disruptive challenge, stating that lessons identified from disaster remain largely unincorporated into wider governance processes. They support effective community engagement practices in preparedness in order to establish low risk, and state that a focus on people and their environment, rather than the event, needs to occur. A narrative approach would provide such a focus. Aldrich (2012) claims that social capital best explains why communities build quickly after disaster, or else fail to do so. For example, few agencies seek to ensure that communities stay connected while in shelters or temporary housing during the disaster and recovery phase (p. 23). Mooney (2011) supports this claim and offers a strengths-based approach to recovery including goal-setting and problem-solving to aid disaster affected communities to focus on the potential for longer-term objectives. In light of this literature a narrative approach towards disaster survivors could contribute to the theoretical understanding of resilience through story analysis of relevant action and identity pertaining to the situation, thus deepening understanding and promoting cultural solidarity. Such community connectedness supports resilience against future shock. Resilience is taken here as an individual's tendency to cope with adversity which may result in the person (or community) returning to a previous state of normal functioning, or operating without negative effects (Masten 2009). In a psychological framework, it is the result of one's capacity to interact with their environment and processes that either promote well-being or protect against the overwhelming influence of risk factors (Zautra *et al.* 2010).



Norris *et al.* (2008) discuss disaster resilience as emergent from social capital, along with other factors, through a sense of belonging, sense of community, place attachment, and participation in society. Cox and Perry (2011) explore place as significant on a psycho-social level for disaster sufferers, as the 'ground upon which social capital and community disaster resilience are built' (p. 395). From this perspective, Cox and Perry argue that place is both 'the material and social site for the development of social capital, anchoring a sense of self, and a sense of self in relation, through memory and the meaning invested in that site through repeated interactions' (2011, p. 396). They claim that disaster represents the interruption of a seamless narrative, not only for the presence of the disaster event, but for the influx of resources into the community at precisely the time when those impacted are experiencing profound disorientation (p. 408). The use of narrative devices in recovery is an opportunity to literally change the narrative, following the response phase.

Eyre (1999) suggests that individual and collective expressions of grief may be therapeutic, as is also recognised in narrative practice. She explains the use of ritual in times of social crisis as collective representations of social groups and cautions against rituals dominated by political figures and identities, rather than affected communities. By empowering affected people through such ritual they may discover and confirm shared meaning. Thus strengthening social capital through sharing narratives may yield a renewed sense of social balance and morale.

Eyre (1999) cautions against rituals dominated by political figures and identities rather than affected communities.

Reflective narrative practice

A person-centred approach is best placed to (re)build social capital and psychological resilience in relation to disaster, by offering reflections and insight into useful activities surrounding the disaster event. It is not a life course approach (Hutchison 2011) which is suggested but, rather, an approach to take place in the reconstruction phase of disaster. As narrative reflects a subjective truth at any given point in time (Czarniawski 2011), it is not the intention to reflect oscillations in community cohesion but focus on constructing a preferred narrative (White & Epston 1990). Narrative can reveal pertinent information regarding community cohesion and healing, or alternatively what might have improved emotional well-being, but didn't transpire.

Shoter (2003) supports a reflective approach towards exploring suffering and distress over a problem-solving approach, so that a dialogue may begin for issues such as disorientation to be explored. Cox and Perry (2011, p. 409) cite this approach as bringing a revelation to survivors who, until offered the opportunity to reflect, would not otherwise be aware of their feelings of deep disorientation ensuing from the event. This is confirmed elsewhere through an oral history project where the bereaved experienced narrative transformations or 'epiphanies of self-understanding... [through] some fairly obvious questions which the interviewees had apparently not asked themselves before' (Kelham 2012, p. 57).

Storytelling is a reflective act, according to Clandinin and Connelly (2004), where narrative inquiry is its academic partner. Reflection was first termed by Schön (1983) and stems from lifelong learning principles where the person examines their experiences in order to learn from them (Bradbury 2010). Its emotional influence is a powerful characteristic in relating 'lessons' to the audience of the disseminated narrative (Benozzo 2011).

In some forms of narrative it is preferable to allow the participant to recount the story uninterrupted, where it would, in fact, be regarded as intrusive to use questioning. Only when the story is completed should it be followed with prompts such as 'what happened before/ after/ then...?' (Bauer 1996, p. 7). In other forms of narrative, reflective devices are embedded as part of the process through specific types of questioning in order to help the person through a critical incident. This approach is the result of seminal work by White and Epston in the social work domain. In this way, White *et al.* (in Shapiro & Ross 2002) employ the following question types.

Narrative question types

- **Deconstructive:** To show how stories are constructed and to situate the narrative in a larger system.
- **Renaming:** To support participant efficacy by sharing authorship and expertise.
- **Perspective:** To explore other people's views of the participant.
- **Opening Space:** To allow hopeful actions to surface; highlight participant efficacy regarding the issue.
- **Hypothetical (Miracle):** To stimulate participant imagination and identify different futures.
- **Preference:** To make sure that the exceptional moments are preferred to the 'problem story'.
- **Story Development:** To explore and linger on elements of the preferred story.
- **Redescription:** To help the participant recognise preferred qualities in themselves and probe implications for identity.

- **Bifurcation:** To help the participant recognise preferred qualities in themselves and probe implications for identity.
- **Stopper:** To refocus participant when s/he seems to get stuck in the old story.
- **Audience:** To identify supportive witnesses to the new or developing story.

This focus addresses psychological issues and possible resolutions as central to the investigation. This reflective narrative methodology of the White *et al.* (2002) model incorporating Brookfield's method of reflection (1998) provides a reliable framework for the approach. Brookfield's perspective harmonises well with narrative practice through his view that autobiographies are 'one of the most important sources of insight into teaching to which we have access' (1995, p. 31). His use of four lenses fits with the questioning guidelines correlate with White *et al.* These have merged as follows:

- **Lens 1: Autobiography.** Participants can begin to view their critical incidents as collective experiences and can further access a deeper level of emotion. This lens fits with 'Deconstruction' as it provides context for the individual within the collective framework
- **Lens 2: Through the learners' eyes.** Survivors are able to view themselves objectively and understand how the audience interprets (or misinterprets) their experience. This lens would help survivors relate more responsively. This lens fits with 'Perspective'
- **Lens 3: The experience of colleagues** (adapted to: the experience of other disaster survivors). Other survivors serve as critical mirrors, reflecting back. Sharing experiences with other survivors through access to their narratives and thus increasing perspective may enhance the opportunity of uncovering useful information. An additional feature of this lens is for the personal benefit of the survivor, in helping to resolve feelings of being disenfranchised, afforded through the shared experience. This lens fits with 'Renaming' and 'Perspective' (shared experience).
- **Lens 4: Accessing theoretical literature in order to label areas of confusion.** Introducing labels can potentially help survivors 'name' their confusions in regards to the disaster event where disorientation and isolation are among the key themes that we are concerned with. This lens fits with 'Redescription' (ie labeling the confusion).

Ethical considerations

Any execution of the proposed approach would need to address ethical considerations. As an exemplar of ethical issues regarding disaster survivors, Muller (2010) specifically deals with trauma in accessing survivors of the Black Saturday bushfires in Australia. The guidelines presented were developed by the media in the coverage of the bushfire victims and offer a useful approach. While the approach would not entail media coverage, but rather an in-depth exploration of emotional issues, and, in part, their resolution, any attempts to execute such an investigation should aim to avoid intrusion. Further and to the contrary, an invitation for survivors to share their stories would provide an opportunity for release and better understanding of their own experiences. Those who fear vulnerability within such an activity would potentially decline the invitation.

Conclusion

It is proposed that a narrative approach towards addressing emotional impact of disaster survivors could provide five key benefits. Firstly, narrative inquiry is primarily acknowledged for its capacity to help people, either individually or collectively, to reframe their experience and create meaning in their lives (Clandinin & Connelly 2004). Subjectively, these stories allow survivors to express the experience in their own words and to understand the 'why' behind their claims (Lyons & Kubler LaBoskey 2002). Secondly, their communities could collectively benefit through the sharing of stories, thus acknowledging the emotional or psycho-social impact. The form of narrative proposed would assist in this aim. Thirdly, narrative is recognised as a powerful tool in transfer of learning through its aim to communicate meaning (Bruner 1990). The extent to which these stories help to address other afflicted communities is a key consideration. Fourth, the approach could potentially influence policy through a more holistic approach towards recovery. Finally, any case studies ensuing from the execution of such an approach could provide a valuable education resource for multiple user groups including communities-at-risk as well as emergency services workers, due to the emphasis on the perspective of the survivor.

References

- Aldrich, D 2012, *Social, Not Physical, Infrastructure: The Critical Role of Civil Society after the 1923 Tokyo Earthquake*, *Disasters* 3(36) pp. 398-419.
- Bauer, M 1996, *The Narrative Interview: Comments on a technique for qualitative data collection*. *Papers in Social Research Methods. Qualitative Series No 1*. London: London School of Economics and Political Science, Methodology Institute.
- Benozzo, A 2011, *An Experienced Academic Becomes Participant in a Training Course*. *Creative Approaches to Research* 4(1) pp. 19-32.

- Bradbury, H [ed] 2010, *Beyond Reflective Practice: New Approaches to Professional Lifelong Learning*. Milton Park, Abingdon, Oxon: Routledge.
- Brookfield, S 1998, *Critically Reflective Practice*, *Journal of Continuing Education in the Health Profession* 18, pp. 197-203.
- Brookfield, S 1995, *Becoming a Critically Reflective Teacher*. San Francisco: Jossey-Bass.
- Bruner, J 1990, *Acts of Meaning*. Cambridge, Mass: Harvard University Press.
- The California Department of Mental Health. At: www.dmh.ca.gov/Disaster/CCPToolkit/PhasesOfDisaster.asp [10 December 2013].
- Clandinin, D & Connelly, F 2004, *Narrative Inquiry: Experience and Story: Qualitative Research*. San Francisco, Calif: Jossey-Bass.
- Cox, R & Perry, KM 2011, *Like a Fish Out Of Water: Reconsidering Disaster Recovery and the Role of Place and Social Capital in Community Disaster Resilience*, *American Journal of Psychology* 48, pp. 395-411.
- Czarniawski, B 2011, *The Influence of Fictional Narrative Experience on Work Outcomes: A Conceptual Analysis and Research Model*. *Review of General Psychology*. 15(4) pp. 361-370.
- Diaz, J & Dayal, A 2008, *Sense of place: A model for Community Based Psychosocial Support Programs*, *Australasian Journal of Disaster and Trauma Studies* 1, pp. 1174-4707.
- Erikson, K 1976, *Disaster at Buffalo Creek. Loss of communality at Buffalo Creek*. *The American Journal of Psychiatry*. 133(3), pp. 302-305.
- Eyre, A 1999, *In remembrance: post-disaster rituals and symbols*. *Australian Journal of Emergency Management*. Spring 14(3), pp. 23-29.
- Eyre, A 1998, *Mass Disaster in Weston*, R, Martin, T & Anderson, Y (eds) *Bereavement and Loss: Managing Change*. Blackwell Science, Oxford.
- Eyre, A 1988, *More than PTSD: Proactive Responses Among Disaster Survivors*. *Australasian Journal of Disaster and Trauma Studies* 2. At: www.massey.ac.nz/~trauma/issues/1998-2/eyre.htm%20.
- Hutchison, E 2011, *Dimensions of Human Behaviour: The Changing Life Course*. Fourth Edition. Sage Publications ISBN:9781412976411.
- Kelham, M 2012, *Creating and Confronting Community: Suicide Stories in Central Australia*, *Oral History Association of Australia Journal* 34, pp. 54-61.
- Lyons, N & Kubler LaBoskey, V 2002, *Narrative Inquiry in Practice: Advancing the Knowledge of Teaching*. New York: Teachers College Press.
- Masten, AS 2009, *Ordinary Magic: Lessons from research on resilience in human development* *Education Canada* 49 (3), pp. 28-32.
- Mooney, M, Paton, D, de Terte, I, Johal, S, Gardner, AN, Gardner, D, Collins, S, Glavovic, S, Huggins, T, Johnston, L, Chambers, R, Johnston, D 2011, *Psychosocial Recovery from Disasters: A Framework Informed by Evidence*, *New Zealand Journal of Psychology* 40(4), pp. 26-38.
- Mort, M, Convery, I, Baxter, J, & Bailey, C 2005, *Psychosocial effects of the 2001 UK foot and mouth disease epidemic in a rural population: qualitative diary based study*. At: www.bmj.com/content/331/7527/1234 [16 February 2014].
- Muller, D 2010, *Ethics and Trauma: Lessons from Media Coverage of Black Saturday*, *Australian Journal of Rural Health* 18(1), pp. 5-10.
- National Rural Health Alliance Inc. 2004, *Rural Communities and Disaster Recovery, Position Paper, September 2004*. At: www.ruralhealth.org.au.
- Norris, F, Stevens, S, Pfefferbaum, B, Wyche, K & Pfefferbaum, R 2008, *Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness*, *American Journal of Community Psychology* 41(1-2), pp. 1573-2770.
- O'Brien, G, O'Keefe, P, Gadema, Z & Swords, J 2010, *Approaching Disaster Management through Social Learning*, *Disaster Prevention and Management* 19(4), pp. 498-508.
- Shapiro, J & Ross, V 2002, *Applications of Narrative Theory and Therapy to the Practice of Family Medicine*, *Family Medicine* 34(2), pp. 96-100.
- Schön, D 1983, *The Reflective Practitioner, How Professionals Think In Action*. New York: Basic Books.
- Shotter, J 2003, *Real presences: Meaning as living movement in a participatory world*, *Theory and Psychology* 13(4), pp. 435-468.
- Taylor, M, Wells, G, Howell, G & Raphael, B 2012, *The Role of Social Media as Psychological First Aid as a Support to Community Resilience Building: a Facebook Study from Cyclone Yasi Update*, *Australian Journal of Emergency Management* 27(1), pp. 20-26.
- White, M & Epston, D 1990, *Narrative Means to Therapeutic Ends*. WW Norton and Co. New York, US. ISBN 13: 9780393700985.
- Whittle, R, Medd, W, Deeming, H, Kashefi, E, Mort, M, Twigger R C, Walker, G, Watson, N 2010, *After the Rain – learning the lessons from flood recovery in Hull, final project report for Flood, Vulnerability and Urban Resilience: a real-time study of local recovery following the floods of June 2007 in Hull*, Lancaster University, Lancaster UK.
- Zautra, AJ, Hall, JS & Murray, KE 2010, *Resilience: A new definition of health for people and communities in Reich, W, Zautra, AJ & Hall, JS (eds.), Handbook of adult resilience*. New York: Guilford Press.

About the authors

Dr Kargillis and **Associate Professor Gillham** are academics in the Educational Scholarship group of the School of Nursing and Midwifery at Flinders University. The aim of this group is multidimensional but includes a focus upon cognition and learning enhancement.

Dr Kako is a member of the Flinders University Disaster Research Centre.

The frontline: a new focus for learning about leadership

Dr Nita L Cherry, Swinburne University of Technology, examines aspects of effective frontline leadership under conditions of complexity and its value in developing the understanding of contemporary leadership. 

ABSTRACT

Are there new lessons to be learned from frontline leaders and teams who regularly work under conditions of emergency and complexity? Commentators have observed that much existing leadership thinking in the management literature has been preoccupied with the contributions and capabilities of upper and middle managers in corporate settings. By drawing on contemporary thinking and some recent data about leadership in emergencies and at the frontline, this paper highlights the contributions that the sector can make to the understanding of 21st Century leadership more generally. But it also suggests some ways in which frontline leadership might usefully be refreshed if it is to withstand the relentless pressure of working in that complex space.

Introduction

In his review of Maclean's (1992) book *Young Men and Fire*, Weick (1996) paints a vivid and terse word picture of the Mann Gulch fire that killed 13 fire fighters in Montana in 1949. In Weick's words:

... the episode illuminates problems facing corporate leaders. Increasingly, corporate work unfolds in small, temporary outfits where the stakes are high, turnover is chronic, foul-ups can spread, ... the unexpected is common ... and organisations ... are susceptible to sudden and dangerous losses of meaning... When the noise created by wind, flames and exploding trees is deafening and the temperature is approaching a lethal 140 degrees, and when relative strangers ... are struck out in a line, people can neither confer with a trusted neighbour nor pay close attention to a boss who is unknown and whose commands make no sense whatsoever. As if these obstacles were not enough, it is hard to make common sense when each person sees something different – or nothing at all – because of the smoke (Weick 1996, pp. 143-144).

This picture of practice and leadership at the front line is a vivid depiction of operational complexity. It is a powerful prompt as to why it is timely and helpful to turn to the front line for guidance about the theory and practice of leadership fit for our times.

Many commentators have pointed out that contemporary life and work poses complex challenges for individuals, organisations and communities (Stacey 1992, Barnett 2012, Briggs 2007) as dimensions of contemporary life, work and leadership. This complexity plays out nationally and globally through the rapid mobility of people, money, diseases, goods and services across the world. The nature of national or community identity, borders and security, needs to be rethought when technology and transport make most systems accessible and increasingly transparent.

Surveillance systems provide an excellent example of what Perkins (1999) has called 'troublesome knowledge': knowledge that has profound social advantages that comes at considerable social cost. These global trends are not just large-scale abstractions. Local communities and organisations must wrestle with complex dilemmas that are unresolvable and won't go away. This happens when issues involve many different stakeholders whose needs and priorities are so different that they cannot be reconciled. It happens when actions inevitably produce unwanted and negative consequences for some people while benefiting others; or surprising outcomes that fix one problem but create others that are worse. Ignoring such issues simply displaces them or postpones them but they do not go away, they may appear in new forms and get worse. Creating safe and sustainable suburbs on the fringe of very large cities is a case in point. What works in terms of the built environment might be at odds with the natural environment. Another is building health and education systems that are affordable and accessible for those who use them but are also safe and desirable places to work.

Briggs (2007) suggests that when communities and constituencies start to accept the consequences of complexity as common-place and inevitable there are even more pervasive dangers and opportunities. The opportunities are that individuals have access to more data than at any previous time in history. They have more opportunities than ever before to create

new pathways for the creative and constructive use of human imagination. The dangers are that they will become resigned to chronic failures of government policy, will not expect corporations and universities to develop and implement truly sustainable ways of doing difficult things, and will not take up their own responsibility to live and work as wisely as they can.

Stacey (1992) has observed that under conditions of complexity, many leaders shorten their timeframes, lower their ambitions and simplify their thinking in order to cope. Educational thinkers like Briggs (2007) argue that life and work at the front line of organisations in situations of complexity requires levels of skill and attentiveness that need deliberate cultivation through the school and higher education systems. The same can be said of leadership at the front line. Many of those who lead frontline teams must be able to contain the anxiety of teams that know whatever they do, there will be people with legitimate needs and voices who will be disadvantaged. These teams must be able to engage every day with issues and problems for which there is no definitive fix, and sometimes not even an obvious method of engagement. And they need leadership practices that can help them do that.

Learning from leadership at the front line

Lipsky (1980) has noted the high probability that street-level leaders will either drop out or burn out. To stay effectively engaged requires sustainable ways of coping with the dilemmas of their work, and such coping frequently involves the lowering of their expectations and ideals. Frontline leaders come to face a professional dilemma of their own: to significantly grow their leadership confidence and skills in proportion to the challenges faced, or to regress in the face of them. Genuine complexity is not a space where one can simply mark time. It is not a place for the status quo. In turn, the way in which they engage with the dilemma of 'grow or regress' creates the container or context in which their teams also practice. As a result:

... it is understandable that some view paradoxical complexity as posing the fundamental challenge of our age for sustainable practice, leadership and education (Bowden & Marton 1998, Barnett 2012). How are people to be prepared for front line practice in organisations of all kinds, whether in the commercial, government or not-for-profit sectors? How are their leaders and organisations going to assist and sustain them? Does our understanding of front-line from that which seems to dominate thinking about executive leadership? And where might we turn for helpful insight when considering these questions? (Cherry 2013 p. 9).

Yet the existing management literature on leadership is not as helpful as it might be. Rowley and Gibbs (2008) have argued that this literature is still dominated by mid-20th Century models of leadership that focus on command and control from the top down in corporate settings. De Church *et al.* (2010), having looked

systematically at the results of 25 years of leadership research, concluded that it has mostly centred on individual leaders right at the top of organisations. Relatively little attention has been paid to studying the leadership of teams and units at the front line. In a similarly comprehensive study, also covering 25 years of publication and published very recently, Van Knippenberg and Sitkin (2013) were very critical of not only the preoccupation of that literature with executive leadership, but with the poorly-developed theorising it offers.

These observations are further reasons to look at what can be learned from frontline leadership. This is not a novel suggestion, having been put forward by Lipsky (1980) over 30 years ago in his exploration of street-level bureaucracy, and revisited by him more recently (2010). Although marginalised in the management literature, Lipsky's perspective drew attention to the role played by people who work in front-line roles in public administration, including those of front-line leadership. These are people who have significant discretion in making decisions about who can access public money and resources, what is lawful behaviour, when penalties and sanctions are to be applied and what is to be done in emergencies. Dilemmas and complexities that can't be resolved at the level of public policy and strategy must be dealt with, often on the basis of individual circumstances, in particular contexts, day after day. But often this must be done on the basis of limited information and in isolation from others. Frontline practitioners and leaders use wide discretionary powers and must exercise considerable judgment in circumstances that seriously affect the lives of individuals, families and communities:

I argue that the decisions of street-level bureaucrats, the routines they establish, and the devices they invent to cope with uncertainties and work pressures, effectively become the public policies they carry out (Lipsky, 2010, p. xiii).

More recently, Weick (1993, 2012) and Perez (1997, 2011) have suggested that frontline work in policing and emergency services is so complex that it is unique in its complexity and has many lessons for those who want to effectively lead in the complexity of the 21st Century. In interviews with 50 serving police officers in Melbourne, Cherry (2013) explored perceptions of the experience of working in multicultural communities formed as a result of the displacement and mass migration of people from other countries and cultures. This study vividly illustrated, through first-hand accounts, the dilemma-filled complexity of every day police practice and leadership at the frontline. It specifically operationalised the paradoxes of policing identified by Perez (1997), concluding that frontline leadership in this context requires deliberate, persistent concentration and effort. This is consistent with Lipsky's (2010) assessment that such complexity sets up the conditions in which leadership cannot be enacted on automatic pilot or become reliant on acquired techniques that are used as a matter of habit. This is a leadership role that requires unwavering attention and alertness.

Weick's (1996) contribution, which introduced this paper, went on to highlight some key insights into frontline leadership in emergency situations. Some of these reinforce the importance of attentiveness, but also stress the importance of studying where people habitually direct their attention and what sorts of things drive that. For example, what 'markers' do they normally seek out to form a view of a situation? What short cuts do they take? What does it take to override that habit or distract the person from their normal scanning patterns? And what does it take to disrupt them to make them think again, or think differently, about what they are seeing? Weick's point is that making sense of things is what human beings naturally want to do, but they will generally rely on familiar and habitual ways of doing it. Even if the familiar and habitual cues are no longer reliable, or even dangerous, people under pressure will fall back on entrenched routines of observation and judgement.

When there are no familiar cues, or the old rules and structures are clearly not working, something even worse can happen. It is that situation of complexity that can be very instructive about the skills required of effective frontline leadership. Unlike the boardroom, where it is generally possible to work with timeframes of weeks, months or years, under the pressures of frontline complexity questions like: what is our vision? what is our strategy? who are our stakeholders? are not front-of-mind. Instead, teams and leaders can be focused on the anxiety — even fear — that results when the data available to work with are new, or contradictory, or missing. In these circumstances the familiar techniques that give people a sense of mastery and control can become irrelevant, even useless, unless used in a different way. Under pressure, members of teams and their leaders might find themselves isolated from each other and unable to communicate in the usual ways, or working with strangers with whom they have no history of trust or relationship. With the loss of data, tools, structure, relationships and communication, can come the ultimate losses—those of role and identity. When there are no leaders, roles or routines, the usually clear sense of who I am, what I can do, how I can influence things, can be challenged, at least temporarily. They may no longer trust their own judgment or be resourceful or experimental in the ways they usually are. According to Weick (1996),

'Talking about Mann Gulch at a distance of nearly 50 years enables us to glimpse vulnerabilities that lie much closer at hand. To grapple with those vulnerabilities and design our way around them is not an exercise in rationality and decision making. Instead, it ... requires a closer look at the social context in which sense making creates the decisions that people think are so crucial. Mann Gulch teaches us that the real action occurs long before decisions ever become visible. By the time a decision needs to be made, sense-making processes have already determined its outcome. That's why ... we need to design structures that are resilient sources of collective sense making' (p. 148).

Weick's advice is that the work of leadership at the front line is to actively build the social infrastructure in advance that is needed to ameliorate the critical losses that can rob people of their sense of competence and confidence. Of critical importance, he suggests, is the development of strong communication channels through what he refers to as *nonstop talk* (1996, p.148). This is the idea that leaders will build trust and relationship through regular direct two-way communication that is both formal and informal.

However, this *nonstop talk* serves an even deeper purpose. In times of crisis, communication channels are often cleared for what is considered essential communication, and communication is limited to terse, formal and often coded exchanges. This process works well when that communication still enables people to make helpful sense of their circumstances. When it doesn't, and confusion and anxiety take hold, it is often the case that one or other parties stops communicating because they literally no longer have a language to describe what is happening. The absence of communication then makes it even more difficult for those involved to help each other. When communication no longer carries the means to help people make sense of things, then the losses of functionality start to emerge. These include:

- having the capacity to pay deep attention to whatever can still be seen and heard
- having the ability to remain open and curious
- being confident to work resourcefully when needed (intelligent improvisation)
- being able to listen to others long enough to take in what they are saying, and
- being able to report one's own observations in ways that others can understand and use.

There are a number of things that frontline leaders can do to build the kinds of group and individual capabilities that can withstand the pressure of complexity. Protocols that build the habit of constant talk are commonly used in retail settings at the beginning and end of trading days and operational de-briefs that use dumb-smart questions are powerful ways of doing 'no-blame' reviews of processes, outcomes and learning from successes and failures. Less commonly used, but equally powerful, are coaching exercises that train people to describe what they are seeing, not what they *think* they are seeing, to 'look again' and check their first impressions, and to use plain, concrete language to describe what they have not seen before.

Talking and listening are central skills for these capabilities. Weick's (2012) later work has developed the idea that for teams and leaders to communicate under conditions of complexity, keen attention is required to the language that is regularly used to indicate when a situation is becoming hard to handle and when an individual might be losing confidence and functionality. Teams and individuals who constantly work under pressure develop short hand forms of language where single words or phrases carry a very

large shared meaning. The problem with constantly communicating in such terse ways is that meaning that was once rich becomes stripped from the words until only a very thin version is available. That in turn means that important information is no longer shared, heard or acknowledged. The missing information might include fundamental thoughts and feelings such as 'I don't know what to do', 'I'm uneasy', 'I'm concerned', 'I'd like to know what you think', 'I really need your help here'. A key skill for frontline leaders is being able to recognise clipped language cues that reveal states of mind and attention that are not communicated more directly or in other ways. This understanding of front-line leadership goes well beyond a narrow model of work allocation and performance review to a framing of it as developing core organisational capabilities through the coaching of specific individual and team skills in making sense of things.

Conclusion

This paper has asked what can be learned from effective frontline leadership under conditions of complexity that will be of value in developing the understanding of contemporary leadership more generally. It has highlighted some dimensions of frontline leadership practice that can easily be taken for granted by experienced operational leaders. But the real challenge for experienced frontline leaders is to be alert and deeply attentive to cues, both subtle and stark, that teams and individuals are being tested in zones of uncertainty and complexity which have the power to make them regress or grow but will not allow them to stand still.

The way this work is done is going to be different in different kinds of settings. In some professions, people become very proficient at reading the subtle cues that tell them whether today is going to be a good day or a bad one for the team. But most of us are not mind readers and it is often necessary to put in place some protocols that the whole team can use.

Quick check-ins are a very common way of doing this. Without making a big deal of it, the simple question 'What's front of mind for you right now?' provides a professional way of checking-in and doing much of what Weick (1996) meant about the structures that are resilient sources of collective sense-making.

References

- Barnett, R 2012, *Learning for an unknown future. Higher Education Research and Development*, 23, 3, pp. 247-260.
- Bowden, J & Marton, F 1998, *The University of Learning: Beyond Quality and Competence in Higher Education*. Kogan Page, London.
- Briggs, L 2007, *Tackling Wicked Problems: A Public Policy Perspective*, Public Service Commission, Canberra. At: www.apsc.gov.au/publications07/wickedproblems.htm.
- Cherry, NL 2013, *Lessons from the street: Leading complex work at the front line. Contemporary Issues in Business and Government*, 19, 1, pp. 7-18.

De Church, I, Hiller, N, Murase, T, Doty, D & Salas, E 2010, *Leadership across levels: levels of leaders and their levels of impact. Leadership Quarterly*, 21, 6, pp. 1069-1085.

Lipsky, M. 1980, *Street-Level Bureaucracy: Dilemmas of the Individual in Public Services*. Russell Sage Foundation, New York.

Lipsky, M 2010, *Street-Level Bureaucracy: Dilemmas of the Individual in Public Services, Celebration Reissue*, Russell Sage Foundation, New York.

Perez, D 1997, *Paradoxes of Police Work: Walking the Thin Blue Line*. Copperhouse Publishing Company, Incline Village, Nevada.

Perez, D 2011, *Paradoxes of Police Work, 2nd Ed*. Delmar, New York.

Perkins, D 1999, *The many faces of constructivism. Educational Leadership*, 57, 3, pp. 6-11.

Stacey, R 1992, *Managing the Unknowable: Strategic Boundaries Between Order and Chaos in Organisations*. John Wiley and Sons, New York.

Van Knippenberg, D & Sitkin, S 2013, *A critical assessment of charismatic-transformational leadership research: Back to the drawing board? The Academy of Management Annals*, 7, 1, pp. 1-60.

Weick, KE 1993, *The collapse of sense-making in organisations: the Mann-Gulch disaster, Administrative Science Quarterly*, 38, 4, pp. 628-652.

Weick KE 2012, *Organised sense-making: a commentary on processes of interpretive work, Human Relations*, 65, 1, pp. 141-153.

About the author

Dr Nita Cherry is Professor of Leadership in the Faculty of Business and Enterprise, Swinburne University of Technology. Nita has over 35 years of experience as a senior executive, consultant, director, psychologist and educator in the private, public and third sectors. She teaches leadership in Swinburne's MBA program and is a Chief Investigator in teams awarded Australian Research Council Grants.

Professor Cherry works with Dr Peter Hayward, Program Coordinator, Master of Management at Swinburne University. Dr Hayward is presenting on Strategic Foresight at *Connection! 2014*, 14-18 July at the Australian Emergency Management Institute, Mt Macedon. See page 67 for more details and registration.



14-18 July 2014

**15% EARLY BIRD DISCOUNT
CLOSES 30 MAY 2014**

From silos to flows: spatial metaphor and communication responses to the Christchurch earthquakes

Dr Michael Bourk, University of Otago, and Dr Kate Holland, University of Canberra, discuss some of the challenges faced by key organisations involved in public information management after the Christchurch earthquake. 

ABSTRACT

This paper discusses some of the challenges faced by key agencies involved in public information management after the 2011 Christchurch earthquake. The study analysed data collected from published documents and in-depth semi-structured interviews with senior managers and key personnel within government and a citizen journalist who launched the Christchurch Recovery Map. Metaphor is used as a way of conceptualising the constraints faced by state agencies and consideration is given to the features and possibilities of an alternative approach to imagining bureaucratic spaces in times of national emergency.

The study identified differences between state agencies constrained by political and bureaucratic priorities and more flexible community-based initiatives serving their own perceived civic duties. In particular, it is suggested the former incorporated a recurring bureaucratic spatial metaphor that framed policy and its implementation. This facilitated tensions and unintended contests among agencies seeking stakeholder attention and restricted the potential for collaboration with volunteers offering proven skills and expertise from the broader community. A need to recast established hierarchies of information flow in a way that reflects openness to the value of community sourced information is identified. It is suggested that different ways of conceptualising space may help to facilitate such changes in practice.

Introduction

On 22 February 2011 the South Island of New Zealand was rocked by an earthquake of magnitude 6.3 (ML) that devastated the country's third-most populous city, Christchurch, and surrounding areas. Although an

earthquake in September the previous year had been larger, its location and seismological characteristics mitigated its impact on the city, taking no fatalities. In contrast, the February earthquakes killed 185 people and severely damaged the city. The Minister of Civil Defence declared the event a National Emergency on 23 February, which remained in place for almost nine weeks. In accordance with Civil Defence legislation and planning provisions, the event and its aftermath involved two phases—response and recovery. The response phase ended on 30 April when the Christchurch Earthquake Recovery Authority (CERA) assumed responsibility for the recovery effort to rebuild the city, which was estimated to take several years at a cost of more than NZ\$20 billion.

The primary purpose of this paper is to discuss some of the challenges faced by key agencies involved in public information management after the February earthquakes. The complementary role of a citizen-based web initiative alongside state online resources is also explored. The paper draws on international scholarship (Luoma-aho 2009, Veil *et al.* 2011, Palen *et al.* 2010) that extends Putnam's (1993) concept of the importance of social capital to functioning democracies. Scandinavian researcher Vilma Luoma-aho's (2009) application of social capital to transform organisational systems through building networks of 'trust and reciprocity' among stakeholders and citizen groups is discussed with reference to engaging the community before and during times of crisis. Furthermore, some scholars are advocating social media as a way of building such networks (Veil *et al.* 2011, Palen *et al.* 2010), reframing emergency response into what Palen and colleagues describe as a 'socially distributed information system' (p. 2).

It is argued that state online responses to manage crisis events such as the Christchurch earthquakes are informed by spatial bureaucratic metaphors that conceptualise information spaces as controlled territory with negative consequences for civic participation and engagement. In contrast, by replacing the former conceptual building blocks with metaphorical associations that stress constructive relational concepts such as family,

teamplay and neighbourhood, more inclusive civic engagement structures and policies are encouraged. We also consider the role of boundary spanners (Leichty & Springston 1996) in such a reframed emergency response.

New Zealand government response

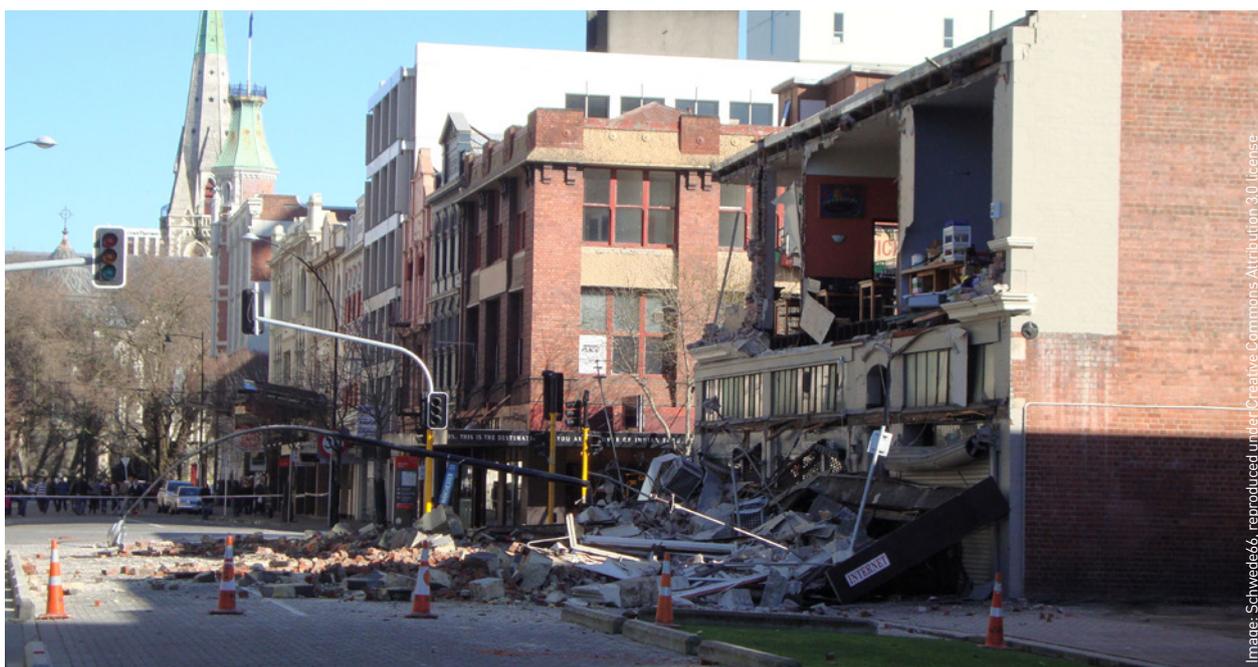
The New Zealand government and state agencies responded quickly to the crisis and in the immediate aftermath. The Ministry of Civil Defence and Emergency Management (MCDEM) assumed overall responsibility as the peak agency for managing the crisis. The Ministry oversees 16 CDEM Groups across the country, including the Canterbury CDEM, which was directly associated with the Christchurch earthquakes. CDEM Groups comprise of elected representatives from local authorities (city, district and regional councils) and maintain their own operational staff (e.g. emergency services).

The earthquakes tested legislation (*Civil Defence Emergency Management Act 2002*) that divested control to deal with a major crisis from central government and state agencies in Wellington to local governments. In practice, local jurisdictional boundaries, coupled with a lack of resources and expertise among local authorities, required the small team of Wellington CDEM staff to assume a greater leadership role to co-ordinate the response. In addition, political interference from larger Ministries led to key Civil Defence personnel being forced to engage in a shared communication platform that came under later scrutiny and criticism (RCDEMR 2012).

Method

To identify the challenges faced by agencies involved in providing information in the wake of the earthquakes researchers reviewed published documents and conducted in-depth semi-structured interviews. In particular, researchers drew from an independent review of the CDEM response (RCDEMR 2012), a series of interviews carried out in June 2012, and internal memos provided by interview participants. Interview participants included senior managers and key personnel within the MCDEM and a citizen journalist who launched the Christchurch Recovery Map. The recorded interviews were transcribed and thematic analysis was used to draw out key themes pertinent to the study's aims. While the independent review and the participants identified several practices that worked well, the primary focus was on identifying areas of concern and improvement with respect to developing communication and online responses to future disasters.

The analysis draws on metaphor as a way of conceptualising the constraints faced by state agencies. Metaphors are linguistic devices that inform how people describe and relate to the world by comparing common concepts with those less familiar (Lakoff & Johnson 1980). The metaphorical association with communicative events as controlled territory has historical roots in public administration, political campaigning, and corporate message strategies. For example, territorial concepts inform political mandates to 'own the message' as well as the psychology behind branding. Bureaucratic forms of organisation tend to be underpinned by notions of rationality, linear thinking, task differentiation and compartmentalism (Williams 2002). Some of the ways this manifested itself in government responses to the Christchurch earthquakes are identified.



Earthquake damage on Worcester Street, Christchurch after the 2010 quake.

Image: Schwede66, reproduced under Creative Commons Attribution 3.0 license.

The review of the Civil Defence response

In November 2011 the central government commissioned an independent investigation, eponymously named the Review of the Civil Defence Emergency Management Response to the February Christchurch Earthquake (RCDEMR 2012), which released its final report in June 2012. The report presents a rich array of qualitative data based on more than 200 interviews and background material. Headed by Ian McLean, the review found the CDEM response overall to be 'well managed and effective', yet it made 108 recommendations in its 243-page report (RCDEMR 2012, p. 10).

The review observed that before the declaration of the national emergency both the (Canterbury) Group CDEM and the Christchurch City Council (CCC) formed separate Emergency Operating Centres (EOCs), which confused roles, duplicated management and operational activities, and led to uncertainty among service agencies. Although the two groups merged once the event was declared a national emergency, the report concludes they 'never melded into a cohesive organisation', despite each possessing expertise the other lacked (RCDEMR 2012, p. 191). Notably, the whole-of-government response was excluded from the review's terms of reference and the government rejected two of the six major recommendations made in the report. In particular, at a structural level, the location of Civil Defence within the Department of Internal Affairs drew criticism from the McLean committee, that recommended the agency be transferred and elevated to the Department of the Prime Minister and Cabinet. The review also recommended that territorial local authorities should no longer have the power to control the response to emergencies, although they should retain the right to declare them.

The review identified possible material structural constraints that hampered the CDEM in performing its managerial role as lead agency responding to the crisis, which stretched its limited resources significantly (RCDEMR 2012). Located as a small business unit within the Department of Internal Affairs, and overseen by a junior Minister, approximately 30 staff were expected to function as team leaders to manage crisis events. The government's rejection of the review's recommendation to relocate the CDEM reflects the political challenge for governments balancing the need to adequately resource and position emergency response agencies against low probability and infrequent events (Waugh 2000, in Herzog 2007).

Key features of government communication

Prior to the first earthquake on 4 September 2010, the government had three primary earthquake-related government websites. In addition to these, four additional government websites pertaining to emergency preparedness, disaster recovery, historic

events, and science and education also carried earthquake-related information (DIA 2011a). In response to the February earthquakes the CDEM worked alongside an 'all-of-government' group of communication managers representing various government departments. Together, they collected and distributed information relevant to their various publics, which included politicians, directly affected communities and their friends and relatives, and broader national and international audiences. The all-of-government group posted information deemed relevant to their particular stakeholders to various government websites, frequently duplicating content distributed by Civil Defence (DIA 2011a). An internal memo distributed to Department of Internal Affairs staff stated that individuals seeking information on the Christchurch earthquake 'are forced to navigate a proliferation of websites with very similar purposes, set up by differing government agencies' (DIA 2011a).

The all-of-government website (Canterburyearthquake.govt.nz) also had a similar name to the Environment Canterbury Regional Council initiative (Canterburyearthquake.org.nz), which caused 'significant confusion' according to one interview participant. Furthermore, the report identified differing priorities among government departments and agencies and interdepartmental programmes (RCDEMR 2012, p. 26). At times, agencies posted to their websites incomplete information pertaining to a shared initiative as occurred between the Ministry of Social Development and the Work and Income (WINZ) websites, each of which provided partial details of an Earthquake Support Package (DIA 2011a).

Twitter also featured strongly in the government response to the Canterbury events (Bruns & Burgess 2012). Two national agencies, the Department of Internal Affairs and MCDEM (within the Department of Internal Affairs), and one local government body, the Christchurch City Council used Twitter extensively. Collectively, in the three weeks following the February event, they tweeted 5 000 messages, which were subsequently (DIA 2011b). To maintain consistency and accuracy, all responses were managed through the Public Information Manager at the National Crisis Management Centre (NCMC) in Wellington. Government staff used Twitter to answer questions from affected communities concerning a range of issues, including the state of essential services and 'availability of support'. Twitter allowed government staff to correct erroneous information and 'end false rumours' (*ibid*, see also Poole 2012). On one occasion the feedback received from the NCMC was used in a tweet from Civil Defence to quash a rumour circulating on social media that the Hotel Grand Chancellor was on fire.

Disaster communication as territorial control

The way in which diverse agencies conceptualise their role during times of crisis influences their communication practices. In the context of state

responses to the Christchurch earthquakes, bureaucratic spatial metaphors that associate communication with 'controlled territory' frame how online communication among state agencies and the broader citizenry are conceptualised in terms of legitimacy, access, control and participation parameters. The perception of online space as territorial control is evident from the interviews, which revealed some confusion about the role or 'fit' of different websites within the information environment.

In discussing the numerous websites that sprang up across government agencies one participant invoked the larger problem of agencies having a sense of ownership over information, driving a reluctance to link to other sources. Doubts were raised, for example, about the creation of Canterburyearthquake.govt.nz following the September earthquake in response to a senior ministerial request, as to what information it would provide that was not already being provided elsewhere:

'Could some of this information more feasibly have gone under the Civil Defence website? Some would say no because it's not part of the Civil Defence response. It's wider, almost getting into the recovery phase. But that's where people might have been looking for it.' (Interviewee 1)

Despite recovery being listed on the Civil Defence website as part of its role, this comment suggests the presence of rigid borders and boundaries in the minds of those instituting policy can lead to unnecessary duplication. Participants cited the brand that Civil Defence has established through periodic public information campaigns focused on building community awareness and national recognition of the prominent leadership role it has taken in times of emergency, which has seen significant website spikes following an event. Given its brand the Civil Defence website was well-placed to incorporate links to local sources and ensure that information from them reached a wide audience. Further, the community may have expected to find certain information on its site while being unaware of the new specially created site.

Silo mentality as barrier to collaboration

One participant identified the inward looking, siloed nature of many government agencies as a potential barrier to effecting a more co-ordinated, streamlined approach to information provision:

'there's a long way to go for us to resolve the – the way that agencies think; the way that Ministers think; it's still quite siloed – they're very – the mindset of many agencies is still around internal structure of their agency.' (Interviewee 1)

Many New Zealanders were left confused as to where to access timely, relevant and vital information required to mitigate the effects of the disaster. The confusion is characterised by tensions between

state departments and agencies and territorial local authorities of communities affected by the crisis, which led to multiple government websites duplicating information, poor distribution of vital information to affected communities, inadequate training, and lack of understanding of basic communication concepts pertaining to emergency management (DIA 2011a, RCDEMR 2012, p. 165). However, despite some criticism, the report commends the communication efforts of the CDEM staff working under uncertain and challenging circumstances, including the Wellington-based NCMC and the Christchurch CRC. Similarly, interviewees did not identify interdepartmental tensions as a cause of concern. It was clear that government agencies had strict lines of command for verifying information before making it public and the experience of participants was that this process worked well and they were able to disseminate information in a timely fashion.

Participants acknowledged the importance of having an authoritative voice as a reference point within the plethora of available information. However, the downside of this, according to one participant, is that it can inhibit the provision of specifically tailored information (Interviewee 2). This is where sources that are unconstrained by the bureaucratic spatial frame can play an important role.

Some actors operating outside official communication channels were met with resistance and uncertainty among officials concerned about how they were using official information and the reliability of the information they were providing. The Christchurch Recovery Map (CRM), also known as eq.org.nz, was created in response to the February earthquake. The site contained information gathered via email, Twitter (#eqnz hashtag), SMS and locally-based websites and was built with open source tools and support of Crisis Commons and Ushahidi.¹ The Ushahidi platform combines crisis information from official sources, citizen generated reports, media and NGOs, facilitates early warning systems and assists in data visualisation (geographical mapping tools) for crisis response and recovery. The site provided information about essential services, including their location and times of operation.

The CRM is an example of an emergent group harnessing their expertise to address perceived gaps in the existing information and communication environment. People involved in putting the site together were drawn primarily from the Wellington IT sector (Interviewee 2). Initially, most of the traffic to the CRM site came from offshore but as connectivity improved it was accessed by locals. One interview participant who was involved with the CRM described

¹ CrisisCommons is a global community of volunteers who use their knowledge of open-access technologies and the Internet to help communities to respond to crisis events and to improve resiliency and response in disaster preparedness (CrisisCommons website). The Ushahidi (Swahili for 'testimony') platform combines crisis information from citizen-generated reports, media and NGOs and facilitates early warning systems and assists in data visualization for crisis response and recovery (Ushahidi website).



Image: Dr Michael Bourk

Local infrastructure damage was widespread.

how it was able to get 'buy in' from official sources such as the Banking Federation and was embedded in the website of the New Zealand Herald (Interviewee 2). Much of the volunteer effort involved in the CRM was focused on ensuring that information on the site was timely and not duplicated.

The initial caution surrounding the CRM site appeared to be related to a lack of familiarity with the Ushahidi platform and the processes through which information included in the site had been filtered. But, for some officials at least, this gradually gave way to recognition that it was performing a role that government agencies were unable to because of resourcing and time constraints and the sheer difficulty of managing and responding to local information needs from the centre. One participant said: 'Crisis Commons were able to get down to a much more localised and specific layer of detail'. They described the site as 'playing in slightly different spaces' (Interviewee 1). Another participant who was involved in co-ordinating the CRM said everyone in Wellington was supportive of what it was doing, but that friction arose as he attempted to communicate with staff within the CRC in Christchurch. His efforts to respond to their concerns and create a dialogue about the workings of the site were unsuccessful (Interviewee 2). This perhaps reflects the understandable anxieties exhibited by those responding to the unfolding crisis occurring literally in the physical space around them as major aftershocks continued.

Some concern about 'boundaries' with respect to how 'informal information' could best feed into more official communication activities and vice versa was also evident. For example, one participant referred to the need for official agencies to 'get a better grip on' the potential of different players and expertise within

the 'Internet community' during disaster situations (Interviewee 1).

Discussion: (Re) imagining bureaucratic spaces in times of national emergency

As Lakoff & Johnson (1980) observe, spatial metaphors are fundamental to describing human experience. Furthermore, territorial control is one of many ways to conceptualise space. However, the attributes of old public information models are easily incorporated into new models of policy through metaphorical association, which can work to reinforce communication strategies focused on territorial control rather than allowing for those that value shared space, which encourages creative collaboration among diverse agencies and civic groups. This study suggests that both material and symbolic structures influence how responses to national crises are conceptualised and implemented. It is argued that a bureaucratic spatial metaphor framed how stakeholders strategically imagined their role as public servants to manage their stakeholders through the crisis presented by the Christchurch earthquakes. It is also evident that material structures ranging from resource capability, the location of the CDEM overseen by a junior Minister within a general department, through to multiple websites contributed to facilitating turf protection tactics that promoted closed cultures among state agencies (see RCDEM 2012).

Given that the midst of a disaster is not the appropriate time to be attempting to understand and engage new technologies, it is important to ensure that relevant government agencies and citizens are trained in advance and that post-disaster debriefing is inclusive

of those with expertise in these areas. Further, the consequences of silo-building attitudes are not simply confined to general managerial cultures among various departments but also a feature of IT and online information delivery systems. For example, government departments often run different web content management systems that do not necessarily talk to each other. Standardisation at this level is thus an important consideration. The challenge for policy makers is to imagine new spatial contexts that align with the permeable walls and open domains that characterise contemporary communication environments and the multiple publics that inhabit them. Into this conceptual space relational metaphors such as those associated with family membership, teamplay and neighbourhood offer opportunities that focus on roles, trust, and a sense of community, which extends beyond attempts to 'control the message'.

Luoma-ao's (2009) application to public relations of Robert Putnam's approach to social capital offers insights into how spatial metaphors can be reconceptualised around community building. Putnam defines social capital as 'connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them' (in Luoma-ao 2009, p. 235). Luoma-ao extends Putnam's definition, which primarily focuses on heterogeneous grass-roots civic and cultural community groups, to an organisational focus. She argues social capital is the 'extent of the resources available to an organization through networks of trust and reciprocity among its stakeholders', and is shaped by frequent interactions (p. 248).

This approach has a number of theoretical and practical implications that resonate with increasing recognition of the ways in which new media and technologies can be harnessed during disasters (Veil *et al.* 2011). Palen *et al.*'s (2010, p. 2) idea of a 'socially-distributed information system' would see publically available computer-mediated communications such as community websites, blogs, Twitter, social networking sites, mapping sites, etc. integrated into official systems to empower citizens to 'assess context, validity, source credibility, and timeliness to make the best decisions for their highly localized, changing conditions'. This requires a disposition toward co-ordination rather than control and recognition of the dynamic nature of information during a disaster and the way in which community expectations shift accordingly.

Boundary spanning describes the communication activities of social actors interacting with those outside their own organisation for the purpose of building closer relations between an organisation and other publics (Leichty & Springston 1996, see also Grunig & Hunt 1984). Boundary spanners have the capacity to challenge entrenched silo-building attitudes and practices by acting as institutional cultural translators between an organisation and key publics or stakeholders. The response phase in Christchurch benefited from boundary spanning activity when the Christchurch Response Centre relocated a liaison

officer with two volunteer groups, the Farmy Army under the organisation of the Federated Farmers and the Student Army led by students from the University of Canterbury, both of whom contributed significantly to the relief effort (RCDEMR 2012). After the February earthquake, the Student Army relocated to the Farmy Army headquarters in Addington, where the CRC staff-member later joined them, which resolved tensions and facilitated better co-ordination of volunteer resources to meet the priorities set by operations (RCDEMR 2012).

On the basis of this study, it is suggested that liaison officers deployed by the CDEM to function as boundary spanners could work with online emergent groups who demonstrate their capacity to contribute to a socially distributed information system. Evidence-based results are easily obtainable from Google metrics and nested links to trusted community services such as national media and major commercial institutions. For example, the CRM had more than 100 000 views across the ten days of its operation and links to high-profile service providers. However, it experienced similar barriers to accessing the CRC in Christchurch prior to the allocation of a liaison staff member. Likewise, CDEM staff could perform boundary spanning roles as deployed cultural interpreters and liaison officers in other state departments and agencies.

Conclusion

The Christchurch earthquakes and subsequent response highlight a number of issues that provide salutary lessons to those responsible for dealing with disasters that will occur in the future in any jurisdiction. Among the participants there was a desire to know how the information they were disseminating was actually assisting people to act. In the absence of this knowledge the value of new technologies may be too easily dismissed or, conversely, overstated. This may lead to inaction or inappropriate action. Thus, the study indicates the need for further research into citizens' use and expectations of information sources during various stages of disasters. The potential for confusion to ensue from the production of multiple official websites is a factor that should be considered in the planning and organisation of emergency communication and information. This may be aided by government agencies adopting a disposition toward co-ordination with other agencies as well as citizen groups.

This paper has argued that a spatial metaphor with its origins in historical state bureaucratic structures of control reduced the potential for creative online collaboration and restricted communicative effectiveness through the crisis period. Despite widespread recognition of the importance of empowering local communities during disasters and the role of new technologies in enabling this, in practice this can pose challenges to conventional approaches to public information management (see Mersham 2010, Palen *et al.* 2007). Disasters by their nature break down boundaries creating a need to

rethink or recast established hierarchies of information flow and the assumptions and expectations that underpin them. This requires flexibility and openness to the value of community sourced information. It is suggested that different ways of conceptualising space may help to facilitate changes in practice that allow the development of new and more open informational relationships between official organisations and citizen groups (see Palen *et al.* 2007).

In addition there is a role for communication boundary spanners acting as cultural interpreters through face-to-face interaction to break down organisational barriers and co-ordinate engagement between lead agencies in a crisis and other institutions. This includes state agencies reporting to their own stakeholders and community groups that bring significant social capital to response efforts at times of national emergency. Although the strategic deployment of emergency management staff as boundary spanners requires additional staffing, it is argued the dividends delivered from greater co-ordination of human and information resources will reward the investment.

Acknowledgement

The research for this project was supported by a grant from Emergency Media and Public Affairs, 'Examining the "crisis commons" during the 2011 Christchurch earthquake'.

References

- Brown, J & Campbell, E 1991, *Risk Communication: Some Underlying Principles*, *Journal of Environmental Studies*, Vol. 38, pp. 297-303.
- Bruns, A & Burgess, J 2012, *Local and global responses to disaster: #eqnz and the Christchurch earthquake*. In Sugg, Peter (Ed.), *Disaster and Emergency Management Conference, Conference Proceedings, AST Management Pty Ltd, Brisbane Exhibition and Convention Centre, Brisbane, Qld*, pp. 86-103.
- Christchurch Recovery Map: Providing Community Information for the Christchurch Earthquake 22 Feb. 2011. At: <http://eq.org.nz>, [30 July 2012].
- CrisisCommons. At: <http://crisiscommons.org/>.
- Department of Internal Affairs 2011a, 2561500DA, *Internal Memo, Wellington, New Zealand, 28 March*.
- Department of Internal Affairs 2011b, *Government use of Twitter, Internal Memo, Wellington, New Zealand, 19 April*.
- Grunig, J & Hunt, T 1984, *Managing public relations*, Holt, Rinehart & Winston, New York.
- Herzog, R 2007, *A Model of Natural Disaster Administration: Naming and Framing Theory and Reality*, *Administrative Theory and Praxis*, Vol. 29, No. 4, pp. 586-604.
- Lakoff, G & Johnson, M 1980, *Metaphors we live by*, University of Chicago Press, Chicago.
- Leichty, G & Springston, J 1996, *Elaborating Public Relations*, *J. & M.C. Quarterly*, Vol. 73, No. 2, pp. 467-477.
- Luoma-aho, V 2009, *Bowling together – Applying Robert Putnam's theories of social capital to public relations*, Ihlen, O & Fredriksson, M (Eds.), *Social Theory on PR* Routledge / Lawrence Erlbaum, New York, pp. 231-251.
- Mersham, G 2010, *Social media and public information management: the September 2009 tsunami threat to New Zealand*. *Media International Australia*, (137), pp. 130-143.
- Palen, L, Hiltz, R & Liu, S 2007, *Online forums supporting grassroots participation in emergency preparedness and response*, *Communications of the ACM*, Vol. 50, No. 3, pp. 54-58.
- Palen, L, Anderson, K, Mark, G, Martin, J, Sicker, D, Palmer, M & Grunwald, D 2010, *A vision for technology-mediated support for public participation and assistance in mass emergencies and disasters*, *Proceedings of ACM-BCS Visions of Computer Science*, Swindon, UK. At: <http://ewic.bcs.org/content/ConWebDoc/35016>.
- Palttala, P, Boano, C, Lund, R & Vos, M 2012, *Communication Gaps in Disaster Management: Perceptions by Experts from Governmental and Non-Governmental Organizations*, *Journal of Contingencies and Crisis Management*, Vol. 20, No. 1, pp. 3-12.
- Putnam, RD 1993, *Making Democracy Work*, Princeton University Press, Princeton, N.J.
- Poole, M 2012, *Public Information Management in Christchurch following the February 2011 earthquake: lessons learned*. *Australian Journal of Emergency Management*, Vol. 27, No. 4.
- Review of the Civil Defence Emergency Management Response to the 22 February Christchurch Earthquake (RCDEMR) 2012, *McLean Consultancy Services Ltd*. At: www.civildefence.govt.nz/memwebsite.nsf/wpg_URL/For-the-CDEM-Sector-Publications-Review-of-the-Civil-Defence-Emergency-Management-Response-to-the-22-February-Christchurch-Earthquake.
- Ushahidi (n.d.) *Ushahidi 1-Pager*. At: www.ushahidi.com/uploads/docs/Ushahidi_1-Pager.pdf.
- Veil, S, Buehner, T & Palenchar, M 2011, *A Work-in-progress Literature Review: Incorporating Social Media in Risk and Crisis Communication*, *Journal of Contingencies and Crisis Management*, Vol. 19, No. 2, pp. 110-122.
- Williams, P 2002, *The competent boundary spanner*, *Public Administration*, Vol. 80, No. 1, pp. 103-124.

About the authors

Dr Michael Bourk is a Lecturer in the Department of Media, Film and Communication, University of Otago. His primary research interests include institutional frames and public policy narratives.

Dr Kate Holland is a Senior Research Fellow in the News and Media Research Centre, Faculty of Arts and Design, University of Canberra. Her primary research interests include media reporting and public understandings of health and risk issues.

Earthquake preparedness in South Australia: recommendations based on previous earthquakes in Australia, New Zealand and the United States of America

Dr Olga Anikeeva, Dr Malinda Steenkamp and Professor Paul Arbon from the Torrens Resilience Institute consider some of the short and long-term health consequences of earthquakes. 

ABSTRACT

Adelaide is the most earthquake-prone capital city in Australia, with earthquakes of a magnitude five to six on the Richter scale occurring frequently enough to be a potential danger. This paper explores the short and long-term physical and psychological consequences of earthquakes that have occurred in settings comparable to metropolitan Adelaide in order to make recommendations in terms of the lessons learned. The danger posed by unreinforced masonry buildings in Adelaide is highlighted and the importance of effective communication and collaboration between local and national providers of essential services is discussed. The paper concludes with recommendations, including the development and rehearsal of emergency plans, community education and preparedness, planning for longer-term health outcomes and availability of practical and financial support.

Introduction

Although Australia experiences few earthquakes by world standards (Gibson 2010, McCue 2010), Adelaide is the most earthquake-prone city on the continent, with moderate earthquakes (magnitude five to six on the Richter scale) occurring frequently enough to be a potential danger (Doyle *et al.* 1968). In the past 150 years, 15 earthquakes of magnitude five or greater were recorded in South Australia. Earthquakes of this magnitude lead to damage in the epicentre zone and can be felt over an area with a radius of approximately 200 km (Greenhalgh *et al.* 1994).

Earthquakes in South Australia primarily occur within two belts:

- the Adelaide seismic zone extending from Kangaroo Island, through the Mount Lofty and Flinders Ranges, to Leigh Creek in the state's north, and
- the Eyre Peninsula zone (Doyle *et al.* 1968, Sutton & White 1968, Greenhalgh *et al.* 1994) (Figure 1).

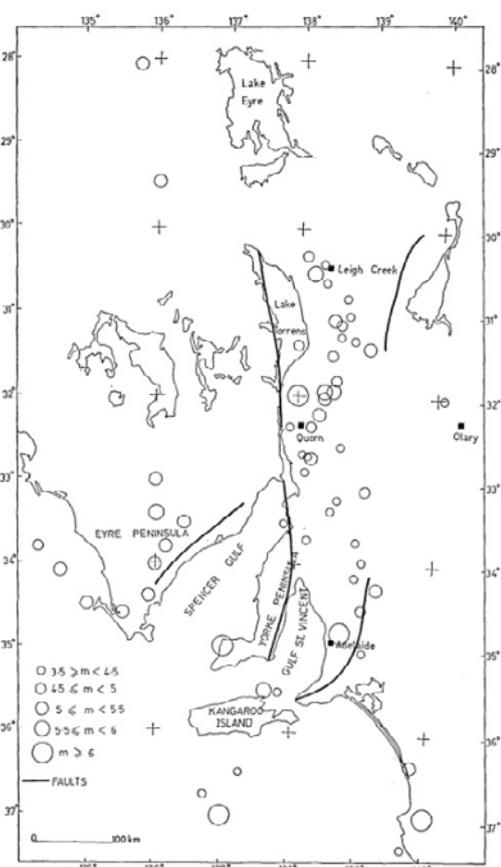


Figure 1: Map of earthquake epicentres in South Australia (Doyle *et al.* 1968).

Earthquakes occurring in urban areas pose a risk to residents and essential societal systems, including critical infrastructure (World Association for Disaster and Emergency Medicine 2003, McCue 2010). If an earthquake of a similar magnitude to the 1954 Adelaide earthquake (5.4 on the Richter scale) were to occur today, it would result in substantial loss of life, injuries and damage, with losses over AUD\$1 billion (Greenhalgh *et al.* 1994).

Aim

This paper examined earthquakes that have occurred in settings comparable to the physical and social environment of metropolitan Adelaide to make recommendations for South Australia in terms of lessons learned. The focus was on at-risk population groups and lifelines and the short and long-term consequences of selected events, including fatalities, injuries, psychological impact and damage to infrastructure.

Methods

A recent comprehensive review article by Doocy and colleagues (Doocy *et al.* 2013) was used for identifying relevant articles. Additional searches were performed on Medline, Scopus and Google Scholar to identify papers published after the period covered by the article. Earthquakes were selected based on the similarities of their location and environment to the South Australian context in terms of building stock, demographics and level of development. The details of the selected earthquakes are presented in Table 1. The South Australian Government *State Emergency Management Plan* (State Emergency Management Committee 2012) served as a starting point for the recommendations made in this paper.

Discussion

Australia

Australia has experienced a number of destructive earthquakes in the past, most notably the 1954 Adelaide and 1989 Newcastle events that caused widespread damage to housing and commercial structures, particularly unreinforced masonry buildings (Doyle *et al.* 1968, Gibson 2010). The Adelaide earthquake led to over 30 000 insurance claims being filed and the Newcastle earthquake resulted in between \$900 million and \$1.5 billion of property damage (Lewin *et al.* 1997). While the 1954 Adelaide earthquake did not result in any deaths and caused only 16 injuries (McCue 2010), the Newcastle earthquake caused 13 fatalities (Greenhalgh *et al.* 1994). In total, 105 individuals received injuries that were treated in Newcastle's public medical centres, with 30 of the injured being admitted to hospital. The main causes of injury included contusions and bone fractures. A further 800 people required emergency accommodation.

In the first month following the earthquake, 78 full and 173 partial demolitions were approved, 1 161 buildings were deemed a danger to the public and 3 812 were damaged but habitable. Several of the damaged structures housed important public infrastructure associated with essential services. The Royal Newcastle Hospital was evacuated due to structural damage, while two other hospitals and the City Fire Station and Ambulance Office sustained some damage, impacting on their ability to provide services (Carr *et al.* 1997).

The Newcastle earthquake was of moderate magnitude (5.6 on the Richter scale) and was the first recorded earthquake in Australia to result in loss of life. In the first six months following the earthquake, over 20 per cent of the adult population in Newcastle used general and/or disaster-related support services. Nearly 60 per cent used personal sources of support, including family, friends and neighbours, with over one-third of the population relying exclusively on these informal supports (Carr *et al.* 1997). However, the frequency of visits to doctors did not increase in the six month period, suggesting that earthquake-related issues were dealt with during consultations for other matters. Psychological problems were found to decline over time, but tended to stabilise at approximately 12 and 18 months for general psychological illness and trauma-related mental illness, respectively. Those who sustained injuries in the earthquake exhibited the highest level of distress. The degree of initial earthquake exposure (avoidance coping style, traumatic life events since the earthquake, ongoing disruptions, older age, a history of emotional problems and poor social relationships) contributed to ongoing psychological issues two years after the event (Carr *et al.* 1997).



Demolition of Newcastle Workers Club, the scene of the greatest damage to any building in Newcastle where nine people died and many others were injured.

New Zealand

While New Zealand differs from Australia in terms of earthquake frequency and severity (McCue 2010), there are similarities between the healthcare systems in each country considering building stock and demographics. Thus, the two recent earthquakes in Christchurch can inform planning in South Australia.

The first of the New Zealand events occurred 30 km west of Christchurch on 4 September 2010 at 4:35am, with frequent and unpredictable aftershocks continuing for months. The earthquake did not result in any fatalities, but caused two serious injuries. This was attributed to the performance of most modern buildings and the early morning occurrence, which meant that most residents were away from the business districts of Christchurch and Kaiapoi (Wood *et al.* 2010, Dorahy & Kannis-Dymand 2012). Unreinforced masonry commercial and office buildings in the two business districts performed poorly, with two buildings collapsing and many partially collapsed, which would have led to numerous deaths and injuries had the buildings been occupied (Wood *et al.* 2010).

The immediate emergency response to the earthquake was effective, with local authorities, lifeline utility operators, engineers and national agencies responding using planned arrangements. While outages occurred, power and telecommunications were restored to 90 per cent within 24 hours, with water supplies restored within five days (Wood *et al.* 2010). Despite the small number of injuries and swift emergency

response, residents of areas most affected by the earthquake were more likely to report depression and anxiety symptoms. This was due to stress and sleep disruption, which may be explained by property damage, increased fatigue and uncertainty about the future, including further aftershocks (Kemp *et al.* 2011, Dorahy & Kannis-Dymand 2012).

The following year a 6.3 magnitude earthquake occurred at 12:51pm on 22 February 2011 in Christchurch (Doocy *et al.* 2013). The earthquake resulted in 185 fatalities, 6 659 injuries and widespread damage to buildings and infrastructure, particularly in the central business district (Giovinazzi *et al.* 2011, Ardagh *et al.* 2012, Sibley & Bulbulia 2012). The collapse of two multi-storey office buildings and associated fires led to 110 fatalities. Falling debris crushed two buses, killing six individuals, with another 16 dying from falling debris and landslides (Sibley & Bulbulia 2012). While the majority of injuries were minor, serious injuries occurred as a result of falls and being struck by rubble. Patients who were trapped under rubble suffered crush syndrome, characterised by severe shock and renal failure following crushing trauma to skeletal

Table 1: Summary of included earthquakes.

Location	Event	Magnitude (Richer scale)	Day of week and time of day	Fatalities and injuries	Psychological impact	Impact on infrastructure
Australia	Adelaide 1954	5.4	Monday 3:40 am	0 fatalities 16 injuries	Not reported	30 000 insurance claims filed. Widespread structural damage.
	Newcastle 1989	5.6	Thursday 10:27 am	13 fatalities 105 injuries	20% of population sought formal support. Psychological morbidity still detectable after two years.	78 full and 173 partial demolitions. 1 161 buildings deemed a danger to the public. 3 812 buildings damaged, but habitable.
New Zealand	Christchurch 2010	7.1	Saturday 4:35 am	0 fatalities 2 injuries	Depression, anxiety, stress and sleep deprivation more common among those affected by earthquake.	Two buildings collapsed and many partially collapsed, with unreinforced masonry buildings performing very poorly.
	Christchurch 2011	6.3	Tuesday 2:51 pm	185 fatalities 6,659 injuries	Not reported	Two multi-storey office buildings collapsed, many more buildings partially collapsed.
California	Loma Prieta 1989	7.1	Tuesday 5:04 pm	63 fatalities 3 757 injuries	Not reported	Elevated freeway collapse, bridge damage, widespread structural damage.
	Northridge 1994	6.7	Monday 4:31 am	57 fatalities 7 000 injuries	Lower psychological symptoms among older residents.	Substantial damage to power lines, roads, bridges and property.

muscle. Soft tissue injuries and bone fractures were common (Ardagh *et al.* 2012). Emergency services were overwhelmed, hospitals exceeded their capacity, power, water and telecommunications outages were extensive and prolonged and many residents were displaced (Sibley & Bulbulia 2012).

Christchurch has one hospital with an emergency department, which is located on the edge of the central business district. It sustained significant damage, including loss of power, emergency generator failure, and collapse of a section of the ambulance bay. Damage to roads and communications failures contributed to difficulties in triage of patients. However, the hospital activated its well-developed and annually rehearsed incident plans, which ensured that staff were effectively managed, patients were identified using pre-labelled packs and wards were equipped with torches, headlamps and charged batteries. Thus, although the earthquake occurred during the day when many people were in high-rise concrete buildings and there were two full multi-storey building collapses, Christchurch's stringent building codes and the proximity to high quality and well-managed healthcare minimised fatalities (Ardagh *et al.* 2012).



Patients and staff outside the emergency department at the Christchurch Hospital.

United States of America

The 1989 Loma Prieta and the 1994 Northridge earthquakes in California highlight the potential for road destruction during earthquakes. The Loma Prieta earthquake occurred in Santa Clara County in Northern California on 17 October 1989 at 5:04pm and registered 7.1 on the Richter scale (Pointer *et al.* 1992). The earthquake caused 63 fatalities and 3 757 injuries, with 42 deaths among motor vehicle occupants and pedestrians resulting from the partial collapse of an elevated freeway ramp (Pointer *et al.* 1992). The earthquake occurred when many residents were in their homes preparing to watch a World Series baseball match, leaving the usually heavily congested freeways relatively quiet. Had this not been the case, the fatality and injury rates would have been much higher. Furthermore, two large sections of the San Francisco-Oakland Bay Bridge fell, resulting in one fatality and rendering the bridge unusable. Damage to 18 306 residential properties and 2 575 businesses resulted in

the displacement of 12 053 people (Nolen-Hoeksema & Morrow 1991, Pointer *et al.* 1992).

The most common injuries sustained during the Loma Prieta earthquake included falls, cuts, abrasions, fractures, burns and being hit by falling objects. While five local hospitals reported difficulties in treating patients due to staffing shortages and insufficient operating suites, most hospital resources were not overwhelmed. Although hospitals near the epicentre experienced a near doubling in the number of patients presenting to the emergency department, off-duty doctors and nurses were able to deal with the influx. The familiarity with and preparation for earthquakes in the region resulted in rapid triaging and expedited paperwork, ensuring that the earthquake did not impact negatively on patient care (Pointer *et al.* 1992).

The 1994 magnitude 6.7 Northridge earthquake occurred on 17 January 1994 at 4:31am in the San Fernando Valley of Los Angeles (Scientists of the US Geological Survey and the Southern California Earthquake Center 1994, Bolin & Stanford 1998, Peek-Asa *et al.* 1998, Knight *et al.* 2000). The damage was widespread, including fires, downed power lines and traffic signals, and property and road damage. Over 12 000 residential properties, businesses and hospitals sustained structural damage, leading to the displacement of over 20 000 residents. Schools experienced substantial non-structural damage such as falling lights, which would have resulted in fatalities had schools been in session. Disruptions continued for months due to damaging aftershocks and the collapse of freeway overpasses, which resulted in three major freeways remaining closed until they were rebuilt. However, the emergency response to the earthquake was efficient and preparations such as the retrofitting of masonry buildings prevented more widespread damage (Scientists of the US Geological Survey and the Southern California Earthquake Center 1994).

The earthquake resulted in 57 fatalities that were mostly due to building collapse leading to asphyxia and crush syndrome. Over 7 000 injuries required hospitalisation that were primarily due to falls or being hit by objects (Peek-Asa *et al.* 1998, 2000). Older individuals were more likely to be injured due to their decreased ability to move quickly to avoid falling debris and their lower tolerance to sustained injuries (Mahue-Giangreco *et al.* 2001). However, older individuals displayed the lowest levels of earthquake-specific negative thought patterns and those with prior exposure to earthquakes were less likely to experience post-earthquake depression (Knight *et al.* 2000).

Recommendations

Some work has already been done or is underway in South Australia that addresses the damage that could occur during an earthquake. An earthquake hazard mapping exercise has identified the areas of South Australia most likely to experience an earthquake and estimated the numbers of fatalities and injuries that would occur during earthquakes of various magnitudes

and epicentre locations. However, more can be done to expand on existing knowledge in order to improve South Australia’s preparedness.

Currently, there are no sufficiently strong motion recorders installed in South Australia to determine the manner in which the earth might shake during an earthquake (McCue 2010). It is not clear whether the movement would be different to earthquakes occurring in relatively similar locations. While the absence of these data leads to difficulties in predicting the impact that an earthquake of a given magnitude would have on existing structures, there are nonetheless important recommendations for Adelaide that can be drawn from the events reported on in this article. Key recommendations are summarised in Table 2.

Considering the damage sustained by unreinforced masonry buildings during previous earthquakes, it has been argued that the most significant earthquake risk mitigation in South Australia will be through improving building standards (Ramirez & Peek-Asa 2005, Gibson 2010). Some areas of Adelaide, particularly the inner-city and eastern suburbs, have buildings of similar age and construction to Christchurch, with substantial numbers of unreinforced masonry buildings. Due to the high level of earthquake hazard in New Zealand unreinforced masonry buildings have been seismically assessed and retrofitted where necessary, with most retrofitted buildings performing well during the 2010 Christchurch earthquake (Wood *et al.* 2010). Following the Adelaide and Newcastle earthquakes a number of school buildings in Adelaide and Newcastle were strengthened and a hospital in Adelaide was relocated away from what was thought to be an active fault in the southern suburbs (McCue 2010). It may be necessary to assess the economic viability of retrofitting unreinforced masonry buildings in Adelaide that may lead to high numbers of fatalities and injuries during an earthquake (Greenhalgh *et al.* 1994).

Bridges and roads are highly vulnerable to earthquake damage, resulting in numerous injuries and fatalities (Nolen-Hoeksema & Morrow 1991, Marmar *et al.* 1996, Peek-Asa *et al.* 1998, Ramirez & Peek-Asa 2005). Many bridges in South Australia are relatively old and therefore may be prone to cracking in the event of an earthquake (Templeman & Bergin 2008). The failure of infrastructure, such as traffic signals and road lighting, may also contribute to accidents and injuries (Ramirez & Peek-Asa 2005). Damaged roads and bridges may make it difficult to access essential services, including hospitals (Ardagh *et al.* 2012). Thus, alternate routes or modes of transport should be part of emergency plans.

The importance of each community’s level of preparation must be acknowledged. Research has demonstrated that social capital, or the degree of trust and connection between community members, is a strong predictor of post-disaster recovery. Communities should focus on developing social infrastructure, such as community networks and organisations, which contribute to greater resilience and rapid recovery (Aldrich 2010). Communities should develop knowledge and understanding of earthquakes and ensure the availability of essential supplies, transport and communications services (Templeman & Bergin 2008, Gibson 2010). Essential services, including hospitals, should have sound emergency power and communications systems and contingency plans in place. Emergency operation plans should be developed and rehearsed, including well-defined hierarchical structures for the management of staff and volunteers (Ardagh *et al.* 2012). In the event of a large earthquake, it is likely a national (and potentially international) response will be required during the response and recovery period (Templeman & Bergin 2008). Arrangements should be in place to enable effective co-ordination and communication between local and national service providers and for the endorsement and co-ordination of international disaster response teams.

Table 2: Key recommendations

Area	Recommendations
Building standards	<ul style="list-style-type: none"> • Focus on unreinforced masonry buildings. • Consider economic viability of retrofitting vulnerable buildings.
Transport and infrastructure	<ul style="list-style-type: none"> • Emergency plans for possible bridge and road collapse and failure of critical infrastructure.
Community preparedness	<ul style="list-style-type: none"> • Implement community resilience models and strategies. • Develop and rehearse emergency plans.
Health services	<ul style="list-style-type: none"> • Be prepared for profile of injuries routinely observed during earthquakes. • Make arrangements to collaborate with national and international health agencies.
Recovery and rehabilitation	<ul style="list-style-type: none"> • Plan for longer-term physical and mental health outcomes. • Ensure ongoing access to treatment and support services.
Practical and financial support	<ul style="list-style-type: none"> • Prepare for prompt repairs to homes and businesses. • Organise efficient settlement of insurance claims and financial support. • Organise flexible employment arrangements for affected workers.

The South Australia Department for Manufacturing, Innovation, Trade, Resources and Energy (Mineral Resources Division) manages earthquake monitoring devices in South Australia. Sites include Government House, Mt Osmond, Whyalla, Port Pirie, Napperby, Payneham, and Torrens Island. The stations are moved around the metropolitan area every two years.



Early trigger earthquake recorder used in metropolitan areas of South Australia.

Health services should be prepared to deal with the pattern of injuries routinely observed during earthquakes, including crush syndrome, soft tissue injuries and bone fractures (Ardagh *et al.* 2012, Doocy *et al.* 2013). Acute kidney injury is common in patients with crush syndrome and rapid provision of renal replacement therapy is important. Injured individuals are likely to attend the closest or most familiar health facility in the event of an earthquake and may present to facilities that would not normally receive seriously injured patients. Thus, robust emergency plans should be in place for all healthcare providers, not only major hospitals. Moreover, the state health system's capacity to manage a large mass casualty event needs to be maintained and practiced and plans put in place to collaborate effectively with national and international health agencies (Templeman & Bergin 2008).

Longer-term recovery and rehabilitation should be considered, not only in regard to physical trauma, but also taking psychological impacts into account. Although psychological problems among earthquake survivors decline substantially over time, a minority continue to experience significant and persistent mental illness (Lewin *et al.* 1998). It is important that these individuals be able to access treatment and support services, not only immediately after the

disaster, but throughout their recovery period. Those with elevated levels of depression and stress prior to an earthquake and a ruminative style of responding to these symptoms may benefit from engagement in relief efforts and other similar activities that have a positive influence on their sense of efficacy and overall mental state (Nolen-Hoeksema & Morrow 1991).

Earthquakes have ongoing and substantial effects on the lives of individuals and local businesses, rather than being events with a well-defined endpoint. Thus, it is important to recognise that sole reliance on initial earthquake exposure to identify individuals in need of support will exclude those for whom the impact is latent, occurring as a result of accumulation of ongoing disruptions and resulting stress. In order to decrease these disruptions, prompt repairs, speedy settlement of insurance claims, financial assistance and flexible employment arrangements should be made available to individuals and businesses affected by earthquake (Carr *et al.* 1997).

The level of preparation for an earthquake event and the characteristics of the impact, such as fatality and injury rates and damage to essential services, may be underestimated when the Adelaide context is compared in a crude fashion to the experiences of similar cities. The engagement of civil society through community awareness and preparedness is influenced by the community's recent experiences of disaster. In Adelaide, where significant earthquakes are infrequent, an earthquake may have a greater impact because the community, its public policy, organisations and individual community members, are less aware of the potential risks.

References

- Aldrich, DP 2010, *The power of people: social capital's role in recovery from the 1995 Kobe Earthquake*. *Natural Hazards*. doi: 10.1007/s11069-101-9577-7.
- Ardagh, MW, Richardson, SK, Robinson, V, Than, M, Gee, P, Henderson, S, Khodaversi, L, Mckie, J, Robertson, G, Schroeder PP & Deely, JM 2012, *The initial health-system response to the earthquake in Christchurch, New Zealand, in February, 2011*. *The Lancet* 379: pp. 2109-2115.
- Bolin, R & Stanford, L 1998, *The Northridge earthquake: community-based approaches to unmet recovery needs*. *Disasters* 22(1): pp. 21-38.
- Carr, VJ, Lewin, TJ, Kenardy, JA, Webster, RA, Hazell, PL, Carter, GL & Williamson, M 1997, *Psychosocial sequelae of the 1989 Newcastle earthquake: III. Role of vulnerability factors in post-disaster morbidity*. *Psychological Medicine* 27: pp. 179-190.
- Carr, VJ, Lewin, TJ, Webster, RA & Kenardy, JA 1997, *A synthesis of the findings from the Quake Impact Study: a two-year investigation of the psychosocial sequelae of the 1989 Newcastle earthquake*. *Soc Psychiatry Psychiatr Epidemiol* 32: pp. 123-136.
- Carr, VJ, Lewin, TJ, Webster, RA, Kenardy, JA, Hazel, PL & Carter, GL 1997, *Psychosocial sequelae of the 1989 Newcastle earthquake: II. Exposure and morbidity profiles during the first 2 years post-disaster*. *Psychological Medicine* 27: pp. 167-178.
- Doocy, S, Daniels, A, Packer, C, Dick, A & Kirsch, TD 2013, *The human impact of earthquakes: a historical review of events 1980-*

2009 and systematic literature review. *PLoS Currents* 5: ecurrents.dis.67bd14fe457f451db450b5433a5438ee5420fb5833.

Dorahy, MJ & Kannis-Dymand, L 2012, *Psychological distress following the 2010 Christchurch earthquake: a community assessment of two differentially affected suburbs*. *Journal of Loss and Trauma* 17: pp. 203-217.

Doyle, HA, Everingham, IB & Sutton, DJ 1968, *Seismicity of the Australian continent*. *Journal of the Geological Society of Australia: An International Geoscience Journal of the Geological Society of Australia* 15(2): pp. 295-312.

Gibson, G 2010, *Earthquake risk in Australia*. *Australian Planner* 47(1): pp. 54-57.

Giovinazzi, S, Wilson, T, Davis, C, Bristow, D, Gallagher, M, Schofield, A, Villemure, M, Eidinger, J & Tang, A 2011, *Lifelines performance and management following the 22 February 2011 Christchurch earthquake, New Zealand: highlights of resilience*. *Bulletin of the New Zealand Society for Earthquake Engineering* 44(4): pp. 402-417.

Greenhalgh, SA, Love, D, Malpas, K & McDougall, R 1994, *South Australian earthquakes, 1980-92*. *Australian Journal of Earth Sciences: An International Geoscience Journal of the Geological Society of Australia* 41(5): pp. 483-495.

Kemp, S, Helton, WS, Richardson, JJ, Blampied, NM & Grimshaw, M 2011, *Sleeplessness, stress, cognitive disruption and academic performance following the September 4, 2010, Christchurch earthquake*. *Australasian Journal of Disaster and Trauma Studies* 2011-2012: pp. 11-18.

Knight, BG, Gatz, M, Heller, K & Bengtson, VL 2000, *Age and emotional response to the Northridge earthquake: a longitudinal analysis*. *Psychology and Aging* 15(4): pp. 627-634.

Lewin, TJ, Carr, VJ & Webster, RA 1998, *Recovery from post-earthquake psychological morbidity: who suffers and who recovers?* *Australian and New Zealand Journal of Psychiatry* 32: pp. 15-20.

Mahue-Giangreco, M, Mack, W, Seligson, H & Bourque, BL 2001, *Risk factors associated with moderate and serious injuries attributable to the 1994 Northridge earthquake, Los Angeles, California*. *Annals of Epidemiology* 11: pp. 347-357.

Marmar, CR, Weiss, DS, Metzler, TJ, Ronfeldt, HM & Foreman, C 1996, *Stress responses of emergency services personnel to the Loma Prieta earthquake interstate 880 freeway collapse and control traumatic incidents*. *Journal of Traumatic Stress* 9(1): pp. 63-85.

McCue, K 2010, *Assessing earthquake hazard and risk in Australia*. *Australian Planner* 47(1): pp. 52-53.

Nolen-Hoeksema, S & Morrow, J 1991, *A prospective study of depression and posttraumatic stress symptoms after a natural disaster: the 1989 Loma Prieta earthquake*. *Journal of Personality and Social Psychology* 61(1): pp. 115-121.

Peek-Asa, C, Kraus, JF, Bourque, LB, Vimalachandra, V, Yu, J & Abrams, J 1998, *Fatal and hospitalized injuries resulting from the 1994 Northridge earthquake*. *International Journal of Epidemiology* 27: pp. 459-465.

Peek-Asa, C, Ramirez, M, Shoaf, K, Seligson, H & Kraus, JF 2000, *GIS mapping of earthquake-related deaths and hospital admissions from the 1994 Northridge, California earthquake*. *Annals of Epidemiology* 10(1): pp. 5-13.

Pointer, JE, Michaelis, J, Saunders, C, Martchenko, J, Barton, C, Palafox, J, Kleinrock, M & Calabro, JJ 1992, *The 1989 Loma Prieta earthquake: impact on hospital patient care*. *Annals of Emergency Medicine* 21(10): pp. 1228-1233.

Ramirez, M & Peek-Asa, C 2005, *Epidemiology of traumatic injuries from earthquakes*. *Epidemiologic Reviews* 27: pp. 47-55.

Scientists of the US Geological Survey and the Southern California Earthquake Center 1994, *The magnitude 6.7 Northridge, California, earthquake of 17 January 1994*. *Science* 266: pp. 389-397.

Sibley, CG & Bulbulia, J 2012, *Faith after an earthquake: a longitudinal study of religion and perceived health before and after the 2011 Christchurch New Zealand earthquake*. *PLoS ONE* 7(12): e49648.

State Emergency Management Committee 2012, *State Emergency Management Plan*. Adelaide, Government of South Australia.

Sutton, DJ & White, RE 1968, *The seismicity of South Australia*. *Journal of the Geological Society of Australia: An International Geoscience Journal of the Geological Society of Australia* 15(1): pp. 25-32.

Templeman, D & Bergin, A 2008, *Taking a punch: building a more resilient Australia*. Canberra, Australian Strategic Policy Institute.

Wood, P, Robins, P & Hare, J 2010, *Preliminary observations of the 2010 Darfield (Canterbury) earthquakes: an introduction*. *Bulletin of the New Zealand Society for Earthquake Engineering* 43(4): pp. i-iv.

World Association for Disaster and Emergency Medicine 2003, *Health Disaster Management: Guidelines for Evaluation and Research*. Madison, WADEM.

About the authors

Dr Olga Anikeeva is a Postdoctoral Research Fellow at Torrens Resilience Institute and the Disaster Research Centre at Flinders University with a background in public health and epidemiology.

Dr Malinda Steenkamp is a Postdoctoral Research Fellow at Torrens Resilience Institute and the Disaster Research Centre at Flinders University. She has a background in epidemiology, public health and maternal and infant health.

Professor Paul Arbon is the Director of Torrens Resilience Institute and the Disaster Research Centre at Flinders University and current President of the World Association for Disaster and Emergency Medicine. His research focuses on disaster resilience and the health aspects of disaster response and recovery.

Development of pharmacy emergency management guidelines

Wendy Walker, Vice-President of the Military and Emergency Pharmacy Section of the International Pharmaceutical Federation, outlines what that organisation is doing to create and share standardised emergency management guides.

ABSTRACT

There is little doubt that the list of disasters the world has witnessed in the last decade have resulted in high cost damages and great human suffering. While many organisations have responded to the nations and areas affected by disasters, from a pharmacy perspective, there seem to be very few, if any, procedures, plans or guidelines to refer to or follow. Those few documents that do exist are not standardised, nor widely disseminated. This article describes what the Military and Emergency Pharmacy Section (MEPS) of the International Pharmaceutical Federation (FIP) is doing to address the situation.

Background

There are many definitions for both terms emergency and disaster. Wikipedia, the free encyclopaedia offers the following definitions:

- Emergency – a situation that imposes an immediate risk to health, life, property or environment. Most emergencies require urgent intervention to prevent a worsening of the situation, although in some situations, mitigation may not be possible and agencies may only be able to offer palliative care for the aftermath.¹
- Disaster – a natural or man-made (or technological) hazard resulting in an event of substantial extent causing physical damage or destruction, loss of life, or drastic change to the environment. A disaster can be ostensibly defined as any tragic event stemming from events such as earthquakes, floods, catastrophic accidents, fires, or explosions. It is a phenomenon that can cause damage to life and property and destroy the economic, social and cultural life of people.²

1 Wikipedia, The Free Encyclopedia. At: <http://en.wikipedia.org/wiki/Emergency>, [28 October 13].

2 Wikipedia, The Free Encyclopedia. At: <http://en.wikipedia.org/wiki/Disaster>, [28 October 13].

The United Nations definition of a disaster combines the above two: A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.³

Therefore, by extrapolation, when a disaster occurs, an emergency ensues. Assistance will be required from external agencies and will invariably involve pharmacy support. As this external support may take time to be readily available, the immediate response must be provided by local agencies. However, without a robust disaster response plan detailing the emergency management guidelines, an effective and rapid pharmacy response may not be feasible.

Introduction

The International Pharmaceutical Federation (FIP) recommends the inclusion of the pharmacy profession in the disaster response planning process and the actual response (FIP Statement 2006), in order to maximize the effectiveness of not only the pharmacy response, but also the overall health plan and response to emergency situations. By having members of the pharmacy profession on the planning and response teams, victims of disasters will be ensured continued access to pharmaceutical care.

Additionally, pharmacist expertise can be sought in:

- developing casualty treatment guidelines
- suggesting medicines and other health care items for inclusion in national, regional and local stockpiles
- ensuring proper logistics (packaging, storage, handling, labelling) and dispensing of emergency supplies of medicines, and
- ensuring appropriate deployment of emergency medicines.

Pharmacists may also be employed as first responders, in triage, immunisation and administration of medicines. As each phase of a disaster response

3 United Nations Terminology. At: www.unisdr.org/we/inform/terminology, [28 October 2013].

requires different supplies and skills, the pharmacist can advise on the best treatment of various injuries and illnesses given the available medicines. For example, in the *response* phase, trauma and lacerations may be prevalent, whereas in the *recovery* phase, there is more emphasis on infections, communicable diseases and the more chronic physical and psycho-psychiatric conditions. Pharmacists are well placed to provide immunisations required and can educate responders and the disaster-affected personnel on both detection and prevention of diseases.

As the name suggests, the Military and Emergency Pharmacy Section (MEPS) of FIP consists of military pharmacists (uniformed and civilian) from across the globe working side-by-side with emergency pharmacists from civilian organisations. Due to the nature of MEPS membership and the first-hand experience and knowledge contained within, the Section can provide input to disaster management planning from a pharmacy perspective.

Pharmacy Emergency Management Guidelines

Various MEPS members have participated in many congresses, seminars and workshops for emergency response from a pharmacy perspective in places like Hyderabad, India in September 2011, Kobe, Japan in October 2011, Chongqing, China in September 2012, Amsterdam, The Netherlands in October 2012, and Dublin, Ireland in 2013. The congresses and seminars presented the lessons learned from a variety of disasters and the workshops were held to progress the development of Pharmacy Emergency Management Guidelines (PEMGs) using those lessons learned.

A discussion document was submitted in February 2103 by MEPS to the FIP Bureau suggesting a Working Group with a wider membership be established by the Federation to further develop the Guidelines. The Board of Pharmaceutical Practice of the FIP agreed, and two MEPS members (the current Secretary and a past-President) have been elected to the Board of the Working Group which was created in September 2013.

Any good plan will have at least four phases. The plan being developed by MEPS for the wider pharmacy community has four phases. There are:

1. Reduction or risk mitigation - potential risks are identified and actions are taken to eliminate or reduce the impact.
2. Readiness or preparedness - operational systems and capabilities are developed and exercised prior to and in preparation for a disaster and emergency response.
3. Response - the action taken prior to (if there is a warning, e.g. Tsunami), during and after the disaster.
4. Recovery - the co-ordinated efforts and processes to establish immediate, intermediate and long-term regeneration of a disaster-struck area.

These phases meet those already in practice for most emergency response organisations. From a pharmacy perspective, the Reduction/Risk Mitigation phase should come first and possibly last, as there is access to a vast number of lessons learned from previous disasters. The Plan must be flexible enough to adapt to the national, regional, local and individual levels of input and assistance requirements.



Pharmacy Emergency Management Guidelines workshop in Chongqing, China Sep 12. L-R: Commander Sylvain Grenier (Canada), Special Projects Officer MEPS; Lieutenant Colonel Wendy Walker, Vice-President MEPS; Mrs Danica Irwin (Canada), invited guest; Colonel Chen Zheng-yu (China), President MEPS; Mrs Jane Dawson (New Zealand), Secretary MEPS.



Military and emergency pharmacists in FIP attendance in Dublin, Ireland 2013.

Considerations

Seven main themes have been identified out of the international fora that should be considered when developing the Guidelines. These considerations include:

- medicines
- pharmacy law
- patient information
- communication
- human resources
- transportation, and
- plans/planning.

These themes are accompanied by various issues and challenges identified by MEPS members when responding to disaster and emergency situations.

Medicines

The major issue identified under this theme was shortage. That is, with the destruction of infrastructure (manufacturer, wholesaler, retailer, and private and commercial accommodation) comes the loss, and therefore, the scarcity of medicines. There are more acute health requirements associated with emergency response and if combined with the lack of supply, there is an increasing need for outside assistance. Donations are always done with the best of intentions; however they are not always appropriate for each circumstance. One possible solution would be to stockpile certain medicines associated with disaster and emergency response. These stockpiles could be located strategically to ensure minimal downtime and disruption.

Pharmacy law

Another consideration is the legal requirements for the conduct of pharmacy business. For example, the local pharmacy may have been destroyed and was the only licensed dispensing premises. How is this overcome and how can a pharmacist legally conduct business at another site; it may even be a tent? Additionally, more thought needs to be given to pharmacist prescribing (limited supply only) using known patient history and a patient's own knowledge of their medicines. This will reduce the number of patients required to visit a doctor and will allow doctors to treat more acute and urgent cases.

Patient information

This is not just information about the patients who have visited the pharmacy, that is, the dispensing records and histories, but also includes information that pharmacists can offer to patients affected by the disaster. Based on extensive experience of many MEPS members, this is a major area of concern and one in which pharmacy and pharmacists can make a significant contribution. During both the *reduction* and *readiness* phases, planners must consider details of how to manage a patient's expectations of medicine supply. That is, what if their usual brand of medicine is unavailable? How do you counsel the patient on change?

Another aspect of patient information is that many patients assume the local pharmacy or medical centre or hospital will have records of their medicines—both current and past—and very few patients will keep their own records. However, in a disaster situation, these records may be inaccessible, lost or unusable and emergency supply of medicines to patients cannot be affected. Add this scenario to the tourist who is effected by the disaster. How do they communicate their requirements when all they have left is their wallet or handbag, the rest has been destroyed or

washed out to sea? MEPS is in the very early stages of trying to develop a 'medicines passport' type booklet which can be either downloaded from the Internet, or obtained from their local pharmacy, and can be used as a personal medicines record. The booklet should be packed with other important documentation and items (e.g. passport, bankcards, laptop, etc) and packed for evacuation if the need arises. Travellers can also use the booklet to increase the likelihood of receiving the correct medicine in an emergency.

Communication

The lack of communication mediums results in an uncoordinated and disjointed effort in response. As so often happens in a disaster situation, landline communications are disrupted or destroyed and mobile phone access becomes congested. The need to communicate with other health care providers is added to the need to communicate with the relief and aid teams. Language barriers with tourists and indigenous populations are also an issue faced during disaster and emergency responses. Employment of pictograms in these situations will assist with communication. Of course, with power restrictions, forethought must be given to producing hard copies of communication products to be included in the pharmacy emergency kit.

Human resources

Without adequate human resources an appropriate response cannot be delivered. When a disaster occurs locally, everyone located in or nearby that locale is affected and the human resources required to mount a response are limited. External assistance is required.

When resources are available, they must be appropriately and adequately trained, not only to provide disaster relief assistance, but also proper pharmaceutical care. Often, business people (pharmacists) who are affected are in shock and disbelief themselves and are unable to communicate their relief requirements. Having someone with disaster relief experience assist with the provision of adequate and appropriate personnel is an advantage. Without assistance, pharmacists in disaster-affected areas may not realise they are providing below optimal care and may burn out very quickly.

Transportation

This topic is not limited to pharmacy emergency management, however it must be considered when planning for disasters and emergencies from a pharmacy perspective. With local stock destroyed, how can it be replaced? What priority is given to pharmaceutical supplies? In recent disaster responses, distribution of medical supplies, including pharmaceuticals to treat acute illnesses and injuries, has been given top priority. That needs to be backed-up with priority regular supply of routine pharmaceuticals and other health care products. Care should be taken when requesting supply that it can be received and receipted in a timely manner. Having stock sitting

beside an airfield for days in inclement weather defeats the purpose.

Plans and planning

Having a plan would assist in providing an organised and structured response. Standard Operating Procedures can be developed from the plan, which should include the requirement for an essential medicines list. This would, in turn, alleviate some of the issues associated with many of the above-mentioned considerations.

Conclusion

Given the perceived increasing number of disasters occurring around the world, it is far better to be even a little prepared to respond in an effective and efficient manner, than to be totally unprepared. Potential risks should be identified and mitigated as soon as, and as best as, possible. Development and dissemination of the FIP Pharmacy Emergency Management Guidelines helps ensure efficiency and effectiveness both in responding to and recovering from disasters and subsequent emergencies. It will also enable emergency response organisations around the world to reduce time and resources by not having to 're-invent the wheel'.

References

International Pharmaceutical Federation 2006, *The Role of The Pharmacist in Crisis Management: Including Manmade and Natural Disasters and Pandemics*. Amsterdam, North Holland: FIP Press. At: www.fip.org/programmes_projects?page=statements.

About the author

Wendy Walker graduated from the University of Queensland in 1991 as an undergraduate Lieutenant in the Australian Army. After 23 years in the Australian Regular Army, she retired as a Lieutenant Colonel Australian Army Pharmacist in December 2012. Wendy served in Bougainville and the Solomon Islands and has run the Australian Defence Force national logistics unit for medical, dental and veterinary stores in Sydney on two different occasions. She is currently the Vice-President of the Military and Emergency Pharmacy Section of the International Pharmaceutical Federation.

Contact Wendy at wwalker@inet.net.au

Lessons from Louisiana, and a new normal in disasters

Journalist Kate Lahey talks to U.S. Colonel Joey Booth about sharing the lessons we learn from major disasters in the USA and Australia.



Colonel Joseph Booth

Colonel Joey Booth is an experienced emergency commander in the USA who is keen to exchange ideas with his Australian counterparts and doesn't mince words. "What we don't need to be doing," he said, "is learning the same lessons from different bloody noses."

Col. Booth has copped one of the bloodiest. He was Deputy Superintendent of Louisiana State Police in 2005, when *Hurricane Katrina* hit the Gulf Coast and killed more than 1 800 people, flooding New Orleans and changing what he thought he knew about disasters. He was incident commander over preparation and response for *Katrina* and later for *Hurricane Rita*. Today, he is Executive Director of the Stephenson Disaster Management Institute, at Louisiana State University. The institute works to improve disaster response management through research and education and by forging stronger collaboration between research and practice.

In July 2013, Col. Booth traveled from the USA to Australia to share his knowledge and forge new relationships that he hopes will benefit both countries as they grapple with a 'new normal' in natural disasters. Col. Booth spoke about this concept at the Emergency Management Conference in Melbourne. He also met with staff from the Australian Emergency Management Institute and other groups from the

emergency sector, as well as representatives of the private sector.

Col. Booth said it was critical to be able to share knowledge in the way that Australia and the US have agreed to do under a Memorandum of Understanding, first signed in 2010, and especially so in the new environment authorities are now operating under. In his presentation to the conference, Col. Booth discussed the increased frequency and cost of disasters, the increase in the number of people affected and - in contrast - the reduction in deaths from disasters between the years 1900-2011.¹

Col. Booth said that although 'big' disasters were getting bigger and more frequent, our improved capabilities in both preparation and response were the reason fewer people were dying in disasters.

"Our ability to reach disaster-affected areas is far greater, our ability to get resources anywhere in the world very quickly is far better than it was in the early years of that reporting period," Col. Booth said in an interview on his return to the USA. Plus, some of the bigger death tolls earlier in the reporting period were due to disease epidemics, which can now be better predicted and immunised against, he said.

As if he needed any more convincing of the 'new normal,' on his way to Australia Col. Booth had been reading news online about wildfires in Colorado.

"It said that Colorado had had record-setting fire seasons three of the last four years. Every year they break the record. Now that's the new normal. We're breaking records on magnitude and scope of disaster, numbers of disasters. As someone said, we're having a 100-year-flood every three years now," Col. Booth said.

About a dozen major wildfires burned parts of Colorado during the US summer in 2013 under record-high temperatures. One fire, known as the Black Forest Fire, caused the evacuation of 40 000 people and destroyed 500 homes, making it the most destructive in Colorado's history. Two people died.

¹ Supporting data showing these trends can be found at EM-DAT: The OFDA/CRED International Disaster Database - www.emdat.be - Université catholique de Louvain - Brussels - Belgium.

Across the USA in June, there were actually fewer fires than average for the month but they burned more area than average, according to the National Climatic Data Centre. At the same time, according to the data centre, there were about four times as many records broken for warmer temperatures (2 800) than there were for records broken for cooler temperatures.

More severe weather is not the only 'new normal'. Other factors creating the new environment were economic constraints, a lower reliance on government and stronger ties with the private sector, Col. Booth said.

Last year in the United States, economic constraints were particularly tight as automatic cuts (to a total value of US\$85 billion) were enforced throughout government departments under what is known as budget sequestration.

The US Department of Homeland Security, which includes the Federal Emergency Management Agency (FEMA), was made to absorb about US\$3 billion in reductions in seven months, about five per cent of its budget.

In February, shortly before the cuts came in to force, the then secretary of the department, Janet Napolitano, told a Senate Committee, "cuts to FEMA would have significant, negative impacts on our nation's disaster preparedness, response and recovery efforts".²

Sequestration also reduced the US Disaster Relief Fund by over US\$1 billion.

Col. Booth said the reduction in funding, which also affected the military, would mean it would take more work to prepare for disasters.

"We're going to have fewer resources to put on to problems than we did before and this comes at a time when we're having a higher number of disasters and a higher demand for those resources.

"We've got to take a risk analysis approach and look at what our threats are and what we can do for low cost in advance of a disaster. I think the resilience quality that we're going to get is not going to be that we're better responders but that we're better prepared," Col. Booth said.

Under constrained resources, people would also need to be less reliant on government help, he said. "Twenty years ago, if something happened, as soon as the disaster passed you were out in your yard cleaning up. Over the years our government programs have grown to be so enormous and so effective that people go straight to the government program. I've heard people talk about a tree blowing down in somebody's yard and rather than clean it up themselves, they'd sit and wait for weeks for someone to come and clean it up for them.

"As we get in a more resource-constrained environment, you're going to see people having to go back to the way we used to do things and have a greater dependency on their own ability to meet their needs," Col. Booth said.

People needed to consider that emergency services would not always meet demand, and practise basic survival preparation, like keeping enough water to last up to five days and storing non-perishable goods at home, he said.

"There's going to be more of an emphasis on that standard of making sure people know how to fend for themselves for the first three to five days following a major disaster. And there needs to be," he said.

More than eight years after *Hurricane Katrina* unleashed its fury on New Orleans, the recovery process continues. Many residents who fled are yet to return, and others are only just returning now. Among the assumptions authorities made in preparing for *Katrina* was that they would evacuate New Orleans in advance, then be able to send everyone home once the hurricane had passed. Instead, levees failed and the city flooded, leaving people stranded both in and out. Col. Booth said one of the biggest problems in helping the city to recover was that local businesses could no longer function. This taught him the importance of getting the private sector back on its feet as soon as possible.

"I really learned that we had not considered that as part of our plan. It just wasn't how government looked at what is recovery. The more I studied this over the years, the more we started collaborating with the private sector and learning what we need to do." Col. Booth said.

The Stephenson Disaster Management Institute is now one of several organisations behind The Louisiana Business Emergency Operations Center (LA BEOC). The centre is dedicated to disaster preparedness, response and recovery for business. It facilitates communication with the state's major industries, as well as owners and operators of critical infrastructure and resources. The LA BEOC is also set up to co-ordinate private sector involvement and support during a time of crisis. Col. Booth said that during other storms since *Katrina*, recovery was slower than it could have been as utilities and services were out and commerce wasn't functioning.

"We started looking at ways to exchange information with the private sector and work with them to help get them back up to normal operating tempo as soon as possible because, in the United States in particular, so much of our critical infrastructure is owned and operated by the private sector, including telecommunications and other really vital infrastructure that has to be operating for government to recover its operation.

"There's a real symbiosis there that has to be dealt with and managed. There's an information exchange and a co-operative platform that has to be established. We had a tendency in the past where, well if in this

2 Written testimony of Secretary Napolitano to the Senate Committee Appropriations Hearing. At: www.dhs.gov/news/2013/02/14/written-testimony-secretary-napolitano-senate-committee-appropriations-hearing.

area, if electricity was out, we would just send in mass amounts of supplies into the area. But when you're giving out free commodities in front of stores that could be opened, you're not helping them come back into business.

"So our priority is not just to get free commodities in the affected area. Our priority is 'what does it take to get those businesses back open?' Small businesses tended to be the least prepared, partly because small business operators often lacked time," Col. Booth said.

To convince small business owners to properly prepare, it was important to focus on the business case for it. In other words, show them a return on investment. This has included highlighting what their insurance doesn't actually cover (despite what they might think it does) and impressing what happens if they are closed and customers get used to shopping elsewhere. Businesses in Louisiana were now being encouraged to plan for any interruption, not just a massive natural disaster, Col. Booth said.

"We're trying to make them understand it doesn't have to be a [one in] 100-year disaster to affect your business or change your life. Even if a pipe breaks in the business above you, or there's a fire on the floor below you, or if someone breaks the key off in the lock at four o'clock in the morning, or if you're a bakery [owner] and your guy who delivers the flour doesn't show up, those can be single points of failure and/or reliance on critical dependencies that may fail. So we're saying, use a contingency model where you have to be prepared for those kinds of interruptions," he added.

Resilience, he said, was about being prepared to deal with an interruption in normal process. "It's far beyond a disaster," Col Booth said.

Insurance companies could also play a stronger role in building resilient communities. "There's got to be a way where we quantify what the value of preparedness is and put some incentives in place to encourage people to be better insured," he said.

In the United States, flood insurance is offered to homeowners, renters and businesses via the FEMA-administered National Flood Insurance Program. Standard home insurance does not cover flooding. The government established the flood program in 1968. To access it, communities must adopt regulations that meet or exceed FEMA requirements to reduce the risk of flooding. The program, however, is tens of billions of dollars in the red. In January 2013, the U.S. Congress passed legislation to increase the program's borrowing authority to US\$30.4 billion to address claims from *Superstorm Sandy* in 2012.

In February 2013, the U.S. Government Accountability Office explained why the flood insurance program continued to create a 'high risk' for the government and US taxpayers.³ It has been considered 'high risk' since 2006 (a year after paying out more than US\$16

billion for *Katrina* losses), due to its 'long-term financial solvency and operational issues'. One of the major concerns the office has expressed about the program is that it has failed to account for climate change.

Some changes were made to the program in 2012, but the Government Accountability Office says they may not be enough to repay the billions FEMA owes to Treasury or to cover future catastrophic losses. Under the changes, many property owners are facing steep increases in premiums. Col. Booth said the rise in premiums would make it harder for some people to obtain insurance. "I think we're not through the process of figuring out what we're going to do about this problem," Col. Booth said.

Operating under all of the factors contributing to the 'new normal' made it even more important to exchange ideas and lessons learned between the U.S. and Australia, Col. Booth said.

"You guys learned a lot in the fires of *Black Saturday*. We learned a lot after hurricanes *Katrina* and *Rita* and there's no point waiting until you get a cyclone that knocks you off your feet or we get a fire that does the same thing to us.

"I think it's critically urgent that we have an environment where we can share those lessons and implement the lessons learned. Especially between Australia and the United States where we have similar methods and similar philosophies of government that allow us to learn from each other and implement some of the same practices and procedures in our emergency preparedness," Col. Booth said.

For this reason, Col. Booth said, the Memorandum of Understanding on Emergency Cooperation⁴ was very important. "Both of us have very mature emergency management practices, we have large numbers of public servants that are in those areas and we also have large economies that would be affected by large natural and man-made disasters. I think the ability for us to share information in that regard is very valuable."

During his time in Australia, Col. Booth visited AEMI's offices at Mount Macedon in Victoria (west of Melbourne). "We presented to each other on our needs, our concerns, what we were doing about it and how we were addressing various issues and we spent some time comparing the commonality in our approach.

"We're trying to establish a more consistent relationship, where we can have a regular exchange of information and update on what we're doing and I'm hopeful that we can even work on some projects together," Col. Booth said.

At the conference in Melbourne, Col. Booth met Dr Alan March, the Associate Dean (Undergraduate) in the Faculty of Architecture, Building and Planning at Melbourne University. Dr March specialises in urban planning for disaster risk reduction. He has lectured at courses at AEMI and is a contributor to this journal.

3 United States Government Accountability Office Report to Congressional Committees At: www.gao.gov/assets/660/652133.pdf.

4 Emergency Management Agreement with the United States of America. At: <http://usrsaustralia.state.gov/us-oz/2010/04/29/ag1.html>.

Col. Booth said he hoped to establish stronger ties with Dr March, to potentially exchange information between the Melbourne and Louisiana State Universities.

"We also have a studio that looks at sustainable architecture designed to look in the type of risk we have. Wind and wave are our most common and serious threat.

"We have several schools at LSU that have research ongoing in that topic. It seems to me it would be very worthwhile to have an information-sharing relationship where we could learn from each other," Col Booth said.

Dr March said he, too, saw great value in this prospect. He hoped it would help to integrate urban planning more in disaster risk management. "I think it would be ideal, since many of the principles and ideas could be exchanged if we managed to develop more of a common theory and knowledge base for work in the disaster area.

"We have a lot to offer here in Australia in terms of expertise, and I think that we need to work on developing the careers of a range of people across multiple disciplines that are related to disaster. This would include providing pathways for research, ongoing placements, links into universities and job-swaps. I am sure there would be other avenues, too," Dr March said.

Col. Booth said he shared the materials he gathered from AEMI with colleagues at home, including publications on how to conduct exercises and how to write plans. He said he was particularly interested in – and impressed by – the organisation of the Victorian Country Fire Authority and Metropolitan Fire Brigade, and the Victorian command structure that put, at the time, the Chief Commissioner of Police at the helm during a major disaster.

"I thought that was an effective way to do it. I thought it was interesting because at least everybody agrees on who's responsibility it is and you don't have to guess from jurisdiction to jurisdiction who you're going to be dealing with. That probably makes it easier, I suppose, for knowing: who do you start with, where do you call and when (people are asking who's going) to be the commander?" he said.

Col. Booth said that while the US had a federal wildfire firefighter service (and many states had effective and large services) generally, local governments dealt with fires in their own jurisdictions. In many jurisdictions in the US, sharing resources with neighbours, and even being able to help each other could sometimes be problematic, he said.

"Fires are like hurricanes, they don't care about geographic local subdivision lines, so it requires doing a little bit more inter-governmental co-operation in advance, and there are notification and request procedures and a reimbursement procedure. I know they do it very quickly and they've got it down to a natural practice but it seems to me it expedites the process when it's all a single entity. Especially in a wildfire situation when you know you're going to have days that are going to be higher risk and you can put resources in those areas." he said.

Having witnessed the political fallout of *Hurricane Katrina* Col. Booth said he was interested to see that AEMI ran a course in developing and using political nous. "I think that's really wise, I'm very interested in learning more about that. Everybody's got some experience with that one!" he laughed.

He described *Katrina* as having become "very political very quickly" and said that this was, at times, a distraction to the response and recovery processes. Asked if he believed *Katrina* was a pivotal point in emergency management, he said: "Sometimes I think it changed the world and sometimes I wonder if anybody was paying attention".

Katrina so severely damaged the local authority in New Orleans, it destroyed "the whole mechanism of how response works. The whole thing is built on that model, that the locals respond and the state and federal governments assist the locals in their response. But after *Katrina*, there was no local authority. There was no police, no fire, everything was flooded, nobody had a place to govern from, they couldn't get to their jobs, communications was destroyed, they had no way to function," Col. Booth said.

In that sense, *Katrina* changed his understanding of disaster response. "There's big disaster, then there's disaster that completely outstrips any local government's ability to respond," he said.

At the time of writing, Col. Booth was looking forward to returning to Australia as the keynote speaker at *Connection! 2014*, 14–18 July at the Australian Emergency Management Institute. See page 67 for details.

About the author

Kate Lahey is a freelance writer and journalist living in the US. She has worked as a city reporter for *The Age* and a business reporter for the *Sydney Morning Herald*. She was also the Victorian political correspondent for Australian Associated Press.

This paper is part of a series of articles reflecting the emergency management agreement of co-operation recently renewed between Australia, through Attorney-General's Department, Emergency Management Australia (EMA) division and United States of America through Federal Emergency Management Agency (FEMA).



From a message in a bottle to best practice in communications

As Australian states and federal bodies work to improve emergency communications, journalist Kate Lahey speaks with Louisiana's Brant Mitchell about the radio network he helped build after *Hurricane Katrina*.



Brant Mitchell, Director of Research and Operations of the Stephenson Disaster Management Institute at Louisiana State University.

Of all the communication technologies New Orleans could boast in 2005, few held up under the force of *Hurricane Katrina*. Mobile phones failed, landlines were knocked out and the few emergency radio systems that did work were jammed. Fire and emergency medical services lost all 911 communications.

To communicate with each other, first responders were forced to thumb out text messages on their phones or find a runner—someone who could physically travel to the person they were trying to reach, on foot or by car.

To warn a team of emergency workers about a dangerous gas leak, a military helicopter dropped a message in a bottle. This was among the evidence given in a report on the communications failures during

Katrina, for the United States Federal Communications Commission.¹

The report also described how thousands of first responders were forced to communicate in single channel mode—one single radio to another single radio at a time—using just three frequencies. Radio users had to wait their turn before speaking, sometimes up to 20 minutes.

Katrina, of course, was not unique in destroying communications or highlighting the shortcomings of a system ill-prepared. Problems during Victoria's Black Saturday bushfires included poor coverage, serious delays, channel congestion and difficulties among metropolitan and regional police who were using incompatible systems, according to the 2009 Victorian Bushfires Royal Commission.²

Responders to the Queensland floods in 2011 battled black spots, congestion and a lack of interoperability between emergency service agencies, the Queensland Floods Commission of Inquiry found.³

Australian states and federal bodies are in the process of improving radio communications for emergency services and developing systems to eventually allow first responders in all states to communicate with inter-agency and interstate colleagues when they need to.

The *National Framework to Improve Government Radiocommunications Interoperability*, endorsed by COAG in 2009, aims to enhance government voice and data radio communications and have all domestic radio communications equipment working on interoperable systems by 2020.⁴

1 Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks Report and Recommendations to the Federal Communications Commission. At: <http://transition.fcc.gov/pshs/docs/advisory/hkip/karrp.pdf>, p 26.

2 Victorian Bushfires Royal Commission Final Report. At: www.royalcommission.vic.gov.au/commission-reports/final-report.

3 Queensland Floods Commission of Inquiry. At: www.floodcommission.qld.gov.au/publications/final%2Dreport.

4 National Framework to Improve Government Radiocommunications Interoperability. At: www.em.gov.au/Documents/Nationa%20Framework%20to%20Improve%20Government%20Radiocommunications.pdf.

In New Orleans, those who endured the chaos of *Katrina* are already using such a system. Eight years after *Katrina*, Louisiana now lays claim to the largest statewide radio system in the USA by number of users – more than 70 000 – and one that is considered best practice in the country.

Brant Mitchell is among those responsible for leading this transformation. He visited Australia recently to explain how Louisiana built the USA first statewide digital 700MHz radio system.

Using recovery grants from the USA Federal Emergency Management Agency (FEMA), as well as state and local funds, authorities began building the new network in south-east Louisiana immediately after *Hurricane Katrina*, then extended it to the rest of the state.

It took about four years and cost more than \$250 million, Mr Mitchell said. Some of that was for infrastructure, and some for radios, which Mr Mitchell said cost between \$1 500 to \$5 000 each. 'If you look at the number of users, you're talking about a lot of financial support to be able to acquire just the radios alone,' he said.

By January 2012, authorities had completed the system of 118 towers. Most of the towers have nine to 12 repeaters, giving the digital network far greater capacity than the previous statewide analogue system.

Today, the network is used by all levels of government, including border control, US marshals, sheriffs' offices, firefighters, city police, state police, emergency managers and FEMA, as well as organisations like the Red Cross.

Radios are programmed to allow for specific talk groups. This means when firefighters in one town know that medical help is coming from another town, they can communicate with the medical team directly, *en route*.

'While each agency has their own talk groups, there's a minimum number of talk groups that are required to be programmed in every radio, and that's by design, to ensure you have the interoperability when you need it,' Mr Mitchell said.

The repeaters can work on both 700MHz and 800MHz spectrums. Mr Mitchell said the advantage of using two spectrums was that it provided more capacity.

'If you operate strictly in 700MHz there's just a limited number of frequencies that you can use. There are not enough 700MHz frequencies to build that state-wide, with the capacity that we have,' he said.

Most Australian emergency radios operate in the Region 3 (Asia Pacific) frequency in the 400MHz band. This is the equivalent of the USA 700MHz band, for narrowband communications, which is mostly voice communication over radio.

Louisiana authorities had been planning for a 700MHz system before *Katrina* hit, Mr Mitchell said. As soon as

the life-saving recovery efforts were completed in New Orleans, the work to introduce this system began.

The Louisiana Wireless Information Network, known as LWIN, has already proven its worth.

'We have statistics that show that during *Hurricane Gustav* (in 2008), which was our first major test, you had a 99.9 per cent chance of getting through on the first time,' Mr Mitchell said.

It has also proved to be invaluable on a bigger scale. When the BP Deepwater Horizon oil spill gushed oil for 87 days into the Gulf of Mexico in 2010, LWIN was used to help establish voice communications for the United States Coast Guard – linking different systems across the Gulf Coast. Responders in Texas, Louisiana, Mississippi, Alabama and Florida were able to quickly establish a network of seamless communications as the world's biggest oil spill lapped their shores.

By coincidence, the Gulf states had purchased the same hardware, Motorola P25. Although this was not essential in linking communications systems, Mr Mitchell said it did make it easier.

'Because the technology was the same we were able to literally just plug in right away. We were able to have a much greater reach because the radios were all on the same vendor. Our radios that we have programmed here (in Louisiana) were programmed on the same master control site in Mississippi, so when we went to talk on Mississippi's network it recognised our radios. We only limited it to certain radios. In order to be able to utilise that we built our own talk groups specifically for that system,' he said.

Mr Mitchell led the work to establish GulfWIN and said it made a significant difference to the response to the spill. 'For command and control it was very important,' he said.

Responders in the field were able to stay in contact regardless of where they were on the bay. It also extended the reach of those working on the water, beyond the usual 'line-of-sight' scope of marine radios, Mr Mitchell said.

Another tool Louisiana contributed to the oil spill response was Virtual Louisiana – a geospatial information system, built on the same platform as Google Earth. Mr Mitchell was responsible for introducing this and the program provided an additional way for first responders to share information. About 4 500 people now use Virtual Louisiana and have to be approved to do so due to the sensitive nature of some of the information that is shared.

'We used it extensively during the BP oil spill where we were providing hourly updates on oil sightings, bird sightings, animal sightings or issues with different booms (containment barriers) that were laid out.

'We've used it quite a bit for other events. The great thing with it is, once we get information that's

geospatially related, we can take it and put it in Virtual Louisiana and we can share it with our community.

'It's a secure network, so we are able to put some sensitive information on there that we wouldn't necessarily put into the public [arena] but we need our first responders to see,' he said.

Mr Mitchell, a Lieutenant Colonel with the United States Army Reserves, was not in the USA when *Katrina* made landfall. He was commanding an infantry company in Bagdad. He spent one year in Iraq. From 2008-2012 he was Chairman of the Louisiana Statewide Interoperability Executive Council which is responsible for providing governance of the LWIN. Today he is Director of Research and Operations of the Stephenson Disaster Management Institute at Louisiana State University.

He also recently served as a member of the Federal Communications Commission's Public Safety Advisory Committee for the Emergency Response Interoperability Committee, to help develop technical specifications for a nationwide broadband network for the USA, dedicated to first responders.

Dubbed FirstNet, the data network is yet to be built and is not designed to replace land mobile radios. The US Congress has committed more than \$7 billion to the project.

Like Australia, the USA is working to improve emergency communications systems in two major ways. The first is by upgrading narrowband communication—mainly voice calls over radio. This is what Louisiana has done and what Australian states are working towards.

In both countries, radio voice communication continues to play a critical role in keeping public safety officers in touch, particularly in times when demand for availability is high and urgent. To add to that, both countries are aiming to give first responders access to mobile broadband data while they are working.

This technology would allow emergency services to, for example:

- Check live maps, building plans, fingerprint scans, biometric data and facial recognition.
- Access databases and records, including medical records.
- Access surveillance video and tactical video.
- Monitor vehicles.
- Monitor a patient's vital signs.

In 2011, the Australian Government established a Public Sector Mobile Broadband Steering Committee to guide decisions about the broadband needs of emergency services.

In 2013, Federal Parliament's Joint Committee on Law Enforcement released a report on its inquiry

into Spectrum for public safety mobile broadband.⁵ It recommended the Minister for Broadband, Communications and the Digital Economy issue a Ministerial Direction to the Australian Media and Communication Authority (ACMA) to allocate 20MHz of contiguous spectrum in the 700MHz band for a public safety mobile broadband network, and that the Government should secure priority access to an additional 10MHz of spectrum in the 700MHz band for public safety purposes.

This differed to the ACMA's decision to allocate 10MHz of the 800MHz band, as well as 50MHz of spectrum in the 4.9GHz band. At the time of writing, the committee's recommendations were still being considered.

The Attorney-General's Department, in its submission to the inquiry, supported the call for public safety agencies to have mobile broadband capabilities.

Part of the debate around allocating spectrum to Australian emergency services has centred on how much of it first responders need to operate day-to-day and during a disaster, and whether enough spectrum should be allocated to cover a 'rare contingency', such as a terrorist attack on a major city.

The ACMA has argued this 'rare contingency' capability is unnecessary and that there are other ways to access spectrum when it is needed. Others have argued it should form part of the new allocation.

The spectrum is valuable. As Australia's television networks switched from analogue to digital technology, some of the nation's 700MHz band opened up. When it did, three companies, Optus Mobile, Telstra and TPG Internet, paid close to \$2 billion for a piece of it, and of the 2.5GHz spectrum (which became available for different reasons).

Meanwhile, Australian states are working towards better narrowband systems that will allow emergency personnel to communicate directly among agencies and jurisdictions. Alongside this work, the ACMA has been re-planning the 400MHz band to relieve congestion and to provide a dedicated, harmonised government radio segment. In heavily congested areas, the ACMA intends to finalise transition to the new arrangements by the end of 2015, and by the end of 2018 elsewhere.

In September 2013, the Queensland Government announced an enhanced digital radio voice and narrowband data communications network for the state, worth \$457 million.⁶ The Queensland Government plans to begin the project in Brisbane, the Gold Coast and Cairns and roll the network out across the rest of the state over time. It is to provide improved communications security and interoperability between

5 Spectrum for public safety mobile broadband. At: www.apf.gov.au/Parliamentary_Business/Committees/Joint/Law_Enforcement/Completed_inquiries/2010-13/spectrummobilebroadband/index.

6 Queensland Government media release. At: <http://statements.qld.gov.au/Statement/2013/9/2/wireless-network-gets-everybody-talking/>.

public safety agencies and the G20 Leaders' Summit in 2014 will be among its first tests.

Around the same time, the Victorian Government announced it would begin a trial of its Emergency Services Integrated Communications project.⁷ The project aims to allow Victorian emergency services organisations to communicate with each other on a common channel, from any device to any device.

The NSW Telco Authority recently reviewed the state's mobile radio network infrastructure with a view to rationalising it and improving services. At the time of the review, there were 77 agencies operating either fixed or mobile radio infrastructure, 16 of which also used the shared Government Radio Network, according to the Telco Authority website.

Mr Mitchell said although the Louisiana Wireless Information Network was 'finished' in January 2012, it would never be completed. 'We're always continuing to work on improving it. If we can add coverage somewhere - changing one tower to a higher tower - we always try to improve the coverage,' Mr Mitchell said.

The biggest challenge in establishing the network among its users was their agreement to become a part of it, he said. 'Essentially, every fire department, every police department, every sheriff's agency, they have their own radio system.

'So, when you ask them to come to a statewide radio system, you're basically asking them to give you trust that it's going to be operational, that you're going to meet their needs and you're going to design it for what their particular issues are,' he said.

Mr Mitchell said several factors helped in this regard. One was being able to guarantee in-building penetration for 95 per cent of users, another was the state's decision to foot the operational bill and scrap user fees that agencies had previously been asked to pay to join the old analogue network. The old network had just 10 000 users - only 10 per cent were from local agencies such as city police or fire departments.

Developing relationships was critical to forming the network, he said. 'We went from region to region to talk about what the benefits were. We have a very responsive staff. If anyone called - and even today when they have coverage issues - we always try to send technicians to those areas,' Mr Mitchell said.

'We're not at 100 per cent of all of our first responders. We don't have every agency on there. There are still some agencies that have their own capabilities and their own networks - although we do have ability to talk to those other networks. We just have to use different technology for that,' he said.



Euan Ferguson, CFA Chief Officer, Craig Lapsley, Fire Services Commissioner Victoria, James Esposito, New York City Fire Department, Brant Mitchell, Shane Wright Chief Officer, Metropolitan Fire & Emergency Services Board.

In March 2013, Mr Mitchell spoke at The Association of Public-Safety Communications Officials Conference in Adelaide. He also visited Melbourne, where he spent some time with Victorian firefighters and with the Australian Institute of Emergency Management.

'I can't say enough about how well organised and equipped and knowledgeable that whole group is,' he said.

'The way they do their training is very similar to ours. Their issues are very similar to ours as well, it's just different aspects of how we do things. Overall there are a lot of similarities.

'Their hazard library was really interesting and the website that they have, with all the different hazards where you can go see frequency and type that has struck Australia, was a very nice tool.'

He said the Memorandum of Understanding (MoU) between Australia and the USA on emergency management co-operation was very helpful. At the time of writing, Mr Mitchell was involved in competing for a maritime security grant. He said, if successful, this project was something he would like to involve Australia in. Having the MoU in place meant that the relationship to work together had already been established, he said.

Articles by Kate Lahey reflect the emergency management agreement of co-operation recently renewed between Australia (through Attorney-General's Department, Emergency Management Australia division) and the United States of America (through the Federal Emergency Management Agency).

⁷ Victorian Government media release. At: www.premier.vic.gov.au/media-centre/media-releases/7831-australian-first-for-victorian-emergency-services.html.

Graduate education in the planning and management of natural hazards

It will come as no surprise to readers of the *Australian Journal of Emergency Management* that people have always lived in the presence of natural hazards. Yet it is widely accepted that contemporary factors like increased urbanisation and climate change are exacerbating global vulnerability to natural hazards. In Australia, the extent of the threat of natural hazards was borne out by the unusually high losses of 2009-2011 as a result of the Black Saturday bushfires, the Queensland floods and *Cyclone Yasi*.

The response of policy makers to natural hazards has been increasing alongside the rising toll of natural disasters. The United Nations has actively promoted global strategy around natural hazards planning since the mid-1990s, most actively through the Hyogo Framework of 2005. A variety of national strategic responses have since appeared, and a significant contribution in Australia has been the recent *National Strategy for Disaster Resilience*.

Dr Melissa Parsons, lecturer in Geography and Planning at the University of New England in Armidale, NSW, states that 'the resilience approach adopted in Australia's disaster strategy is pioneering. It extends Australia's excellence in emergency management further into the inter-crisis periods where disaster resilience is built strategically using ideas of shared responsibility, co-ordination, adaptation and risk awareness'. The *National Strategy for Disaster Resilience* will steer policy work around natural hazards in various tiers of government in Australia for years to come.

To lend support to the expanding policy arena around natural hazards in Australia, the University of New England (UNE) has launched a series of graduate courses in the Planning and Management of Natural Hazards. The courses range from the relatively concise Graduate Certificate, to the more substantial options of the Graduate Diploma and Masters Degree. The courses offer analysis of historical and contemporary examples of natural hazards and disasters, relevant policy in global, national, state and local contexts, and practical considerations for translating knowledge around natural hazards into effective public policy. In the Diploma and Masters courses, this core work can be linked to additional studies in governance, environmental policy, and geography.

According to Associate Professor Neil Argent, co-ordinator of the new graduate courses, 'UNE has received expressions of support for the courses from professional bodies and experts in areas ranging from urban and regional planning, environmental policy, and emergency management. This indicates not only the diversity of fields with a direct interest in natural hazards, but also the expanding career advantages for professionals with training in the planning and management of natural hazards.'

The new courses are delivered online with many constituent units of study also offered on-campus, and study can be undertaken either on a part-time or full-time basis. UNE has been a leading innovator of flexible study for over 60 years and is committed to giving busy adults the chance to study effectively from home. With UNE, the ability of graduates to upskill into the important field of planning and management of natural hazards is now more achievable than ever.



Associate Professor Neil Argent (Right) and James McGregor (Left), course coordinators. Dr Melissa Parsons (Centre) lectures within the program. All are researchers within the Bushfire and Natural Hazards Cooperative Research Centre, developing an Australian natural disaster resilience index.

Information on the new graduate courses in Planning and Management of Natural Hazards can be found at www.une.edu.au/naturalhazards. Interested persons can contact James McGregor at jmcgreg5@une.edu.au.

Notes from the Field

Coober Pedy Mine Rescue Squad / State Emergency Service

Coober Pedy is the opal capital of the world. In 1915, a 15-year-old boy named Willie Hutchinson first discovered opal in the area. The town has grown progressively since that time and, after World War I, many returning soldiers found comfort living in the underground housing that is commonly found in Coober Pedy. The town is located 850kms north of Adelaide and 680kms south of Alice Springs and has a long history of extracting opal, supplying an estimated 70 per cent of the world's opal. Coober Pedy is also the service town for the mining ventures at Prominent Hill, Cairn Hill, and Peculiar Knob.

The Coober Pedy Mine Rescue Squad is located in central Coober Pedy. The unit was originally started by local volunteers to assist opal miners during shaft collapses or equipment faults resulting in miners becoming trapped. The unit later joined forces with the South Australian State Emergency Service.

Along with a history of mine rescue, the unit assists the local Country Fire Service Brigade during fires and responds regularly to road crash incidents on the Stuart Highway. The unit also helps stranded tourists and local residents, often travelling as far north as Marla and as far south as Glendambo, and as far north east as Oodnadatta and as far east as William Creek, all almost three hours away. The Stuart Highway has a dedicated runway marked out and the squad maintains equipment to allow its use. The squad works in conjunction with the South Australian Police and remains a vital component of search and recovery operations.



The volunteers with the Coober Pedy Mine Rescue Squad and State Emergency Service are a vital component of search and recovery operations for the mining town.

This year the volunteers were involved in the search for possible remains of a missing teenager after a man was charged in November 2013 with the girl's murder almost two decades ago. Long days were spent working in 35 to 44 degree temperatures alongside major crime investigators and detectives. At times the team cleared mine shafts by hand and with buckets and, at other times, used heavy machinery to remove large volumes of dirt. Over eight mine shafts were searched without locating any remains.

The Coober Pedy Mine Rescue Squad and State Emergency Service volunteers are a vital response team for residents and visitors to this remote area of central Australia. Members of the Service come from all walks of life. There are presently experienced opal miners, health care professionals, council workers, mechanics, child care workers, teachers, truck drivers and lines men. These people are an excellent example of what a community can produce when like-minded people work together.

Andrew Clarke is the District Officer – Outback for the South Australian State Emergency Service.



Image: Andrew Clarke

Large volumes of dirt are brought to the surface to be sifted in the search for remains.



Images: Andrew Clarke

The Coober Pedy Mine Rescue Squad and State Emergency Service.

ALIES

AUSTRALASIAN LIBRARIES IN THE EMERGENCY SECTOR

Rare atmosphere: introducing the National Meteorological Library

Rosa Serratore, Chief Librarian, gives an insight into the Bureau of Meteorology's Library.

"What is the definition of shade?" "What was the role of weather forecasters during the war?" "Where are Queensland's rainfall belts?"

These questions are a snapshot of the sort of enquiries received by the Bureau of Meteorology's National Meteorological Library (NML).

Located in the Bureau of Meteorology's Head Office in Docklands, Melbourne, the NML has been functioning since the Commonwealth Bureau of Meteorology commenced operations in 1908.

As well as managing a leading collection of key meteorological books and journals, the Library also manages and develops substantial collections in climatology, oceanography, hydrology, disaster management, and Antarctica. The Library welcomes visitors frequently hosting local and international visitors. However, external lending is restricted to interlibrary loan to other libraries only.

The NML is staffed by Chief Librarian Rosa Serratore and librarians Galina Brejneva and Lily Gao. The Library staff assist Bureau staff make critical research findable by providing relevant research services and products. The Bureau trains all meteorologists, observers and engineering technical officers in-house and supports the

Bureau of Meteorology Training Centre (an accredited training provider) as well as its students.

Rare Book collection

The Library is the keeper of the Bureau's research and corporate history. A unique feature of the NML is its Rare Book collection. Amongst its treasures are:

- The early works on winds from the mid 1600s.
- The last hand-written observations recorded by William John Wills (1834-1861) in the Daily meteorological register of 1860. These were recorded by Wills before he left the Flagstaff Observatory in Melbourne to join the ill-fated Burke and Wills expedition.
- Synoptic maps from the Victorian colonial meteorological service from 1890 – 1896.
- Handwritten weather observations for Victoria dating from 1859.



One of the early works on wind from the mid-1600s. Cover of the book *Fr. Baconi de Verulamio Historia naturalis & experimentalis de ventis, &c.*, Lugd. Batavorum: Apud Franciscum Hackium, 1648.

International contribution

The Library receives varied and challenging enquiries from Bureau staff as well as from non-Bureau researchers and enthusiastic amateur meteorologists. The following example highlights the significance of the NML's manuscript collection.

The NML's Rare Book collection includes the original meteorological records of the British, Australian and New Zealand Antarctic Research Expedition under the command of Sir Douglas Mawson. They were never published and it appears that these manuscripts are probably the only source of the meteorological data kept on board the ship, the *Discovery*, during its two trips to the Antarctic between 1929 and 1931.

The data was used in the Atmospheric Circulation Reconstructions over the Earth initiative's 20th Century Reanalysis Project to digitise historical surface meteorological observations. The data comes from supply, support and rescue vessels and the expedition bases of various late 19th-early 20th Century Antarctic expeditions.



A sample of early work from the Library's Rare Book collection.

Information breakfasts

One of the most popular activities run by the Library is the monthly breakfast information sessions. Bureau staff in Head Office are invited along to hear about a new product or service offered by the Library for a short 30-minute session. One recent breakfast featured emergency and disaster management resources.

The monthly sessions are well attended although the home-baked goodies on offer, particularly the scones, may be the key drawcard!

ALIES together

The NML is a member of the ALIES network. ALIES is the Australasian Libraries in the Emergency Sector network. It collaborates to fulfil the information needs of the emergency sector throughout Australia and New Zealand by exchanging and sharing information, skills and resources among libraries. The various member libraries also maintain a distributed Australasian emergency management collection and provide an expert information service.

ALIES, founded in 1991, is governed by an Executive Committee with elected representatives from member libraries. The NML's Chief Librarian is currently a member of the ALIES Executive.



Chief Librarian, Rosa Serratore (L) and Bureau staff enjoying home-made scones.

Contacts

Email: library@bom.gov.au
Web: www.bom.gov.au/library
Phone: 03 9669 4472

COLLABORATION IN COMMUNICATION

a shared responsibility



EMPA CONFERENCE 2014

MERCURE CANBERRA, AUSTRALIA

SUN 1ST - TUES 3RD JUNE 2014

LOCK THESE DATES IN YOUR DIARY NOW!



KEY SPEAKERS INCLUDE:

DENIS MCCLEAN
*Chief of Communications,
UN Office for Disaster Risk
Reduction, Geneva:*
Global Humanitarian
Communications



MARK CROSWELLER
*Director-General, Emergency
Management Australia:*
Strategic Leadership to
Support Disaster Ops



MELANIE IRONS
Tassie Fires, We Can Help:
Harnessing the Power of
Social Media



KATE BRADY
Australian Red Cross:
The Language of Emergencies

WHO SHOULD ATTEND?

- Emergency Public Information Officers
- Emergency Services Senior Management
- Federal, State And Local Government
- Response And Recovery Agencies
- Media Managers
- Media Liaison Officers
- Public Affairs Practitioners
- Editors
- Journalists
- Crisis Communications Professionals
- Public Relations Professionals
- Researchers

PROGRAM INCLUDES:

- 'Beyond The Media Officer' Half-Day workshop
- Interactive sessions
- Two days of regular sessions
- Welcome Cocktails
- Conference Dinner & 'Disastrous' Trivia

CONFERENCE FEES:

INDIVIDUAL
\$1335

GROUP OF 3 OR MORE
\$1095 pp

For further information, including full speaker program, a full list of fees, bookings and registration forms **VISIT** www.emergencymedia.org.au **PHONE** (03) 9596 6662 **EMAIL** events@hpe.com.au

EMPA is the only voluntary organisation of emergency service and crisis communications practitioners in the world.

Formed in 2006, EMPA holds regular conferences in Australia and funds important research on crisis communications and community response and recovery.



PRESENTED BY
Emergency Media &
Public Affairs



SPONSORED BY
Emergency Management
Australia



ORGANISED BY
High Profile
Events



Australian Emergency Management Institute



Australian Government
 Attorney-General's Department
 Emergency Management Australia

The Australian Emergency Management Institute (AEMI) is a Centre of Excellence for education research and training in the emergency management sector.

Advanced Diploma of Public Safety (Emergency Management)

The Advanced Diploma of Public Safety (Emergency Management) is a flagship educational product of AEMI. This nationally-recognised program is undertaken over 2 years full time (or equivalent) study under the tutelage of AEMI's highly experienced emergency management educators and guest lecturers.

Upcoming 2014 Dates - Register Now

07-08 May	Establish and manage a recovery centre	Facilitate emergency planning processes	17-19 June
05-09 May	Facilitate emergency risk management	Manage recovery functions and services	02-04 July
26-29 May	Coordinate resources for a multi-agency incident	Develop and maintain business continuity plans	21-24 July
27-30 May	Community in emergency management	Develop and use political nous	05-07 August
10-13 June	Designing and managing exercises	Design and manage exercises	05-08 August



**14-18
 July 2014**

AEMI is offering one week of workshops, forums, masterclasses, and expert panels with many possibilities to hear from national and international speakers on emergency management issues.

In the **Strategic Foresight Forum and Masterclass**, learn how organisations are connecting future challenges with current approaches under the instruction of leading foresight strategists.

Or choose to join the **Social Media Masterclass and Forum** to hear from Twitter, Hootsuite, Facebook and others about how the emergency management landscape is changing dramatically in this world of real-time data.

Or opt to participate in the **Facilitating Excellence Masterclass** to get the best out of yourself and your learners, and to acquire practical techniques to facilitate change in formal and informal settings. **Register today:** www.em.gov.au/aemi

Australian Emergency Management Institute

601 Mount Macedon Road

Mount Macedon VIC 3441

T: 03 5421 5100

E: aemi@ag.gov.au

www.em.gov.au/aemi



AEMI - A Centre of Excellence

Building resilience through education, collaboration and innovation



Australian Government
Attorney-General's Department

Emergency Management Australia



2014 RESILIENT AUSTRALIA AWARDS

Do you have a project that has helped your community to be more disaster resilient?

If so, the 2014 Resilient Australia Awards may be the perfect way to promote and recognise your project.

WHAT ARE THE RESILIENT AUSTRALIA AWARDS?

The **Resilient Australia Awards** recognise and promote initiatives across the nation that support and strengthen community disaster resilience. The awards encourage excellence and innovation in all sectors of society. They are sponsored by the Australian Government Attorney-General's Department in conjunction with the state and territories.

TIMELINE

Applications open
2 April 2014

Applications close
2 July 2014

State and territory judging and ceremonies
August-October

National judging and ceremony preparation
October-December

National ceremony
December

ENTER ONLINE

Or for more information: <http://raa.e-award.com.au/newentry/intro.php>

**PHOTOGRAPH CATEGORY
NEW FOR 2014**

'Resilient Australia Awards have been a fantastic way to recognise the hard work and commitment that our team of volunteers has put into the development of an online eLearning program, allowing remote training and preparedness for disasters.'

Highly commended 2013 Education and Research Category
ADRA eLearning—Volunteer Basic Training Adventist Development and Relief Agency (ADRA)

'A massive thanks again to everyone involved in the awards—we and the Councils involved have been so pleased with the acknowledgment of effort and outcomes achieved through the CDEI.'

Joint winner 2013 Local Government Category
Community Development Engagement Initiative (CDEI) 17 Queensland Councils with support from the Queensland Government and Local Government Association Queensland

'Thank you for a wonderful and fulfilling day of Awards. The opportunity to meet many others with the same passion to create a safer community wherever they may be across Australia was very rewarding. The War Memorial was a superb venue, both reminiscent and inspirational—a day to remember in a place of remembrance forever.'

Highly commended 2013 Not for Profit Category
Creating a Safer Community Port Neill Emergency Ready Committee (SA)

'It was a great honour to have Weather the Storm receive the award'
Highly commended 2013 Projects of National Significance Category
Weather the Storm, Women Prepare National Rural Women's Coalition

