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EMA 'safer sustainable communities'

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FEATURING PAPERS FROM THE EMERGENCY MEDIA AND PUBLIC AFFAIRS CONFERENCE

How important is communication in emergencies?

Can drama help us understand decision-making in emergencies?

What is best-practice in post-disaster communication?

What role do our senses play in what we think, say and do in high pressured situations?

historical snapshot

An Emergency Hospital for Influenza Patients
Source: http://virus.stanford.edu/uda

The Influenza Pandemic of 1918

By the northern autumn of 1918 a strain of influenza seemingly no different from that of previous years suddenly turned deadly, and engendered such a state of panic and chaos in communities across the globe, that many people believed the world was coming to an end. It struck with amazing speed, often killing its victims within just hours of the first signs of infection.

The 1918-1919 pandemic killed more people than World War I, at somewhere between 20 and 40 million people. It has been cited as the most devastating epidemic in recorded world history. More people died of influenza in a single year than in four-years of the Black Death Bubonic Plague from 1347 to 1351. Known as "Spanish Flu" or "La Grippe" the influenza of 1918-1919 was a global disaster.

A large factor of worldwide flu prevalence was increased travel. The modern transportation systems made it easier for soldiers, sailors, and travelers to spread the disease quickly and to communities worldwide.

The pandemic affected everyone. With one-quarter of the US and one-fifth of the world infected with the influenza, it was impossible to escape from the illness.

Source: http://virus.stanford.edu/uda
http://www.ninthday.com/spanish_flu.htm

This logo, for the Emergency Media and Public Affairs conference, was designed by Alison McDonald, a University of Southern Queensland design student. The rationale for the design is that the sphere represents the planet, with the red and yellow colours and a radiating circle indicating a crisis. The strong red, breaking up from left to right, indicates the high energy and interest that is created during a disaster or emergency that then diminishes with time as the recovery phase takes over. The meridian lines denote the complexity of communication around the emergency, along with the resultant reverberation of the effects of the crisis.

Cover shot: © Newspix. Media interviewing Emergency Services officer.
Communication is an integral element of Emergency Management.

EMA
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Please note that 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.

AJEM FOREWORD

By Tony Pearce, Director General, Emergency Management Australia.

Communication as core business

There was a certain irony in an opinion article header in a recent capital city newspaper entitled 'Pause for a communications breakdown'. The commentator might well have been reflecting on political or national issues of the day, but regardless of the importance of the content, the heading is of the kind that prompts those of us in the emergency management sector to take a second look. The combination of the two words 'communications' and 'breakdown' have all too often been the cause of intense concern at times of emergency or disaster.

When an emergency is upon us – whether it be slow or rapid onset – it is the reliability and effectiveness of communication that will provide the linchpin to the safety of a community and its people.

But the word 'communication' has become somewhat generic of recent times, leaving many of us confused as to how the topic relates to our particular view of emergency management. Is it the technology of communications? – such as radios, satellite telephones, internet or other electronic devices. Or is communication the interaction amongst those who are engaged in the work of emergency services? – perhaps the instructions or the reports that have become such an essential tool of our trade? Or is communication simply the emergency alert or warning, or the public awareness campaign to get everyone better prepared for an impending disaster?

Then again perhaps it is the role of the communicators? – those who are required to move the emergency messages out to the public, or through to the media, or across to our colleagues in business and industry, or up the ladder to our political leaders.

I had the pleasure back in June to participate at a conference of just such communicators. It was the second annual conference of media and public affairs professionals in the emergency sector in Australia. Delegates comprised a very enthusiastic collection of media liaison officers from all tiers of government and some NGOs, along with public relations practitioners and a few representatives from media networks. They came from every state and territory and many came from departments and agencies other than the regular combat organisations. The conference, supported and sponsored primarily by EMA and the Queensland Department of Emergency Services, also drew on strong involvement by the media studies and communication faculties of several universities. While providing a solid grounding of academic support, the involvement of communication lecturers is a logical connection to a future source of qualified people to service the needs of the emergency sector.

The conference took as its theme the challenging goal: "Excellence in Crisis Communications". Along with international input from Canada on effective communication planning, and an assessment of crisis communication at major terrorism incidents in the United Kingdom and Europe, the conference traversed an excellent selection of topics. They ranged from the Language of Emergency and Challenges facing Crisis Communicators, to Crisis Preparedness for Industry, and case studies on the recent equine influenza outbreak and on a multi-jurisdictional crisis simulation of a major highway incident.

While a panel of senior media specialists from radio, television and newspapers provided robust realism, it was a welcome opportunity for delegates to hear at first hand just how important it is for a partnership with the media to be developed.

As emphasised by Victoria's Emergency Services Commissioner, Bruce Esplin, in his keynote address to the conference, communication is core business—not an add-on. He went on to add that communication is likely to be one of the primary subjects upon which the public will judge the effectiveness of our organisations in a time of emergency.

I would concur and expand the Commissioner's advice to say that as we watch increasing numbers of natural and human-caused disasters unfolding across the globe, the value of quality and timely messages to the communities of people under threat, will become paramount and directly relative to the degree to which the emergency impacts upon us. I commend the initiative of those in the media liaison and public affairs sections of emergency management, for bringing together your colleagues and peers to focus on your roles and how to be more effective. Your challenge now is to continue the interaction and the learning.

This issue of AJEM carries three of the papers presented to the communicators' conference.

Tony Pearce,
Director-General, Emergency Management Australia

The use of applied drama in crisis management: an empirical psychological study

Joanne Arciuli, John Carroll and David Cameron suggest applied drama methods can be used in training professionals in crisis management.

Abstract

This empirical study examined whether role-based participation in dramatic scenarios enables a first-hand understanding of decision-making under pressure in a team situation. We asked 30 members of the undergraduate university population to take part in a role-based drama concerning an incident (fictitious) that occurred on campus and subsequently escalated into a crisis. Using the same scenario we conducted three sessions; female only (n = 10), male only (n = 10) and mixed (n = 10). Results showed that the exercise was perceived to be realistic and educational. Moreover, the exercise appeared to tap in to a range of skills including effective communication, critical analysis of information and respect for individual differences. There were no significant effects of gender. We suggest that these applied drama methods can be used to assist in the training of professionals working in the area of crisis management.

Crises occur in a variety of forms (e.g., natural, man-made, government, corporate etc) and there exist numerous crisis typologies (see Gundel, 2005, for discussion). They tend to share general characteristics such as being unpredictable and dynamic. Another commonality concerns the importance of effective *communication* amongst crisis managers during these times. Effective crisis management communication requires high-functioning individuals situated within coherent and co-operative teams (in which individual team members are able to appreciate others' points of view).

One challenge that confronts many in the area of crisis communication concerns the provision of cost-effective training and educational scenarios within a protected environment. Various methods have been put forward as ways to address these needs. Certainly, there is growing reliance on software-based methods of crisis communication training (Leigh et al 2007, Garrett et al 2008) most obviously in simulators related to aircraft flight and the operation of heavy machinery. Shaffer (2006) argued that software-based gaming can bridge that gap between novice and professional by assisting with rapid adoption of innovative real-world problem-solving skills. However, the degree of software-based usage varies widely (Marincioni 2001). Some of the reasons for this variation include the difficulty in simulating appropriate physical environments and complex human interactions in large groups. In addition, there are substantial costs associated with the development, administration and maintenance of software-based systems. For these reasons off-line exercises remain popular in crisis management training. For example, Alexander (2004) outlined the use of cognitive mapping as an off-line training exercise.

Applied drama methods are particularly useful where the degree of fidelity required for the simulated environment/interactions is difficult to replicate. In the current study we tested the effectiveness of role-based applied drama methods in off-line training exercises. Here, 'effective' was defined as the ability to elicit increased awareness, co-operative responses and individual skill—as a result of genuine cognitive and emotional engagement—within a protected environment. Moreover the immersive qualities of role-based applied drama provide these clear learning outcomes in a cost effective way.

Applied drama is a form of role-based performance with a history that goes back to the middle of the 20th Century. It draws on the earlier educational drama work of Slade (1954), Courtney (1968), Bolton (1984), Heathcote (1991), O'Neill (1995), Haseman (1991) and many others. It is based on improvised performance, situated in a specifically devised context and designed to develop dramatic narrative and problem solving without a script or an external audience. It is lived at life-rate and operates from a discovery-in the-moment basis rather than being memory-based (Bowell & Heap 2001 p.7.). The narrative development, tension and context unfold in time and space through the action, reaction and interaction of the participants. It is an approach to learning and training that emphasizes involvement, participation and engagement (Nicholson 2005),

which are seen as of particular significance for its use in simulation training. The applied drama concept of adopting a dramatic role-based identity has been utilised by education, management training and business, as well as computer studies (Turkle 1995). It is also a central concept in the analysis of digital environments such as virtual reality spaces, online chat rooms and videogames (Ryan 2001). There is a growing focus on the efficacy of mediated forms of teaching and learning especially as web-based technology provides a wider range of communication platforms to host complex interactions (Carroll, Anderson & Cameron 2006).

Interestingly, the influence of gender in applied drama and in crisis management has seldom been directly addressed in previous research. However, there are some previous research findings that are of relevance. It has been argued that women excel at tasks requiring group-based consensus (Wood, Polek & Aiken, 1985). Other research indicates that males are more likely than females to emerge as dominant individuals in groups (e.g., Kent & Moss, 1994) or that males are likely to exhibit individual dominance acts only when their group is asked to undertake a highly structured activity as opposed to unstructured tasks (Mabry, 1985). It has also been reported that women are more risk-averse than men during decision-making (e.g., see Karakowsky & Elangovan, 2001).

One aim in the current study was to examine whether applied drama methods are seen as realistic and relevant for crisis management training by the participants. We also sought to assess whether these methods are able to tap in to the range of skills required for effective crisis management in team situations such as: effective communication, critical analysis of information and respect for individual differences. Clearly, any group-based training exercise with the potential for gains in skills of individual participants is of value in crisis communication training. In answering all of these questions we sought to assess the possibility of gender effects.

We hypothesised that applied drama methods would be seen as realistic and educational for the purposes of learning more about crisis management. We were unsure what to expect with regard to gender differences. It seemed possible that the female-only group may exhibit higher quality interactions than the male-only group and that, as a result, the female-only group may be less likely to report dominance by individual members of the group. However, given that the groups had not worked together before, that the task was fairly unstructured and there were not any high-risk decisions involved it also seemed possible that we would find no gender differences. We were not sure what to expect with regard to perceived benefits for individual participants in terms of specific skills.

Method

Participants

A total of 30 participants were recruited from the first-year undergraduate psychology student population at a large regional university. Students participated in return for course credit. We conducted three separate sessions using the same scenario and the same actors. Participants were randomly assigned to one of three groups: female only (n = 10, average age: 19.9 years), male only (n=10, average age: 19.8 years) and mixed (n=10, average age: 20.3 years).

Experimental session (scenario and questionnaire)

The session took place over 1 hour. The scenario (background information) used during the session was fictitious and the simulation (dramatic enactment) was based on a reported incident that occurred in on-campus accommodation at a university. There were 4 (non research participant) 'facilitators' involved in the scenario who assisted by working in-role and coaching the participants into role-based involvement and in building the dramatic tension. The drama-based roles were introduced one at a time as the drama unfolded:

1) A facilitator
2) An inexperienced university-appointed student welfare officer role
3) A university bureaucrat role
4) A newspaper reporter role

A numbered summary of the key features of the scenario is provided in the Appendix. The facilitator introduced himself to the group and invited them to enter the role as members of the Student Welfare Advisory Panel (SWAP). Their task would be to advise the inexperienced university-appointed student welfare officer how to deal with a set of complaints. SWAP's role was close to the students' own area of expertise (student life) and provided a safe platform for their participation in the scenario. The facilitator gave SWAP the following background information (by reading aloud):

"Motor racing fans arrived at Gordon House (student accommodation) late on Friday night claiming they had been invited to a party by student residents. Noise and alcohol consumption occurred, they were asked to leave by some residents, an argument developed, security was called, and it escalated and police became involved. No arrests were made, the incident seemed over, however, some residents complained and the new student welfare officer was asked to investigate the complaints." (Document 1)

SWAP's initial task was to present to a newly appointed student welfare officer the problems of student life associated with such incidents. This initiated a

discussion and prioritisation of the problems associated with student housing which utilised both their real world expertise and the "reported incident."

The simulation began with the SWAP members introduced to the new student welfare officer (Sue) and they discussed the issues they had prioritised. She listened to their advice and confided in her inexperience in the newly created position. An out-of-role discussion then occurred as to the authenticity of the simulation responses.

The simulation resumed with Sue presenting an escalation of the issue to SWAP and an explicit request for assistance. Sue went on to explain that although she was inexperienced she was keen to address this complaints and that she would like SWAP to think about how she might go about dealing with it. She read out the following complaint:

"Dear Sue, I am writing to say how upset we are about the behaviour in the residence the other night. It was a lot worse than people treated it and two of the girls in my corridor are really upset. They felt threatened and abused and are scared it is going to happen again. We want to know what the university is going to do to prevent it happening again. If we can't get a good answer we will have to move out of residences, as it is too dangerous to be here. My father was very upset about what happened and is going to write to the Vice Chancellor about it. Something has to be done. Can a group of us see you tomorrow to discuss this problem? Sincerely, Kate Larsen." (Document 2)

Sue left the room and the facilitator then urged SWAP to consider ways of dealing with the incident, and to advance ways that the university might officially respond to the complaint. They also considered a report filed by the university security officer concerning the incident, which gave further disturbing insight into the situation (read out aloud by the facilitator), which said in part:

"A residential tutor explained that she had asked the men to leave the premises several times, on each occasion she and other students had apparently been verbally abused by the men, and they had ignored her requests to leave. It appeared that a small number of students were also arguing with the residential tutor that the men should be allowed to stay." (Document 3)

The scenario moved forward in time two days and the issue had escalated further. Two of the girls involved in the incident were reported to be in counselling and the father of one had written to the local newspaper complaining about non-professional advice from the university, implicating SWAP. The local newspaper wished to publish a story and requests were made for an interview with the student group about the incident.

SWAP prepared for the interview by consulting a member of the team in role as a university bureaucrat, who took a legalistic approach and pointed out that within the regulations of the university the student group was responsible for any advice. SWAP was also informed at this point that the student welfare officer blamed them for providing bad advice and had taken stress leave.

The tension escalated as the group then had to face a team member in role as an aggressive newspaper reporter looking for a headline. They were protected in this situation by the facilitator, who used the dramatic convention of 'hot-seating'[1], to get them to justify their position. However, the students were acutely aware of the likely negative outcome of the interview with the press and made strong efforts to clarify/justify their involvement when it occurred.

At the end of the scenario research participants were debriefed (see Appendix 1 for underlying scenario structure). They were then asked to complete a self-report questionnaire. The questionnaire contained two lines of inquiry related to: (1) Realism, Educational Function and Individual Activity and (2) Specific Skills. It took around 15 minutes to complete. Questions included a variety of items such as 5-point Likert scale ratings, yes/no items and open-ended questions.

Results

The experiment provided both quantitative and qualitative data. As mentioned above, we report on two lines of questioning.

Realism, educational function and activity of individuals

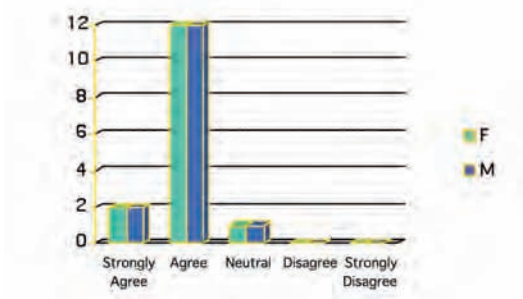
A total of 100% participants agreed (on a yes/no basis) that the exercise reflected, at least to some degree, events/roles/outcomes that might actually occur in real life. The average rating regarding the realism of the task was 2.17/5 (with 1 indicating 'very realistic' and 5 indicating 'very unrealistic'). We performed an independent samples t-test and found no significant differences between male (mean of 2) and female (mean of 2.3) ratings of realism ($t(28)=1.22$, $p=.228$). We also performed a one-way ANOVA and found no differences in the degree of realism for each group (mixed vs. male-only vs. female-only) ($F(2,27) <1$).

[1] Hot seating: The group, working in an assigned role as enquirer, has the opportunity to question one of its members role-playing a character in the simulation. The "hot seated" role is drawn from within the group who takes on a specific character role provided by the simulation. The exploration of this role allows a transfer and sharing of knowledge from within the dramatic structure.

When asked (on a yes/no basis) whether the session enabled an understanding of what it is like to make difficult decisions under pressure, 97% responded 'yes' (1 male responded 'no').

When asked whether the session enabled an understanding of how one situation can be viewed differently by different people, 93% of participants agreed or strongly agreed (mean of 1.93/5 with 5 indicating 'strongly disagree'). These results are displayed in Figure 1. The same pattern of responding was seen across males and females. A one-way ANOVA showed there were no significant differences in responses elicited across the groups (mixed vs. male-only vs. female-only) ($F(2,27) < 1$).

Figure 1: Responses to the question: "Today's session enabled me to gain a better understanding of how one situation can be viewed by different people in different ways".



Interestingly, there was no correlation between ratings of realism and ratings of whether participants gained an understanding of how a situation can be viewed differently by different people ($r(30)=.137$, $p=.471$).

When asked (on a yes/no basis) whether certain individuals dominated the task, 60% of the mixed group, 80% of the male-only group and 100% of the female-only group responded 'yes'. These results do not provide evidence of a male tendency to exhibit individual acts of dominance.

An open-ended question asking how the session helped to gain an understanding of decision-making under pressure resulted in two clear themes: (1) the effectiveness of including a media presence to build tension and (2) the effectiveness of the session in terms of appreciating others' perspectives. Exactly one third of responses used terms that related to reporter/journalist/media and 20% of responses used terms related to others' opinions/group work/co-operation. There did not appear to be any gender differences in the kinds of responses. Of the other kinds of responses that emerged to this open-ended question many appeared to relate to the benefits of being able to *experience the consequences* of decision-making:

- "Experience and hence understanding." (1-1)
- "The consequences of seemingly harmless actions/ decisions." (1-2)
- "…Had to think quick and make decisions on the spot." (1-3)
- "Understanding the source of pressure and finding ways to counteract or minimise the pressure or conflict." (1-4)
- "Seeing what happens if you make the wrong decision in a high pressure situation." (3-8)
- "Seeing how not being clear can misconstrue situations." (3-10)

Specific skills addressed

Our questionnaire contained 13 questions about specific skills related to group-based crisis communication. The items are linked to some of the low-level core competencies utilised by the Australian Defence Force in their training of Public Affairs personnel. The data are displayed as percentages per gender per question in Table 1. The opening line was "I felt today's session encouraged me to…"

Table 1: Specific skills related to group-based crisis communication

	Male		Female	
	Yes	No	Yes	No
Communicate verbally	87	13	100	0
Communicate non-verbally	33	67	47	53
Communicate with external people (eg welfare officer/ bureaucrat/reporter)	87	13	93	7
Give and receive instructions	100	0	67	33
Take part in group discussion	100	0	93	7
Prepare written notes	53	47	60	40
Contribute to team activities	100	0	93	7
Share knowledge and information within my group	100	0	100	0
Give and receive support within my group	80	20	87	13
Identify and review information	80	20	100	0
Analyse information	100	0	93	7
Recognise individual differences amongst members of my group	87	13	87	13
Respect individual differences	87	13	87	13
Overall Average	**85**	**15**	**85**	**15**

The general trend was that the session appeared to effectively tap in to these specific skills. It is perhaps not surprising that this task was not particularly effective in encouraging non-verbal communication. The overall average response rates for males and females were the same—within both males and females an average of 85% of participants responded 'yes' to these questions and an average of 15% responded 'no'. Responding across males and females was identical on three items: "Share knowledge and information within my group", "Recognise individual differences amongst members of my group", and "Respect individual differences". An interesting male-female difference that emerged was on the item "Give and receive instruction" where 100% of males agreed that the task tapped these skills compared to only 67% of females.

Discussion

There has been no previous empirical investigation of the effectiveness of role-based applied drama methods in the context of crisis management and, to our knowledge, no previous work examining possible gender effects during group-based crisis communication training. We are also unaware of any previous attempt to measure the perceived individual benefits in terms of specific communication skills during applied drama. Effectiveness training in crisis communication requires decision making under pressure within competing priorities. The immersive nature of drama provides this tension in a way other exercise-based forms find difficult to simulate. It is also an effective training approach as the dramatic frame provides a cost effective approach to the assumption of operational roles when compared with a more overt physical reconstruction of the crisis scenario.

The current study addressed all of these elements in a role-based protected environment. The study provided both quantitative and qualitative data. In short, our results demonstrated that applied drama scenarios are perceived to be realistic, enable an understanding of what it is like to make difficult decisions under pressure and shed light on how a single situation can be viewed very differently by different people. There did not appear to be any gender differences associated with these findings and we found no evidence of a male tendency towards individual acts of dominance.

In their open-ended responses, participants noted, in particular, the effectiveness of utilising a media role to build tension and that they had gained greater awareness of others' points of view during the session. Other responses mentioned the benefits of being able to learn about the consequences of decision-making. Using a list of 13 questions related to specific communication skills, participants were asked whether they felt they had, as an individual, been encouraged to use these skills during the session. The clear trend was for participants to report having been encouraged to use these skills during the session. Responding was consistent across males and females especially on three questions related to sharing knowledge and information within the group, recognising individual differences and respecting individual differences.

Taken together, these results suggest that applied drama methods can make a valuable contribution in crisis communication training. The effectiveness appears to be generalisable to both men and women. These results should be seen as preliminary as they are based on a modest sample size. In addition, the exercise utilised newly formed groups without prior crisis management training, was fairly unstructured and did not involve high-risk decisions. It is possible that other populations (e.g., experienced crisis managers) and other kinds of scenarios (e.g., involving potential loss of life or property) might produce different results, particularly with regard to gender. However, there appears to be clear potential for the methods reported here to deliver a realistic/educational training experience that enhances basic communication skills in a safe environment.

Appendix

The underlying structure of the scenario:

1. A pre-text of information concerning a latent but emerging crisis containing information of varying levels of reliability is provided
2. Participants are enrolled in dramatic attitudinal role within a positive help situation, to aid a full-role performer with a crisis and demand for action
3. An emotional connection to the task and the full-role is gradually built via coaching from the facilitator
4. Role-based improvisation ensues (with assistance of documents)
5. Participants bond and engage in problem solving discussion but are also given opportunities for individual responses
6. Initial success leads to presentation of higher level crisis (increasing tension)
7. Gradually, less role protection is provided by the facilitator and the participants must respond to more complex demands
8. Tension escalates further and the potential for negative consequences increases as the group prepares delivery of media response
9. Media interview probes the group's weaknesses and/or negative consequences of some of their decisions.

References

Alexander, D 2004, 'Cognitive mapping as an emergency management training exercise', *Journal of Contingencies and Crisis Management*, vol. 12, no.4, pp.150-159.

Bolton, G 1984, *Drama as Education: an argument for placing drama at the centre of the curriculum*, Longmans, London.

Bowell, P & Heap B 2002, *Planning Process Drama*, David Fulton, London.

Carroll, J, Anderson, M & Cameron, D 2006 *Real Players? drama, technology and education*, Trentham, Stoke on Trent.

Courtney, R 1968 Play, *Drama and Thought*, Cassell, London.

Garrett, M McMahon, M & Widdis, A 2008 *Serious games for defence training: Using the location and scenario training system to enhance the spatial awareness of trainee submariners* SimTect 2008, viewed 20 February 2008, www.simtect.com/2008.

Gundel, S 2005, 'Towards a new typology of crises', *Journal of Contingencies and Crisis Management*, vol.13, no.3, pp.106-115.

Karakowsky, L & Elangovan, A 2001, 'Risky decision-making mixed-gender teams: Whose risk tolerance matters?' *Small Group Research*, vol. 32, no.1, pp.94-111.

Kent, R & Moss, S 1994, 'Effects of sex and gender role on leader emergence', *Academy of Management Journal*, vol.37, pp.1335-1346.

Mabry, E 1985, 'The effects of gender composition and task structure on small group interaction.' *Small Group Research*, vol.16, no.1, pp.75-96.

Marincioni, F 2001, 'A cross-cultural analysis of natural disaster response: the northwest Italy floods of 1994 compared to the U.S. midwest floods of 1993' *International Journal of Mass Emergencies and Disasters*, vol.19, no.2, pp.209-236.

Nicholson, H 2005, *Applied Drama. The gift of theatre*, Palgrave Macmillan, Houndmills.

Haseman, B 1991, 'Improvisation, Process Drama and Dramatic Art', *The Journal of National Drama*, July 1991, pp.19 – 21.

Heathcote, D 1969, 'Dramatic activity' *Drama, English in Education*, vol. 3, no. 2.

Heathcote, D 1991, *Collected writings on education and drama*, Northwestern University Press, Evanston, Ill.

Leigh, E, Mason, T & Clynick, G 2007, *Using Simulation in a Training Environment*, SimTect 2007, viewed 20 February 2008, www.simtect.com/2007.

Ryan, M-L 2001, *Narrative as virtual reality*, John Hopkins University Press, Baltimore.

Slade, P 1954, *Child Drama*, University of London Press, London.

Shaffer, D W 2006 *How Computer Games help Children Learn*, Palgrave Macmillan, New York.

Turkle, S 1995, *Life on the screen: identity in the age of the internet*, Simon & Schuster, New York, NY.

Wood, W, Polek, D & Aiken, C 1985, 'Sex differences in group task performance', *Journal of Personality and Social Psychology*, 48, pp.63-71.

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Crisis communication and multimodal decision making on the fireground

Valerie Ingham offers the new concept of 'multimodal decision making' to help understand decision making in crisis situations.

Abstract

A crisis situation calls for multiple decisions to be made and communicated rapidly. Despite its lack of visibility and explanation there is an art to communication and decision making in dynamic high pressured situations, which I term Multimodal Decision Making.

Multimodal Decision Making provides an holistic approach to understanding decision making in time pressured, uncertain conditions where incident commanders find themselves having to distinguish between what is read at face-value and what is intuitively understood to be happening.

I interviewed Inspectors from within a large Australian fire fighting organisation and found their visual perception and somatic awareness to be integral to their understanding of what was happening and their subsequent communication of decisions.

Through the analysis of a fireground incident I will demonstrate the vital importance of visual perception and somatic awareness when contradictory and incomplete information has to be processed and communicated quickly.

Introduction

The technical aspects of fire behaviour may be described in scientific language without difficulty. The indeterminate, messy and confusing problems encountered by incident commanders on the fireground cannot be so easily or fully explained. In these complex situations incident commanders are visually and somatically informed, relying on an intuitive and embodied reading of the fireground that is difficult to express in the measurable and objective scientific language that is demanded by emergency communications.

Within the realist construct risk is identified through scientific measurement and analysis and then communicated and managed using quantifiable and objective language. The impulse within us to categorise, sort and delineate is exceptionally strong and through the infiltration of the scientific perspective we have been programmed to think perception is all about distinguishing these elements. Typically somatic awareness, which is the concept of a decisions-maker during an emergency using all the senses, as a 'whole' body, to evaluate and act, is not recognised as crucial.

There is a ground swell towards an holistic approach to risk perception and decision making in a number of disciplines. In physical therapy, Taylor argues for a new philosophical foundation with an integrative approach encompassing the physical, emotional and intellectual body (Taylor 2002). And in nursing, 'personal knowing' and 'clinical judgment' are recognised as 'important in enabling nurses to respond to new situations creatively, using imagination and abstract thinking' (Rose and Parker 1994, p. 1007,8).

The focus of this paper is decision making on the fireground. It is standard practice for fire services to plan and prepare for a procedure-based approach to various anticipated fireground situations. Contained within these procedures are directives concerned with communications between fire commanders and their crews, the communications centre and dealing with inter-agency communication. There is little, if any, official recognition which acknowledges or incorporates the importance of the somatic awareness of incident commanders. My interest lies in the incident commander's holistic and multidimensional perception of the fireground and their communication of decisions contingent upon this awareness. I found the manner in which complex incidents were negotiated, how competing demands and conflicting information was resolved, and the incident commander's ability to decode the situation in order to precipitate and communicate a plan of response, involved their whole body in a continuous and holistic awareness of the scene.

Recent research in emergency communication focuses on the individual or the team in relation to word-based and verbal communications, the result of radio messages, computer generated or electronically transmitted print-outs, and the like. These word-based, verbal and written communications are consequently collated, interpreted and disseminated into further forms of communication (Paton, Johnstone and Houghton 1998, p.8). Inter-agency communication is a major area in need of addressing (Banipal 2006) and some researchers have proposed multimedia solutions (Nikolic, Savic & Stankovic 2007).

In 1997, Quarentelli warned of the challenging aspects of the, then, increasing move towards using information technology in disaster planning and response. He pinpointed ten potentially problematic aspects. One related to non-verbal communication, and highlighted his concern that an individual's ability to collect information using non verbal cues would be weakened by increasing reliance upon technology, resulting in diminished voice and body response. He also warned that this situation would lead to a breakdown in the hierarchical powerbase necessary to drive an effective emergency response. He stressed that:

> *"Meaningful communication is dependent in many ways on gestures, inflections, body language and affective tones, etc., over and beyond the cognitive symbols involved (Quarentelli 1997, p.100)."*

The gestures, affective tones and other non verbal responses Quarentelli lists are somatic—that is they relate to the whole body being involved in the communication process, indicating that words alone are not enough for meaningful communication.

Paton, Johnston and Houghton observe that meaningful communication in a crisis situation is also non-linear, as '[p]rescriptive decision making, likely to typify routine decision making, is inappropriate for crisis circumstances' (1998, p.9). In recent years crisis communication in the media has moved from a linear model in which network gatekeepers defined details to be released upon the general public, towards interactive technology—thus transforming the general public into a global community. Today information is continuously reviewed and exchanged through a variety of platforms such as mobile phone communications, blogs, Google, YouTube, and other web spaces which encourage debate (Volkmer 2008, p. 97). This multidimensional aspect to crisis communication, in which geographical, political and cultural borders have been superseded by 'spheres' of communication, newly defined by Volkmer as the 'culture of spatial reach' (2008, p. 97) connects the complex world of crisis communication in the media and, more specifically within this paper, the fireground, by transcending locally imposed boundaries and providing an holistically integrated perspective.

In terms of decision making, the popular current theory usually applied to explain time-critical decision making is Naturalistic Decision Making (NDM). Although NDM recognizes the importance of intuition as experiences that may be subconscious and unanalysed, it is typically researched through the breaking down of a task into its constitutive parts, examining, and then reassembling for further insight, in a process known as Cognitive Task Analysis (Flin, Salas et al. 1997; Klein 1998). I understand this approach to be counterproductive to the fluid and non verbal nature of intuition and somatic awareness.

Although acknowledging the important contribution of NDM in raising awareness of decision making in time pressured crises, my approach is from the somatic perspective and is multimodal and holistic in that I understand information received through various modes of awareness to be integrated and inseparable. I understand intuition to be informed through visual perception and somatic awareness and I make the case that visual perception and somatic awareness are important and essential in the decision making processes of incident commanders on the fireground.

Emergency communication involves being able to negotiate the competing demands of not only the fire, but of the entire incident ground. This incorporates risk, danger, sparse pieces of conflicting information, and the pressure to communicate rapidly. These elements form the image that incident commanders have to mold and shape.

In the following excerpt a newly promoted Inspector expresses his frustration when managing the competing demands of the public, his own organisation and the fire itself, resulting in having to make and communicate decisions without being able to size up the incident for himself:

> *"So many people are coming at you. The police are coming at you. The managers of the shop or factory are coming to you. Now the fire fighters and then you have got senior officers coming at you to make sure you have done everything right for them. You know - like drawn it, put a time, sent your messages; and all you want to do is get down there to get your head around it. (unpublished interview)."*

Multimodal Decision Making has an holistic approach to recognising the importance of visual perception and somatic awareness in decision making when contradictory and incomplete information has to be processed quickly. Multimodality is distinguished from formal rationality and informal sense-based rationality in that it approaches art, science and practice as an irreducible whole; a linear, monomodal approach is not conducive to capturing the holistic dimensions of the decision making experience.

I collected and have processed a substantial amount of extended interview texts and images. Twelve recently promoted Inspectors from a large Australian fire fighting organisation participated in the interview process. The following interview excerpt demonstrates that the thread of somatic response is inextricably woven into the fabric of what informs crisis communication.

Case study - rural factory fire

Early one morning a country Inspector is called out to a factory fire in a town, normally one hour's drive away. It takes him 40 minutes to drive to the fire, and on the way he busies himself receiving two updates from the communications centre and talking by radio to the first arriving officer at the incident. Nothing the first arriving officer said was unusual or alarming. What was alarming, said the Inspector, was the very slight tremor in the officer's voice. It contained a hint of fear.

The Inspector deduced the incident was possibly more serious than the communications centre had so far anticipated. He organised backup, no mean feat considering the distance to be covered by the backup appliances and the country towns which required their own fire protection maintained, and the speed at which he was driving. These decisions, maintained the Inspector, were prompted by 'the quivering' in the first arriving officer's voice. As he pulled up to the fireground the Inspector saw immediately that his call for backup was indeed necessary, as the fire was moving out of control with the possibility of spreading.

We pick up the story somewhere along the road as the Inspector is speeding towards the scene, after he has spoken directly to the first arriving officer:

> *"…so I got the message from the first pump that was on the scene. I could hear in his voice that he was quivering, so I thought 'I am not too sure if he is comfortable, I'd better get him some help' so I rang up the communications centre, and I said 'Listen, I know you have got these two trucks coming from A., you've got the rural fire service', I said 'you need to send U. up now…I may have waited another 10 or 15 minutes before I said 'Ok you better get G. there' - it's only another 40km maybe, I said 'get them on the road as well."*
>
> V – This is all while you are in the car?
>
> *"All while I am in the car driving to the incident, I am building a mental picture of what's happening, and from hearing his voice, I felt that he was maybe not in control because of the quivering in it."*
>
> V – Did you know him well already?
>
> *"Yeah I knew him sort of well enough… I could just tell, he sounded like he was in trouble…I felt once I arrived, he more or less - I could feel a weight come off his shoulders, 'You're here now, I don't have to deal with this anymore, its all yours." (Ingham 2007)*

Crisis communication involves deciphering between face value and intuitive understanding

As he speeds towards the incident the Inspector is continually readjusting his plan. First he organizes back up from one location, then twenty minutes before arrival he decides to call for even more back up. What precipitated this decision? Perhaps it was his increasing anxiety as he got nearer to the incident. Perhaps the quivering in the first arriving officer's voice was increasing. What we can say conclusively is that it was not the result of the literal content of the verbal reports, but rather his somatic response to the 'quivering voice' and his somatically informed imaging of the scene in his mind. His call for backup proved necessary as the fire was indeed raging out of control, and no effective plan was in place. Multimodal Decision Making acknowledges the somatic input this Inspector acted upon – the quivering in the officer's voice.

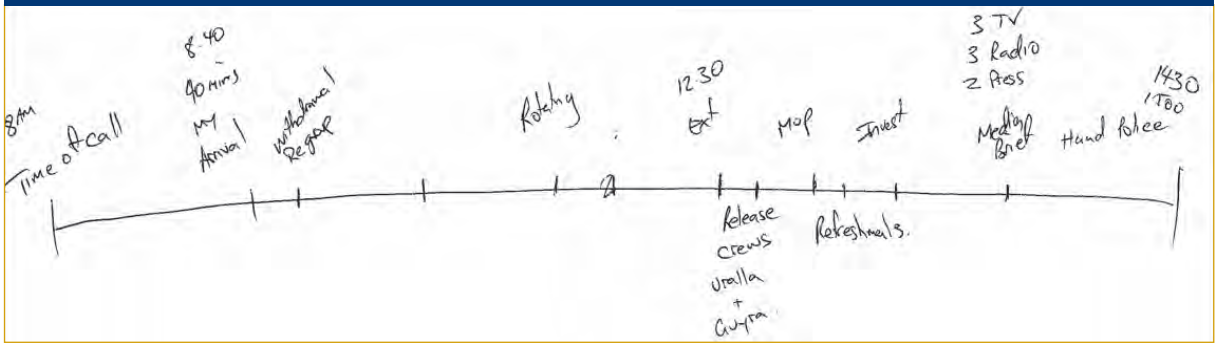
The Inspector could have understood the risk factor in scientifically measurable terms: 'factory well alight, two appliances in attendance…' and so on. Nothing unusual or is odd happening, a straightforward textbook factory fire. If the Inspector had only responded to the words of the message he would not have called for backup whilst driving towards the incident. In fact, what he responded to was not the information he received in the verbal words of the message, but rather it was a slight tremor in the first arriving officer's voice (Ingham 2007). According to Dewey (1934, p.119) '[i]n ordinary perception we recognise and identify things by their shapes; even words and sentences have shapes, when heard as well as when seen'. The Inspector recognised the 'shape' in the tremor of the Station Officer's voice. The shape equated to 'not handling the situation well', although the literal meaning of the words themselves did not. The Inspector's somatic perception informed his decision to call for backup, overriding the words communicated in the verbal report.

Crisis communication requires multiple decisions to be made rapidly

Figures 1 and 2 were created by the Inspector as he related the incident.

Multimodal Decision Making understands time pressure as an important factor in fireground decision making and communication. Although colour is not shown in Figure 1, the Inspector depicts the trajectory of human interventions in his direct labeling of precisely where critical decisions were taken. For instance, on his arrival he withdrew all firefighters from the fire and regrouped them. Somewhere before 12:30 he rotated them around, and at 12:30 he released a couple of crews, indicating the crisis point was past. Mopping up, fire investigation

Figure 1: Timeline of Rural Factory Fire



and dealing with the media all occurred before formally handing over the incident to the Police.

The timeline of the *Rural Factory Fire* illustrates the perception that time appears longer during the crucial moments of the incident, and gradually speeds up to 'normal' time as the crisis point passes, i.e. the measures on the timeline are not all equal. The scale changed in calibration when so much action was packed into the first arriving minutes, and then gradually, as the fire came under control, the measurement of time on the timeline slowed down. Certainly, the somatically informed action during the first arriving moments on the incident ground has an otherworldly feeling about it. The unrelenting bombardment of information from other officers reporting in, by-standing public and constant requests for information from the communications centre, the media and other attending firefighters is processed and filtered by the experienced incident commander into specific, directive communications. If we add the incident commander's own fast speeding thoughts, it becomes clear that if each single request were attended to the fire may never be put out. All Inspectors alluded to or directly addressed the art of sifting and deciphering the important messages to respond to, including their own, amidst the backdrop of barrage and noise of the fireground.

Crisis communication involves interpreting and communicating 'reality'

In the West there is an expectation that life and property are to be preserved, but not at all cost - the associated cost or risk factor is culturally determined. Hodge and Kress state that '[s]ocial control rests on control over the representation of reality, which is accepted as the basis of judgment and action' (1988, p.147). Reality for the incident commander is contingent upon standard operating procedures as well as cultural norms, and 'reality' is represented in their communication and decision making. That is, how far an incident commander is willing to risk life and property is not only contingent upon standard operating procedures; whether consciously or subconsciously, incident commanders take into account socially and culturally determined values, and these values carry moral obligation associated with risk, communication and decision making.

One way of interpreting and communicating reality is to draw an image of the fireground. Fireground mudmaps serve two purposes. The first is immediate, as an aid to decision making in, for example, in the deployment of appliances and firefighters. The second is long term, as these images may form part of the documentation recording the incident, and can be called upon in a court of law, for instance in insurance cases or the coroner's court.

The fireground mudmap in Figure 2 is informed and enculturated with acknowledged fire brigade practice. For instance there are codes representing stations, the understanding of sectors, the importance of accuracy with the placement of vehicles and roadways in relation to one another, and the depiction has an aerial perspective similar to that of a draughtsperson. Incident commanders have to be able to read the fireground, constantly readjusting and interpreting 'reality' in order to anticipate the fire's next move, otherwise they are not fulfilling their role. This ability is somatically informed, and based as much in reality as it is 'scientific' and based on standard operating procedures.

Conclusion

Incident commanders are basing their decisions on something other than what is scientifically verifiable by measurement and calculation. They are visually perceptive and somatically attuned to employing non-verbal skills in order to understand the fast-moving image before them. They are making decisions and communicating rapidly using information gained through visual perception and somatic awareness that at present is little acknowledged because it is so difficult to recognise, describe and explain.

Figure 2: Mudmap of the Rural Factory Fire

Multimodal Decision Making is decision making in highly complex, time critical situations based on multimodal understandings from a range of inputs and perceptions. Visual perception and somatic awareness inextricably link and constantly inform communication and decision making in crisis situations, facilitating the anticipation and recognition of discrepancies and variations as the crisis progresses.

References

Banipal, K 2006, Strategic approach to disaster management: lessons learned from Hurricane Katrina, *Disaster Prevention and Management*, vol. 15, no. 3, pp. 484-494.

Dewey, J 1934, *Art as Experience*, Penguin, New York.

Flin, R Salas, E Strub, M & Martin, L (eds.) 1997, *Decision Making Under Stress*, Ashgate, London.

Klein, G 1998, *Sources of Power*, Massachusettes Institute of Technology, Massachusettes.

Hodge, R & Kress, G 1988, *Social Semiotics*, Polity Press, Cambridge.

Ingham, V 2007, Decisions on Fire, *M/C Journal*, vol. 10, no. 3 Retrieved 11 Feb. 2008 from <http://journal.media-culture.org.au/0706/06-ingham.php>.

Nikolic, V Savic, S & Stankovic, M 2007, Designing a multimedia platform for emergency management, *Management of Environmental Quality: An International Journal*, vol. 18, no.2, pp. 198-210.

Paton, D Johnston, D & Houghton, BF 1998, Organisational response to a volcanic eruption, *Disaster Prevention and Management*, vol. 7, no.1, pp. 5-13.

Quarentelli, EL 1997, Problematical aspects of the information/ communication revolution for disaster planning and research: ten non-technical issues and questions, *Disaster Prevention and Management*, vol. 6, no. 2, pp. 94-106.

Rose, P & Parker, D 1994, Nursing: an integration of art and science within the experience of the practitioner. *Journal of Advanced Nursing*, vol.20, pp. 1004-1010.

Taylor, M J 2002, *Foundations of the art of healing and the science of caring*. Unpublished manuscript, California Institute of Integral Studies.

Volkmer, I 2008, Conflict-related media events and cultures of proximity, *Media, War & Conflict*, vol. 1, no.1, pp. 90-98.

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Communication with disaster survivors: towards best practice

Nicholls and Healy examine the World Trade Center and London bombing events to determine best practice in post-disaster communication.

Abstract

This paper describes the findings of exploratory research carried out in late 2007 into communication strategies implemented by agencies and individuals involved in assisting recovery of survivors of the World Trade Center attacks in New York in September 2001, and the London bombings of July 2005. Asking the question, "How has communication been used to assist the recovery of affected communities of New York and London?", the research reveals the complexity, common characteristics, and unique features of recovery communication. This paper discusses some of the different communication approaches adopted by government agencies following these events. It explores differences and similarities, drawing on the research findings to suggest best practice in post-disaster communication and to recommend further research avenues.

Photo: S. Nicholls

The Statue of Liberty.

Introduction

For an array of reasons, both intrinsic and extrinsic to people affected by disaster, communication with this audience is difficult for public affairs officers and others charged with the task (Gordon, 2004). Despite initially being similarly affected by a disaster, differences between disaster survivors relating to social, linguistic, ethnic and cultural characteristics (to name a few) render effective communication difficult and a single message strategy almost impossible. As well, public affairs officers working for government agencies have a number of stakeholders whose needs they are obliged to meet. These include political office-holders with vested interests in the formulation of messages addressed to their electorates, but not necessarily any expertise in communication campaigns, so that the communication needs of the target audience – that is, the disaster-affected population – may be set aside in the face of political pressures. Moreover, most politicians and the majority of public affairs officers lack expertise or understanding of the peculiar and contradictory needs of disaster-affected communities, both in the short and longer term (Gordon 2004).
This paper will present findings from recent exploratory research specifically investigating communication practices, materials and policies that were developed following the 11 September 2001 attacks in the US, and the London bombings of 7 July 2005. Based on the question, "How has communication been used to assist the recovery of affected communities of New York and London?", the research used observation, data collection and informal interviews with communication practitioners as its methodology. The paper will begin by describing in detail some of the strategies adopted by agencies and individuals involved in recovery communication, first, following the 2001 attacks on New York's World Trade Center, and second, following the 7 July London bombings. It will then attempt to assess these strategies in terms of recovery communication and suggest avenues for further research.

Communicating for recovery

It is said that recovery has a long tail (see Harckham & Chanes, 2000). This tail is capable of lashing out, scorpion-like, against those who are seen by survivors as being responsible, if not for the disaster itself, then for ongoing assistance with their attempts to achieve a

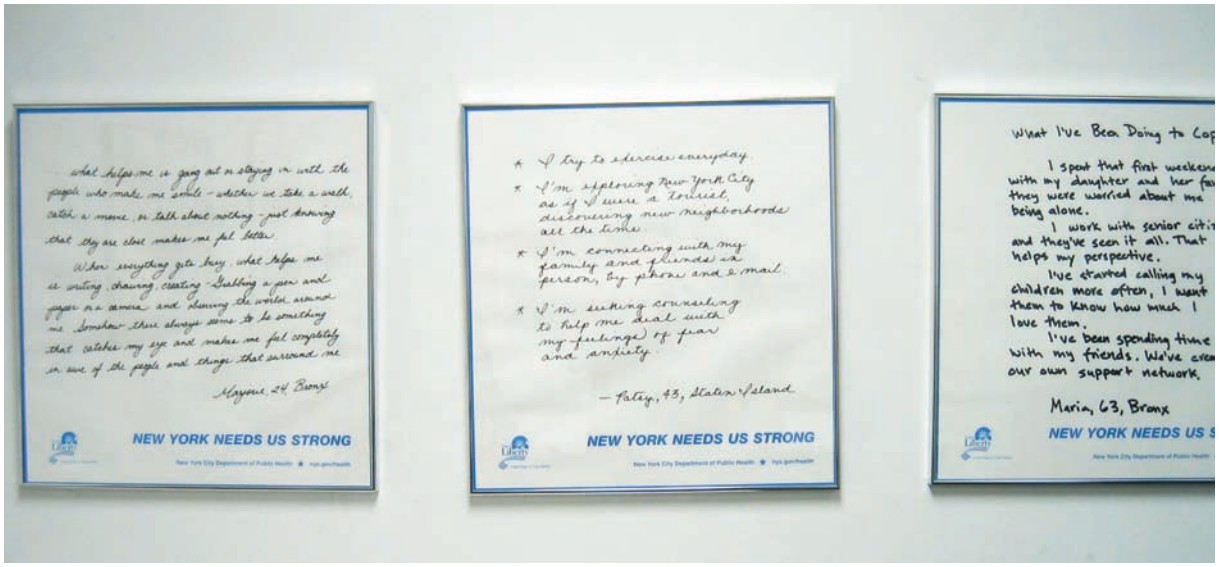


Photo: S.Nicholls, images courtesy LifeNet

Messages from New Yorkers.

"new normal" if this support is felt to be inadequate. Governments are dependent on the favour and respect of electorates: it therefore behoves elected incumbents (and the public affairs officers who work for the government of the day) to develop emergency management communication in ways that maximise effectiveness and satisfaction, and minimise blame and hostility (Nicholls, 2006). Of all the areas generically covered by emergency management, including risk, disaster preparedness, recovery and memorials, recovery has received the least attention from researchers (Smith & Wenger, 2007). Even less attention has been devoted to recovery communication (Beckenham & Nicholls, 2004).

After 9/11 – Project Liberty and 1800-LIFENET

The researchers interviewed a number of individuals who were (and are still) involved in the recovery of affected communities following the destruction of the World Trade Center Twin Towers on 11 September 2001, and viewed a range of materials produced to assist recovery.

Background

Immediately after the attacks, New York City and ten surrounding New York counties were declared a federal disaster area (the counties because they contain large populations that commute to Manhattan for work). The city and counties were then eligible for Federal Emergency Management Agency (FEMA) programs, including the Crisis Counselling Assistance and Training Program. The mental health crisis counselling and public education program following the attacks, and the media campaign to promote these was called Project Liberty. The State Mental Health Authority designed, implemented and evaluated Project Liberty; it was awarded US$155m in federal funding; of this, US$137m was ultimately spent. It was the most highly funded program of this kind in FEMA's history (Donahue *et al.*, 2006).

From September 2001 to December 2002, Project Liberty spent US$9.38m on a large scale media campaign to inform and educate the public about common psychological reactions to traumatic events, and the availability of Project Liberty services designed to address them (Donahue *et al.*). Populations of special concern were those most highly affected, including victims' families, displaced individuals, emergency and recovery workers, the elderly, children, certain cultural and ethnic groups, and people with limited financial support resources or mental illness. Project Liberty provided face-to-face counselling and education and outreach to an estimated 1.2 million individuals in the disaster-declared area up to 31 December 2003 (Donahue *et al.*).

Nearly 200 agencies participated, including large and small mental health agencies with experience serving particular ethnic, cultural or racial groups. Coinciding with the media campaign, hundreds of Project Liberty outreach workers visited the affected communities to distribute literature and provide a supportive presence.

Project Liberty's overall goal was to alleviate the psychological distress that large numbers of New Yorkers experienced as a result of the attacks. Project Liberty provided free and anonymous community-based mental health services to help individuals to recover from their distress and regain their pre-disaster level of functioning. Many affected people had never sought help with their feelings/distress before. Many did not want to risk the perceived stigma of seeking help, thinking that others would believe they were weak or mentally ill.

Branding

The instantly recognisable crowned head of the Statue of Liberty was used on all Project Liberty communication materials, signifying (among other things) the core American value of freedom. There was some controversy about this: because the Statue of Liberty is such an iconic identifier of New York City with widespread, strong and approving recognition, the fact that a particular segment of the population would have a different view was overlooked until the issue was raised. In brief, native Americans objected to the use of the image, pointing out that for them, it symbolised "the intrusion of foreigners into one's homeland, destruction of property, mass killings of innocents, pervasive fear" (Naturale, 2006, p.378). The parallel was not lost on the communicators, who masked the symbol on information materials distributed among this group.

In fact, one of the characteristics of Project Liberty's outreach efforts was its recognition of hard-to-reach, culturally or linguistically distinct communities – referred to by Naturale as "special populations", in which New York is particularly rich: "Outreach staff may easily overlook closed communities, populations that attract little attention to themselves and groups that may be invisible due to hidden bias' (Naturale, 2006, p.369). Cultural competence was important in the communication strategy, with extensive use made of personal contact and meetings with affected communities. Project Liberty services were provided in 32 languages and print material was produced in 12 languages.

The anchor of the outreach campaign was LifeNet, a 24/7 crisis, information and referral hotline that has provided these services since 1996. People wishing to access Project Liberty services and/or talk to a counsellor on the phone were invited to ring 1800-LIFENET, a name and number already familiar to many New Yorkers. Draper *et al*. point out that before a serious disaster occurs, it is a major advantage to have a behavioural health hotline that is already performing, on a daily basis, the kinds of functions that are useful following a disaster (Draper *et al*. 2006). Before 9/11, LifeNet had been fielding about 3000 calls per month over the previous eight months. This figure had doubled by January 2002, while LifeNet's records show a peak of more than 12,000 calls in September 2002, coinciding with a Project Liberty multimedia campaign on the first anniversary of the attacks. However, broad scale activating events alone – such as anniversaries – are not likely to promote more help-seeking unless a public education campaign is co-occurring with the event.

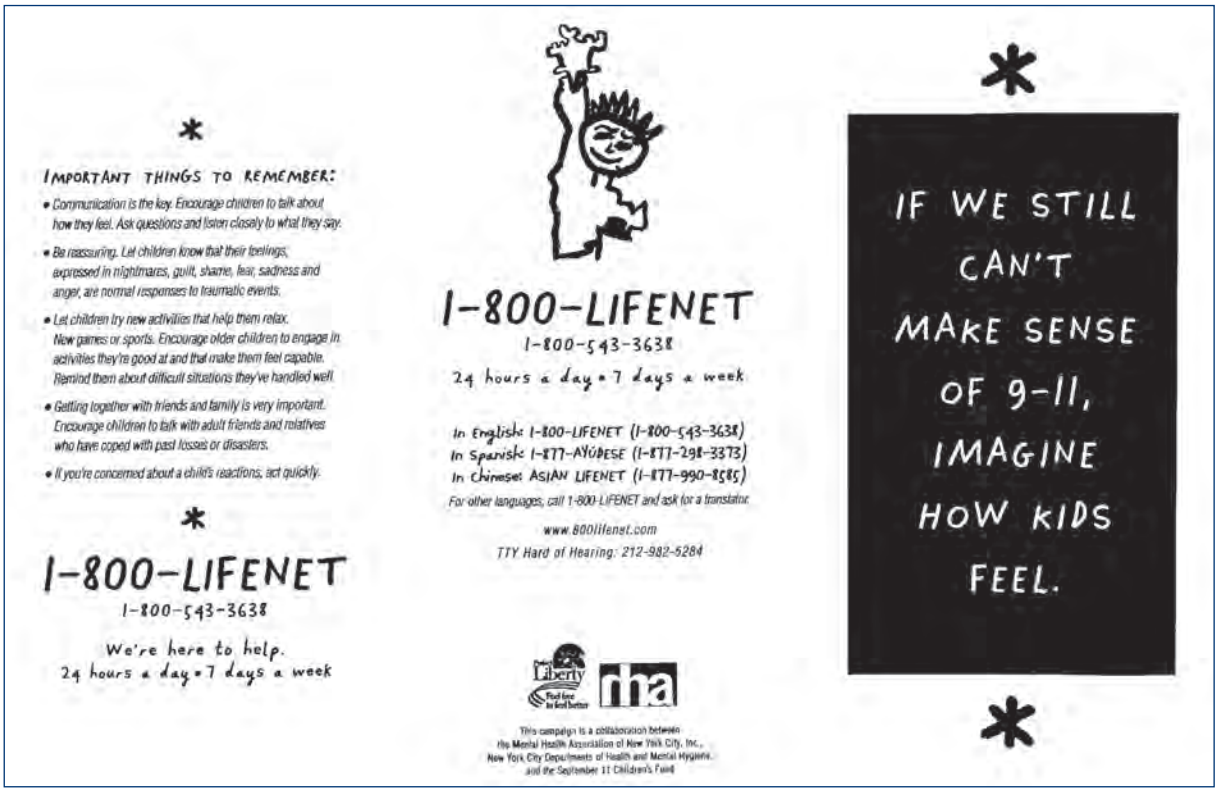
"Clearly, no single factor has had greater effect on LifeNet call patterns than Project Liberty's multi-media public education campaigns'. (Draper *et al*. 2006, p.288)

The post 9/11 campaign was "the most comprehensive, ongoing mental health public education and media campaign ever launched in the New York area, and the most broad-scale post-disaster mental health media campaign ever supported by the federal government." (Draper *et al*. 2006, p.287) Subways, coffee carts, telephone kiosks and billboards were blanketed with Project Liberty messages and LifeNet's phone number. English and Spanish television and radio advertisements were broadcast over a wide regional area. Brochures in a number of languages were printed and distributed throughout the New York area while websites, newspaper advertisements and articles gave information about where to access help[1]. The brochures described common emotional, behavioural and physiological responses to disasters as well as the scope of Project Liberty services and how to access them through LifeNet.

A key message was "Feel free to feel better". Some poster messages were developed from people writing in and saying what they did to feel better. These were reproduced in varying handwriting styles, giving first names, age and borough, and were widely distributed. April J. Naturale, co-ordinator of Project Liberty, received 450 emails about the campaign with responses such as, I saw that poster, I don't feel so alone; I'm not crazy; I'm going to get better. There were special posters for children with children's own responses, such as: "A bad thing happened, then all the flags came out". There was also a poster depicting two primary school-age boys, one white, one black, dressed up as Superman, arms around each other's shoulders, with the caption "Even Superheroes need help sometimes". In television advertisements, actors Susan Sarandon and Alan Alda donated their time for voice-overs encouraging survivors to contact LifeNet – resulting in some people saying that Alan Alda had told them to call LifeNet (personal communication).

Messages were developed to emphasise that what people were feeling were normal reactions to an abnormal event; that they were not weak or mentally ill; that services were free and confidential, that is, their privacy would be maintained. All printed material used a calm light blue. An example of a specifically targeted and effective message was Project Liberty's campaign directed at parents and adult caregivers of children affected. A TV, poster and brochure campaign targeting children and caregivers produced a 58% increase in calls for children under 12 years (the target group) and a 44% increase in adolescent-related calls (the secondary target group) from September 2002-August 2003

[1] During the researchers' visit to New York in October 2007, there were still posters in the subway reminding people who worked in 9/11 rescue and recovery to register for compensation by a date in March 2008.



Gatefold leaflet directed at parents and caregivers. This leaflet appeared in a number of community languages.

(Draper *et al*.). By contrast, while there were periods when print and broadcast journalists gave 9/11 intensive and extensive coverage, this type of media had little or no effect on hotline calls unless the report specifically mentioned the number 1800-LIFENET. However, when such reports featured the number and explicitly described the services it could offer, the results were dramatic (Draper *et al*).

A major concern for communicators was how to represent or refer to the 9/11 event without reawakening horror and grief. Defining the messages and getting a balance between encouraging people to take notice of their feelings and seek help while not disturbing them with explicit reminders caused tensions. An example is when communicators wanted to use images such as a man gazing across the waters of York Bay at the distant Manhattan skyline, newly reduced without its twin towers: the message was that you are at a safe distance, and distance from loss makes it easier to bear. This poster was considered too close to the bone and not used (personal communication).

Characteristically, governments, who are normally the main funders of such campaigns, often want to encourage people to "move on" as time goes by, so that government can announce that morale is returning and things are getting "back to normal" (Nicholls 2006; Camilleri *et al*. 2007). Although for many there will be no "back to normal", as Naturale observes, the federal crisis counselling disaster response model "seems to address the majority of concerns of most communities… People from all over the disaster area who watched crisis counseling television commercials, read narratives on subway cars, and/or received services in community-based locations reported positive effects." (Naturale, 2006, p.381) Without Project Liberty's substantial, carefully planned and, crucially, extremely well-funded communication strategy, it is reasonable to assume a far lower level of "positive effects" would have been the case.

The 7 July 2005 London Bombings

Again, the researchers interviewed a number of individuals involved in the recovery of affected communities following the London bombings.

Background

On 7 July 2005 four bombs detonated in central London. Three bombs went off at 8.50am on underground trains just outside Liverpool Street and Edgware Road stations, and on another travelling between King's Cross and Russell Square. The final explosion was around an hour later on a double-decker bus in Tavistock Square, not far from King's Cross. Seven people were killed on the train near Liverpool Street; six were killed at Edgware Road; 26 were killed at King's Cross/Russell Square. More than 700 were treated for injuries and hundreds more suffered psychological trauma. Recovery workers at the assistance centre set up after the event believe that those affected in some way or other totals around 4000.

Photo: S. Nicholls, image courtesy LifeNet.

Flag collage.

Two days after the event, the Metropolitan Police, Westminster City Council and other government and voluntary agencies established a Humanitarian Assistance Centre, initially called the Family Assistance Centre, at the Queen Mother's Sports Centre. On 12 July this was moved to the Royal Horticultural Halls, and then to a suite of rooms in Westminster on 19 August 2005. Services at the centre included personal face-to-face counselling and support, a help line, complementary therapies and other similar services, and regular newsletters that are still available in hard copy and downloadable from the centre's website. The centre now also provides services for those affected by disasters, terrorist attacks and traumatic events, both prior and subsequent to 7 July, including the Bali Bombings, the Asian Tsunami and the Failed London Bombings. The centre has recently moved to north-west London. At the time of the researchers' visit (October 2007), special briefings regarding forthcoming trials were being provided on the website by the police.

Branding

In September, the name Family Assistance Centre was changed to 7th July Assistance Centre when it became apparent that the name had unintentionally excluded those who did not consider themselves "family" (Cabinet Office 2006). Initially Westminster City Council was responsible for marketing the centre and advertised the centre's existence widely. However, the budget was limited which, workers at the centre believed, adversely affected the communication strategy (personal communication).

The Department for Culture, Media and Sport (peculiarly, the UK Government department responsible for disaster recovery) ensured that the centre was mentioned in press articles and advertisements in widely available free newspapers at the time of the first anniversary. Nevertheless, the limited volume of consistent and ongoing promotion, along with the initial misconstrued "brand", has given rise to doubt as to whether knowledge of the centre's services reached all affected people in a timely manner (Cabinet Office 2006). However, the centre had an excellent web site which is still highly regarded by users (personal communication).

Communication difficulties

Security concerns have been a distinctive and often problematic feature of the recovery response (personal communication). For example, initially, admission to the centre was via an airport security arch, and because of privacy laws, police records identifying affected people were not available to staff at the centre, preventing ongoing contact even when affected individuals specifically requested it. Security was also in evidence in the management of the two internet chat rooms hosted by the centre from its website. These chat rooms are secure and participants are vetted by the Metropolitan Police. If people wanted to join they had to give a statement to the police regarding their involvement in the bombing events, if they had not already done so. It is difficult to say how this has affected the number of potential users of this service, but the vetting served as a safety and privacy measure for affected people. Given the nature of the threat and the risky nature of insecure or unmediated chatrooms, this precaution was clearly viewed as necessary.

The secure chat rooms are an interesting feature of the centre's strategy to support affected people. Revealing of the diverse nature of affected individuals and groups, one chat room was reserved for survivors and one for bereaved. These two groups had quite unique needs and concerns, and only one person in the chat rooms was both a survivor, and bereaved (personal communication). Another characteristic of the self-identity of survivors was their sense of the uniqueness of their own personal experience. While others talk of the "London" bombings, many affected people refer to "the Edgware Road bomb" or "the King's Cross bomb". Counsellors at the centre reported that some survivors were offended by claims that "London is recovering", when they felt that "London" per se had nothing to do with what they were experiencing (personal communication; see also Tulloch, 2006).

Conclusion and further research

Clearly the two events had significant differences. The 9/11 event had extremely high casualties and was played out in front of the whole world, let alone the USA and the population of greater New York. Most of the destruction and death in London happened far underground, and affected much smaller numbers not only in terms of death and injury, but also in terms of the wider primary impact on the whole population. There is evidence to suggest that the 7th July Assistance Centre communication budget was inadequate, while the 9/11 response received millions of dollars to support Project Liberty's outreach campaign. Another difference was the swift recognition by New York's mental health agencies, both state and city, of the need for outreach and a centralised agency to provide psychosocial support. In the UK, even the very existence and set-up of 7th July Assistance Centre as an agency for supporting survivors was not immediately thought of by first-responding authorities: it was "not in the plan" (EMA 2007). In Lessons from London and considerations for Australia, a report of a workshop held by EMA in Australia in 2007, and attended by some of the most senior officials who took part in the London response, the afterthought nature of the agency is clear:

"A Family Assistance Centre had not been considered in the [emergency response] plans … but the need quickly became apparent as the event unfolded, with people being seen holding photographs and looking for their loved ones in the streets. A meeting was held at 9pm [on 7 July] and over the next three hours it was determined what family assistance was and what an assistance centre would need to be. The centre was established by 2pm on 9 July, with voluntary services, social services, the health service, legal advisers, financial advisers and the like providing a one-stop shop for relatives and the bereaved." (EMA, 2007, pp.9-13)

Conspicuously, plans to publicise and promote the centre are not mentioned among issues noted in this report. Nor is the issue of the name of the centre recognised. It appears that, certainly in their planning, and at least in the initial stages of recovery, London authorities did not seem to be aware of lessons learnt from both Australian experiences of disaster – for example, the Canberra Bushfires of 2003 (Beckenham & Nicholls, 2004) – and Project Liberty's extensive and well documented survivor support efforts. The UK response was dominated by forensic priorities, security concerns, infrastructure restoration and business continuity issues. The report quoted above does, however, go on to say by way of lessons learnt: "Recovery starts at the same time as response. Facilities such as family assistance centres must be established as soon as possible." (EMA, 2007, p.21)

Since 2005, the UK has made considerable advances in the development of guidelines for assistance centres and a wide range of humanitarian assistance measures, with a focus on resilience, outlined in comments by London Resilience's Director Zyg Kowalczyk in February 2006 (EMA 2007; see also Eyre, 2006, 2007).

For government, communicators and researchers, the lessons from both these stories of recovery are not only that funding must be available to assist with psychosocial as well as material recovery, but also that a significant part of this funding must be dedicated to a comprehensive, integrated, multi-media communication campaign directed at affected populations, in addition to information for the usual media stakeholders. Such a campaign must recognise the unique characteristics of diverse affected communities, must tailor and distribute messages appropriately, and must be responsive to expressed needs from the target audiences at the time, as well as ongoing according to need.

7 July Assistance Centre.

Among future research areas to be explored are evaluations of response to recovery communication campaigns in the medium and long term, in order both to persuade government funding agencies of the efficacy of well-planned campaigns, and to improve on past practices; the use of websites for information and real-time online support; the relationship between public affairs activities, such as media releases and liaison, and editorial coverage in mass media supporting recovery communication efforts; and differences in audience needs after a "natural" disaster compared to a terrorism-caused disaster.

The authors would like to express their gratitude to the many individuals in the UK and the US who so generously gave their time and shared their experiences. An earlier version of this article was presented at the Emergency Media and Public Affairs Conference in June 2008.

References

Beckenham, A. & Nicholls, S. (2004) "Government communication strategies for community recovery following the ACT Bushfires, January 2003". *Australian Journal of Emergency Management*, 19(4).

Camilleri, P., Healy, C., Macdonald, E., Nicholls, S., Sykes, J., Winkworth, G. & Woodward, M. (2007) *Recovering from the 2003 Canberra bushfire: A work in progress*. Canberra: EMA. http://www.ema.gov.au/agd/EMA/emaInternet.nsf/Page/Publications Retrieved 28 February 2008.

Cabinet Office (no author) (2006) *Addressing lessons from the emergency response to the 7 July 2005 London Bombings: what we learned and what we are doing about it*. Norwich: UK Government.

Donahue, S.A., Lanzara., C.B., Felton, C.J., Essock, S.M. & Carpinello, S. (2006) "Project Liberty: New York's crisis counseling program created in the aftermath of September 11, 2001". *Psychiatric Services* 57(9).

Draper, J., McCleery, G. & Schaedle, R. (2006) "Mental health services support in response to September 11: the central role of the Mental Health Association of New York City", in *9/11: Mental Health in the Wake of Terrorist Attacks*. Neria, Y., Gross, R., Marshall, R.D., Susser, E.S. (eds) Cambridge: Cambridge University Press.

Emergency Management Australia (2004) *Recovery: Manual 10* (no author). Canberra: Emergency Management Australia.

Eyre, A. (2006) *Literature and best practice review and assessment: identifying people's needs in major emergencies and best practice in humanitarian response*. London: Department for Culture, Media and Sport.

Eyre, A., Brunsden, V. & Murphy, J. (2007) *Humanitarian assistance in the UK: current capability and the development of best practice*. London: Department for Culture, Media and Sport.

Gordon, R. (2004) "The social dimension of emergency recovery" in Emergency Management Australia, *Recovery: Manual 10* (no author). Canberra: Emergency Management Australia.

Harckham, F. & Chanes, J. (2000) "Wag the Dog: How Allocation Determines Recovery for Long-Tail Losses'. *Policyholder Advisor 9(2)*. www.andersonkill.com/publications/pa/pdf/200002.pdf Retrieved 28 February 2008

Naturale, A.J. (2006) "Outreach strategies: An experiential description of the outreach methodologies used in the September 11, 2001, disaster response in New York", in *Interventions following mass violence and disasters: strategies for mental health practice*, in Ritchie, E.C., Watson. P.J., Friedman, M.J. (eds). New York: The Guilford Press.

Nicholls, S. (2006) "Disaster memorials as government communication". *Australian Journal of Emergency Management*, 21(4).

Smith, G.P. & Wenger, D. (2007) 'Sustainable disaster recovery: operationalizing an existing agenda", in Rodriguez, H., Quarantelli, E.L. & Dynes, R.R. *Handbook of disaster research*. New York: Springer.

Tulloch, J. (2006) *One day in July*. London: Little, Brown

http://www.londonprepared.gov.uk/londonsplans/july7/ Retrieved 28 February 2008

http://www.londonprepared.gov.uk//londonsplans/july7/index.jsp Retrieved 28 February 2008

http://www.7julyassistance.org.uk/ Retrieved 28 February 2008

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Total flood warning systems

Mary Barry, CEO Victoria SES, reports on the findings of a recent review of the role of VICSES in flood warning in Victoria.

Abstract

As the control agency for flood response in Victoria VICSES commissioned Molino Stewart consultants to review its current and future role in Flood Warning across Victoria. This paper provides an overview of the key findings and recommendations on how to ensure Victoria has a robust flood warning system across the State.

Warning systems components

In 1995, recognising the importance of flood warnings, Emergency Management Australia (EMA) developed a set of guidelines for flood warning system development and implementation in Australia. These guidelines (updated in 1999) provide a national reference for best practice and are based around the integrating concept of a "total flood warning system" (TFWS). The purpose and goal of TFWS are:

Purpose

- to enable and persuade people and organisations to take action to increase safety and reduce the costs of flooding.

Goal

- to generate appropriate responses from the people and organisations at risk, and from the agencies with responsibilities during flood times (EMA, 1999, p.2).

TFWS have six integrated parts:

- **Prediction** - Detecting changes in the environment that lead to flooding, and predicting river levels during the flood.
- **Interpretation** - Identifying in advance the impacts of the predicted flood levels on communities at risk.
- **Message Construction** - Devising the content of the message which will warn people of impending flooding.
- **Communication** - Disseminating warning information in a timely fashion to people and organisations likely to be affected by the flood.
- **Response** - Generating appropriate and timely actions from the threatened community and from the agencies involved.
- **Review** - Examining the various aspects of the system with a view to improving its performance (EMA, 1999, p.7).

Total flood warning system in Victoria

In October 2005, the Victorian Flood Warning Consultative Committee (VFWCC) released a report titled A Review of Flood Warning System Development Priorities Within Victoria. This report found that there are many organisations participating in floodplain management and flood warnings including:

- The Bureau of Meteorology,
- The Department of Sustainability and Environment,
- Catchment Management Authorities,
- Water Supply Authorities,
- Victoria State Emergency Service (VICSES),
- Local Councils and others.

However, with a few exceptions, the roles and responsibilities of each organisation are not well defined, which can result in important tasks being poorly done or omitted. The report concluded that a "continuation of the current lack of clarity on this matter will prevent the full realisation of the benefits that can stem from Victoria's existing flood warning systems." (VFWCC, 2005, p iii).

The report states that the task of educating the Victorian community about flood risk, and maintaining and updating this knowledge, is not the clear responsibility of any stakeholder. It is loosely spread across VICSES, Local Government and Catchment Management Authorities (CMA), none of whom regard it as core business (VFWCC, 2005, p.16, 37, 64).

As a result, flood warning systems maintenance and operation within Victoria lacks a clear "champion" or leader—which is essential to drive the on-going processes given that roles and responsibilities are not always clear cut. (VFWCC, 2005, p (iii), p 6, 16).

Given that VICSES is the control agency for flood response in Victoria and has a clear legislated role for aspects of emergency management planning and preparedness, VICSES declared that with access to appropriate resources and funding it was prepared to:

- Be the "champion" for flood warning systems maintenance and operation in Victoria: and;
- Take a lead role in community education and awareness.

The VFWCC report made 22 recommendations that were sorted into 10 themes of action by the State Flood Policy Committee. VICSES identified two of these themes for action:

- Flood awareness responsibility and roles; and
- Sustainability of flood warning systems

With the support of the VICSES Flood Project Board (comprising representation from all flood stakeholders in Victoria), VICSES engaged Molino Stewart consultants to:

- Determine the roles and responsibilities for VICSES in relation to flood warning systems
- Assess the sustainability of flood warning systems in Victoria including gaps
- Determine the roles and responsibilities for VICSES in flood awareness and education
- Determine the resourcing for flood education and warning systems and the steps required to meet responsibilities for VICSES.

Key findings from Molino Stewart report: Review of SES role in flood warning

EMA's total flood warning systems (EMA Guide 5, 1999, pg. 8) depicted above (Figure 1) includes the concept of consultation and review with agencies and the community at all points within the system, stating that:

> *"credible well communicated warning messages will best be able to generate appropriate community behaviour when they are preceded by soundly-based public consultation and education programs."*
> *(EMS Guide 5, p. 11)*

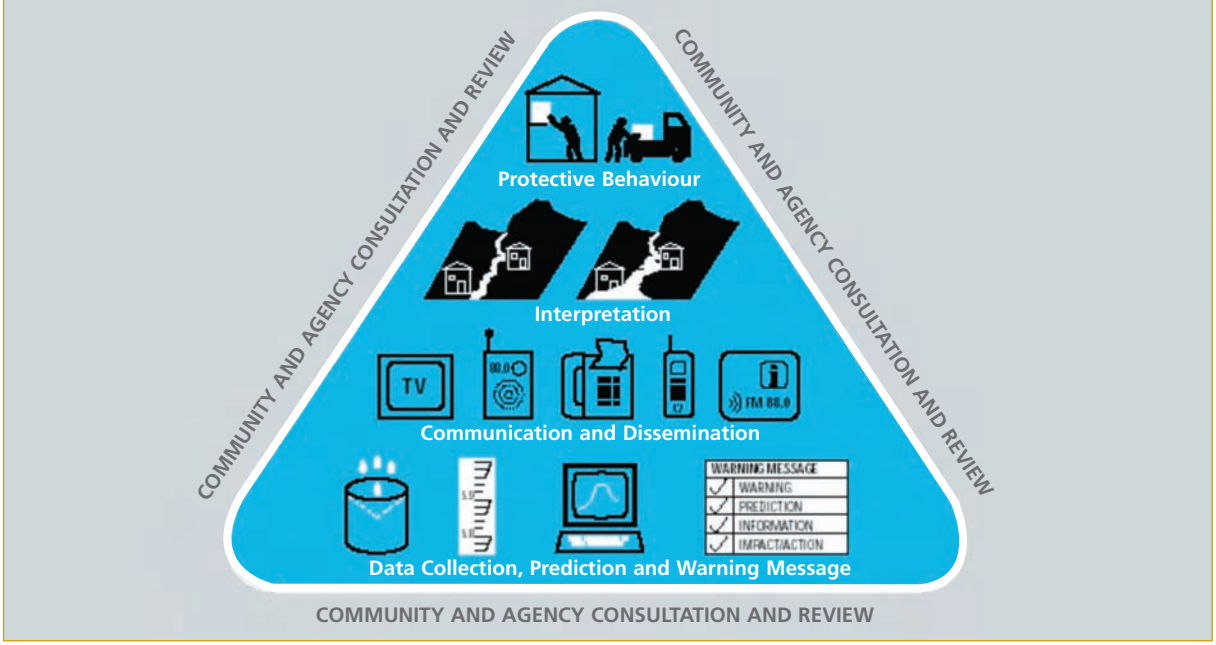
This means that when flood warning messages are disseminated, business, organisations and individuals should respond in a premeditated way based on preceding flood education and awareness programs.

This premeditation or preparation for action could be as comprehensive as a documented flood response or action plan, or as simple as a mental check list.

In either case, unless some thought is given to appropriate actions beforehand, there is a high risk that the response actions taken by organisations and individuals will not be appropriate when a warning is issued.

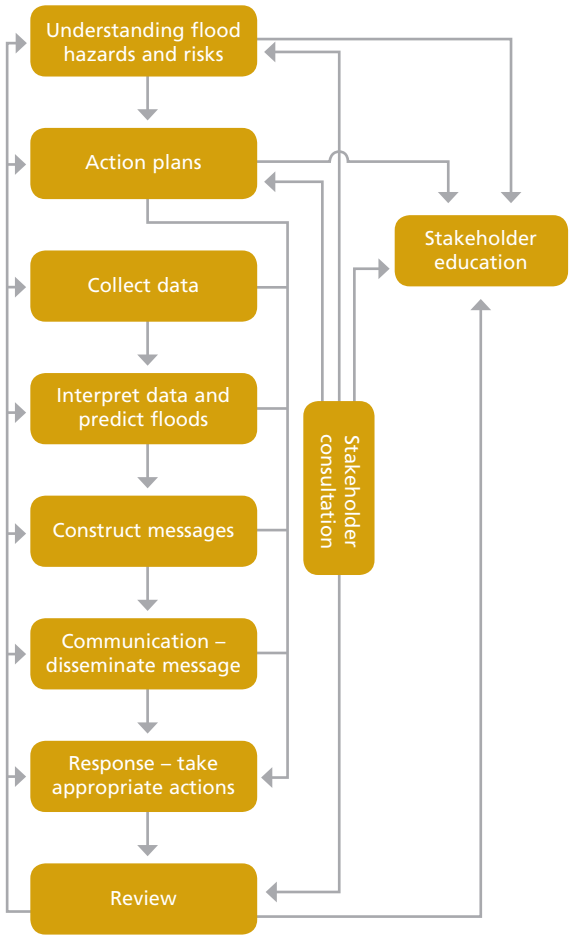
Molino Stewart argue that flood response planning should actually drive flood warning system design. They argue that to enable people to take appropriate actions they need to be given useful information in a timely manner via reliable communication channels.

Figure 1: The main elements of a flood warning system



Total Flood Warning Systems – EMA.

Figure 2: Interrelationships between flood warning components.



To be able to provide this information in a meaningful way, the flood warning system design along with flood response planning, must be based on an understanding of flood behaviour, hazards and risks.

Molino Stewart has therefore put forward the following diagram (Figure 2) that attempts to show the inter-relationship between:

- Flood warning system components,
- Stakeholder consultation,
- Stakeholder education,
- Flood studies and flood response plans.

In the following diagram Molino Stewart have added three preceding steps to EMA's six-step TFWS:

- Understanding the Flood Risk
- Action plans
- Data Collection

They argue that for Victoria to have a robust flood warning system these first three steps must already be in place.

Without the information, action plans, data and crucial flood intelligence generated by these three steps, VICSES and other flood stakeholders will find it extremely difficult to ensure there is an effective flood warning system and flood response plans across the State.

Findings on the status of the above three steps

1. Understanding the flood risk

Understanding flood behaviour, hazards and risks in particular localities is vital for VICSES to carry out its role as the control agency for flood as it provides vital information about:

- What areas will flood;
- When they will flood;
- What and who will be directly affected;
- The danger the flood poses to people and property;
- What and who will be indirectly affected through loss of access, utilities and services;
- What resources are needed to manage the direct and indirect impacts of flooding;
- How much time is available to warn and respond; and
- When and where flood warning messages need to be issued and what information they need to contain.

This understanding can be used to:

- Improve flood response plans;
- Improve warning systems;
- Train those affected by flooding; and
- Issue more useful flood warning messages.

Both the Bureau of Meteorology and Melbourne Water have indicated that they can provide targeted flood warning information, including predicted peak heights at gauge locations and the expected timing of the height.

However, for community safety and operational reasons, it would be useful for VICSES and other stakeholders to have access to height information at various points before the peak height is reached.

This will be critical for determining when:

- Key road and pedestrian routes will be cut;
- Levees will be overtopped;
- Infrastructure will be shut down; and
- Homes and businesses will be flooded.

Flood warnings could advise the time at which these situations are likely to occur, in addition to the timing of expected peaks.

Current information sources

Information about flood risks comes from two sources:

- Historical flood data; and
- Flood modelling.

Historical flood data

- Some historical data relating to flood heights and extents has been collected as part of flood modelling exercises by Catchment Management Authority (CMA) following a flood.
- Some VICSES local units observe flood behaviour during a flood which is then relayed to the operations controller; however, this is often not recorded.
- Although over 250 flood studies have been completed throughout Victoria, these studies have been undertaken over a period that has seen many changes in industry practice, modelling techniques and computing capabilities. Therefore, these studies vary in both scope and accuracy—for some only hard copy maps of flood extents exist, while others are computer based and can be reproduced to manipulate outputs.

Flood modelling and mapping

- In the greater Melbourne metropolitan area, local councils are responsible for drainage in catchments less than 60 hectares. Melbourne Water is responsible for drainage in larger catchments.
- Melbourne Water undertakes flood modelling and mapping for its catchments including overland flow modelling. It is considering extending the flood modelling and mapping to include the smaller catchments for which it is not responsible so that it has a more complete picture of flooding.
- Some Metropolitan councils have completed their own flood mapping.

Outside metropolitan area

- Outside the metropolitan area, Catchment Management Authorities (CMAs) have developed regional floodplain management plans which set priorities for flood modelling and mapping.
- Much of the available flood mapping data was produced before the CMAs were formed (1988).
- More recent studies which are dependent on the availability of local, state and federal funding are commissioned by either the CMA, local councils or both.
- There are also areas with known flood risks but where no flood modelling or mapping has been completed.

There is no legislative requirement for these studies to be undertaken or for them to be done by any particular organisation.

Shortcomings of existing processes

Focus on 1 in 100 levels

In many locations across Victoria the flood modelling and mapping has only extended to the 100 year Annual Recurrence Interval (ARI) flood, because town planning constraints are only applied at this level.

This can be particularly problematic for VICSES flood response where a flood exceeds the 100 year ARI event.

- There could be a quantum leap in the number of buildings experiencing overfloor flooding if most buildings are built just above this level due to planning constraints. Yet there may be little or no information on the extent of flooding and impacts which can occur above this level.
- Critical access routes, infrastructure or older residential and commercial developments could be flooded at levels lower than the 100 year event, but the studies don't always provide a clear indication of at what levels this occurs.

From an emergency planning point of view, simply knowing historical or modelled flood levels and the impacts at those levels is usually not sufficient information. Other information that is critical for emergency planning includes:

- Flood depth and velocity, which are critical for determining flood hazard;
- Rate of rise, which determines how much time is available for evacuation, response or rescue; and
- Critical changes in flood behaviour such as those that occur when levees fail or are overtopped.

While all stakeholders agree that more flood modelling and mapping would be useful, CMA's advise they are unable to do so due to funding constraints. As a result, CMAs are focused on trying to map the 1 in 100 flood extents in as many areas as possible.

Lack of other Data

As well as flood data from historical records and flood studies, there is often a shortage of other useful information available to VICSES such as:

- Ground and floor flood levels within new developments;

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Accessing flood height information is critical for understanding when levees will be overtopped.

- Where and when roads will close due to flooding and how regional road networks should operate in these situations;
- The location, impact and condition of levees;
- The risks of flooding to VICSES and other emergency service resources; and
- The indirect impacts of flooding from both an operational and social point of view.

2. Action plans

Current situation

- All councils are required by law to prepare a municipal emergency management plan (MEMP), which is audited by VICSES every three years.
- The preparation of a Flood Sub-Plan is not a mandatory part of the MEMP, even where there is a credible risk of floods.
- As the response agency, VICSES must have its own plans for responding to floods.

Shortcomings of existing processes

VICSES

- The quality of VICSES flood response plans is variable, mainly due to the variability of available information.
- Plans tend to focus on VICSES response to floods rather than strategic response and co-ordination with other organisations.
- Historically VICSES has a 'response and combat' culture rather than a planning culture; current planning revolves around assisting councils with MEMPs.
- As floods often cover a larger area than an LGA there may be the need for catchment-wide flood response, plans which do not currently exist in Victoria.

Councils

- Quality of MEMPs varies across the state.
- Where flooding is recognised as a significant hazard the way in which it is dealt with in the MEMP can vary from a few lines about how the council would manage the issue, to a comprehensive flood sub plan.
- The knowledge and time available for emergency management varies across the State, with EM accounting for no more than 10% of the Municipal Emergency Resource Officer's (MERO) time in some councils.

Proposed improvements

VICSES plans

- VICSES flood response plans could be improved by ensuring that there are local as well as regional and state plans available depending on the level of flooding.

- Catchment-wide flood response plans could be prepared where required.
- Local plans could focus on VICSES operations and rely on MEMPs for wider community, inter-organisational and strategic issues.

To do this VICSES requires better information on flooding and its impacts, and more planning officers to develop, implement and maintain these plans.

MEMP flood subplans

- MEMPs should have flood subplans where flooding is a significant hazard.
- Guidance should be provided to Councils in preparing flood subplans.
- A template, or table of contents or list of issues should be prepared by VICSES for use throughout the state.
- The council MERO needs to have the time, resources and expertise required to work in partnership with VICSES to develop these plans.

3. Flood data collection

In Victoria there is no legislated responsibility for collecting flood data. Without reliable data on rainfall and runoff it is not possible to provide accurate and timely predictions of flooding.

Current situation

There are several different types of data collection systems operating throughout Victoria, however, a lack of clear responsibility for the funding, installation and maintenance of the systems is a common issue.

Bureau of Meteorology (BoM)

The BoM has weather radar and rainfall gauges, but also collects data from rainfall and stream gauges owned by others including:

- Department of Sustainability and Environment (DSE),
- water supply authorities,
- local councils and
- privately owned gauges.
- In the greater Melbourne metropolitan area, Melbourne Water installs, owns, maintains and collects the data from all rainfall and stream gauges. The Bureau of Meteorology has access to all of Melbourne Water's data for display on its website, but Melbourne Water does the flood predictions.
- During and after a flood the CMAs generally take responsibility for collecting data on flood extents.
- Water Authorities also provide information about outflows from reservoirs.

Regional systems

In regional Victoria there are generally two kinds of data collection systems:

- newer systems, which are managed and maintained by the CMAs with funding from a range of sources depending on who uses the data, and;
- older systems, which are more than 10 or 15 years old and usually have more primitive technology and no formal funding arrangements.

There are also a number of flood data collection systems that are owned and funded by Councils.

One of the shortcomings of both the newer and older systems is that it is only practical and affordable to have gauges at a few locations in a catchment and along a stream. The variable spatial distribution of rainfall means that it is possible for intense rainfall in one part of a catchment, or flow from a particular tributary to be missed, meaning flood forecasts may be inaccurate. The greater the density of data collection the less likely this is to occur.

Flash floods and overland flows

Most of the flood warning systems in Victoria are for riverine floods with more than six hours warning time. It is more difficult to provide flood warning for shorter, steeper riverine catchments or where flooding is caused by overland flows.

There are some flash flood warning systems installed across the state, but these tend to advise of intense rainfall in the catchment and a risk of flooding as there is generally insufficient time for streamflow measurement and flood modelling. Some of these systems also bypass the Bureau of Meteorology and send the data directly to the local Council or even directly to residents. Melbourne Water is soon to introduce Doppler Radar, which will in time provide improved quantitative rainfall estimates.

Proposed improvements

- Several locations throughout the state require a network of rainfall and stream gauges to collect data as part of a total flood warning system.
- In other places there is the need to supplement existing gauges to provide more accurate and timely data.
- While in other locations there is the need to replace obsolete or ageing gauges.

The newer systems being installed generally require a total annual contribution of about $30,000 - two thirds for system maintenance and the remainder for future capital replacement costs. The availability of funds will be difficult to resolve while there is no agreement on who is responsible for creating and maintaining data collection networks.

According to Molino Stewart, "Without adequate data appropriate flood warning cannot begin".

Conclusion

The findings from the Molino Stewart report confirm to VICSES that Victoria does indeed need a flood warning "champion". A champion will not just drive the development, implementation and sustainability of a TFWS, but will raise awareness of the importance of appropriate resources for relevant agencies. Recognising the appropriateness of resources will help the organisation to carry out critical tasks such as flood modelling, mapping and data collection. These tasks are necessary pre-requisites to having an effective TFWS.

Without access to this information VICSES will not be able to develop and implement appropriate flood response plans or effective flood education and awareness programs, which when combined, help to reduce the damage and impact of flooding on communities, business and critical infrastructure.

The last 12 months has seen a vast increase in storm and flood activity in Victoria, NSW and Queensland. With COAG, CSIRO and others predicting an increase in more extreme weather events, and large scale single events with more severe cyclones, storms and floods, it will be crucial for all Victorian flood stakeholders to work together over the next 12 months to ensure the impacts of flooding are understood and acknowledged by government, VICSES, the media and the community.

Key Recommendations

1. VICSES to become a central repository of existing flood data

   To be able to perform its legislated responsibilities appropriately VICSES needs access to flood information and intelligence. The report recommends that in partnership with CMAs, Melbourne Water and Councils, VICSES should collect, collate and catalogue all existing data about historical and modelled flood extents in Victoria.

2. Flood studies

   VICSES should be involved in all future steering committees that develop flood study briefs, ensuring that they include outputs that will assist with operational functions.

3. Request and record flood intelligence

   VICSES should seek to have MOUs with Melbourne Water, CMAs, councils, Vic Roads and utility organisations so that it is notified by field staff of observed flood levels and impacts as a flood unfolds.

4. VICSES field staff

   VICSES field staff and volunteers should report key observations of flood behaviour and impacts as the flood unfolds.

5. For the above initiatives to be implemented VICSES would need additional professional staff with appropriate skill sets in flood modelling and intelligence recording

   This does not mean having hydrologists or flood modellers on staff, but rather providing planners with appropriate training in the fundamentals of flood modelling.

References

Council of Australian Governments (COAG), 2001, - a paper prepared for COAG - *Economic Costs of Natural Disasters in Australia Report 103*. Bureau of Transport Economics Commonwealth of Australia

Emergency Management Australia, 1999, Australian Emergency Manuals Series Part 111, Emergency Management Practice volume 3 Guidelines, *Guide 5 Flood Warning second edition*, Commonwealth of Australia

Molino Stewart Pty Ltd (NSW)
(1) *Review of SES Role in Food Warning*, 2007
(2) *Roles and Responsibilities for VICSES in Flood Education 2007*, Victoria, VICSES Website: www.ses.vic.gov.au

VFWCC – Victorian Flood Warning Consultative Committee, 2005 Flood Warning Service Development Plan for Victoria , *Review of flood Warning System Development Priorities within Victoria*, Main Report; Commonwealth of Australia, AusInfo, Canberra ACT

About the author

Following its re-establishment as a Statutory Authority, **Mary Barry** was appointed inaugural CEO of the Victoria State Emergency Service (VICSES) in January 2006. VICSES is the control agency for response to flood, earthquakes, storms, tsunamis and their affects across Victoria. It is also the largest road rescue service in Australia with 101 accredited road rescue units.

Invited article R

Emergency management of tsunami in New South Wales and the response to the Solomon Islands tsunami April 2nd 2007

Gissing, Webb and Hanslow provide an insight into the emergency management of tsunami in NSW including the current activities being undertaken to prepare for tsunami and provide an overview of the NSW response to the April 2007 Solomon Islands tsunami.

Abstract

New South Wales has a well developed tsunami emergency plan, which details the arrangements for the preparation for, response to and the initiation of recovery coordination arrangements following the impact of a tsunami. The NSW State Emergency Service (SES) is the combat (lead) agency for the emergency management of tsunami in NSW and responsible for planning for and controlling tsunami response operations when they occur. The arrangements within the State Tsunami Emergency Sub Plan have been exercised, but the April 2nd 2007 Solomon Islands Tsunami provided the first real life test for the Plan.

In close consultation with the NSW SES, the Bureau of Meteorology provided real time warnings to the community during this event. The liaison between the NSW SES and the Bureau on the day highlighted the benefits of detailed pre-event planning and scenario-based exercises. Both agencies were aware of the capabilities of the system and the messages to be provided.

This paper will provide an insight into the emergency management of tsunami in NSW including the current activities being undertaken to prepare for tsunami and provide an overview of the NSW response to the 2nd of April Solomon Islands tsunami.

Introduction

Globally, many tsunami events in history have caused significant death and destruction. In recent times being demonstrated by the Indian Ocean tsunami of 2004. New South Wales (NSW) is exposed to numerous potential sources of tsunami within the Pacific Ocean. The most frequent source of tsunami within this region is from subduction zones located at continental plate boundaries. Source zones of significance to NSW include the New Hebridies Trench offshore of Vanuatu, the Tonga-Kermadec Trench north of New Zealand, the Puysegur Trench south of New Zealand and the Peru and Chile trenches west of South America. Landslides on the steep continental shelf edge around the south east of Australia are also a potential source of tsunami (Burbidge and Cummins, 2007). One hundred and seventy landslide scars have been identified along the coast of NSW (Jenkins & Keene, 1992).

Since European settlement NSW has been impacted by numerous small tsunami with reports of some damage to property and infrastructure. No detailed tsunami risk studies have been conducted along the NSW coast, hence little is known about the magnitude of the risk posed by tsunami to NSW coastal communities.

The NSW State Emergency Service (SES) is a 10,000 strong volunteer emergency service responsible for performing the role as the combat (lead) agency for floods, storms and tsunami in NSW. The NSW SES's combat agency role for tsunami has been recognised since 2004. Prior to this, command and control arrangements for the emergency management of tsunami were unclear. The State Flood Plan (a sub-plan to the State DISPLAN (Disaster Plan)) acknowledged the NSW SES as the combat agency. However, some local DISPLANs recognised emergency operation controllers as the control authority. The NSW SES was considered best placed to undertake the role of combat agency based upon its experience with and role in flood

emergency management and because in broad terms, tsunami is a type of flood - hence a logical extension of the NSW SES's flood role. The NSW SES was also recognised as having the appropriate capabilities to develop tsunami emergency plans and warning systems, and had developed much experience relating to the warning and evacuation of communities.

The NSW SES has developed a detailed tsunami emergency plan and is currently managing a program to develop a comprehensive understanding of tsunami risk. It is being assisted by developments in the Australian Tsunami Warning System and the formation of the Joint Australian Tsunami Warning Centre between the Bureau of Meteorology and Geoscience Australia; Emergency Management Australia in undertaking tsunami capacity development programs and the design of community education material; and the NSW Department of Environment and Climate Change, with assistance from Geoscience Australia in the management of tsunami risk studies.

This paper discusses tsunami in the NSW context and outlines advances in emergency management of tsunami and the experiences and lessons learnt from the April 2nd, 2007 tsunami event.

Characteristics of tsunami

A tsunami is a series of ocean waves generated by a sudden displacement of large volumes of water. In the process of the sea level returning to equilibrium, waves are generated which propagate outwards from the source region. They may be caused by the vertical movement of the sea floor as a result of large earthquakes; submarine or coastal volcanic eruptions; meteor impacts; or coastal landslides either land based or submarine (Burbidge and Cummins, 2007). Earthquakes have generated the majority of tsunami recorded on the Australian coast (Allport and Blong, 1995). However, not all earthquakes generate tsunami. To generate a tsunami, the fault where the earthquake occurs must be underneath or near the ocean, and cause vertical movement of the sea floor over a large area. Shallow focus earthquakes along subduction zones (where one tectonic plate is pushed under another) are responsible for the majority of tsunami experienced world wide (Blong et al, 2000).

Tsunami travel outward in all directions from their point of generation (but not necessarily with equal energy in every direction) and can strike coastal areas great distances from their source. Tsunami speed is dependent on water depth. In deep water and open ocean, tsunami can reach speeds of 800 kilometres per hour (Blong et al, 2000). Heights of tsunami in deep water are only small and can go unnoticed. As a tsunami enters shallow water its speed decreases rapidly. This causes the wave length of the tsunami to decrease and the height of the wave to increase (UNESCO IOC ITIC, 2005).

It is important to note that despite these changes a tsunami's energy flux, which is dependent upon both its wave height and speed remains nearly constant. Energy begins to be lost once a tsunami begins to rush onshore. Some energy is reflected offshore, while shoreward propagating energy is lost through friction and turbulence (Bureau of Meteorology, 2008)

The height of the run-up at the coast associated with a tsunami is dependent on the tidal level at the time of arrival, the incoming wave characteristics (height, period etc) as well as the configuration of the coastline and shape of the ocean floor (Bryant, 1991). Narrow bays, inlets and estuaries may cause funnelling effects that enhance tsunami magnitude (Blong et al, 2000). These factors mean that the flooding produced by a tsunami can vary greatly from place to place over a short distance.

A tsunami is not a single wave, but a series of waves. The time that elapses between the passage of successive wave crests at a given point is usually from 5 to 60 minutes, although higher frequency oscillations may also be present. Oscillations of destructive proportions may continue for several hours, and several days may pass before the sea returns completely to its normal state (IOC, 2005). The first wave in the series may not be the largest. The approach of a tsunami may be preceded by abnormal ocean behaviour. Depending on whether the first part of the tsunami to reach the shore is a crest or a trough, it may appear as a rapidly rising or falling tide.

Within harbours and estuaries even relatively small tsunami can cause strong currents which may have adverse consequences for both recreational and commercial boating as well as other marine based risk groups.

History of tsunami in NSW

The NSW coast has experienced some 40 tsunami since European settlement, many of which have been too small to produce noticeable effects. Many of these are outlined in Allport and Blong (1995).

The largest tsunami in 1868, 1877 and 1960 were recorded as tide gauge measurements of approximately one metre. There has been no recorded loss of life or major damage recorded as a consequence of tsunami, although, some minor damage to boats and coastal infrastructure is known to have occurred as a result of the 1960 Chilean and 1868 and 1877 Peruvian tsunami (Allport and Blong, 1995)

The historical record is useful when assessing the tsunami risk, but is limited by its short length of 220 years. The absence of impact from large tsunami over recent history is not on its own sufficient to preclude the possibility of impact from larger events.

Palaeo-tsunami research along the coast of NSW by some coastal geologists implies the coast may have been impacted by very large tsunami achieving flood heights in excess of tens of metres several times during the last 10,000 years (Bryant and Nott, 2001; Bryant and Young 1996; Bryant, Young and Price, 1992). Other researchers, however, have questioned the evidence for these proposed palaeo-megatsunami (Dominey-Howes, 2007, Dominey-Howes et al., 2006, Synolakis and Fryer 2001, Felton and Crook 2003) and further research is needed to validate the palaeo-tsunami record and its interpretation (eg Dominey-Howes, 2007).

Emergency planning for tsunami – NSW Tsunami Emergency Sub Plan

The development of the NSW Tsunami Emergency Sub Plan by the NSW SES began in early 2004, prior to the Indian Ocean tsunami of the 26th of December. It is because of that event that the priority for tsunami research and planning has been given greater emphasis in Australia (and elsewhere). The plan was endorsed at the NSW State Emergency Management Committee meeting held in December, 2005. This followed extensive investigation and consultation by the planning staff of the NSW SES with all agencies listed in the plan. In particular, it was essential that the authors of the plan had a full and detailed understanding of the nature of tsunami and of the current capabilities and limitations of tsunami detection and warning systems.

It was in the process of undertaking the required research that it became apparent that there are significant gaps in the knowledge base for tsunami world-wide and especially in the Australian context. There are differences of opinion within the scientific community about the evidence for past tsunami events and the likelihood and magnitude of tsunami in the future. The most difficult challenge for those involved in the response planning is that there is little or no information available by way of real time tsunami prediction of consequences for actual events.

The Tsunami Emergency Sub Plan is comprehensive in scope and deals with preparedness, response and the initiation of recovery. The plan deals with all possible tsunami magnitudes and generating mechanisms. The plan is strategic in nature and establishes the framework and principles for the emergency management of tsunami in NSW. Responsibilities for agencies likely to be involved in tsunami management are listed within the plan. As with all NSW emergency management plans, the plan works from an assumption that agency responsibilities should focus on those activities for which they are naturally best suited by virtue of their usual business orientation. Put simply this means: fire & HAZMAT managed by fire & HAZMAT specialists, rescue managed by rescue specialists, health managed by health specialists, warning and evacuation managed by warning and evacuation specialists, and so forth.

To ensure that key stakeholders are aware of the Plan, the Plan has been exercised and a series of briefings held to educate emergency managers about the arrangements contained within the Plan. Briefings were sponsored by Emergency Management Australia and held at eight different locations along the NSW coast during 2007. Topics presented at the briefings included the science of tsunami, tsunami warning systems, the NSW Tsunami Emergency Sub Plan, tsunami risk assessment and future planning initiatives. These briefings were attended by over 800 emergency managers illustrating the current interest in the emergency management of tsunami.

The plan is publicly available from the emergency NSW and NSW SES websites at www.emergency.nsw.gov.au and www.ses.nsw.gov.au.

Concept of operations

The concept of operations for the Plan recognises that any tsunami response operation will require a coordinated multi agency effort under the overall control of the NSW SES. The Plan separates tsunami response operations into three phases consisting of pre-impact (warning), impact and post impact.

The pre-impact phase is defined as the period before the impact of tsunami and consists of precautionary tasks focused upon the protection of life and property such as warning and evacuation; operational readiness; provision of accommodation and welfare for displaced people; protection and pre-deployment of resources; and the restriction of access to areas likely to be impacted. The ability to undertake these tasks is dependent upon the warning time available.

The impact phase is characterised by the impact of a series of separate waves over several hours. It will be difficult to undertake many activities directly within at-risk areas due to the dangers posed by the impact of further waves. Hence activities within this phase will be focused on warning, reconnaissance, welfare for evacuees and preparation for response activities during the post impact phase.

The post-impact phase begins upon advice that the destructive potential of a tsunami has ceased and that it is safe for emergency services to enter affected areas (if any). The scale of post impact phase activities will be dependent on the size of the event that has occurred. Some activities conducted during this phase may include reconnaissance, search and rescue, treatment of sick and injured, welfare provision, disaster victim identification, response to fire and hazmat incidents and provision of advice to the community.

The work to prepare the Tsunami Emergency Sub Plan identified that both marine and land based elements are vulnerable to tsunami. It is likely that all significant tsunami (i.e. those that are noticeable) will affect marine based risk groups who may be vulnerable to the effects of unusual currents as well as varying water levels, whilst larger tsunami are likely to cause damage to land based elements. It is therefore important to distinguish between these two classes of tsunami within the concept of operations, and to determine what actions will be necessary in each scenario during each of the defined phases of tsunami response operations.

Tsunami warning systems

Advice about potential tsunami that may affect Australia is issued by the Bureau of Meteorology, as part of the Australian Tsunami Warning System. The Bureau has formed the Joint Australian Tsunami Warning Centre with Geoscience Australia. This centre produces information regarding the level of potential tsunami threat and this forms the basis of public Tsunami Warnings issued by the Bureau's Regional Offices. Further information regarding the Australian Tsunami Warning System is available from the Bureau of Meteorology website www.bom.gov.au/tsunami

The Bureau of Meteorology is responsible for the initial broadcast distribution of NSW Tsunami Warnings. The NSW SES is responsible for directing the dissemination of tsunami warnings via narrowcast means at regional and local levels.

Warnings will be disseminated by broadcast media; doorknocking; fixed and mobile public address systems; marine radio; variable message signs and the internet. The NSW SES has undertaken further research into other possible warning dissemination methods and is currently considering the implementation of further methodologies.

Available effective warning time will vary depending upon the distance of our coastline from the point of tsunami generation. In the event of a tsunami being generated directly offshore of our coast, little to no warning will be available at the point of first impact apart from possible environmental warning signals such as the recession of the ocean prior to tsunami impact. The best warning strategy for local tsunami is public education to ensure that the community is aware of environmental cues and what actions to take when they are observed.

Tsunami risk assessment

The hazard magnitude for tsunami threatening NSW is difficult to assess because of a lack of suitable research. A consequence of the lack of research is that, no detailed tsunami hazard assessments have been conducted to assess what areas may be exposed to the greatest hazard (Opper and Gissing, 2005). The general nature of the information available from the short history of tsunami occurrence and lack of detailed modelling also makes it difficult to estimate magnitude-frequency relationships for tsunami.

It is clear that the knowledge gaps regarding tsunami risk must be addressed. To this end the NSW SES and the NSW Department of Environment and Climate Change with support from Geoscience Australia have entered into a partnership to manage a tsunami risk assessment scoping study for the NSW coastline. Funding for the study was successfully obtained through the Natural Disaster Mitigation Program.

The study will compose the following components:

- Identification of tsunami sources, including an assessment of their relative tsunamigenicity;
- Summary of NSW tsunami history, including paleotsunami studies;
- Estimation of travel times for each credible tsunami source;
- Estimation of wave heights along the entire NSW coast to 50m depth for regional and distant tsunami sources;
- Broad based assessment of coastal vulnerability;
- Assessment of the influence of typical coastal configurations on tsunami magnitude;
- Assessment and collation of available topographic and bathymetric data to facilitate future modelling of tsunami inundation; and
- Assessment of inundation and risk modelling requirements.

The outcomes of the study will provide a general assessment of tsunami risk and provide information for the prioritisation of communities for future detailed tsunami inundation modelling as well as some of the inputs required to perform this modelling.

The provision of more detailed risk assessment information will allow for more detailed emergency planning and community specific education programs to be conducted.

The April 2nd 2007 Solomon Islands tsunami event

At 6:40 am AEST on Monday the 2nd of April 2007, a magnitude 8.1 earthquake located 10 kilometres below the seafloor in the Solomon Islands occurred. As a consequence of the earthquake a tsunami was generated. In the areas closest to the point of tsunami generation severe damage was experienced by the waves reported to have been several metres high. Some 52 reported

deaths occurred in the Solomon Islands, with some 5,500 people displaced (Fritz and Kalligeris, 2008; OCHA, 2007)

Tsunami Bulletins were issued by the Pacific Tsunami Warning Centre, which warned of potential impacts on the Australian coast. As a consequence tsunami warnings were issued by the Bureau of Meteorology for the East Coast, including NSW.

The first public warnings were issued at 8:20 am AEST and indicated that the NSW coast could be affected by 10:15 AEST. The public were encouraged to take the following safety actions:

- People at the beach should leave the beach, and any areas exposed to surf and move to higher ground;
- People in boats in shallow water should immediately return to land, secure vessels and move to higher ground;
- Boats and ships at sea should move to deep water and not return to harbour until advised that it is safe to do so;
- If you see the sea go out like a very low tide then immediately go to high ground; and
- People should keep listening to the local media for updated information and advice and follow instructions and advice from emergency services.

As a consequence of warnings beaches were closed and swimmers were evacuated; some Sydney ferry services were suspended; some vessels moved offshore from ports and a small number of schools were evacuated. Throughout the morning of the 2nd, most media agencies streamed continuous coverage of the situation. At 1:30 pm AEST the warning for NSW was officially cancelled by the Bureau of Meteorology.

NSW SES State and coastal Region Operation Centres were opened as well as many local coastal Unit Headquarters to monitor the situation and to pass information to supporting agencies and the public.

As outlined in the Plan, NSW SES operations were supported by various other agencies including Local Government, Surf Life Saving NSW, NSW Police Force, Port Corporations, NSW Maritime, Royal Volunteer Coastal Patrol, Australian Volunteer Coast Guard and VRA Sea Rescue.

Actions undertaken by emergency services included enhancing operational readiness, disseminating warnings to people in or on water, closure of beaches in consultation with local government councils, monitoring and reconnaissance and management of the media.

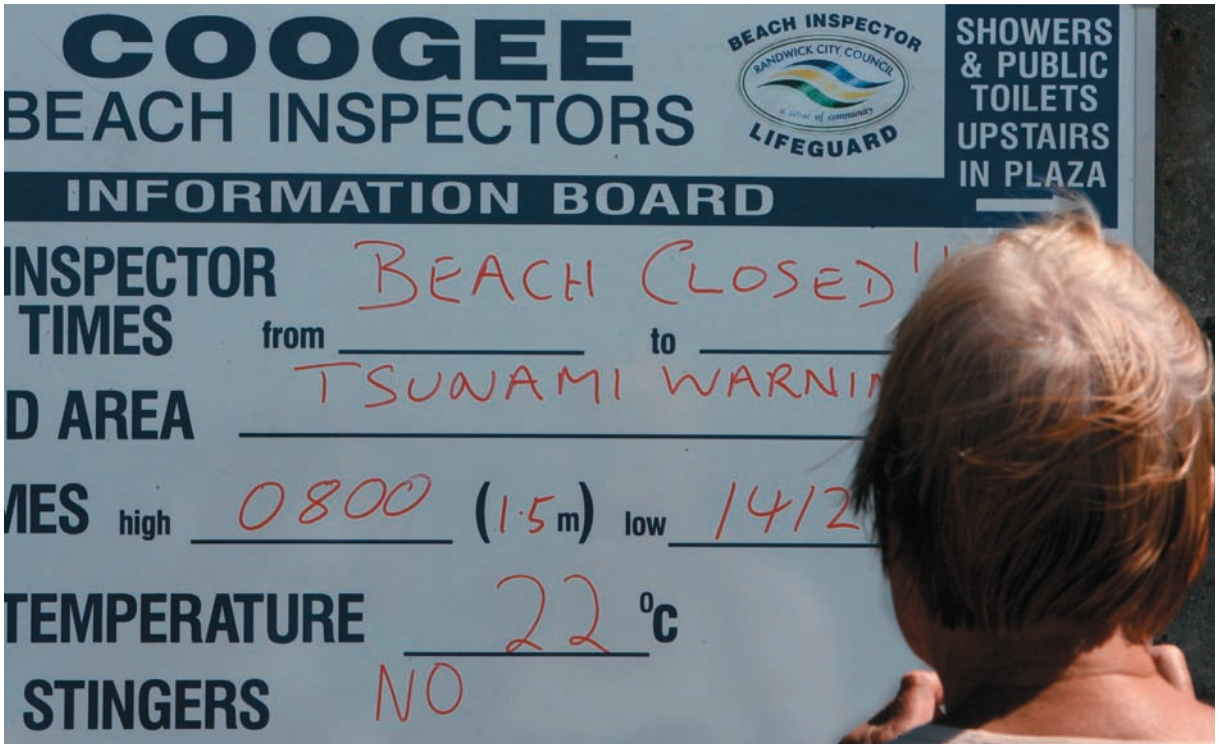
A small tsunami was measured along the NSW coast as small changes in tides over short periods of time. Some strong currents were observed at Coffs Harbour. Tidal anomalies measured at Tweed Heads matched well with the predicted NSW arrival time of 10:15 AEST. Fortunately, no significant damage or injuries were reported. Table 1 below details peak tsunami wave heights collected at 15 minute intervals at locations along the NSW coast and offshore islands.

Table 1 Peak tsunami wave heights

Location	Maximum Wave Height (Crest to Trough) (Metres)
Norfolk Island	0.4
Lord Howe Island	0.18
Tweed Heads	0.14
Brunswick	0.16
Ballina	0.11
Yamba	0.08
Coffs Harbour	0.18
Tomaree	0.13
Sydney	0.14
Creswell	0.07
Bermagui	0.12
Eden	0.4

Some key observations and lessons learnt from the event included:

- It was clear at subsequent debriefs that having a well exercised plan was a big advantage and a worthwhile investment. The partnerships which were built between the NSW SES and other emergency services during the planning process ensured that coordination of operations was effective;
- Not all key stakeholders at the local level were aware of the NSW Tsunami Emergency Sub Plan, reinforcing the fact that there is an ongoing need to market emergency plans to ensure awareness of them;
- Post event debriefs and reviews regarding warning effectiveness managed by the SES indicated that the large majority of residents became aware of the tsunami warnings through the media. Since, the event occurred during morning hours when people were travelling to or attending work; it was relatively easy to reach people through this communication method. If the event had occurred outside of waking hours other warning methods would have been required to supplement the media. However, due to the much lower number of people who would have been within the potential area of concern during this event, the warning task would have been much smaller in scale.



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Many beaches were closed as a consequence of the tsunami warning on April 2nd, 2007.

- There was some confusion in advice messages regarding what was meant by deep and shallow water. Messages will now refer to geographical descriptions, such as open ocean, harbours and estuaries, rather than depths.
- A lack of consequence information made operational decision making difficult, reinforcing the need for detailed risk assessment work to be undertaken.
- Modern communication means that information is very quickly exchanged across State borders. The need for consistent messages across State borders is vital to ensure that warnings do not create confusion and are appropriately responded to.
- Though the event showed that warning advice messages needed refinement. The process of developing these messages with the Bureau prior to the event and the procedures for warning consultation between the Bureau and the NSW SES enhanced the ability of both agencies to provide consistent information to the public during the event.
- It is the experience of the NSW SES and evident through post event reviews that the majority of the community does not recognise tsunami as a hazard to the NSW coast and hence believed that the event would not have any serious consequences. This experience illustrates the need for community education programs to be delivered which raise awareness regarding the tsunami hazard and appropriate actions to undertake in response to tsunami warnings. Similar observations and conclusions have been made by Bird and Dominey-Howes (2006; 2008)
- It is vital that the media and other emergency services are aware of the structure of the total tsunami warning system and that Bureau of Meteorology Tsunami Warnings are the official warning products for Australia, and all broadcast information should be consistent with the information contained within them. An education campaign has been undertaken by the NSW SES in conjunction with Emergency Management Australia, Geoscience Australia, NSW Department of Environment and Climate Change and the Bureau of Meteorology to enhance the knowledge of the total tsunami warning system amongst the media and emergency services.

Conclusion

The 2nd of April tsunami event provided the first real test of the NSW Tsunami Emergency Sub Plan. Lessons learnt will be incorporated through an ongoing review of the State Tsunami Emergency Sub-Plan.

The primary focus of current NSW tsunami management initiatives is to maximise the capacity of emergency services to combat tsunami, in particular to enhance the ability to warn and evacuate people at-risk. Without detailed risk assessment information these tasks will be much more difficult to undertake, as was illustrated by the 2nd of April tsunami event.

Future initiatives will focus upon community education; more detailed emergency planning and advanced warning systems. Community education programs will be aimed at developing understanding of the tsunami risk posed to communities and empowering people to take appropriate action in response to a tsunami. These enhancements also fundamentally depend on the tsunami risk assessment process.

References

Allport, J.K. and Blong, R.J., 1995, *The Australian Tsunami Database* (Four Volumes). Natural Hazards Research Centre, Macquarie University, Australia.

Bird, D. and Dominey-Howes, D., 2006, Tsunami risk mitigation and the issue of public awareness. *Australian Journal of Emergency Management*, v. 21 n. 4, 29-35.

Bird, D. and Dominey-Howes, D., 2008, Testing the use of a 'questionnaire survey instrument' to investigate public perceptions of tsunami hazard and risk in Sydney, Australia. *Natural Hazards* 45, 99-122.

Blong, R.J., Sinai, D., and Packham, C., 2000, *Natural Perils in Australia and New Zealand*. Swiss Re Australia Limited, Australia.

Bryant, E., 1991, *Natural Hazards*. Cambridge University Press, United Kingdom.

Bryant, E., Young, R. and Price, D., 1992, Evidence of tsunami sedimentation on the south eastern coast of Australia. *Journal Geology* 100, 753-765.

Bryant, E. and Price, D., 1996, Bedrock-sculpturing by tsunami, South Coast New South Wales, Australia. *Journal Geology* 104, 565-582.

Bryant, E. and Nott, J., 2001, Geological Indicators of Large Tsunami in Australia. *Natural Hazards* 21, 231-249.

Burbidge, D. and Cummins, P., 2007, *A Preliminary Tsunami Hazard Map for Australia*, Geoscience Australia, Canberra

Bureau of Meteorology (2008) *Tsunami Information*. Bureau of Meteorology. Available at: http://www.bom.gov.au/tsunami

Dominey-Howes, D., 2007, Geological and historical records of tsunami in Australia. *Marine Geology* 239(2007), 99-123.

Dominey-Howes, D., Humphreys, G. and Hesse, P., 2006, Tsunami and palaeotsunami depositional signatures and their potential value in understanding the Late-Holocene tsunami record. *The Holocene* 16 (8), 1095–1107.

Felton, E. A. and Crook, K.A.W., 2003, Evaluating the impacts of huge waves on rocky shorelines: an essay review of the book 'Tsunami – The Underrated Hazard' *Marine Geology* 3304, 1-12.

Intergovernmental Oceanographic Commission (IOC), 2005, Communications Plan for the Tsunami Warning System in the Pacific. Intergovernmental Oceanographic Commission. Available at: http://ioc3.unesco.org/indotsunami/mauritius05/TWSP_Communications_Plan_2005_rev2.pdf

Jenkins, C. and Keene, J., 1992, Submarine slope failures of the southeast Australian continental slope: a thinly sedimented margin. Deep Sea Research v. 39 n. 2, 121-136.

Opper, S. and Gissing, A., 2005, *Anticipating Waves of Destruction – Preparing the New South Wales Tsunami Emergency Management State Plan*. State Emergency Service. Available at: http://www.ses.nsw.gov.au/infopages/2276.html

UNESCO IOC International Tsunami Information Centre, 2005, *Tsunami The Great Waves*. UNESCO IOC International Tsunami Information Centre, Honolulu, Hawaii, USA.

United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2007, *South Paciifc Tsunami – OCHA Situation Report No. 3*. Available at: www.reliefweb.int

Synolakis, C.E. and G.J., Fryer, 2001, Book Review: *Tsunami: the underrated hazard* by Edward Bryant, *Eos, Trans. Am. Geophys. Union*, 82, 588

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Public behaviour during a pandemic

Hagan, Maguire and Bopping outline a number of public response issues for effective pandemic planning.

Introduction

A pandemic resulting from a newly emerged disease constitutes one of the more probable events likely to threaten national security (Cecchine and Moore, 2006, Brower and Chalk, 2003). Like many countries, Australia is currently taking steps to improve its ability to manage an outbreak of pandemic. An important component of these efforts to date is Exercise Cumpston[1], a multi-jurisdictional exercise held in October 2006. Exercise Cumpston provided State and Federal Government agencies an opportunity to validate elements of their pandemic influenza management plans. Moreover, it offered us a means by which to test and, if necessary, refine the inter-departmental coordination processes so critical to the effectiveness of any response.

The plans developed by government agencies form the first part of what we see as a two-part pandemic management equation. The second part relates to the public—specifically, how the public is likely to behave should a pandemic occur. What is rarely discussed is the dependency between these two parts. The quality of an agency's pandemic management plan will depend, to a large degree, on the quality of the assumptions it makes about how the public will respond. There is little sense in assuming that people will seek help from influenza assessment centres, for example, if the prevailing public intention is to present at hospital emergency departments. What must be recognised is that plans themselves cannot *ensure* the public will do the 'right' things. People will differ in their responses, and the majority of people will react based on their best understanding of the situation, an understanding that will depend on what information they have and how they interpret that information. Ultimately, the success of the pandemic plans will depend on their ability to predict the ways in which people will act in a pandemic.

This paper outlines a number of public response issues for effective pandemic planning. These include conforming to movement and quarantine regulations, following health and medical advice, and staffing 'essential worker' roles. Our analysis of these issues leads us to the key concept of compliance. We argue that by better understanding the drivers of compliance, communication strategies can be devised to benefit the management plans of government agencies.

Movement restrictions

One of the fundamental methods of containing a pandemic (and thereby slowing its spread) is the imposition of restrictions on movement and gatherings (WHO, 2005, Office of Health Protection, 2006). Restrictions can be placed on the movement of the uninfected population at local, national and international levels. At the local level, many pandemic plans call for school closure along with more general recommendations to avoid crowds (WHO, 2006). At the national and international level, restrictions will be placed on people's capacities to move from one region to another. As a global phenomenon, a pandemic would bring about severe international movement restrictions.

A range of psychological and social factors will influence the effectiveness of restrictions on movement. People are motivated to contravene movement restrictions by a strong desire to be with their families and community, to protect their economic wellbeing, or even due to their mistrust in the advice of the government. The motivation to flee en masse can be driven by anxiety and fear of contracting the disease. The plague outbreak in Surat, India in 1994 led to the uncontrolled flight of 600,000 people, including essential medical staff (Ramalingaswami, 2001). The extent to which fear and anxiety drive this sort of collective 'panic' will be related in part to people's beliefs about the effectiveness of the government's response. While panic is a highly uncommon response to crisis (Auf der Heide, 2004) there is a large amount of research showing people's unwillingness to modify their movements in the ways that the authorities would prefer (Donner et al., 2007). The public's response to instructions is dependant on a range of social and psychological factors (Mileti and Sorensen, 1990).

[1] Exercise Cumpston was Australia's largest health simulation exercise, testing preparedness for response to pandemic influenza. It served as a comprehensive test of Australia's National Pandemic Plan.

Relating to this, there is mixed evidence for the effectiveness of isolation measures in stopping the spread of highly contagious diseases like influenza (WHO, 2006, Garrett, 2005). If such information questioning their effectiveness becomes public knowledge, and the availability of information in our culture suggests that it will, we can expect it to affect people's willingness to comply with movement restrictions. At the national level a lack of coordination in policy can lead to problems. During the 1919 Influenza epidemic in Australia, differences in State policies led to interstate tensions, when States unilaterally implemented movement controls to protect themselves (WHO, 2006). We can expect modern media to immediately report on such problems, and for awareness of this to affect people's attitudes and behaviour.

Quarantine

When a pandemic first emerges, we can expect that at least its first victims will be quarantined in hospitals. As it develops, victims may also be quarantined at home (Cava et al., 2005b, CDC, 2007, Office of Health Protection, 2006). Any new influenza virus has unique characteristics and it takes time to develop an understanding of how it is transmitted and when protective measures need to be taken. In particular, it is well understood that it will take between 4 to 6 months to develop effective vaccines (CDC, 2007).

While Australians are familiar with the rationale and value of quarantine of diseases and pests in order to protect Australia's natural environment and industry, they are unfamiliar with quarantine of people. Evidence from several previous quarantine efforts indicates that compliance is mixed (WHO, 2006). Even where compliance is reportedly high, as it was during the SARS crisis, compliance within households was far less effective than general public compliance (Hawryluck et al., 2004). People were willing to remain quarantined at home, especially as they were encouraged to do so by social pressure. However within their home they ignored health protocols (such as wearing a mask) where they found the requirement questionable or burdensome (Cava et al., 2005b).

Evidence suggests that being quarantined has a psychological effect on an individual. Hawryluck and colleagues (2004) found that both being quarantined and being acquainted with a quarantined individual were associated with high levels of symptoms indicative of post traumatic stress disorder. Longer duration of quarantine was also associated with greater distress symptoms. This suggests that during a pandemic the process of quarantine itself will contribute a significant psychological burden on the community.

As with movement restrictions, adherence to quarantine will be strongly influenced by its perceived effectiveness. Quarantine worked well during SARS because of the low transmissibility and delay in peak infectivity (Skowronski et al., 2006). As such, the population was willing to comply with instructions. It also helped that the numbers quarantined, while large, were still small enough for compliance with the orders to be checked on a regular basis by health professionals (Cava et al., 2005a). The work load on health workers during a pandemic may make this type of individual monitoring impractical. When a highly transmissible disease (like influenza) emerges, many experts believe quarantine will be ineffective (WHO, 2006). If this doubt becomes public, a consequence may be that people are likely to be less willing to comply. The rapid transmission of information in modern society suggests that awareness of these doubts will spread quickly through the population if the crisis response suffers setbacks.

Health/medical instructions

An effective pandemic response requires people to comply with precautionary health measures. People will be required to recognise their own (or their family members') symptoms, and to follow certain instructions based on these symptoms. People will be required to make the judgment on when they should attend hospital, and when they should administer self-care at home. Self-care measures may include wearing masks, washing hands, avoiding contact with infected people, taking prescribed medication and not taking non-prescribed medications.

It is accepted that many of the people who arrive at hospitals during a pandemic will be there due to their distress and illusory symptoms, rather than actual infection (Reissman et al., 2006). These self-referrals for screening and admission increase the risk of hospital cross-infection (Wong et al., 2004). They also add to the burden on the health care system (e.g., by flooding triage and emergency wards).

People will also try to get access to drugs regardless of their actual need for them. In India, during the 1994 plague outbreak, supplies of the drug tetracycline (believed to be effective against the disease) were unavailable after widespread public buying (Ramalingaswami, 2001).

Alternatively, the public may also refuse to use drugs if they fear that they have been given incomplete information regarding particular medication. Concern about side effects may outweigh the fear of not taking the medication and of contracting the disease. Public confidence in the United States government plummeted after hasty adoption of a widespread 'swine flu' vaccination program (Enemark, 2007, Thomas, 2007). The virus only killed one person, and never became an epidemic. The vaccine that was given to halt a possible

epidemic resulted in hundreds of people hospitalised after adverse reactions, and more than 20 deaths. This outcome did considerable damage to the CDC's reputation, endangering future public cooperation (Thomas, 2007). As WHO regard the timely use of antiviral drugs as vital to containing a pandemic, such non-compliance could increase the scale of the disaster significantly (WHO, 2005).

Pandemic planning must recognise that we cannot assume that people will comply with health and medical instructions. It is likely that there will be low levels of compliance with any public health recommendations (Reissman et al., 2006). During the SARS crisis, even doctors were inconsistent in complying with basic hygiene measures (Wong et al., 2004). Wong et al. (2004) attribute this to the fact that the doctors had no experience or understanding of the disease, and no clear knowledge of its infectiousness. Clearly the public will have an even more limited comprehension of the infection, and may not understand the importance of certain measures. However understanding alone will not be enough to guarantee compliance, as social and psychological factors will influence people's response to instructions even if they understand the reasons for those instructions (Mileti and Sorensen, 1990).

Essential workers

Government pandemic plans focus on ensuring that hospitals are well equipped and supplied to deal effectively with affected individuals, and on keeping other essential services operating. Essential sectors include health, law and order, defence, electricity and water, telecommunications, banking and finance, and food supply. However, in order for hospitals and other services to function effectively, it is necessary to have people to operate and work in them. We can question whether doctors, nurses, and other essential workers will continue to work during a pandemic.

Most of the evidence about behaviour during disease type crisis events has been collected on health workers. The refusal of healthcare workers (and workers more generally) to attend work is likely to be motivated by a fear of risk to themselves and to their families (McNeil, 2003). This fear will be fuelled by uncertainty about the mode of transmission of the disease and about appropriate protective measures. The public may also see certain people as potential threats as a result of their occupation (e.g., healthcare workers exposed to infected patients) and stigmatisation may arise in response.

With continued contact with infected patients, healthcare workers are likely to be at increased risk of becoming ill. During the SARS crisis, doctors, nurses and other healthcare workers were among the first affected (Abraham, 2005). Many general practitioners in Hong Kong changed their consulting behaviour, potentially affecting the standard of care delivered (Wong et al., 2004). A smaller number went so far as to close their clinics after a suspected SARS case. The outbreak of SARS in Taiwan led to mass resignations of medical staff, especially the poorer paid nurses (McNeil, 2003).

With such a threat, and with the fear that comes from uncertainty, it is reasonable to expect a proportion of healthcare workers to refuse to attend work. To minimise this it will be necessary for healthcare and other essential workers to be included in pandemic planning, and to ensure that they receive information about risks and about the protective measures that can be taken (Kotalik, 2005). An important first step has recently been taken in Australia with the release of the online pandemic planning tool for GPs[2].

As a pandemic spreads to a significant percentage of the population, such that any social situation is a potential threat, the above effects are unlikely to remain restricted to health workers. Workers in all the essential sectors can feel threatened, and may adjust their behaviour to minimise this threat. Given the dependency of modern life on basics, such as electricity and immediate communications, the ability of a full range of essential services to maintain staff numbers is of critical importance.

Compliance

As this paper has discussed, priority issues in pandemic planning include movement restrictions, quarantine, adherence to health and medical instructions, and staffing of essential roles. Common to each of these priority issues is the notion of compliance. Compliance may be defined as changing behaviour as expected or requested. The psychological description of the compliance process involves communication (a request) and a response (acquiescence) (Cialdini and Goldstein, 2004). Research on compliance has generally focused on questions of when and why people will comply. There is a large literature on the problems in encouraging compliance through communications during a crisis (Mileti and Sorensen, 1990, Donner et al., 2007). Compliance has also been extensively studied in the medical literature, in the context of when people will or will not follow drug regimens. Within the psychological literature several factors have been identified that influence compliance, a subset of which may be amenable to manipulation during a crisis:

- Authority
- Social Validation
- Consistency
- Reciprocity

[2] http://info.anu.edu.au/mac/Media/Media_Releases/_2007/_April/_030407_influenzaonlinetool.asp?p=1

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Media can assist in disseminating information to the public during a pandemic.

An awareness and understanding of these factors will help governments and authorities increase the compliance of the population with requests made during a pandemic.

Authority

People are more willing to accede to the request of a legitimate authority (Cialdini, 1988, Mileti and Sorensen, 1990, Donner et al., 2007). Compliance is more likely to occur when the person making the request is seen as the appropriate authority to be acting in the particular situation. In terms of a pandemic, it is encouraging that Exercise Cumpston included government officials up to and including the Prime Minister, as national-level requests are more likely to be complied with when presented by the highest authority. During a pandemic, the other component of legitimate authority will be medical knowledge. Simple things like the use of the title "Doctor" may influence people's compliance with instructions, as people see the medical advice as coming from a knowledgeable source. If counter-claims about the effectiveness of pandemic response measures also come from medical authorities, the legitimate authority will be questioned and compliance will be reduced.

Social validation

People get information about how to behave by looking to the behaviour of others, particularly those in the same social group (Reno et al., 1993). This is particularly true in uncertain situations—notably in crisis situations (Cialdini, 1988). In the floods in Grafton in 2001, for example, those who were uncertain about whether to evacuate or not looked to see what their neighbours were doing (Pfister, 2002). If their neighbours were not evacuating, they also failed to evacuate. In this way, non-compliance encourages further non-compliance. Compliance can be increased by minimising the uncertainty, but primarily by emphasising that the social group's response is to comply.

Consistency

People will behave consistently with their previous behaviour. For example, if they failed to evacuate for a previous flood (and there were no adverse consequences), it is likely that they will also not evacuate for a later flood. Thus the decision for non-compliance, if it does not result in bad outcomes, will encourage non-compliance to similar demands. This effect will occur even when the specific threat is greater, and the likelihood of negative outcomes larger, in the second incident. Consistency can also work to increase compliance, if the public's behaviour can be shaped. Cialdini and Goldstein (2004) describe the foot-in-the-door technique for enhancing compliance, which involves making a small request, obtaining compliance and then making a second, larger (related) request. Once the person has agreed to the first request, they are more likely to comply with the second (larger request). Turning this tendency into an action applicable to pandemic planning would require some creativity, however it may be possible to leverage the consistency bias in some situations.

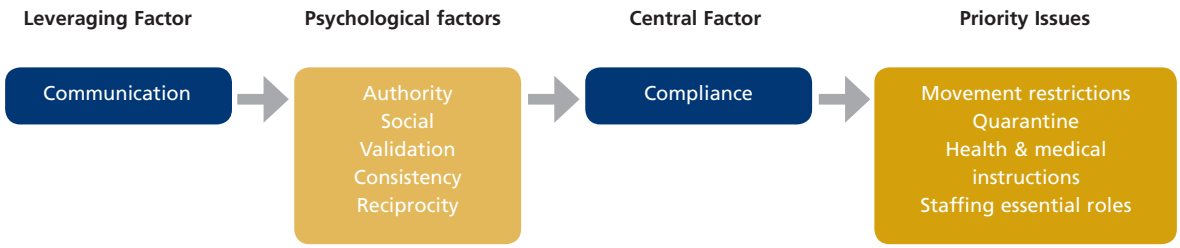
Reciprocity

People feel obliged to repay others for what we have received from them (Cialdini, 1988, Gueguen and Pascual, 2003). One of the ways of encouraging compliance is to give something to the target, thus creating in them the obligation to give something in return. Medical workers in Taiwan, Singapore and China received bonuses and preferential treatment during the SARS crisis, specifically to encourage them to continue to work despite the threat to their person and family (McNeil, 2003, Wiskow, 2003). Reciprocity can also be activated using the door-in-the-face technique, which involves asking a large request then retreating to offer a smaller request (the intended request). Compliance is explained by the person's feeling of obligation to accept the smaller request as reciprocation for the requester's concession. This has been found to have a strong effect on behaviour, even in naturalistic settings (Pascual and Gueguen, 2006).

Communication

The primary leveraging/driving factor that government bodies will have to encourage compliance is communication. Effective communication with the public is essential for ensuring compliance with instructions given and restrictions imposed during a response. To foster trust of authorities, effective

Figure 1: Psychological factors and social issues in pandemic planning.



communication is important before, during and after a pandemic. Figure 1 shows a conceptualisation of the role of communication and compliance.

While it is necessary to find a balance between informative communication and panic-inducing communication (Enemark, 2006), the public will demand timely and comprehensive information regarding what is happening, what they need to do—and why (Donner et al., 2007, Mileti and Sorensen, 1990). If people are less uncertain about what is happening and what they need to do, they are less likely to turn to others to get a sense of the appropriate behaviour (i.e. less need for social validation). Adequate information can be used to discriminate the current situation from previous ones, undermining the consistency effect where it encourages non-compliance. Similarly, if information is not complete, the public may lose faith in the government as an authority (Enemark, 2006, Penfield and Larkin, 2006) and rely on rumour systems and unofficial media reports. Indeed, Kotalik (2005) argues that a concern for public panic is an insufficient reason for failing to communicate unfolding events to the public.

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A quarantine isolation unit.

By better understanding the drivers of compliance, communication strategies can be devised to benefit the management plans of government agencies. Communication is not the only option available, although it may be the simplest to apply with limited planning. Communication will be the primary factor deciding the success of using authority and social validation to encourage compliance. In the factors of consistency and reciprocity there remains greater potential for government agencies to implement creative crisis response strategies designed to maximise compliance.

References

Abraham, T. (2005) *Twenty-first Century Plague: The Story of SARS*, Baltimore, John Hopkins University Press.

Auf Der Heide, E. (2004) Common misconceptions about disasters: panic, the "disaster syndrome", and looting. IN O'LEARY, M. (Ed.) *The First 72 Hours: A Community Approach to Disaster Preparedness*. Lincoln, Nebraska, iUniverse Publishing.

Brower, J. & Chalk, P. (2003) *The Global Threat of New and Reemerging Infectious Diseases: Reconciling U.S. National Security and Public Health Policy*, Santa Monica, RAND Corporation.

Cava, M. A., Fay, K. E., Beanlands, H. J., McCay, E. A. & Wignall, R. (2005a) The Experience of Quarantine for Individuals Affected by SARS in Toronto. *Public Health Nursing*, 22, 398-406.

Cava, M. A., Fay, K. E., Beanlands, H. J., McCay, E. A. & Wignall, R. (2005b) Risk Perception and Compliance with Quarantine During the SARS Outbreak. *Journal of Nursing Scholarship*, 37, 343-347.

CDC (2007) CDC Influenza Pandemic Plan (OPLAN). Centres for Disease Control and Prevention.

Cecchine, G. & Moore, M. (2006) *Infectious Disease and National Security: Strategic Information Needs*, Santa Monica, RAND Corporation.

Cialdini, R. B. (1988) *Influence: Science and Practice*, Glenview, Scott, Foresman and Company.

Cialdini, R. B. & Goldstein, N. J. (2004) Social Influence: Compliance and Conformity. *Annual Review of Psychology*, 55, 591-621.

Donner, W. R., Rodriguez, H. & Diaz, W. (2007) Public Warning Response Following Tornadoes in New Orleans, LA, and Springfield, MO: A Socialogical Anaysis. *Second Symposium on Policy and Socio-economic Research*. San Antonio, Texas.

Enemark, C. (2006) Pandemic pending. *Australian Journal of International Affairs,* 60, 43-49.

Enemark, C. (2007) Pandemic Influenza and National Security. *Australian Defence Force Journal*, 171, 18-32.

Garret, L. (2005) The Next Pandemic? *Foreign Affairs*, 84, 3-23.

Gueguen, N. & Pascual, A. (2003) Reciprocity and Compliance to a Request: An Experimental Evaluation in a Natural Setting. *Psychology and Education: An Interdisciplinary Journal*, 40, 16-19.

Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S. & Styra, R. (2004) SARS Control and Psychological Effects of Quarantine, Toronto, Canada. *Emerging Infectious Diseases*, 10, 1206-1212.

Kotalik, J. (2005) Preparing for an Influenza Pandemic: Ethical Issues. *Bioethics*, 19, 422-431.

McNeil, D. G. (2003) SARS Fears Shake Taiwan Medical Staffs. *The New York Times*. New Your.

Mileti, D. S. & Sorensen, J. H. (1990) Communication of Emergency Public Warnings: A Social Science Perspective and State-of-the-Art Assessment. Washington DC, Federal Emergency Management Agency.

Pascual, A. & Gueguen, N. (2006) Door-in-the-Face Technique and Monetary Solicitation: An Evaluation in a Field Setting. *Perceptual and Motor Skills*, 103, 974-978.

Penfield, S. & Larkin, J. (2006) Avian Flu: A Test of Collective Integrity. *Strategy + Business*, 43, 1-5.

Pfister, N. (2002) Community Response to Flood Warnings: The Case of an Evacuation from Grafton, March 2001. *Australian Journal of Emergency Management*, 17, 19-29.

Protetction, O. O. H. (2006) Australian Health Management Plan for Pandemic Influenza. IN DOHA (Ed.), Commonwealth of Australia.

Ramalingaswami, V. (2001) Psychosocial Effects of the 1994 Plague Outbreak in Surat, India. *Military Medicine*, 166, 29-30.

Reissman, D. B., Watson, P. J., Klomp, R. W., Tanielian, T. L. & Prior, S. D. (2006) Pandemic Influenza Preparedness: Adaptive Responses to an Evolving Challenge. *Journal of Homeland Security and Emergency Management*, 3, 1-28.

Reno, R. R., Cialdini, R. B. & Kallgren, C. A. (1993) The Transsituational Influence of Social Norms. *Journal of Personality and Social Psychology*, 64, 104-112.

Skowronski, D. M., Petric, M., Daly, P., Parker, T. A., Bryce, E., Doyle, P. W., Noble, M. A., Roscoe, D. L., Tomblin, J., Yang, T. C., Kraiden, M., Patrick, D. M., PourbohloulL, B., Goh, S. H., Bowie, W. R., Booth, T. L., McGeer, A. & Brunhem, R. C. (2006) Coordinated Response to SARS, Vancouver, Canada. *Emerging Infectious Diseases*, 12, 155-158.

Thomas, J. C. (2007) Ethical Concerns in Pandemic Influenza Preperation and Responses. Southeast Regional Centre of Excellence for Emerging Infectious and Biodefence.

WHO (2005) Responding to the Avian Influenza Pandemic Threat. World Health Organisation.

WHO (2006) Nonpharmaceutical Interventions for Pandemic Influenza, National and Community Measures. *Emerging Infectious Diseases*, 12, 88-94.

Wiskow, C. (2003) The Impact of Severe Acute Respiratory Syndrome (SARS) on Health Personnel. International Labour Office.

Wong, W. C. W., Lee, A., Tsang, K. K. & Wong, S. Y. S. (2004) How did General Practitioners Protect Themselves, their Families, and Staff During the SARS Epidemic in Hong Kong? *Journal of Epidemiology and Community Health*, 58, 180-185.

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Living with bushfire risk: social and environmental influences on preparedness

Paton, Bürgelt and Prior discuss the process of developing a model capable of informing the development of community outreach strategies to facilitate the sustained adoption of bushfire preparedness measures.

Abstract

This paper discusses the process of developing a model capable of informing the development of community outreach strategies to facilitate the sustained adoption of bushfire preparedness measures. Following the identification of anomalies in defining the predictors of preparedness, a qualitative study of the reasoning processes that influence whether or not people decided to prepare for bushfire hazards is presented. The findings of the qualitative study are used to revise the preparedness model. Finally, using data from 482 residents in high bushfire risk areas in Hobart, the ability of the revised model to account for differences in levels of household preparedness is discussed.

Introduction

Encouraging people to prepare for bushfires (e.g., creating a defensible space around the home, cleaning leaves from guttering, placing metal flyscreens on windows, screening eaves, ensuring access to resources for extinguishing spot fires, and determining householders 'stay or go' positions) is a significant public policy issue in Australia (McLeod, 2003). Preparing reduces the risk of loss and injury, facilitates coping with bushfire consequences, and minimises damage and insurance costs. However, despite the attention directed to this task, the goal of ensuring sustained levels of bushfire preparedness has proved elusive (McLeod, 2003). Consequently, developing more effective public outreach education programs is an important risk management goal.

Public outreach programs typically assume that advising people of their risk and what they should do to manage that risk (e.g., prepare) will motivate people to act (Smith, 1993). However, following a study that compared levels of risk perception and preparedness before and after a comprehensive outreach program, Paton et al. (2000) demonstrated that this assumption could not be supported. The receipt of information per se did not affect whether people would prepare. In a subsequent study of earthquake preparedness, Paton et al (2005) demonstrated that whether or not people prepared was a function of how people interpreted their relationship with the hazardous aspects of their environment. Two basic processes were implicated. The first concerned people's perception of the relative importance of hazard issues (compared with other demands on the community). The second involved people's interpretation of their ability to take action to increase their safety. Furthermore, these factors did not make equal contributions to preparedness. Rather they described a sequence of decisions that people made before preparing.

Paton et al. (2005) also observed that while these interpretive processes could facilitate preparedness, they could also result in some people actually deciding not to prepare. This distinction between "preparing" and "not preparing" outcomes was also found in a subsequent study of bushfire preparedness (Paton et al., 2006). This finding meant that, if they are to function to increase preparedness, outreach programs must be designed to a) encourage those disinclined to prepare to appreciate the importance and benefits of preparing, and b) motivate preparedness (Paton et al., 2005; Paton & Wright, 2008).

The core objective of the studies introduced in the previous paragraphs was to develop a model that could provide emergency management and fire agencies with an evidence-based means for managing these issues. A valid and reliable model would provide them with a framework for assessing community outreach needs and guiding the development of effective outreach programs. To pursue this objective, it is first necessary to identify the predictors of each outcome.

However, when testing the ability of the model to predict earthquake (Paton et al., 2005) and bushfire (Paton et al., 2006; Paton et al., 2007) preparedness,

analysis revealed that one predictor, critical awareness (the degree to which people think about and discuss hazard issues (Dalton et al., 2001; Paton et al., 2005), predicted both "preparing" and "not preparing" outcomes. Furthermore, this same variable was the strongest predictor of both outcomes. When linked to opposing outcomes in this way the variable itself ceases to have any value as a guide to planning outreach programs. Consequently, if a robust model capable of informing intervention development was to be developed, a more searching analysis of the predictors of preparedness was required.

To achieve this goal, it was first necessary to gain a better understanding of how one variable (critical awareness) could account for such disparate outcomes. This issue was examined using a qualitative analysis of the reasoning processes behind decisions to prepare versus deciding not to do so. Because the development of outreach programs can be more effectively pursued if fire agencies have a valid and reliable model to guide their outreach planning and intervention development, the findings of the qualitative study were subsequently used to develop a revised model. In the next section, the findings of the qualitative analysis and its implications for revising the model are discussed.

Qualitative study

Method

In-depth, semi-structured telephone interviews were conducted with residents in Hobart at the commencement of the 2004/05 bushfire season. The interviews were thus conducted at a time when people had received outreach material from fire agencies and should have been in the process of preparing for the forthcoming bushfire season (but before any bushfire had occurred). The timing of the research was selected to provide insights into people's preparedness decision making as it happened.

Interview participants were theoretically sampled from survey respondents whose perspectives could shed light on why critical awareness predicted both "preparing" and "not preparing" outcomes. In both the earthquake and bushfire studies, the type of intention people formed was found to be a reliable indicator of whether they would fall into the "prepare" or "not prepare" groups (Paton et al., 2005). Consequently, interview participants were selected from those scoring high on "intention to prepare" (i.e., those more likely to prepare: n = 13) and those with high "intention to seek information" (i.e., those disinclined to prepare: n = 4) scores in the Paton et al. (2006) survey that demonstrated that critical awareness predicted both "preparing" and "not preparing" outcomes. This case sampling approach was adopted to increase the opportunity to compare the underlying conditions, patterns of interaction, responses, and consequences associated with decisions to prepare versus not prepare (Flick, 2002).

Interviews were fully transcribed and systematically analysed using grounded theory analysis techniques (i.e. open, axial, and selective coding, paradigm model, constant comparison between individual cases, asking questions of the data, creating networks among the emerging concepts) (Strauss & Corbin, 1998). To manage the technical aspects of the analysis more effectively, the qualitative data analysis programme ATLAS.ti was used. The analysis identified important meanings, contexts, interactions and consequences of "preparing" versus "not preparing". The outcome was the best fit between the data and their interpretation and the systematic integration of data into a coherent account of people's beliefs and social relationships influenced "preparing" and "not preparing" outcomes (Flick, 2002). The interview data revealed that those deciding to prepare and those disinclined to do so interpret and think differently about bushfire risk and preparedness.

Results

The categories and sub-categories that describe peoples' choices are summarised in Tables 1 and 2. With regard to those who decided to prepare, respondents reported how stories about bushfires circulating within their community enhanced their knowledge of the local history of bushfires, increased their acceptance of both bushfire risk and the importance of preparing for bushfires, and provided a supportive context in which they were able to acquire information about what to do to prepare. Responsibility for self and others, being connected to the natural environment, having a positive outlook, being action oriented and organised, having sufficient time and resources, and being knowledgeable about fires, weather and environment also influenced people deciding to prepare. However, believing that preparing would not make a difference, conflicting views about the need for preparing within the family, conflict with and/or a lack of willingness to collaborate with neighbours to manage vegetation, and perceiving bushfires as having a lower priority in life than other demands were cited as reasons for deciding not to prepare. Before discussing these findings in details, it is worth noting that a belief in preparing did not guarantee a uniformly high level of preparedness. Several contingencies influenced people's beliefs regarding what to do and when they should do it.

One factor concerned beliefs about what constituted adequate preparation. These beliefs ranged from mowing the lawn regularly to adopting all the measures recommended by fire agencies. Even if it falls short of what is, objectively, an adequate level of preparedness, if people believe they are already sufficiently prepared,

they are unlikely to attend to risk information or change their behaviour. People's decisions were also qualified by their beliefs regarding when to act.

While some people routinely prepared at the start of the fire season, others stated that they would not prepare until the threat was imminent. That is, only when dangerous weather (e.g., receipt of fire warning, awareness of hot, dry, windy conditions) and bush conditions prevailed, or when fire was perceived as a direct threat to their property (e.g., smoke visible and coming their way). While people may know what to do, the short time frame afforded by this approach, and the high levels of stress likely to prevail as the fire front approaches, will reduce the effectiveness of any decision making and action at this time. A final contingent influence concerned how environmental beliefs influenced support for some mitigation measures but not others.

Respondents whose environmental beliefs were salient aspects of their lifestyle were happy to support measures with low environmental impact (e.g., clearing leaves, mowing the lawn). However, they were reluctant to support activities that would adversely affect their natural living environment (e.g. controlled burning, felling eucalyptus trees, clearing a defensible space around their house). Their perception that such actions would damage the flora and fauna in their living environment, and thus the environmental qualities they value, created dissonance between their love of nature and preparing, reducing their support for the latter. Such dissonance was not, however, inevitable.

One lifestyler adopted an approach labelled as *positive preparation*. Positive preparation included factors like house design that offers maximum fire resistance through position, building material, and building features and maintaining a lush and green garden of native vegetation with water features. In combination, these factors contributed to sustaining environmental quality and provided better fire resistance.

This discussion illustrates how people's interpretation of their circumstances affects the level of preparing. Others, however, take this further and are disinclined to prepare in the first place. One goal of the qualitative study was to identify variables that could be included in a model capable of guiding the development of fire agency outreach planning and intervention. In the next section, the paper discusses how the qualitative findings were used to achieve this goal. It also examines the degree to which the revised model can account for differences in levels of bushfire preparedness. If this relationship can be demonstrated, fire agencies will have a valid and reliable model available to inform their outreach planning.

Table 1. The categories and sub-categories derived from interviews with those in the "preparing" group (N=14).

Category	Sub-categories
Preparing is Effective	• Preparing will make a difference in a bushfire • High levels of knowledge and wisdom about fire, weather and bush conditions • High personal responsibility for safety • Being independent • Being action oriented • Having the necessary resources • Preparing increases safety • Preparing reduces anxiety
High Attachment to Place	• Strong attachment to home and property • Strong environmental beliefs
Community Participation	• Regular participation in community groups and activities • Discuss bushfire issues with others in the community • Discussion helps understanding risk and identifying what to do to prepare effectively • Desire to give back to the community and help others
Staying in Case of Bushfire	• Staying will save lives and property
Habit	• Preparation has become a habit
Insurance	• No insurance

Preparing versus not Preparing

This section focuses primarily on those aspects of the qualitative data that inform understanding of how Critical Awareness (CA) could predict both the "preparing" and "not preparing" outcomes observed in the earlier work (Paton et al., 2005; Paton et al., 2006). CA describes the frequency with which people think about and discuss bushfire issues, but not the content of their deliberations or discourse (e.g., whether they think and talk about preparing in positive or negative ways). The interview data shows that *what* people think about influences the nature of their decisions.

Both the "prepare" and "not prepare" group members raised issues regarding their beliefs about the efficacy of preparedness measures (Tables 1 & 2). Members of the "prepare" group believed that preparing is an effective strategy. In contrast, the "not prepare" group were equally adamant that preparing would not make a difference to their safety. The critical awareness variable would not have distinguished between these diverse beliefs (i.e., because it asked about the frequency with which people thought and talked about bushfire issues rather than their content). By articulating these diverse

beliefs, these data thus illustrate how the same variable, Critical Awareness, could predict both "preparing" and "not preparing" outcomes. This finding suggests that the critical awareness variable be abandoned in favour of one capable of differentiating between these control beliefs. One such variable is Outcome Expectancy (McClure, Allen, & Walkey, 2001; McClure, Walkey, & Allen, 1999; Paton et al., 2008). Outcome expectancy comprises two components. Positive outcome expectancy taps into beliefs that personal preparation can make a difference and add value to one's life. Negative outcomes expectancy taps into beliefs that hazards are too destructive for personal action to make a difference.

Table 2. The categories and sub-categories derived from interviews with those in the "not preparing" group (N=4).

Category	Sub-categories
Preparing is Ineffective	• Preparing will not make a difference • Poor knowledge of fire behaviour • Willing to take the risk • Bushfire are a source of anxiety • Can't do more
Low Attachment to Place	• Low attachment to where I live • Intention to leave if fire occurs
Social Pressure and Conflict	• Disagreement about effectiveness of preparing amongst family members • Social disapproval from neighbours if I prepare • Conflict with neighbours about taking action • Other activities more important
Stay and Defend	• Staying will not improve chances of survival • Staying increases danger
Insurance	• Well insured

Insights into the factors that lead some people to prepare but others to decide not to act were also evident in people's accounts of the relationship between their social context and their risk management choices. Both the "preparing" and "not preparing" groups identified the quality of their attachment to where they lived and the people in their community as having a bearing on their bushfire preparedness behaviour (Tables 1 & 2). However, each described the relationship between bushfire mitigation and their social contexts in very different ways.

Preparing was associated with a sense of attachment to where they lived and engaging in community life. For example, they cited how day-to-day activities and participation in community life (e.g., neighbours discussing previous bushfires when they meet on the street or when involved in community activities) afforded opportunities to gain insights into the bushfire history of the area and to work out why and how to prepare. This identifies how sense of attachment to place and to others within their community can influence preparedness. It indicates that social interaction also serves a problem solving function.

The link between preparedness and feeling a sense of attachment to the community in which one lives mirrors the finding that place attachment (the degree to which people feel that they are embedded within their social-ecological environment) increases people's emotional investment in their community (Hummon, 1992; Low & Altman, 1992), making it more likely that people will be motivated to act to enhance their safety within this environment. The second finding, that engaging with others provided valuable information and assists one's ability to work out what is required (i.e., problem–solving), is consistent with findings in the risk perception literature that points out that interaction with those with similar interests and circumstances plays an important role in helping people work out how to deal with uncertain, challenging events (Eng & Parker, 1994; Hardin & Higgins, 1996; Lion et al., 2002). The qualitative analysis thus identifies three potential variables that could be included in a revised model; attachment to place, involvement with other community members, and problem solving.

In contrast to those participants who were predisposed to prepare, the decisions of members of the "not preparing" group were made in very different social contexts. Disagreement amongst family members regarding the need for or benefit of preparing was cited by the "not prepare" group as a reason for not preparing. They also described how a lack of resources, a low sense of belonging to where they lived, and unwillingness to collaborate with neighbours on clearing vegetation as reasons for not preparing.

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A sense of attachment to place and to others within community can influence preparedness.

These accounts help provide additional insights into why some people decide not to prepare. The latter issues suggest a need to include a measure capable of encapsulating social conflicts and disagreements in a revised model. While additional work will be required to investigate these issues systematically, a measure of response efficacy that encapsulates these social conflict and resource constraints (Abraham et al., 1998; Lindell & Whitney, 2000) is available for use until a more comprehensive measure becomes available.

The qualitative analysis captured some of the variety and depth of experiences that inform people's risk management decision making. These data informed understanding of how people's interpretation of their relationship with bushfire hazards (e.g., outcome expectancy) and social context factors influenced preparedness decisions. If the findings of this work are to be pressed into service to support outreach development, it is necessary to convert them into a set of variables that fire agencies can use to assess communities and guide intervention development. Furthermore, the value of these data is a function of the degree to which the emergent variables can account for differences in levels of bushfire preparedness. The next step was to model the role of these variables in the revised model. The development and testing of this revised model is dealt with in the next section.

Modelling preparedness

Drawing upon the findings of the qualitative analyses, the variables included in the model were revised. Critical awareness was deleted in favour of the outcome expectancy construct. The responses of the 'preparing' group (Table 1) mirror the components of the positive outcome expectancy construct, and those in the 'not preparing' group (Table 2) reflect its negative outcome expectancy counterpart.

The Sense of Community (SoC) measure (Bishop et al., 2000) was retained. However, in light of the finding that people's accounts of their preparedness decisions differentiated between a sense of belonging to place and to people (Tables 1 and 2), a principal components analysis (PCA) was conducted to determine whether it could reflect this distinction. Before proceeding, the suitability of the data for factors analysis was first determined. The ratio of cases to variables exceeded 10, and the correlation matrix revealed several correlations over r=.3. The Kaiser-Meyer-Olkin value was .791, exceeding the recommended value of .6. All sampling adequacy values exceeded .5, and Bartletts test of sphericity was statistically significant. These tests indicated that the SoC data was appropriate for factor analysis. The PCA confirmed the existence of two factors, one (SoC Place) describing a sense of belonging to place (e.g., I would not move from this community) and the other (SoC People), identifying a sense of belonging to people in one's community (e.g., I often have friends from the community visiting). The qualitative analysis revealed that decisions to prepare involved more than being part of a community. It also revealed how interaction with others helped people work out what they had to do and why. That is, social interaction also fulfilled a collective problem solving function.

Eng and Parker (1994) discussed how dealing with uncertain and challenging circumstances required both access to information from others with similar views and interests and an ability to engage with others to work out how to adapt information and advice to fit individual needs. Because this aspect of preparing was not captured by the SoC measure, Eng and Parker's measure of 'articulating problems' was included as a variable in the revised model. To accommodate the potential for social conflict to constrain preparing, a measure labelled 'preparation inhibitors,' derived from studies showing that social conflict and resource constraints (e.g., not prepared to work with others, time, financial) reduced the likelihood of people preparing (Abraham et al., 1998; Lindell & Whitney, 2000) was included.

As with its earlier counterpart, the revised model proposes that people's decisions to prepare reflect the outcome of a sequence of evaluative activities. The process commences with people's beliefs regarding whether or not personal action can influence one's safety. If people believe that bushfires are too catastrophic or uncontrollable for personal actions to make any difference (i.e., negative outcome expectancy beliefs), it was hypothesised that people will not prepare. Because respondents described social and resource constraints as factors leading to their deciding not to prepare, it was hypothesised that "preparation inhibitors" would mediate the relationship between negative outcome expectancy beliefs and bushfire preparedness.

If, however, people believe that preparing can be effective (i.e., hold positive outcome expectancy beliefs), they will be motivated to prepare. However, whether they form intentions will be a function of the degree to which they feel a sense of belonging to where they live and by the degree to which they can access information and guidance about managing their bushfire risk from others within their community. It was hypothesised that sense of community and articulating problems would mediate the relationship between positive outcome expectancy, intentions to act and preparing.

Consistent with the social-cognitive theoretical foundation upon which it is based (Paton et al., 2005), the model describes preparing as the outcome of a sequence of decisions. As such, with the exception of the outcome expectancy variables that indicate the

starting point of the process, the contribution of each of the remaining variables in the model is dependent on those preceding them (as indicated by the arrows linking the variables in Figure 1). Consequently, structural equation modelling was selected for the analysis. Because it can estimate multiple and inter-related dependence relationships simultaneously, structural equation modelling allows statistics to be calculated to test the model as a whole and to show how well the data fit the hypothesised model (Goodness-of-Fit).

The variables outlined in the above discussion were compiled into a questionnaire. The questionnaire was distributed to 1000 households in suburbs in Hobart. The areas selected were identified by fire agencies as having comparable levels of bushfire risk. Survey data were obtained from 482 residents in Hobart during November 2006, giving a rate of return of 48%.

Results

Data were analysed using structural equation modelling (Amos 6.0). The results are summarised in Figure 1. The model presented here accommodates the hypothesised relationships and those identified by the modification indices furnished by the analysis. The fit indices ($x2$ = 8.30, df = 5, p=0.138; RMSEA = 0.037 (90% 0.0 -> 0.080), P-Value for Test of Close Fit (RMSEA < 0.05) = 0.628; NFI = 0.983, GFI =0.995, AGFI = 0.972) indicate that the revised model is a good fit for the data. The model accounted for 39% of the variance in preparation. Based on his meta-analysis of similar social cognitive models, Sheeran (2002) would define this as a very good effect size.

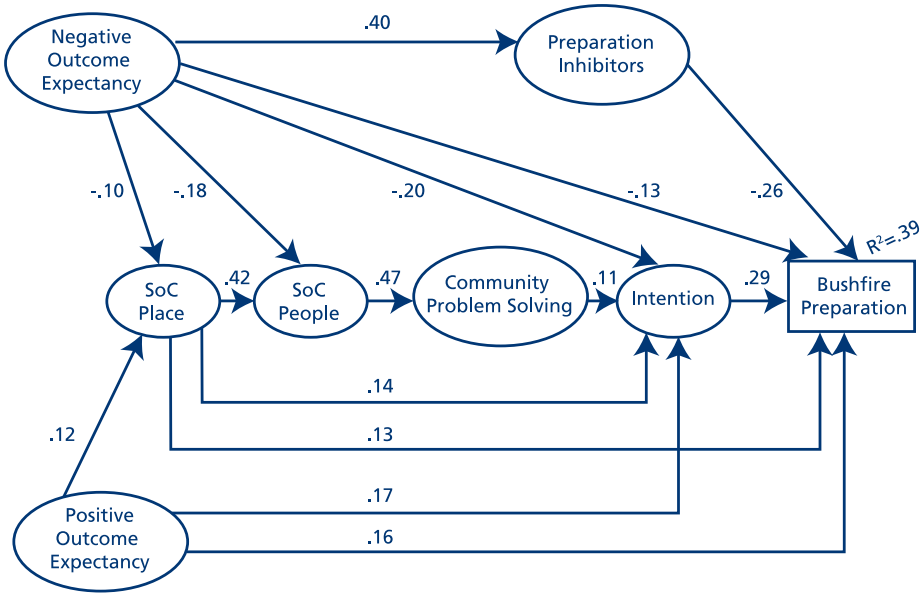
Discussion

The model confirms that "preparing" and "not preparing" are separate processes. With regard to "not preparing," negative outcome expectancy (NOE) was the principal driver. It had a direct negative influence on both intentions and actual preparedness (Figure 1). An indirect influence, with "preparation inhibitors" mediating its relationship with preparing, was also evident. Finding a negative relationship between NOE and the SoC variables suggests that holding NOE beliefs reduces the likelihood that one will engage with others to identify and manage sources of environmental risk.

Positive outcome expectancy (POE) had a direct influence on both intentions and preparing (Figure 1). This direct relationship suggests that at least some people know what to do and act accordingly. Others, however, appear to rely on others for guidance, with their sense of belonging to place and people, and their ability to access social resources to assist their working out what to do playing an important role in their risk management.

While it did not predict preparedness directly, 'SoC Place' mediated the relationship between POE and both intentions and preparing (Figure 1). This confirmed the qualitative finding that a combination of POE beliefs and a desire to safeguard one's living environment (assuming a degree of parity between 'SoC Place' and the place attachment construct – see above discussion) motivates preparing. However, for some respondents, an additional input was required.

Figure 1: Summary of the structural equation model of bushfire preparedness (SoC= Sense of Community)



The model (Figure 1) confirmed the qualitative finding that information from people with similar interests and values (SoC People) in routine social contexts increases understanding of one's circumstances and helps one decide what to do. The analysis also confirmed that access to collective problem solving capabilities makes an additional contribution to people's preparedness decisions.

The analysis also identified the fact that while positive outcome expectancy beliefs were sufficient to motivate action directly in some respondents, others first form intentions (Figure 1). This draws attention to the fact that several factors influence whether intentions are converted into action. Because attitudinal ambivalence moderates the likelihood of people acting on intentions (Conner et al., 2003), the dissonance reported by some respondents between preparing and protecting their environment (see discussion of the qualitative data above) can reduce the likelihood of their acting on their intentions, at least with regard to those preparedness measures perceived as having a detrimental environmental impact. Another factor is peoples' beliefs regarding when the next bushfire will occur. For those who believe it could occur within 12 months, the likelihood of converting intentions into actions is high, but this drops substantially as the expected timing of a future bushfire is pushed further into the future (Paton et al., 2005). While not systematically investigated here, investigation of factors that influence the conversion of intentions into actions should be included in future research agenda.

Conclusion

Living in high bushfire risk areas, or just receiving information about risk and how it might be managed is not sufficient to motivate people to prepare. Rather, several individual and community factors interact to influence how people interpret the hazardous circumstances that could prevail in their community. The nature of the interpretive process they invoke in this context determines whether or not people decide to prepare. Because preparing and not preparing are relatively discrete processes, outreach programs must accommodate both possibilities and to design intervention accordingly (see Paton & Wright, 2008 for a discussion of strategies that cater for each process).

By capturing people's views and how they make choices about preparing, the model provides a robust framework for outreach planning and intervention design. The model illustrates the complexity inherent in people's preparedness decision making process and the existence of several routes to the same end-point. For some a belief in the efficacy of preparing (and presumably the knowledge and resources required) is sufficient to motivate some people to act. For others, the decision is more a function of interaction between personal beliefs and social context influences. Outreach programs must be designed to accommodate this diversity in the routes that people can follow on the road to preparedness. However, before unambiguous conclusions can be reached about the latter, it will be necessary to accommodate the constraint of the cross-sectional nature of the present analysis and conduct longitudinal, prospective analysis of preparedness. While the pursuit of this objective is often constrained by the fact that people have engaged in some level of preparedness in the past, the identification of a group that are predisposed to "not prepare" could provide a way of circumventing this constraint. By working with members of the latter group, it could be possible to conduct a prospective analysis of their preparing decisions following the point where their "not preparing" predisposition is undermined and they commence the process of thinking about preparing. Additional work is also required to fully understand the mechanisms that influence levels of preparedness and the reliance of some people on preparing only when directly threatened by bushfire and to examine the relationship between intentions and actions.

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References

Abraham, C., Sheeran, P. & Johnston, M., 1998 From health beliefs to self-regulation: Theoretical advances in the psychology of action control. *Psychology and Health*, Vol. 13, pp. 569-591.

Bishop, B., Paton, D., Syme, G and Nancarrow, B., 2000, Coping with environmental degradation: Salination as a community stressor, *Network*, Vol. 12, pp. 1-15.

Conner; M., Povey, R., Sparks, P., James, R. and Shepherd, R., 2003, Moderating role of attitudinal ambivalence within the theory of planned behaviour, *The British Journal of Social Psychology*, Vol. 42, pp. 75-94.

Dalton, J.H., Elias, M.J., & Wandersman, A. (2001) Community Psychology, Belmont, CA, Wadsworth.

Eng, E. and Parker, E., 1994. Measuring community competence in the Mississippi Delta: The interface between program evaluation and empowerment. *Health Education Quarterly* Vol. 21, pp. 199-220.

Flick, U., 2002, *An introduction to qualitative research*. London: Sage.

Hardin, C.D. & Higgins, E.T., 1996, Shared reality: How social verification makes the subjective objective. In R.M. Sorrentino & E.T. Higgins (Eds), *Motivation & Cognition, Volume 3, The interpersonal context*, TheGuildford Press, New York.

Hummon, D. M., 1992, Community attachment: Local sentiment and sense of place. In I. Altman & S. M. Low (Eds.), *Place attachment*. Plenum Press, New York.

Lindell, M.K. & Whitney, D.J., 2000, Correlates of household seismic hazard adjustment adoption, *Risk Analysis*, Vol. 20, pp. 13-25.

Lion, R., Meertens, R. M., & Bot, I. (2002). Priorities in information desire about unknown risks. *Risk Analysis, 22*,765-776.

Low, S. M., and Altman, I., 1992, Place attachment: A conceptual inquiry. In I. Altman & S. M. Low (Eds.), *Place Attachment*. Plenum Press, New York.

McLeod, R., 2003, *Inquiry into the operational response to the January 2003 Canberra Bushfires in the ACT*. Department of Urban Services, Canberra, ACT., Australia.

McClure, J.L., Allen, M., & Walkey, F.H., 2001, Countering fatalism; Causal information in news reports affects judgments about earthquake damage. Basic and Applied Social Psychology, Vol. 23, pp. 109-121.

McClure, J.L., Walkey, F.H. & Allen, M., 1999, When earthquake damage is seen as preventable: Attributions, locus of control, and attitudes to risk. Applied Psychology: An International Review, Vol. 48, pp. 239-256.

Paton, D., 2008, Risk communication and natural hazard mitigation: How trust influences its effectiveness. International Journal of Global Environmental Issues, Vol. 8, pp. 2-16.

Paton, D., Kelly, G., Bürgelt, P.T. and Doherty, M., 2006, Preparing for Bushfires: Understanding intentions. Disaster Prevention and Management, Vol. 15, pp. 566-575.

Paton, D., Smith, L.M., and Johnston, D., 2005, When good intentions turn bad: Promoting natural hazard preparedness. *Australian Journal of Emergency Management*, Vol. 20, pp. 25-30.

Paton, D. & Wright, L., 2008, Preparing for Bushfires: The public education challenges facing fire agencies. In J. Handmer & K. Haynes (Eds) Community Bushfire Safety. Canberra: CSIRO Publishing.

Smith, K., 1993, *Environmental hazards: Assessing risk and reducing disaster*, Routledge, London.

Sheeran, P., 2002, Intention-behaviour relations: A conceptual and empirical review. In W. Stroebe, & M. Hewstone (Eds.), *European review of social psychology* (pp. 1–36). Wiley, Chichester, England.

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An economic assessment of the voluntary land search and rescue sector in New Zealand

Scott & Scott report on a research project that investigated and quantified the economic value of the land voluntary search and rescue services to New Zealand.

Abstract

Volunteers are an important part of search and rescue operations in New Zealand but their value to society is not easily quantified. During the year ending June 2007 volunteers were estimated to have contributed $3 million ($579 per volunteer) or 59% of annual land search and rescue costs. If the services of the voluntary land search and rescue sector were not provided, then either this activity would be curtailed and police and /or other public sector, and health and injury costs would rise. An additional $1 million of funding devoted to avoiding the need for search and rescue operations would be justified if 6 incidents were prevented.

Introduction and aims

Volunteers are an integral part of land and inland waterways search and rescue operations in New Zealand. However, because volunteers are in general not paid for their services their value is hidden, not easily quantified and often not recognised by society. The aims of this research were to investigate and quantify the economic value of the land voluntary search and rescue services to New Zealand.

Background and literature review

The value of the total voluntary sector to New Zealand was $3.31 billion or 2.3% of GDP in 2004 (Statistics New Zealand, 2007b). The equivalent contribution to GDP in Canada was 2.6% in 2003 compared with 3.3% in Australia, 2000 (Statistics New Zealand, 2007b). In Australia the imputed value of volunteers' time was reported to be equivalent to the combined total of the labour input of education and health services (Bittman & Fisher, 2006, fig 1 p4), twice that provided by government support (Bittman & Fisher, 2006, fig 2 p6).

It is considered (Summers, 2001) that "Australia would become dysfunctional if it were not for its volunteers". In particular, there is a heavy reliance on its volunteer fire fighters and the need to train, retain and fund them is an important theme in recent Australian literature and submissions. "There is no economically viable alternative to a volunteer mode of service delivery in many areas of the emergency services." (Australasian Fire Authorities Council, 2001,p1). Volunteers are often highly skilled. In Canada trained volunteers are regarded as equally effective "as highly trained paid professionals, and are more readily available." (Royal Canadian Mounted Police, 2007).

In the context of this paper, search and rescue is defined as "…the process of looking for, locating, and retrieving a missing person" (Wellington Land Search and Rescue, 2007). Search and rescue incidents in New Zealand are graded as; Class I involving only the Police, Class II incidents when the Police require assistance, and Class III that involve the activation of Emergency Locator Beacons, missing aircraft and ships at sea (New Zealand Police). At least two Police staff (the emergency call taker and an incident controller) will be involved with any search and rescue incident requiring assistance.

New Zealand Land Search and Rescue (LandSAR) provide land search and rescue advice to the Police and assist in co-ordinating search and rescue activities of volunteers and Police. LandSAR has over 2,500 trained search and rescue volunteers (LandSAR New Zealand, 2007).

Methods and data

Two sets of costs have been calculated; health and injury incident costs, and programme delivery costs. All unit costs are in New Zealand dollars and were the latest available at the time of the study and are net of any government transfer payments. ($NZ1 = $A0.7997 and $US7607, Reserve Bank of New Zealand mid point rates average for June 2008.)

Health and injury incident costs are the costs generated by the incidents that fall upon the health sector, the rescued person and their family, and society at large. For the purposes of this study, we have defined health and injury incident costs as the total of; direct medical costs, direct non-medical costs, indirect costs (productivity costs of those rescued and their family) and intangible costs (quality of life and mortality) (Appendix 1).

Details of land search and rescue incidents (Classes II and III) were obtained from the New Zealand Police (New Zealand Police, 2007c) for the years ending June 2006 and June 2007. Incidents were allocated to each year based on the incident date. Health and injury incident costs were calculated by grading each incident using the health/ injury cost impact scale and multiplying the numbers thus derived by the unit costs of each cost rating category (Appendices 2 and 3).

For each recorded incident a Police researcher classified those rescued using the narrative attached to each incident record and the incident severity scale descriptors (Appendix 2: Incident severity scale (Scott & Scott, 2007)). Where the person was not located a health cost impact rating of zero was given, and all suicide incidents were given a severity grade of 9. The numbers of incidents in each severity grade were totalled and recorded in a spreadsheet. The totals in each incident severity ranking were then used to evaluate total potential health and injury costs (broken out by economic impact rating) by multiplying the numbers in each severity grade by the unit cost of that grade (Scott & Scott, 2007) (Appendix 3).

Programme delivery costs are the administrative overheads of LandSAR and costs incurred by volunteers and by the Police. The opportunity cost to volunteers include work and leisure time activities foregone (productivity costs), transport, and equipment wear and tear. Volunteers' productivity costs were calculated by multiplying volunteer hours by average hourly earnings. The Automobile Association costs for a 1601 – 2000cc petrol motor vehicle travel. It was assumed that an individual volunteer could drive an average of 400km per year although some individuals would drive up to 3,000km per year for operations and training.

Volunteers should have good bushcraft and survival skills in addition to stamina. "First response group members are expected to maintain their skill levels by attending 50% of our training exercises and 50% of SAR call-outs per year. This amounts to 3-4 one-day training courses and 1-2 weekends per year, plus 2-3 days on searches. You should also spend enough time in the hills to maintain your fitness and bushcraft skills" (Wellington Land Search and Rescue, 2007). A skilled searchers' time probably has a higher opportunity cost that of the average New Zealand worker. This was taken into account in the sensitivity analysis.

Based on information from LandSAR (LandSAR New Zealand, 2007) the average number of volunteers in a search and rescue team was 8. However, team numbers vary according to the requirements of the particular operation and numbers have been as high as 200 and as low as one.

Each land search and rescue volunteer is expected to have basic equipment consisting of the usual outdoor clothing (boots, gaiters, parka, over-trousers, gloves and hat), sleeping bag and mat, cooker and utensils, torch, whistle, compass, first aid kit, NZMS 260 series topographic maps and have sufficient food and water for 24 hours. We considered that volunteers' equipment would have a life of only 5 years instead of the gear lasting 10 years under normal use. The annual average cost of equipment was calculated by comparing the difference between discounting the purchase cost over 10 and 5 years and using a discount rate of 5%. Base case purchase costs were retail list prices (Kathmandu, 2007) less 20%. It was considered that the following basic items would not deteriorate and were therefore not included; backpacker stove, utensils (polycarbonate plate, bowl, cup knife, fork, spoon), compact pot set, whistle, and compass.

The economic value of volunteers' contribution to search and rescues may be evaluated in three ways; (1) the opportunity cost to the volunteer, (2) the input cost to the provider if volunteers did not contribute resources (referred to by Bittman and Fisher as "the alternative provider cost method) (Bittman & Fisher, 2006, p5), and (3) the opportunity cost of not providing search and rescue services. We implicitly assumed that method (1) and (2) were equivalent and could be estimated using one set of unit costs. For method (3), if land search and rescues were not provided it could be assumed that the number of incidents resulting in death and injury and the costs generated by such incidents would rise. We did not attempt to estimate the increase in health and injury that would occur if search and rescue services were withdrawn.

Sensitivity analysis (Drummond, 2005, ch9) was conducted to take account of uncertainty in the estimates and measure the impact of changes in the values of determinants on key output variables. Univariate sensitivity analysis was applied by changing one variable at a time while holding all else constant and recording the effect on the outputs of interest. Multivariate sensitivity analysis was not conducted because it was considered that it was more informative to consider the un-confounded effect of key inputs on the outputs of interest.

The following variables were investigated:

Unit cost for incidents resulting in death:
low = half the base case, high = the base case.

Number of searchers per team:
low = 6, base case = 8, high = 10

Hourly earnings of searchers:
low = base case, high = base case multiplied by 2.

Equipment unit costs: The retail list prices less 40% were used as the low bound as city-based outdoor equipment stores in New Zealand may discount prices up to this amount. Many volunteers are not city-based and are unable to take advantage of retail price reductions and volunteers frequently need to replace equipment when it fails thus we used a base case of list prices less 20% and the full retail list price as the high value.

Kilometres travelled by volunteers:
low = 50, base case = 400, high = 3,000.

Appendix 4 provides additional information on data references.

Results

Over the 2 years ending June 2007 the New Zealand Police coordinated an annual average of 714 incidents (seeking 732 people, an average of 1.03 persons per incident). The annual average health and injury costs of these incidents amounted to $116 million, or $163,083 per incident (Table 1). Almost all of this cost was generated from incidents involving deaths.

Table 1. Land search and rescue and the cost of injury and illness.

Health cost impact rating and the effect of illness/injury on the individual		Unit cost for each rating	Persons needing assistance Year ending June Mean 2006–2007		Cost per year	
Rating	Effect on individual rescued	(1) $	(2) N	%	(3)=(1)x(2) $	%
0	None	0	406.0	55.46	0	0.00
1	Minor	9	3.5	0.48	31	0.00
2	Minor	36	12.0	1.64	436	0.00
3	Minor	42	27.0	3.69	1,123	0.00
4	Medium	42	37.5	5.12	1,560	0.00
5	Medium	281	69.0	9.43	19,423	0.02
6	Major	3,598	106.0	14.48	381,369	0.33
7	Major	3,971	24.0	3.28	95,302	0.08
8	Life changing	5,896	6.0	0.82	35,376	0.03
9	Life changing	2,825,000	36.5	4.99	103,112,500	88.62
10	Life changing	2,825,000	4.5	0.61	12,712,500	10.93
Sub total	9 & 10 (deaths)	2,825,000	41.0	5.60	115,825,000	99.54
Total needing assistance and cost			732.0	100.00	116,359,620	100.00
Included in above						
– Suicides (given rating 9)			11.0			
– Not located/recoverable (given rating 0)			17.0			
Total incidents (4)			713.5			
Persons sought per incident			1.03			
Cost per incident					$163,083	

(4) Unit record data sorted on incident date
Because of rounding, the numbers may not add exactly to the totals shown

During the year ending June 2007 LandSAR volunteers contributed 16,924 hours (2.96 per volunteer) to search and rescue incidents (operational hours of LandSAR personnel). Volunteers also incurred transport and equipment costs.

The costs for all volunteers per year was a total of $3.304 million, (time $0.395 million, transport $1.667 million and equipment $1.243 million). For each volunteer these costs amounted to $579 per year (time $69, transport $292 and equipment $218) (Table 2).

Table 2. Volunteer costs annual average of years ending June 2006 and 2007 in 2007/08 prices.

		Per volunteer		Total	
	Unit cost	Volume	Cost (3)=(1)x(2) $	Incidents and volunteers	Cost (4) $
Number of incidents involving LandSAR and Police (5)				713.5	
Number of volunteers (6)				5,708.0	
Time hours (7)	23.32	2.96	69.14		394,668
Transport km (8)	0.73	400	292.00		1,666,736
Outdoor equipment (9)	217.82	1.00	217.82		1,243,294
Total			578.96		3,304,697

Notes
Because of rounding, items may not add exactly to the totals shown
(4) = Cost item per volunteer (column 3) x the number of volunteers (6)
(5) Operations involving LandSAR (mean June 2006 and 2007)
(6) = (4) x 8 volunteers per search team. A volunteer may take part in more than 1 incident per year.
(7) Operational hours, directing, managing incidents (year ending June 2007)
(8) A volunteer was assumed to drive their own motor vehicle 400 km to/from incidents and training @ AA 1601 - 2000cc petrol
(9) 2007 prices. Boots, gaiters, gloves, overpants, jacket, hat, sleeping bag, thermal rest, torch, first aid kit, and pack were assumed to have no residual value after 10 years of recreational use but 5 years for LandSAR volunteers. A discount rate of 5% was used and an annual equivalent cost calculated. Purchase cost was the retail list price less 20%.

Boots	$400	
Gaiters	$48	
Gloves	$6	
Overpants	$336	
Jacket	$520	
Hat	$24`	
Sleeping bag	$416	
Thermal rest	$112	
Torch	$18	
First aid kit	$27	
Pack	$240	
Total cost of outdoor equipment	**$2,147**	
Real interest rate	5%	
Future value	0	
Life - years	10	5
Annual equivalent cost	$278	$496
Difference between discounting over a life of 5 versus 10 years		$218

Table 3. Programme delivery costs year ending June 2007 amounted to $5.580 million.

Cost	$	%
LandSAR central and regional adminstration (1)	968,244	17.4
LandSAR volunteer cost	3,304,697	59.2
Police (2)	1,307,029	23.4
Total	5,579,970	100.00

(1) LandSAR incorporated budget for the year ending June
(2) Land based search and rescues class II and class III combined

Table 4. Key output variables.

Item	Reference	Value
Number of incidents (annual average of years ending June 2006 and 2007	(1)	714.00
Incident health and injury costs (2008 prices, and volumes mean of 2006 and years ending June)	(2)	$116,359,620.00
Programme delivery costs (budget 2008 year ending June)	(3)	$5,579,970.00
Population (100,000, Dec 2007)	(4)	42.396
Number incidents per 100,000 people per year	(5)=(1)/(4)	16.8
Health and injury cost per incident	(6)=(2)/(1)	$163,083.00
Programme delivery cost per incident	(7)=(3)/(1)	7821.00
Number of incidents avoided to breakeven on programme costs	(8)=(3)/(6)	34.00
Increased number of incidents that must be avoided to breakeven on an increase in search and rescue funding of $100,000,000	(9)=1000/(6)	6.1

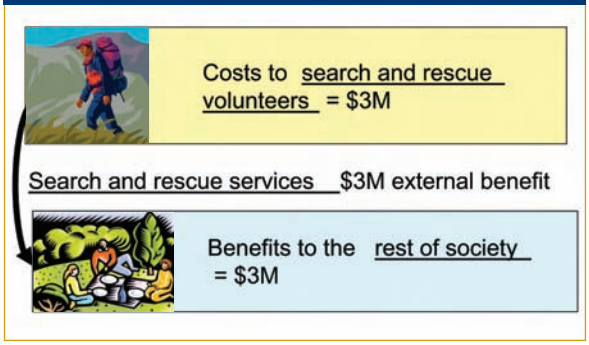
Table 5. Sensitivity analysis.

Output variable	Number of incidents that must be avoided to breakeven on programme delivery cost		Increased number of incidents that must be avoided to breakeven on an increase in search and rescue funding of $100,000,000	
	Change %	Output variable N	Change %	Output variable N
Base case value of output variable		34.2		6.1
Determinant				
Unit costs or volumes of incidents causing death x 0.5	99.1	68.1	99.1	12.2
Number of searchers per team reduced by 25% to 6	-13.0	29.8	–	6.1
Number of searchers per team increased by 25% to 10	13.0	38.7	–	6.1
Hourly earnings of searchers x2	7.1	36.6	–	6.1
Clothing full price (rather than 20% off list price)	5.6	36.1	–	6.1
Clothing list price less 40% (rather than 205 off list price)	-5.6	32.3	–	6.1
Km travelled 50 (rather than 400)	-26.1	25.3	–	6.1
Km travelled 3,000 (rather than 400)	194.2	100.6	–	6.1

There were 714 average annual incidents for the years ending June 2006 and 2007; 16.8 per 100,000 people. The number of incidents that would need to be avoided to breakeven on all programme delivery costs was 34 and the increased number of incidents that would need to be avoided to breakeven on an increase in programme funding of $1 million was 6 (Table 4).

Comprehensive sensitivity analysis (Table 5) showed that the results were robust in response to cost determinants changing within credible ranges. However, if extreme situations were considered; halving the number of incidents causing death, and/or increasing the average number of kilometres to 3,000 that a volunteer drove in a year the results show a dramatic increase.

Figure 1: Social benefits generated by the volunteer search and rescue sector.



Discussion and conclusions

Discussion

The opportunity cost to volunteers is a conservative estimate as the time component of the cost was based on average hourly wage rates which do not adequately reflect volunteers' skills and commitment. In addition, no account was taken of the time spent on training. The business sector (employers and the self-employed)

are also bearing part of this productivity loss to society when they recognize the need for volunteers to take time off when incidents arise. Specialist equipment required for the LandSAR Search Dogs, LandSAR Caving groups, the Alpine Cliff Rescue and the Whitewater groups was not included in the analyses but would be expected to be part of equipment required by volunteers in such teams.

Incidents can arise at any time and the need to ensure that a state of preparedness exists (planning, organisation, and readiness) means that the cost of delivery of such a service as LandSAR is substantial. The human capital embodied in the volunteers enables them to save time and lives in the field through their local knowledge, first aid training and ability to communicate with medical professionals thus limiting the physical deterioration of those rescued.

The value of the contribution of volunteers to search and rescue costs should be recognised and appreciated as volunteers' costs of $3.0 million represent an external benefit to the rest of society (Figure 1).

If the services of the voluntary land search and rescue sector were not provided, then either this activity would be curtailed or police and /or other public sector costs would rise. If LandSAR did not exist (the counterfactual) then there would be no costs incurred by LandSAR administration and volunteers, but it would be reasonable to assume that the number of incidents resulting in death and injury and that the costs generated by such incidents would rise. In addition, valuable experience and knowledge would be lost to search and rescue activities.

Limitations

It was not possible to forecast accurately the increase in severity of health and injury outcomes that would occur if search and rescue activities were scaled back, withdrawn, or to become less effective. Although volunteering improves social capital (a beneficial externality) that enhances the functioning of society it was not possible to quantify this.

Conclusions

Collection and analysis of data on search and rescues should continue. An incident severity score for each person rescued should be recorded and information on the number of volunteers per incident and the private costs of volunteers collected.

Volunteering has the capacity to complement some government services and thus lower the cost from the public purse but volunteers should not be used to replace services that should be supplied by government. The personal cost to a volunteer is an average of $579 per year. If volunteers did not contribute to search and rescue activities then either this activity would be curtailed or police and other public sector costs would rise by at least $3 million per year. The study demonstrates that an additional $1 million of funding devoted to avoiding the need for search and rescue operations would be fully offset by a reduction of 6 incidents.

Appendices

Appendix 1: Health and injury costs, and social and human capital

Direct medical costs of an incident are the opportunity costs of resources directly utilised by treatment and are concerned with services delivered by the health sector.

Direct non-medical costs are directly related to treatment of an incident but the services may not be provided by the health sector. Indirect costs (productivity costs) are the time related costs to the individual arising from the incident as a result of reduced capacity to work or to engage in leisure-time activities. They also include lost production to society through death (if not captured in intangible costs). Intangible costs relate to the loss of life and reduction in quality of life.

Social capital refers to the intangible elements of human relations relating to levels of trust and the quality of social networks. Social capital enhances efficiency in social relations and minimizes transaction costs (Jackman, 2001). Human capital refers to the accumulation of productive skills and technical knowledge of individuals (Spellerberg, 2001, p9).

Appendix 2: Incident severity scale

SEVERITY RANKING	IMPACT ON PARTICIPATION	INJURY	ILLNESS	SOCIAL / PSYCHOLOGICAL DAMAGE
0	NONE	None	None	None
1	MINOR/SHORT TERM IMPACT on individual/s that doesn't have large effect on Participation in activity /programme.	Splinters, insect bites, stings	Minor irritant	Temporary stress or embarrassment
2		Sunburn, scrapes, bruises, minor cuts	Minor cold, infection, mild allergy	Temporary stress or embarrassment with peers
3		Blisters, minor sprain, minor dislocation Cold/heat stress	Minor asthma, cold, upset stomach, etc	Stressed. Beyond comfort level. Shown up in front of group.
4	MEDIUM IMPACT on individual/s that may prevent participation in the activity / programme for a day or two.	Lacerations, frostnip, minor burns, mild concussion mild hypothermia, mild heat stroke	Mild flu, migraine	Stressed, wants to leave activity, a lot of work to bring back in.
5		Sprains & hyper-extensions, minor fracture	Flu, food/hygiene related diarrhoea/ vomiting	Distressed, freezes on activity, requires 'emotional rescue', does not want to participate again.
6	MAJOR IMPACT on individual/s that means they cannot continue with large parts of the activity/ trip/ programme.	Hospital stay < 12 hours, fractures, dislocations, frostbite, major burn, concussion, surgery, breathing difficulties, moderate hypothermia/heat stroke	Medical treatment required, hospital stay < 12 hours eg, serious asthma attack, serious infection, anaphylactic reaction	Very distressed, leaves activity and requires on site counselling, unwilling to participate in activity ever again.
7		Hospital stay > 12 hours eg, arterial bleeding, severe hypothermia/heat stroke , loss of consciousness	Hospital stay > 12 hours eg, infection or illness causing loss of consciousness, serious medical emergency	Therapy/ counselling required by professional
8	LIFE CHANGING effect on individual/s or death.	Major injury requiring hospitalisation eg, spinal damage, head injury	Major illness requiring hospitalisation eg, heart attack	Long term counselling/ therapy required after incident
9		Single death	Single death	Post-traumatic stress disorder, changed profession because of incident,
10		Multiple fatality	Multiple fatality	Suicide because of incident

Note: This table is based on the outdoor incident severity scale developed by the New Zealand Mountain Safety Council and Davidson (New Zealand Mountain Safety Council, 2007), (Davidson, 2004)

Appendix 3: Health and injury costs by impact rating scale 2007

HEALTH COST	IMPACT RATING	Health costs				Unit cost for impact rating (2008 prices)
		Direct medical a $	Direct non medical A b $	Indirect c $	Intangible d $	$
0	No cost					
1	Minor impact	9				9
2		36				36
3		42				42
4	Medium impact	42				42
5		95		187		281
6	Major impact	2,731	494	373		3,598
7		2,731	494	746		3,971
8	Life changing effect	3,536	494	1,866		5,896
9					2,825,000	2,825,000
10					2,825,000	2,825,000

Notes
1a Antiseptic cream (tube)
2a = 1a plus sterile pads (pack), and strapping tape
3a, 4a = 2a plus analgesic (pack)
5a = 4a plus 1 general practitioner consultation after hours
6a, 7a Accident and emergency short stay observation plus 1 general practitioner consultation
6b, 7b, 8b Ambulance callout for an emergency (New Zealand average emergency incident x2)
5c 8 hours, 6c 16 hours, 7c 32 hours, 8c 80 hours, lost productivity @ average total hourly earnings
8a Average of AR DRGs B79Z Skull Fractures, and F70B Major Arrhythmia and Cardiac Arrest W/O
9d, 10d Value of a statistical life

Appendix 4: Data sources

Data item, date of data: source

Ambulance callout for an emergency 2004: (New Zealand Ministry of Health, 2005)

Average hourly earnings, December quarter 2007: (Statistics New Zealand, 2008)

Cost per km, current in 2008: (AA, 2008)

DRG prices 2008 weights, 2004/05: (New Zealand Health Information Service, 2007)

General practitioner fees, 2008: (Southern Cross Medical Care Society, 2008)

Inpatient national price, 2006/07: (New Zealand Health Information Service, 2007)

LandSAR central and regional administration, 2007/08: LandSAR budget

Operational hours LandSAR personnel, 2006/07: (Land Search and Rescue New Zealand, 2007, p10)

Outdoor equipment, 2007: (Kathmandu, 2007)

Police costs in delivering class II and III incident response, 2006/07: (New Zealand Police, 2007b)

Population, October 2007: (Statistics New Zealand, 2007a)

Unit record data relating to incidents occurring during the 2 years ending June 2007 (New Zealand Police, 2007c)

Value of a statistical life, current in 2007: (New Zealand Ministry of Transport, 2004)

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References

AA. (2008). Fuel & car running costs. Retrieved 22 April, 2008, from http://www.aa.co.nz/motoring/owning/running-costs/Pages/default.aspx

Australasian Fire Authorities Council. (2001). An invited submission to the Charities Definition Inquiry from the Australasian Fire Authorities Council on behalf of fire and emergency sevice agencies, *Charities definition Inquiry*. Melbourne.

Bittman, M., & Fisher, K. (2006). *Exploring the economic and social value of present patterns of volunteering in Australia*. Canberra: Department of Families Community Services and Indigenous Affairs.

Davidson, G. (2004). Exploring the myths: Analysis of incidents and accidents in professional outdoor education in New Zealand, 1996 – 2000. *Journal of Adventure Education and Outdoor Learning*, 4(1), 11-35.

Drummond, M. (2005). *Methods for the economic evaluation of health care programmes* (3rd ed.). Oxford: Oxford University Press.

Jackman, W. (2001). Social capital. In *International encyclopedia of the social & behavioural sciences* (pp. 14216-14219): Elsevier Science Ltd. http://www.sciencedirect.com (accessed 27 November 2003).

Kathmandu. (2007). *Summer 07-08*. Christchurch: Kathmandu.

Land Search and Rescue New Zealand. (2007). Annual report 2006-2007. Wellington: Land Search and Rescue New Zealand.

LandSAR New Zealand. (2007). LandSAR New Zealand. Retrieved 26 October, 2007, from http://www.wlsar.org.nz/General/faq.html

New Zealand Health Information Service. (2007). Inpatient national prices. Wellington: New Zealand Health Information Service.

New Zealand Ministry of Health. (2005). Ambulance services sustainable funding review. Retrieved 20 February, 2007, from http://www.moh.govt.nz/moh.nsf

New Zealand Ministry of Transport. (2004). *The social cost of road crashes and injuries: June 2004 update*. Wellington: Ministry of Transport.

New Zealand Mountain Safety Council. (2007). The National Incident Database Project. Retrieved 19 February, 2007, from http://www.incidentreport.org.nz/

New Zealand Police. (2007a, January). New Zealand Police search and rescue. Retrieved 29 October, 2007, from http://www.police.govt.nz/service/sar/

New Zealand Police. (2007b). *Search and rescue annual statistics report 2006/2007*. Wellington: New Zealand Police.

New Zealand Police. (2007c). Search and rescue incident database: New Zealand Police.

Royal Canadian Mounted Police. (2007). Search and rescue. Retrieved 25 October, 2007, from www.rcmp-grc.gc.ca/ccaps/sar_e.htm

Scott, G., & Scott, H. (2007). An economic impact scale for outdoor health and safety management. *6th iHEA World Congress*. July 8-11, Copenhagen. iHEA.

Southern Cross Medical Care Society. (2008). Ultra Care Plan. Retrieved 21 April, 2008, from http://www.southerncross.co.nz/sx_internet/library/v14120_3.pdf

Spellerberg, A. (2001). *Framework for the Measure of Social Capital in New Zealand*. Wellington: Statistics New Zealand.

Statistics New Zealand. (2007a). New Zealand population clock.

Statistics New Zealand. (2007b). Non-profit institutions satellite account: 2004. Quickstats Retrieved October 12, 2007, from http://Stats.govt.nz

Statistics New Zealand. (2008). Quarterly Employment Survey March Quarter 2008.

Summers, A. (2001). Volunteering in emergency services: the South Australian perspective. Australian Journal of Emergency Management(Spring), 2-4.

Wellington Land Search and Rescue. (2007). Wellington LandSAR. Retrieved 26 October, 2007, rom http://www.wlsar.org.nz/General/faq.html

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Gen Y and emergency management: How do we engage generation Y in the emergency management sector?

Wajs-Chaczko examines the values and expectations of the next generation of emergency managers.

Abstract

What are the broad implications of the values and expectations of Generation Y and what do they entail for the emergency management sector?

This article focuses on emerging community resilience issues, engaging Generation Y as volunteers and employees within the emergency management sector and the variety of changes for which we might expect or plan.

The article includes a series of considerations for planning by emergency management organisations. Gen Y is now entering the workforce and undertaking significant roles within the sector and the community. Therefore adjustments are needed to help the sector to adapt to changing societal values.

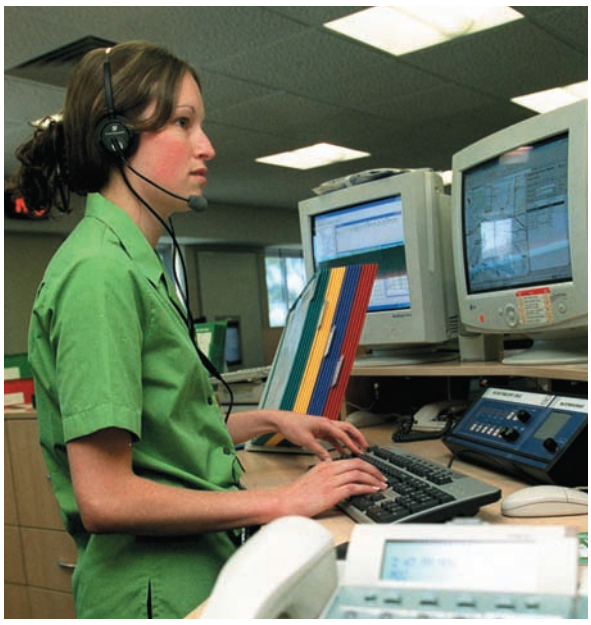
Introduction

Defining exactly what we mean by Generation Y is a perennial source of debate. Whichever definition one chooses to use, whether it is Generation Y, Millennial, iGen or echo-boomer, most refer broadly to the those individuals born between 1977 and 1995. There is significant variance in precise definitions: Huntley (2006:2) deems 1982 to be the start of Gen Y, as does McCleneghan (2005:142). However, Howe and Strauss (2000:4); and Weiler (2004) and Krohn (2004:325) believe it started in 1980, and Freestone and Mitchell (2004:123) support Beard (2003:218) in setting the start at 1977. Regardless of the start date, there are around 5 million members of Gen Y in Australia. Contextually this equates to approximately 25-30% of the Australian population (ABS, 2006).

Characteristics, experiences, value sets and emerging risks

Defining key characteristics and comparing these with those characteristics of previous generations allows us to begin to discuss what the experiences of this generation may mean for society. Baby boomers (circa 1946-1964) experienced the development and popularity of television, the space race, the emergence of Rock and Roll, both the Cold and Vietnam Wars, the emergence of the AIDS virus and the shift to decimal currency. Generation X (circa 1965-1977) saw the arrival of personal computers, experienced the AIDS epidemic, witnessed an increase in divorce rates and single parent families, public debate and growth in multiculturalism, the broader industrial relations issues relating to companies implementing popular downsizing techniques, and an increased attention to tertiary education.

It is imperative for those involved in emergency management to understand the different experiences underpinning the value sets of various generations in our community, as these are inextricably linked to how we should prioritise preparedness, prevention, response and recovery measures in relation to community expectations. Thus the experiences of Generation Y could change the landscape of Emergency Management, for example.



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Phone operator Laura Grigg at the South Australian Ambulance Service state communications call centre.

Gen Ys have lived through the emergence and evolution of the World Wide Web, internet, email and instant messaging and use the internet to obtain and disseminate information as part of their daily routine. Whilst such practices are now fairly standard in any developed nation–and across all generations– of critical importance is the fact that this generation has not known life any other way, thus causing a heavy community reliance on such services. The risk generated by this dependency has seldom been assessed by the emergency management sector. Potential impacts for the sector (after a more precise establishment of context and hazard analysis) may include the necessity to generate new plans for longer-term outages of such services.

The significant increase in "live" and "reality" television, the rollout of cable television services and development of community websites such as *YouTube*™ has meant that the 'always on' generation has not only been able to access a wide variety of up-to-date sources of information, but also the nature of the media has also allowed it to actively participate in generating content for global audiences. Community participation and the dispersal of mass-media by the community itself (without reliance on traditional journalism) may mean that community expectations of the speed, format, content and method of public information provision may need to be reassessed. The information-seeking habits of Gen Y have already had extensive attention in literature (Weiler, 2004). It has been established that only a very small percentage of the younger population prefers to learn by reading and an underlying dependence on television and the internet is emerging for information gathering.

Gen Y has experienced a plethora of new options in social networking and communication techniques, moving from the traditional social engagement to new media. The emergence and development of the publicly available mobile phone has progressed three technological generations. Current technology (3G) allows SMS, multimedia messaging (MMS) and mobile internet (and instant messaging). The reliance on mobile communications has created new community standards. Not only are individuals expected to be available regardless of location, but expectations of communications services provision have also increased. Social networking websites such as *Facebook*™ and *MySpace*™ have meant that information pertaining to individuals is immediately and readily accessed by their own social network. Equally, information dissemination across networks has become simplified to the point where information may become ubiquitous at a much faster rate. The potential implications for social and cultural capital in our communities and the consequent impact on community resilience may be highly significant. It has recently been argued that communities with higher levels of social capital are more resilient

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Generation Y consumers: laptops, ipods and mobile phones.

to the impact of hazards (Brenton, 2001; Maguire & Hagan, 2007).

Globalisation and its inherent networks and media of communication have meant that Gen Y is able to be aware of economic, social and political occurrences around the world. Participation in community actions surrounding emerging global community issues is also changing community expectations. A typical example could be the increased recent attention to environmentalism and expectation of corporations in performing corporate social responsibility. Issues relating to Climate Change will be of significance for this generation—a generation which has grown-up during times of drought, water shortages and the emergence of recycling. These same issues also have significance for the emergency management sector on a daily basis aligning the value set of the generation with that of the core business of emergency management. Further compounding these issues is the validity and reliability of the information obtained by Gen Y through these new sources of information. Regardless of the validity of information, community expectations may be altered as a result.

The events of September 11, 2001 and the London Bombings, as well as the more general threat of terrorism, has given rise to the general concept of what Beck (1992) has called the 'Risk Society'. These events have had a significant impact on the perception of Gen Y. Whilst society has always been subjected to notions of risk, the notion of 'Risk Society' discusses exposure to hazards that are the result of the human development.

Natural hazards have always had negative effects on human populations, but these are seen to be produced by non-human forces. Modern risks, on the other hand, are seen to be the product of human activity. These two different types of risk are referred to by Giddens (1999) as "external risks" and "manufactured risks". 'Risk Society' has a predicated interest in manufactured risks (see Beck [1992] and Giddens [1999]). If, as indicated by current literature, Gen Y is a key participant in the 'Risk Society', then clearly the community expectations of the emergency management sector to investigate 'manufactured risks', and their implications, will increase and the sector should pre-empt this expectation.
It must be mentioned that many members of Gen Y have simply never experienced some of the more traditional significant disasters (such as flood), and this fact in itself could increase the risk posed to the community.

However, the perception of risk for Gen Y is not exclusive to the hazard of terrorism. The unprecedented attention in the media, in recent years, to events such as earthquakes, fires, floods and tsunamis, has instilled in Gen Y an awareness of these external risks. The very real perception of these risks held by members of this generation may instil some increased sense of vigilance. Conversely, either stronger social capital bonds or a feeling of community alienation-depending on the individual's experience of community-could lead to a decreased sense of vigilance.

Implications for emergency management

The experiences of this generation will have a strong impact on the emergency management sector only when considered cumulatively. High dependence on advanced social networking, higher expectations of media and information availability, increased awareness and involvement in global community issues in a 'Risk Society' creates the platform for a dynamic emergency management sector, both in terms of its comprehensive approach to emergency management and for emergency management practitioners.

There are a number of factors which the emergency management community will need to respond to as Gen Y becomes more prevalent in community participation. These responses may include some of the below:

- Revisiting public information techniques both in terms of delivery mechanisms, speed of production, release and content, including that of disaster victim registration systems and enquiry methods to address the new information seeking habits of Gen Y.
- Participant-based approaches to community education through utilising new media and a focus on hazards from not only a local but international perspective to address the globalised perceptions experienced broadly by Gen Y.

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Organisations are increasingly employing Gen Y as volunteers and employees in the emergency management sector.

- Risk assessments as to the implications of technological dependency of community bonds (and community resilience) and reliance on technology for routine lifestyle functions.
- Redevelopment of volunteer and professional emergency management agency programs, adapting to changes in expectations.

In all likelihood the very fundamental nature of this generation in being quick to change and respond to change may mean that these recommendations are redundant sooner than expected.

Direct participation in the emergency management sector as either volunteers or salaried staff will also need to be examined to ensure relevant programs and careers, adjusted to the value sets of Gen Y. Further consultation and research involving members of Gen Y is paramount in designing programs to recruit and retain volunteers and staff. Aspects and attitudes which will need to be considered to ensure relevance may include:

- Innovative, creative, collaborative and engaging experiences in career development and volunteer programs;
- Immediacy, quick milestones being possible and immediate feedback being provided;
- Clearly articulated tasks and expectations and explanations as to how these tasks are relevant to the broader picture;
- An increased use of technology;
- Gen Y members being respected as an equals whilst still being directed, regardless of their actual experience;
- Experience being offered where appropriate and accepting that challenges to the status quo may be prevalent, but not necessarily meant to cause agitation.

Conclusion

Emergency management professionals will need to consider the shifting value sets of community members and also consider life experiences to date when delivering comprehensive approaches to emergency management. The same approach should be taken when considering all groups within our community, regardless of generation. Fundamentally this should already be in practice when *establishing the context* in line with the Australia/New Zealand Risk Management Standard 4360:2000.

Adaptation will be required both in the practice of emergency management and also in the professional development of the sector to align with these shifting values. Areas such as public information, education, technological utilisation and assessment of community expectations will require extensive revisiting. These recommendations are not necessarily unique to Gen Y, however they are integral to the practice of emergency management at any time and will mean that the sector evolves to reflect the continuous state of flux the broader community experiences.

References

Australian Bureau of Statistics (2007) 2006 *Census Data*, viewed viewed 15 December 2007, http://www.abs.gov.au/

Beard, F. (2003), College student attitudes toward advertising's ethical, economic, and social consequences, *Journal of Business Ethics*, 48:217-228.

Beck, U. (1992) *Risk Society: Towards a New Modernity*. New Delhi: Sage.

Breton, M. (2001). Neighborhood resiliency. *Journal of Community Practice*, 9(1), 21-36.

Freestone, O. & Mitchell, V. (2004) Generation Y attitudes towards e-ethics and Internet related misbehaviours, *Journal of Business Ethics*, 54:121-128.

Giddens, A. (1999) "Risk and Responsibility" *Modern Law Review* 62(1): 1-10.

Howe, N. & Strauss, W. (2000) *Millennials rising: the next great generation*, Vintage Books, New York.

Huntley, R. (2006) *The world according to Y; inside the new adult generation*, Allen and Unwin, New South Wales.

Krohn, F.B, (2004) A generational approach to using emoticons as nonverbal communication, *Journal of Technical Writing and Communication* 34(4): 321-328.

Maguire, B. & Hagan, P. (2007) Disasters and Communities: understanding social resilience, *Australian Journal of Emergency Management*, 22(2):16-20.

McCleneghan, J. (2005) Interactivity with "Generation Y" and small south western community newspapers, *The Social Science Journal*, 42:141-148.

McCrindle, M. (2007) Understanding Generation Y *Australian Leadership Foundation* viewed 15 December 2007, http://www.leadership.org.au/

Wieler, A. (2004) Information-Seeking Behavior in Generation Y Students: Motivation, Critical Thinking, and Learning Theory *Journal of Academic Librarianship* 31(1):46-53

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REPORTS

The AFAC Knowledge Web

September 2008 will see the launch of the AFAC Knowledge Web; Australasia's largest cross jurisdiction repository of fire and emergency service information.
By Jay Gleeson, AFAC Communications Manager

The fire and emergency service industry will soon have a new central resource for the sharing of information. Construction has begun on the AFAC Knowledge Web, a web based information portal for the fire and emergency service industry that will play a key role in the Fire Knowledge Network.

The Fire Knowledge Network was developed after the Bushfire CRC received additional funding from DEST in 2004 for increased communication and public outreach programs. The primary audience for the Fire Knowledge Network was the fire and land management agencies around Australasia and the general public.

The intent of the Fire Knowledge Network was to be user driven by the needs of the agencies and to become a permanent, long term entity that acts as the focal point for fire knowledge within Australia, New Zealand and globally. Its value would be in its ability to link research and knowledge to practice and to create an inclusive community for the exchange of information and experience.

The Fire Knowledge Network project took a holistic approach to knowledge sharing by incorporating the various aspects of people, technology, process and content as part of its overall development. One key element of this project was a series of events, run by the Bushfire CRC, as part the Network's public outreach program. Between 2004 and 2007 the Bushfire CRC ran approximately 20 events, including the Bushfire Forum held in Canberra in 2007.

The second key element of the Network was a web based application (the Knowledge Web) for the sharing of fire and emergency knowledge and experiences. Finally a third element was a range of publications generated by the Network's activities and outputs of the Bushfire CRC.

Considerable effort went into the development of the website with a large amount of agency consultation undertaken to understand user needs and what agencies would value in a Fire Knowledge Network website. The results of these consultations were captured in various reports which then fed into the development of a prototype website design. The prototype was further developed and refined through additional testing with agencies.

During this time marketing and branding activities where conducted to raise the awareness and profile of the Network and a range of executive briefings, public forums and workshops were conducted.

After the consultation process, some core elements were developed for the Fire Knowledge Network website project, including:

- A database of research material, reports and summaries
- A database of lessons learnt (case studies) reports and summaries
- Latest news and events
- Moderated forums, collaborative workspaces and communities of practice
- Operational knowledge and resources
- A primary online information dissemination system
- Public and secure (member) areas of the site
- AFAC Group working areas

As the Bushfire CRC entered its fifth year it began to move into its knowledge transfer and adoption stage. For the Fire Knowledge Network project this meant taking the concepts developed from the research and consultation stage of the project and making them a reality.

To achieve this, in October 2007 Bushfire CRC began discussions with AFAC on the best means of delivering the website aspect of the Fire Knowledge Network project to the industry and wider public. Both organisations decided to undertake a collaborative approach to the project with AFAC coming on board to provide the infrastructure, people networks and content development skills to make it a reality.

AFAC and Bushfire CRC began a tender process at the end of 2007 and chose a content management system and website developer before the end of the year. In January 2008 the construction of the website got underway.

Since construction began the original prototype for the website element of the Fire Knowledge Network has been further progressed to draw in a wider cache of

information. When the project team started reviewing the material being submitted by agencies they quickly realised extra areas of the site would need to be created. So along with the original concepts focusing on research and lessons learnt material (case studies, reports, inquiries) the site will now draw in information from areas such as:

- Management and administration
- Business development
- Learning and development
- Professional development
- Community safety

Other areas may be added as they are identified.

When thinking about improvements to emergency service and what has been learned from experience, we naturally think of the emergency itself and what was learnt from the incident and the operational procedures that stood behind it. What is often overlooked is the amount of improvement and learning that occurs in the areas of management, business development, training and professional development. The sharing of this information helps support agencies in the design and development of their processes and procedures. The potential for saving time and avoiding duplication through this sharing is significant and supports the industry's desire to have a more consistent approach to service delivery across Australasia.

The website, to be known as the AFAC Knowledge Web, is being designed to facilitate the transfer of information through, interaction, collaboration and sharing. AFAC Groups will use the website to progress their work in an online environment. Each Group will have its own collaborative work space where they can share documents, post comments and co-author papers. The sites forum function will allow AFAC to seek a wider array of comment and feedback when developing positions on national issues.

The website will also use the forum features to develop (over time) a range of communities of interest who can share experiences in an online environment. As the website is utilizing an enterprise content management system the natural evolution of the site will see each agency being able to contribute, author and edit its own content; ensuring this web resource is owned, operated and developed for the industry, by the industry.

The launch of the AFAC Knowledge Web in September will be the beginning of a new era in knowledge and resource sharing for the fire and emergency service industries. It will make up a key piece of the Fire Knowledge Network and provide another avenue for information dissemination throughout the industry. As well as sharing knowledge from agencies in Australasia, AFAC and the Bushfire CRC are working to forge agreements and partnerships with international fire agencies to make the Knowledge Web a truly global resource.

For more information on the AFAC Knowledge Web visit www.afac.com.au or email jay.gleeson@afac.com.au

Key Areas of information exchange on the AFAC Knowledge Web

Research

- Bushfire
- Structure fire
- Hazmat
- Rescue

Case studies (lessons learnt)

- Bushfire
- Structure fire
- Hazmat
- Rescue

Operations

- Standing orders and standing operating procedures
- Incident management information
- Manuals
- Mous and agreements
- Specifications
- OH&S material

Community Safety

- Education programs
- Fire Engineering
- Alerting and communication

Business Management

- Agency profiles
- Collaborative Purchasing
- Legal
- Performance Reporting
- People management
- Volunteering

Interoperability

- Business processes
- Information management
- Technical Standards

Professional Development

- Training resources and programs
- Leadership development
- Resources
- Recruitment

In Profile:

Brian (Hori) Howard

Maj. Gen. Brian (Hori) Howard AO MC ESM (Retd.)

Just saying the words, "Maj. Gen. Hori Howard" to about anyone in emergency management in Australia brings forth a myriad of reactions. Whether soldiers of the Australian Army, erstwhile colleagues of the former National Disasters Organisation (NDO), executives of the NSW State Emergency Management Committee, volunteers and staff of the NSW State Emergency Service (SES), personnel of Emergency Management Australia (EMA) or members of the Australian Emergency Management Volunteers Forum, everyone has a story about the talented and colourful personality who has had a major role in forging the character and structure of the sector over the past two decades.

Erroneously describing himself as a 'dinosaur of emergency management', Maj. Gen. Howard has had over twenty years experience managing emergencies in various capacities. Modestly summing up his credentials he says, 'I have been lucky enough over my time to have made most of the mistakes people need to make along the way – sometimes two or three times and, hopefully learning from these things, I feel I still have something to give'.

Forever the 'soldier', Howard has a profound fondness for his early Australian Army career—rising through the ranks to become a senior military officer—and along the way developing a significant military operational and training capability.

His first foray into the emergency management arena was when he was appointed to head the then Department of Defence's NDO, the forerunner to EMA. The position was a late change in posting and a surprise.

While not realising it at the time, the role of Director General of the NDO set him up for his future roles exposing him to the State and Territory infrastructure, emergency management organisations, the civilian community and the State Emergency Service organisations.

After assisting Maj. Gen. Ron Grey, the then Commissioner of Police, with a comprehensive review of rescue services in New South Wales, Howard was offered the position of Director-General of the NSW State Emergency Service. Then in 1989 the Directors of the collective SES organisations appointed him as the second Chairman of the Australian Council of State Emergency Services. He was subsequently asked to stay on after he retired.

Reluctantly resigning from the Australian Army, he took on these new challenges as a civilian public servant. He says, 'I didn't get a terrible shock when I left the Army because the skill sets needed in the SES were much the same as I needed in the military environment—planning, intelligence, training, administration and management—they just needed to be applied slightly differently'.

Howard says that prior to that time, NSW didn't really have an emergency management system and Gen. Grey discovered that heavy work needed to be done to reform the SES. 'While there were good Units and volunteers doing good things within the SES, an Office of Public Management review said the organisation was under-funded and it also needed a complete restructure—the SES did not even have its own boss, it reported through a Pro-Director to the Commissioner of Police'.

He self-effacingly attributes much of the success of the change management of the NSW SES to Rick Haines, a former colleague from the NDO, who had a great hand in the daunting task of helping the organisation to get back on track.

In 1990 the State Headquarters of the SES moved from Sydney to Wollongong so Howard also relocated, taking his wife and two sons from Canberra to the Illawarra.

Howard's career has provided many first-hand experiences of the larger and more notable emergency management operations of our time so he has some solid lessons to pass on.

Two to three weeks after he settled into the new role at the SES, the Newcastle earthquake, one of Australia's largest disasters after Cyclone Tracy, occurred. Howard says, 'I learned one of the great principles of emergency management from Newcastle and

that is there needs to be one central, authoritative person with local knowledge who coordinates the recovery effort'.

The head office of the NSW SES was in Sydney at the time and therefore Police Commissioner John Avery and Howard decided the Newcastle Police District Commander Russ Cook should be in charge of operations (under legislation of the day, the Police took charge of such emergencies). Howard goes on, 'As Cook was on holidays an Inspector was chosen as the Response Coordinator for the operation as he was very experienced and had appropriate rank and qualities, until Cook returned and could assume control. The Inspector just said to us that there is no point trying to run things from Sydney, so just provide the resources he needed and let him run it. So that was the decision we made. Cook was a Newcastle person, he knew all the leaders of all of the services in the town, he knew all the departmental heads and they had run exercises together prior to the disaster, enabling him to cut through the bureaucracy. So even though the earthquake was 'out of left field' in magnitude and scope, all we had to do was pour resources into it'.

Howard believes the principles of running a big operation are simple. 'Issues are always the same in a big operation—it all comes back to command and control. One can assume—and we can in this country—that the response agencies are reasonably well trained for what you are going to ask them to do. We rarely have difficulties providing resources in Australia—but they need to be coordinated and supported and that is where things are always more difficult, particularly when the structure of the organisation is not robust'.

Another observation is that sometimes things are unpredictable, as Howard found during the widespread flooding of Nyngan and Warren in 1990. 'Those floods were incredible and the level of flooding was unexpected. Because of the flatness of the countryside and the fact that so many little streams were tributaries into the river, accurate forecasting of river height was impossible for any agency. There was no local SES unit in Nyngan so they had no emergency capacity in the town. We appointed the then Bogan Shire President, John Hoare as the local controller who ran the whole operation with assistance from Martin Russell, the SES Division Controller based in Dubbo. From there we provided all the resources the town needed at the time. We didn't know what would happen at Nyngan. The best advice the Bureau of Meteorology could give us was that we had to get the levee to a particular height by a particular time or the town would flood. It was also so wet that the roads and railway line were inoperable so we flew people in from Dubbo, thirty at a time, by RAAF Caribou. Unfortunately the water rose to a higher level than could have been predicted and the town flooded. We coordinated the evacuation of the town by appointing the Police District Commander, Lloyd Townsend and the Police Inspector in Nyngan, Jim Hampstead as the Controllers of Operations. The organisation of the evacuation helicopters was done by SES headquarters in Wollongong. The people of Dubbo who accommodated the roughly 2,000 people we evacuated from Nyngan, were also a big part of the recovery operation'.

'The situation in Warren a few months later was very different as the river was more defined, the flooding was more predictable and the countryside was more accessible. We were also able to use earth moving equipment provided by the Department of Defence'.

Another lesson from these floods was the handling of the post-disaster appeals process. Howard says the outpouring of grief for the communities and the consequent generosity was overwhelming. 'Coordinating the appeals became messy. For example an appeal for furniture created a surplus of unusable items that needed to be thrown out, attracting a lot of media attention'. A standing committee was subsequently instigated in NSW to coordinate appeals through emergency agencies such as the Red Cross, as well as through regular government channels.

Howard acknowledges the opportunity that arises from one disaster, to pass on knowledge for preventing and preparing for future actions. 'The thing that came out of Nyngan and Warren was the need for an audit of the height and the integrity of the levees in the several hundreds of towns in NSW that are protected by them. When the levee audit was completed it gave people a rather nasty surprise because some of them were not very good'.

He says, 'You cannot underestimate the benefits of reliable levees and I believe there may still be a few that may not withstand a big flood. Of course, the trouble over the last few years has been the drought: how do you convince people that expenditure on heavy earthworks to re-build levees is important in the middle of the biggest drought ever?'

Howard has seen the emergency sector grow and develop over the years in Australia. 'I think credit for a lot of that improvement should go to the work of EMA, including the Institute at Mt Macedon. I have been a critic of the Institute in the past but it nevertheless has facilitated improvement,' he says.

Howard has given thought to future issues for emergency management in Australia. He sees the need to maintain a good balance between the attention given to crisis management (i.e. terrorism) and emergency management (disaster mitigation and response),. 'I see that the majority of attention at the moment is on the terrorism side

of the equation and through no fault of its own, I see EMA having difficulty keeping up with the other side of the Attorney-General's area. For example, the National Counter-Terrorism Committee has a budget and the Australian Emergency Management Committee (AEMC) does not. Consequently the AEMC cannot do much and they cannot cost anything—it is unbalanced'. He believes the two sides of the house need to come together to ensure Australia is fully protected in case of a major emergency. He adds, 'I guess I am one of those people who would say to colleagues that we *may* have a terrorist attack but we *will certainly* have a natural disaster. However, there have been some real improvements in certain areas of emergency management that have been hanging on the back of terrorism initiatives in this country'.

Howard believes the shift of EMA to the Attorney-General's portfolio is probably far more important than people realise because it puts both sides of emergency management under the same Minister. He says, 'Whether terrorism or a natural disaster, the approach to emergency management would be the same—although I suspect there would be greater community panic if it were a terrorism event'. He is quick to point out, however, that he is not a supporter of a Department of Homeland Security style of organisation which he thinks would 'bureaucratise' existing systems in Australia.

Howard is currently the Chair of the Australian Emergency Management Volunteers Forum, better known by its members as just the AEMVF. He says there are some interesting challenges the sector will face in the future in relation to volunteers. 'The message I keep getting from most volunteer organisations is that they are being taken for granted and I think they're right. So the sector needs to be a bit more vigilant in recognising its volunteers. The failing is not deliberate, it's just that our volunteers are so good that half of the community thinks they are being paid as professionals to do the work they do', he says.

Modern volunteers also have changed expectations about the volunteer experience which will be a consideration for emergency management organisations into the future. 'Firstly, there are enough natural disasters in Australia to attract volunteers, who tend to want to be active and useful in the community. It is my observation however that the best Units are usually the busiest ones and the busy Units, in turn, attract the best people. Volunteers these days don't want to be wasting their time doing the administration and filling in paperwork. Modern candidates also are looking for organisations that are credible, well-recognised, well-resourced and well led. They are less likely to want to be based in dirt floor sheds as in the past. These days they want a nice Unit house or shed, as they spend most of their time there'. He says training and recognition are also important. 'Most organisations do well at these things but people are still being driven away because they become too engaged in administrative work. So organisations should endeavour to recruit people specifically for the administrative work', he says.

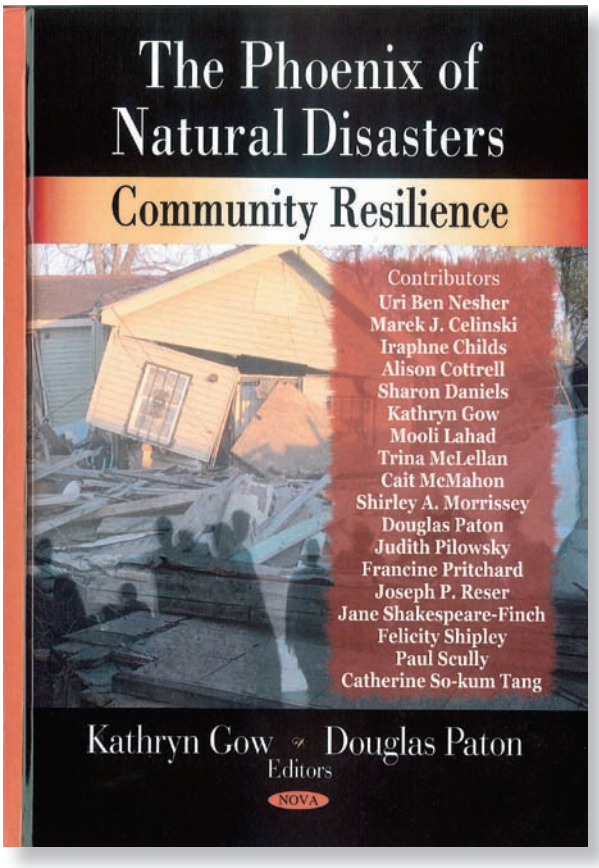
Howard is also concerned about the image of emergency management. He says, 'I think there is a lack of understanding about exactly what emergency management is in the general community. Emergency management goes way beyond the organisations that people recognise as Emergency Services. A lot of the key tasks are actually undertaken by recovery agencies that the public rarely hear about and that does not help our image'.

Another thing causing an element of disquiet about emergency management is the degree of authority given to the role. 'When I was with NSW SES, I tried to convince the New South Wales Government that the State Emergency Management Committee should be located under the Premiers' Department because many of the member agencies were not under the control of the Minister for Emergency Services, and the Premier's Department was the one department which had control over them all. It was also where the counter terrorism responsibility resided, and the benefit of having both capabilities under the one department would, I thought, have been obvious'.

Without wanting to appear platitudinous, Howard sums up by saying, 'Emergency management is really a'all agencies, all hazards'. If we get that right, the rest will fall into place. It is not that difficult but we seem to have problems with it. It is really very simple'.

BOOK REVIEW

By George Seymour



The Phoenix of Natural Disasters: Community Resilience.
Kathryn Gow and Douglas Paton (eds.) (2008) Nova Publishers.

Spanning 15 chapters from 18 contributors, *The Phoenix of Natural Disasters: Community Resilience* is an academic resource which examines and interprets the nature of resilience in communities and individuals. The contributors come from academia, the emergency services sector, support agencies and the media. It is edited by Kathryn Gow and Douglas Paton, both of whom are psychologists who have studied stress, burnout, trauma and resilience on an individual and community level in times of natural disaster.

Resilient societies recognise that they need to put in place procedures and capabilities for their benefit when disaster strikes. The distinct chapters, which can be read in isolation, address a number of aspects of resilience, coping and recovery at the individual and community levels, the broad aim is to canvass topics that provide an overview of the issues that societies must address to develop and maintain resilience.

The text is organised into three parts. Part 1 outlines the overarching frameworks that provide insights into the scope and applicability of the resilience concept as a device that can facilitate planning and policy making in societies for whom the risk of experiencing disaster is high. Part 2 focuses on the individuals and organisations, such as the State Emergency Service and the Royal Australian Navy, that are responsible for enacting plans and policies when disaster strikes. Part 3 examines the implications for the citizens and communities that comprise contemporary societies.

The contributors stress the importance of engaging and supporting communities to prepare for, and manage, natural disasters. As is noted by several of the contributors, disaster readiness and preparation initiatives can make a longer term contribution to social capital.

The style of the book reflects the background of the majority of its contributors; academia. Like the development of resilience itself, the text is not suitable for quick access or consultation during the heat and drama of an emergency. It is a useful, welcome and somewhat rare contribution on the role and importance of resilience in coping with, and moving on, from natural disasters.

Preparing for the unexpected – third edition

When emergencies strike, maintaining food and grocery supplies is among the top priorities. To assist communities prepare for an emergency event, the Australian Food Sector has recently released a pantry build-up list. This list assists households to identify basic food and grocery essentials that may be pre-stored to live on for up to 14 days during an emergency event.

The Australian Government seeks various ways to assist in building the resilience of the Australian people. Since 2003, Emergency Management Australia has published the booklet, Preparing for the Unexpected. This booklet is a ready reference for Australian households and provides clear advice and practical actions to prepare for and deal with a range of emergencies.

Emergency Management Australia has recently revised this publication to incorporate the pantry list in support of the Australian Food Sector's initiative and to provide a comprehensive information source to assist communities and households prepare for the unexpected. The new edition of Preparing for the Unexpected was presented by the Attorney-General at the launch of the pantry build-up list in February 2008.

The booklet *Preparing for the Unexpected – Third edition* is available from Emergency Management Australia or via the website **www.ema.gov.au**. The Australian Food Sector pantry list is available at **www.pantrylist.com.au**.

USEFUL INFORMATION

Australian Journal of Emergency Management

The Journal is published quarterly and disseminated throughout the emergency management community and related disciplines, in Australia and overseas. Articles identifying and discussing issues, policies, planning or procedural concerns, research reports and any other information relevant to the emergency/disaster management community are welcome.

Refer to the EMA website (www.ema.gov.au/ajem) for current and past issues and information on how to subscribe and contribute.

Letters to the editor

The Journal welcomes Letters to the Editor. Please note that letters should be no more than 300 words. Letters exceeding this limit may be edited or refused. Letters must be in good taste and focus on issues of emergency management or past AJEM content.

Letters must contain a name, address and daytime phone number of the author. Unsigned letters or those submitted without a phone number will not be considered.

Regular contributors should submit letters on varied subjects. Letters by the same author that reiterate opinions previously expressed may not be published. The editor reserves the right to reject or edit any Letter to the Editor.

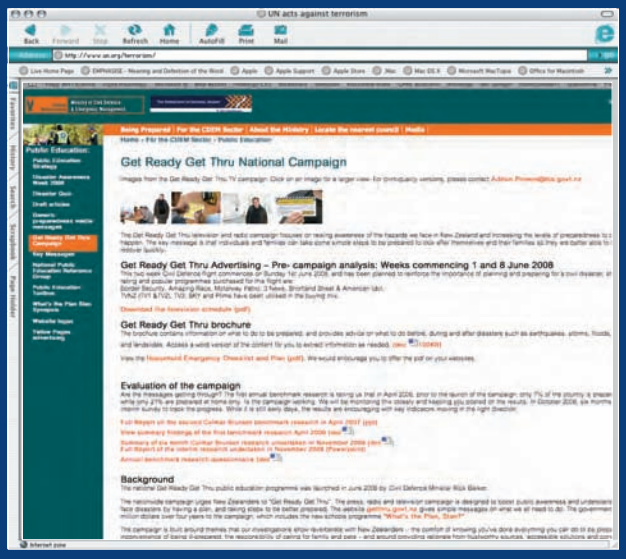
Advertising in AJEM

Display and classified advertising may be accepted for publication with the agreement of the Editor-in-Chief. The editor reserves the right to insert the word "Advertisement" above or below any copy.

Conference diary

Full details of local and international conferences relating to emergency management are available from the EMA website. For information, please visit **www.ema.gov.au**.

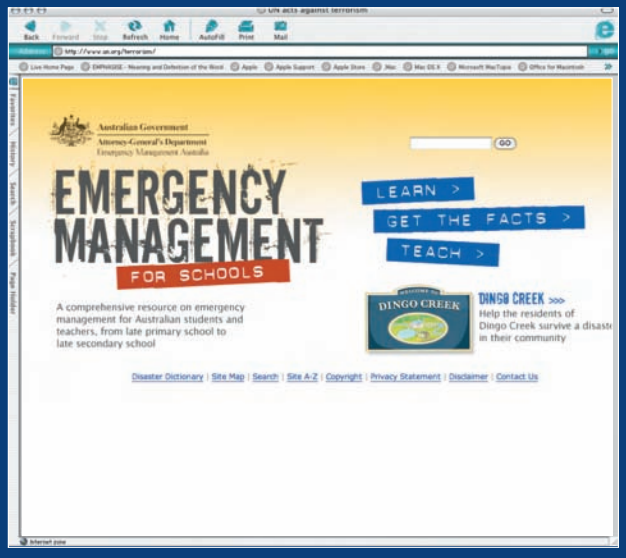
interesting websites



New Zealand's 'Get Ready, Get Thru' National Emergency Management awareness Campaign

http://www.civildefence.govt.nz/memwebsite.nsf/wpg_URL/For-the-CDEM-Sector-Public-Education-Get-Ready-Get-Thru-campaign?OpenDocument

This website details the recent New Zealand Ministry of Civil Defence & Emergency Management's advertising campaign focused on raising awareness of the hazards New Zealand faces and increasing the levels of preparedness to cope with disasters when they happen. The key message is that individuals and families can take some simple steps to be prepared to look after themselves and their families so they are better able to deal with the impact and recover quickly.



Emergency Management Australia – school education

www.ema.gov.au/schools

Emergency Management Australia has relaunched its school education website.

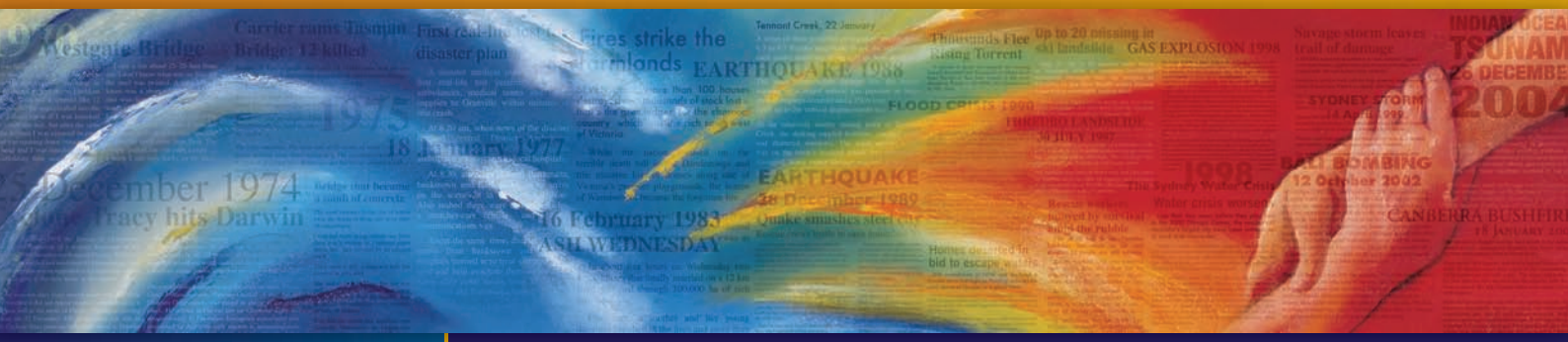
The contemporary look website is a comprehensive resource on emergency management and natural disaster education for Australian students and their teachers from primary through to secondary school. Navigation of the website has been improved and three distinct sections are now featured:
LEARN - Explore and learn all about preparing for disasters and what disasters could have an impact on the Australian environment. You can also find links to State and Territory Emergency Services
GET THE FACTS - Get the facts on natural disasters and how they impact on the Australian environment. You can also find some project ideas that you can share with your class, teacher and family.
TEACH - Teachers and educators can use these disaster lesson plans, resources and interactive teaching tools to help young Australians understand what to do if a disaster or emergency arises.

Australian Government
Attorney-General's Department
Emergency Management Australia

AUSTRALIAN DISASTERS CONFERENCE 2009

Surviving Future Risks

National Convention Centre, Canberra | 10-13 February 2009



EMA invites you to help shape the future of Australian emergency management.

The traditional emergencies for which we have planned in the past may not adequately cover the real risks that Australia may face in the future.

The Australian Disasters Conference 2009 – *Surviving Future Risks* – is a major national conference, endorsed by Government, to explore the future disaster risk environment for Australia. The conference outcome is to recommend future ways to enhance mitigation and preparedness measures and build community resilience to meet these new challenges.

Expert speakers have been invited to address the four key conference sub-themes:

- **the changing face of crisis management** – a convergence of consequence management and crisis management
- **global warming** – potential impact and consequences
- **the catastrophic event** – identifying risk and mitigation strategies, and
- **recovery** – surviving the impact and consequences of a major disaster event.

This conference is designed for key stakeholders at the local, state and national level who have a role in emergency management, including government agencies, volunteers, business and industry, non-government organisations, research and professional bodies, and community organisations.

For further information or to register on-line, visit the EMA website at: www.ema.gov.au

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