



South East
Healthy Communities
Partnership

A systematic review: The implications of climate change for health and community services

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January 2011



Acknowledgements

The Systematic Review was undertaken by Rae Walker, John Hassall, Sue Chaplin, Janet Congues, Rachael Bajayo, School of Public Health, La Trobe University with sponsorship support from South East Healthy Communities Partnership.

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1. Introduction

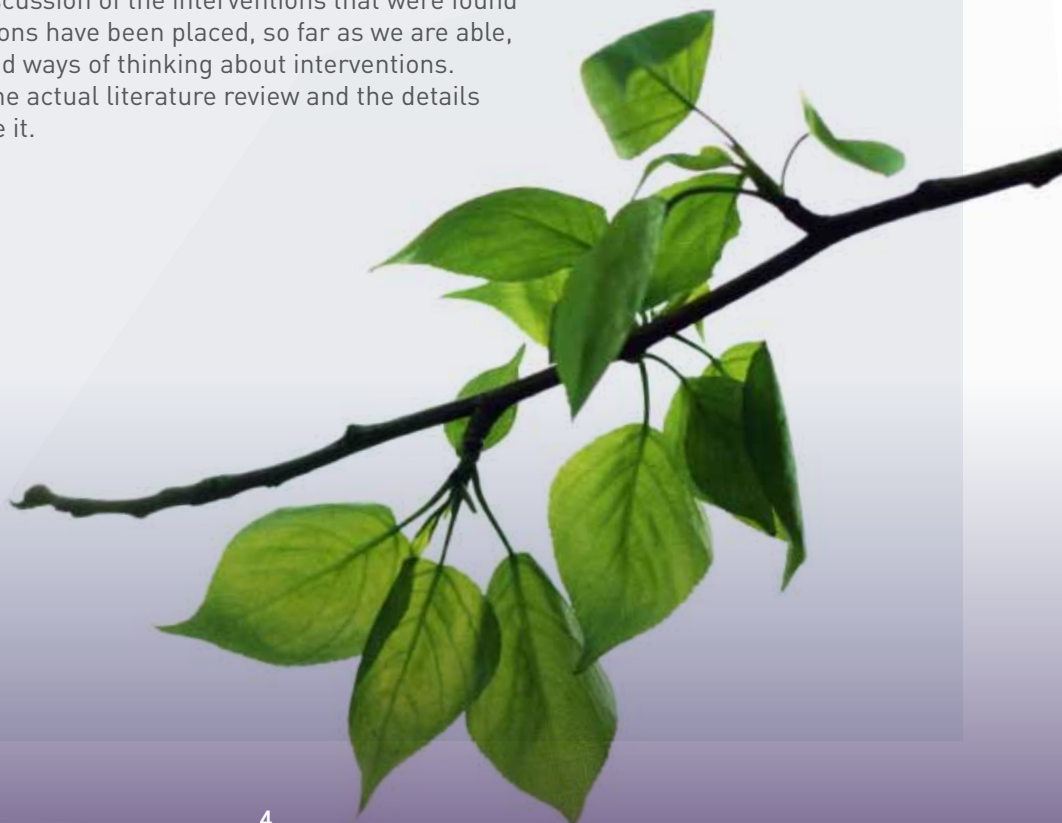
This report is a review of published literature that addresses both climate change and key areas of primary health care. The literature was obtained primarily from electronic data bases of journals and theses.

Objective of the review: Through a systematic review of the literature, to define a perspective on climate change and a framework for addressing relevant climate change impacts on populations with which the primary health care sector works.

The literature was located using two sets of key words in each search, one pertaining to climate change and one to an aspect of primary health care. Because a search using the broad term primary health care locates a very small number of papers we broke primary health care down into key concepts derived from the major World Health Organisation documents. Use of these terms located a large number of documents that were then reviewed for relevance. Details of the methods are in Attachment 1.

The literature reviewed is that identified in the key word searches. It is literature in which the authors addressed both climate change and one of the key areas of primary health care. In each area there is a great deal of literature that is not included either because it did not address both issues or because it did not come up in the searches.

Part 1 of the report contains a discussion of the interventions that were found in the literature. These interventions have been placed, so far as we are able, in the context of current policy and ways of thinking about interventions. Part 2 of the report will contain the actual literature review and the details of the methods used to undertake it.





2. Overview

Part 1 of this report is focussed on a discussion of the literature that addressed interventions appropriate for health and community care organisations to address aspects of climate change mitigation and adaptation. It contains a subset of the information contained in the full review. The headings used to organise the information are either ones that contained a large amount of relevant papers or are ones that reflect the priorities and activities of the South East Healthy Communities Partnership.

The direct harms from climate change most likely to impact on Australians are: environmental disasters (drought, storms, floods) which are likely to increase in intensity and frequency; extreme heat exposure, heat stress and reduced workforce productivity; reduced water quality and quantity; air pollution; vector borne and food borne infectious disease; and, community and mental health impacts of stress and disaster (Kjellstrom & Weaver 2009). There are also indirect harms that follow from both the direct effects of a changing climate and from our efforts to mitigate and adapt to those changes. They include: increasing social and economic disadvantage from rising prices of utilities, social dislocation and hardship following from disasters, inequitable access to adaptation resources such as home insulation and access to public transport, to name a few. A distinction is also made between rapid onset harms such as fires, floods and storms, and slow onset harms such as droughts, coastal flooding and growing social inequalities. Rapid onset harms are visible, difficult to ignore and we have established disaster management institutions and processes established. Slow onset harms are not so visible, are easy to ignore and require more work to build the institutional capacity to deal with them.

Not all impacts of climate change will be able to be avoided. For this reason mitigation and adaptation are both required responses, adaptation to deal with the effects of warming already in train and mitigation to diminish future emissions and greater climate change impacts. Adaptation is occurring in the context of a slowly changing climate. Impacts vary between localities depending on population vulnerabilities and regional, social and cultural variables, built and natural environments, and social and physical infrastructure. Adaptation measures are most effective when focused on defined populations and places. Different agencies and levels of government have responsibility to act within their mandate and capacity, but in all cases should incorporate population views on risks and adaptation strategies (Ebi 2006). Community consultation is an important part of any major climate change health promotion program.

3 Interventions

3.1 Health Promotion

Health promotion is concerned with physical, social and mental wellbeing and strives to help people take control over the matters that influence their health.

The categories of health promotion interventions used by the Victorian Department of Health are: settings and supportive environments; community action for social and environmental change; social marketing and health information; health education and skill development; and, screening, individual risk factor assessment and immunization (Department of Health 2009). Social marketing, community action and settings interventions to climate change are discussed below.

In the next section, papers advocating mass communication and community building interventions to address climate change will be discussed. These are two important categories of interventions available to health promotion to use in climate change programs.

Social marketing and health information


The problem of a public health approach to climate change is analogous to the response to chronic disease (Maibach et al 2008). Population level behavior needs to change. Population level behavior is determined by people-related and place-related factors. Most of the people and place based drivers of population level behavior can be influenced by mass communication and social marketing interventions (Maibach et al 2008). Mitigation (primary prevention) and adaptation (secondary prevention) both need to be addressed (Maibach et al 2008).

Abroms and Maibach (2008) reviewed the literature on mass communications approaches and impacts relevant to health promotion.

Communication was defined as: *'the production and exchange of information to inform, influence, or motivate individuals, institutional and public audiences'* (Maibach et al 2008:489). In general mass communication campaigns, alone or in combination with other interventions, can significantly influence the health behavior of populations (Abroms & Maibach 2008). When other activities are combined with mass communication the strategy is often called social marketing. Social marketing was defined as: *'the development and distribution of products or services to influence behavior on a large scale for the purpose of societal benefit'* (Maibach et al 2008: 489). The effects of mass communications are typically modest but across whole populations. Although the proportion of a population that changes as a consequence of mass communication interventions may be small, the number of people may be quite large.

Most literature on mass communication campaigns focuses on individual behavior change by addressing the antecedents of behavior using well designed messages 'delivered to their intended audiences with sufficient reach and frequency to be seen or heard and remembered' (Abroms & Maibach 2008: 121). Abroms and Maibach (2008) propose a broader, ecological framework, for health promotion social marketing that they call the 'people and places' framework. The 'people and places' ecological framework is based on the idea that population health is influenced by three things:

- 1) attributes of people making up the population;
 - 2) characteristics of the environments in which people live, work etc; and,
 - 3) the interactions between people and places.
- People are influenced through three fields:
- 1) the individual field
 - 2) the social network field
 - 3) the group, community or population field.



In places people are influenced by local forces e.g. in the home and neighborhood, or by distant forces e.g. government policies or commercial products. Mass media can be used to influence people in all fields (Abroms & Maibach 2008).

Most media campaigns target individual level change. The variables predictive of individual behavior are: affect (e.g. depression), skills, motivation and intentions. Media campaigns seek to influence these. Following a well resourced media campaign on average 9% more people will manifest the behaviour promoted. That figure almost doubles if the promoted behavior is enforced by law. Two important campaign variables, that increased the impact, were reach and novelty of the message (Abroms & Maibach 2008).

Influencing social environments through social networks means influencing people close to the person whose behavior is the target – e.g. friends, partners, parents, siblings – to increase social support for, and encouragement of, behavior change. Messages can also encourage people to discuss the issue in their social networks. Social network targeted mass communication campaigns have not been systematically reviewed and evidence of impact has not been synthesized across studies (Abroms & Maibach 2008).

The characteristics of communities that can be targeted in mass communication campaigns are: social norms, social capital, social cohesion, collective efficacy, income inequality and racism. Most mass communication effort has gone into influencing social norms. Again, evaluation evidence has not been systematically reviewed (Abroms & Maibach 2008).

Media advocacy is a special form of mass communication in which messages are intended to influence decision makers. Four aspects of place can be the subject of media advocacy:

- 1) laws and policies;
- 2) availability of products and services;
- 3) physical structures in the environment;
- 4) media and cultural messages in the environment (Abroms & Maibach 2008).

The research literature on climate change mitigation at the individual level focuses on household energy use, recycling, surface transport behaviour and the purchase of green products. Research on individual adaptation has focused on household disaster preparedness.

Effective individual level communication strategies to reduce energy use (typically about household energy use and based on evaluated interventions) are:

- Home energy audits – reduce energy use by 4%–21%
- Feedback (preferably continuous) on energy use – reduction of 5%–15%
- Encouraging people to set energy reduction goals, enhanced by provision of energy use feedback, is effective.
- Use of mass media to model energy conservation behavior. Reduced energy use by 10% but change not evident after one year.
- Eco-labelling. Effectiveness increases over time as people learn to trust the labeling system.
- Household disaster preparedness campaigns can be successful (but not always) if they use: simple and clear messages (who is at risk, how severe and how certain is the risk, what can be done) repeated often (through multiple channels) by a variety of trusted sources (Maibach et al 2008).

• Marketing programs to 'sell' products and services can be effective:

- Financial incentives to install energy saving appliances
- Green energy programs from power companies especially if – low minimum purchase requirements, short contract lengths, and aggressive promotion.
- Travel demand management can increase use of public transport (20%–33%), active transport including walking (16%), and cycling (6%–91%), and reduce number of car trips (10%) and distance travelled (17%) (Maibach et al 2008).

Studies of attempts to influence *network level interventions* are few. However, one that developed block level leaders to model and promote recycling with neighbours was effective in increasing neighbourhood wide recycling (Maibach et al 2008).

Some *community level interventions* to influence community norms have been effective in increasing recycling, reducing household energy use and reducing hotel towel laundry. Because community level variables can be more powerful than individual level ones, these interventions warrant more development and evaluation (Maibach et al 2008).



Place-based drivers of population level behaviour.

There are few evaluated communication and social marketing programs using this approach which is often called media advocacy (Maibach et al 2008). Some examples of this approach include:

- Increasing the availability and reducing the cost of low energy lighting has improved sales.
- Walkability of neighbourhoods increases walking.
- Increasing taxes on undesirable products may reduce consumption.
- Using communication strategies to promote public debate on key issues may help change attitudes.

Multi-level interventions.

Single level interventions have a modest effect. Multi-level interventions, research suggests, have a much greater effect. One successful intervention was to reduce household energy use (reduced it by 15%) by: offering financial incentives and in-home assistance to install energy saving devices, and aggressive use of media and social network (word-of-mouth) initiatives to persuade people to take up the measures (Maibach et al 2008). Similar programs are currently operating through the not-for-profit sector in Melbourne.

Campaign targeting.

Campaigns need to be targeted on the basis of audience interests, values and current behavioural patterns. Interests, values and behaviours can vary between locations and between population groups. For this reason population level research on these matters provides the foundation for mass communication and social marketing campaigns (e.g. Plotnikoff et al 2004; Rawlins et al 2007). Information to help define target audiences in Melbourne does exist in reports of community attitude surveys and ABS census data, for example.

Message effectiveness.

Maibach et al (2008) offer some general advice on communicating about climate change. If frightening messages are to be communicated they should be accompanied by recommended actions to reduce the threat and messages that say the community and individuals in it can implement these actions.

On climate change people respond to personal threats and threats to the community or society. The threat to future generations is typically most powerful. Knowledge messages only are unlikely to influence all except those already strongly motivated.

The strongest knowledge issue is understanding what causes climate change. Maibach et al (2008) advise against repeating climate change sceptic arguments to refute them. Replace them with strong climate change messages. Messages are most likely to be heard if they are consistent with the audience's existing beliefs and values.



Community action for social and environmental change

Ebi & Semenza (2008), based on systematic reviews undertaken by the US Climate Change Science program, develop an approach that uses community building strategies to help communities adapt.

The capacity of local communities to minimise adverse health effects through adaptation is in part a function of social capital ... but also of such factors as socioeconomic conditions, infrastructure, government accountability, and institutional responsiveness. Thus adaptation can encompass both spontaneous responses by affected individuals and communities and planned responses by governments and institutions (Ebi & Semenza 2008:502).

Community level adaptation needs to happen at multiple levels – individual, family, community and government. Top-down interventions are those implemented by local, state and national health and environmental agencies. Stakeholder consultation is necessary because climate change impacts, and interventions to reduce impacts, are *'intimately interwoven with specific population and regional vulnerabilities'* (Ebi & Semenza 2008: 502). Public interventions have generally been least effective with low socioeconomic status populations.

Interventions often need to address the social determinants of health – *'social, cultural, environmental, political, and economic contexts that increase vulnerability'* (Ebi & Semenza 2008:502). Doing so creates co-benefits in relation to other health issues.

Community organising (community development) creates local level 'stewardship' that can be translated into concrete adaptation action. The key concept is social capital which is 'the potential embedded in social relationships that enables residents to coordinate community action to achieve shared goals, such as adaptation to climate change' (Ebi & Semenza 2008: 502). There are two aspects of social capital – *structural social capital* that is the social networks and *cognitive social capital* that is the shared 'norms, values, attitudes and beliefs' that emerge during community interaction often described as 'peoples' perceptions of the level of interpersonal trust, sharing and reciprocity' (Ebi & Semenza 2008: 502). There are three forms of social capital: bonding, bridging and linking.

Bonding social capital is the content of homogenous local groups. It is necessary but insufficient to address a problem as complex as climate change as it does not usually have the problem solving capacity or the authority, experience and financial resources to bring about the necessary changes.

Bridging social capital is in the links between heterogeneous people and local groups. It enables the pooling of experience and resources.


Linking social capital is particularly important in climate change adaptation because it links the local community to people at different levels of power and with resources. Climate change adaptation is complex and communities usually need to draw on the capacities of external agencies such as government, scientific experts, for example. Social capital is about working across scales in the system (Ebi & Semenza 2008).

Webb and Cary (2005) use the concepts of social capital to understand the achievements and difficulties of Landcare, a national community based program to improve natural resource management. Investment in social capital is a government level policy option that is thought to: reduce transaction costs, promote cooperative behavior, enhance flow of information and the diffusion of innovation (Webb & Cary 2005: 120). The benefits of social capital accrue to individuals who participate and to communities in which those individuals live.

Figure 1. Characteristics of social capital for effective Landcare (Webb & Cary 2005: 123)

Sources of social capital	Characteristics of social capital	
Community: community Landcare	Bonding social capital Social relations between individuals in a community Landcare group.	Bridging social capital Social relations between community Landcare members and groups with those outside of the group.
State/institutional: bureaucratic Landcare	Organisational integrity Competence, capacity and credibility of bureaucratic Landcare.	Synergy Social relations between bureaucratic Landcare and community Landcare groups.

Source: [Webb & Cary 2005]



In this framework social capital has two sources. The first is found in the social relationships between individuals and between groups. This is the orthodox understanding of the origins of social capital in a community used by Ebi and Semenza (2008) above. In addition, Webb and Cary (2005) draw on the theory of linking social capital to describe the importance of the state and related institutions in the development of social capital. They argue that *'the broader social and political environment highlighting the role of the state in creating institutions that support or hinder the capacity of others to act in their collective interests' is an equally important foundation of social capital* (Webb & Cary 2005: 120). Social capital follows from social organisation that has occurred at multiple scales.

The forms of social capital have distinct characteristics. Bonding social capital, relationships between people and groups like each other, strengthens interpersonal ties and trust providing strong social support for individuals and groups. Bridging social capital, relationships between people groups who are unlike each other, introduces new knowledge, values and resources into the groups and communities. At the institutional and state levels social capital is characterised by organisational integrity and synergy. Organisational integrity *'refers to the coherence, competence, capacity and credibility of the formal bureaucracies'* and supports the capacity of the state to implement its policies and carry out programs. Integrity is gained through the use of appropriate structures and processes that *'establish and maintain credibility and competence'* (Webb & Cary 2005: 122). Synergy describes the relationship between the state (often in the form of the relationship between public officials such as public servants or local government officers, and community members and groups) and the broader community and, when predictable and effective, enhances institutional trust (Webb & Cary 2005: 122).

If people trust institutions they are more likely to believe what they say and to accept changes they propose.

Webb and Cary (2005) apply their framework to an analysis of Landcare, its organisation and effects. The framework can also be used for conceptualising community based climate change interventions in the health sector.



Bonding social capital: Landcare brings people together, improves communication and provides learning opportunities.

Positive characteristics of bonding social capital:

- Access to knowledge and information, *‘especially how other members experience and respond to land degradation’* (Webb & Cary 2005: 124). This is often very localised knowledges.
- Social support for the adoption and implementation of new practices
- Development of strong social norms that support the adoption of new practices.

Negative characteristics of bonding social capital:

- Strong bonds may establish ‘groupthink’.
- Group may make excessive demands on members leading to burnout.

Bridging social capital: Some of the negatives of bonding social capital can be addressed through bridging the links between groups, and with individuals outside a group, thus extending access to knowledge and resources.

Positive consequences of bridging social capital:

- Improved communication between Landcare members and other stakeholders
- Increased trust between natural resource management (NRM) stakeholders
- Better understanding of other NRM stakeholders.

When networks of groups were formed they became:

- More successful at attracting government funding and translating that into projects
- Developed better coordination and communication
- Produced more knowledgeable land managers

- Networks encouraged broader links and networks that included universities, business and non-government organizations (NGOs).

Bureaucratic social capital: Synergy is necessary for a program that is in touch with the community, and it is able to improve the ties between funding, planning and regulatory institutions involved in Landcare.

Positive consequences of synergy:

- Reduced compliance and service delivery costs
- Enhanced trust in the goals and direction of the Landcare program
- Better alignment of local and regional activity with program goals.

This form of social capital is a consequence of relationships between public officers in Landcare agencies and the local community members. Public officers have to provide the usual technical assistance but also work to enhance local capacity through networks, relationships, and sharing of power. Organisational integrity accompanies synergy. It refers to institutional coherence, competence capacity and credibility of bureaucratic Landcare. It follows from transparent decision making and well trained and skilled staff.

Webb and Cary propose a set of indicators that can be used to evaluate social capital based programs that are designed to address natural resource management and climate change issues. These are described in Figure 2 next page.




Figure 2. Possible measures to assess social capital (Webb & Cary 2005: 127)

Sources of social capital	Characteristics of social capital	
Community: community Landcare	Bonding social capital <ul style="list-style-type: none"> • Group size • Diversity of group • Density of ties • Intra group trust • Intra group reciprocity • Commitment to shared vision 	Bridging social capital <ul style="list-style-type: none"> • Links to other organisations • Involvement in regional NRM networks • Links to non-members • Openness to outsiders • Levels of generalised trust
State/institutional: bureaucratic Landcare	Organisational integrity <ul style="list-style-type: none"> • Staff trust in the organisation • Levels of staff knowledge and skills • Decision-making processes • Training and development processes 	Synergy <ul style="list-style-type: none"> • Number of interactions with groups • Quality of interactions with groups • Group trust in institutions • Service and assistance provided to groups

Because effects and responses to climate change depend on the local context strong community engagement in adaptation planning and implementation, working with community assets, is very important. Ebi and Semenza (2008) propose a cyclical model of community based adaptation consisting of: community outreach, situation analysis, asset mapping, stakeholder involvement, intervention prioritisation, resource mobilisation, intervention implementation, evaluation, and back to a new cycle starting with community outreach again. Each step is designed to enhance social capital.

A number of agencies in health and community care have a tradition of community development work. This capacity within the sector can be linked to climate change adaptation either directly or by overtly seeking co-benefits within projects with other priorities. The idea and some examples of co-benefits are discussed in the section on the built environment setting that follows.



Ayers and Forsyth (2009) find that while community-based adaptation is concerned with the anticipated risks from climate change it also aims to address development needs such as measures to improve access to livelihoods and productive assets which will increase the adaptive capacity of more vulnerable or poorer communities. *'Responding to the concept of adaptation is local and place-based, it addresses the locally and contextually specific nature of climate change vulnerability because it takes place at local levels, where people encounter impacts'* (Ayers and Forsyth 2009: 26).

Ivet et al (2004) explored the complexity of dealing effectively with community level adaptation to water insecurity under conditions of climate change in rural Canada. Climate change is increasing climate variability and the probability of more severe and more frequent droughts making adaptations that prepare the community to cope with drought a priority.

In Canada, resource management, including water management, has been devolved from the state to local regions. In many rural regions the capacity to fulfill this role is limited – that is adaptive capacity is low. Adaptive capacity has been defined as *'the potential or ability of a system, region or community to adapt to the effects or impacts of climate change. To adapt to water shortages is to make changes that will maintain or improve the ability of a system to continue to serve its functions during periods of insufficient supply'* (Ivet et al 2004: 37). A number of adaptive measures are available but their effectiveness depends in part of the capacity of the organisation or community to implement them.

At the institutional level efforts to conserve water were common. There was a provincial drought response plan but no municipality had developed one at the local level. Institutional adaptation was about balancing human and ecological water needs under current climate conditions meaning that existing water use patterns were sustained rather than modified in preparation for periods of reduced supply.

Three general lessons could be drawn from the study. First, for many local water managers planning for *'collaborative adaptation to climate change'* was a low priority. Managers had to focus on short to medium term goals, for political and financial reasons. Climate change was too long term to make it onto the agenda. Second, organisations with roles in water management need to work together coherently rather than at cross purposes. Third, there were diverging points of view, information and action on urban growth and rural and recreational water use – some increasing water use, others conserving it. The chaos in the water management system needed to be replaced with a coherent perspective shared by all the major players that climate change is irreversible and that planning for less water availability is necessary. The water management institutions needed to develop relationships and response pathways across scales, in the fashion described by Webb and Cary (2005) above, to begin an effective adaptive response. Ivet et al (2004) propose a set of indicators for water managers to use when assessing the adaptive capacity of their community arrangements. These are described in Figure 3 next page.

Figure 3. Factors affecting the capacity of communities to adapt to climate change-induced water shortages (Ivet et al 2004).

Element of capacity	Indicator questions
How do institutional arrangements affect capacity?	<ul style="list-style-type: none"> • Are the roles and responsibilities of senior and local government agencies clear, consistent and comprehensive? • Are appropriate adaptation activities available to decision-making and implementation agencies according to their roles and responsibilities? • Have senior government agencies demonstrated commitment and support (e.g. financial, political, technical) for local agencies to implement adaptation activities?
How does the nature of the community affect capacity?	<ul style="list-style-type: none"> • Are community stakeholders aware of the potential impacts of climate change and water shortages on human and ecological systems? • Are local water management agencies perceived by community stakeholders as legitimate? • Do local water management agencies and related organisations communicate, share information, and coordinate their activities? • Is there an agency providing leadership to local water management organisations? • Are members of the public involved in water management decision-making and implementation of activities?
How do a community's resources affect capacity?	<ul style="list-style-type: none"> • Are sufficient and secure financial resources available to decide upon and implement adaptation activities? • Are adequate staff with appropriate training and technical expertise available to implement activities? • Are information (e.g. about water resources, climate change, and impacts) and technical resources accessible and of appropriate quality?

Community development is also a key strategy for building community resilience that is discussed in a later section.

Settings and supportive environments

Settings are places where people aggregate to carry out the activities of daily life. The built environment was the setting most systematically addressed in the literature located in this search.

Rissel (2009) summarises a range of interventions used in New South Wales to enhance active transport in urban areas as a means of climate change mitigation. Active transport (walking, cycling and public transport) reduces the use of private motor vehicles and reduces greenhouse gas emissions. It also has the co-benefits of improved health through improved physical and fitness and social interaction.

In NSW State level initiatives include: active living in the design of new housing developments, active living criteria in the evaluation tool for new urban developments, active transport in the revised design code, inclusion of end-of-trip facilities (for example, bicycle racks) within refurbished buildings, and a bicycle plan.

In NSW local initiatives include: transport access guides for places such as hospitals that show active transport routes, promoting the use of bicycle paths, encouraging active travel to school, investment in cycling infrastructure, and social marketing campaigns to increase cycling.

A package of interventions to increase cycling included: improved bicycle infrastructure, funding for active transport initiatives, mass marketing campaigns to increase cycling, behavior change programs such as Ride to Work, bicycle events to encourage novices, bicycle education programs, and urban design to make the physical environment more attractive for cyclists.

The built environment influences human choices and poses physical, social and biological risks. It is manmade and involves many sectors – planning, engineering, architecture, government, transport and conservation.

The International Panel of Climate Change (IPCC) recommends that cities reduce greenhouse gas production, decrease use of motor vehicles, increase energy efficiency of buildings and reduce de-forestation. Younger et al (2008) focus on transportation, buildings and land use in their discussion of the built environment, climate change mitigation and adaptation, and the health co-benefits of them. Their perspective is summarised in the table on the next page. The table illustrates how health promotion can pursue health co-benefits by working across sectors. The acronym LEED stands for Leadership in Energy and Environmental Design.



Table 1. Relationships among the built environment, climate change, and health (Younger et al 2008)

Built environment category	Link to greenhouse gas emissions and climate change	Built environment strategies	Impacts	Health co-benefits
Transportation	<ul style="list-style-type: none"> • Fuel consumption associated with personal and commercial vehicle use • Number of vehicle miles travelled per capita • Long distances between homes, jobs, schools, and other destinations • Long distances from farm and factory to market 	<ul style="list-style-type: none"> • Increase proportion of people and goods transported on rails rather than roads • Promote telecommuting • Decrease air travel • Decrease distances between destinations (denser and mixed-use development) • Increase facilities and opportunities for transit use, walking, and bicycling • Promote safe routes to school programs • Promote use of food and goods from local suppliers • Develop infrastructure for alternative fuel generation and distribution 	<ul style="list-style-type: none"> • Improved air quality from reduced motor vehicle emissions • Increased physical activity from walking and bicycling • Enhanced social capital 	<ul style="list-style-type: none"> • Reduced motor vehicle injuries and fatalities from reduced motor vehicle travel • Reduced levels of respiratory illnesses (e.g., asthma) due to improved air quality • Reduced likelihood of cardiovascular diseases, some cancers, and osteoporosis, due to increased physical activity • Improved mental health and decreased depression and anxiety, due to enhanced social capital

Built environment category	Link to greenhouse gas emissions and climate change	Built environment strategies	Impacts	Health co-benefits
Buildings	<ul style="list-style-type: none"> • Energy use in producing and transporting construction materials ('embedded energy') • Energy use in construction practices • Energy use in heating and cooling • Energy use in building operations, such as lighting and elevators • Building site choices that promote automobile dependency and sprawl 	<ul style="list-style-type: none"> • Increase use of sustainable, local, and/or recycled construction materials and reuse of older buildings • Increase heating and cooling efficiency through site orientation, insulated windows, green roofs, and natural ventilation • Decrease electricity use by occupants by providing convenient stairs, compact fluorescent bulbs, day-lighting, and motion sensor light switches • Adopt LEED guidelines for energy-efficient buildings • Use less square footage when designing and building houses • Reduce drive-through services that typically involve idling automobiles 	<ul style="list-style-type: none"> • Improved air quality from reduced coal-generated electricity • Increased physical activity from stair use • Decreased heat island effects 	<ul style="list-style-type: none"> • Reduced levels of respiratory illnesses (e.g., asthma) due to improved air quality • Reduced likelihood of cardiovascular diseases, some cancers, and osteoporosis, due to increased physical activity • Improved mental health and productivity from use of day lighting • Reduced susceptibility to heat related illnesses due to decrease in heat island effects

Built environment category	Link to greenhouse gas emissions and climate change	Built environment strategies	Impacts	Health co-benefits
Land use, forestry, and agriculture	<ul style="list-style-type: none"> • Deforestation associated with logging, agriculture, and sprawling development • Separation of land uses, which increases travel • Buildings constructed in vulnerable areas, such as coastal regions and flood plains 	<ul style="list-style-type: none"> • Develop mixed-use communities following smart growth and LEED-ND principles • Preserve and expand parks, trails, and green space • Encourage community gardens and farmers' markets • Reduce construction in coastal locations, flood plains, and other vulnerable areas • Provide incentives to protect, manage, and sustain forests • Coordinate regional planning • Support sustainable logging and agriculture • Reduce demand for meat consumption 	<ul style="list-style-type: none"> • Increased physical activity from walking and bicycling in mixed-use communities • Improved social capital from use of parks and trails and contact with nature • Improved nutrition and social capital from locally grown food • Increased multi-use forests for recreation and commercial use 	<ul style="list-style-type: none"> • Reduced likelihood of cardiovascular diseases, some cancers, and osteoporosis, due to increased physical activity • Improved mental health and decreased depression and anxiety, due to improved social capital • Reduced fatal and nonfatal injuries from severe weather events

LEED, U.S. Green Building Council's Leadership in Energy and Environmental Design rating systems; LEED-ND, for neighbourhood development November 2008 Source: Younger et al (2008) The built environment, climate change and health: Opportunities for co-benefits. *American Journal of Preventive Medicine*. 35(5): 517-526

In health promotion the most systematic approach to health and environment is found in the global Healthy Cities movement based on local government structures. Bentley (2007) reviewed two Healthy Cities sites, one in Australia and one in Europe, to explore the connection between Healthy Cities and climate change. He found no explicit connection between the activities of Healthy Cities programs and the adverse health impacts of climate change. Healthy Cities programs engage in many environmental actions including those to reduce pollution and improve air quality. Healthy Cities do work on transport, air quality, housing and urban planning, all of which are also climate change concerns. However, the link to climate change remains implicit. Issues are framed as environmental and described as about sustainability rather than climate change. Healthy Cities are a setting in which to explore the social and environmental sustainability of cities. In Australia, Healthy Cities is not a major social movement but is potentially one that could become a more important vehicle for health promotion's engagement with climate change in urban environments.

Another well developed setting, in Australia, with potential to adapt to the climate change challenge is the Health Promoting Schools movement. In Australia there are two whole of school frameworks for institutional change – Health Promoting Schools and Sustainable Schools. Adherents of the two approaches rarely communicate. Davis & Cooke (2007) argue that synthesis is required to create a healthy and sustainable schools change program able to respond to the challenges of climate change.

Ecosystems defined by water catchments are also settings in which environment and health intersect (Parkes & Horwitz 2009). Water catchments operate at a meso (medium)-scale. They help to define place and community. They provide an opportunity for cross-sectoral action and multi-scale solutions to climate change impacts that are apparent at the catchment scale and are large enough to support nested smaller scale projects in them.

They join social and health issues to environmental issues in concrete ways linked by the concept of resilience. It is likely that the use of water catchments as settings is going to be more viable in rural areas, where agricultural interests already view water catchments as defining relevant boundaries for farmers, than in urban ones.

In conclusion, health promotion has an important role in the mitigation of, and adaptation to, climate change. It has many techniques available that can be used to help individuals, communities and populations to both mitigate climate change and adapt to its effects.



3.2 Community Resilience


There is no single, universally accepted definition of community resilience, although the term is generally used to refer to the capacity of a community to adapt after disturbance. Some definitions from the literature on community resilience and climate change include; *'the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain acceptable level of functioning and structure'* (Green, 2008: 225), *'the measure of a community's or individual's ability to respond effectively to change or an extreme event'* (Sullivan, 2008: 38), *'the ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event, adaptive processes that facilitate the ability of the social system to reorganise, change and learn in response to a threat'* (Cutter, Barnes, Berry, Burton, Evans, Tate, & Webb, 2008: 599).

Despite being a somewhat fragmented body of literature, papers on the subject of climate change and community resilience offer stimulating discussion about a range of variables that influence community capacity for resilience and adaptation to both fast onset (e.g. fire, flood) and slow onset (e.g. drought) climate changes.

Vulnerability is one such variable; its reduction being described as one means for increasing community resilience to climate change, particularly in marginalised communities which are likely to experience disproportionate impacts from climate change relative to their contribution to the problem (Ford, 2009; Saavedra & Budd, 2009). With predicted increases in the frequency and severity of fast onset events, some authors warn that failure to reduce pre-existing vulnerabilities will increase the impact of disaster events on these communities (Colten, Kates & Laska, 2008). Others argue that past failures to address vulnerabilities have served to perpetuate

power relationships; relationships that dictate which communities control access to critical resources and which ones are therefore likely to cope with the impacts of slow onset climate change (Langridge, Christian-Smith, & Lohse, 2006).

Community knowledge about climate change also influences prospects for community resilience, functioning to motivate and to inform the development of mitigation and adaptation strategies. Describing the King County Climate Plan, Saavedra and Budd (2009) write that building community resilience necessarily involves a process of *'combining knowledge for learning'*. Green (2008) too links climate knowledge with resilience, arguing that a worldwide culture of prevention and safety can be created by improving risk awareness, risk reduction education and risk reduction practice. Certainly, researchers have established that knowledge of local climatic conditions has enabled Arctic populations to adapt to changes in access to resources, travel safety, weather predictability and species availability (Berkes & Jolly, 2001). Conversely, both lack of knowledge and failure to apply knowledge are believed to undermine prospects for resilience and adaptation. Zamani, Gorgievski-Duijesteji and Zarafshani (2006) argue that lack of community awareness of slow onset threats serves to undermine resources over time and that it is vital to raise awareness of threats in order to prevent/counteract resource loss and promote community resilience. Colten, Kates and Laska (2008) assert that the potential resilience of New Orleans communities was compromised by failure to take into account best available scientific data in anticipation of Hurricane Katrina.




The importance of generating, sharing and using climate related knowledge to inform climate planning is the focus of a paper by Shaw (2006), who suggests that in order to build resilience to climate related disasters, lessons learned must be shared and accumulated knowledge integrated into both local reconstruction initiatives and higher level government policies. Sullivan (2008) too emphasises the importance of integrated knowledge, describing resilient communities as having policies, procedures and practices at local, state and federal levels which address community understanding of weather related risks. Interestingly, a lack of precise knowledge about weather related risks is not thought to limit adaptive capacity of communities, provided that climate related strategies account for a wide array of impacts (Adger, Dessai, Goulden, Hulme, Lorenzoni, Nelson, Naess, Wolf & Wreford, 2009).

Literature affirms that social capital plays an important role in promoting community resilience to climate change. This multifaceted construct is central to Ebi and Semenza's (2008) stage based model for community adaptation to climate change, which sets out a framework for building community capacity through development of bonding, bridging and linking social capital. It is also a key ingredient in McLeman and Smit's (2006) Model of Migration as an Adaptive Response to Climate Change. Research supports the relationship between social capital and resilience; Berkes & Jolly (2001) recounting that two traditional Inuvialuit practices that have afforded adaptive capacity are reciprocal sharing within bonded networks and trade between bridged communities. Loring & Gerlach (2009) raise concerns about the continued resilience of such communities as social bonds and bridges break down with changes to subsistence food systems brought about by climate change. Hess, Malilay and Parkinson (2008) raise concerns too, fearing that the weakening of community '*bonds with place*' brought about by climate induced displacement will threaten the resilience of communities by undermining collective

engagement which helps to '*drive place-specific public health preparedness*' (Hess, Malilay & Parkinson, 2008: 468).

Like bonding and bridging social capital, linking social capital is also believed to engender community resilience; authors agreeing that local mitigation and adaptation strategies are more likely to succeed when they are embedded within broader regional, national and even global policy frameworks (Green, 2008; Saavedra & Budd, 2009; Kiem, 2008; Henstra & McBean, 2005 and O'Brien, 2006). Case studies confirm that communities with strong social capital, particularly political links, have greater success in securing and maintaining access to resources which enable resilience (Langridge, Christian-Smith & Lohse, 2006). The creation of formal links between Inuvialuit and regional, territorial and federal governments in the 1980's certainly provided a means for learning and self organisation that has helped to build local capacity to address climate change (Berkes & Jolly, 2001). Just as an integrated and supportive policy environment enhances prospects for community resilience to climate change, nurturing inter-sectoral partnerships with key stakeholders is critical if communities are to succeed in achieving mitigation and adaptation objectives (Saavedra & Budd, 2009; Green, 2008 and Colten, Kates & Laska, 2008).



Like social capital, economic capital features in discussions on community resilience and climate change. Sullivan, (2008) describes the role of general insurance in mitigating financial risks associated with climate change impacts; arguing that resilient communities have good levels of general insurance and that it is possible to reduce barriers to the uptake of insurance through financial literacy, policy support for insurance and an adequate supply of appropriate insurance products for consumers. Other papers use case studies to demonstrate that economic capital increases community capacity to access critical resources in times of slow onset climate change (Langridge, Christian-Smith, & Lohse, 2006), and that it influences the capacity of communities to use migration as an adaptive response to climate change (McLeman & Smit, 2006).

Emergency preparedness is another theme within literature on community resilience and climate change; authors agreeing that emergency preparedness planning increases community prospects for resilience to climate change (Sullivan, 2008; Kiem, 2008; Saavedra & Budd, 2009 and Ford, 2009). Describing emergency response to Hurricane Katrina as inadequate, Colten, Kates and Laska (2008) recommend that in order to build future resilience to fast onset change, planners recognise the importance of an integrated government and non-government approach to emergency preparedness. Kiem (2008) argues that public health has a role to play in building resilience through the development of emergency preparedness and response strategies and, outlines plans for increasing community resilience to six fast onset climate events including storms, floods, landslides, heat, drought and fire.



3.3 Mental Health

Mental health and extreme weather events

From a social perspective Fritze et al (2008) identify three categories of mental health harms from climate change. First, the direct effects of extreme weather events, for example, have impacts on mental health experience and services. Second, vulnerable communities experience disruptions in the social, economic and environmental determinants of health. Third, awareness of the global impacts of climate change can create emotional distress and anxiety.

Extreme weather events can lead to loss, disruption and displacement. Psychological and psycho-social interventions have become part of disaster responses. The poorer communities typically suffer most from extreme weather events and have fewer resources for recovery. Post disaster communities often show higher rates of depression, domestic violence, Post Trauma Stress Disorder (PTSD), for example, as a consequence of exposure to the event, *'displacement, unstable housing and lack of access to support services and employment'* (Fritze et al 2008: 3). Post emergency services need to meet the needs of a *'distressed community, as well as the needs of those who are traumatised, and those with severe mental illness'* (Fritze et al 2008: 3). An important first step is to restore safety so that community members able to help themselves are able to do so. This involves: *'creating conditions of security and safety, reuniting families, establishing systems of justice, creating foundations for work/livelihoods, and restoring institutions that confer existential meaning and coherence'* (Fritze et al 2008: 3).

The social determinants of mental health are: economic security and participation, social inclusion, freedom from violence and discrimination (Fritze et al 2008:3). The economic impact of climate change is likely to be greatest for the economically marginal. Social exclusion is a consequence of displacement which can follow from weather related disasters.

Violence following disaster may manifest as violence against children and exploitation of children and other vulnerable people (Fritze et al 2008).

Bourque et al (2006) examined the impacts on physical and mental health of populations in the USA affected by hurricanes. They conducted a literature review on the death, injuries and diseases attributed to hurricanes making landfall in the USA prior to Hurricane Katrina, and their potentially for causing psychological distress when evacuations are mishandled as in the case of Katrina. Their study found that vulnerable elderly people are overrepresented among the deceased and that the major stressors for survivors were the disruption to social networks along with lack of shelter, relocation, financial strain and coping with insurance companies. They concluded that timely evacuation orders and the provision of transport can reduce fatalities from extreme weather events, and that resources should be devoted to interventions that bring a quick return to pre-disaster conditions and routines for affected communities so as to reduce psychological distress.

Ahern et al (2005) summarised and critically appraised the published studies of flood events across the world and then identified knowledge gaps relevant to reducing the public health impacts. The section of their study that related to mental health impacts found that it was largely only the most common mental disorders (anxiety, depression), post-traumatic stress and suicide which had been analysed. What was missing were studies on the longer term mental health impacts of flooding in particular, even in high-income settings. In particular there are very few studies on mental health impacts on children or on suicides in relation to flooding.

Three papers analysed the relationship between heat stress and mental and behavioural disorders. Hansen et al (2008) identified mental and behavioural disorders (MSD) that contribute to heat-related morbidity and mortality in Adelaide. This study found that hospital admissions for MSD increased for temperatures above 26.7°C during heatwaves and they increased by 7.3% during heatwaves as compared with control periods. Specifically, there was an increase in deaths in the 65 to 74-year age group, a 2-fold increase in deaths due to schizophrenia, schizotypal and delusional disorders, and an increase in dementia in the 15 to 64-age group. Hansen et al (2008) therefore concluded that episodes of extreme heat pose a salient risk to the health and well-being of the mentally ill, particularly as the Australian society is ageing which will see age-related impairments becoming more common. Shiloh et al (2005) study found a significant correlation between the admission rates of schizophrenia patients to psychiatric hospitals and maximum environmental temperatures during spring and summer months. They concluded that it seems to be the persistent exposure to relative high temperatures rather than episodic increases in temperature that affect the psychotic status of schizophrenia patients. In a linked earlier study, Shapira et al (2004) focused on bipolar affective disorder depressed patients (BPD) and major depressive disorder patients (UPD) admitted to seven public psychiatric hospitals in Tel-Aviv, Israel. They found that bipolar, but not UPD, patients exhibited significant seasonal variation which correlated with the hottest seasons.

Hansen et al (2008) recommended that to mitigate the effect of heat on vulnerable populations, heatwave response plans that incorporate heat alerts for the health authorities and the public should be developed. These plans should explicitly include people with relevant mental illnesses living in the community, and include institutions caring for people with mental illness.





Mental health and disaster planning

Disaster planning is an aspect of climate change adaptation that has received a great deal of attention in Australia. However, psychological risk and vulnerability are not fully addressed in disaster planning. Psychological interventions, for which there is evidence of effectiveness, but which are not widely used in disaster preparation and planning, include: *'emotion management training cognitive behavioural coping skills training and stress inoculation training'* (Morrisey & Reser 2007: 123). Until recently the emphasis has been on post-disaster stress and responses to these. There is an increasing awareness of system related matters (as opposed to individual experience-focused) in disaster preparedness, risk communication, warnings and community awareness.

Psychological resilience and coping are recognised in disaster responses and preparation. Relevant variables are personality factors, historical factors such as prior experience of disasters, and psychological and situational preparedness (Morrisey & Reser 2007: 122). Coping successfully with a prior disaster creates knowledge, realistic expectations, self-efficacy and confidence when experiencing subsequent disasters.

The reverse may also be true. Personal and household assessments may help health workers to identify people and families most at psychological risk in a disaster and suggest pre-disaster interventions that may assist their coping. The Australian Psychological Society publishes disaster relevant materials for health professionals.

Bartlett (2008) discussed the climate change risks for urban children living in poverty by focusing on health, learning, psychological wellbeing impacts and the implications of family coping strategies. She found that *'children's psychological vulnerability and resilience in the face of hardship depend on their health and inner strengths, but also on household dynamics and levels of social support'* (Bartlett 2008: 509). The anxious behaviour of children after a disaster can contribute to abusive responses, particularly when household stability is undermined by facing more pressure than to which it can adapt. Therefore efforts to reduce the vulnerability of children and enhance their resilience, and adaptations to climate change should include interventions to restore daily routines and activities, allow them to be actively involved rather than being seen as victims and strengthen the capacity of families to cope.

Australian studies of rural communities coping with natural disasters and their impact on mental health

Three studies focused on the impact of natural disasters on rural communities in Australia but from differing perspectives. Sartore et al (2008) explored the perceived impact of drought on the emotional and social wellbeing of diverse groups within two farming communities in central-western NSW. They also examined the factors that may mitigate this impact in order to guide the development of community-based strategies to support the emotional well being of people within these communities. Their analysis was based on qualitative data collected from semi-structured focus groups and 30 individual interviews which comprised farmers, farm and non-farm business people and health workers. They found *'the most significant effects of the drought on lifestyle and business were the uncertainty and inability to plan ahead'* (Sartore et al 2008: 7) because of the drought. The future of the local community was a primary concern for all groups as was the social isolation arising from not being able to afford 'extra-curricular' activities. The environmental degradation of their home environment was associated with severe distress and anxiety-like symptoms. Sartore et al (2008) concluded that drought induced distress is not confined to the farming sector but has an impact on the wider community. Based on the responses of the participants the study suggests that there is a need to revise and enhance the support provided to farmers and that it should be extended to drought-affected businesses. To support individual and community adaptation to drought, broad-based programs of support for rural communities which have the potential to improve mental health and wellbeing need to be developed.

Morrissey & Reser (2007) took a much broader approach so as to characterise how psychological perspectives on individual and community perceptions, responses, preparedness and planning

to climate change and natural disasters might provide insights and evidence-based practice for allied health professionals and paraprofessionals working with rural communities in Australia. They found that the *'ever present threat of natural disasters in Australia, and the inherent uncertainty, anxiety and dread that are a part of living with such phenomena constitute powerful background stressors that are routinely underestimated and/or ignored'* (Morrissey & Reser 2007: 122). In particular the real costs and impacts of such continuing natural disasters are rarely factored into the assessment and statistics for regional health planning. Neither are the impacts of likely increases in the incidence of natural disasters on community health and wellbeing. Morrissey & Reser (2007) concluded that health professionals and stakeholders must consider the immediate and longer-term options for preparing communities and individuals to cope with climate changes. One effective public health intervention might be a *'stress inoculation'* training program which incorporates cognitive behavioural coping skills and emotion management.



Morrisey and Reser (2007) explore the contribution of psychology to the wellbeing of rural people experiencing environmental stress due to drought. They recommended general interventions to deal with the long-term needs of rural communities affected by drought are:

- Community education and community building in regard to the *'physical, financial and mental health effects of drought'*
- Cooperation and coordination between agencies delivering mental health and drought support
- Continuity and planning of better mental health services (Morrisey & Reser 2007: 123).

Not all support is provided by health services. Communities collectively create ways of coping and adapting to stressors in their environment. *'It is clear that communities living in different parts of a country develop their own frames of reference for thinking about and coming to terms with aspects of their environment and place, which are challenging, at times stressful, and sometimes oppressive'* (Morrisey & Reser 2007: 121).

Using an occupational science perspective Pereira (2008) provides a commentary on how climate change has adversely affected the mental health of rural communities which has led to new ways of classifying and understanding mental health problems arising from adverse weather conditions. This is known as solastalgia which is caused by the loss of one's home environment (severing of the link between the land and one's livelihood or garden and home environment) and occupational deprivation. Pereira (2008) recommends that public health policy should be developed to assist in identification of solastalgia, with a particular emphasis on older adults, because currently there is a tendency to see the impacts of climate change in terms of environmental impacts without acknowledging the human experience in terms of the burden of disease.



3.4 Heatwaves

Rising temperatures that are a consequence of climate change have led to growing concern about the health impacts of heatwaves, particularly in urban settings. The health impact of heatwaves is typically measured by the number of excess deaths attributable to the heatwave conditions (Smoyer-Tomic & Rainham 2001). Clinical signs of excess heat are: heat stroke, heat exhaustion, heat syncope, heat cramps (Kovats & Hajat 2008: 42). Severe heat stroke can cause death, or in survivors, organ dysfunction and risk of early mortality.

Heatwave has a loose definition that varies between jurisdictions, although it is often based on temperature exceeding a specified threshold. Heat waves are also associated with air pollution, bushfires, failure of water and electricity supplies, each of which has its own health impacts. The effects of heatwaves depend on severity, duration, timing in the season, population experience of heatwaves and public health responses (Kovats & Hajat 2008).


Risk factors for heat stroke may be intrinsic (age, disability) or extrinsic (housing, behaviour). Climate affects population sensitivity. The threshold for heat related mortality is lower in climates with lower summer temperatures. The vulnerability of older people is due to changes in their thermoregulatory system. Risk increases with increasing age from 50 years upwards. Elderly people living in institutions are more vulnerable than those living at home. Increased institutional mortality appears to be associated with lack of adequate air conditioning. Frailty increases vulnerability in nursing homes but nursing interventions can decrease this. Babies and young children are also more vulnerable than the population at large. Women are more vulnerable as are elderly people who are socially isolated. People with depression, cardiovascular disease, cerebrovascular disease and diabetes are more vulnerable. People with

Dementia and Parkinsons Disease behave in ways that make them more vulnerable (Kovats & Hajat 2008). Houses lacking air conditioning appear to create the greatest risk for vulnerable people in the community during heatwaves and this is one factor in the increased risk experienced by low income populations and homeless people. Air conditioning is not always an option for low income people. For this reason passive cooling strategies, such as shading and home insulation, are also important. Urban heat island effects may increase risk in inner city areas (Kovats & Hajat 2008).

The effects of heatwaves can be addressed through environmental change and through behavioural change. Both are important but most immediate benefits can be gained from behaviour change. Behaviour change is often addressed through mass communication campaigns.

- Education and awareness campaigns about signs of heat stroke and prevention strategies is most important but must be repeated at the beginning of each summer.
- General heat warnings when temperatures above a threshold are forecast (Kovats & Hajat 2008).

Education and awareness messages may suggest behaviour changes such as: reduce activity, drink water, seek shelter, check on elderly relatives and neighbors. Messages need to be broadcast at the beginning of a heat event. They may be alerts or emergency messages requiring action. They need to be accompanied by a service plan to provide support to vulnerable people (Smoyer-Tomic & Rainham 2001). In addition, some agencies identify and contact high risk individuals on heatwave days.



Harlan et al (2006) set out to examine '*heat-related health inequalities within one city in order to understand relationships between the micro-climates of urban neighborhoods, population, the thermal environments that regulate microclimates, and the resources people possess to cope with climatic conditions*' (Harlan et al 2006: 2848). They found that increases in air temperature during heatwaves could differ by up to 3.5°C between localities within the city. They found that:

- There was a positive correlation between heat stress exposure and the proportion of poor and minority inhabitants
- Exposure to heat stress was highly correlated with place-specific ecological variables – namely vegetation and open space
- In hotter neighborhoods people had fewer social supports and material resources (e.g. air conditioners, housing designed for coolness) for coping with heat (Harlan et al 2006).

This study was used to generate practical environmental initiatives to reduce temperature in vulnerable urban neighborhoods using 3 major strategies: increase vegetation in public spaces, adopt standards for reflective roofing and paving materials, and lowering carbon emissions. The most important places to modify are low-income inner city neighborhoods and new middle class communities on the urban fringe. In inner city areas the focus should be on improving existing housing stock, providing shade, green parks and public swimming pools. The urban fringe needs stricter building codes to reduce indoor temperatures, increased tree cover and more open space, and alternatives to cars for transport (Harlan et al 2006).

Brown and Walker (2008) explored an alternative approach to the understanding heat vulnerability by examining the everyday settings in which elderly residents experience heatwave conditions. This pilot study was based on participant observation involving 40 residents (both men and women) conducted between July and September 2007 in a Georgian building located in a quiet residential area in north west England. As that summer did not have any heatwave conditions, the authors observed how staff and residents practised heat management on an everyday basis and identified the institutional, infrastructural, social and cultural factors that shaped those practices. They found that when '*hot weather arrives, residents are reliant upon the nursing staff to carry out all of the preventive measures, not because they are physical incapable of doing it themselves, but because this is what usually happens*' (Brown and Walker 2008: 369).

A decline in morale amongst residents also impacts on their willingness to help themselves in everyday routines. Also the measures put in place to ensure the safety or security of residents may be actually contributing to their vulnerability to hot weather. For example the limiters put on windows to prevent forced entry obstructs ventilation. The barriers on the side of beds to prevent falls make it difficult to move around at night to cool off. Such understandings about everyday practices of daily life in residential home environments provide insights into why effective adaptation to hot weather conditions can become constrained. Brown and Walker concluded that there is a need to develop a heatwave adaptation process that is not dependent on cooling systems (because of costs and additional energy consumption) and to focus on other adaptations for achieving thermal comfort such as changing clothes and patterns of food and drink intake.

3.5 Health Equity

The WHO uses the EURO European Centre for Health Policy, ECHP, Brussels, 1999 definition of 'equity in health' to define health equity. It states that equity in health implies that everyone should have a fair opportunity to attain his or her full health opportunity, and that no one should be disadvantaged from achieving this potential <http://www.who.int/hac/about/definitions/en/>.

As Walpole, Rasanathan & Campbell-Lendrum (2009: 799) point out, addressing climate change solely does not automatically improve health equity because many of the policies aimed at climate change mitigation such as reducing carbon emissions could increase income equality because of the associated costs and therefore people's access to health services. Likewise, improving health equity alone, through the construction of basic infrastructure like housing, sanitation, road and communications requires a significant increase in carbon emissions (Walpole, Rasanathan & Campbell-Lendrum 2009, p. 799–800). Therefore, in order to achieve health equity for all people, the health sector needs to address climate stabilisation, the eradication of poverty and ensuring health gains collectively (Friel et al. 2008: 1677).

Strategies and policy developments aimed at addressing climate change will impact positively in terms of public health when the health sector works in a trans-disciplinary way across a broad range of environmental health policies (Campbell-Lendrum & Corvalan 2007: i115 and Kjellstrom et al. 2007: i94). In this way, health workers function as advocates mitigating climate change without undermining poverty alleviation and over time health equity becomes a precondition for the development of all environmental health policy (Hanlon & Carlisle 2009: 360, Reid 2001: 402 and Walpole, Rasanathan & Campbell-Lendrum, 2009: 800).

A key strategy to improve social well-being and progress greater social and health equity will be to utilise an array of environmental and health synergies that introduce mitigation and adaptation strategies to climate change and reduce health risks concurrently (Hanlon and Carlisle 2009: 360). For example, redesigning cities to be sustainable can include the redevelopment of the public transport system to reduce private vehicle dependence while encouraging more cycling and walking and addressing issues around obesity. At the same time it reduces fossil fuel combustion and reduces high concentrations of air pollution which decreases the potential for serious illness such as cardiovascular diseases and respiratory infections (Kjellstrom et al. 2007: i90, Patz et al. 2008: 35, Reid, 2001: 402, Walpole, Rasanathan & Campbell-Lendrum 2009: 800 and Woodcock et al. 2007).

Integrated assessment methods that consider the range of effects on health can maximise synergies and optimize trade-offs between competing priorities (Walpole, Rasanathan & Campbell-Lendrum 2009: 800). For example, O'Neill, Kinney and Cohen (2008) recommended new areas of research in terms of addressing death and illness caused by air pollution. These included addressing both the air pollution and temperature health models together, conducting integrated assessments evaluating climate, air quality and health, determining co-benefits for health from reducing greenhouse gas emissions, and incorporating equity concerns into air pollution risk assessments (O'Neill, Kinney & Cohen 2008: 575, Patz et al. 2008: 29 and Walpole, Rasanathan & Campbell-Lendrum 2009: 800).

In terms of understanding the direction the health sector needs to follow, there are already a number of organisations who have established frameworks, goals and approaches to evaluating and managing climate change, public health and health equity.



Some of the programs recommended are:

1. Health Impact Assessments (HIA). These are a useful tool through which a systematic identification and quantification of the many pathways through which climate change can affect health can be assessed. The HIA can be used *'to better inform preventative measures ranging from risk-specific activities such as heatwave early-warning systems and mosquito abatement programs to broader energy policies to reduce emissions of fossil fuels'* (Patz et al. 2008: 28). The stakeholder concerns can be generally grouped as either economic, political, quality of life or moral concerns and the process includes three key components – equity/democracy, sustainability and ethical use of evidence (Kjellstrom, Hakanasta & Hogstedt, 2007: 35, Kovats and Akhtar 2008: 172, Patz et al. 2008: 28 and Patz et al. 2007: 404).
2. The Health City, Municipality and Settings Approach. This is a comprehensive approach that combines infrastructure improvement, health promotion and community participation and is promoted by the WHO and Pan-American Health Organisation. *'It engages local governments in health development through a process of political commitment, institutional change, capacity building, partnership-based planning and innovative projects'* (Kjellstrom et al. 2007: i92). The creation of these 'Healthy Cities' also promotes comprehensive and systematic policy and planning with an emphasis on health inequalities and urban poverty. (Campbell-Lendrum, & Corvalan 2007, and Kjellstrom et al. 2007: i94).
3. The 'Horizons' Framework. This is a process that can facilitate new thinking and aid policy makers to understand some of the dynamics at play when discussing climate change, public health and health equity. As Hanlon and Carlisle (2009: 259) point out,

'the use of 'horizons' thinking enables formal recognition of at least three different world views and three simultaneous views of the present; such recognition might make for a 'smarter' policy debate and better long-term decision-making.'

Horizon 1 is the viewpoint that the system is under strain and beginning to show signs of failing or being unsustainable. Horizon 3 is the eventual evolution of a sustainable system that has adapted to new conditions and may take several decades to achieve. Horizon 2 is the transition stage or the struggle between the two, where the mindset is one of dissatisfaction with Horizon 1 and inspirational regard for the visionary Horizon 3. (Hanlon & Carlisle 2009: 359).




4. Conclusion

There is a significant literature relevant to interventions to address climate change. However, it is scattered through the literature of many disciplines making it quite difficult to locate. Much of the research literature is focussed on the science of climate change and diseases. There is not a lot of good research addressing social change aspects of climate change mitigation and adaptation that is relevant to health and social care. Nor have many evaluations of interventions been published. Nevertheless, there is sufficient information available to support the development of relevant local interventions. If these are to become available to people in other locations and be the foundation for better interventions in the future evaluations such as those being undertaken by the SEHCP are important.

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6. Attachments

Attachment 1

Research Plan, Methods and Techniques

This is a systematic review of literature relevant to the intersection of climate change and primary health care. Most of the existing literature uses qualitative research methodologies. For this reason we use methods developed by the Cochrane Qualitative Research Methods Group.

Search strategy to identify articles:

- electronic bibliographic databases – MEDLINE 1996 –, EMBASE, CINAHL, PAIS, Current Contents, Expanded Academic, Web of Science, JSTOR, ProQuest 5000, Social Sciences Abstracts, Sociological Abstracts, and INFORMIT databases
- theses indexes – Proquest dissertations, Index to theses, Libraries Australia
- databases will be searched for publications in the period 1st Jan 2000 to 31st September 2009
- search for English language papers only.

Origins of primary health care search terms

- primary health care key values identified in World Health Report 2008. Primary Health Care: Now more than ever. Introduction and overview
- key concepts in the Declaration of Alma Ata
- prerequisites for health identified in the Ottawa Charter for Health Promotion.

Search terms

Search terms A: climate change or global warming or greenhouse effect

Search terms B:

Social change

Community participation

Health equity

Health promotion

Community resilience

Economic development Social development


Food security + health

Violence

Mental health

Primary health care

Relevant literature will be about the intersection search terms A with search terms B.



Relevant studies

Research papers, literature reviews, reports of interventions, discussion papers, policy reports.

Inclusion criteria:

To be included papers should address at least one of the following:

- discuss harms following from climate change (those relevant to the specific topic)
- discusses adaptation to climate change that reduces harms
- discusses impacts of climate change on defined population groups (impacts relevant to the specific topic)
- discusses interventions with defined population groups (interventions relevant to the specific topic)

AND

- if a research paper describes the research methods used
- if an intervention paper discuss the effects of the intervention on individuals and/or social groups and/or communities.

Exclusion criteria:

Papers that manifest the following criteria will be excluded:

- report the science of an issue without reference to populations, communities or primary health care issues. This is most likely to occur with papers retrieved in the food security and water security searches.
- are written in a language other than English.

Analysis of papers:

The following steps will be followed.

Step 1. Screen papers by title and abstract to identify those meeting the inclusion criteria. Exclude remainder.

Step 2. Screen full text papers to identify those meeting the exclusion criteria. Exclude these papers.

Step 3. Screen full text papers to identify those meeting the inclusion criteria. Exclude remainder.

Step 4. Sort papers into two major categories – a) impacts of climate change on human populations and b) coping, adaptation and mitigation responses to climate change.

Step 5. Summarise studies in data tables – including aims, methods, methodological quality, findings, arguments.

Step 6. Compare and synthesise studies using the methods of thematic synthesis (Thomas and Harden 2008)

Step 7. Prepare report.