NSW Health
Disaster Mental Health

Handbook 1 - Resilience & Disaster Adaptations

A collaboration between NSW Health and University of Western Sydney

Handbook 1 - Resilience and Disaster Adaptations

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Resilience is a concept of growing focus and significance with respect to disaster and other adverse circumstances. In the disaster field it is usually described in terms of the capacity to deal with the hazard of disaster in ways that reflect strengths, capacity to respond without significant disruption to function, and with positive outcomes. Resilience can apply to individuals, systems and organisations, societies, cities and also to physical structures, natural and man-made. There is increasing agreement that resilience is a process, although definitions and measurement of resilience have not yet adequately encompassed this. Resilience is just one of the adaptive processes. Post Traumatic Growth is another. More negative adaptations also occur and will be discussed below.

The Australian Government, at the meeting of the Council of Australian Governments in December 2009, committed to the National Disaster Resilience Statement and the development of a National Disaster Resilience Strategy. It highlighted the following points:

i. That there is a collective responsibility for resilience at community and individual levels
ii. That governments at all levels have a significant role in strengthening the nation's resilience to disasters
iii. That there is a need for a National Disaster Resilience Strategy
iv. That businesses could play a fundamental role supporting communities' resilience to disaster
v. That individuals themselves have a significant role in preventing, preparing for, responding to and recovering from disasters, and building resilience
vi. Non-government organisations and volunteers also play a major role

This strategy is now in place and can be viewed at http://ag.gov.au. It will be discussed further in this chapter in the context of community resilience, but also has significance for individuals, organisations including businesses. It has a major focus on "the shared responsibility of governments, business and communities in preparing for, and responding to disasters".

Aims

To identify and describe resilience and other major adaptations that may occur in response to All Hazards, and across Prevention, Preparedness, Response and Recovery. These include, but are not limited to:

1. **Resilience,** individual and collective; resilient trajectories, their recognition, definitions, potential assessment or measurement; and strategies for potentially enhancing resilience for individuals and systems in disaster contexts.
2. **Post Traumatic Growth and other positive adaptations**, their recognition, definition, measurement or assessment; and significance for individuals, groups and organisations.
3. **Action Focused Adaptations** which may reflect resilience, post-traumatic growth or other effective processes, or may be associated with positive outcomes or negative
4. **Dysfunctional Adaptations,** for instance: paralysis of effective response; inhibited, non response; fear-driven inappropriate responses to threat (panic / inhibition); failure of leadership; denial of reality; inappropriate aggression; "splitting" so no unified action occurs; inadequate resource provision (when resources are available); overwhelming and demoralisation of populations. These may include at a broader level, continuing chaos, social disintegration, and the like.

1. Resilience

For the most part the concept of resilience in disasters has been researched, and understood in four main contexts: Individuals, Communities/ Societies, Systems, and Organisations.

"Wellbeing" is one of the domains in which resilience "outcomes" are viewed. This is an identified positive process / outcome and could be seen as relevant for individuals, communities, organisations and so forth. "Wellbeing" has been measured for population studies on individuals in terms of the Australian Unity Wellbeing Index for instance (http://www.australianunitycorporate.com.au/community/auwi/). Nevertheless it is not established that wellbeing is the only major domain of resilience for individuals or collectives, or for resilience as

a process over time. It is important in considering resilience across all levels that there is recognition of the multiple domains and trajectories of human adaptations and the capacity for resilience, and suffering, resilience and maladaptive processes to co-exist.

a) Individuals and Resilience

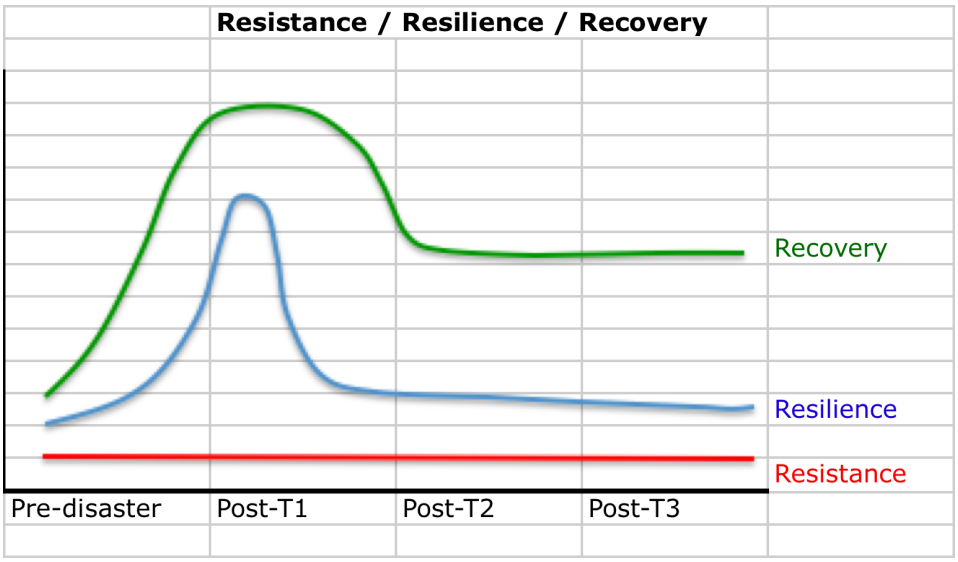
Resilience has been defined and described in many different ways chiefly reflecting the capacity to "bounce back" in the face of adversity or challenge. The term has been used in technical fields such as engineering, in environmental concepts, and in the human biological, psychological, social and cultural adaptations people may make in response to threat and adversity.

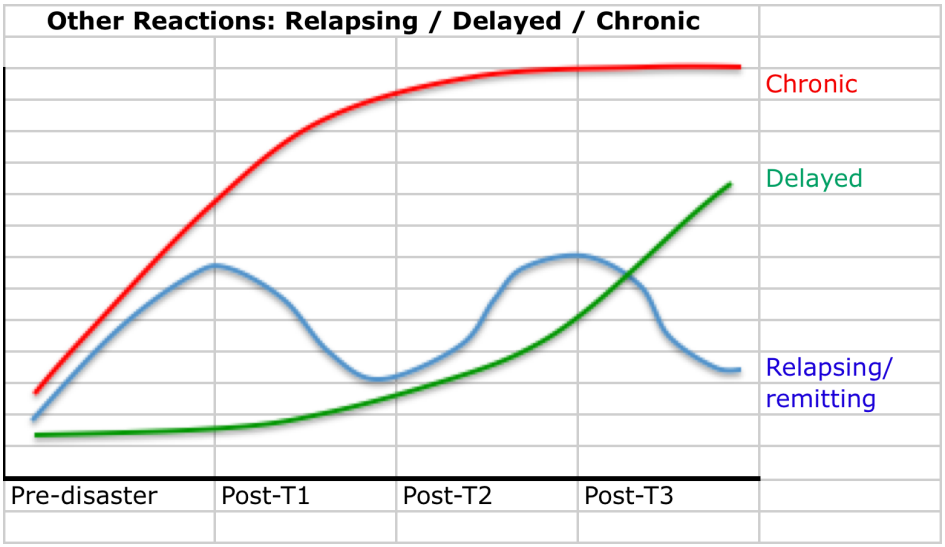
This paper identifies the concept of resilience in relation to traumatic experiences, which is the field in which most disaster related concepts are considered. However it's meaning is usually broader than this, as will be discussed in relevant areas. In terms of disasters / All Hazards, it is identified as relevant to disaster prevention, preparedness, response and recovery. For instance resilience may help individuals or communities act to prevent a disaster through actions of fire mitigation; through preparedness with knowledge, information and competence to mitigate risk; through response by efficacy in emergency action, and through recovery by community strengths, initiatives.

Resilience is more than bouncing back, more than the absence of pathology, is a process over time, "bouncing forward", with future orientation. In the disaster field it has been described as the capacity to experience a psychologically traumatic exposure without developing PTSD, or similar pathology following a major loss or bereavement (Bonanno & Gupta, 2009). It is suggested in Bonanno's research that those so exposed who developed one or zero PTSD symptoms would be defined as resilient to trauma. This concept may be useful when specifically addressing the response following Potentially Traumatic Events (PTEs).

In ongoing analyses and studies (Bonanno et al 2010a, 2010b) highlight the resilience of most, the multiple trajectories following exposure, which are influenced by both risk and resilience factors, and the findings that despite resilience, disasters can put families, neighbourhoods and communities at risk. Norris et al (2008) have looked in depth at resilience of individuals and communities. They looked at resilience and related concepts, for instance resistance (to trauma exposure) with no or mild reaction; resilience; recovery; chronic dysfunction; delayed reaction (Norris et al 2009).

These can be represented diagrammatically as described in Norris et al's work.





Figures adapted from 'Looking for resilience: Understanding the longitudinal trajectories of responses to stress', F.H Norris et al, Social Science & Medicine 68 (2009). Figure 1, p2191.

As can be seen this model of resilience, as experienced by and reflected in the response of individuals, focuses on symptoms, with the assumptions of what is normal, and recognition of this process over time – i.e. a person may be resilient at one time, but not at another (Norris et al, 2009). A range of vulnerabilities may potentially influence mental health trajectories over time, such as new or continuing stressors or other triggers, or alternatively protective factors may operate to influence the nature and course of any reaction.

The critical importance of extending research in this field to more sophisticated levels that can assist with the development of intervention programs and scientific bases for its relevance to disaster PPRR, must be emphasised.

Resilience may be influenced by:

- Personal factors of the individual: personality, temperament, coping styles, personal strengths, biological factors, demographic variables such as age and gender
- Nature of the stressors to which the person is exposed, particularly the extent of threat to life, losses, the danger generated by a disaster
- Past experiences, and vulnerabilities and strengths that might have resulted from these
- Support provided by family and significant others in one's social network, and one's connectedness with its members. Perception of such support, i.e. whether perceived as helpful or not, is a critical aspect.
- Resources available including: information, practical, financial, social and other resources
- Further stressor exposures, adverse life events, or ongoing stressors or consequences of the original incident, and the duration and intensity of exposures.

Resilience may also be influenced by:

- Capacity for flexible adaptive strategies
- Capacity for pragmatic coping
- Variable exposures
- Other vulnerabilities such as
    - Developmental vulnerability
    - Physical, cognitive, emotional, social, health and other vulnerabilities
- "Too much" exposure to trauma, loss and adversity, leading to a 'tipping point' of less adaptive response (e.g. significant numbers of current, recent or cumulative major life stresses)

Positive physical and social resources may increase the likelihood of resilience at one time but further difficulties may alter a resilient trajectory at a later time.

Resilience may have multiple domains:

It has been described above as the response to individual experience of trauma in terms of the development of psychopathology or not.

It may also be related to survival of the self or others in the face of adversity.

Individual Resilience in Tough Times

In an Australian population study of how individuals (adults) manage adversities, it has been found in response to the question "what are the things that get you through tough times", that a range of strategies are used, reflecting resilience. The reported strategies were: turning to family support or relying on oneself (52%); to friends and neighbours (21%); use of positive emotional and philosophical strategies (17%); using a sense of humour, determination, and the belief that things would get better; and spiritual / religious belief (Taylor et al, 2010). These were variable to a degree for women and men, and for those with lower incomes (e.g. more positive emotional and spiritual strategies). These findings show some of the wide range of personal and social resources people use in resilient ways. Similar strategies are likely in varying degrees in the face of mass adversity.

Resilience and vulnerability

Research increasingly highlights the potential effects of gene / environment interactions in both vulnerability and resilience in the face of adversity or traumatic exposure. Caspi et al (2010) have recently reviewed the gene-environment interactions in terms of the serotonin transporter gene and environmental interactions in terms of stress responses. They highlight the complexity of this research but note consistent findings suggesting that the 5-HTTLPR S-carriers are "characterised by the stable trait of negative affectivity that is converted to psychopathology only under conditions of stress" (p.515). Exposure to stressors may thus be more likely, in vulnerable individuals, to lead to trauma or depressive syndromes after disasters. Clearly there is a need for further research development before these issues can be operationalised in therapeutic settings and clinical contexts, let alone disasters. This is the more so in terms of the variable findings and conclusions in this complex field.

Resilience in the disaster context

Resilience in the disaster context has usually been considered as the way people adapt in the Response and Recovery processes. It is suggested that training beforehand in Prevention or

particularly in Preparedness may contribute to greater resilience in the face of threat (Morissey & Reser, 2003). Studies such as those of Ronan et al (2008) have highlighted the importance and effectiveness of engaging children and their families in disaster preparedness in terms of natural hazards. They found in their school based intervention studies, that children and families made a number of hazard reductions as a result of such interventions. This led to greater preparedness and it is likely that there was enhanced capacity to deal with a disaster, though this was not specifically reported.

First responders, for instance, report they are more confident and effective if secure about their preparation in terms of skills and knowledge for dealing with disaster hazards, (Chaffee, 2009, Stevens et al, 2010) and if their protective and response equipment is of the required standard and capability – i.e. they trust its effectiveness and the capacity to keep them safe (Reilly et al, 2005, DiMaggio et al, 2005). Learning how to manage fear regarding actual or possible exposures, for instance with CBRN (Chemical Biological, Radiological or Nuclear threat), may also help such responders to be "resilient". Increasing knowledge about hazards, potential actions for safety and survival may also assist. However scientific evidence, such as Randomised Controlled Trials (RCTs), is not as yet available regarding these issues. Here, as elsewhere, understanding of resilience is complicated by the wide use of the term descriptively, its differing meanings, and the limitations of the currently utilised measures, and their reliability, validity and conceptual bases.

Resilience and vulnerability in childhood

Research and work with children growing up in very adverse social environments has identified their developmental resilience in many such circumstances. Masten (2001) has labeled this as "ordinary magic", in terms of their capacity to progress despite such challenges. Rutter (2006) has emphasised the importance of gene-environment interactions and developmental processes in resilience in childhood, and the significance of family and other environments. Both these authors also highlight the importance of certain assets in protecting the child's development. These include factors that have enhanced the child's sense of efficacy, self-esteem and worth, being valued, and the capacity for rewarding achievement. Connections to competent, caring adults in family and community; and connectedness to peers and others can assist, particularly if they are in positive environments, such as schools, and where they may also have the support of other trusted adults such as teachers. Building cognitive and self-regulations skills, motivation to succeed, and positive views of the self, may also be helpful. Some intervention strategies in school settings have aimed to build resilience

for children and young people, and to improve their mental health in this process, for instance the Resourceful Adolescent Program (Schochet et al 2004), and others aim at supporting the child's emotional and cognitive development through parenting and school-based strategies. Early home visiting programs for women in the latter stages of pregnancy and particularly during the infant years have been shown to have long term positive outcomes for children who may be at risk (Olds, 2006). Community-based parenting programs (Triple P) provided universally have been shown to diminish risk of conduct problems (Zubrick et al 2005a). A Triple P program for post disaster support for parenting has also been developed (M. Sanders, personal communication, 26th September 2011)

Such resilience in childhood may continue to be relevant at later stages of development into adolescent and adult life, but may also be threatened by later adversities.

Children's resilience and adversity

Recent evidence has focused on the prevalence of adverse experiences in childhood, particularly for some children such as indigenous children (Zubrick et al, 2005b). Broader studies include cross-sectional, longitudinal and retrospective reports (Olesen et al 2010, Copeland et al 2007, Green et al 2010, and McLaughlin et al 2010). Adversities are common and many of them potentially traumatic with very significant impacts on mental heath both in childhood and in terms of heightened problems in adult life, especially those adversities associated with abuse and violence. Family disruptions, conflict, losses and substance use, health and mental health problems may all contribute. These studies clearly together demonstrate the major contribution such childhood experiences make to child and adult mental health problems and other morbidity. Disaster stressors may be superimposed on such background experiences and vulnerabilities. This type of "resilience" is understood here too, as the absence of pathology, where there was heightened risk of it potentially occurring – i.e. it is an absence.

Children and resilience in the disaster context

There is increasing interest in and research related to children's and adolescent's resilience in the face of traumatic experiences such as disasters. There is recognition of the impact of exposure to severe life threatening events ("I thought I could die"), deaths of loved ones, in contributing to vulnerability to post disaster mental health problems, including PTSD, anxiety disorders, depression, and possibly Complicated Grief, as well as the influence of post incident variables that may increase

risk. The latter include parental disaster related mental health problems, and ongoing disruptions of family life, school and sense of security.

It is also clear that a significant proportion of children who experience such adversity are "resilient". They may even grow psychologically through the aftermath, without symptoms or developmental disruptions. Protective factors have been demonstrated in studies post Cyclone Larry in North Queensland and studies in other natural disasters (McDermott et al 2009, conference presentation). Predominant in these circumstances and other studies by this researcher is the role of connectedness with others in protecting the child through such disaster experience, and specifically in this study, the child's connectedness in the school setting.

Security and continuity of family and school life are potential elements of connectedness, but it should be noted that "resilience" of families, as measured in one study, was not protective.

Some recent research has explored the courage and courageous behaviours of children, and suggests these may also be part of, or contribute to, resilience (Muris, 2009).

Ronan et al (2008) have studied the importance of preparing children and their families for facing natural disasters through a school-based program of the 4Rs, one of which is Resilience (see also previously). This involves building knowledge about hazards and what to do, as well as making a plan, and "adjusting" hazards beforehand. There is a component in schools, and homework for children to work with their parents to develop a family plan for any likely emergency. This had effective preparedness benefits compared to controls. Such preparedness may contribute to resilience when the emergency occurs.

Family resilience

There is a growing interest in family resilience, although it is variously defined (Robinson & Parker 2008). The Australian Family Relationships Clearing House has explored the role of prevention and early intervention strategies in strengthening families and relationships. As they note the strengths-based approach is often only considered in terms of a family member presenting with a problem. Families experiencing crises have been asked to identify their strengths and how they have used them effectively in past crises (Geggie et al 2007); or alternatively successful families have been studied (Babington, 2006).

Couple relationships' wellbeing has been reviewed and reported as being based on: commitment for the longer term; communications that are positive and respectful; conflict resolution; interaction and time together; intimacy and emotional support.

While a variety of factors have been considered for family wellbeing, the model of the Family Strength Research Project (Family Action Centre, University of Newcastle, NSW) has produced a useful set of qualities or indicators:

- Communication: frequent, honest, open
- Togetherness: sense of belonging, family bonds, values
- Sharing activities
- Affection: demonstration of love, concern, interest for each other
- Support: assisting, encouraging, "looking out" for each other, seeking and giving support equally
- Acceptance: respect and understanding, acceptance of each other
- Commitment: dedication, loyalty, family as a priority
- Resilience: ability to withstand and rebound from adversity

This model includes resilience per se so it is not an independent measure, but does indicate domains that are reflected in other conceptualisations of resilience.

McDermott et al (2009) explored family resilience in the aftermath of disaster using a form of the McMaster Family Assessment Device with domains of:

- Problem solving
- Communication
- Roles
- Affective Responsiveness
- Affective involvement
- Behavioural control
- General functioning

As noted previously this was not shown to protect children experiencing this disaster, ie. be associated with resilience in terms of mental health symptoms, but it may be valuable in other contexts with further research development.

Enhancing individual resilience, building family strengths and resilience, is clearly important for individual resilience, as identified in the study above. And as well, as described by Landau (2007) in

her model of Linking Human Systems (LINC) through the inherent competence and collective strengths can also contribute to community resilience through LINC interventions that "engage respected community members to act as natural agents for change" (p.351). Nevertheless with current family / life and adaptation challenges, families may be less resilient and require further focus to support their own resilient trajectories over time and development.

Resilience and other potentially vulnerable populations / people

There is recognition that some individuals or groups may be more vulnerable to the stressor exposures associated with disasters, and potentially less resilient. Some of these concerns are dealt with in sections of this handbook addressing the specific needs of these groups. Key issues arise around whether previous experience / preexisting factors have led to a strengthening of capacity to deal with such exposures, i.e. greater resilience, or whether they have made people more vulnerable to the impact of the disaster. This is exemplified, but not as yet clear from research, in the following observations and hypotheses:

Culturally and linguistically diverse populations.

These may be more vulnerable through past traumatic experiences, for instance as refugees or in migration, or from experience in conflict affected countries, or through language and communication difficulties, or threat or discrimination in current environments, or they may be more resilient through strengths built from dealing with past adversities, resilience inherent in their survival and migration, connectedness of families and communities.

Indigenous populations or people may be more vulnerable through their social and economic disadvantage, their experience of multiple and transgenerational adversities and their health and wellbeing impairments. But they also acknowledge their resilience in their connectedness as a people, to their community, to their land, through their culture and in their strengths in terms of their dealing with adversity.

People with physical or mental illnesses and disabilities may be vulnerable because of these adversities, particularly in lack of mobility, access to communication, lack of resources and ongoing stressors. Their resilience may be in their overcoming these adversities, a life where adjustments are known and adaptations made to "make do" have known value when things go wrong.

Older people. They may be more vulnerable because of their frailty, isolation, fewer resources, less connectedness. They may be more resilient because of learning from past experience, less fear of death, less to lose, and so forth.

These examples are not linked to by specific research on resilience. But they make clear the complex nature of resilience, the multiple strengths, vulnerabilities, and the variability.

Measuring individual resilience

One of the challenges about these diverse aspects of conceptualising resilience, both at certain times and as a process, is that there is little agreement about its measurement. Some strategies that have been used include the following:

In terms of pathology spectrum outcomes there is:

- A 2 item scale - the Connor-Davidson Resilience Scale (Connor & Davidson, 2003) which has been derived from the larger scale, and is validated and widely used

'I am able to adapt to change'

'I tend to bounce back after illness or hardship'

Not at all true
Rarely true
Sometimes true
Often true
True nearly all of the time

- People can also be asked about their coping strategies, i.e. how well they have coped, or think they would cope, e.g. 'How well do you think you would cope in an emergency situation' (not at all well, not very well, moderately well, very well, extremely well)
- People can also be asked about hopefulness and optimism e.g. 'Generally are you an optimistic person?' (none of the time, a little of the time, etc). These variables frequently indicate resilience, as do other possible questions (Carr et al, 1995, 1997a & b)

- There are also possibilities such as suggested by Bonanno (2006), and Norris et al (2009) in terms of low or no symptom levels after stressor exposure, measuring an absence rather than an attribute

Perceptions of meaning are also important when considering resilience. People may not have perceived the incident as a threat, or stressor. They may have seen it as a challenge. In this case it is less likely to evoke negative reactive processes and the person may be more likely to perceive himself or herself as adapting positively. The threat of a deliberate attack, like terrorism, may lead to a sense of helplessness or victimhood, and associated with this, less resilience. Or it might mobilise energy to not 'give in', to fight back, "hardiness" or fighting spirit, and demonstrable resilience in association with this.

Interventions for Enhancing Individual Resilience

A number of strategies have been developed with the intent of enhancing individual resilience, but there has been limited research supporting these and no clear linking of this to the disaster context. Strategies for the military have been developed, in terms of enhancing resilience pre-deployment (Cohn et al, 2010).

Interventions aimed at enhancing resilience have strong elements of building preparedness to deal with threats such as disaster, combat. However resilience interventions have also been developed in school-based programs aimed at reducing the risk of depression, e.g. the Resourceful Adolescent Program (RAP, Shochet et al 2009) as discussed above. With respect to military preparedness and resilience, and Australian report by Cohn et al (2010) reports on a strategy "BattleSMART" (Self Management and Resilience Training). This is a cognitive behavioural program that aims to develop both "arousal reduction techniques" and "adaptive cognitive coping strategies". This program for the Australian Defence Force is currently being evaluated in collaboration with senior researchers from the US military. It is also supported in terms of understanding resilience over time by the "LASER" project, which is a longitudinal study of resilience over time.

The implications of these approaches highlight the different contexts of resilience enhancement strategies, the core elements of cognitive behavioural focus in many of these, as well as the

emerging recognition of very heightened arousal in response to a major stressor as a potential indicator of vulnerability to pathology.

A recent preliminary randomised clinical trial of a resilience-oriented intervention for PTSD focusing on positive emotional health and cognitive performance showed benefits, chiefly in terms of with positive emotional health and affective symptoms (Kent et al 2011). Further studies will be important, with the options of building cycles of positive response (e.g. Frederickson and Joiner, 2002).

Mental Health Implications

Resilience, the capacity to be resilient, "hardy" in the face of exposure to stressors may depend on many factors, including context, past experiences, and access to resources, support, etc. Nevertheless it is likely that some actions may be helpful in enhancing the natural resilience of most people in such circumstances. Potential actions include:

- Expect and support resilient behaviours and psychological strengths
- Preparedness to deal with potential hazards is closely linked to the capacity to be resilient in the face of threat. This may involve: building knowledge about threat and what to do to protect self and others; planning at personal and family levels how to handle emergencies; identifying strengths and resources to act.
- Connecting with others and mutual support help to build resilience in the face of adversities
- Communication and information can assist with dealing with threat and risk, and with connecting with others in one's "community", e.g. school, town, work, etc.
- Shared actions with family or others close, can provide both connectedness, and practical preparedness planning
- Coping strategies that address problem solving, risk management, how to deal with arousal (e.g. slow breathing), and tuning to one's feelings can all reflect elements of resilience.
- Resilience strategies such as those focused on building knowledge and competence to deal with possible disaster threat, supporting more optimistic and positive thinking and emotions, practical problem solving, and increasing sense of self efficacy may be considered in line with some of the effective strategies described above and the structured "BattleSMART" program of the ADF (Australian Defense Force).

b) Resilient communities / societal resilience

This is an area of growing interest in that those planning for potential mass hazard in terms of natural disaster, terrorism, pandemic and the like. It links to concepts such as community engagement where government and other agencies may attempt to educate and help communities to prepare for possible disaster, with the view that this may mitigate negative outcomes through building their resilience.

Australia's "National Strategy for Disaster Resilience" aims to "improve Australia's ability to withstand and recover from future disasters" (COAG Communique, 13th February 2011).

National Disaster Resilience Strategy: Australian Government

This important strategy addresses the key issues in line with Council of Australian Government's "COAG National Disaster Resilience Statement". This statement emphasises: Collective responsibility for resilience, role of Government; National Disaster Resilience Strategy; role of business; role of individuals; role of non-government sectors and volunteers.

The Strategy deals with the following themes:

1. Why Change is needed. While recognising the resilience and resourcefulness of the majority of Australians in disaster situations, it identifies "the need to develop and embed new ways of doing things to enhance existing relationships across and within government" (p.2) as well as with the business, non-government and community sectors so as to enhance resilience. This is needed because of factors increasing vulnerability in terms of work-life challenges, socio-demographic factors, resource access, and "the escalation in the frequency and magnitude of hazards" (p.2). It aims to enhance "action-based resilience planning to strengthen local capacity and capability, with greater emphasis on community engagement" (p.2), also with better recognition of the strengths, vulnerabilities, diversities and needs. There is a major emphasis on "shared responsibility", i.e. responsibility for all, and at a national level "an integrated whole-of-nation effort" in terms of partnerships, understanding of risks and disaster impacts. It is closely linked to emergency management concepts of All Hazard: Prevention, Preparedness, Response and Recovery. The aim of developing disaster resilient communities is seen as a long-term goal.
2. Disaster-resilient communities are those that: function well under stress; adapt successfully; are self-reliant; demonstrate social capacity. This resilience is also reflected in the community having well-rehearsed emergency plans; fire mitigation programs; building

controls; personal and business financial mitigation strategies such as insurance, to help rapid recovery. Collaboration and partnership processes between communities and relevant agencies are core elements, as is the community's engagement in such processes. This section also recognises the different types of communities of interest.

3. Proposed actions include: leading change and coordination efforts; identifying priority outcomes; understanding and preparing to deal with risks; communicating and educating people about risks; partnering with those who effect changes; empowerment of individuals and communities to exercise choices; reducing risks in the built environment; and supporting capabilities for disaster resilience. Priority outcomes are identified for each of these themes and include examples such as: flood response measures; better understanding of risk in coastal areas; communicating risks through emergency management roles; forging partnerships though the Trusted Information Sharing Network (TISN); community partnerships with culturally and linguistically diverse communities; urban flooding research; and NSW Government approach to building capabilities.
4. What now (or next) is considered in terms of the need for "sustained behavioural change across the entire community" (p.15) requiring a coordinated whole-of-nation action. This will build on existing networks across the range of sectors, but also needs to encourage individuals and communities to be actively involved in achieving greater resilience. It relies on "releasing the potential of all parties to build their resilience to disasters and supporting and influencing these (priority) outcomes" (p.15). This emphasises the important aims identified in the priority outcomes listed for the identified themes discussed in (3) above and provided in detail on pages 7-14 of this national Strategy for Disaster Resilience.

As indicated, the "strategy does not operate in isolation" and is complemented by several other initiatives:

- The National Disaster Resilience Framework (http://www.ag.gov.au/www/emaweb/emaweb.nsf/Page/Publications_ProgramPublications_NationalDisasterResilienceFramework);
- The Australian Governments Critical Infrastructure Resilience Strategy (http://ag.gov.au/www/agd/agd.nsf/Page/Nationalsecurity_CriticalInfrastructureProtection)
- The National Climate Change Adaptation Action Plan (http://www.ag.gov.au/www/emaweb/emaweb.nsf/Page/Publications_ProgramPublications_ClimateChangeAdaptationActionPlan); and

- The National Partnership Agreement on Natural Disaster Resilience (http://www.ema.gov.au/www/emaweb/emaweb.nsf/Page/FundingandGrants_FundedPrograms_NaturalDisasterResilienceProgram).

It concludes by recognising economic and other costs but emphasises the benefits that will balance these through improved disaster resilience. "This disaster resilience approach seeks to ensure we are able to adapt to new and emerging hazards, reduce our exposure to risks, and recover from disasters effectively, with an ability to move forward" (p.15).

Research in the field of community resilience

This has highlighted the spontaneous resilience of most communities in the face of disaster. The strength of the community; its preparedness and engagement with the possibility of threat or adversity; planning for it; and leadership committed to supporting communities; have been seen as important variables. Measuring community resilience is difficult, because, like individual resilience, it is a process, evolving over time. It may be called for in a circumstance of both acute threat, such as the Victorian bushfires; for the longer-term challenges of recovery; or for endurance and adaptation in the face of chronic, continuing adversity, as with drought affected rural communities (Sartore et al 2005).

Resilience strategies described include the coming together and connectedness for mutual support and shared tasks and goals to address problems; information and communication strategies for these purposes; building hopeful activities; advocacy for resources needed and utilising effective social institutions. Many of these features are identified in the framework of 'social capital' and represent the society's or community's resources, which can mitigate adversity and facilitate adaptation. Such social capital has been found to be associated with better mental health outcomes when such communities are affected by disaster, for instance after the Kobe earthquake (Kawachi & Subramanian, 2006).

A valuable model of community and societal resilience has been developed by Norris et al (2008) from review of relevant studies.

These authors define such resilience as "a set of networked adaptive capacities"(p.135). They recommend such resilience be seen as leading to community level adaptations, which would be understood as "population wellness" and which could be compared to individual wellness.

"Wellness" is suggested as made up of "1) absence of psychopathology; 2) adaptive patterns of behaviour, 3) adequate role functioning at home, school and/or work; and 4) high quality of life" (Norris et al 2008, p.133). Wellness is considered to be on a continuum for individuals and communities. Community adaptation is seen as "a high prevalence of wellness in the community" (p.133), as "high and non-disparate levels of mental and behavioural health, role functioning and quality of life in constituent populations" (p.133). As these authors subsequently note, these themes overlap with those of prevention / health promotion at individual and population levels. This is particularly relevant in the context of population-level exposures with mass adversity such as disaster.

It identifies four key elements of community resilience, which contribute to this process rather than outcomes.

These are:

- Information and communication strategies, which help communities prevent, prepare for, respond and recover from disaster and 'all hazards'. This refers to systems and infrastructure for informing the public, communication and narrative (Norris et al, p.140).
- Social capital reflecting the community's networks and systems of social connectedness, participation, bonds, commitment and mutual support to prepare for and adapt to adversity. Systems are significant in this context, including those of social institutions and will be discussed below.
- Economic development is reflected in identifying resources that are significant for the community to respond effectively and recover, including financial and infrastructure resources, shelter, safety, security. Norris et al identify these resources in terms of volume and diversity, and in terms of resource equity and social vulnerability.
- Community competence reflecting the capacity of the community to come together to address issues, solve problems, provide structures for the support and development of their population, i.e. capacity for "collective action and decision-making" alongside "collective efficacy and empowerment" (p.140).

This framework is a useful model; probably most directly suited to those groupings of society that function as geographic communities. Communities of different kinds may have similar themes, but further research is needed to identify the flexibility and adaptation that reflect resilience with, for instance, online communities of young people, or for very disadvantaged or marginalised groups.

One aspect of social capital conceptualisation refers to the 'bonding' of community members and their participation together. But it is probable that 'bridging' social capital as identified by Putnam (1995) is also important because it reflects linkages to other communities, and systems and is also potentially a resource for openness, flexibility and new adaptive strategies.

Measuring community / societal resilience

Norris et al (2009) report on longitudinal studies that demonstrate "resilient trajectories" in terms of patterns of psychopathology over time post-disaster, for instance after 9/11.

While no specific measures exist, some studies of social capital are available using survey tools (eg. NSW Population Health Survey 2006) to identify participation, connectedness, trust and safety in local communities. Other survey tools assess participation and social capital as perceived by survey participants (Berry, 2008). A survey tool has also been developed to test people's perception of community resilience in terms of Norris' model (Raphael et al 2009), although data analysis is not yet available on this. This tool is as follows:

If a major emergency occurred where I live, the government and community services in my area….	Strongly disagree
….would provide clear information to residents about the situation.	Disagree
….would have the resources to deal with the problem.	Neither agree nor disagree
….would be able to manage the situation effectively.	Agree
	Strongly agree

Connectedness and participation are also measured in terms of other aspects of social capital, as with the NSW CATI Health Survey process (2006), which includes items such as the following:

Most people can be trusted	Strongly disagree
My residential area has a reputation for being a safe place	Disagree
I am actively involved in my local community	Agree
Religious or spiritual beliefs are an important part of my life	Strongly agree
I have strong social connections in my local neighbourhood	Don't know
I have strong social connections outside my local neighbourhood	
My family gives me the emotional support I need	
My friends give me the emotional support I need	

Further research is needed in this field to examine this type of resilience over time, and in relation to different adversities. In addition there is the need for observation and exploration of the spontaneous resilience demonstrated in different circumstances of threat, and different timelines, to see if there are models that differ from those defined by the absence of pathological outcomes.

Spontaneous resilience of communities in the face of disasters has long been recognised, in observation and in descriptions of those phenomena; in the "natural leadership" that arises to lead people through the emergency; the altruism and affiliative behaviors (Mawson, 2005) of the "honeymoon" phase (Raphael, 1986, Myers & Zunin, 2000), the courage and effectiveness of individuals and groups working together in the emergency and the aftermath, for the benefit of the wider community. These are all reflections of resilience. Keim (2008) also describes these themes in considering resilience and the natural disasters associated with climate change. The resilience, leadership, hopefulness and connectedness in response to emergency and need that individuals demonstrate, contribute to community resilience.

Resilience in the longer term may require different individual and community attributes. The chronic stressors and challenges of recovery may not only create difficulties for individuals in terms of their capacity to endure, but may also reflect the resilience of their communities, especially if there has been extensive damage to infrastructure and resources. Gordon & Wraith (1993) described the splits that may occur in the aftermath that can disrupt community cohesion and functioning. These issues require further research at community and population levels. There is also the need to consider the nature of different "communities" / "societies", (eg. online), their engagement, resilience or other adaptations over time.

Interventions for Enhancing Societal Resilience

Such interventions chiefly deal with recognising and supporting resilience as a natural phenomenon of most communities and groups, building the social capital and connectedness of communities, and engaging them in preparedness strategies to deal with disasters, as identified in the COAG National Disaster Resilience Statement (COAG, 2009), and National Strategy for Disaster Resilience (2011) as described previously.

Israel has developed a conceptual framework for national and local resilience (UJA et al, 2009), 'Resilience Network'. This is a resilience network based on a culture of preparedness. It aims at readiness; local solutions; personal preparedness; information sharing; individual and corporate responsibility.

Landau (2007) describes a Linking Human Systems (LINC) Community Resilience Model (see also previously). This assumes that "individuals, families and communities are inherently competent and resilient" (p.351); that "with appropriate support and encouragement they can access individual and collective strengths", and sense of competence. The LINC program engages respected community leaders to facilitate such processes. This program has been focused on transitional periods with communities after major loss and impacts such as 9/11, with case studies reporting the value of these approaches.

Most importantly, as described in the national Strategy for Disaster Resilience, the following themes and priority outcomes can provide a basis for action:

1. Leading change and coordination efforts
2. Understanding risks
3. Communicating with and educating people about risks
4. Partnering with those who effect change
5. Empowering individuals and communities to exercise choice and take responsibility
6. Reducing risks in the built environment
7. Supporting capabilities for disaster resilience

Central to these aims and outcomes are community and individual engagement, collaboration across governments, agencies, business and others for resilience at local and national levels.

Mental Health Implications

Mental health aspects of preparedness are central to resilience at a community level, and include roles such as engaging with communities, facilitating information and preparedness strategies and the mental health aspects of these. These should contribute to:

- Information and communication strategies re: threat and how communities can identify psychosocial strengths such as shared actions, connectedness and mutual support, across "everyday" emergencies, and how these can be useful for general capacity building, as well as in the event of a disaster
- Linking and connecting with others is a core component. This should focus firstly on families, for example making sure that there is a family plan for emergency connectedness and other emergency response, as well as identifying other important personal, social and practical points of connectedness
- Knowing community plans for an emergency, what the warning systems are, and actions to be taken, and what the community will do itself as well as what agencies such as emergency services will do (e.g. fire, rescue, SES); what organisations will do, including government; and what community actions and resources will be mobilised.
- Knowing the actions one should take oneself, but also where they "fit" in the community picture, e.g. who will contact isolated members; what are local NGOs such as Red Cross doing; where emergency health needs will be met (e.g. GP, Emergency Departments)
- Community linkages and local leadership are critical to community resilience over time, and especially in the aftermath
- Mental Health support for those with pre-existing and new mental health and related problems, and supporting their resilience and ongoing care is an important component
- Children's communities should be a priority focus because of children's physical and psychological vulnerability. Family and community linkages should focus support and resilience enhancement for schools, children, families and the school community of staff and others. It should be noted that schools are a central focus in many communities, and may play an important role in the aftermath
- Community engagement is a core process related to both preparedness, and establishing processes that will enhance connectedness, and resilience in the face of adversity.

c) Resilience and systems

Resilience of systems is a widely used concept, ranging from engineering and technological systems, to environmental and biological systems. Walker (2004) has looked at the features of systems, particularly complex systems in regard to resilience, considering both environmental and social systems and their complexity. He defines it as "the capacity of a system to absorb disturbance and re-organise while undergoing change, so as to retain essentially the same function, structure and feedbacks – to have the same identity" (Walker et al 2004). He discusses the basis of new adaptations in response to shock and that thresholds or 'tipping points' are relevant for all systems. In human or social systems he notes such adaptations or tipping points with crowd behaviours, riots, voting behaviour, fads, business economic viability, transport systems and so forth.

He goes on to discuss what he considers to be five characteristic features of complex systems that are relevant to their potential resilience. These are that:

1. Maintaining resilience requires constant change, i.e. systems evolve through time
2. High "response diversity", is critical to keeping systems resilient
3. There are multiple domains or scales of resilience with interacting thresholds e.g. ecological, social, economic etc.
4. Resilience is both specific and general, i.e. it may be resilient for nil or to one symptom, but general resilience incorporates all aspects of the system and all kinds of shocks. Both are important and should be considered in assessing resilience. General resilience is seen as involving diversity, modularity (connectedness), multiple loops of feedback, openness, reserves, overlapping institutions, polycentric governance.
5. Building resilience – may or may not be desirable. Transformability of a system is influenced by:
    - Preparedness to change
    - Capacity to change
    - Options for change – new trajectories

Walker identifies complex adaptive systems as central. He also comments about "changes in resilience though time" and the evolution with phases of development and renewal. Adaptive cycles include phases such as growth, conservation, release, organisation, slow and fast, even chaotic change. Bruneau et al (2003) quoted by Norris et al (2008) describe the attributes resources should have to engender resilience: robustness; redundancy (extra, spare capacity for response); rapidity with which they can be mobilised to achieve goals; resourcefulness, the capacity to mobilise to deal with threats (p.134).

Most organisations are constituted of multiple Complex Adaptive Systems (CAS), such as schools for example. They have Information systems, Learning systems, Client systems, Management systems, Protection and Support systems and many others, internally and externally linking to other Complex Adaptive Systems.

These systems will require leadership and self-organisation that can monitor functioning, avoid potential threat environments, prepare for and respond with resources that will optimise the achievement of goals.

Guidelines suggest this requires:

- Leadership commitment to organisational resilience and learning
- Plans and preparation for challenges and optimal adaptive strategies:
    - Clear roles
    - Training
    - Ideas, or development
    - Connections
    - Communication
    - Identifying expectations
- Development of a culture of resilience, learning and responsibility for adaptive planning
- Communication and collaboration with the organisational field to promote opportunities that may assist response to challenge and adaptation
- Preparedness for organisations and members and their roles and responsibilities in the face of threat
- Contribution to and collaboration with other systems preparing for challenges, threat, disaster and adaptive, resilient outcomes.

This template requires recognition of systems within and including organisations; assessment of their capacity to respond to likely threats; and ensuring strategies exist for prevention, preparedness, response and recovery when these are feasible.

Critical Infrastructure Resilience

Critical Infrastructure is a key focus in the capacity for resilience across All Hazard PPRR, i.e. it is relevant to Disaster Prevention, Preparedness, Response and Recovery. C.I.R. addresses physical facilities, supply chains, information technologies and communication networks, and often reflects networked connections and chains of action.

This strategy it is exemplified by sections dealing with the following:

- Energy
- Water services
- Communications
- Transport
- Food chain
- Health
- Banking and finance

Two-way, with interactions contributing to:

- Organisational resilience
- Risk management

and through to community and disaster resilience.

IT, security and related issues are critical, particularly cyber-security, but also the security of other key infrastructure as above.

Strategies identified in this are:

- Operating partnerships for C.I. owners and operators and government
- Promoting organisational resilience in relation to this
- Assisting owners and operators of CI to manage cross-sectorally
- Providing high quality policy advice on these issues
- Implementing Australian Government cyber-security strategy
- Supporting States and Territories for these objectives

Critical Infrastructure Resilience is not the primary focus for Mental Health or other disaster responders, but needs to be recognised as a set of vital resources and processes to be taken into account in understanding and responding to disaster.

Mental Health Implications

Mental health workers dealing with disasters need to be aware of the systems in which they work, and those that are important for disaster response, for instance emergency response systems. It is important to understand these broadly and to consider how intervention or support may assist return to functioning if the system has been impacted by the disaster and how the human factors may need to be understood and be managed. Actions may range from:

- Support through communication, information
- Practical assistance
- Linking to others
- Helping individuals to return to roles
- Be aware of one's own role and fitting in flexibly where assistance is required

Think "systems" and how people may be affected by system failure, supported by system resilience, and specifically consider how to assist people and communities through enduring support for critical systems, i.e. their resilience.

d) Resilient organisations and business continuity

Organisations are usually committed to maintaining their functioning, and their business, through times of difficulty. These issues have become a greater focus in terms of the possible impacts of major hazards such as terrorism, pandemic, or mass natural or other disasters. Organisations are usually composed of multiple interacting systems, for instance in a hospital, medical care systems, equipment and logistics, communication, information, etc.

Business continuity strategies

These are specific plans developed to manage such circumstances of disruption, including disasters. These deal with, but are not limited to: the roles and responsibilities of different personnel and managers; the priority and mechanisms to retain or recommence functioning; the communication systems for the organisation; its resources, supply chains and "customers". Core elements are identified below.

Core themes identified in Business Continuity Management (BCM) programs are:

- Understanding the organisation, and the urgency and priorities of resumption of business activities and processes
- Determining BCM options – selecting strategies to be used to maintain the organisation's business activities through an interruption / disaster
- Developing a BCM response –
    - Creation of a Business Continuity Plan, identifying actions and resources needed to manage any interruption / disruption, whatever the cause
    - In the case of the event falling outside the scope of the Business Continuity Plan, the situation may escalate to the implementation of an Incident Management Plan, which also takes into account external stakeholder requirements.
    - Business Unit Plans providing operational response to the incident in each department of the organisation, e.g. Incident Response, Human Resources response, IT logistical plans, etc.
- Exercising, maintaining and reviewing Business Continuity programs, through structured exercises, updates taking into account constant changes, and audits against defined standards and policies.

- Embedding BCM in the organisation's culture – assessing current BCM knowledge, designing and delivering education, training and awareness, and monitoring cultural change to keep any awareness campaign current.

Much depends on knowing potential risks and hazard impacts, the degree of potential / actual physical damage, resources, infrastructure, people and human factors, and so forth, as well as the capacity of the organisation to deal with what has happened. Redundancies in function and resources may be helpful, although may be less available when efficacy and cost containment limit such options. This framework sits in the broader context of organisational and system resilience.

Organisational resilience is also often defined by outcomes. Indeed the Australian Government department dealing with resilience of systems makes this clear (Mike Rothery, Safeguarding Australia Summit, August 2009). There is a growing literature dealing with organisational resilience, particularly in terms of an organisation's capacity to effectively respond to and deal with adversities such as mass natural disasters, for instance Hurricane Katrina in the US; the Black Saturday bushfires in Victoria (February 2009), the 2011 floods, flash flooding and Cyclone Yasi in Queensland; and terrorism, pandemic influenza and so forth. This relates to strategies such as those for protection of critical infrastructure, for example energy, food and water supplies; communication networks; information and related essential infrastructure resource capabilities eg. the internet; banking, health and so forth. Organisational resilience is the capacity of an organisation to adapt in the face of threat, to continue or rapidly re-engage its 'mission' or functional responsibilities, while responding appropriately to the challenges and changes that have resulted from the threat / incident.

Key elements of organisational resilience include the following (McManus, 2008):

- Situation awareness: The "organisation's awareness of its entire operating environment, including threats and opportunities, connectivity and internal and external stakeholders" (p72).
- Five resilience indicators were identified in this context:
    i. Roles and responsibilities: Knowledge of individual roles in the organisation, as well as the roles and responsibilities of others. While it is important that these are known

and understood, and staff are secure, confident, competent, and feel valued and consulted, there is also the need for flexibility and adaptability, not rigidity. Rigid structures, systems and individuals may not allow adaptability, internally or externally.

ii. Hazard and consequence awareness

Organisations need to be aware of the range of hazards to which they may be exposed and the potential impacts of these, how manageable they may be, particularly when critical infrastructure is affected, such as telecommunications, energy, computer resources etc. The potential human factors in response and impact may be particularly poorly recognised, including their potential for long-term effects. The interactions within systems, the system response, and that between systems, may not be understood in terms of vulnerabilities, necessary skills and resources for response, and potential actions that will be needed at individual and system levels.

iii. Connectivity awareness. Awareness of immediate operating environments and the linkages directly relevant to these is usual, but there is a need for advanced awareness of connectivity with the wider community of stakeholders, and their needs and capacity to connect and meet these, e.g. other organisations who can contribute or who would be impacted, and who are closely connected to the organisation's functioning and responsibilities, for instance energy, IT. Also the network of internal connections needs to be known, for role continuity and human continuity for functioning through and after the emergency and its consequences.

Awareness of the 'whole picture', the complex connections, and the 'systemic nature' of networks with interconnections even globally, is critical, at least as readily available to those likely to be leaders, their deputies and teams.

iv. Knowledge about resources including financial, insurance or other resources available, is important in regards to assisting "business" if there is interruption, and for disaster recovery. Knowledge of resources to support response and recovery is also critical, as are identified processes to access these

v. Recovery Priorities. Important aspects of situation awareness and response include 'understanding the minimum business requirements and the organisational recovery priorities'. These need to be well known, 'badged' as critical or priority goals of the mission and supported by leaders in terms of operational response (e.g. post-Katrina power services).

Identification and management of key vulnerabilities is critical for mitigating their impact on the organisation's response, whether collectively or individually. They include:

- Planning strategies which engage the organisational members and stakeholders, and which are known, understood, in the context of challenges and reactions to these and changes / response required.
- Exercises to test the system, plans etc.
- Capability and capacity of internal resources
- Physical and human adaptabilities and capacities
    - Physical - buildings, structures, equipment, power energy and especially information technology
    - Human -
        - Engagement and response of people over time,
        - Possible effects of loss of human resources through death, injury, incapacity, succession planning, rosters, management, skills, leadership and redundancy
    - Process resources are also vital – i.e. standardisation of systems, procedures, and protocols.
- Capability and capacity of external resources are very relevant and need to be understood plus vulnerabilities. These include providers, organisational linkages, supply chains, and uncertainties. The 'expected availability of external resources' may be essential to adaptation
- External assistance sources should be known, and how these can be accessed in emergency and for recovery
- Services and how they can be mobilised e.g. electrical, IT, transportation, water and sewage, food supplies etc.
- Supply networks and supply chains and communication

Organisational Connectivity

The connections, internal and external, should be understood.

Adaptive capacity

- Communications and relationships – comprehensiveness
- Strategic vision and outcome expectations
- Information and knowledge

- Leadership, management and governance

Systems themes for organisations may underline this type of planning and response to incidents/disasters; i.e. Redundancy, Robustness, Rapidity of mobilisation, Resourcefulness, encompasses the capacity for critical capacity to mobilise resources to deal with indentified problems or threats to the organisation.

Resilience Indicators (McManus, 2008)

Situation awareness	**Keystone vulnerabilities**	**Adaptive capacity**
Roles and responsibilities	Risk management and planning	Silo mentality Management
Hazards and consequences	Exercises	Communications and relationships
Connectivity awareness	Internal resources	Strategic vision
Insurance	External resources	Information and knowledge
Recovery priorities	Connectivity	Leadership and management

Adapted from Table 14, p. 134 "Organisational Resilience in New Zealand", Sonia McManus, 2008.

Health organisations, systems and resilience

Ensuring the resilience of health organisations and systems is difficult because of the high level of baseline demand on resources, existing levels of unmet need, potential limitations of structural and economic resources. Health organisations are most readily understood in terms of hospitals, where these issues may be critical in emergency response, but ambulance, primary care, emergency teams and community health are also very relevant.

Health system resilience is critical in a number of ways. This includes resilience to address health disasters or public health emergencies where preparedness, planning, procedures, policies and resources and training are necessary "to maximise the ability to prevent, respond to and recover from major events" (p.269) as indicated by Schoch-Spana et al (2008) in discussion of Homeland

Security planning. This would require a "comprehensive plan for promoting community and public health medical preparedness" (p.271) and community engagement / education and so forth to achieve this. This also applies to all emergencies / disasters with potential mass health consequences including terrorism, mass casualty incidents, "slow disasters" such as drought, and climate change.

Health care system business continuity is another component (Geelen-Baass & Johnstone, 2008).

Mental Health Implications

Important themes in health system resilience are as follows:

- Prevention where this is possible, where the disaster is a 'health disaster' for instance, pandemic
- Preparedness is likely to enhance resilience of the health system, and capacity for effective and efficient response. Focus on warning systems, education, training, health capability audits and resource development (e.g. medical stockpiles), and exercises, for instance using Emergotrain, can be helpful.

  Workplace and human factors are central. Not only do health workers need skills and competencies for prevention, preparedness and response to disaster impacts and recovery, but also necessary physical resources from medication, to equipment, to protective clothing, vaccination, procedures and the like. Specifically there is also the need to prepare the health workforce psychologically, and to provide support systems throughout response and recovery for them and as appropriate for their families.
- Response: Briefing, mobilisation and management of emergency response, in collaboration with other health agencies, requires strategies to ensure resources, equipment and leadership support their response; manage tours of duty and provide necessary backup; protect their physical and mental health and wellbeing; and recognise their contributions and experience
- Recovery – Providing stepdown strategies, transition to recovery and return to usual work are key issues for emergency health responders. Operational review, validation of experience, identification of successes and problems, lessons learnt; are important for health workers and their organisations. Progression with recovery planning, including mental health plans and programs as well as physical health and rehabilitation programs, is also required. Looking after the mental and physical health of health workforce who have been directly affected, as well as those impacted by the stressors in their disaster response roles are important aspects.

Challenges for health organisations lie in:

- Leadership through the PPRR of the disaster
- Planning, preparation and testing so that priorities, flexibility and responsiveness can be utilised to manage demand through the emergency in coordinated, collaborative and feasible ways; taking into account the realities of the specific disaster, resource availability and other significant factors
- Surge management, optimising functioning in the event of infrastructure destruction, for instance hospital damage, or workforce casualties; impacts on functional capacities of health systems, including access to medical resources.
- Transition from emergency organisations' "command and control" governance to recovery organisations' "collaboration and coordination" governance, taking into account the critical role of coordination across all phases.
- Sustainability through longer term and recovery with capacity to address disaster impacts while maintaining priorities for ongoing health system functioning – ie. "looking after business" through the emergency and longer term
- Incorporating accountability, evaluations and lessons learned into core businesses and to inform future planning
- Recognising specific health challenges of different hazards eg. pandemic, mass deaths, CBRN terrorism, etc.
- Addressing human needs, workforce challenges and health workers' experience of the disaster through effective preparedness and support systems, and recognition of psychosocial needs
- "Looking after" people, workforce; through PPRR to develop, sustain and enhance their capacities, and to protect and ensure their wellbeing and positive outcomes.

Measuring organisational resilience

While there may be templates and organisational standards against which business continuity and organisational resilience can be monitored there are not formal measurement strategies. However narratives and reviews are suggested as helpful in supporting organisational resilience, and comparisons against any relevant organisational standards. Resilience of organisations could also be assessed, or measured by achievements in and through a disaster or incident, in terms of capacity to

achieve or re-establish priority functions and to meet additional need resulting from the incident. Timelines, extent, effectiveness and cost benefit in social and economic terms could be counted as indicators, but may not be able to be readily measured.

Mental Health Implications

Mental health contributions to organisational resilience lie in two major fields. The first is planning for the organisational needs of mental health services to support their "business continuity" for patient care. The second lies in support for the psychosocial needs of the workers who are essential for other organisations' functioning, for instance nurses in general health care in the event of a pandemic. Key elements for mental health care systems resilience are:

- Knowledge of roles and responsibilities so as to ensure critical functioning for mental health care in the event of a disaster, for instance for emergency assessment and management of acutely ill patients, inpatient care priorities, and maintenance care priorities in terms of sustaining those with severe and chronic illnesses.
- Emergency management priorities for new cases, or impacts on existing patients
- Strategies to support staff in terms of psychosocial needs, family, etc.

Other organisations or systems may be supported by:

- Mental health consultation and expertise to develop support systems for their workers and their families beforehand, or in dealing with an emergency and recovery
- Consultation and backup if organisational disruption occurs

2. Post-traumatic growth and other positive adaptations

There is increasing focus on the strengths people demonstrate in the face of disaster, how they rise to such challenges, and may even emerge stronger. A range of concepts, including post-traumatic growth, address this.

a) Post traumatic growth

This is a concept that describes the ways in which some people seem to gather additional strengths through their experience of disaster; they may reevaluate their lives and develop new competencies, for multiple reasons, including that they have managed and survived. Tedeschi and Calhoun (1995) wrote of this phenomenon and described its elements, building on earlier observations and their own research. More recently they have reviewed the conceptual foundation and empirical evidence (Tedeschi and Calhoun, 2004). Posttraumatic growth may be reflected in:

- Greater appreciation of life, relationships, family and different priorities, positive social and personal values
- Greater sense of personal strength

Extraversion as a personality trait, openness to experience, optimism and capacity to accept the reality of a trauma or loss and grieve, may all be relevant to post traumatic growth. Other protective factors include social support, spiritual issues, and capacity to develop meaning.

Post-traumatic growth differs from resilience, but the concepts may be confused (Levine et al, 2009). Research has shown that unlike resilience, which is in many contexts seen as the absence of mental health pathologies despite experiencing major disaster stressors, Post Traumatic Growth has been shown to occur alongside mental health problems. These concepts and research underpinning them are still evolving.

Posttraumatic Growth, it is suggested, may lead to: “a more fulfilling and meaningful life” (Tedeschi & Calhoun, 2004) and has been found after a range of traumatic exposures. Val and Linley (2006) studied posttraumatic growth and other positive and negative changes reported following the Madrid train bombings in March 2004. The persons in this study had experienced the event indirectly. They used the PTSGS (short form) scale of 13 items. They found that women reported higher levels of posttraumatic growth and positive changes, and these were not associated with either depression or anxiety. They also reported that extraversion was associated with

posttraumatic growth and positive change. Negative change and distress also correlated as a separate dimension, and with anxiety and depression. Other workers also highlight the "multiple faces of Posttraumatic Growth" (Pat-Horenczyk & Brom, 2007), emphasising the range of often contradicting studies, such as those which show a correlation between posttraumatic growth and the development of PTSD.

Hobfoll et al (2007) have written "Refining Our Understanding of Traumatic Growth in the Face of Terrorism: Moving from Meaningful Cognitions to Doing what is Meaningful". Their studies post 9/11 and in Israel found correlations of posttraumatic growth with greater psychological distress but also more right-wing attitudes. They go on to suggest that posttraumatic growth is sought by individuals. Such individuals may have cognitions which lead them to positive actions (benefit-finding) and these may in turn lead to lower psychological distress. Clearly further research is needed. It should also be noted however that psychological experiences have many dimensions and the co-existence of growth, positive experience and pathologies occurs in many health and life settings – these are not necessarily opposites.

Measuring Posttraumatic Growth

Recognising and measuring posttraumatic growth is supported by the research tool developed by Tedeschi and Calhoun (1996). The Post Traumatic Growth Inventory, a scale of 21 items, covers five domains:

I. Relating to others
II. New possibilities
III. Personal strengths
IV. Spiritual Change
V. Appreciation of life

These items and the scale were established as having good psychometric properties. A short form of the Post Traumatic Growth Inventory (10 items) was developed by Cann et al (2010). These items are as follows, and cover the same domains.

1. I changed my priorities about what is important in life. (V-1)
2. I have a greater appreciation for the value of my own life. (V-2)
3. I am able to do better things with my life. (II-11)
4. I have a better understanding of spiritual matters. (IV-5)

5. I have a greater sense of closeness with others. (I-8)

6. I established a new path for my life. (II-7)

7. I know better that I can handle difficulties. (III-10)

8. I have a stronger religious faith. (IV-18)

9. I discovered that I'm stronger than I thought I was. (III-19)

10. I learned a great deal about how wonderful people are. (I-20)

(Adapted from Table 1, p.130, Cann et al 2010).

b) Positive adaptations

Positive adaptations to traumatic experiences have been explored in a variety of ways with differing conceptualisations. Prominent in this field is the work of researchers such as Linley (2003), Linley and Joseph (2004), and Joseph et al (2004). These workers have reviewed theoretical understanding of positive adaptations individuals make and the role of optimism, self-efficacy, sense of control and sense of coherence (Antonovsky 1993). In his review Linley (2003) links positive adaptation to wisdom and sees this as both process and outcome. He builds on Valent's (1998, 1999) concepts of the significance of 'fulfillment' as a fundamental human motivation, i.e. that "people seek to grow and develop beyond the satisfaction of their basic physical and security needs" (p.601) and that they aspire for loving relationships, family, and the development of their capacities. Traumatic experiences may disrupt this, whereas positive adaptation, such as reflected in wisdom is suggested to refer to "a person's expertise in the fundamental pragmatics of life" (p.602). Wisdom is not necessarily related to age, or even experience, although it may be.

While recognising the overlap with concepts such as locus of control, self-efficacy and hardiness, Linley highlights the significance of Antonovsky's model and the "sense of coherence" which encompasses these themes. He highlights from this review three key dimensions of wisdom:

1. Recognition and management of uncertainty, including openness to change and experience.
2. Integration of affect and cognition, including for those dealing with traumatic experience, perhaps with narrative development

3. Recognition of, and acceptance of, human limitations and the management of this, with recognition of the finitude of life

In their review of positive change following trauma Linley and Joseph (2004) examined 39 empirical studies available at that time. They concluded that growth and distress are separate dimensions. From these studies, they suggest that women, younger respondents, and those with higher education may be more likely to report "growth", with personality styles (e.g. extraversion, openness, self-efficacy, hardiness) also being more positive. Longitudinal studies indicated such "adversarial growth" was likely to continue over time, but that it was not possible to predict adaptation, reinforcing the theme that many were "independent dimensions of experience that may have a range of associations" (p.18). They also highlighted the difficulties in building the knowledge of these phenomena because of the diversity of measures used in research, the reliance on self-report measures; the need for behavioural and physiological studies, plus the difficulties of the influence of expectancies, cultural views and reported outcomes.

This group goes on to explore domains identified in a study utilising different measures through a principal components analysis with the Post-traumatic Growth Inventory, the Perceived Benefits Scale and the Thriving Scale (Joseph et al 2004), with respect to the most upsetting events in people's lives. All the positive change subscales loaded highly on a single component suggesting that it was a unitary concept. These were 3 second order subcomponents: relationships and valuing others; "strength" in perception of self; spirituality / life philosophy. Women tended to report more growth than men; and that the amount of time since the adversity did not influence findings. They conclude that these measures were "essentially measuring the same construct" (p.93) and that this was "best assessed as a unidimensional phenomenon (p.93).

This growth occurs after adverse experience of diverse stressors and is a part of human adaptation, positive adaptation to the adversities of life.

c) "Strength"

The concept of strength is a key issue in disaster response. This has been studied in terms of Australian (Western, individualistic) culture (Canberra bushfires) and collectivistic culture (South-east Asian tsunami, Aceh) (Citraningtyas, in press).

"Strength" is interesting in terms of the emergency, and may be less likely to be identified in the more prolonged recovery period. Nevertheless the recognition of personal psychological strengths, and community collective strength, is important in facilitating adaptation and recovery. Such strengths include personal and community coping, belief in effectiveness, hopefulness and optimism, traits associated with survival (Bostock and Henderson, 1975) and better outcomes (Carr et al 1995, 1997a and b). Hope, positive beliefs and attachment ideation, i.e. thoughts of loved ones, have also been shown to be positively associated with survival (Bostock and Henderson as above).

As noted for Post Traumatic Growth, there may be co-occurrence of "strength" and positive adaptations on one parameter, and more problematic on another. Generally however, positive adaptations build more positive cycles, and hence better outcomes, more positive futures, as evidenced in studies of positive emotions post 9/11, which showed such emotions reinforcing positive states, building positive cycles (Frederickson, 2002).

Mental Health Implications: Positive Adaptation

Each of these, i.e. Posttraumatic growth, positive adaptation and strength, requires recognition that such processes are likely to be frequent amongst populations affected by disasters, terrorism and mass adversity. Importantly they may also occur alongside suffering, mental health need, and psychopathology. Key issues for mental health include:

i. Recognising and supporting the range of positive adaptation strategies, including specifically Post-Traumatic Growth while assessing possible mental health issues that may co-occur and require response
ii. This includes personal characteristics such as hopefulness, optimism, integration of emotional and cognitive capacities, recognition and management of uncertainty, and capacity to act, reinforce cycles of positive emotions and adaptation.
iii. Engaging those affected in positive actions is likely to be helpful
iv. Supporting resilience is also relevant, particularly in connecting to others, access to resources and information and communication as needed.
v. Looking for and supporting "strength" and positive adaptations as well as pathologies.

A focus on strength, positive adaptation, validating peoples' positive achievements and capacities, can assist adaptation to disaster.

3. Action as adaptation

Actions undertaken in preparation for potential disaster may indicate some degree of recognition of the reality of the threat, some commitment to deal with it. Training in procedures and the practice of such actions may enhance the capacity to utilise these effectively in the emergency response. This type of training to achieve competence to act effectively in response to threat is a key element of emergency workers' capability.

The sense of being 'paralysed' by fear or uncertainty may occur during an emergency, leading people to feel more helpless and thus vulnerable. There may be an altered sense of time in the very acute phase, such that people may subsequently feel that they should have done more, for instance to help or save others. These may be significant concerns subsequently and those who are affected in this way may need assistance to understand some of these realities. These issues may contribute to a survivor's guilt – for instance "I should have done more / I could have done more".

The capacity of a person or persons to act effectively in the emergency, even if extremely fearful and aroused, is likely to help them in the aftermath as they try to make meaning of their experience and the consequences. This capacity to act to protect the lives of the self and others, to enhance survival, may add to the sense of self-efficacy, even if there have also been feelings of helplessness. For the vast majority of people, behaviors and actions during the emergency are courageous and appropriate in terms of what is humanly possible. They may need to have their experience and actions validated in this human context, particularly when life threat, death and destruction have been extreme.

Actions that may appear in specific behaviors subsequently, including what has been called the "disaster syndrome" – people wandering dazed across the site for instance, probably in a dissociated state. They may place themselves or others at risk in such circumstance and may need to be contained or protected until this response has settled, usually in a few hours. If it extends they may need to be triaged for further specialised mental health assessment and management.

Actions and behaviours of leaders are often critical through the emergency, and immediate aftermath. Actions to support effective response, demonstrations of strength of will to deal, as far as is humanly possible, with the disaster, with compassion, with determination and commitment to support people through the emergency and longer-term, are valued. These actions are usually perceived as supportive and positive; they validate the community's and individuals' experience and

worth. Specific actions that may assist are those such as visiting the site of a disaster when it is possible; demonstrating compassion and support for those affected; hopeful and honest communication; and spontaneous positive, validating actions. Leaders may require training and support to assist their response, including communication, particularly if they are directly or severely affected themselves. The challenges of leadership may be highlighted in overwhelming disasters where they may be tempted to promise what cannot be delivered eg. “We will make everything back to the way it was”, or “we will find and bring to justice those responsible”. This is difficult to achieve, and may prevent people from carrying forward their need for positive actions for recovery and future.

The “counter disaster syndrome” describes the over-commitment of leaders and others; their working excessive hours or tours of duty; their unwillingness to step down; their firm belief that they must stay, do more, cannot hand over, are essential and effective. These behaviours, while driven by many positive motivations, are likely to lead to problems in response because they may impact on human performance capacity, interfere with judgment and decision making, and continue certain actions when flexibility and change are necessary. Command and control management and leadership modeling though the emergency and aftermath plus task and role monitoring can assist in managing these issues, particularly if they have been addressed in earlier education and training. It is important for leaders to have clearly identified deputies who can support and share leadership as needed. Response structures with requirement for rest periods can enhance response effectiveness.

Actions for recovery should, ideally, be driven by leadership from, and engagement with affected communities or groups. Providing support, access to resources needed, utilising partnerships with broader leadership, such as government, non-government and support agencies are important actions towards recovery. Recognition and support of local leadership, with consultative backup, is likely to contribute to more positive outcomes for communities, a greater sense of community efficacy and achievement, and “ownership” of these recovery oriented initiatives. This support for local leadership applies to resource management, and to activities sought and enabled by communities to address identified needs e.g. social meetings, practical rebuilding with its symbolic importance, celebration, memorialisation, advocacy and so forth. Decision-making for the future is particularly important in these contexts, but is complex, as is access to resources, communication, a “voice” beyond the “honeymoon” of the emergency period. This helps to avoid the perception of

"abandonment" that may otherwise occur when those affected by the disaster are no longer a focus. The overall organisation and management of recovery, with appointed and local authorities, may contribute further challenges in terms of resource distribution, decision making, communication and power dynamics within affected communities. Appropriate consultation processes can help to deal with the political and social difficulties that may arise, and thus facilitate a more positive and effective recovery process.

Intense emotional response is inevitable in disaster and may drive actions in problematic directions. Studies post 9/11 showed that fear may be associated with more inhibited response, anger with more risk-taking and aggression (Lerner et al, 2003). Emotional response is normal and appropriate, but if extreme and extensive in the population, can lead to actions with negative outcomes: for instance the disruptions of communities as terrorists may intend; the splitting and threat to communities associated with those who are seen to be, in people's mind linked to the incident, for instance Muslims post 9/11 and so forth. Fears may be amplified by media interpretations, and may lead to fear-driven restrictions of actions, or change in behaviours, or indeed, violence.

Collective Actions and Behaviours

Collective behaviours are of considerable interest. It is clear they are for the most part positive. Mawson (2005), Drury (2009a, b) and others have highlighted the shared, altruistic responses as the norm in the face of disaster, with affiliative behaviours. It is suggested that the shared identity of those affected contributes to these positive actions, rather than the 'panic' that was once assumed. Citraningtyas (2011) has described the response of people in the 2004 tsunami in Aceh. In this collective culture the spontaneous shared actions of people "rose" with the wave, symbolically and responded then and subsequently with altruism and courage.

However some collective, crowd behaviours can be maladaptive, e.g. the mass convergence on the disaster site of the media, the curious, and the would-be helpers. There are also the fears that may drive people to health facilities, when uncertainty after "exposure" to toxic agents can lead to "epidemic" psychosocial contagion, which can overwhelm these health facilities.

There are also group behaviours that can become "crowd disasters" (Fruin, 2004), as with the Hillsborough Stadium in the UK, where 94 persons were crushed by others and died of asphyxiation. Sporting events with aroused groups may lead to a contagion of violent or other behaviours with victimisation and other adverse outcomes. Disasters do not however generally lead to such outcomes as a rule. Most behaviours are collective adaptive actions.

Mental health post-disaster: actions and behaviours as adaptations

Such effects may lead individuals to demonstrate a range of changed behaviours or actions. These include withdrawal, avoidant behaviours; which may be associated with trauma syndromes; depression; acting out behaviours with increased alcohol / drug consumption, or aggression; violence; interpersonal relationship problems, such as increased family breakdowns; difficulties in learning, and concentration affecting education and work; health focused preoccupations and health care seeking behaviours, as with ongoing generalised health fears after some exposures; being "locked" into the experience, the trauma, and constantly reliving it in play for children; or story telling etc for adults. The identity defined as 'disaster survivor' may take over some people's lives and actions. Accessing appropriate mental health assessment and care may assist in mitigating negative behavioural outcomes.

Loss and grief may drive actions such as searching behaviours for a loved one from whom the person is separated, and who may or may not be deceased; memorialisation actions for and by individuals and groups that are usually positive. They are normal manifestations of loss and grief. When no remains can be found, when no goodbyes or rituals are possible, or occur for the deceased, there may be prolonged uncertainty and ongoing actions focused on the belief in the loved one's return, holding on to the absent or deceased person. Profound impact on functioning may be associated with chronic patterns of grief – yearning, intense preoccupation with the person who is missing, or a syndrome of Prolonged Grief Disorder (Prigerson et al, 2009) which may require mental health assessment and treatment. Suicide risk assessment should be taken into account where there is extensive loss, hopelessness, a sense there is no purpose in going on with life.

Disasters lead to the full spectrum of actions and behaviours through the emergency and aftermath. For the most part these are effective, lead to shared actions and ultimately a future focus, which honours those lost, what has gone, and assists to people to gradually re-engage with their future (Walsh 2002), with positive affect and hope.

Mental Health Implications

The wide range of behaviours that can occur should be understood as part of the spectrum of human reactions. Response should recognise and support those that reflect positive responses of altruism and efficacy, and be attuned to those reflecting risk and need.

i. Support action adaptations that are likely to be beneficial to the person, the group, others in the community.
ii. Mobilise support and protection for those affected whose actions lead to placing themselves or others at risk, and contain and further assess if these actions do not settle.
iii. Facilitate actions and engagement in practical activities that enhance efficacy, a sense of competency and are focused to the future and to recovery.
iv. Assess any ongoing patterns of behaviour or actions and their positive or negative mental health implications and provide appropriate response.

4. Dysfunctional adaptations

For the most part these are infrequent at population levels, but may occur for individuals, families and sectors of society, or organisations, or systems.

Many of the potentially dysfunctional adaptations that may occur for individuals have been described. They may link to preexisting behavioural patterns or pathologies, or the circumstances of life; experiences during or as a consequence of the disaster, such as life threat, loss, inability to act, destruction of resources; consequences for health, relationships, resources, mental wellbeing, for instance relationship breakdown, substance use problems, effects of injury. Access to appropriate health, mental health and social resources can mitigate these, and facilitate effective functioning, although some will remain functionally impaired. Family functioning may be similarly affected, although as with individuals, most will be resilient.

Societal change may occur and affect communities adversely, for instance economically and functionally. Societal disintegration is unlikely, but can occur. These more negative outcomes, while rare, are more likely if there is a preexisting conflict setting in communities, chronic adversity or similar problems, where the disaster becomes the tipping point, shifting the community to further dysfunction. Destruction of critical infrastructure, and financial and essential resources may lead to negative consequences for low income countries, although international organisations and global response agencies will address these issues with rapid response of aid support in most circumstances. Collective trauma (Somasundaram, 2007) is one such indication of social vulnerability and associated potential dysfunction.

Political change may occur, for instance in voting patterns, or level of commitment to democratic processes. Dysfunctional adaptation may occur when damage is so extensive, or impact of trauma and disruption so great, that even with aid, development cannot occur and further societal dysfunction, or failed states may follow. This is the more likely if there has been a background of conflict, complex emergency or other severe vulnerability.

Chaos may reign in the emergency and subsequently, particularly with ongoing threat, severe destruction, or ineffective or damaged leadership. This is usually only in the initial phase, but may continue if resources cannot be accessed, leadership continues to fail, or there are political dimensions to this continuing adversity; or indeed total inability to act. “Rogue” leadership may emerge in such circumstances. These are unlikely outcomes for most disasters.

Global organisations attempt to act and respond to the disaster with the hope of preventing such outcomes, though this is not always possible.

Mental Health Implications

Dysfunctional adaptations at individual level are likely to require mental health assessment and management and similarly, potentially in family settings. Large-scale dysfunctional adaptations are beyond the scope of mental health workers, but should be understood in terms of their possible impact on others.

i) Assess and manage dysfunctional adaptations at individual and family levels, and the impacts of community / society dysfunctional adaptations on these people.

ii) Support leaders managing dysfunctional adaptations in the community through consultation, advice.

iii) Reinforce positive, hopeful and strength focused responses with a focus on the future and build progressive strategies to achieve more positive outcomes over time.

iv) Contribute as far as possible to enhancing the core pillars of community adaptation and resilience through:

- Information and communication
- Access to resources that can facilitate effective action
- Enhancing social capital and mutual positive support
- Facilitating and supporting community efficacy and leadership

Conclusion

For the most part resilience and adaptation are the norm and the "good will" of people, societies and nations, hopefully prevails. In a study of "Resilient Cities", Vale and Campanelle (2005) describe the multiple patterns of resilience and variables of significance, including government, leadership, and political factors. They list "Axioms of Resilience", which reflect conclusions about urban resilience, the common themes that the authors have identified through their explorations. They also identify, from earlier research, some of the patterns of renewal and reconstruction that symbolise, reflect and support the human endeavours that contribute to the resilience of cities. Considering the extent and growth of urbanisation, the particular issues of urban / city resilience, as well as those of rural and remote, need to be taken into account. Each needs specific understanding and relevant strategic assistance.

Cities, regions, towns, communities and nations, people, families and groups reflect their resilience in: (adapted from Vale and Campanella)

- Narratives and meaning-making, reflecting the diversity of human experience and responses
- The political necessity of resilience for governments, and people
- The interacting patterns of individual, family, local, institutional and national resilience
- The strengthening of social capital, shared experience, connectedness and effective response
- The concrete manifestation in reconstruction, rebuilding and renewal
- The human drives of collective memorialisation as well as commitment to future goals symbolises adaptation and resilience

Risk and resilience are interacting and variably balanced themes. Resilience "building" or enhancement needs to understand and address potential and actual risks. Yet at the same time resilience also reflects the capacity to take risks, and risk taking as part of effective adaptation (Jew et al 1999). Resilience is not total safety, protection, risk-free living, but involves and may be strengthened by the capacity to take risks, to face and address challenge and adversity.

Core elements for resilience across domains include:

- Information, knowledge, communication systems about risk, threat, resources, potential actions.
- Human connectedness, support, "social capital".

- Recognition and utilisation of strengths, capacities and their potential utility in the face of adversity.
- Diverse resilience trajectories over time; with diverse processes of resilience and other positive and negative adaptive strategies, for individuals, families, communities, systems, organisations, nations and other conglomerates.
- Spontaneous human actions of altruism, courage, optimism, fear, positive effective action, hope and capacity to envisage possible futures.

Mental Health Implications: Building and Enhancing Resilience

While many strategies have been proposed to enhance resilience there has been limited evaluation of these, except in the fields of development, (e.g. Resourceful Adolescent Program).

Key themes of importance include:

- Recognising, respecting and supporting the spontaneous resilience of individuals, families and communities in the face of disasters, both in the acute phase, but also in the longer term, including the capacity to endure prolonged adversity.
- Access to real resources is critical.
- Security, safety and capacity to protect the self, the group, the system, in the face of disaster, as far as is possible, is helpful.
- Community engagement, individual engagement, knowledge, education and opportunity to focus on risk / challenge, and effective response, while continuing to deal with the realities of life and support for such actions.
- Social connectedness, capital, institutional commitment, quality and contribution and capacity for mutual interactive support across diversities of people, culture, experience.
- Strong, effective, compassionate, hopeful leadership at all levels, local to global.
- Continuing to “live well” while encompassing the hazards and realities of life.

Resilience inevitably is about:

- Change – it's inevitability and the capacity of humans and systems to change, and the value of change
- Multiplicity: the multiple and changing domains in which resilience may occur, or be prominent, or be lacking, and how these can change
- Time, trajectories over time and the changing system / environment interactions, and the "acute" time with resilience as survival, and "chronic" time, the latter encompassing resilience as endurance over time
- Both ubiquitous and unique resiliencies and adaptations, and their value or otherwise as human and system characteristics.

Three further resources include:

"Resilience and Mental Health: Challenges Across the Lifespan" (2011) by S. Southwick, B. Litz, D. Charney & M. Friedman (Eds.). (2011). Cambridge University Press, Cambridge.

"Designing Resilience: Preparation for Extreme Events" by L.K.Comfort, A.Boin, & C.C. Demchak. (Eds.). (2010). Pittsburgh : University of Pittsburgh Press.

"The Phoenix of Natural Disasters: Community Resilience" by K. Gow, & D. Paton (Eds.). (2008). New York: Nova Science Publishers.

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