AUSTRALIAN & NEW ZEALAND DISASTER AND EMERGENCY MANAGEMENT CONFERENCE

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Mapping Wildfire Community Impact

Previous work on mapping bushfire risk in peri-urban areas has dealt with fife ignition likelihood and the potential impact on structures. While these studies have improved our understanding of the dangers in these areas, the connection to human safety has been unclear. In this work, we seek to clarify this connection and thereby produce maps that quantify the risk to human safety associated with different ignition sites.

Such maps would indicate areas of elevated concern for risk mitigation. They would also indicate how the spatial distribution of risk is influenced by factors such as human behaviour, public messaging and transport infrastructure. Such information is extremely valuable when evaluating the consequences of possible courses of action.

We employ a state-of-the-art simulation platform (originally developed for decision support) in the IBM Evacuation Planner. This platform captures the inter-dependencies between fire spread, environmental conditions, human behaviour, public messaging, and traffic flow, to estimate an exposure count for any given ignition site.

Using Victoria’s Dandenong Ranges as a case study (an area known to be of particularly high risk), we compute an exposure risk map and discuss its implications. These results were obtained through 300,000 simulation runs and 100 different environmental conditions.

One notable future application of this work is bushfire sensor placement wherein the ability to identify the most dangerous fife ignition sites will lead to more effective placement strategies and earlier detection in critical scenarios.
Mass-Casualty Triage Algorithms: in Search of Best Practice

The application of algorithms to guide pre-hospital triage in mass-casualty incidents is well embedded in paramedic practice, with many such systems currently in use across the world. Such tools are, however, plagued by a paucity of evidence. The difficulty of conducting high-quality prospective research during mass-casualty incidents has ensured that the algorithms in use today have little evidence to suggest that their use positively influences patient outcomes. A literature review was conducted to critically analyse the literature as it relates to mass-casualty triage algorithms, with four distinct themes identified: the benefit and necessity of triage algorithms, the ability of responders to accurately apply an algorithm, education and training in mass-casualty triage, and the validation of pre-hospital triage tools.

It was determined that a formal triage system may only be of benefit if medical resources are overwhelmed to the point where patients must spend an extended period undergoing treatment at a casualty collection post; where sufficient transport resources are available, formal triage algorithms may only serve to impede scene clearance. The accuracy with which responders apply algorithms remains a complicated issue; while it was found that algorithms inherently tend towards high under-triage and low over-triage rates, human factors reverse the trend: during simulations, clinicians tend to under-triage less and over-triage slightly more, and during "real life" incidents, clinicians tend not to under-triage, at the cost of very high instances of over-triage. Both under- and over-triage introduce risks to patient care, so vigilant algorithm design and optimal responder training are critical; but can the clinical judgement of responding clinicians ever be adequately replaced by an algorithm?
Leadership Development in the Emergency Volunteer Context

Leadership requires skills that can be learnt. Developing self-leadership is critically important to the creation and maintenance of an inclusive, effective and efficient organisational culture.

The development of effective self-leadership and leadership of others within a command and control emergency volunteer organisation is discussed. Specifically, this paper addresses leadership development through a program employing "transformational learning" within a framework which actively applies evidence based contemporary theoretical leadership theory and delivers practical and relevant workplace projects.

Participants in the program are provided a unique opportunity within a safe group environment to honestly consider their current leadership practice and personal leadership priorities. Together with experiential learning and debriefing imbedded in the project work, participants identify and add to the skills they bring to their leadership practice.

During the 6 month program, careful attention is given to creating a temporary and psychologically safe organisational structure where mentors and facilitators are able to deliver relevant leadership content. Participants, facilitators and mentors work within the context of delivering tangible outcomes for the SES. Participants generate important self-awareness and critically review their practice through direct feedback and the development of their own observational skills.

In contrast to pure competency based training, the ELDP offers participants the opportunity to identify learning goals specific to their personal leadership challenges. Drawing on contemporary neuropsychology, leadership theory and the experiences of the participants themselves, facilitators and mentors assist participants to expand their repertoire of responses to challenging volunteer workplace situations and create the foundations for effective team performance.

Central to the success of the program is the research of Jack Mezirow (1996) on transformational learning. A critical feature in building true and enduring leadership capability through this learning model, is the experience of a 'disorientating dilemma' within the learner. The program supports participants in their willingness and capacity to explore their reactions to this dilemma. Only when faced with the prospect of not having the skills or the answers, can leaders begin the process of examining their practice, their values and their motivation as leaders. The learning environment provided in the ELDP program includes an appropriate mix of support, challenge, practice and theory to stimulate change and growth.
Mr Desmond Bahr
President, National Safety Agency

Emergency Services Integrated Communications Vehicle

Emergency Services have crucial core technology requirements for general assistance, responsiveness to incidents, maintaining critical infrastructure and recovery. When combining all of the relevant factors that can hinder the accomplishment of planned operations and the unforeseen, the provision of core requirements will not only assist the agencies, but for those who directly require assistance from Emergency Services.

The Black Saturday bushfires and major flooding in 2010-11 played a significant role in presenting the need for more improved communication during natural disasters. This need contributed to the Emergency Services Integrated Communications (ESIC) vehicle's development and creation and allowed the National Safety Agency (NSA) to develop and implement specific features to prevent further potential upset to Emergency Service teams and the community. The ESIC vehicle was present during the 2014 Hazelwood fires to provide extra support to first responders who battled with major communication barriers during the disaster.

The requirement of such technology is advantageous for emergency services as it is suitable for assisting in hazard and community response, recovery, critical infrastructure, review and training purposes. ESIC also provides a technological platform for research and development as new technologies enable advancement in responsiveness to incidents. ESIC can collectively identify the demands and increase department productivity, cohesiveness and resilience in situations where more than one department is required. Incident Management Software (IMS), Computer Aided Dispatch (CAD) and RPAS Image Processing are solutions that can be hosted by the ESIC vehicle in order to assist teams.

There are many communication specifications that ESIC offer. An increased level of communication capability provides an incredibly useful system which results in the ability to provide field based support simulation for modelling, analysing specific environmental behaviours and risk assessment. Communications, modelling and simulation, and mobility are the major industry leading solutions that allow emergency services to perform their duties more efficiently and to support better decision-making.
Dr John Bates  
Director, Australian Institute for Disaster Resilience

A National Initiative to Strengthen and Expand Australia’s Fundamental Resilience

The Australian Institute for Disaster Resilience (AIDR) was launched in late 2015 by Emergency Management Australia in a renewal of their support for leadership of the national approach to disaster resilience. Natural and man-made disasters are an inevitable part of life in Australia and New Zealand and it is not possible to prevent or avoid them completely. Now more than ever before, there is a popular understanding that it is the resilience that comes from a collaborative and holistic community approach that will ultimately minimise the human, economic, environmental and social cost of any disaster.

AIDR has begun promoting debate and discussion across a broad spectrum of our community - extending well beyond the traditional first-responder groups.

Two significant initiatives that AIDR is actively working on of relevance to disaster resilience and emergency management are; (1) leading a refresh of the management and development of the national doctrine collection (and associated documents) and (2) working with organisations reliant on trained volunteers through the Australian Emergency Management Volunteer Forum (AEMVF) to increase the development of leadership skills in our volunteers and for those skills to be recognised and used effectively in the home organisations of those volunteers and in their communities. The presentation will expand on these initiatives and focus on a review of the national doctrine collection and the role of doctrine at all levels in the development of resilience to natural and man-made disasters.

AIDR’s focus is on supporting the development of national resilience across all hazards, all agencies and all communities and to a significant degree, the success of AIDR will depend substantially on the willingness with which you engage with us and participate in these activities and provide your input into the development and implementation of our initiatives.
"Don't Just do Something, Stand There!" Mitigating Goal Seduction in Emergency Management

Goal seduction is a phenomenon where the goal that someone is trying to achieve exerts too much influence over their decision making, leading to sub-optimal performance. In emergency management given the important and urgent nature of the goals that people are trying to achieve mitigating goal seduction is an important part of a safe and effective response. This paper explores the types and consequences of goal seduction in volunteer fire brigades in Australia. Ten experienced volunteer incident commanders participated in a broad semi-structured interview on challenging situations they had faced. The experience of the incident commanders ranged from nine to 34 years (M=22). A thematic analysis revealed three types of goal seduction situations: Getting to the fire station quickly; getting to the incident quickly; and dealing with the incident straight away. Problems that could result from not managing goal seduction effectively included: Rushing off and neglecting things at home, driving dangerously; leaving the station before the location of the incident was known and crews putting themselves at risk. It is important then that incident commanders are alert to the influence of goal seduction, explain its effects to their crews and reinforce appropriate behaviour at training and during incidents. While there are many potential ways to mitigate goal seduction one of the most effective is to take time to conduct a proper assessment of the situation. This assessment of the situation in the face of direct or indirect pressure to act can be characterized by the popular slogan "Don't just do something, stand there!"
Ms Diana Bernardi  
Manager, Emergency Services NSW/ACT, Australian Red Cross

**Australian Red Cross Psychosocial Recovery Approach to the October 2013 Blue Mountains Bush Fires**

Following the October 2013 bush fires Australian Red Cross ran a two-year Recovery Program in the Blue Mountains. The program was unique as it emphasised the long-term, ongoing nature of recovery and placed psychosocial needs as central to all recovery. The approach emphasised respecting the independence, dignity and coping mechanisms of individuals and the community.

The impacts of emergencies are long-lasting, diverse, and have profound effects upon individuals, households and communities. These impacts are often described in terms of psychosocial, economic, built environment, and natural environment impacts. Red Cross recovery activities rest on the assumption that these four impacts are interrelated and that people belong at the centre of all recovery processes.

The focus of the Red Cross Recovery Program was supporting local services through advice, provision of resources and training to increase local capacity to organise, facilitate and manage activities and support community recovery. Activities built upon existing capability and resilience within the Blue Mountains community, and responded to the identified needs of the community and local services. A Red Cross Recovery Project Officer was based in the Blue Mountains and hosted by local government, offering a range of mutual benefits including access to recovery expertise and the embedding of recovery lessons into key local organisations.

A capacity-building approach ensured outcomes of the recovery program could be maintained for both the longer-term recovery from the 2013 bushfires, and recovery from future disaster events. It also contributed to building the resilience of individuals, families and communities impacted by the fires and helped them to prepare for future events.

The program was externally evaluated and revealed the model was respected and Red Cross presence in the Blue Mountains community was highly valued. This paper will focus on examining the approach and identifying how effective elements can be replicated in future events.
The Earth System and Climate Change Hub: Research to Support Australia's Resilience to Climate Extremes

The Australian government’s National Environmental Science Programme (NESP) was launched in 2014 with the goal of providing the environmental research needed to inform Australian decision making; with a focus on biodiversity and climate. The Earth Systems and Climate Change Hub, one of six Hubs within NESP, is a national partnership that brings together Australia's multi-disciplinary Earth system science and modelling capability to provide the information needed to support a productive and resilient Australia. Established in 2015, the Hub begins its program of research in 2016. With a strong outcome-focus, significant stakeholder engagement, and links to the other five NESP Hubs (Threatened Species, Clean Air and Urban Landscapes, Marine Biodiversity, Tropical Water Quality and Northern Australia Resources), the Hub provides an opportunity to ensure that environmental decision and policy-making across many sectors is informed by credible and salient research that is targeted to Australia's needs.

The Hub has identified five climate challenges for Australia - these are the priority areas where our research seeks to make a difference. "Extremes and disaster risk reduction" is one of these five areas, with the outcome being "greater resilience (prevention, preparedness, response and recovery) to extreme weather and climate events in Australia through enhanced understanding of current and future climate variability and extremes, and improved information quality and delivery". The Hub’s research will also address related climate challenges relating to coastal hazards, water resources planning; and food security and resource management.

This presentation will provide an overview of the Hub’s research plan - with a particular focus on the research that addresses the outcome of enhancing resilience to climate extremes and disaster risk reduction.
Future Boosting
Attracting, Engaging, Retaining and Developing Young Volunteers

Since 2008 the NSW SES has begun work on a number of programs aimed at engaging and retaining young people in order to ‘future boost’ the organization and keep it viable and well prepared for the years ahead. A major strategy introduced to engage young people has been the Secondary Schools Cadet Program. The Secondary Schools Cadet Program has had a clear impact on influencing more young people to join the NSW SES. The number of young people joining in the 16 to 25 year age range has grown each year since the Secondary Schools cadet program began. From 2009 to 2014 the number of NSW SES volunteers in the 16 to 25 year age range doubled and has grown faster than any other 10 year age range. Not only have some former cadets gone on to join a unit, it has become apparent that they will often bring a friend, relative or even a school teacher to join with them.

A critical mass situation is often created, where getting young people in a unit attracts more young people to the unit. The success of this program, and other initiatives, in attracting more young people has now brought us to the point where we have identified that we need to take further actions to better engage, develop and retain them.

This session will provide a snapshot of what the research, and young people themselves, are telling us about the needs of Generation Y and Z. The actions now being taken to cater for the needs of the younger demographic will be revealed, including how young people are being included in the decision making process, the barriers that are being removed and the types of training methodologies that have been working best.

The major recommendations from the NSW Young People in Emergency Services Forum and the Young Leaders in Emergency Management will be discussed and the resulting actions being taken by the NSW SES will also be outlined. This will include such actions as making joining easy, removing age restrictions, providing leadership opportunities, making training interesting and using technology.

Young people have spoken up and given us their feedback on what to do to attract, engage, retain and develop them. The decision now lies with us as to whether we listen and take action. A new era of tech savvy, young men and women look in anticipation for the types of opportunities that emergency service organisations can provide. The training and experience that we can give them is sure to build resilience in young people and boost their future prospects too.
Mrs Lisa Cameron de Vries  
Technical Director, Phoenix Resilience

The Five Step Plan to Organisational Resilience

The design of a business continuity and/or emergency management system within your organisation requires a risk assessment. The first step of the risk assessment is to establish your context but how do you do this for your specific organisation? How do you know you are considering all factors? How do you know you've considered all threats and hazards? Can you use the same methodology to identify opportunities, as well as risks?

I have spent twelve years designing, implementing and auditing resilience-related management systems (QHSE, risk, business continuity, security and emergency management) in a variety of industries across the world. Throughout this twelve years, certain trends became obvious to me that made, and continue to make, these systems inefficient and sometimes even counterproductive. This instigated an intensive research project which I have undertaken over the past three years. The findings of this independent research project have culminated in the creation of a 'Five Step Plan to Organisational Resilience'. The concept has been verified and reviewed by academics, business experts and resilience experts.

The concept is based on the following premise: the key to resilience is awareness and the ability to anticipate the consequences of events. Adherence to this premise, facilitated by the Five Step Plan framework will bolster your organisation. It will allow you to effectively plan, prepare for and minimise adverse impacts as well as identify and seize opportunities to build a smarter organisation. The 'Five Step Plan to Organisational Resilience' will provide you with:

- An improved method to map your organisation's context and to identify both advantageous opportunities and potential threats to your organisation
- An innovative holistic risk assessment methodology
- Nine strategies to prevent, prepare for, respond to and recover from any adverse event
Mr Phil Carney  
Director, Community Recovery, Department of Communities, Child Safety and Disability Services

Towards a Stronger Less Vulnerable Community

Queensland experiences more disasters than any other state across the nation. The Inspector General of Emergency Management (IGEM) Review of cyclone and storm sheltering arrangements Report 3; 2014-15 (the Report) (Inspector-General Emergency Management 2015) identified the lack of consistent approach in Queensland regarding people with vulnerabilities and disaster management, noting: roles and responsibilities in disaster management arrangements can be ambiguous; local governments would benefit from assistance and resources to work with local communities; the need to improve consistent, integrated messaging across disaster management stakeholders; the need for accessible, risk based information in plain language; the need for more collaborative community education; and greater coordination across stakeholders is required.

The Framework is primarily intended to be of most value for the development of local plans for identifying and engaging with people who may be vulnerable or become vulnerable in disasters; and the people who know them and/or provide support and services. The Framework will: assist local disaster management stakeholders to identify and engage with people who may be vulnerable or become vulnerable in disasters; enhance existing disaster management arrangements and planning to contribute to more effective support to people with vulnerabilities; and inform and drive actions and initiatives to improve preparedness and planning for people with vulnerabilities.

It is intended to align with and complement existing national and state policies, frameworks, manuals and guidelines responsible for components of disaster management.

The Framework represents a proactive Queensland initiative to begin to address issues identified through the national work of the Vulnerable Sections of Society (an emergency management perspective).

This presentation will discuss the history, development and factors influencing the design and understanding of the framework.
Mr Doug Caulfield
Principal Consultant, Emergency Management Network Solutions

Central Gippsland Essential Industries Group - A Unique Corporate Collaboration

Gippsland with its vast natural resources of coal, oil and gas is a major source of energy for Victoria with a number of independent generators (both thermal brown coal and gas fired), associated brown coal mining activities and high voltage transmission and distribution systems. These generating and transmission facilities provide more than 90% of Victoria's electricity supply. Similarly, the Oil and Gas Sector based in Gippsland is a major supplier of energy to Victoria. Water supply is also an essential component in power generation. Pulp and paper production is also one of the Latrobe Valley's major employers.

With this high concentration of essential industry and critical infrastructure within a relatively compact geographic area, combined with the inherent operational inter-dependencies (gas, water, high voltage transmission networks etc) the need to involve key stakeholders in joint emergency management planning emerged. The need to plan for, respond to and recover from emergency management (and possible security related) incidents within these essential industries was the catalyst for the formation of the Central Gippsland Essential Industries Group (CGEIG).

CGEIG membership now includes electricity supply, oil & gas supply, water supply, paper production, major suppliers, Emergency Service Organisations and State & Local Government. The CGEIG is focused on events that have industry wide implications, rather than those which can be isolated to one production Site.

The CGEIG takes a regional approach to major incidents and recognises the strategic importance of these facilities to Gippsland and the State of Victoria. The group provides a forum for Industry, Emergency Service Organisations and Key Government bodies to liaise and collaborate on Emergency Management and Security issues.

The presentation seeks to explore the background to the formation of CGEIG, the rational behind the operation of the group, its structure and governance arrangements, previous successes and its aspirations for the future.
How Do We Increase the Capacity of State Government and Participating Organisations to Face Unexpected Risks?

This paper makes a knowledge contribution to disaster risk reduction (DRR) strategic thinking. Increasing global uncertainty and hyper-connectivity have been linked to higher exposure to unexpected risks. National and international DRR strategies have been shown to be insufficient to move countries, states, communities and individuals to prepare in a more responsible way.

This paper investigates the application of Complex Systems Thinking (CST) to DRR strategies in order to build resilience in preparation for unexpected risks.

It summarises findings arising from a research project conducted between 2012-2015 in South Australia involving ten State Government agencies, the Australian Red Cross and community members from a metro and a peri-urban council.

CST offers a holistic understanding of a disaster in time and space, while appreciating the uncertainty involved in risk management. However, its implementation is encountering numerous difficulties because of the reductionist model on which DRR strategies are formulated. This paper argues that these efforts need to be complemented with systemic methods that may overcome the hierarchical structures in which current DRR strategies are conceived and implemented. This requires systems to develop the ability to be ambidextrous, that is, to keep current DRR structures in place while extending their range to include unexpected events for which no prescribed actions exist. The question arises, how should this be done? This paper addresses these thematic questions and advances the argument that DRR strategies and policies should be designed with an ambidextrous mindset; this will enable DRR practitioners to ‘think outside the box’ and to take better account of the complex systemic conditions in which disasters develop.
Ms Emma Cliffe  
ANCP Coordinator, Oxfam Australia  

Co-authors:  
Ms Emma Kettle, Director of Partnerships and Business Development, RedR Australia  

**Partnerships for Innovation: Transitional Shelter Solutions in the Syrian Refugee Response**

Shelter has proved to be one of the "most intractable problems" in large scale emergency and disaster response. While there is certainly a place for tents within a suite of shelter options; for refugees or displaced persons who face years or even decades without a permanent home, a more dignified, durable and sustainable solution is required.

The aim of this case study was to reflect on 'partnerships for innovation' between traditional humanitarian responders and private sector organisations; models which can be considered innovative in and of themselves, as well as a fundamental component of strategies to improve the effectiveness, efficiency, quality and impact of emergency and disaster response.

The case study explored 'partnerships for innovation' using the example of the Refugee Housing Unit, a transitional shelter solution designed by UNHCR, IKEA Foundation and social enterprise Better Shelter, and implemented during the Syrian refugee response. The research was undertaken in collaboration with RedR Australia and RMIT University, with the findings informed by field work in the Za'atri and Azraq refugee camps in Jordan in 2015.

The Refugee Housing Unit project effectively leveraged catalytic funding and utilised 'democratic design' principles to ensure the shelter was responsive and adaptive to the needs, climate and culture of its residents. The innovative partnership model was successful as all stakeholders articulated complementary priorities, goals and values, and sought a strategic, long-term approach. The project also illustrated some important challenges during the course of the partnership, including procurement, intellectual property and risk aversion.

While the Refugee Housing Unit should not be viewed as a 'silver bullet'; the case study concludes that the innovation has made a valuable contribution to the shelter solutions on offer and the partnership demonstrated key learning which can be applied to future potential partnerships between traditional humanitarian responders and the private sector.
Nature vs Nurture: Leadership and Management Development of Volunteers in Emergency Services

St John Ambulance (NSW) expends significant financial, volunteer hours and other finite resources in the pursuit of the development and maintenance of critical skills and expertise required for its core business activities. While these learning and development (L&D) activities are principally focused on clinical and operational skillsets, the effort dedicated to management and leadership skillsets and knowledge is also substantial.

The principle aim of this research was to determine whether the organisation's L&D activities were sufficiently preparing its current management teams and future leaders for their roles. The initial feasibility of the research questions had been established via a mini-survey of a selection of managers across the organisation in mid-2014. However, the final action research project, initiated in late 2015, encompassed a much wider selection of the organisation's management structure and utilised both surveys and interviews to determine its findings. The research scope was also expanded to consider the potential contribution of Members' existing knowledge and skills to their managerial and leadership success.

This presentation will provide an overview of the research methodology utilised, the key findings of the research, the resulting organisational recommendations for change and a discussion of potential ramifications for other emergency services organisations with significant volunteer workforces.
Ms Heather Crawley  
Manager, Centre for Emergency Management Studies, TAFE NSW Riverina Institute

The State of Training

This paper examines the state of Vocational Education and Training (VET) offerings for non-operational/leadership roles for emergency management in Australia. The state of training and education is reviewed in light the convergence of an industry that is 'set to grow' given the impacts of climate change, with a training system that has diminishing resources and minimal structure. The industrial landscape, the role of VET, and the current state of training and education in emergency management are discussed in turn, and suggestions about a possible future are proposed.

To inform this paper, research was undertaken on the characteristics of the existing training system, the expansion of the sector, and the existing levels of provision of VET and higher education. In addition, a survey was conducted to provide a snapshot of views from stakeholders about what training might be required for the future and what barriers exist to accessing it. This research barely 'skims the surface' of the field of understanding required to underpin a strong and responsive workforce, but points to growing gap in systemic training arrangements, and a growing training gap.

The implications of these gaps is a workforce unprepared for the leadership challenges ahead, and the potential to compromise the growth of shared responsibility for disaster risk reduction. This is turn could exacerbate the challenges for a sector trying to match scarce resources to growing needs.

There are well-documented reasons to focus on preparing future leaders for catastrophic disasters, and the majority of people who will take up these roles will come from within the sector. Building the skills and knowledge of the workforce to provide leadership for future disasters must encompass the spectrum of training opportunities from VET through to Higher Education, enable access, and offer entry points and pathways to progress the professionalization of the sector.
The Step by Step Bushfire Support Service: a Psycho-Social Recovery and Resilience Model

Strategic approaches for strengthening community resilience need to be embedded within disaster preparedness plans and actions. The devastating October 2013 bushfires in the NSW Blue Mountains provided the backdrop for the crafting of an effective psycho social model which actively engaged all levels of the disaster recovery response. The Step by Step bushfire recovery service offers an innovative case study in enhancing community, service system and individual resilience through strong partnerships and a strengths focused model.

Step by Step was established in partnership between the NSW Disaster Welfare Service (part of the formerly known NSW Ministry for Police and Emergency Services) and a local Blue Mountains community service, Gateway Family Services, to assist individuals, families and the broader community affected by the 2013 bushfires. It was an outreach service that offered users a single point of contact to assist them in navigating and accessing a range of recovery services and resources drawing on a person centred, solution focused, strengths model. At the time there were no other comparable services in the local government area. Step by Step successfully integrated with existing community recovery services and actively participated in coordinated recovery activities.

Formal evaluation of the service, conducted in partnership with the University of Newcastle, highlighted the effectiveness of this strengths based approach, and in particular, the importance of integrating recovery and renewal via a coordinated, community led response. Step by Step service users, staff, managers and stakeholders reported that the service had been successful in meeting complex, multi-faceted needs during a time of significant stress and loss. There was a strong culture of collaboration amongst service networks before the emergency and the Step by Step model drew on this along with the existing local knowledge of staff and others in the community. The evaluation report illustrates the applicability of the Solution Focused, Strengths approach in disaster recovery. The focus of this model is to recognise and activate existing (and potential) individual and community resilience in order to strengthen factors for recovery and renewal.
Organisational Resilience: Building and Enhancing Capability

Natural and man-made disasters are increasing in frequency and if they are not managed well, they will continue to threaten and disrupt individual lives, communities, organisations, and economies. There is an expectation in today’s society that organisations will have the capability to continue to operate during and following major disruptions. Consequently, all organisations have a responsibility to their stakeholders to build and enhance their resilience to reduce the impact of disasters on communities.

The Resilience Expert Advisory Group (REAG) forms part of the Trusted Information Sharing Network for Critical Infrastructure Resilience that was established by the Australian Government Attorney General’s Department. The REAG provides strategic thinking pertaining to the development of key attributes and indicators of organisational resilience to assist the owners and operators of critical infrastructure to adopt a more resilient approach. The REAG comprises representatives from Australian, state and territory governments, critical infrastructure owners and operators, academia and research organisations.

The aim of this panel session is twofold. Firstly, the presentations from the panel will explore the key attributes and indicators of organisational resilience providing real world examples of methods utilised to measure, benchmark and enhance resilience that have been adopted internationally. With interaction with delegates the panel will discuss emerging global trends for organisational resilience and how organisations can contribute towards building a more resilient nation.

Disasters do not distinguish between different types of organisations or communities. Emergency services, not for profit, critical infrastructure, public and private enterprise organisations are all susceptible to the impact of major disruptive events. If society expects organisations that directly contribute to our way of life to have the capability to anticipate, respond and recover from disasters, we all need to adopt adequate methods to ensure that our organisations are becoming more resilient.
Contributing More - Improving the Role of Business in Recovery

Resilient New Zealand' is an initiative from five leading New Zealand organisations - Beca, BNZ, IAG, New Zealand Red Cross and Vodafone - which aims to identify, champion and advocate ways to help make New Zealand more resilient to natural disasters.

Resilient New Zealand's first project focused on improving the role that the private sector has in helping communities recover from natural disasters by: helping businesses improve their resilience; creating the right enabling environment for businesses to contribute to recovery; and setting clear expectations for the public, business and government of the role business can play in recovery.

The project drew on the insights of more than 50 leaders from business, central and local government and NGO sectors who were heavily involved in responding to and recovering from the 2011-2012 Canterbury Earthquakes.

The resulting report 'Contributing More: Improving the role of business in recovery' was released in December 2015 (see www.resilientnewzealand.co.nz) and commended by business leaders and government Ministers.

The report presents 35 findings and 8 case studies in relation to how businesses can: improve their own resilience and contribute towards community resilience; play a greater leadership role in recovery; and collaborate with other parties to better enable recovery.

Eight recommendations are made to central and local government, NGOs, industry bodies and businesses to build resilience and effectiveness in recovery. Collectively they seek to embed resilience in existing businesses practices and planning structures and to improve resilience and recovery governance frameworks in local and central government.

This presentation will: detail each of the recommendations and the work underway to implement them; highlight the key findings in relation to business resilience, recovery leadership and cross-sector collaboration; and outline the recovery and resilience frameworks that underpin the study.
Dr Paula Dootson
Postdoctoral Research Fellow, Queensland University of Technology

Co-authors:
Dr Dominique Greer, Queensland University of Technology
Dr Amisha Mehta, Queensland University of Technology
Prof Vivienne Tippett, Queensland University of Technology

Understanding and Improving Community Comprehension of Emergency Messages to Facilitate Protective Action

Australia experiences a broad range of natural disasters throughout the year, with significant negative economic, environmental, and social impact. This significant impact can be lessened by individuals’ responses to the disaster (Burns and Slovic, 2012). For an individual to take protective action, following the receipt of an emergency warning message, the individual first needs to accurately comprehend the message. Using Mileti’s (1995) social psychological framework for information processing, this presentation will discuss the process individuals go through for each emergency warning message they hear. The framework suggests five stages of information processing: (1) hear, (2) understand, (3) believe, (4) personalise, and (5) respond.

Findings from 10 focus groups across Australia including Queensland (Hervey Bay and Brisbane), New South Wales (Kempsey), Victoria (Dandenong and Melbourne), and Western Australia (Kalamunda and Busselton) will be presented. Key findings include: time between message updates is used as a proxy for event severity, visuals aid in personalising the risk and overcoming limitations of geographic knowledge, location triggers attention and the personalisation of risk, hazard knowledge and past experience can influence message comprehension in ways that lead to negative unintended consequences, and over-warning is preferred to under-warning. Recommendations are made for how to amend existing emergency messages to improve community member message comprehension.

These findings have informed the development of experiments that assess the extent to which the community will comply with an emergency message instruction (e.g. evacuate now). Manipulating message content and style is hypothesised to result in changes to protective behaviours. Small changes in protective behaviours can make valuable impacts (Lindell and Perry, 2012), reinforcing the significance of informed emergency messaging, which is a priority area for Australian national policy and practice (see National Review of Warnings and Information, 2014).

Overall, the research presented here will contribute to improvements in emergency message compliance by generating an evidence-based framework that takes into account behavioural compliance theory and the psychology of decision making under stress.
How to Anticipate Human/Social Disaster Recovery Needs: Applying the Concept of Social Vulnerability to Build Community Resilience During Relief and Recovery Operations

Australian communities are varied in their composition and in their level of exposure to risk whereby certain community members are more vulnerable and may need tailored advice and support to recover from disasters. Social disaster impacts upon individuals, families and communities include safety, security, health and psychosocial wellbeing. To appropriately anticipate recovery needs, disaster management professionals must understand the concept of risk which is very complex, as it represents something unreal by relating to random chance and possibility (Cardona, et al. 2003).

One way to reduce complexity is by utilising Social Vulnerability Indicators (SVI) to anticipate community relief and recovery needs. Social vulnerability can be seen as a dynamic process, rooted in the actions and attributes of human actors (Downing et al., 2006).

To understand the influences of social vulnerability is an essential step in order to plan for potential community needs well ahead of disasters. However, there is disagreement within the scientific community on the selection of specific variables to represent social vulnerability (Cutter et al., 2003). In Australia some common demographic concepts like: economic prosperity, age, sex, education level, ethnicity, social dependence ... etc. are used for disaster planning to draw generalised conclusions about the consequences the disaster might have on communities. It is argued that such generalisations can potentially lead to misinterpretation of community consequences and therefore cause misguided operational decision making. This project is the first to systematically identify SVIs relevant to the community recovery sector in Australia. The identified SVIs are tested for its appropriateness in all States and Territories, to ensure that the proposed methodology is applicable across the whole of Australia. The proposed operational application of indicators includes methodologies and processes which are argued to be impertinent to ensure effective community relief and recovery.
Dr Neryl East
Director, Neryl East Communications Pty Limited

Leadership in the Spotlight of a Crisis

Just what does it take to be a crisis leader in the global spotlight of the digital age - regardless of whether it’s earth, fire, rain or any other disaster?

You need to be an astute and credible communicator, able to persuade and influence while remaining both authentic and empathetic - a tall order when every word can now go global in a heartbeat.

Those responsibilities don’t apply solely to the designated leader. Anyone involved in planning and executing incident responses needs an understanding of both social and traditional media as critical communication tools - even if they’re not likely to be the person fronting the cameras or engaging on Facebook.

We’re all now highly influenced by our peers and "people like us" - which means any public interaction from the disaster response team comes with significant implications.

In this session, crisis communication expert Dr Neryl East will share insights on the critical importance of effective communication in the social media age, including:

- How social media has revolutionised disaster and emergency communication, and what we can learn from recent incident responses
- Why we can’t ignore the continued power of the "old-school" media in reaching and influencing large audiences
- The key skills that are non-negotiable for every crisis leader

As a journalist in radio and television, Dr Neryl East covered many crises and emergencies and knows only too well the difference between a well-planned and a disastrous communication response. She now shows emergency responders how to be outstanding communicators, helping to build community resilience and strengthening the reputation of their agencies in the process.
Mr Vaughn Elsworth
Acting Regional Commander, SA Country Fire Service

Volunteering - Maintaining the Enthusiasm - Reducing the Barriers

Volunteering can be a challenge at the best of times. The changing landscape of employer and employee relationships, the competing needs of a work life balance, the expectations of the volunteers and those of the organisation and the sea-change / tree-change nature of communities all provide challenges for Emergency Service Organisations (ESO).

With these changes comes a need to transform the leadership at all levels - this can be challenging in a volunteer environment where their original intention was to serve the community through providing an on-ground presence. As the world around changes this moves into sometimes unchartered territories of human resource management and financial management to name but a few - these skills sets may not always be part of the common curriculum delivered to Emergency Service Volunteers.

We somehow need to take these additional skills sets and embed them into the normal training regime, drawing on the individuals transferrable skills and providing support through other mediums that will facilitate them becoming what may best be described as an administrator. A starting point may be to build on the skills they may have as Incident Controllers where we are already asking them to manage people.

To add complexity - a volunteer may now only be in that organisation for between 3 - 5 years, somewhat different from when I first started some 30+ years ago. We need to look at how we deliver training both initially and on-going and almost develop an individual pathway for the volunteer that provides the learning, value and impetus for them to continue. To do this we need to provide the right skills to the managers / leaders of those brigades to be able to facilitate this.

The paths we take will vary, the challenges will be exciting - the results can be transformational.
Dr Danielle Every  
Senior Research Fellow, CQU University, Appleton Institute

Co-authors:  
Dr Raymond Matthews, CQU University Appleton Institute  
Dr Chris Bearman, CQU University Appleton Institute  
Ms Laura Haigh, CQU University Appleton Institute  
Dr Larissa Clarkson, CQU University Appleton Institute

"I Make It My Business": Characteristics of Successful Community Fire Safe Group Coordinators

Community-level engagement groups such as Community Fire Safe (SA) are key programs for facilitating shared responsibility for bushfire readiness and response. Membership has been shown to improve bushfire awareness and knowledge, increase planning and preparation, and promote community-level collaboration. However, not all groups are successful in achieving these outcomes. The authors’ survey and interviews with 41 Community Fire Safe coordinators and members affected by the Sampson Flat Fire of 2015 found that only two groups provided support for each other before, during and after the fire. Other groups either provided a space to learn more about fires but did not provide support during the fire, or stopped after an initial meeting.

Previous research suggests three key processes must be activated for these programs to succeed – engagement and trust-building, ongoing knowledge-building and community interaction. These processes are triggered by localized, well-presented information from a trusted source, delivered in a context that generates discussion, collaboration and resource-sharing between neighbours. It is the group coordinator who must activate these processes to achieve the desired outcomes. However, as yet there has been little research on these leaders and the skills and characteristics that are related to positive group outcomes.

Our research identified three key competencies: adaptive (responding to their community); active (in gaining new recruits and keeping old ones engaged); and positive (focusing on achievements). These proficiencies helped coordinators overcome individual (e.g. low risk perception; low self-efficacy; high anxiety) and community (e.g. not everyone is a ‘group person’) roadblocks to change.

This presentation shares the detailed findings on these group leader skills and how they achieved positive outcomes from Community Fire Safe Groups. Based on this research, we also make recommendations for future training for group facilitators.
A/Prof Jacqui Ewart  
Academic, Griffith University

Co-authors:  
Dr Hamish McLean, Griffith University

A Best Practice Model for the Involvement of Politicians in Public Communication About Disasters

In the past few years we have witnessed an escalation in the involvement of politicians in public communication about disasters, particularly before and during such events. Many emergency response and management organisations have no policies or guidelines as to how politicians might best contribute to public communication at such times. Indeed the tendency for politicians to weigh into such events and their need to be seen to be publicly responding can contribute to the difficulties of managing responses to and communication about disasters. In this presentation we will present the findings from interviews we have undertaken with senior emergency managers in eight countries about best practice for the involvement of politicians in communication during the various phases of disasters. We also discuss why it is in the best interests of politicians to follow this best practice model.
NSW Deployment to Vanuatu - Deployment Lessons

Cyclone Pam impacted the island nation of Vanuatu on the 12 March 2015 and resulted in widespread damage. Local infrastructure including schools, hospitals, police stations, resorts and large swaths of residential areas were heavily impacted with disruption to critical services.

The Australian government offered an Urban Search and Rescue Team due to the potential for trapped persons. This aid was accepted and the NSW Taskforce was deployed. On arrival it was determined that there was no need for a traditional USAR response due to the lack of established infrastructure and minimal numbers of multi-storey buildings. The USAR team was changed to a more humanitarian response and commenced work on repairing hospitals and schools in order to assist communities to regain a sense of normalcy and commence the recovery phase.

I worked closely with the Australian Federal Police, the Vanuatu Police Force and the Vanuatu Defence Force to provide security for the NSW Taskforce, and to provide advice in relation to contemporary emergency management processes. This was an interesting challenge, particularly when the paucity of resources in comparison to NSW was revealed.

I will also discuss the challenges of preparing for an international deployment and working within the Australian Government context.
Prof Gerry FitzGerald
Director, Centre for Emergency and Disaster Management, School of Public Health, Queensland University of Technology

Co-authors:
Dr Joanna Rego, Queensland University of Technology

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**Generic Emergency Management Standards for Higher Education in Australasia**

Disaster management programs at undergraduate and postgraduate levels are currently diverse, lacking in consistency, structure, and alignment to course offerings by Higher Education Providers in Australasia. This project aims to develop a Generic Emergency Management Standards (GEMS) framework for higher education programs in emergency and disaster management in Australia and New Zealand. The implementation of such a standard would ensure university graduates in this field possess nationally consistent emergency management capabilities and knowledge.

A structured review of international and national literature was conducted. The first process aimed to analyse recommendations for inclusion to curriculum content while the second one focused on gathering evidence in regard to graduate competencies. Further analyses were based on references which provided recommendations for standards and curriculum based on evidence-based research. These were, however, enriched by other sources where they appeared to clarify or add a detailed understanding to the subject. The content from both processes was then divided into nine themes: 1) policy legislation, community, and operational environment; 2) concepts, principles, and practices; 3) management; 4) leadership; 5) communication; 6) collaboration; 7) critical thinking; 8) personal attributes; and 9) decision making. Subsequently, for graduate competencies the nine themes were grouped into three domains: knowledge, abilities, and attributes.

Furthermore, a review of the current educational offerings and course content in emergency and disaster management among Australian and New Zealand Higher Education Providers was conducted. The findings were categorised into themes based on common teaching elements.

Consolidated information was reviewed by a board of academics and represented through a series of five workshops for stakeholders in Australia and New Zealand to seek their expertise and validation of the proposed standards.

Based on these broad consultations, the preliminary GEMS higher education framework and the details of this research project will be presented.
Mrs Catherine Forbes
Associate, Built Heritage Specialist, GML Heritage

Saving Nepal’s Cultural Heritage: Post Earthquake Emergency Response and Recovery in Kathmandu

The deep sense of loss felt by the people of Nepal following the Gorkha Earthquake (25 April 2015), was not just for family and friends who had died, homes and livelihoods destroyed, or familiar places that were now no longer recognizable. The people also greatly mourned the loss of their cultural heritage. The destroyed temples, palaces, historic urban settlements, museums, artworks and other historical artefacts were of immense importance to the Nepalese people, their identity and their daily lives. They represented their cultural inheritance and was integral to their sense of who they are.

This paper will examine the activities undertaken by the Nepalese people to save their heritage. It will discuss the rapid assessment of damage undertaken through crowd mapping; the emergency stabilization of monuments and the salvage of significant building elements, religious artifacts and museum collections, including the assistance given by the local police and army; the measures put in place to enable the people to continue their daily rituals and customs; the preparations undertaken by Municipal authorities and local stakeholders to facilitate the continuance of important cultural festivals; and the ways in which meaningful access has been provided for tourists, who contribute greatly to Nepal’s income. It will also address issues for recovery. The paper will conclude with lessons learned and their application to the Australian context.

ICOMOS-ICORP (UNESCO’s International Council on Monuments and Sites - International Scientific Committee on Risk Preparedness) has been closely involved at all stages of the process from emergency response to recovery planning, providing expert advice and training in first aid for Nepal’s cultural heritage and disaster risk management planning. The presenter, an expert member of ICOMOS-ICORP, participated in the UNESCO mission to review the extent of damage to the World Heritage property of the Kathmandu Valley, and the progress of emergency response and recovery for Nepal’s cultural heritage.
Software-Based National Impact Assessment Model Changes the Game for Disaster Relief and Recovery in Australia

In 2002, the Australian Government identified the need to establish a nationally consistent approach to the data collection and analysis of disasters to better target relief and recovery arrangements to areas in need. A National Impact Assessment Model (NIAM) was piloted which used a complex series of Excel spreadsheets to collect details of a disaster and calculate the severity of the disaster. In 2015, the Attorney General's Department commissioned the operationalisation of the NIAM as a more sophisticated online solution.

A new NIAM system was configured by Noggin to allow State and Territory operators to input up to 50 primary impact indicators for each local government area affected by a disaster - including anything from number of fatalities or injuries, buildings destroyed or damaged, stock losses, to parks and marine areas affected. The NIAM system can then calculate the severity of impact across four recovery domains - social, built, economic, and environment - and the overall severity of impact of the disaster, from insignificant to catastrophic.

The NIAM system also provides a range of features not available in the Excel spreadsheet model, including: a real-time geographical representation of disasters as they are recorded across States and Territories; the ability to quickly search across all captured disaster information; the ability to analyse the underlying workings of the model; the ability to produce detailed reports on a disaster; the ability to restrict or extend access to disaster information to particular jurisdictions, and a visually appealing user interface.

The NIAM system is due to roll out across States and Territories over the next few months so it is ready for use next disaster season. As the NIAM is put into practice, any further revisions required as the model is fine-tuned can be easily incorporated as the NIAM system is completely configurable and fully flexible.
An Integrated Bushfire Risk Decision Support Tool for Land Use Planning

Decision support tools exist for incident control to assist fireground decision-making and assess potential community impact. However, such tools do not readily extend to assist land use planning decision-making, to guide decision makers and communities to adopt appropriate land use planning strategies to manage risk to existing and new communities.

The growth of populations and development at the urban bushland interface continues to heighten community risk exposure and places increasing strain on land managers to undertake rigorous annual hazard reduction programs in response to surrounding land use transition.

Traditional land use planning practices to respond to natural hazards include hazard and risk mapping, spatial tools such as zoning, design and siting controls, structure planning exercises, and specific planning provisions for vulnerable uses and infrastructure provision. Land use planning has the ability to shape existing and new communities, including where and how they are located and is therefore considered to be the most effective opportunity to mitigate bushfire risk, as established by the National Strategy for Disaster Resilience.

However, decision-makers continue to find it difficult to say ‘no’ to new development and land use planning processes lack the capability to quantitatively assess risk and plan for bushfire resilient communities. Whilst quantitative processes are applied to flood and other risks, the approach to bushfire remains much more embedded in qualitative analysis which seeks to balance competing interests.

This presentation explores a new integrated decision support tool which can be used to formulate planning policy, strategic (plan-making) and statutory (development assessment) instruments and processes, and better communicate risk extent in a spatial context with elected officials and communities. The tool is designed to integrate both quantitative and qualitative data inputs, including fuel load, fire spread and fire behaviour modelling, in a risk assessment metric specifically designed to support land use planning decision-making.
Planning, Building and Landscaping: How Built Environment Frameworks can Enhance Community Resilience, Mitigate Existing Bushfire Risk and Reduce Burden on Fire Services

The strong relationship this trifecta of disciplines maintain is acutely recognised with regard to improving community resilience to bushfire, and their collective influence where existing risk lies is especially vital. Weather systems are changing as a result of global warming and the future demand on emergency services is set to double in some jurisdictions over coming decades, in addition to the burden of undertaking more prescribed burns in shorter non-fire seasons. It is therefore essential that built environment frameworks more actively consider the extent of residual risk that is deferred to fire services, land managers and land owners.

Whilst current statutory and regulatory provisions largely apply to new development, it is the legacy of risk exposure to existing settlements to which we now must turn our attention. The scale of development which has occurred in designated bushfire prone areas requires the application of a suite of concurrent approaches. There are numerous options available to treat and mitigate existing risk. Starting with planning where a range of tools and practices are available to assess and address vulnerability and risk. The opportunity to retrofit to enhance building protection as well as rationalised landscape design offers landowners the increased ability and responsibility to actively prepare individual properties.

This presentation looks at the development of a clear set of collective guidelines for existing communities and dwellings in retreating or adapting to bushfire risk, including how individual properties can be retrofitted to improve bushfire protection. It will undoubtedly require a phased adoption, starting as opt-in and over time, with momentum, to the introduction of a regulated building and landscaping framework for existing dwellings.

The ingredients to achieve this outcome are strong governance, shared responsibility and community leadership. This solution seeks to navigate a pathway where all stakeholders are provided with tools to assist in managing the risk.
Mr Adam Garnett  
Senior Advisor (Community Recovery), Department of Communities, Child Safety and Disability Services

Co-authors:  
Ms Sarah Dean, Senior Adviser, Tablelands Regional Council  
Ms Nikki Howson, Disaster Recovery Manager, GIVIT

'No Safer Place In The World To Be' - Community Recovery Lessons Learnt from the Ravenshoe Cafe Explosion, Queensland's Largest Aeromedical Mass Casualty Burns Disaster

At midday, on 9 June 2015, an out-of-control four-wheel-drive vehicle hit and punctured a 450 kg gas cylinder attached to the Serves You Right Cafe© in the main street of the small town of Ravenshoe in Far North Queensland. A release of gas caused an explosion and subsequent fire. Twenty four people were injured as a result of the accident, some critically. Two local women later died from their injuries.

It's been remarked that 'there was no safer place in the world to be' than Ravenshoe's Serves You Right Cafe© that lunchtime. The circumstances of this disaster, not least its location in a quiet, close-knit rural community surrounded by World Heritage rainforest made this a novel event in recent Australian disaster experience requiring a creative and flexible recovery approach that largely fell outside the scope of extant disaster recovery planning and guidance.

This paper provides an overview of the Ravenshoe recovery process in relation to those directly impacted, including approximately 100 community members (seven per cent of the local population) directly involved in the immediate response, as well as the impact upon the broader community.

The paper also examines the implications that differing interpretations of the 'definition' of a disaster, and the triggers for activating the Queensland Disaster Management Arrangements, had for the subsequent recovery process and also discusses the methodology and challenges of administering a well-supported public appeal fund with a paucity of Australian precedent.

The paper identifies the successes and challenges and makes a number of recommendations in regards to lessons learnt during the recovery phase of what was Queensland's largest aeromedical mass casualty burns disaster.
An Analysis of Human Fatalities From Flood Hazards in Australia, 1900-2014

This paper documents the analysis of the social and environmental circumstances surrounding fatalities due to flooding from 1900 to 2015. This examination is a fundamental first step to providing an evidence base for future emergency management policy, practice and resource allocation and to enable efficient and strategic risk reduction strategies. The basis of this analysis was PerilAUS, Risk Frontiers’ database of historical natural hazard impacts in Australia which was augmented and verified by the use of coronial records. Inquest reports allow additional and more detailed data about the social, demographic and environmental circumstances of the fatality to be determined. A longitudinal analysis of the resulting statistics was undertaken, examining demographics (age, gender), location (state), seasonality and circumstances surrounding the fatality - both environmental (e.g. the event intensity) and social (e.g. factors around the decisions or actions which led to death). The recommendations for emergency management policy and practice are discussed, outlining the need for a new approach which accounts for a continuum of measures including regulation and incentive, education and awareness, structural intervention and consequence management.

Note this project has been funded through the Bushfire and Natural Hazards CRC.
**Why Didn’t You Say Something Earlier?**

*Recounting the Learned Experience of a Firefighter in Post Tropical Cyclone Oswald*

First responders are trained to override normal human impulses for self preservation and to judiciously place themselves in risky, potentially traumatic and extraordinary situations. During intense operations, firefighters as first responders will focus on solutions and processes, directives and regulations in order to achieve their professional priorities and to meet their duty of care.

In the same breathe, fire fighters are also expected to take care of their own legislated health and safety. The onus of self care assumes that, through a process of self awareness and monitoring, the firefighter will know when they are injured or at imminent risk. This pertains to psychosocial risk as well. However self awareness and vulnerability actually have no safe place in prolonged emergency responses such as Post Tropical Cyclone Oswald where 6,055 first responder days were used to evacuate and assist with 1441 houses and premises. The event was dramatic, unprecedented. Having to be so task focused and for so long negates self focus.

Unfortunately, prolonged and intense operational exposures to the emotionally charged events of disasters are the forerunners of the experience of trauma and post traumatic stress disorder. When is it appropriate and possible to stop and check on how you yourself are doing? Who’s responsibility is it to watch out if the individual who is so operationally focus that they inherently and inevitably override their personal needs and responses? How can this be done better? This presentation will focus on the human face of being operational. It will provide an anecdotal account of how self awareness and self concern can become redundant. The psychological need to reconnect with self, humanity and others will be explored as a psychological imperative following significant operational focus. Managers and mates have important roles in this reconnection.
Innovation in Disruptive Technologies - Putting Mission Critical Information into the Hands of Decision-Makers

Aim

The presentation focuses on the new generation of disruptive technologies that are "evolutionising" our ability to make good and timely decisions to keep ourselves and the people we are responsible for safe from harm. "Evolutionising", because we can only go forwards from here.

Topics

- National Public Alerting Systems - choice of technologies around the world that meet the functional requirements to deliver the right outcomes for community safety.

- The role of the private sector in providing national 24x7 all-hazards monitoring capabilities and community alerting that help businesses and individuals make good and timely decisions to stay safe, minimise loss and, so far as possible, maintain productivity and business continuity.

- Intelligent software applications for smartphones and communications centres that passively monitor the movements of people and assets remotely and, in an emergency, locate them in an instant and enable immediate two-way communication to exchange and inform situational awareness as well as save life and protect property.

- The comprehensive use of land, water and airborne platforms, including Unmanned Aerial Vehicles, for 3D mapping and surveying landscapes and structures. In particular, their use in predicting the impact and consequences of disasters, inform mitigation strategies and provide efficient Rapid Damage Assessments for multiple audiences.

The presentation will include evidence from recent events to show the intelligent, practical applications made from the convergence of these disruptive technologies.

Conclusion

That leaders in disaster management and the technology industry need to innovate together to ensure that science produces the technologies that meet the functional, operational requirements to deliver the right outcomes for "evolutionising" disaster management and community safety as well as aid search and rescue.
Emergency Management Policy Evaluation: An Approach and Example from Victoria

Evaluation of policy alternatives is a normal part of the work of any agency, which is increasingly important in an age of accountability. Most such evaluations employ multiple criteria and complex appraisal approaches. This can lead to the evaluation process becoming obscure and difficult for non-specialists to follow. In turn this results in a process that it hard to understand and discuss, and can be easily dismissed or ignored. A readily understood and transparent evaluation process is particularly important where the policy alternatives are controversial.

This was the case with the Victorian policy for planned burning for bushfire risk reduction: should the approach be based on treating a fixed percentage of the state, or on targeting high risk areas? Policy assessment criteria were developed based on the global policy assessment literature and the specific objectives of the policy being assessed. These were refined into twelve criteria which were used to compare two distinct policy options. Throughout the evaluation, emphasis was on a transparent, replicable and easy to follow process.

The presentation sets out the assessment approach developed and used to evaluate planned burning policy options in Victoria. The process could have wider application, and the emphasis in the presentation is on the process, rather than the specific case of planned burning.
Mr Kevin Humphreys
Chief Pilot, Queensland Government Air

The Laymans Lived Experience of Mental Health.
Damaged Goods or Better than Ever?

The stigma of mental health remains unhealthily alive and well at the organisational and individual level. One person and one conversation at a time we can change the perception of mental health to understand that it doesn’t discriminate between white or blue collar, men or women. Indeed understanding mental health is just as important as knowing your company’s operating procedures and embracing the latest technological advancements. It is also a spectrum where recovery is a real prospect for the majority of people.

Having struggled with mental health issues, culminating in a breakdown and nine months off work, Kevin has returned to the top of his game. The road back is a road with no end and has taken Kevin 7 years to have the strength to speak publicly about it.

He is commencing this year as a Community Ambassador for the R U OK? Foundation and Welfare representative for the Australian Federation of Air Pilots to help promote awareness of mental health and addiction issues where the parallels to mental health are striking (stigma of addiction/social impact/incongruence with flying/motivation to return to flying/rehabilitation).

With 45% of people suffering from some kind of mental health issue at some stage of their life, normalisation of the topic is required to encourage self reporting and early intervention to achieve the best possible outcomes for the individual, the organisation and the community.
**The Impact of Shared Trauma on Health Care Professionals Following the Canterbury Earthquakes**

**Introduction** - There is a growing body of literature which explores the trauma of 'double exposure' when someone is impacted both directly by the disaster itself as a member of an affected community, and indirectly as a professional providing services to those adversely affected.

**Methods** - The research design used semi-structured open-ended interviews to elicit extended answers to questions about the challenges health care professionals had faced during and following the earthquakes. Interviews took place with eight GPs, 11 nurses and 25 mental health care professionals from the Canterbury region. The interviews took place between November 2012 and November 2014. The interview transcripts were read numerous times to gain understanding and coded to identify themes from the interviews. These themes were checked through discussions within the research team.

**Results** - The shared trauma of the earthquakes impacted on the participants' personal and professional lives. Experiencing the earthquakes alongside patients/clients and providing support services during the recovery process impacted on patient/client relationships and professional practice. The experience of the shared trauma led to increased understanding and improved relationships with patients/clients for many of the participants. However a number raised concerns about maintaining professional boundaries. As the interviews took place two to four years after the start of the earthquake sequence the participants commented on the experience of the recovery process and in particular the impact of secondary stressors.

**Conclusion** - The earthquakes impacted significantly on both the professional and personal lives of health care professionals and their capacity to undertake their roles. This information supports the development of disaster education, preparation and planning resources for health care professionals.
Mr Peter Kakris  
Crisisworks Trainer and Director, Datalink Internet Systems Pty Ltd

Co-authors:
Mr Callum Fairnie, Colac Otway Shire Council  
Mrs Cherie Graham, Moorabool Shire Council

Effective Post Impact Assessments and Early Recovery Management in the Digital Age: A Tale of Two Cities

During Christmas 2015, a devastating fire ravaged the coastal tourist communities of Wye River and Separation Creek in Victoria, completely destroying 125 homes and affecting 245 properties. Two weeks earlier, a separate large-scale fire in Moorabool saw similar destruction, with 16 properties affected, this time in a rural and farming context with a large number of agricultural and farming interests affected.

With limited trained staff available over the holiday period, the councils mobilised a temporary workforce and used Crisisworks mobile technology to conduct a series of secondary field assessments to assess damage, produce timely and accurate datasets and coordinate services to those most in need.

These councils also used the newest version of Victoria’s Post Impact Assessment & Recovery data standard which had been developed and trailed in 2015, but which only saw its first large-scale use in these two events.

These assessment programs were successful, however not everything worked well, and an agile approach was required. With the help of Colac Otway and Moorabool councils, this presentation provides a warts-and-all exposé that uncovers the reality of mobile data collection in the digital age. You'll learn about the problems faced with mobile data collection including the problems with data standard creation, the need to localise for regional differences, the use of volunteer workforces, technical issues, staffing expertise, data quality, data sharing, reporting formats and more.

This presentation will expose the problems encountered, and outline the solutions and approaches that made it successful, and will offer recommendations that may make a real difference for those responsible for their own post impact data collection programs in their communities, regardless of technology in use.

If you or your organisation is involved in recovery or field data collection, this presentation is a must-see.
Quantifying and Communicating the Uncertainty in Tropical Cyclone Rainfall and Wind Risk Using Numerical Weather Prediction Ensemble Track Forecasts

Numerical Weather Prediction (NWP) is widely used in the atmospheric science community to forecast the future state of the atmosphere based on current weather observations. Weather forecast models are run several times using different initial conditions to generate a set of ensemble forecasts that portray how the outcome of a forecast may change depending on small differences in the initial conditions. Emergency service agencies can potentially leverage ensemble forecasts to identify areas that may experience damaging or life threatening weather conditions. It is important, however, for emergency service agencies to understand the spatial and temporal uncertainty associated with the NWP ensemble forecasts, and any associated damage forecast, in order to make the most informed decisions.

The focus of this study is to quantify the range of potential TC rainfall and wind impacts along the East Coast of Queensland using archived European Centre for Medium-Range Weather Forecasts (ECMWF) and Global Forecasting System (GFS) ensemble forecast tracks for TCs Marcia (2015) and Nathan (2015). Severe rainfall and wind swaths will be generated for each weather forecast model ensemble member using a multi-hazard TC model being developed in-house for each event. We will investigate the range of potential impacts, based on each ensemble forecast, at numerous times prior to landfall (e.g. 72hr, 48hr, 24hr) so the change in impact uncertainty can be quantified. Simulated damage from the multi-hazard TC model will be compared with archived event observations to assess its performance. Conclusions will be drawn from the performance statistics on how well the multi-hazard TC model can communicate the uncertainty associated with using weather forecast model ensemble runs to forecast damage due to rainfall and wind in landfalling TCs.
Mr Anthony Lee  
Emergency Management Coordinator, Mackay Regional Council

Risks Associated with Disaster Deployments for SES Volunteers and Emergency Management Queensland Staff

Queensland State Emergency Service (SES) volunteers and Emergency Management Queensland (EMQ) staff are emergency responders and are expected to be both willing and able to deploy post impact to a disaster, natural or human-made. Sources of risk may pose a possible threat to their own safety, work colleagues or that of their families pre and post deployment. What risks such as health and safety, human resource or administration are associated with deployment of staff and volunteers in response to a disaster? This study identifies risks that staff and volunteers may encounter during disaster deployments. The willingness to deploy is directly influenced by staff and volunteers perceptions of risks prior to deployment and risks they may have encountered or experienced in previous disaster deployments. Emergency management practitioners should consider these risks in emergency preparedness and planning activities.
After Paris - Climate Disasters and Climate Change

The Paris climate accord, in December, were unexpected and unprecedented in the extent of global agreement and in the magnitude of their (admittedly vague) ambitions. Climate disasters and climate change have often been discussed separately. This paper argues that developing resilience, in preparation for future disasters, involves a transformation of our understanding of the unpredictability and range of possible climate change futures. On the other hand, a public willingness to act to mitigate climate change, is based on growing experience and understanding of already manifest climate disasters.

The German Watch Climate Performance Index shows that Australia has been lagging behind other countries, particularly in Europe. This was confirmed in a comparative survey of public opinion in Adelaide and Lisbon, about climate disasters and climate change mitigation, carried out in by the Hawke EU Centre, Adelaide and by the ISCTE at Lisbon University. However, recent political developments, as well as the July study by The Climate Institute, Climate of the Nation 2015, indicate this may be changing.

Worldwide awareness of climate disasters, and their relationship to anthropogenic climate change, surely played an important role in the Paris agreement. In turn the agreement should sharpen awareness of the disastrous impacts of climate change around the world, and promote international collaboration in tackling them.
Mr Stephen McDonald  
Director, Centre for Humanitarian Leadership

Co-authors:  
Mr Brendan Hurley, Fire and Rescue NSW

International Crisis Leadership and the Australian and New Zealand Disaster Context: Exploring the Synergies

Since 2011 Deakin University and Save the Children, in partnership with sixteen international and Australian organisations have designed and implemented a Humanitarian Leadership Programme (HLP). This partnership has evolved, and with the support of the IKEA Foundation and the Australian Aid Programme has now become the Centre for Humanitarian Leadership (CHL) hosted at Deakin University. The HLP has been acknowledged as the 'most important course of its type in the world'. Now with a new partnership with Fire and Rescue NSW, as well as a growing cohort of students from Australian and New Zealand disaster management agencies, is demonstrating its increasing local relevance.

With a focus on adaptive leadership and individual leadership behaviours, rather than technical leadership, the course is having a marked effect on students. This is demonstrated in research conducted in the Philippines following Typhoon Haiyan (9th November 2014) where field research was conducted on the performance of graduates and students deployed to the crisis.

Fire and Rescue NSW have experienced the applicability of this approach having had a small number of staff graduate from the programme. FRNSW is now working with the Centre for Humanitarian Leadership to develop the capability of their internationally deployable USAR teams, as well as explore the integration of the Centre’s approach more widely across leadership development plans within the organisation. In addition, FRNSW and the Centre are collaborating on developing a research and innovation agenda for the benefit of communities in NSW and leveraging FRNSW capabilities internationally. It is envisaged that this partnership will enhance opportunities to build regional capabilities in the Asia-Pacific, that influence responses to international and domestic crises.

Through this collaboration it is hoped that a more effective and adaptable leadership capability will be built within FRNSW and across the region.
Stress and Growth Experiences Reported by Post-Bushfire Field Research Interviewers

Background There are numerous reports that those involved in disaster response and recovery are at-risk of developing post-traumatic stress disorder or experiencing secondary traumatic stress. There are few reports of research concerning the experiences of post-disaster field research interviewers. This presentation describes findings from follow-up surveys of those who conducted five post-bushfire research interview studies of residents 2009 - 2014.

Aim To investigate (a) the nature of their experiences; and (b) their perceptions of the adequacy of their preparation for the task.

Method Sixty-five post-bushfire research interviewers were invited to be interviewed or complete a questionnaire about their post-bushfire field experiences. Thirty-three researchers (51%) provided 38 responses (four researchers participated in more than one study).

Relevance There is widespread agreement that climate change may lead to more frequent extreme weather events and associated natural disasters. Agencies are likely to commission post-disaster field research studies in order to evaluate their preparation and response endeavours. Researchers need to be adequately prepared for the task.

Results Of the 38 responses, 9 (24%) described no stress symptoms associated with the interviews; 26 (68%) described mild levels of stress symptoms; 3 (8%) reported moderate levels of stress symptoms. Twenty three researchers (64%) reported that their experiences overall resulted in positive personal outcomes. Reports about their training and preparation were mostly favourable.

Conclusions Interviewing residents affected by future disaster events will be psychologically impactful for many who conduct post-disaster field research. For the majority, the experience will probably have some distressing elements, but will be viewed positively overall. A small percentage may experience moderate levels of secondary stress, especially if the event involved multiple fatalities, but this will be relatively transient. The approach to training and preparation used for the post-bushfire field interviews was probably adequate, but will need more rigorous evaluation in future.
Ms Louise Mitchell  
Program Manager, Foundation for Rural and Regional Renewal

Co-authors:  
Ms Natalie Egleton, CEO, Foundation for Rural and Regional Renewal

**Resilience & Medium-Long Term Community Recovery: The Opportunity Waiting to Happen**

The National Strategy for Disaster Resilience, 2011 (NSDR) recognises that recovery programs should consider long-term sustainability and enable a reduction in exposure to future disasters. This presentation identifies some of the barriers to this at the community level and offers examples of mechanisms to support the building of community resilience during medium-long term recovery, 12 months on from a disaster. It touches on three of NSDR’s suggested actions: partnering with those who affect change, empowering individuals and communities to exercise choice and take responsibility, and supporting capabilities for disaster resilience within communities.

In the medium-long term after a disaster, a significant barrier to local level resilience building is the extended timeframes required for recovery, and the lack of resources for this work. Alongside this community members are often experiencing fatigue due to the additional demands of attempting to rebuild, recover individually and socially, and re-generate their environmental and economic systems. The implications of the lack of resources, the myriad of extra demands and community exhaustion are that opportunities to build resilience are missed.

Around 12 months after a disaster, when there is capacity for disaster impacted individuals to work more collectively, real opportunities exist for communities to lead and build their own resilience, while integrating emergency services with community priorities. The enabler for this has been the collaborative funding provided by government, private industry and philanthropic partners and coordinated, designed and administered by grant making organisations with ability to be agile and responsive. Key to the success of projects funded by these grants is the requirement for participatory and capability building approaches. Continuing partnerships across all sectors to fund medium to long term community-led initiatives will give communities the opportunity to build their adaptive capacity to withstand or respond to future shocks to their community system, thereby building community resilience.
Ms Margaret Moreton  
Australian National University  

Is Community Action Central to Community Recovery?

Australia's National Strategy for Disaster Resilience: Building our nation's resilience to disasters emphasizes the central role of the community in disaster recovery. This strategy and key policies from local, state and federal governments, and large non-government organizations all advocate 'community led recovery'; arguing that successful recovery engages the community and empowers its members as they emerge from the crisis.

This paper is based on a research PhD being undertaken at the Australian National University, in Canberra. It investigates different perceptions and experiences of the recovery process, and identifies the actions community members and others take during the recovery process. The research includes interviews with key individuals appointed to formal leadership roles to oversee disaster recovery; including the Governor General Sir Peter Cosgrove, Anna Bligh, Christine Nixon, Richard Wilson and disaster leaders from the not-for-profit sector. The research also includes information gathered during community based fieldwork in four Australian communities affected by fire, flood or cyclone. Participants who have directly experienced both the emergency response and the recovery phases of these disasters provide their perceptions of the key factors that influence recovery, and describe what they did and saw others doing, that contributed to the recovery of their community.

Implications can be drawn from this research about the relationship between community action and disaster recovery. Importantly, this research informs the understanding of what happens after natural disaster, and what most supports the process of community recovery. In particular it provides evidence about community action and how this action contributes to recovery, and it therefore has significant implications for how governments, organizations, and communities prepare for and respond to disasters in the future.
Ms Melissa Morgan
Emergency Services Team Manager Planning, Australian Red Cross

Beyond the Emergency Assembly Point; Building the Capacity of Children's Services to Prepare for and Respond to Emergencies

When bush fires impacted the Blue Mountains in October 2013, a number of children’s services became acutely aware that their emergency management plans were not sufficient in equipping staff with the knowledge to respond. Services discovered that many assumptions about who could assist them were unfounded and untested. A significant gap in knowledge and planning was identified.

Australian Red Cross designed and facilitated an interactive pilot workshop for children’s services staff in the Blue Mountains to address these challenges. Results gathered following the workshops indicated that staff immediately felt more informed, self-reliant, better prepared, and confident to act during an emergency. A follow up survey six months on found that as a result of the workshop, 100 percent of participants felt more confident implementing their emergency plans and making decisions during an emergency; 92 percent had undertaken preparedness activities with staff; 88 percent had undertaken preparedness activities with parents and 96 percent had undertaken preparedness activities with children in their care.

Following the success of the pilot workshop, Red Cross facilitated an additional five workshops across urban Sydney and its semi-urban and rural surrounds in 2015. Icek Ajzen’s model of behaviour change was used to evaluate the impact that the workshop had on attendee behaviour regarding their service’s preparedness for emergencies.

This paper focuses on Australian Red Cross’ approach to preparedness and the impact of Beyond the Assembly Point workshops on the participating children’s services staff. The results obtained from workshop evaluations suggest that the content and methodology are effective in increasing the knowledge and resilience of children’s services staff and enhancing their capacity and confidence to respond during emergencies.
Mr John Moy  
Executive Manager, QFES

Hue New? - Blending Orange and Yellow to Paint a new Future

In October 2014 for the first time in Queensland's emergency services history, a new State Training Command was established to bring together two previously very separate, large, diverse but equally significant, volunteer emergency services - namely the Queensland State Emergency Service (SES) and the Rural Fire Service Queensland (RFSQ).

This presentation aims to take its audience on the journey to date, to share the challenges, risks and successes of the bringing together of two unique volunteer emergency services entities through a training approach. It provides a contemporary case study of how important training is in contributing to broader operational excellence, through sharing of resources, reduction of red-tape and building of new partnerships and relationships for now and into the future. It shares a future vision which encourages increased retention of emergency service volunteers as well as one which is more sustainable and that recognises the ever changing demographics of volunteerism in Queensland.

This case study will also share how training is an enabler to capacity, and is a valuable tool in terms of organisational change and operational capability and how the latter contributes to the ongoing quest for greater community resilience and a safer Queensland for all.
Emergency Communication in Australia: Current Situation and Future Directions

This paper will present a brief overview of communication technologies and infrastructure available for emergency operations in Australia. It also highlights significant issues in current operational solutions and explores future technologies that can be used to address these challenges.

Australia is considered to be the most fire-prone country on earth. The threat of natural disasters such as bushfires and floods affect many communities. Effective emergency operations are critical to minimise the loss from natural disasters since first responders need to exchange information (i.e., voice and data) in a timely manner to develop situational awareness and coordinate relief efforts.

Communication technologies have evolved rapidly over the last decades. There are a number of contemporary wireless personal communicators (mobile phones, PCs, PDAs and other devices) employing advanced communication technologies that can be used in emergencies. These include Cellular Networks (NGMN 2015 and TETRA 2015), Mobile Broadband Networks (WLAN 2015), Radio links utilising VHF/UHF voice and data networks (SINCGARS 2015), and Satellite communications (WGS 2015). Most of these technologies, however, are designed for commercial or military use and building resilient communication networks that can cover the large geographical regions in Australia with these technologies has proven to be a significant challenge.

Significant research progress has been made to address the issues plaguing current communication systems for emergency operations. We will present an overview of these technologies that include Wireless Mesh Networks (WMN), Software Defined Radio (SDR), Software Defined Networking (SDN) and leveraging of Big Data and Data Science. An analysis of the advantages and value proposition of advanced networking technologies such as WMN, SDR and SDN will be articulated. This will be presented in the context of providing synergistic benefits through enabling other advanced technologies like Big Data Analytics and data driven decision-making.
Ms Kris Newton  
Manager, Mountains Community Resource Network

Co-authors:  
Ms Kath Harrison, Manager, Katoomba Neighbourhood Centre  
Mr Andrew Kaye, Community Engagement Coordinator, Blue Mountains, NSW Rural Fire Service  
Dr Sarah Redshaw, Research Associate, Institute for Land, Water and Society, Charles Sturt University  
Mr Peter Belshaw, Program Leader, Bushfire & Emergency Management, Blue Mountains City Council  
Ms Diana Bernardi, Emergency Services Manager NSW/ ACT, Australian Red Cross

Lessons Learned from Collaboration in the Blue Mountains

Following the October 2013 bushfires a broad cross section of organisations came together to form the 'Disaster Resilience and Preparedness Working Group' (R&P Group).

The R&P group aims to:  
- Strengthen the relationship between the community services sector and the emergency services sector  
- Improve household preparedness for emergencies including practical and psychological preparedness  
- Support volunteers working with vulnerable community members to engage clients in conversation about preparedness  
- Improve the community services sector’s capacity to respond to emergencies

There are two unique features to the work of the R&P Group:  
- The collaborative partnerships developed by community sector organisations (especially local neighbourhood centres), the Australian Red Cross, the emergency services sector (in particular the NSW Rural Fire Service), state and local government agencies and academics.  
- The work undertaken by this group covers a broad spectrum of resilience and preparedness within the community and the community services sector

The R&P Group was recently announced as the NSW winner of the Resilient Australia Community Award.

The Panel will reflect on how collaboration across the four sectors (community sector, emergency services sector, government and disaster welfare) resulted in improved community engagement as well as individual agency work. The panel will consist of representatives from local emergency services, local government, the community sector and disaster welfare agencies.
Dr Christine Owen  
Researcher, University of Tasmania  

Co-authors:  
Mr Cameron Scott, Emergency Management Lead, National Broadband Network  
Dr Richard Adams,  
Mr David Parsons,  

Leadership in Crisis Some Challenges for Learning Crisis Leadership in the 21st Century  

Emergency management leaders confront demands far more complex than those historically faced by their predecessors.  

The presentation will discuss the experiences of the authors, who collaborated in a significant professional development initiative for leaders in emergency management, conducted through the Australian Institute of Emergency Management (AEMI). Since 2010 approximately 200 people have participated in the leadership development program 'Beyond Command and Control: Leadership in Crisis'.  

Having completed the program 13 times the authors (who have all been involved in the majority of course deliveries) reflect on the insights gained from delivering a professional development program which includes some of the learning challenges participants have faced. These challenges include capacity for reflection, overcoming dysfunctional momentum - that is when participants get caught up in the moment of action and find it difficult to step back and think rather than to keep acting and reacting as well as the challenge of speaking up effectively. These challenges are outlined and some interventions are outlined and discussed so that future facilitators of leadership programs may capitalise on the insights.  

This presentation will also discuss some of the paradigms and myths of emergency management leadership that need to be confronted if we are to build capability in emergency management leadership in the future.
**A/Prof Virginia Plummer**  
Associate Professor, Monash University

Co-authors:  
Ms Patricia Schwerdtle, Monash University

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**Experiences of Health Worker and Civilian Survivors Following Ebola Outbreaks in Liberia and Sierra Leone**

**Aim**  
To explore the experiences of survivors following the West African Ebola Outbreak

**Content**  
West Africa recovers from the worst outbreak of Ebola Virus Disease (EVD) in human history. It is widely accepted that the international community's response was delayed and inadequate. A justification for this inaction was commonly a lack of knowledge and experience in dealing with EVD. As the outbreak subsided the affected countries orientated their efforts from containment and treatment to the needs of an unprecedented number of survivors, some of whom had long term physical, psychological and social sequelae to their illness. Understanding the underlying thoughts, values, beliefs and cultural practices of the survivors towards EVD and the response is crucial to developing effective Ebola control programs.

Data was collected by Medecins Sans Frontieres (MSF) Belgium in August 2015 for the purposes of internal evaluation. There were three focus groups, first in Liberia, with 5 participants, transcribed from Liberian to English. The second and third were in Sierra Leone; one with 12 from a self-care group of survivors who spoke English and the second with a group of 6 survivors in the community translated from Creole to English. All recordings were non-identifiable apart from gender and location. A verbal explanatory statement was provided to participants. Verbal consent was obtained. The local Chief was consulted. Ethical approval was provided by Monash University.

Results are in an early stage of analysis and interpretation, however emerging themes are self-isolation and protecting others, misunderstanding of health care messages, abandonment by healthcare services, witnessing the multiplicity of death.

**Conclusion**  
The experience of Ebola survivors, illustrated their inherent strengths and unique view of the disease and the outbreak response. Their perspectives could be used to improve future outbreak responses in terms of cultural competence, community participation and empowerment.
Ms Melanie Press  
NSW SES Volunteers Association  

Co-authors:  
Dr Steven Smith, Lecturer, Macquarie University  

Exploring Barriers to Collaborative Multi-Sector Disaster Management Efforts in Rural Remote Communities  

To explore possible barriers affecting implementation of a multisector approach to the Disaster Management cycle of Prevention, Preparedness, Response and Recovery (PPRR) between Health and agencies that provide Road Crash Rescue and Community First Response services in small rural and remote communities.  

In rural and remote communities globally, both socio-economic and health status is lower than urban areas, while average age and community involvement rates are higher. A preliminary literature review revealed both a wealth and dearth of information relating to health and emergency first responder organisations’ in rural and remote communities. The review identified common elements across all organisations including maintaining and regaining health and wellbeing of community members through bonding and bridging social capital. There is little research suggesting a link between social capital and health and wellbeing in rural and remote communities.  

Health and emergency first responder organisations have legislated requirements to adopt strategies to enhancing disaster resilience in rural and remote communities. These organisations have employees and volunteer members that are highly qualified in their individual areas of expertise. Current literature and research highlights that barriers may exist between health and emergency first response organisations that are inhibiting collaboration. I propose that improving communication and collaboration between these organisations will increase social capital in rural and remote communities and contribute to both health and safety outcomes resulting in increased community wellbeing and overall resilience.  

This paper will present the findings of current research along with a conceptual framework detailing how collaboration and social capital creation could co-exist using case studies and examples from my research as both a Registered Nurse and emergency services volunteer.
Humanitarian Village, A Design Innovation for Small and Medium-Scale Disasters

The number of small-medium disaster especially flood and cyclones has quadrupled in the last two decades while the number of massive geological disaster such as earthquake and tsunami remained approximately the same at around 20 a year. Over the same period, the number of people affected has increased from around 174 million to an average of over 250 million a year. Furthermore, data from UNESCAP (2015) shows that in the past 4 decades have seen a growing number of small to medium disasters which have resulted a total loss of over US$1.15 trillion.

However this scale of disaster has received less attention from humanitarian agencies. At the same time the increasing number of natural disasters has increased the demand for humanitarian products, including shelter. There are many designs for emergency shelters but most are too technical and neglect the social aspects of the occupants, which makes post-disaster life more distressing for survivors. This paper explores the idea of the Humanitarian Village as an innovative design for responding small and medium-scale disasters, focusing on community-led design for better temporary pop-up shelter and village facilities for people escaping highly distressing scenarios. The paper not only proposes a technical solution for the design of emergency shelters but also investigates ways on how to manage small to medium sized disasters, particularly in the Asia Pacific region which has the highest number of total occurrences, fatalities and effects of natural disaster events.

Keywords: Humanitarian Village, Small-medium Disaster, Design Innovation, Emergency Shelter, Natural Disaster, Asia Pacific
Incidents on Australian Beaches - An analysis of the Surf Life Saving Australia Incident Report Database 2010/11 to 2014/15

Between 2010/11 and 2014/15 Surf Life Saving Australia (SLSA) volunteer lifesavers and lifeguards performed 65,798 rescues and treated 274,211 patients with injuries. Of those rescues and first aid treatments, 25,907 (8% of total incidents) were serious enough to have a detailed SLSA Incident Report Form completed and data entered onto the SLSA National Incident Report Database (IRD).

This study describes the aetiology of incidents occurring on Australian beaches over a five-year period, for which an SLSA Incident Report Form was completed. The study design was retrospective analysis and included all SLSA incidents entered into the SLSA Incident Reporting Database. It is relevant because of the significant number of people who are being injured or get ill on the beach each year.
The Good, the Bad and the Ugly - the Need for International Aid Agencies to Re-Conceptualise Their Approach to Security

Aims: The paper argues that international aid agencies (IAAs) operating in disaster zones have reached a dead-end when it comes to conceptualising and managing their security and calls for a renewed conceptual framework.

Contents: IAAs are facing tremendous security related challenges and their current near-impossibility to respond to certain disasters, in Syria but also in Afghanistan, Honduras, Yemen, etc., show the limitations of their existing approach to security. Unlike armed forces whose security strategies are ultimately based on their quasi-monopoly of legitimate use of violence, aid agencies are unwilling to use violent means to protect themselves, including against serious threats. Because of this, IAAs have during the past two decades collaboratively developed a novel approach to security, dubbed the security management framework, best put forth by Koenraad Van Brabant. They have also considerably bettered the way they protect their field operations, and today far more aid workers are able to mitigate the security risks they are exposed to. However, if IAAs’ conceptualisation and operationalisation of security has improved tremendously, challenges remain, as the killing, kidnapping and injuring of aid workers continues unabated.

After presenting how IAAs have conceptualised and operationalised their approach to security, the paper argues, through the use of a critical constructivist lens, that they now face a conceptual dead-end as their approach does not allow them further protection nor access to the people who most need their aid. The reasons for it are unknown at this stage, although the paper emphasizes IAA’s over reliance on technical fixes, including sub-contracting their operations to local partners or managing projects remotely.

Conclusion: In addition to presenting IAAs’ approach to security, the paper concludes that they have reached a conceptual and operational dead-end. It then calls for the development of a renewed conceptual framework and offers ways forward.
Disaster Management Supported by Unmanned Aerial Systems (UAS) Focusing Especially on Forest Fires and Floods

Introduction: This paper describes initiatives and shows also practical examples which happened recently using Unmanned Aerial Systems (UAS) to support disaster management especially focusing on forest fires and floods. Instead of manned aerials UAS can be an alternative moreover cost effective solution for supporting disaster management.

Method: Author uses thematic division of UAS applications; it is based on two key elements, one of them is the time flow of managing disasters, other is its tactical requirements of forest fires and floods. Logically UAS can be used like pre-disaster activity, activity immediately after the occurrence of a disaster and the activity after the primary disaster elimination. Research used function analysis, practical experiments, mathematical formulas, economic analysis and also expert estimation. Author gathered international examples and used own experiences in this field as well.

Results and discussion: This article focuses on two typical disasters as floods and forest fires however it touches others like earthquakes, nuclear accidents, hazardous material leakages and human induced disasters. Floods are typical for a slow onset disaster. In contrast, managing floods is a very complex and difficult task. It requires continuous monitoring of dykes, flooded and threatened areas. UAS can help managers largely keeping an area under observation. Forest fires are disasters, where the tactical application of UAS is already well developed. It can be used for fire detection, intervention monitoring and also for post-fire monitoring; this article details them based on firefighting tactical requirements. At the end of the article author shows also a new method to use UAS making prescribed fire to prevent serious forest fire.
Social Dynamics of Voluntary Emergency Response Teams - Do We Recruit the Best People for the Job?

In New Zealand, volunteers make up a significant proportion of responders to emergency events. For example, the New Zealand Fire Service workforce are 80% volunteers, St John the largest ambulance provider has 9000 volunteers, and the 17 NZ Response Teams that are 100% volunteer. With volunteers making such a considerable contribution to response capability how can we make sure the right people are recruited, given the high-stress, changeable situations these people will face? This paper presents a case study and personal observations of the recruitment process of a voluntary emergency rescue team. The paper will describe the teams’ recruitment process, personal characteristics that are sought in team members, and how these are tested throughout the recruitment process. It will also provide personal observations on how effective the process is in recruiting the right people and the impact it has on the existing team and new members.

Clare is a Senior Research Scientist with over 8 years’ experience in physical geography research and technical rope, swiftwater rescue and USAR. She currently works in the area of geography, natural hazards and social systems. Her research interests include technical rescue response, and leadership in natural disasters, resilience to natural hazards, integrating science into policy through the translation of research results and risk-based land use planning.
Ms Michele Rumsey  
Director of Operations and Development, World Health Organization Collaborating Centre for Nursing, Midwifery and Health Development

Co-authors:  
Ms Jodi Thiessen, Project Manager, WHO Collaborating Centre of Nursing, Midwifery and Health Development

Disaster Response Systems in the Pacific: Policy Brief for Australian Stakeholders

Climate change is likely to affect the pattern of disasters in the Pacific, and therefore the organisations and systems involved in disaster response. The aim of this research was to provide recommendations to the Pacific and Australian disaster response sectors on current adaptive capacity of Pacific island countries to climate related disasters, and identify the resources, policies and systems needed to enhance this capacity.

A qualitative research methodology was used which prioritised stakeholder participation and end user engagement. Four case study countries (Fiji, Cook Islands, Vanuatu and Samoa) were chosen for deeper investigation of the range of issues present in the Pacific. The research team drew upon background literature as well as interviews and workshops with numerous Australian, New Zealand and Pacific island stakeholders from the disaster, climate change, health and development sectors to draw out key challenges, gaps and complexities present in Pacific disaster response.

The research found that some of the following elements support adaptive capacity of the disaster response system, both from the Australian and Pacific perspectives: High levels of trust and relationships between key individuals; strength in both formal and informal communication, relationships and partnerships; recognition of critical coordination role of national disaster management offices; coordinated disaster assessments; clear Pacific national policy and supporting mechanisms for requesting overseas assistance.

Adaptive capacity was found to be constrained by a number of factors: Limited local human resources for health and disaster response; insufficient engagement between health ministries and other response organisations; gap in provision of psychosocial support; limited capacity of Australian medical services to meet the needs faced in the field during disasters; limited recognition for Pacific in-country systems, capacity and governance structures by external agencies and lack of a future focus to incorporate uncertainty and changing risk into planning processes.

Research done in collaboration with WHO Collaborating Centre, UTS and Institute for Sustainable Futures, UTS.
Building New Capacity through New Command

Effective mission command remains the holy grail for organisations responding to public safety emergencies and threats. Mission command can be the new shiny goblet, heralding the promise of being a fully informed, competent, aligned and agile organisation, meeting all the challenges of an unfolding emergency. As a coveted component of organisational capability, many organisations claim its possession, even though we rarely see it on display.

While mission command remains an aspirational capability, the history of its development and application involves frustration and failure. As public safety organisations rebuild their capabilities to meet the more complex and evolving future, the potential offered by different command approaches should be actively recognised.

In 2015 the Queensland Police Service conducted an experiment by introducing mission command into their operational planning for the 2015 Schoolies celebrations on the Gold Coast. While highlighting some of the traditional challenges, the experiment also realised a number of benefits offered through this command approach.

This presentation provides a description of the potential of mission command, a description of its application in Australia and a summary of its historical challenges and successes. We will use the Queensland Police experiment to explore if Australian public safety organisations are ready to push the focus of command closer to the edge? Are they ready to move away from their traditional centralisation of technology, rank and authority?
Dr Petra Skeffington  
Clinical Psychologist (Registrar), Curtin University

WA Fire & Emergency Service Workers: Vulnerable or Resilient?

Aim  
The aim of this study was to gather information about the types of events (PTEs) Fire and Emergency Service personnel are exposed to in Western Australia, and the associated impact of these exposures on Posttraumatic Stress Disorder (PTSD), depression and anxiety. Whilst it is widely accepted that fire and emergency work is of high risk for PTE exposure and post-trauma pathology, there has been limited published data regarding Australian fire and emergency service workers, with no published studies, to date, regarding fire and emergency service workers in Western Australia.

Method  
210 current serving Department of Fire and Emergency Services (DFES) members were surveyed regarding exposure to Potentially Traumatic Events (PTEs), PTSD, depression, stress and anxiety. The relationship between the protective factors of social support and coping style and mental health outcomes was also explored using a hierarchical regression.

Results  
Results found that DFES career members were exposed to trauma significantly more than the general population and reported elevated rates of Post-traumatic Stress Disorder (PTSD) symptomatology, depression and anxiety. Trauma exposure, social support and coping style significantly contributed to variation in PTSD symptomatology, with maladaptive coping strategies accounting for more PTSD variance than adaptive coping.

Conclusion  
DFES Firefighters were found to have elevated rates of psychopathology as compared to the general population, however the majority displayed resilience despite high PTE exposure. There was evidence that trauma exposure, social support and coping style significantly contributed to levels of PTSD symptomatology. Exposure to trauma was the best predictor of PTSD symptoms, a finding that fits with current conceptualisations of the aetiology of PTSD. Maladaptive coping strategies accounted for more variance in PTSD symptomatology than adaptive coping strategies. Distraction, substance use, venting and self-blame are specific maladaptive coping strategies that accounted for a significant amount of variance in PTSD symptomatology in this sample.
Dr Erin Smith  
Senior Lecturer, Edith Cowan University

**Are You OK? The Mental Health of 9/11 Medics 15 Years On**

The 9/11 terrorist attacks on the World Trade Center killed nearly 3,000 people, including 411 first responders. The attacks caused profound human suffering, physical destruction, and economic loss. While New York rebounded strongly following 9/11, one of the painful legacies of the disaster is the lasting effect on the physical and mental health of thousands of individuals who survived the attacks— including the first responders.

Early health and psychosocial assessments following 9/11 tended to focus on firefighters, and indicated that sleep issues, mood changes, feelings of detachment, and flashbacks were common problems for responders. Research on the health and psychosocial impact of 9/11 on paramedics is scarce. This research utilised qualitative research methods to explore the long-term psychosocial impact of first response during 9/11 on paramedics and EMTs.

Study participants reported problems sleeping, mental health issues such as anxiety and depression, extreme moods, addictive behaviour such as smoking and drinking, and negative impact on relationships. Some reported the breakdown of marriages and marriages between responders and the widows of fallen colleagues.

The emotional and physical health toll was highlighted by the number reporting ongoing health and mental health problems related to their response to 9/11. Most reported that their respective employers had been supportive in providing ongoing health and mental health care to 9/11 responders. Of the 22 participants, 15 were still actively employed in EMS roles, albeit two had moved from the city to outer boroughs of Manhattan.

Six reported the breakdown of their marriage in the previous five years, five participants reported that their families attended ongoing counselling with them, and three reported that their family members had requested that they retire from active duty. Despite these self-reported problems, paramedics and EMTs overwhelmingly reported a desire to continue in their role as a first responder.
Community Recovery After the 2015 Sampson Flat bushfires, Adelaide - Lessons Learned

Background and aim
Natural disasters such as bushfires occur frequently in Australia and will continue to be a significant feature in the future. These events have long-lasting personal, social, environmental and economic impacts; and it can take communities ten years or longer to recover. Despite current research and numerous inquiries, recovery appears to be the least understood phase of the disaster cycle. This study explores the recovery process by examining the experiences and lessons learned by communities affected by the 2015 Sampson Flat bushfires in South Australia.

Methods
Semi-structured face-to-face interviews with key informants including members of the community affected by the Sampson Flat event, South Australian state and local government staff and non-governmental agencies’ workers involved with the recovery efforts.

Results
Preliminary results highlighting fundamental insights into the recovery process and factors that play a role in the recovery efforts of affected Adelaide communities will be presented.

Relevance
Given the increasing occurrence and severity of natural disasters, it is imperative that we develop an improved understanding of the policies, processes and activities that can fast-track recovery in order to minimise the impacts of natural disasters on communities and the costs of recovery efforts.

Conclusions
Recovery is a long-term process that requires formal integrated planning that addresses the different community elements at play in the recovery process. While there is a lack of understanding about this phase of the disaster cycle this project is a step towards formally documenting lessons learnt in a systematic way.
Trends in the Accuracy of Weather Prediction - An Update

Stern and Davidson (2015) recently published an analysis of trends in the skill of weather prediction for Melbourne, Australia, at lead times of 1 to 14 Days. Datasets of weather observations and official and experimental predictions were used to document trends in weather forecast accuracy out to Day-14 for maximum and minimum temperature, and for precipitation amount and probability.

The accuracy of the current official Day 5-7 forecasts was found to be similar to that of Day-1 forecasts from 50 years ago. The accuracy of experimental Day 8-10 forecasts was comparable to that of the Day 5-7 forecasts, when they were first officially provided 15 years ago. Some overall skill, albeit limited, was evident out to Day-14.

Stern and Davidson (2016) examined the potential for day-to-day forecasting beyond Day-14 utilising a numerical model that provides such forecasts out to Day-32 by calculating the correlation coefficients between forecast and observed inter-diurnal sets of changes in maximum and minimum temperature, and precipitation amount and probability. The analysis suggested an absence of skill beyond Day-14.

The purpose of the current presentation is to update these earlier results.

References


A Gap Analysis of Standards That Apply to Emergency Response Teams for Major Hazard, High Risk or Mission Critical Facilities and Operations

Local communities have increasingly higher expectations that major hazard or high risk facilities and emergency service organisations will be seamless in the management of any on-site incidents. In particular, any site incidents with potential off site consequences to the nearby communities. This requires effective partnerships and arrangements which promote interoperability through pre planning, effective communications, resources and assistance.

This can be supported and assisted through a common model by all the stakeholders.

A large number of major hazard or high risk facilities and operations form on-site emergency response teams (ERT). These industrial emergency response teams continue to play an integral role in facility fire and emergency protection - a role that continues to evolve in changing and challenging economic conditions. Facility ERT's are now taking a more active role in loss prevention and life safety.

In the USA, this common approach has been supported in part from a country wide standard NFPA 600, Facility Fire Brigades. Consensus standards (Australian or ISO) have been very effective in outlining what a best practice model looks like.

This presentation will provide an overview of NFPA 600 and discuss some of its challenges in application and opportunities for Australia. This will include comparisons to any other similar federal or state guidelines, industry or public accessible standards (PAS) in this area.

Mr Andrew Tegart
Business Development Executive, Falck Pty Ltd

Co-authors:
Mr John Macleod, Falck Pty Ltd
Transforming Energy Restoration for the Future

Once, disaster planning meant advising customers to stay indoors, riding out the storm, then fixing poles and restringing lines when the worst was over. Critical infrastructure was the priority – after that, it was a matter of reconnecting where and when we could.

Today, the foundation of our restoration response begins well before a cyclone hovers beyond the horizon. Spatial technology, data management, integrated communication systems, flexible strategic planning and social media mean we are poised to respond safely and efficiently at the first possible opportunity. We can confidently allocate our resources to the areas of greatest need and most benefit.

Real-time data links field and depot. Our internationally-feted remote asset and vegetation management technology ROAMES provides both a virtual map of our network and crystal clear damage assessment. We keep our customers informed through our regionally located Contact Centres and a powerful social media presence.

In February, category five Cyclone Marcia crossed the CQ coast, interrupting power to 73,500 customers and demolishing 35km of network. Beforehand, we strategically positioned teams and essential supplies and generation. Using ROAMES data, our Incident Response Team directed infield crews from one specific location and issue to the next, getting critical infrastructure back on supply in record time. We engaged with customers through 55,000 phone calls, and 740,000 page views, 10,000 Facebook page 'likes' and posts, and 550 Twitter interactions. Our online Outage Finder drew 263,000 views.

Ten days after Marcia roared through, every single customer who could be safely resupplied had power.
A Dynamic Evacuation Route Recommender for Emergencies

Major disaster events such as bushfires and floods force annually thousands of people to flee from their homes to more secure shelters. Unfortunately, during such emergencies it is often difficult for people in the affected areas to make the right decisions about the fastest and safest routes to evacuate, due to the psychological and emotional impact of these highly stressful situations. Even worse, if people do not have well-timed information about areas at risk as soon as the situation changes during the emergency event, they might end up fleeing from one dangerous area to another.

In this talk, we present and demonstrate a responsive intelligent evacuation route recommender system that is able to dynamically recalculate and recommend a personalised safest evacuation route for people during the disaster event. Our system leverages latest weather observations and weather forecasts to predict areas at most risk, as well as real-time traffic data and real time data feeds about changing context during an emergency event (e.g., blocked roads) to determine the optimal new safest route.

Given the particular location of an evacuee (e.g., from a GPS-enabled mobile device), the system continuously looks for the optimal route to safety (e.g., towards a shelter) - that is, the route where the evacuee is the least exposed to fire risk, and alerts the evacuee about the changing conditions and the new best (optimal) route to take.

In addition to real-time recommendation of safest evacuation routes, the system also provides people with other useful contextual information such as real-time traffic congestion, potential risk areas, shelters and hospitals.
Mr Charles Waldegrave
Coordinator, Family Centre Social Policy Research Unit

Co-authors:
Ms Tafaoimalo Loudeen Parsons, Family Centre
Ms Taimalie Kiwi Tamasese, Family Centre
Prof Harvy Frankel, University of Manitoba

Trauma, Livelihoods and Resilience in Post-Tsunami Samoa

Aim: to present a culturally based approach to constructively addressing trauma and livelihood destruction in response to the September 2009 Tsunami and its residual impacts on villages and families in Samoa.

Content: The presentation will provide:
1. a description of the culturally based asiasiga approach to addressing trauma and livelihood destruction developed by the Family Centre and carried out in partnership with the Catholic Archdiocese of Apia, Afeafe o Vaetoefaga and associated health professionals immediately following the 2009 tsunami.
2. the findings of a survey questionnaire and follow up interviews of children, youth and households in 2011 that recorded their experience of trauma and wellbeing and their assessment of the impacts on their livelihood and access to resources since the tsunami
3. an examination of the ongoing impact on livelihoods and access to resources for aiga (households) and young people following the tsunami. Resilience in the context of post-tsunami is further considered with reference to psychosocial wellbeing and access to resources.

Conclusion The review reveals ongoing impacts, including continued trauma from the tsunami. However, trauma levels were mitigated to some extent by strong wellbeing and resilience factors among aiga and individuals, for example cultural and social resources, rituals and protocols, spirituality, and land tenure. The review also noted the impact for tsunami survivors of delays in the restoration of essential needs and services such as water supply, public transport, and access/distance to medical care services and schooling. Although significant gains have been made, much work remains before life returns to pre-tsunami levels.
Mr Jan Wandek  
Managing Director / Public Safety & Interoperability Adviser, Emerg Solutions

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**People-Driven Strategies for Communication Among Volunteers**

**Aims:**

To highlight the difference in culture between volunteers and career personnel, and the resulting need for people-driven communication systems that have been developed from the bottom up; not the top down.

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**Content:**

The ways in which volunteer services operate are vastly different from that of career personnel. Around Australia the lives of emergency volunteers are disrupted at any time of the day or night. Commonly by means of a pager message, 'the call' interrupts normal life – eating, sleeping, working, a weekend BBQ or watching a favourite TV show.

The disruption to everyday life can be minimised for our volunteers through the use of natural communication techniques, including smartphone technology.

The presentation will share the experiences learnt when developing a 'grass roots' global turnout solution for emergency volunteers.

From the ground up, ideas and feedback was gathered through social media and focus groups to determine the most appropriate system for the volunteers to communicate better and do their jobs more effectively.

Jan will walk the audience through the challenges, achievements and complications of a system that has grown from 10,000 to over 17,000 in 12 months by word of mouth alone.

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**Conclusions:**

Head offices across the country are intent on telling volunteers what they need and how to conduct themselves, without always taking into account the key differences in culture held between volunteers and career personnel.

By using real people and real situations, more effective strategies can be developed for creating resilient communities.
Dynamic Personalised Recommendations for Reducing Property Risk, Using Mobile and Cloud Technologies

Risk management for natural disasters such as bushfires is an important area of concern to Governments, their responsible agencies, and communities. One bushfire risk management technique is the Bushfire Attack Level, where people in bushfire prone areas self assess the impact of property location, distance to bushland, vegetation type etc. on the property fire risk. While useful for planning, the Bushfire Attack Level gives only a static view at the time of calculation. It does not reflect the spatio-temporal dynamic of the fire risk determined by the changing weather or other dynamic factors.

Dynamic factors, such as weather, are incorporated into fire risk measures through fire danger ratings and indexes. The granularity of the fire danger ratings is coarse (at fire district level), which does not allow risk analytics to achieve a finer granularity and adapt at the same time to the dynamics of evolving weather conditions and relevant factors. Moreover, variability within fire districts can result in ratings that are incongruous with local experience.

In this work we describe a system where a mobile application gives individualised, updated notifications to users about their fire risk, and also makes recommendations on the best actions individuals could take to reduce their risk. The application helps homeowners become aware and act on the easily controllable factors affecting risks, such as accessibility for fire fighting equipment around the property, use of less flammable building materials, clearing up vegetation, identification or installation of water storage, pools or sprinkler systems.

To deliver such capabilities, the system taps into different Cloud-based information sources in real time (e.g. open data, sensors, social network), learns from history and previous actions in order to recognise patterns and act on them pro-actively and most importantly, has a granularity that can reach the individual property, with insights relevant to the homeowner.
Community Capability and Resilience: Building Stronger Partnerships

The need to develop and implement a more adaptive and flexible model for volunteering is critical to our ability to support and service Queensland communities before, during and after disasters. With an increase and encroachment of urbanisation the impact of weather events is being experienced more widely, with often devastating consequences on both person and property.

Factoring how emergency service organisations can support their communities growing needs, within their resource model, is often exacerbated by the increased expectations of response, support, and ongoing service delivery from the community.

Volunteers are a critical component in the provision of emergency services before, during and after an event. However, traditional models of volunteering are unsustainable in being able to meet the needs of communities into the future as volunteers are looking for more flexible and adaptive approaches to suit their lifestyle choices, life stages and personal values. To enable a more inclusive and enhanced, service-focused volunteering capability, Queensland Fire and Emergency Service (QFES) are redefining their entire volunteerism strategy to deliver a greater responsive capability to community disasters and emergencies.

Capstone 2020 is a volunteerism recruitment and retention plan focused on the individual, the organisation, and the wider community’s needs. Built upon an adaptive framework of inclusion, partnership and flexibility, it will enable people to commit to as much or as little as they choose, whilst still ensuring ever-changing service delivery expectations are met. Not only will this enhance the ongoing sustainability of our volunteering service well into the future, it will assist in increased community resilience, and capability and resources in times of need.
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POSTER PRESENTERS

Dr Paul Adams
Director and Chair, Aeromedical Innovation Australasia Limited

Success of the V22 Osprey in Disaster and Humanitarian Settings

The V22 Osprey was not an out-of-the box success, however its unique attributes have matured with age to a point of resilient proof that it is unmatched in capability.

Desert warfare and international clandestine operations are core report card items that the Osprey has excelled in whilst in service with the USA. A key foundation for effective international disaster and humanitarian relief operations is the amphibious ability of a responding agency.

Being able to internationally self deploy or easily transfer ship borne supplies to improvised landing sites with efficiency has been clearly demonstrated. Typhoon Haiyan and the Nepal Earthquake are shining examples of how useful such an aviation platform is in responding to urgent humanitarian need.

Countries outside the USA are starting to see the benefits in what is a significant outlay for acquisition. The 2016 Defence White Paper concedes that the ADF does not have a dedicated capability for combat search and rescue and limited battlefield aero-medical evacuation capabilities. It also pledges investigation of options to enable tasks are achieved more speedily and at longer range.

With the next generation V-280 Valor on the horizon and the AW609 nearing certification, Australasia must seriously evaluate the cost-benefit equation for the use of military tiltrotors in our region in future.
Mr Abdulrahman Al Thobaity
Ph.D Candidate, Monash University, Australia

Co-authors:
A/Prof Virginia Plummer, Monash University
A/Prof Brett Williams, Monash University

Barriers to Developing Disaster Nursing in Kingdom of Saudi Arabia

Background: The impact of disasters on lives and health is increasing significantly. In KSA, disasters have resulted in more than 5,000 deaths and more than 32,000 physically and psychologically affected since 1980. Given the importance of disaster preparedness for nurses in KSA, and the fact disaster preparedness remains unreported and the literature lacks meaningful data. In order to improve disaster nursing in this country in terms of education, planning, research and training, it is imperative to explore, the barriers that might affect its development.

Methods: The study was carried out in KSA (national) in 14 hospitals located in different cities that have been affected by natural disasters in the past and are at risk for disasters in the future. An anonymous paper based cross-sectional survey using a Likert scale (1 (strongly disagree) to 10 (strongly agree)) to quantify the barriers of developing disaster nursing in that country. Purposive sample recruited for the study comprised nurses in KSA who were currently working in emergency departments.

Results: A total of 880 out of a possible 1600 questionnaires were retained, 741 of participant were included as they have no missing values. The demographic data of this study revealed that the sample was dominated by female participants. The majority of the participants had experiences with real disasters (65%) and disaster drills (85%). There were moderate barriers for developing disaster nursing in KSA. These included a lack of research, formal education, training, organisational support, expert staff, professional development tools, and the restricted roles of nurses.

Conclusion: Nurses need formal education to enhance the disaster nursing development. Furthermore, focusing on drills will enhance the knowledge and skills of nurses in disaster nursing and improve the development of this field. This study has implications for further research and planning.
Dr Benjamin Brooks  
Senior Research Fellow, Australian Maritime College  

Co-authors:  
Dr Steven Curnin, TASWATER and Tasmanian Institute of Law Enforcement Studies (TILES)  

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Can I Train My Brain To Make Better Decisions During Disasters?  

Recently there has been an explosion in online brain training websites and apps that lay claim to reversing the reductions in brain performance that naturally occur as we age. These tools focus on aspects such as short term memory, peripheral vision and attention. They rely on the emerging understanding of neuroplasticity - that the brain can 're-wire' itself, and that we can to some extent control this process through training. On face value, it would seem that these tools might be useful for organisations involved in emergency management, as everyone would like to be more attentive, have a better memory, and enhance their situational awareness.  

However a major recent study involving over 11,000 people in the journal 'Nature' questioned the generalizability of these training approaches to other aspects of human performance (e.g., work performance) and the majority of the studies on reversal of cognitive decline have focused on geriatric cohorts or those with acquired brain injuries or genetic conditions. This leads to the conclusion that the value of brain training for emergency services is at best ambiguous. This paper reports on results in other high consequence work environments that have applied these tools. It also reports on a BNHCRC project that is evaluating the value of brain training as a support for strategic decision-making in the emergency services.
Mr David Butt
Lifesaving Operations Manager, Surf Life Saving Australia

Co-authors:
Ms Sarah Anderson, Public Safety Project Coordinator, Surf Life Saving Australia

**Tsunami: The Ultimate Guide - a Collaborative Approach to Online Community Education and Disaster Resilience**

**Context**
The impact of tsunami in the Indian and Pacific basin over recent years has been staggering. The 2004 Indian Ocean tsunami resulted in over 220,000 deaths and the 2011 Tohoku tsunami saw over 15,000 lives lost. The risk of similar tsunami events exists year round.

The Joint Australian Tsunami Warning Centre (JATWC) provides warnings of impending tsunami to minimise loss of life and damage. The Australian Tsunami Advisory Group (ATAG) faces a challenge to educate the public about the low-frequency, high-impact tsunami threat, the warning system and where to find accurate information.

It stated resilience is not solely the domain of emergency management agencies; rather, it is a shared responsibility between governments, communities, businesses and individuals. The purpose of the strategy is to provide high-level guidance on disaster management to federal, state, territory and local governments, business and community leaders and the not-for-profit sector.

**Objectives**
In 2011, the Australian Federal Government launched the National Strategy for Disaster Resilience. Under the auspices of this strategy, ATAG developed a national community education strategy to improve awareness of tsunami. Key elements include:

- The Australian Disaster Forum

Managed by Surf Life Saving Australia (SLSA) under ATAG and in collaboration with all jurisdictions, the toolkit is comprehensive and accessible. It provides nationally consistent information to improve awareness of the tsunami threat, warnings and preparedness to foster community resilience to the hazard.

**Key Messages**
There was not a comprehensive online source of tsunami information with an Australian focus. Tsunami: The Ultimate Guide fills this information gap, and, with its ATAG imprimatur, it is the authoritative reference for tsunami in Australia.

The project demonstrated a partnership between government and key stakeholders in all jurisdictions to develop, promote and enhance national disaster resilience resources for tsunami. Managed by SLSA, the online resources were designed and created through an iterative collaboration process with ATAG. It brought together scientific experts, government, emergency practitioners, community organisations and
publishing professionals to create a resource that provides authoritative, nationally consistent information that is innovative and appealing.

Discussion and conclusions
The Guide was produced in a national framework and the material created in a format that can be replicated across other hazards. Lessons from this project could assist other jurisdictions to implement best-practice community awareness programs to assist with increasing disaster resilience and therefore reducing injury.
Mr Charlie Forsyth
Director of Products and Services, Noggin

New Task and Management System a True Game-Changer for Disaster Response and Recovery in Queensland

Background
The Queensland State Emergency Service recently implemented a Task and Management System (TAMS) built by Noggin to facilitate the management of disasters and emergencies in Queensland. The TAMS software is available on desktop and mobile and depending on the severity of the disaster season, can service thousands of requests for community assistance across the state. Members of the community can request assistance either online or via phone during times of need.

The problem
In the past, the old system used by the SES was based on outdated technology, which required software to be installed on a desktop computer and was not available on mobile devices. In addition, the system had a complex interface that required a 2 day training course. This was a major issue for an organisation comprising mostly volunteers with a large turn-over rate, and who use their own devices. The system had little management information, requiring information to be exported for reporting, and the process relied on people being logged in to the system to actively search for allocated tasks.

The solution
The TAMS system addresses these issues with a number of features that help to improve the operational efficiency of the SES:

System accessibility from the field: TAMS is accessible via desktop, tablet and any mobile device, with an offline-mode that supports limited connectivity.
Simple, intuitive interface: TAMS has an easy-to-use interface, with little training required.
Executive reporting dashboards: TAMS automatically filters important information to executive overview dashboards from the entire State, and provides fully-customisable reports.
Direct notification of tasks: TAMS allows SES groups contacts to receive direct notification via SMS, email or Fax for new tasks, updates or cancellations to tasks.

The result
Since the rollout of the TAMS system in August of 2015 TAMS has handled:

7,500 volunteers and approximately 1000 users of the system
2000 public requests for assistance and 350 agency support requests
15,000 notifications (approximately 7,000 SMS, 8,000 emails, 30 Fax)

The SES has seen great success in the efficiency of responses and response times and has already proven itself as an invaluable asset in reducing the stress and burden associated with Australia's Disaster Season.
Ms Inga Lie  
Trainer and Assistant Supervisor, Sexual Assault Counselling Australia

**Vicarious Trauma: Managing the Inevitable**

The term 'vicarious trauma' is often associated with the "cost of caring" for others. It refers to the detrimental impacts suffered by people who are indirectly exposed to traumatic material, in particular workers in 'helping professions' such as Disaster & Emergency Services, Police, Health, Social Work and Counselling. Vicarious trauma can have deleterious, cumulative and prolonged effects on individual's mental and physical well-being and can seriously undermine their ability to work in a role that includes responding to traumatised clients. It presents a serious work, health and safety risk for employers, and can produce significant human and financial costs in the following areas: employee physical and mental wellbeing, work performance, unplanned absences, attrition rates, and compensation claims, and workplace culture. According to research the risk of vicarious traumatisation for professionals who work in trauma context cannot be fully eliminated. The effects of vicarious trauma can be however ameliorated if they are made conscious and addressed proactively by organisations and individuals. This presentation will introduce participants into the construct of vicarious trauma and provide a global overview of strategies that organisations can adopt to manage vicarious trauma effectively. Furthermore, it will explore the Rape & Domestic Violence Services Australia Vicarious Trauma Management Program which received the 2007 WorkCover New South Wales award for 'The Best Solution to an Identified Occupational Health and Safety Issue.' Through implementation of this Program the organisation was able to achieve a greater than 50% reduction in unplanned absence from work, elimination of workers compensation claims arising from vicarious trauma, and annual savings of nearly $100,000.
Dr Krishna Nadimpalli  
Research Team Leader, Geoscience Australia  

Co-authors:  
Mr Russell Hay, Geoscience Australia

**Natural Hazards Exposure Information Framework - A Step Towards Improving Disaster Management Capabilities**

Emergency services are continuously striving to improve capabilities to strengthen and build disaster resilient communities across Australia. However, each disaster reveals new challenges to our understanding of the exposure and impacts on government, industry and the community as a whole. An example exposure data derived from Geoscience Australia's National Exposure Information System (NEXIS) is used to produce on-demand event-based reports to the Attorney-General Department's National Crisis Coordination Centre to support the response and activate appropriate recovery assistance. Similarly, some jurisdictions also have capabilities that can derive basic exposure information. Yet, no two systems produce the same information which can lead to conflicting interpretations at different levels of government. To assist in improving the content and consistency of future exposure information capabilities the "Natural Hazards Exposure Information Framework" project has completed a review of information requirements and existing capabilities nationally and internationally.

The exposure information framework has categorised information needs into three levels for disaster and emergency management. 1. Aggregated information for policy & planning purposes for a national or jurisdictional context. 2. Aggregated information on a range of small administrative areas for emergency response & recovery. 3. Asset level data predominately for research and analysis for estimating impacts and consequences. The framework currently describes a comprehensive list of exposure elements related to buildings, utilities, infrastructure, population, businesses and primary industries.

In developing the framework, significant gaps have been highlighted in available information to derive comprehensive exposure information. To demonstrate the benefit of applying the exposure information framework, a utilisation plan is being prepared in consultation with researchers and end-users of the Bushfire and Natural Hazards CRC. Implementation of the framework will enable organisations to develop robust, reliable, consistent and sustainable exposure information capabilities to assist governments and industry to make evidence based decisions for community safety.
Emergency responders (ERs) have identified horse owners and horses as a priority in animal emergency management. They are a particular challenge for responders due to horses' size and strength, human-animal attachment and the logistics of transportation, especially in hazardous conditions. In January 2015 the Sampson Flat bushfire in South Australia burnt over 12,000 hectares in the peri-urban area of the northern Adelaide Hills, South Australia. This area contained a significant proportion of South Australia's horse population. A survey of 120 horse owners affected by the fire was undertaken in late October, 2015 to help develop ways to improve horse owners' and horses' safety in future fires while minimising the load on ERs.

Two thirds of respondents were land owners, and the rest, many living in urban Adelaide, agisted their horses in the area. Ninety per cent of respondents had a bushfire plan although only 19% had it in writing. Ninety eight per cent included their horses and other animals in their plan. People without a plan mostly lived in urban Adelaide and relied on the bushfire plan of the place where they agisted their horse(s). On the day, many people did not respond as they had planned. Most had planned for everyone to leave early but the most common action taken was 'wait and see™. Conversely, others planned to stay and defend but decided on the day to leave. Transport of agisted horses or those from places with large numbers of horses was often provided by volunteers from unaffected areas who may be unfamiliar with local conditions and routes.

The level of human-horse attachment appears to be an important driver for both respondents' bushfire preparation and planning and volunteers providing horse transport. Further research on the role of human-horse attachment must account for the characteristics of spontaneous volunteers providing transport.
Ms Kaitlyn Porter  
PhD Candidate, Queensland University of Technology

Planning for Heat: Exploring the Impact of Extreme Heat Events on Hospital Emergency Department Admissions

Background  
Extreme heat events are increasing in their frequency and duration, and cause more deaths in Australia than any other extreme weather event. The principal driver is climate change with over 97% of climate scientists in agreement that climate change is the result of human activities. These extreme heat events are causing an increase in global mortality and morbidity rates. The total economic cost of extreme weather events in Australia each year is estimated at $6.3 billion with this figure expected to double by 2030.

Aim  
This study investigated the association between extreme heat events and emergency department admissions to the Royal Hobart Hospital (RHH) for the period 2003-2010.

Methods  
Non-identifiable RHH emergency department data and climate data from the Australian Bureau of Meteorology was obtained for the period 2003-2010. Statistical analysis was conducted using the computer statistical software 'R' with a distributed lag non-linear model (DLNM) package used to fit a quasi-Poisson generalised linear regression model.

Results  
The relative risk (RR) of admission to RHH during 2003-2010 was significant over 240C with a lag effect lasting 12 days with the peak effect noted one day after an extreme heat event (p < 0.05).

Significance/Conclusion  
This study highlights the significant impact extreme heat events have on hospital admissions. Importantly, this increased demand will last for days after a heat event. These findings corroborate those of international studies. Public health organisations need to implement adaptation strategies to prepare for a climate where heat events will occur more frequently. To optimise patient care, pharmacists have extensive pharmacological knowledge to assist other health professionals by identifying medications and co-morbidities that place individuals at increased risk of heat-related adverse health outcomes. Pharmacists have the potential to provide a communication channel between patients, emergency services and hospitals thereby enhancing the resilience of the community.
Community Under Fire: An Exploration of the Impact of the 2012/2013 Tasmanian Bushfires on Community Pharmacies

Background
Extreme weather events are increasing in Australia as seen with this summer’s bush fires in Western Australia, Victoria and Tasmania. In January 2013, Tasmania experienced three catastrophic bush fires, which led to the evacuation of several communities, the loss of many properties and a financial cost of approximately AUD$80 million.

Objective
The purpose of this research was to explore the impacts of the 2013 Tasmanian bush fires on community pharmacy operations.

Method
Qualitative research methods were undertaken, employing semi-structured telephone interviews with a purposive sample of seven Tasmanian pharmacists. The interviews were recorded and transcribed, and two different methods were used to analyse the text. The first method utilised Leximancer® text analytics software to provide a birds-eye view of the conceptual structure of the text. The second method involved manual, open and axial coding, conducted independently by two of the researchers for inter-rater reliability, to identify key themes in the discourse.

Results
The two key themes identified were firstly, the psychosocial impacts on people (both patients and pharmacy staff) and secondly, challenges with medication supply. Sub-themes for patients were emotional and financial factors, and sub-themes identified for pharmacists and pharmacy assistants were personal attributes and professional judgement. From the ‘supply’ theme, three sub-themes were derived, ‘pharmacy operations’, ‘disaster management planning’ and ‘emergency supply regulation’.

Conclusion
This research identified the challenges faced as well as the psychosocial impacts of the 2013 Tasmania bushfires on pharmacies and their local communities. It highlights the need for State and Federal governments and their agencies to recognise the important primary care role that community pharmacists play during disasters. With the predicted increase in the frequency and severity of these extreme weather events, the authors recommend the inclusion of community pharmacists in disaster management planning.
The Impact of Bushfires on Water Quality

The population growth in urban areas leads to a higher demand in water supply. The quality of water is a very important factor not only from the aesthetic point of view, but also for the health purposes. This research is designed to develop a spatial approach to support the planning of the water quality in the areas subjected to bushfires, in the State of Victoria. In particular, this research involved the implementation of a GIS-embedded hydrological model in order to predict the river water quality, to assist in the decision-making process.

The impact of bushfires on water quality can be highly variable for many of the individual water quality constituents. This variability is caused by a number of landscape influences and climatic factors, most notably rainfall. High magnitude and intensity rainfall events soon after fire generate the largest impacts on water quality and sometimes trigger extreme erosion events.

There are many important water quality parameters that must be taken into account when the water is delivered to the population. For some of the water quality parameters there is very little information available, which makes it difficult to draw conclusions about bushfire impacts.

Existing modelling tools are concerned primarily with predicting event magnitude after a fire has occurred (i.e. the catchment conditions and the fire event are given). The challenge is to understand fire impacts on soil and to be able to model the connectivity between hillslopes and drainage networks for different fire severities.

The outputs of the model showed higher concentrations of suspended sediment, nutrients and metals. However, because of the limited number of water quality data available, the evaluation of the model is still in progress.
Developing a New Technology to Make Aerial Firefighting More Effective

Introduction: Aerial firefighting is obviously effective however very expensive solution to suppress forest fires; because of its high expenditures it is not useless to evaluate the real effectiveness of the whole process. This paper describes a new technology - developing in a project, called I4F technology financed by the program of Horizon 2020 of the European Union - which intends to make the process of aerial firefighting more effective. Before starting the project a study was prepared which focused on the economic efficiency of aerial firefighting. This study says that the effectiveness of aerial firefighting using just pure water is very limited but there are possibilities for extending this effectiveness using additional like foam agents or retardants. I4F (Instant Foam for Fighting Forest Fire) is an abbreviation which expresses one of the essence of the technology what is based on using instant foam.

Technology: Project makes not just theoretical calculations but also practical experiments on ground. Based on the theoretical works made before, this project focuses on pilot production. It seems, any traditional foam agent - what uses fighting against forest fire as usual today - can be also used to this technology however new foam agent has also been developing to optimize the possibilities. I4F technology uses also a special tank installed on board and the liquid is emitted in the required place by pressure. With this process the quality of the created foam become very homogeneous and some feature also can be modified during the process. For higher effectiveness at the end of the tank there is a special nozzle. It makes a stabile size foam blanket with maximum weight volume of foam on foliage. Requirements of the effective foam volume on foliage come from different studies such as R-20F and R-10A methods. Based on these, instant foam technology can suppress fires in such dimensions where others have objective limits.

Results and discussion: No doubt, in the market there are already some special water tanks, even with pressured systems, however the results comparing the extended efficiency of the I4F technology to the others seems notable. Moreover, instant foam technology is even cost effective, making the process of aerial firefighting real effective. Article presents the backgrounds of the technology, the planned ground tests, some features of the nozzles and the perspectives of the aerial tests.
Dr Agoston Restas  
Associate Professor, National University of Public Service

Decision Making Method in Emergencies at Tactical Level

Introduction: Internal security agencies, such as police, fire department, disaster management in many cases face special or emergency situations without any signs in advance. In these cases decision makers are under time pressure and they do not have enough time to make the traditional, analytical based decision making method. Despite the above well-known circumstances during education and trainings managers get information mostly about the theory of traditional decision making processes even if practical trainings obviously focuses on the quick responses as tactical elements. This article deals with internal security managers especially faces to firefighters, how they make their decisions during emergencies mainly at tactical level.

Method: A word and picture association method is introduced specially designed by the author to demonstrate the differences between the traditional and time pressed decision making method. Results of the analysis of both word and pictures association methods demonstrates the differences of gravity and orientation of internal security managers’ decision making method.

Results and discussion: Results reveal the most essential but limiting factor is time, proven by essay analysis. This provides a framework impossible to burst and a forced drift, a pressurized channel for the decision-maker, entangled in which one can no longer break free. The above proves that in certain situations, the multi-criteria, analyzing, evaluating decision-making simply cannot be used or only in a limited manner. However, it can be seen that managers, directors or commanders are many times in situations that they simply cannot elude from their decisions; they should make them in a short time. The functional background of decisions made in a short time, their mechanism different from the conventional one was studied lately, and was given the name recognition-primed decision to this special decision procedure.
Rewritten hospital response plans and heightened national security, including an increase to the terror threat level, were the drivers for a large metropolitan hospital in conducting a multi-agency chemical, biological, radiological (CBR) Counter Terrorism Committee sponsored field exercise. Internal incident management arrangements and integration with external Emergency Services were evaluated in response to a chemical attack at a mass gathering, involving the contamination of a dignitary and multiple victims. The exercise enabled the practical application and validation of multiple emergency response plans whilst fostering relationships with external agencies, and most importantly, identifying opportunities for improving patient outcomes. Volunteers were recruited to represent mass victim presentations, and staff and resources were deployed as per the Hospital’s response plans. Exercise outcomes included the rapid deployment and assembly of the mass decontamination shower unit, effective campus zoning and security, efficient decontamination of 30+ chemically-exposed victims, and a significant increase in campus-wide practical knowledge of CBR response. Areas identified for improvement included scene control structure, the Disaster Reception Area model, and internal communications.
Enhancing Community Resilience Through Personalised Understanding of Risk and Vulnerability to Ember Attack

Bushfire risk management in the peri-urban fringes is a combination of actions by individuals and governments to manage their environment for personal and community benefit, often with competing priorities. Governments and agencies typically have responsibility for the management of local bushland, with recreational, ecological and financial concerns. With respect to bushfire risk, such areas are typically managed to reduce the risk of radiant heat and direct flame impact on local houses should a bushfire occur within these lands. In addition, planning regulations place limitations and controls on individuals to address aspects of bushfire risk related to e.g. construction material, while actions such as Total Fire Bans address activities likely to lead to fires.

At the household level, individuals are responsible for understanding their bushfire risk and taking personal action to be informed and prepared for bushfire activity within their community. This responsibility has not however reliably transformed into action, with many ill-prepared for a bushfire emergency within their community. One possible contribution to this is the generalised nature of information and services.

As part of a larger project to provide personalised insight into bushfire risk and vulnerability with recommended actions, we review the contribution of embers to the total bushfire risk through a model for the expected ember load impacting a property. This model is informed by the characteristics of damage recorded from the Hastings Bushfire at Warringine Park, where ember attack has been identified as the initiating cause of all property damage. The personalised nature of this dynamic risk information educates and empowers homeowners to take action to reduce their personal risk, while this information collectively enables councils and other responsible agencies to adapt and respond to the specific priorities of their community - leading to improved community resilience.
A Decision Aid Tool for Dynamic Deployment Of Fire-Fighting Assets in Response to Changes in Fire Risk

Effects of bushfires can be devastating, costing lives and damaging the environment and economy of the affected area. Timely response to fires with an appropriate configuration of fire-fighting assets is crucial for minimizing negative effects. A vital factor in achieving timely responses is the ability to efficiently allocate available resources among accessible stopping locations, including fire stations and viable roadside locations, at different times of the day.

We demonstrate a deployment optimisation tool that assists in making rapid and effective decisions for dynamic reallocation of fire-fighting assets, with the aim of minimizing overall fire risk remaining in the targeted area at any given time.

Our deployment optimisation model is able to deploy different types of fire-fighting assets dynamically among the available stopping locations. We show how changing different real-world constraints (such as resource types and their characteristics, capacity constraints for stopping locations, response time constraints etc.) impacts on the overall fire risk for properties in the area. Given a risk measure for each individual property for each hour interval, our objective prioritises coverage of properties with highest risk. Also, response time for resource vehicles is calculated as travel time along the road network.

We showcase our model for a set of properties in the Blue Mountains area, NSW, Australia and we explain how we deal with the complexities of big data computations by developing a scalable clustering model that clusters similar properties based on property risk and distance to accessible roads. The clustering model is not static but changes every hour to cater for dynamic changes of property risk due to changing weather conditions and relocation of fire-fighting assets during the day.

Experimental results show that our scalable optimization model is effective in terms of property coverage and risk reduction while remaining efficient in the amount of time required to obtain solutions, making it practical for real-time applications.
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**An Effective Data-Driven Temporal Bushfire Risk Prediction Approach**

Ability to predict the risk of damaging weather events (e.g. bushfires) is crucial in helping the emergency services in their decision-making processes, to mitigate and reduce the severity of such events. Today, a well-established McArthur Forest Fire Danger Index (FFDI) is extensively used to estimate the risk of bushfires in Australia. However, with the advent of the Internet of Things based on sensors and sensor networks, more accurate forecasting models of fire danger can be potentially proposed.

In this paper we propose a data-driven approach to supplement the existing methodology to predict the bushfire risk. We show how we address the inherent challenges of such an approach that arise mainly due to the temporal dynamicity of weather data. Weather observations naturally change in time, with finer-scale variation (e.g. stationary day or stationary night) or large variations (non-stationary day or night), and this determines a temporal variation of the predicted risk.

We show how our dynamic bushfire risk prediction model addresses the abovementioned challenges using data mining techniques and can be customized to different regions individually. We developed a novel predicative model that is dynamically parameterised by analysing historical data for that particular region. The advantage of our solution is that it maintains multiple historical models for different temporal variations (day versus night), which leads to higher prediction accuracy of bushfire risk. In addition, our solution is completely unsupervised and does not rely on expert knowledge, which makes it flexible and easy to be applied in any region of interest. Considering multiple bushfires locations in the Blue Mountains 2013 bushfires as a case study, we have compared the results of our model with the existing FFDI methodology. Our experimental results show that our predictive model in combination with FFDI has a higher accuracy in predicting the danger of 2013 bushfires, which makes it an effective model to supplement the FFDI.
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Capacity Building at the Grass-Roots Level: A Perspective from the Developing World

Colombia (South America) is a developing country vulnerable to both natural and man-made disasters. This became particularly apparent in 2010 and 2011 with "La Niña" phenomenon, highlighting the need for policies and strategies directed towards improved disaster risk management. Relevant legislation that aimed to promote sustainable development was introduced in 2012 and incorporates disaster risk management into sectorial and territorial planning. Implementing these top-down plans and regulations at the local level however is not a straightforward process and often fails to address specific local, contextual needs and fails to build on local resources and capacities. The purpose of this paper is to highlight the relevance of the bottom-up approach, providing lessons in the value of local capacity building initiatives in a context with significant limitations and challenges.

Since 2013 a community-based disaster risk management initiative has been implemented with the Volunteer Firefighting Service in Chía, a middle size city in Colombia. The purpose of this project was to strengthen the local disaster risk management capacity by working with a local community organization which has played a lead role in different aspects of disaster risk management in the municipality and to provide a model for other regions. The process initially supported by an Australian private organization, has recently been complemented with research done by the University of Queensland.

The initiative has empowered the organization and revalidated its leadership within the municipality. It has improved administrative procedures increasing budget availability and improving resource allocation and use. It has promoted the introduction of contemporary concepts on disaster risk management and community participation. It has produced for the first time in the municipality a formal assessment of aspects such as risk perception, disaster experience, hazards and preparedness information, self-efficacy, trust, empowerment, and the extent to which people engage or plan to engage in preparedness activities.

While there is still much work to be done and cultural change to be achieved, initial positive outcomes are encouraging. The experience points to the need for local, context sensitive capacity building and the need for international organisations to partner with local organisations at the grass-roots level.
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Ms Judith Hewitson, Reality Learning

Building Confidence- Innovative Education Programmes that Increase Volunteer Healthcare Engagement in Disaster Management

When hearing about the need for disaster preparedness, health care professionals say "not me, not here." As disasters increase, they are not prepared. Around the world they, and students, need to learn and have confidence to apply their existing skills to disaster preparedness and response. How do we build their confidence to participate in pre and post disaster responses?

This presentation highlights three issues- directing the attention of health care professionals to the field of disaster preparedness and response, helping them to see the relevance of this to their own country, and showing them how to apply their professional skills in disaster management.

Two projects are presented. The first is an innovative online reality learning module that enhances occupational therapy professional knowledge and skills for tackling complex issues related to disaster management. Using three global scenarios, learners engage, participate and collaborate in real-time scenario webisodes depicting unfolding events and issues. This simulative learning experience includes international experts commenting on issues related to each stage of disaster response; and forums and reflections that expand skills in working with community and neighbourhood leaders.

The second project is a learning opportunity for occupational therapy students in which classroom learning is followed by field visits to villages affected by disaster. Students use activities to interact with villagers. They then reflect on the experience to gain greater insights into such issues as: post disaster temporary housing; accessibility; concerns of persons with disabilities; working with leaders to accommodate elderly persons and those with disabilities, pre and post disaster and supporting the reestablishment of routines and occupational opportunities.

The paper finishes with some reflections on the strengths and weaknesses of these approaches to engage students and therapists in vulnerable and disaster-struck areas.
Trends in the Accuracy Of Weather Prediction - An Update

Stern and Davidson (2015) recently published an analysis of trends in the skill of weather prediction for Melbourne, Australia, at lead times of 1 to 14 Days. Datasets of weather observations and official and experimental predictions were used to document trends in weather forecast accuracy out to Day-14 for maximum and minimum temperature, and for precipitation amount and probability.

The accuracy of the current official Day 5-7 forecasts was found to be similar to that of Day-1 forecasts from 50 years ago. The accuracy of experimental Day 8-10 forecasts was comparable to that of the Day 5-7 forecasts, when they were first officially provided 15 years ago. Some overall skill, albeit limited, was evident out to Day-14.

Stern and Davidson (2016) examined the potential for day-to-day forecasting beyond Day-14 utilising a numerical model that provides such forecasts out to Day-32 by calculating the correlation coefficients between forecast and observed inter-diurnal sets of changes in maximum and minimum temperature, and precipitation amount and probability. The analysis suggested an absence of skill beyond Day-14.

The purpose of the current presentation is to update these earlier results.

References


Mr Keith Suddes
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The Elephant in the Room...CDEM’s Role During a Terror Event

This poster highlights situations locally, nationally and internationally which directly affect the communities in which we live and work.

Civil Defence and Emergency Management organisations generally response to natural hazards and utility / infrastructure failures.

However, in recent times, the resources and skills possessed by CDEM have been called upon to support emergency services when criminal or terror events occur.

The size of the event, the displaced communities and business people as well as the recovery from such incidents requires the coordination of many stakeholders in support of first responders and the welfare of all those involved.

The information on this poster will promote discussion by CDEM staff, management and leaders about their responsibility to one another and the emergency services, stakeholders, businesses, and communities they support.
Capability Enhancement through Disaster Management Education and Training - the Queensland Experience

Disaster management training is an essential component of capability enhancement and is one of the activities undertaken to maintain and enhance the Queensland disaster management arrangements. Section 16A(c) of the Disaster Management Act 2003, provides the legislative requirement for those involved in disaster operations to be appropriately trained. Disaster management training is also identified in the key outcomes of the capability integration component of the Standard for Disaster Management in Queensland, under the Emergency Management Assurance Framework.

To support these requirements and outcomes, training for Queensland disaster management stakeholders is undertaken in accordance with the Queensland Disaster Management Training Framework.

This paper will explore the disaster management education and training journey in Queensland from the 2011 implementation of the Queensland Disaster Management Training Framework, the significant continuous improvement review in 2015; the injection of vocational and higher education training across 2014-2016, through the Regional College of Disaster Management initiative; and the development and implementation of the Disaster Management Learning Management System in 2015. It also considers current and future challenges in disaster management training and across the broader context of capability enhancement and integration.
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