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Long term planning for recovery after disasters

Ensuring health in all policies

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Summary

- This document aims to show what can be learned from previous disasters about the impact of decisions and actions taken that have affected people's wellbeing during the recovery period. The document is written from a public health perspective but draws on the literature of many disciplines.
- Recovery takes place in several phases, from immediate response to long term rebuilding, with transitional phases in between. These phases overlap and the stages of recovery may be of longer or shorter duration for particular groups of people within the affected area.
- The 1931 Napier earthquake was a catalyst for the establishment of building codes, earthquake insurance and Civil Defence, none of which existed previously. Recovery appears to have been quick and had much citizen involvement, but society was far less complex and dependent on technology at that time.
- The immediate health sector response to disasters is concerned with core functions (water, sanitation, food, and vector control), ensuring the continuity of health care, and issuing public advisories. Surveillance of disease and data collection are costly and use time and resources but are critically important for all phases of recovery and learning how to mitigate future disasters.
- Short term and long term planning for recovery need to be integrated. There is always tension between acting speedily and taking time to plan well. Pre-disaster planning is the best means of avoiding short term decisions that create or exacerbate long term problems.
- A single agency with representatives from all relevant fields is recommended as the best means of leading and coordinating the recovery efforts. A single agency can also take overall responsibility as consensus cannot always be reached among the various interests and some decisions will not please everyone. It is essential, however, that there is input from all stakeholders, including the general public of the affected community.
- Community participation is now routinely incorporated, at least in principle, into recovery planning after disasters, but it is not always clear what form it should take. It must be more than simply informing or consulting the community.
- Community driven initiatives appear to be particularly successful on a local scale and have been shown to contribute significantly to the larger recovery. However, the interaction between official and community efforts has often been uneasy at best, and a source of conflict at worst. This appears to be an important area that needs to be addressed so that all efforts can be harnessed towards the recovery.
- All those concerned with the long term health and wellbeing of a disaster-affected population have a key role to play in recovery planning and decision making. Using simple, concrete language such as "health begins where we live, work, and play" has been found to be a more compelling way to get the message about wellbeing into practice than talking about the social determinants of health.

- Opportunities to maximise health in all policies as part of the recovery process are in membership on recovery groups, advocacy at the policy level, supporting community efforts with expertise and advocacy, and developing partnerships with organisations that are working for the same ends.
- Key areas where health begins are:
    - Equity: those with financial and intellectual resources generally recover faster from disasters than those without. Rebuilding offers opportunities to create a more equitable community but needs careful planning and oversight or the less well-off may be further disadvantaged
    - Housing: communities that are displaced suffer more adverse effects and take longer to recover, particularly if they are separated from their social networks or relocated far from their original areas. Housing shortages and rent rises also further disadvantage low income groups. As well as being safe and sanitary, housing sites for displaced residents must have access to shops and services, including transport, education, and employment so as to avoid creating long-standing social problems.
    - Social cohesion and community resilience: most people derive their major support in a disaster and its aftermath from relatives and friends. Those who lack these support networks are likely to be particularly vulnerable. Communities also work together to support one another during a disaster, but the relationship between volunteer workers and official agencies is often an uneasy one. Pre-disaster planning can help avert this and ensure that community efforts are used to best advantage.
    - Psychosocial distress is mostly self-limiting after disasters. Fostering a belief in self-efficacy and coping skills is the preferred approach to avoiding post traumatic distress rather than professional psychological interventions. A small proportion of people continue to have persisting distress, particularly those who have been forcibly evacuated and separated from their social support networks. Those with existing mental health and other chronic diseases are at risk of exacerbations of their conditions. Domestic violence, substance abuse, and suicide rates are likely to rise after disasters, especially among displaced populations.
    - Economic recovery and access to services are key considerations in recovery of communities and need to be integrated with support for individuals and families. Small, local businesses in particular need support to restart as soon as possible.
    - Heritage buildings and sites: forward planning and communication between emergency response services and heritage interests are the best means of ensuring that the loss of cultural heritage is minimised in disasters. Little specific advice seems to be available about how to act in the absence of such plans being in place. Careful deconstruction of culturally significant buildings may be one way of offsetting the distress associated with their loss.
    - Sustainability: disasters offer an opportunity to rebuild cities and communities in a more sustainable way so that the impact of future disasters is mitigated. The importance of incorporating sustainability

principles now appears to be recognised at least in theory, across traditionally diverse disciplines such as public health, environmental management, engineering, and economics.

- Limitations of the evidence base: The studies located are almost all from the United States. However, the findings are consistent, and have valuable insights into what can go wrong, especially for disadvantaged groups of the population. There are fewer success stories available.
- Limitations of this review: this is a broad overview of what literature was readily available and has been put together in a short time-frame. It is not a systematic and comprehensive examination of the areas covered. In particular, acute primary and secondary care concerns are not included. New Zealand information has not been able to be fully investigated in the time frame.

Introduction

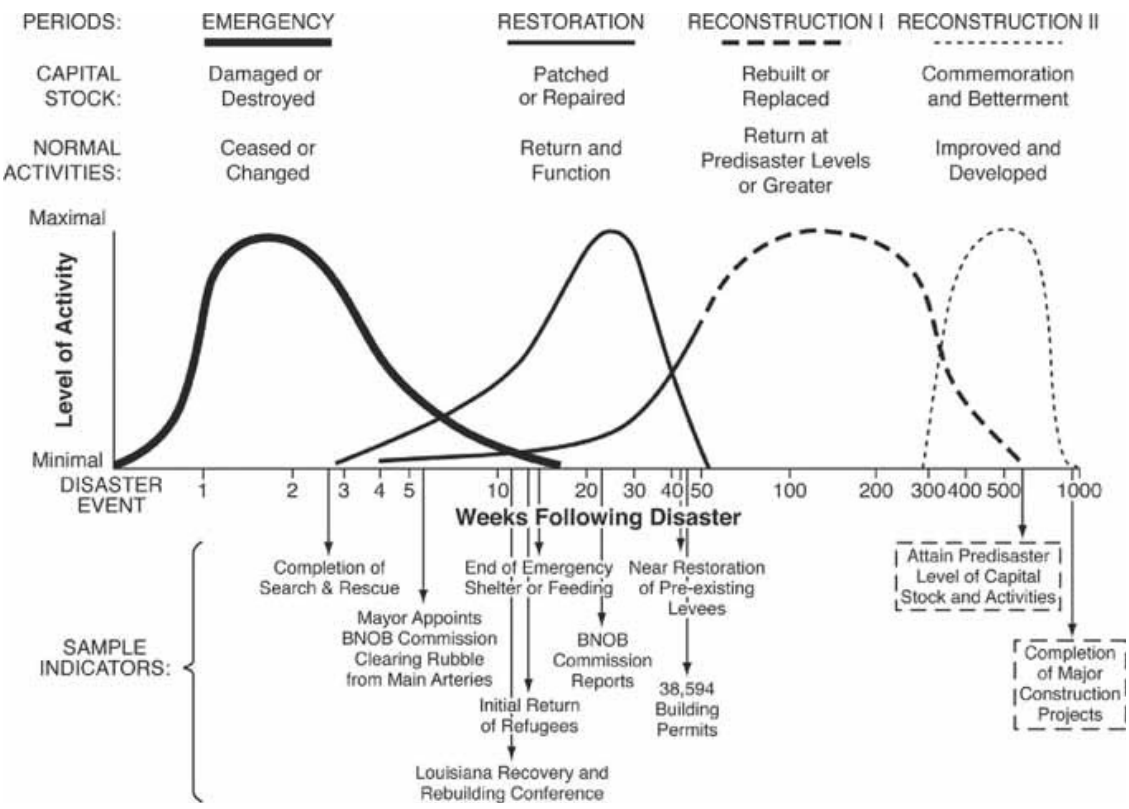
Purpose of this document

This document reviews the available international literature on long term planning for recovery after disaster and how that planning can maximise the wider determinants of health. It is based on searches of published and grey literature carried out by the Ministry of Health and Community and Public Health staff. New Zealand information appears to be sparse, however a case study of recovery after the 1931 Napier earthquake (Hollis 2007) provides a helpful overview of its relevance for the present.

What is recovery?

Recovery can be defined as a process that brings "..the post disaster situation to some level of acceptability, which may or may not be the same as the pre-impact level" (Quarantelli 1999). "Recovery", as well as "reconstruction", and "restoration" all tend to be used interchangeably and sometimes vaguely in the literature to refer to the period after a disaster in which there is a return to full functioning of the affected community or area. Recovery goes through several phases: the first urgent phase of ensuring survival needs and restoring essential services, the second that works to care for the medium term human impacts; and the third which encompasses community rebuilding and betterment (Quarantelli p. 2-3)

These phases are not separate but overlap considerably. The sequence and timing of recovery after Hurricane Katrina in New Orleans is shown in the diagram below as an example (Jacob 2008). The emergency response lasted up to ten weeks post disaster, peaking around week 2-3; the restoration phase where infrastructure and housing were patched and repaired enough to function started at week three and lasted up to one year; the reconstruction phase started slowly at week four, and by the end of the first year was projected to peak at around three years but likely to last up to ten years; lastly there is a projected phase for long term betterment with an improved and developed city that could last up to twenty years (p. 123).



Sequence and timing of reconstruction after Hurricane Katrina in New Orleans (from Jacob et al. 2008)
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The Napier earthquake

A recent thesis from the University of Canterbury looked at the response and recovery from the 1931 Napier earthquake (Hollis 2007). In the discussion section, the successes of the response are examined and compared to what might happen today (p. 106-115). Of particular note is the speed with which a temporary housing site was set up in Napier and a replacement business and shopping district (Tin Town) built. Critical infrastructure was restored within days, and debris was cleared quickly and deposited on the beach front. The Napier Citizen's Committee was formed the morning after the earthquake and a relief fund and reconstruction committee shortly afterwards. Although the Borough Council placed overall control of the recovery in the hands of commissioners, these citizen committees are believed to have contributed significantly to the success of the process and ensured that ideas were carried through into action. The public was consulted about the recovery efforts and the rebuilding style, information was distributed through leaflets and the newspaper, and property owners were compensated if their properties were needed to carry out some of the rebuilding changes (p. 106-107). The temporary district was set up quickly so that business owners could keep operating, and the majority were back in permanent premises within two years of the earthquake. The rebuilding made improvements such as the widening of streets and services laid

underground. The Sound Shell and Sound Bay on Marine Parade were built as commemorative structures.

The thesis outlines the disaster mitigation efforts that the Napier earthquake generated, including the introduction of building codes and earthquake insurance which have had a far-reaching effect on offsetting the impact of subsequent disasters. The earthquake was also a catalyst for the establishment of Civil Defence. Less positive, was the building of the suburb of Marewa on uplifted land, which remains vulnerable to future earthquakes, although this was not understood at the time. The airport is in this area and main road and the rail link also pass through (p. 110).

Social impact is not examined in detail in this thesis – which is primarily about hazard and disaster management - but a number of relevant social comparisons are made between New Zealand society 80 years ago and the present day. Compared to today, the population had recent experiences of hardship and devastation during World War I which may have contributed to their readiness to respond to an emergency situation. Another factor was likely to have been the government ownership of all public services so that their duty was to the public rather than to company shareholders. Both home and business life were very much less complex and dependent on technology 80 years ago, and the lack of legislation is also believed to have made quick action easier, such as the decision to dump all the debris on the beach.[1] Additionally, there was not the same situation with global companies that could easily withdraw their businesses from New Zealand back to their overseas bases.

Immediate response phase

Core public health functions following disaster

Following an earthquake a number of priorities for public health have been identified (Landesman 2006; UNDP undated; Noji 2005):

- Monitor environmental infrastructure including water, sanitation, food and vector control
- Assess the needs of special populations. It is recognised the vulnerability to disaster is related to socio-economic deprivation, ethnicity, urban density, older people, and recent migrants (Cutter 2008; Morrow 1999; Powell 2009). Morrow et al. (2009) emphasise the need to identify where such vulnerable groups are and actively involve them in recovery.
- Ensure the continuity of health care injury prevention
- Initiate surveillance, including rates of injury, infectious disease, drinking water, sewage, solid waste collections

[1] The author could not foresee the Canterbury Earthquake Response and Recovery Act (2010) which would override much of the existing legislation.

- Issue health advisories, these should be in appropriate languages and media. A recent Australian study found that broadcast media were a particularly important source of information during disaster (Cretikos et al. 2008)
- Determine needed immunisations and allocate appropriate resources.
- Take steps to plan for future disaster preparedness and mitigation

Surveillance and disaster epidemiology

Public health research can help inform disaster recovery. Van den Berg et al. (2008) and Landesman (2006) identify several priority areas for public health research:

- A rapid assessment of health needs
- Data collection and epidemiological studies using questionnaires including longitudinal studies
- Surveillance using existing systems (such as cancer registries, notifiable disease surveillance systems, interRAI[2])
- Monitoring the use and distribution of health services
- Research into the aetiology of the health effects of disasters
- Utilising the information from surveillance systems to establish strategies to control disease, and monitoring the effectiveness of such strategies.

Several authors have identified the benefits of routine sources of data collection (syndromic surveillance) to identify change, for example in infectious disease incidence (SIDARTHa 2010; Landesman 2006). Such surveillance and information should inform the recovery decision making process (Malilay 2000; Noji 2005). However, Foxman et al. (2006) emphasise the inherent difficulties in measuring the health effects of disasters, including calculating accurate denominators and comparators.

Importance of integrating short term response and long term planning

Integrated planning for all phases is critically important and should also encompass planning for mitigation of future possible disasters. Moreover, failure to foresee long term impacts of decisions made in the immediate and short term response phases is likely to have a negative impact on long term recovery outcomes. There is a tension between the need to act quickly to relieve distress of homeless residents and to replace infrastructure, and the deliberation and planning required to rebuild in a safe and equitable way, which will mitigate the impact of future disasters (Nelson 2007). While there is a strong and necessary tendency to focus on the obvious and direct destruction and damage there are long term and wide-ranging indirect effects particularly in the form of socioeconomic costs (Quarantelli 1999). Some mistakes made in past disasters have

[2] interRAI: an integrated set of assessment tools developed by an ongoing collaboration across more than 30 countries. See website at http://www.interrai.org/section/view/

included poor location of temporary housing and businesses which have become much more permanent than intended and worsened existing inequalities, the selection of unsuitable sites for dumping disaster debris, hasty decisions about the demolition of buildings, and the reoccupation of sites that are disaster prone and would have been better relocated (Nelson 2007; Graham 2006; Denhart 2009; American Planning Association 2005).

Pre-disaster planning is the recommended method of overcoming the conflict between the need to take action and the need for deliberation. A prior "plan to plan" (Nelson 2007), means that authorities recognise at the start of the response that systematic planning is critically important. Lessons learned from disaster recovery efforts have also shown that ideally there should be a single designated authority to oversee the rebuilding of an area, and that it should be able to boost capacity in times of need, understand the importance of consultation and participation of representatives of all affected parties, and have mechanisms to do that (Nelson 2007; American Planning Association 2005; Ingram 2006). Because so often those most affected by disasters are the worst-off members of society, a key emphasis of long term recovery has been to build a better and more equitable replacement for what originally existed (Morrow 1999; Keim 2008).

Longer term planning: incorporating health in all policies

Many of the wider factors that influence community health and wellbeing are reflected in the literature on post-disaster recovery but appear to have been seldom recognised as such by city planners and construction engineers or even by those engaged in primary and secondary care. The American Planning Association guidance on planning for post disaster recovery, for example, incorporates relevant advice for creating a more sustainable society by exploring the creative possibilities that can be achieved for "…housing, transportation, environmental protection, parks and recreation, urban redevelopment and even health and sanitation" (p. 74). The key challenge is to gain a place in the recovery planning effort and ensure that health and wellbeing is recognised as a key factor to be considered in all decisions and actions, rather than "health" being narrowly viewed as limited to health protection and disease control functions, vital though they are.

Research by the Robert Wood Johnson Foundation (2010) found that policy makers and non-academic audiences did not relate to the academic language used to describe the wider determinants of health but the underlying concepts were important when phrased differently. Using more colloquial language with contexts that people could relate to and focusing on the solution rather than the problem were much more successful. Phrases such as "health begins where we live, learn, work and play" or "health starts – long before illness – in our homes, schools and jobs" were among the most successful messages. This same report has useful recommendations about the judicious use of facts and statistics in the battle to ensure that decision makers in all fields consider equity, warm homes, clean environments, social capital, and access to services in their planning.

Even though health is rarely mentioned in the recovery literature apart from its traditional role in acute personal health care, sanitation, disease outbreaks and vaccinations, there is a reasonable literature from other disciplines which is relevant to wider and longer term health impacts. Conclusions are reasonably consistent and provide some guidance about lessons learned and pitfalls to avoid, although there are fewer examples of what works well.

Equity

People are not equally at risk from disasters. Evidence from past disasters shows that those who have greater resources (financial, social, and intellectual) are better able to prepare and recover more quickly than those least well off. The very old and the very young, the disabled, and those who are poor or have limited literacy skills are likely to suffer the most. The less well off, particularly the elderly, are also likely to have poorer health and less physical ability. In Hurricane Katrina, although only 16% of the population was over 60 years of age, 75% of those who died were in this older age group (Morrow 1999).

Elliott and Pais (2010) found that after a few years had passed following a disaster, overall population growth, housing and employment were likely to show little discernable impact compared to any other area, but that these "macro-level" studies missed the effect on vulnerable populations (p. 1189). They suggest that rather than one aggregated recovery, there are many different recoveries in a disaster, and that they need to be investigated in more detail.

Rebuilding after a disaster offers opportunities to use extra funding generated specifically for rebuilding and which would not otherwise have been available, to create a better and more equitable replacement of what existed previously. However, without careful planning, this opportunity can be lost, and existing inequalities exacerbated. Gotham and Greenberg (2008) in an examination of rebuilding in New York after 9/11 and New Orleans after Hurricane Katrina, found that market-centred approaches in both places pushed through far-reaching neoliberal policy reforms using the billions of dollars of aid money that became available. In New York, the Lower Manhattan Development Corporation sought and obtained a "waiver on all income requirements and public benefit standards, including a complete waiver of the stipulation that 70 percent of funds go to low income people" (p. 1047). In addition, tax relief was made available to all developers regardless of the public benefit of their projects. The authors of the study found that the redevelopment created "new opportunities for elite actors and organised interests to champion controversial policy reforms that bolstered corporate profit making, enhanced place promotion, and depressed wages" (p. 1051). The article concluded that the implementation of disaster relief through private enterprise disadvantages those who have low incomes, exacerbates inequalities, and has a history of removing public accountability. They recommended that recovery needs careful planning and oversight to ensure that it does not create "highly inequitable effects that impede comprehensive,

long-term, and sustainable rebuilding." A more general examination of the variable impact of disasters on socioeconomic groups looked at areas where population growth occurred after hurricanes by combining GIS data from the major storms of the early 1990s in the United States with census tract information (Pais and Elliott 2008). This paper found that regional factors (size and density of the population and the proportion of people affected) influenced the patterns of recovery but have been largely ignored in previous studies. Their findings showed that in densely settled urban areas, the rebuilding programme seemed to leverage private investment by those who could afford it and displaced those would could not. In more sparsely populated areas, however, where there was less property, fewer people, and smaller pro-growth coalitions, there was an increase in socially vulnerable populations along the storm's path (p. 1200). The study also found that there tended to be substantial population growth after disasters, which provided an optimistic view of the capacity for resilience after disaster in some respects. However the growth was socially and spatially uneven, with people on low incomes and low rates of home ownership tending to characterise the growth areas, and set the scene for future disasters, and potentially "fan racial and ethnic tensions, especially in the context of immigrant influx." (p. 1449)

Housing

A useful overview of housing issues for populations displaced by disasters is given by Levine et al (2007). Even though the article primarily refers to the aftermath of Hurricane Katrina in the United States, the findings appear to be relevant to Christchurch and are worth summarising in some detail.

- Post disaster housing encompasses four phases in succession – emergency shelter, temporary shelter, temporary housing, and permanent housing.
- Providing housing for displaced populations raises a variety of downstream issues such as land use criteria, the provision of water, electricity and sewerage, availability of education and employment for children and adults, and access to transport, public services and food.
- There is a poorly defined transitional period between immediate response and full recovery. In this period there are issues of displacement, temporary housing, social vulnerability, and decisions to return or not to return by displaced residents to consider, as well as the need to avoid short term thinking about land development, long term housing and resettlement. Delays in planning and rebuilding during the transitional period may cause temporary housing to become permanent even when it is not suitable for long term occupation, and may predispose the population to future disasters.
- Temporary housing should be as geographically close as possible to the original location and displaced communities should be kept together to preserve their social and economic networks and minimise the stress of being displaced. Uprooting low-income elderly people from their social networks and health care systems is known to be particularly damaging.
- Cultural and social factors play a key role in family decisions about whether or not to return. People with strong networks and historical ties to a place are less

likely to relocate, whereas concern for the psychological health of children may encourage relocation to a safer area. Home and car ownership also influence decisions.

- Population displacement can have flow-on effects on communities far from the disaster zone caused by a flood of new residents arriving, housing shortages, and soaring prices, land use issues, and the need to extend existing infrastructure.
- Policy responses tend to be fragmented, highly politicised by the urgency of the moment, and are often "inadequate, dysfunctional, or tainted by hidden consequences…" (p. 10).

This article also highlights an example of poor planning that occurred when residents of New Orleans were relocated to a mobile-home park after Hurricane Katrina where there were no jobs, no transport available for residents to go to the nearest large town to look for work, nowhere to buy food within walking distance, and where children missed several months of school before the authorities managed to establish a school bus service.

A study of impediments to recovery in the worst hit areas of New Orleans after Hurricane Katrina found that without access to income and capital, getting satisfactory permanent housing continued to be very slow. In some cases residents of New Orleans were provided with rental vouchers for obtaining housing, but rental housing was in very short supply and rents rose sharply. People who had owned their own homes prior to a disaster and had them insured were more likely to have commenced rebuilding one year after the disaster. Those without these resources had little choice but to rely on government assistance and were likely to be living in unsatisfactory conditions even 14 months later (Green et al 2007).

Wholesale relocation of communities after disasters, however reasonable from a scientific and planning perspective, has proved to cause controversy and distress for the residents of the area which has been deemed unsuitable. Decisions about not rebuilding in the most disaster-prone areas after Hurricane Katrina were seen as an attempt to benefit wealthier white neighbourhoods by diverting scarce resources from flooded to unflooded areas, and to deny African Americans the right to return to their homes. No policies, other than general statements, were proposed to facilitate residents' return to other parts of the city and media reports which suggested that flooded areas were to be turned into green space created a high level of resistance to the plans (Nelson 2007).

The Participatory Planning Guide for reconstruction after disaster (Environmental Planning Collective 2004) advises that minimum relocation is the best policy, stating that "past experiences world-wide have repeatedly shown that wholesale relocation very seldom works….A more feasible alternative is selective relocation of parts of the community away from [the worst] sites but remaining within the same general area" (p. 6). The guide goes on to note that the affected community needs to be provided with technically and economically feasible resettlement options and transitional assistance including income support and employment.

The literature on what works best for rehousing people after disasters is somewhat smaller than that on what not to do. An example from post-hurricane New Orleans cited by Levine et al (2007) is the Katrina Cottage, a small (380 square foot) home built to withstand gale force winds, and which could be placed on a damaged section while the owner rebuilt. It cost the same as a government-provided mobile home, could remain on site afterwards and be used as a granny flat, spare room, or studio, or subsequently be expanded into a larger home.[3]

The American Planning Association guide for post-disaster reconstruction (2005) covers issues of residential, commercial and public facility building, the importance of regulations and zoning, and decisions that need to be made about strengthening building codes. It notes that there will be existing premises (both residential and commercial) that do not comply with strengthened codes and that it is "both practically and politically unlikely" that a rigid stance should be applied in the circumstances immediately after a disaster (p. 53). The approach recommended when there are hundreds, or even thousands, of non-complying buildings and intense pressure to re-establish on the same site, is to seek a compromise that strikes a balance between the benefits and risks. They suggest "nonstructural measures directing land use away from hazardous areas or simply seeking to influence human behaviour"(p. 57). Although not directly stated, this is likely to refer to the use of zoning regulations and/or the provision of incentives to make it more attractive to rebuild in safer areas.

Nelson (2007) in the study of recovery planning in New Orleans concluded that:

- the process by which decisions are made should be transparent
- it should be participatory if possible but the engagement process should not get in the way of achieving important objectives
- outside experts are likely to be needed but they should be prepared to collaborate with local residents and professionals, and to adapt their expertise to the particular cultural and political context
- effective leadership means that decisions must be made even in the face of opposition and will sometimes be difficult and unpopular (p. 47).

There appears to be little about the impact of damaged housing on families in the aftermath of the Napier earthquake. Hollis (2007) comments only that that the mainly wooden houses were less affected than the business area, and owners carried out repairs when they were able, given that the country was in the depths of depression (p. 108). The fact that temporary housing was set up and many women and children were evacuated, however, suggests that there was considerable displacement and the social history of the earthquake may be under-investigated.

Mental health

[3] See website at http://www.katrinacottagehousing.org/

Although extreme distress is common in the immediate aftermath of a disaster, most survivors recover spontaneously without the need for professional help. Intervention in the form of "stress debriefing" is unsupported by the evidence and may even exacerbate distress (Gheytanchi et al 2007). Focusing on fostering a belief in self-efficacy, adaptive coping and problem solving skills of survivors has consistently been found to be a buffer against persisting distress and postraumatic stress disorder. Survivors from a number of serious disasters in the US were found to have severe distress in the immediate aftermath but those who believed in their ability to cope with events and exercise control over their lives did not experience long-term symptoms (Benight and Bandura 2004). However, a small proportion of people who believed they were at the mercy of circumstances and could not turn off "perturbing ruminations" were still experiencing elevated distress years later (p. 1136).

A random dialling survey of adults in New York at one, four, and six months after the 9/11 terrorist attacks (Galea et al 2003) found that the prevalence of self-reported symptoms of post traumatic stress disorder declined from 7.5% at one month to 0.6% at six months, suggesting that there was a rapid resolution of symptoms in the general population. Although this finding is reassuring on a population level, the authors reported that some people were still experiencing clinically meaningful mental health consequences after six months. Service providers had also reported an elevated rate of mental health use.

Increased levels of long term stress, behavioural and emotional disturbance, and psychiatric illness after disasters are more likely under particular circumstances. Children and young people are particularly vulnerable. A cohort study of children in Louisiana and Mississippi found that some suffered long term persistent stressors and symptoms over the following four years and that they were nearly five times as likely as a pre-Katrina cohort to suffer serious emotional disturbance even after controlling for parental mental illness and social adversity (Abramson 2010). Another study of health care needs in New Orleans six months after Hurricane Katrina (Springgate 2009) noted that many psychiatrists had left town, psychiatric services had all but disappeared, and there were suicidal and psychotic patients waiting for days to be seen. Primary care services also reported that around 90% of the patients they saw were reporting very high levels of stress from a range of causes including homelessness and from insurance issues. It is also important to consider the emotional impact on those providing giving the help during disasters, as they may be working outside their normal area of expertise and not trained to deal with people under extreme stress (Quarantelli 1999, p. 8).

Displaced families living in mobile homes and other temporary housing after Hurricane Katrina were found to have high levels of both medical and mental health problems exacerbated by poor living conditions (Madrid 2008; Jacob 2008). In the haste to evacuate during Hurricane Katrina, those people who were not able to go to family and friends by themselves and had to rely on emergency transport out of the city were taken to totally unfamiliar locations, and some families were separated from one another and not reunited for a long time. Evacuees in temporary housing reportedly moved an average of 3.5 times, adding to the burden of stress and disruption (Jacob 2008).

There were frequent disruptive behaviour disorders, and learning problems, anxiety, depression, and stress in children, with addiction and mood disorders most common among adolescents and adults. Other studies of displaced people six months after the disaster showed high rates of domestic violence and suicide (Larrance et al 2007), as well as substance abuse in adolescents (Rowe and Liddle 2008). Moreover, services were ill equipped to cope with co-occurring substance abuse and traumatic stress reactions. Several authors report on family-based interventions as being a preferred approach in such circumstances to support resilience in families and communities (Rowe & Liddle 2008; Landau 2008), but avoiding the extent and duration of displacement from social networks altogether may have been a better approach.

Social cohesion and resilience

Social capital is defined as the connections and relationships among and between individuals and communities. It includes trust within networks of family and friends and the reciprocal exchange of benefits through access to networks of contacts, resources, skills, influence, reassurance and mutual support (Currie and Stanley 2008). Extended family and community networks are known to buffer the effects of stress and are the most important source of assistance in time of disaster (Quarantelli 1999). In a study of people affected by Hurricane Andrew, for example, about three quarters of families had local kinship networks that played a major role in the ability to recover (Morrow 1999). Those who do not have these networks are likely to be more vulnerable, particularly those in new communities where people do not know one another well, recent immigrants, transient people, and tourists. People living in rental accommodation may also be more vulnerable as they are likely to have less control over their surroundings and to be less invested in their community. The number of healthy, resourceful adults available in a household is an "important but virtually ignored" factor in disasters (Morrow 1999, p. 6). Having an adult household member available during the day to forage for supplies, wait in queues to apply for assistance, meet with damage assessors, contractors, and insurers has enormous advantages compared to, for example, an elderly person living alone, or a lone parent with small children to care for.

Outside family networks, wider community connections are also an important source of support in a disaster and its aftermath (Chang 2010; Morrow 1999; Patterson 2010; Jacob 2008). One of the lessons from Hurricane Katrina was the role of community-based organisations and networks in all stages of the disaster. Faith-based, volunteer, and non-governmental organisations showed more flexibility and adaptability than the official agencies as conditions developed and changed (Patterson 2010). Under disaster conditions being in familiar surroundings tends to decrease fear and distress, whereas being separated from loved ones and familiar places has been found to be a greater stressor than the physical danger itself (Jacob 2008, p. 563). Rather than triggering social breakdown, it appears that solidarity and camaraderie increase when people are able to remain in familiar surroundings and with people to whom they are attached (Jacob 2008). A study of community reaction to serious flooding in Carlisle in England which caused hundreds of homes to be uninhabitable and created widespread distress, found that

community attachment had been further strengthened by the disaster, and residents were keen to participate in efforts to repair their town and assist the recovery (Chang 2010).

The role of community in disaster response is an important one as community groups can often swing into action immediately. Patterson et al (2010), for example, describe the help and support provided by the Vietnamese community in New Orleans and an interdenominational group of churches in Baton Rouge immediately after Hurricane Katrina. In spite of community networks being recognised as a factor in supporting people during a disaster, the relationship between official agencies and community groups is often uneasy, with groups wary of having their independence and autonomy undermined by official agencies, particularly if they accept government funding or reimbursement of expenses. The role that community groups can play appears to depend on multiple factors that will differ according to the particular community, the exact nature and extent of the disaster, and how much previous preparation and planning for possible disasters has been undertaken. There is also a potentially negative side to community solidarity if it provides a false sense of reassurance which encourages people to remain in vulnerable areas when they should leave, or allows influential community groups to gain resources and information for themselves at the expense of others (Patterson 2010 p. 139).

Community participation in planning for recovery

Citizen group activism and commitment to the wider city are key elements of resilience that assist recovery of individuals and communities (Nelson 2007, p. 46). After Hurricane Andrew in Florida, local activism combined with organisational support and financial assistance from government and non-government agencies was found to have been an effective means of developing and implementing recovery initiatives. These initiatives not only restored damage but built disaster resistant communities by addressing the root causes of community vulnerability (Morrow 1999, p. 11). Nelson (2007), in the study of planning after Hurricane Katrina recommended that official agencies should anticipate and encourage activism by residents and should work with it rather than against it, but emphasised that community groups cannot work alone and that one official agency is needed to take overall responsibility for planning and leading the recovery, finalising policy, and taking hard decisions when necessary, even though these decisions may be unpopular with some segments of the population (Nelson 2007, p. 46). Community members do not necessarily speak with one voice in their vision for recovery and planners may be caught between contrasting philosophies. Some people will want to return to pre-disaster conditions while others will want to use the opportunity to pursue new goals. Other barriers are the raising of community expectations which cannot be fulfilled, or long delays in action and implementation, leading to frustration among residents (Pearce 2003, p. 218).

Although it is now accepted, at least in principle, that the public should participate in community planning after a disaster (Pearce 2003 p. 219), in practice official agencies and grassroots community groups appear to consistently have difficulties working

together successfully. "Traditional and emergent procedures do not always mesh well" and trained organisational workers interacting with volunteers "almost always proves troublesome" (Quarantelli 1999, p. 8). Following Hurricane Katrina, there was a high level of distrust of and resistance to government and experts. Many residents felt that they had to protect themselves *from* the planners and decision makers. Along with the physical damage and displacement from the disaster, residents felt that they had lost control over where they could live, lost their tightly knit neighbourhoods of families and friends, and feared that the political decisions would serve developers and wealthy residents ahead of poor neighbourhoods (Nelson 2007, p. 38, 45). Long delays in being able to re-enter damaged neighbourhoods to gain access to their properties and portrayal by the media of areas being unsalvageable and a liability to the recovery exacerbated the distress for residents of the worst hit areas. Many who were anxious to return to their communities stayed away because of the uncertainty about the availability of services and whether there would be adequate law enforcement (Green 2007).

An interesting aspect of the Napier earthquake from a modern point of view was the immediate citizen response which took place in the absence of a Civil Defence organisation. Citizen groups appear to have achieved a great deal in a short period and perhaps avoided the conflict that can result between community-driven and official efforts (Hollis 2007). However, the fact that Civil Defence was set up as a result of the earthquake may suggest that the city (and the nation) recognised the need for such an organisation to take over in times of disaster.

The American Planning Association guidance (2005) recommends establishing a recovery task force. They provide examples of the composition of four existing recovery task forces in Florida and Los Angeles, mostly composed of government and emergency organisations (p. 50). The guide notes that in addition there is a "…need to include in some way all those who must be heard to ensure the plan's successful implementation." (p. 52), including representatives from major social service agencies, as well as "…private citizens, whether as individuals or representatives of civic or neighbourhood organisations, [which] is critical in enhancing the quality and breadth of input into decision making…" (p. 49).

The participatory planning guide developed for India (Environmental Planning Collective 2004) is targeted at village communities in a developing country, rather than a large, developed city, but nonetheless has relevant advice on the steps that should be taken in any participatory planning process. The guidance covers the process from the starting point, through committee formation, identification of stakeholders, creating community vision, developing a plan and presenting it for discussion and feedback, to adoption and implementation of the recovery plan (p. 9-12). The document has useful advice about ensuring that equity principles are adhered to, and that all interests are represented and have mechanisms for "policy dialogue" at the local level that then feed into higher level decision making. It should be kept in mind, however, that this advice was developed for a very different geographical, economic, and political context and the more detailed recommendations are likely to be of limited generalisability.

An interesting discussion of community participation in housing reconstruction after disasters is given by Davidson et al (2007). They note that "community participation" has been understood many different ways, and that informing or consulting the community is often wrongly passed off as participation. They give contrasting approaches demonstrating successes and failures of community participation in post-disaster housing projects using four individual case studies from Colombia, El Salvador, and Turkey. Their study concluded that because the socio-politico-economic context must be considered, there can be no single optimum approach for community participation (p. 113) but "…the participation of users in decisions within the project design and planning phases including the capacity to make meaningful choices among a series of options offered to them leads to positive results" (p. 100). While the examples may seem remote from Christchurch, they have relevant insights about where, when and how users can be involved, particularly in community-scale projects.

In an interesting approach to community participation 90 urban planning students and faculty from three major universities outside the area, partnered with residents in a badly hit area of New Orleans after Hurricane Katrina to create a "peoples' plan" for an area which officials had written off as not worth rebuilding or restoring basic infrastructure or social services (Reardon et al 2009). In spite of racial, class, and age barriers to overcome, the advocacy and partnership were ultimately successful in ensuring that equity and social justice concerns were heard, and that the city's poor neighbourhoods had a strong voice in formulation of planning their recovery.

Economic recovery

The American Planning Association puts economic recovery right at the top of the agenda for long-term recovery and reconstruction (American Planning Association 2005, p. 53-57). Based on events after other disasters, they estimate that around 30% of small businesses do not survive, mainly because of the length of time they are disrupted after the disaster. The key points of their discussion are summarised:

- Economic recovery and community wellbeing are linked. Businesses need an available workforce as well as an economic base for local retailers and other enterprises, and the restoration of employment, local infrastructure and support services are needed by everyone in the community, whether businesses or residents (p. 54).
- Economic recovery is likely to take longer in poorer sections of the community because of the relative lack of resources to restart and limited capacity to undertake or even influence (in the case of rented premises) the speed and focus of the recovery process.
- Economic activity usually undergoes a "roller coaster" trajectory after a disaster with a downward plunge in the short term, followed by an intense phase of reconstruction usually supported by outside aid from government and other external sources, but this then flattens out and the economy returns to a more normal balance.

- The intense rebuilding period needs to be used to build an economy that is economically stronger and less vulnerable to future disasters. This may involve relocating a business district away from disaster prone areas (for example flood plains) or diversifying the type of business undertaken. The loss of tourism, even for a short period, is a major economic threat for those communities that depend on it for a significant portion of their income.
- Using the experience of disaster to incorporate mitigation efforts for the future also protects the local and regional tax base, which in turn is good for local government.

Even though supporting businesses is vital for the overall recovery of communities in the long term, assisting businesses in the short term may sometimes divert from immediate human service needs. Quarantelli (1999) cites an example from Mexico following a hurricane in Cancun where restoring the tourist hotel resort area was given the highest priority to ensure the flow of foreign currency into the country and protect the jobs of the many local people employed in the tourist industry. While this may have been the right decision from a broad economic perspective, it resulted in a reduction in humanitarian assistance to some of the worst hit neighbourhoods, where homeless people were neglected for many months.[4] The same report then goes on to note that although there has been minimal research on the influence of political factors in disaster response and recovery, political power is a crucial factor and "…it would be naïve to think that even in [democratic] societies, no political factors enter into the relevant decision making and the providing of recovery aid" (p.9).

Access to services

Restoration of routine public services and commercial businesses is an integral part of rebuilding communities after disasters, including access to utilities, health care, transport, food supplies, education, and sources of employment. Ensuring the continuation and resilience of these services is just as important a part of forward planning for future disaster mitigation as considering the impact on individuals and families – neither can be considered in isolation (Keim 2008). The psychosocial impact of relocating whole communities to areas without services after Hurricane Katrina, for example, has already been discussed (Levine et al 2007) as has the necessity of strengthening the resilience of the economic base of a community to ensure its continuation (American Planning Association 2005). The same type of interventions that support social capital and sustainability also tend to decrease vulnerability of services in times of disaster (Cork 2009; Maguire and Cartwright 2008).

[4] The suggestion of accommodating Rugby World Cup tourists in luxury liners in Lyttelton harbour because Christchurch had lost so many hotel beds comes to mind here, as well as the subsequent negative comments that the suggestion provoked.

Sustainability: mitigating future disasters

Many of the studies on disaster recovery emphasise the dual benefit that can be derived from incorporating sustainability principles into planning for disaster mitigation. The topic has been approached from other viewpoints, such as climate change, environmental management, and poverty reduction (Keim 2008; Thomalla 2006; American Planning Association 2005; Springgate 2009; Pearce 2003). Although these are diverse fields, they share much common ground with each other and with population wellbeing. In a theoretical paper Thomalla et al (2006) draw on ideas from all these fields to show how "…underlying social, economic, and environmental factors operating on different spatial and temporal scales give rise to vulnerability". It is the interaction between exposure, sensitivity, and resilience in relation to these factors that make people and communities more or less vulnerable to disasters and which need to be addressed to achieve true mitigation of future disasters, rather than focusing solely on "single stressor responses" such as designing more resistant buildings or erecting stop-banks (p. 42). Public health writing also reflects the need to address underlying social determinants in disaster planning and mitigation An assessment of health care after Hurricane Katrina found that there was a wish to use the recovery process to transform the "historically low-quality" health system with a "new vision and new voices" so that diverse, urgent needs could be addressed (Springgate 2009, p. S241). Similarly, a study of the role of public health in climate change called for reducing the burden of disease, building social capital, and strengthening resilience so as to lessen human vulnerability (Keim 2008).

Even disciplines which do not directly refer to health appear to have grasped the concepts of wider wellbeing. A case report of hazard mitigation by a Californian community situated over the San Andreas fault (Pearce 2003) written primarily from a geological hazards perspective notes the gains to be made through a combination of expert geological advice and public participation. The planning proved to meet community needs as well as taking steps to mitigate future disasters by restricting new development to stable areas, leaving open spaces in areas assessed as hazardous, and preserving the natural environment and character of the town. Likewise, the American Planning Association (2005) recommendations, which primarily focus on economics, advise that communities should improve rather than simply rebuild, by integrating principles of sustainable development and energy efficiency, diversifying the economic base, and mobilising public opinion behind a new vision for comprehensive overall planning for the area. A case study given as an example in their guidance outlines a flood prevention plan in a North Carolina community with "100% voluntary participation of owners to sell their properties" in the flood prone area, and which offered those owners low interest loans and priority for repurchasing in a new area. A residential care facility was relocated to a safer area and the existing structure reoccupied for daytime use only. Infrastructure such as water and sewerage was extended into the safer area to allow for the relocations, and a wetland was created in the flood plain where the houses had been removed (p. 73).

Heritage buildings

Heritage buildings are part of the identity of a city. They give the people of the community a sense of their arts, history, and traditions.[5] Heritage buildings also have hosting value as destinations where people can meet for creative, recreational, and cultural activities and as such they contribute significantly to individual and community wellbeing (Ministry for Culture and Heritage undated). They present people with familiar surroundings which provide reassurance in times of uncertainty such as the aftermath of natural disasters (Spenneman 1999).

The nature of a disaster often causes damage to cultural heritage but is often further exacerbated by actions taken without proper consideration as part of the urgency of response, meaning that part of the area's heritage is forever lost. Pre-disaster efforts can help by strengthening or retro-fitting buildings to mitigate damage in disasters. It is also important to have plans in place for heritage management immediately after a disaster. The American Planning Association (2005) provides general advice on the need for each community to plan ahead and think through the conditions under which "non-complying" buildings should be allowed to remain, and under what conditions they should be demolished, or undergo seismic retrofitting (p.67-68).

Donaldson (1998, reprinted 2004) acknowledges that during the immediate response phase following a seismic event, the preservation of historic resources becomes the lowest priority of disaster-related activities and it may be difficult or impossible to halt processes that are done in the name of protecting the public from injury. What is recommended, however, is that heritage interests should initiate immediate collaboration with search and rescue, should be considered as part of the process and should be able to provide information to the other agencies from a qualified team of "a preservationist, structural engineer, and preservation architect familiar with older construction methods" (p. 26). Other advice in this document includes obtaining a second opinion on any historic structures listed for demolition, and having a separate and distinct damage assessment placard for historic buildings.

Australian researchers who were concerned about poor handling of heritage sites in the course of responding to disasters, conducted a study in New South Wales to obtain some evidence about the relationship and barriers between the fields of emergency management and heritage interests (Graham and Spenneman 2006). Their study surveyed fire service personnel and local government heritage managers to examine their attitudes to and knowledge about each other's fields. Their findings showed there was limited knowledge and communication on both sides. The researchers aimed to use the evidence they had gathered as a starting point for measures that would improve understanding and collaboration and therefore enhance the preservation of buildings and cultural heritage sites in the event of disasters.

[5] See New Zealand Historic Places Trust website at http://www.historic.org.nz/AboutUs/IntroNZHPT.aspx

One small study reported on a method of offsetting "emotionally wrenching situations" when buildings which had a lot of meaning to particular communities needed to be demolished (Denhart 2009, p. 197). This was the Mercy Corps deconstruction programme in New Orleans which obtained permission from authorities for churches and their communities to deconstruct their buildings carefully using local minority contractors. The materials were able to be reused instead of going to landfill, but even more important than being able to sell or gift the materials, was the improvement in psychological wellbeing that resulted for the communities, through the showing of respect for their buildings and the sense of empowerment among the people when they, rather than authorities and outside contractors, were able to decide how to dispose of them.

Limitations of the evidence base

- Epidemiological data in the studies located for this overview was largely limited to health care utilisation, particularly psychiatric services, and demographic data referring to the movement of populations. Because of the difficulty in collecting and recording data at the time of an emergency (Foxman 2006), statistical information may not always show the true picture of effects. It is worth noting that aggregated data may conceal poor recovery in more disadvantaged groups because of the averaging effect when the data is amalgamated.
- There are difficulties in quantifying levels of resilience, social cohesion, or the impact of community participation, and the information available is largely based on expert commentary, theoretical writing, case studies, or self-reported reactions and experiences.
- The available literature is heavily weighted towards US disasters, especially Hurricane Katrina. This is inevitable as the US provides funding for research and publication to an extent that is not available elsewhere.
- The appears to be little New Zealand literature apart from the thesis by Hollis (2007). Nothing has been located that relates specifically to Maori, though it is well established that all minority groups are more vulnerable to the impact of disasters.
- In spite of the differences between the US and New Zealand, the lessons learned are consistent, and certainly of value for the current situation in Christchurch

Limitations of this review

- This review has been carried out in a short time frame and has accessed only readily available literature. It is not, and does not claim to be comprehensive or systematic. Every section warrants an in-depth literature review of its own but this has not been realistic in the time frame.
- This review has been carried out from the perspective of the wider health impact of disasters. It has incorporated research from other fields and would benefit from peer reviewing by subject experts in these disciplines.

- New Zealand literature, apart from the thesis by Hollis (2007) has not been included as there appears to be little readily available though it is likely that there is grey literature in existence. Nothing relating to Maori has been located.
- No review has been done of literature on acute health care needs post-disasters.

Reflections on the literature for the Christchurch recovery

Much of the evidence in the sections above, particularly that on the unequal impact of disasters on vulnerable populations, is well known to those who work with communities. The key question is how this knowledge can be used to influence decisions made and actions taken during the recovery process so that Christchurch is a better and more equitable place to live. It would seem that collaborative action between like-minded organisations could provide a valuable means of translating this knowledge into practice in the recovery. Organisations could, for example:

- Seek membership on recovery planning committee(s) either jointly or severally.
- Advocate strongly for health and wellbeing in all policies using any opportunity offered through committee membership, submissions, public hearings or any other means.
- Convey the message that health starts "where we live work and play" using the "new way to talk about the social determinants of health."
- Further develop existing partnerships and pursue new ones with local authorities, primary care, mental health, and social service organisations to strengthen this voice at the policy level.
- Resist getting bogged down in long drawn-out planning, which delays action being taken.
- Ensure that "community participation" really is that, and not just information or consultation that is then disregarded.
- Be watchful for the type of policies and proposals that will further disadvantage vulnerable groups and advocate for those that improve rather than exacerbate inequalities. Lessons from the literature demonstrate that decisions about relocation, temporary housing, and letting of contracts appear to be among those that have the greatest potential to have either a positive or negative impact depending on how they are handled.
- Advocate at the interface between official and community groups to ensure that all energy is directed at the recovery rather than being diverted into conflict and dissatisfaction. This might include supporting small, local, and sustainable efforts and groups to ensure they are not disadvantaged by larger national or economic interests.

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