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COMMUNITY SAFETY PROMOTION NETWORKS: FROM METAPHOR TO METHODOLOGY

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Date: February 2007

A thesis by portfolio of publications submitted in partial fulfilment of the requirements of the degree of Doctor of Public Health within the School of Public Health, Tropical Medicine and Rehabilitation Sciences, James Cook University

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I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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STATEMENT OF THE CONTRIBUTION OF OTHERS

I wish to acknowledge the contribution of my co-authors to a number of manuscripts included as part of this thesis:

Chapter 3, Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland; Dr Robert Pitt, Richard Hockey, Elizabeth Miles and Dr Reinhold Müller.

Richard Hockey extracted data from the Queensland Injury Surveillance Unit (QISU) data base. I conducted a literature review on emergency department injury surveillance systems, reviewed published data concerning injury in the Mackay and Moranbah Heath Service District, analysed the QISU data set, and drafted the original manuscript which was circulated to my co-authors for editorial comment.

2. Chapter 4, Safe Communities: An Ecological Approach to Safety Promotion; Paul Vardon and Jacqui Lloyd.

The key concepts from this paper were the result of early brainstorming sessions involving Paul Vardon, Senior Health Promotion Officer with the Tropical Population Health Unit (TPHU) in Mackay, Jacqui Lloyd, Director of Health Promotion with the TPHU, and myself regarding the rationale for Mackay Whitsunday Safe Communities. As lead author I drafted the original manuscript after a literature review into the ecological basis on safety promotion. The injury iceberg was conceived by myself as a visual metaphor to illustrate Green and Kreuters (1999) social ecological model of health promotion, though the concept was refined in collaboration with my co-authors. This manuscript was published as a chapter in "Reducing Injury in Mackay North Queensland" edited by Reinhold Müller

Chapter 5, The Injury Iceberg: An Ecological Approach to Planning Sustainable Community Safety Interventions; Dr Jan Hanson, Paul Vardon, Kathryn McFarlane, Jacqui Lloyd, Dr Reinhold Müller and Dr David Durrheim.

A literature review regarding intervention and coalition sustainability was undertaken by myself and, in collaboration with Paul Vardon and Jacqui Lloyd, was published as a chapter entitled "Becoming Queensland's First Safe Community: Considering Sustainability from the Outset", in "Reducing Injury in Mackay North Queensland" edited by Reinhold Müller (see Appendix 22). I subsequently undertook a further literature review into the ecological foundations of sustainability in environmental systems culminating in the drafting of this manuscript. After comment from my co-authors the manuscript was refined and submitted to the Health Promotion Journal of Australia.

4. Appendix 20, Addressing Childhood Injury in Mackay: A Safe Communities Initiative; Kelly Hart, Kathryn McFarlane, Anthony Carter, Richard Hockey and Elizabeth Miles.

In 2003 I conducted an epidemiological analysis of all Emergency Department injury presentations in children under 15 years of age over a five year period from 1998 to 2002 in the Mackay and Moranbah Health Service Districts. This analysis was published by QISU in June 2003 in collaboration with Kelly Hart, the newly appointed Child Injury Prevention Officer and Kathryn McFarlane, Senior Health Promotion Officer with the Tropical Population Health Unit in Mackay to ensure that the local facilitators of the project had an intimate knowledge of the underlying epidemiology but just as importantly to ensure that the report was drafted in a way that made it accessible and understandable to non health professionals engaged in the ChIPP action group.

5. Appendix 21, Ecological Models for the Prevention and Control of Unintentional Injury; John Allegrante and Ray Marks.

I was invited to co- author a chapter entitled Ecological Models of Unintentional Injury Prevention in the textbook "Injury and Violence Prevention: Behavioural Science Theories, Methods, and Applications" edited by Andrea Gielen, David Sleet and Ralph DiClemente. The initial draft of the chapter had already been completed by John Allegrante, Senior Professor of Health Education at Teachers College, Columbia University and Ray Marks, Associate Professor of Health Education at Columbia University when I became involved. I contributed a number of new sections to the manuscript, which were ultimately incorporated in the introduction and conclusion, resulted in a major revision of the section on ecological models and new sections on community safety promotion and WHO Safe Communities. John Allegrante as senior author retained final editorial control over the manuscript. However my contribution to the final version of the manuscript was substantial.

Appendix 22, Becoming Queensland's First Safe Community: Considering Sustainability from the Outset; Paul Vardon and Jacqui Lloyd.

A literature review regarding intervention and coalition sustainability was undertaken by myself and after comment from my colleagues Paul Vardon and Jacqui Lloyd was published as a chapter in the monograph, "Reducing Injury in Mackay North Queensland" edited by Ray Müller.

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Signature

Date

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I wish to express my sincere thanks to all members of Mackay Whitsunday Safe Communities and its Support Network who participated in this research. Special thanks to my colleagues from the Tropical Population Health Unit of Queensland Health for their mentoring as I learnt, researched, practiced and attempted to evaluate the process of community safety promotion.

I would particularly like to thank the executors of the Tom and Dorothy Cook Estate, of Mackay North Queensland, for their generous provision of the Tom and Dorothy Cook Research Fellowship that funded the three year study program that culminated in this thesis.

I would also like to thank my supervisors, Associate Professor Reinhold Müller, Associate Professor David Dürrheim and Professor Rick Speare for their encouragement and support during the design and execution of this research program and in particular for their constructive suggestions during the early drafting of this thesis and their detailed review of the final drafts.

Finally, I would like to thank my wife Jan Hanson for her tolerance and support but also for many hours spent proofreading this manuscript.

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Signature

Date

SUMMARY

Injuries are preventable. However, discrepancy between academic, practitioner, community and political perceptions regarding injury causation remain an important barrier to mounting an effective response.

The biomechanical model of injury prevention dominated the late 20th century. Injury was defined as "any unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical, or chemical energy or from the absence of such essentials as heat or oxygen". This reductionist perspective overlooks the importance of the psychological and sociological determinants of injury. Safety has physical, psychological and sociological dimensions. Interventions aiming to achieve long term improvements in community safety must seek to develop sustainable safety promoting characteristics within the target community.

The thesis proposes the "injury iceberg", a unifying cognitive framework designed to facilitate productive dialogue between the academic, professional and community groups required to design and implement effective community based safety promotion interventions. The individual is, metaphorically speaking, the "tip of the iceberg," just one part of a complex ecological system. While they may be the most visible part of this system, important determinants of behaviour and environmental risk are "hidden below the waterline."

While this comprehensive, wholistic model of safety promotion offers many opportunities to address a community's injury problem, it also poses special challenges. The dynamic, multi-causal, multi-level nature of community safety means it is resistant to interventions designed by a single profession or agency. Promoting safety requires a multifaceted, comprehensive response.

Networks have been advocated as an effective response to the complex problems that plague modern society. Health practitioners, researchers, administrators and politicians have all embraced the network metaphor. By networking, sharing knowledge, expertise and resources, it is argued that communities can be empowered to generate the critical mass of expertise, resources and activity required to promote their own health and safety.

The Mackay Injury Surveillance Network was established in 1997 as part of the Queensland Injury Surveillance Network. It reported 35,211 injury presentations to regional Emergency Departments over the three year period from the 1st of January 1998 to the 31st of December 2000. This represented an age standardised rate of 12,584 per 100,000 for males, 2.0 times that observed in South Brisbane, and 6,319 per 100,000 for females, 1.7 times that observed in South Brisbane, suggesting that Mackay, like other Australian regional cities, had comparatively high injury rates in relation to major urban centres.

Mackay Whitsunday Safe Communities was launched in February 2000 in response to excess injury morbidity observed in the region. In keeping with contemporary wisdom it formed a collaborative network. Given that Mackay Whitsunday Safe Communities used a social process, a collaborative network, to achieve its public health objectives, it was important to evaluate the network using a research tool able to analyse the structure and function of this social system. The standard approach used by epidemiologists and health promotion researchers is to define a population and study a representative sample of individuals with this population. A key assumption is that the attributes and behaviour of individuals are independent. However, in human systems, the interdependence of actors and their social and physical environment is an essential characteristic of human social interaction. To meaningfully understand how social systems work, research tools must be able to describe and model the inter-dependence of human social systems.

This thesis used social network analysis to evaluate Mackay Whitsunday Safe Communities. Social network analysis is a quantitative sociological methodology that maps and analyses the relationships observed in a social network. By collating this set of relationships, it is possible using graph theory to mathematically describe and analyse a social system. Social network analysis therefore has the capacity to model the interdependent interaction between

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individuals, their immediate interpersonal environment and the overall social system. It therefore had the potential to provide unique insights into how safety promotion networks such as Mackay Whitsunday Safe Communities function.

The network was delineated using a snowballing technique that followed a chain of relationships emanating from the Mackay Whitsunday Safe Communities Network Support Group over three survey waves. Respondents were asked to actively recall relationships with people they considered facilitated their contribution to community safety, including people who were not members of Mackay Whitsunday Safe Communities. This allowed the identification of an external support network that may also contribute to the capacity of the network.

Social network analysis proved a powerful tool, providing diagrammatic representation of the social structure and quantifying important changes in the structure and function of community safety promotion network and its external support network. Since the network was established the number of relationships doubled from 500 to 1002, the relational distance separating network members decreased (average distance reduced from 3.9 to 2.7) and cohesiveness of the network increased (density increased from 0.022 to 0.036). There was increased tendency for group formation (clustering coefficient increased from 0.30 to 0.50) and a more centralised structure (centralisation index increased from 18% to 43%). Mackay Whitsunday Safe Communities had clearly succeeded in developing cohesive social capital – the ability to collaborate for mutual benefit.

However, social network analysis also provided compelling evidence that a small number of well-connected social entrepreneurs played an important facilitative role in network activities. Whether measured in terms of direct social influence, efficiency of communication, or brokering potential, six actors were disproportionately influential, maintaining 44% of all relationships and brokering 52% of in-kind, 54% of human and 66% of financial investments made in the network. They provided an important social conduit for the transfer of information, expertise and resources within the system.

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In 2004 the network accessed an estimated 6.5 FTE of staff time and \$0.9 million dollars. However, Mackay Whitsunday Safe Communities is an open network. It can only be properly understood in the context of its external support network. While rich in social resources, the discretionary in-kind, human and financial resources mobilised within this community network were limited. These resources were largely accessed from, and controlled by, an external support network. Open systems never achieve equilibrium, a theoretic state of in which the resources produced by the system are sufficient to sustain system function. Rather, open systems can only be sustained in steady state, a dynamic state in which the flux of resources into and out of the system are sufficient to maintain network function. The entrepreneurial bridging relationships that unite network members around a cause and facilitate access to the in-kind, human, financial and social resources necessary to maintain network productivity are therefore critical to ensure the sustainability of community safety promotion networks.

Maintaining a functional safety promotion network has a cost. In this study the number of relationships maintained by network members was strongly correlated with the amount of time they invested in network activities. However, the relational pressure this placed on the network facilitators was evident. As a group they process 258 incoming relationships (43 relationships per facilitator), compared with 1.8 incoming relationships for other network members.

This network analysis identified that two types of social capital were necessary to develop and sustain a productive community safety promotion network: cohesive social capital and entrepreneurial social capital. The development of stronger, dense relationships (cohesive social capital) meant that Mackay Whitsunday Safe Communities was better positioned to co-operate for mutual benefit and thereby promote safe standards of community conduct and a safe physical environment. However, to develop this state and facilitate a sustainable resource base to maintain it, the entrepreneurial social capital of key network facilitators appeared to be critical component of network function.

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LIST OF ABBREVIATIONS

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
AIPN	Australian Injury Prevention Network
ATODS	Alcohol, Tobacco and Other Drugs Service, Queensland Health
BSCAT	Building Safer Communities Action Team (Whitsunday)
ССРАТ	Community Crime Prevention Action Team (Mackay)
ChIPP	Child Injury Prevention Project (Mackay)
DES	Department of Emergency Service
ED	Emergency Department
JCU	James Cook University
LGA	Local Government Area
MBH	Mackay Base Hospital
MCC	Mackay City Council
MWSC	Mackay Whitsunday Safe Communities
MWSC & SN	Mackay Whitsunday Safe Communities and Support Network
MVA	Motor Vehicle Accident
NDS-IS	National Data Standards for Injury Surveillance
NSG	Mackay Whitsunday Safe Communities Network Support Group

QH	Queensland Health
QISU	Queensland Injury Surveillance Unit
QPS	Queensland Police Service
QT	Queensland Transport
RAAG	Road Accident Action Group
SHOROC	Shore Regional Organisation of Councils, comprising Mosman, Manly, Warringah and Pittwater on Sydney's Northern Beaches
SLA	Statistical Local Area
SN	Support Network (of Mackay Whitsunday Safe Communities)
SPHTMRS	School of Public Health, Tropical Medicine and Rehabilitation Sciences, James Cook University
TPHU	Tropical Population Health Unit, Queensland Health
WHO	World Health Organisation
WSC	Whitsunday Shire Council

CHAPTER ONE

There is a growing realization that one of the biggest challenges for contemporary governments is resolving highly complex and intractable social problems, such as poverty, unemployment, homelessness, drug abuse, and social dislocation that continue to plague many communities despite concerted efforts. These "messy problems" or "wicked issues" present a special challenge to government because they defy precise definition, cut across policy and service areas, and resist solutions offered by the single-agency or "silo" approach (Keast et al, 2004, p 363).

1.1. IDENTIFYING THE LOCAL ISSUE

In 1998 the Mackay Division of General Practice conducted a community needs analysis which identified that age standardised hospital separation¹ rates for injury and poisoning in the 1995/96 financial year were high in the Mackay Region (Azzopardi et al., 1998). This sentinel finding prompted a review of age standardised injury hospital separations in Mackay from 1993 until 2000 and Emergency Department (ED) injury presentations from 1997 to 2000 which suggested that rates of injury in Mackay were double the Queensland average (Vardon, et al., 2000; Hanson, et al., 2002a). This increased risk of injury appeared to involve all age groups and types of injury (Carter and Müller, 2002a). To reduce this global increase in injury risk it was necessary to design a comprehensive safety promotion strategy that addressed multiple injury issues simultaneously (Coggan and Bennett, 2004; Moller, 2004). It would involve collecting, analysing and interpreting injury surveillance data from the region, using this data to set priorities, designing effective safety promotion programs to address these issues, and then mobilising sufficient expertise and resources to implement these programs (McClure et al., 2004).

¹ As hospital admissions are formally counted and coded when the patient is discharged they are technically described as "hospital separations".

1.2. IDENTIFYING THE ESSENTIAL PROBLEM

These sentinel studies had identified a population health problem. The Mackay population as a whole appeared to experience an increased incidence of injury. There is ongoing controversy regarding the key determinants of population health and, by implication, how population health problems can be strategically addressed.

Rose (1985) draws a critical distinction between "sick individuals and sick populations". The tools of modern epidemiology most often adopt a case oriented approach, "Why did this patient get this disease at this time?" Rose argues there is another equally important question, "Why does this population have a high incidence of disease at this time?" Failure to draw a clear distinction between the causes of individual cases and population incidence has been the source of ongoing confusion. Known as the "ecological fallacy", it is a failure to appreciate that an association between variables observed at a population level does not imply a similar association at an individual level and vice versa (Last, 1995). The two different levels of analysis require different kinds of investigation and do not necessarily provide the same answer even when studying the same health issue (Keys, 1962; Rose, 1985).

Arguably this ongoing confusion is the predictable outcome of a polarised discourse regarding the determinants of health. Modern biomedicine with its reductionist epistemology attempts to explain the health of population in terms of the health of individuals (Engel, 1977; McMichael, 2001; Schneiderman and Speers, 2001). By identifying and targeting at risk individuals, it is argued that the health of the population can be improved. However, in the post-modern era (Abercrombie et al., 1994) the pre-eminence enjoyed by the biomedical paradigm has increasingly been challenged. Proponents for a "New Public Health" (Ashton and Seymore, 1988; McPherson, 1992) and "Population Health" (Dunn and Hayes, 1999; Friedman, 2003; Szreter, 2003) argue the need for a more wholistic approach that ascribes equal importance to individual, social and environmental determinants of health.

This is not just an academic debate, but one of central importance to the design of any intervention targeting a population health problem. If the problem is essentially one of at risk individuals, investigative techniques and interventions must target the individual. In contrast if the problem is one of an at risk population, investigative techniques and interventions must target the social and physical environment in which people live and work. To plan an appropriate response to the excess injury risk experienced by the people of Mackay it was necessary to reach an understanding of what the underlying determinants of this problem might be so that the appropriate investigative and management techniques could be employed to target the strategic issues.

Historical approaches to population health were reviewed to identify the most strategic response to the Mackay problem.

1.3. THE PRE-MODERN ERA: A FATALIST ECOLOGICAL PERSPECTIVE.

The pre-modern era viewed disease and injury from a fatalistic ecological perspective. Helpless against the onslaught of war, plague, pestilence, famine and disaster, man was at the mercy of the forces of nature and subject to the whims of "the gods" (McMichael, 2001). Injury, in particular, was perceived to be the result of an accident, "an unfortunate event that is without apparent cause" (Moore, 1997, p8).

1.4. THE MODERN ERA: THE ENLIGHTENMENT AND THE GENESIS OF EMPIRICAL SCIENCE

The enlightenment brought the advent of empiricist science and a shift away from ecological dependency towards a reductionist positivist approach to disease (Schneiderman and Speers, 2001). René Descartes (1640) advocated a mechanistic approach. Humans were likened to a machine that could be understood by systematically investigating the function of their component parts.

"And so that the reader will have from the beginning a general notion of the whole machine which I have to describe, I shall say here that it is the heat of the heart which is ... the mainspring and origin of all the movements of the body; and that the veins are the pipes which carry the blood from all parts of the body towards the heart, where it serves as nourishment" (Descartes, 1640, p226-7).

Importantly, Descartes also argued the separation of mind and body, thought and matter:

"The knowledge that 'I think therefore I am' is the first and most certain of all items of knowledge which anyone will arrive at if they philosophise in the right order. This is also the best approach for understanding the nature of mind, and its distinction from body" (Descartes, 1644, Principles 1.7 and 1.8.).

Descartes' philosophical thinking laid the conceptual foundation of the modern biomedical paradigm (Engel, 1977) in which thought, emotions and social interaction are separate from bodily processes. Disease could be explained in terms of physical processes that could be understood and manipulated by modern scientific investigation (Schneiderman and Speers, 2001).

1.5. THE INDUSTRIAL REVOLUTION: ECOLOGICAL PUBLIC HEALTH AND SOCIAL REFORM

Scientific positivism fostered increasing confidence in man's ability to understand and control his environment. This provided fertile soil for the development of the "social hygiene" movement in the 19th century (McMichael, 2001; Szreter, 2003).

The industrial revolution precipitated massive population shifts away from the country into the burgeoning cities in early 19th century Europe. Living conditions in the industrialised cities of Europe were appalling, especially in England (McMichael, 2001; Szreter, 2003). The link between living conditions and poor health was widely recognised. The utilitarian Edwin Chadwick drove social reform in Britain. Appalled at the living conditions of the working class which rendered them unhealthy, impoverished and a financial burden on society, he championed the landmark Public Health Act of 1848 that sought to ensure the supply of clean water to Britain's increasingly urban society (Szreter, 2003).

The public health movement of the 19th century promulgated a radical new idea that survives to this day - the health of populations can be protected by attacking disease and poverty at the population level and, most importantly, governments

have some responsibility for maintaining community health (O'Connor and Parker, 1995).

1.6. GERM THEORY, INDIVIDUALISM AND BIOMEDICINE

Late in the 19th century, a radical new theory of disease causation gained credence that shifted scientific attention away from the social environment towards the individual and their immediate biological environment. The last two decades of the 19th century saw an explosion of scientific discoveries by Koch, Pasteur, Jenner and others, which resulted in the positive identification of a plethora of micro-organisms with a clear causal link to disease (McMichael, 2001). The idea that environmental contextual factors, whether natural, manmade or social, could impact on the health of whole populations (ecological public health) was eclipsed by a reductionist biomedical paradigm with its focus on the individual and their immediate biological and biochemical environment.

The empirical power and specificity of the germ theory dominated ideas about health and disease in the early twentieth century. Individuals got infected by agent X and duly contracted disease Y. That theory brought a type of simple determinism which ... helped spawn the century long dominance of the so called biomedical model, with its emphasis on the specificity of agent and effect (McMichael, 2001, p319).

The advent of effective clinical treatments in the 20th century meant clinical therapeutics assumed precedence over disease prevention. Physicians and the general public alike came to believe that the health of populations could be ensured by effective health systems delivering best clinical practice to the population (McKinlay and McKinlay, 1977; McKeown, 1979; Matzen and Lang, 1993; McMichael, 2001).

1.7. FROM ACCIDENT PREVENTION TO INJURY PREVENTION

In the 20th century, the science of injury prevention followed a similar shift away from ecological fatalism toward biomechanical determinism. In 1942 De Haven (2000) published his classic case series of eight survivors from high falls (50-150 feet), concluding that energy from high force impacts could be dissipated,

thereby preventing serious injury. This key observation precipitated the birth of the bioengineering paradigm of injury prevention.

Gordon (1949) hypothesised that the epidemiological concepts of infectious disease could be generalised to an injury event, which resulted from the interaction between host (human), agent (hazard) and the environment. Gibson (1961) refined the concept, proposing that the agent of injury was energy. Haddon (1963, 1980) further developed this idea, proposing that the injury vector (for example, a motor car) was the carrier of the agent (energy). Haddon demonstrated the application of this epidemiological framework, developing Haddon's Matrix (Haddon, 1972 & 1980).

Haddon precipitated a major paradigm shift from accident prevention to injury prevention. Injury was defined as "any unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical, or chemical energy or from the absence of such essentials as heat or oxygen" (NCIPC, 1989, p. 4). By preventing, or dissipating the adverse release of energy, it was thought possible to minimise the chance of injury without necessarily preventing the accident. Descartes' separation of the physical from the psychosocial is striking in this definition. The possibility that an individual's behaviour or social situation may place them in an environment where energy was likely to be released, was neither acknowledged or addressed in this definition. Practice reflected the epistemology:

On the whole, effective countermeasures are those that do not require any action by individuals intended to be protected by them. This principle first articulated in the 1960s but recognised to have particular resonance for the practice of injury prevention focuses on the extent to which an intervention is 'built into the environment', having an effect regardless of human activation. (Stevenson et al., 2004, p37)

"Passive" interventions - those that require no action by the individual being protected (for example, occupant protection zones used in modern automotive engineering) were preferred over "active" interventions - those that required an active behavioural response (for example, buckling a seatbelt).

This deterministic biomechanical approach to injury prevention was extremely successful in the second half of the 20th century, especially in the field of road trauma (ATSB, 2004). Substantial advances were made through engineering innovations, better car design (impact absorption, occupant protection, shatter proof windscreens), protective equipment (seat belts, air bags) and better road design.

1.8. THE POSTMODERN ERA: PUBLIC HEALTH TURNS FULL CIRCLE, A RETURN TO ECOLOGICAL CONSTRUCTS OF HEALTH

The late 20th century saw the advent of postmodernism and an increasing scepticism about the benefits of modern scientific "progress" (Baum, 1998). While reductionist science, industrialism, free market economics and interventionist government had delivered social benefits, there was growing evidence of unexpected costs (McMichael, 2001). The adverse environmental effects of unchecked industrialism and population growth meant that for a whole generation it was conceivable that mankind would either destroy itself or, just as disastrously, outstrip the carrying capacity of the earth (Wright, 2004). It was necessary to take a more wholistic, ecological view of society and the environment, in which all components of the ecological environment were seen as important, interrelated and mutually dependant (Ackoff, 1974; Harmon and Mayer, 1986).

In the health domain, the benefits of rapid decline in infectious disease had been outstripped by an equally rapid increase in the incidence of "lifestyle diseases" (McKinlay and McKinlay, 1977; James, 2002). These diseases, characterised by a "complex aetiology and multifactorial causation" (AIHW, 2000), were unlikely to be solved by a single reductionist "magic bullet" approach (Doyle, 2001). Causal models become an increasingly complex tapestry of genetic predisposition, biochemical mediators and physiology, unmasked by individual lifestyle factors.

At the same time the perceived association between reduced mortality and morbidity in developed nations and clinical biomedicine was increasingly being challenged. In the 1940's Morris and Titmuss demonstrated that the incidence of juvenile arthritis, rheumatic heart disease and peptic ulcer were related to social conditions (Morris and Titmuss, 1942, 1944a; 1944b; Oakley, 1991). In 1979 McKeown conducted a review of the changing patterns of mortality and morbidity in England and Wales during the 19th and 20th centuries concluding that:

the improvement of health during the past three centuries was essentially due to the provision of food, protection from hazards, and limitations of numbers (McKeown, 1979, p197).

The limitations of clinical preventative medicine and lifestyle behavioural approaches were becoming increasingly apparent. Public health researchers and practitioners renewed their interest in the contextual determinants of health and behaviour at a population level. Kickbusch argued:

The link between social change, pressure for social reform and public health has been lost ... public health has over time lost its broad gauged approach and moved into a phase of medical dominance and concern for behavioural epidemiology, preventative medicine and health education. It has individualised cultural patterns by concentrating on disease categories and risk factor causation principles (Kickbusch, 1989, p266).

In 1986, the First International Conference on Health Promotion held in Ottawa gave expression to these ideas (WHO, 1986). The Ottawa Charter redefined health promotion as "the process of enabling people to increase control over, and to improve their health" and identified five important domains of activity:

- develop healthy public policy,
- create supportive environments,
- strengthen community action,
- develop personal skills,
- reorient health services.

In this new system of practice, behavioural change, "the development of personal skills", was only one of five domains of activity. Syme and Balfour (1998) observe:

It is difficult to expect that people will change their behaviour easily when many forces in the social, cultural and physical environment conspire against such change. If successful behaviour modification programs are to be developed to prevent disease, more attention will need to be given not only to the behaviour and risk profiles of individuals, but also to the environmental context in which people live (Syme and Balfour, 1998, p796).

If healthy behaviours were to be effectively promoted, these behaviours needed to be firmly grounded in supportive social and physical environments. Healthier choices had to become easier choices (Milio, 1987).

Increasing concern over mankind's adverse impact on the natural environment suggested that environmental degradation could of itself become a serious challenge to public health (WCED, 1987; Brown et al., 1992; Wright, 2004). As a result, a discourse on ecological health promotion, which articulated the need to think about the health of populations and individuals in the terms of their social and environmental context, while emphasising the need to maintain a healthy environment for current and future generations, became popular.

If the Ottawa Charter was the public expression of this "New Public Health" (Ashton and Seymore, 1988; Holman, 1992; McPherson, 1992), the WHO Healthy Cities program (Ashton, 1992) and later the WHO Safe Communities Program (Welander et al., 2004; Spinks et al., 2005) were its practical expression. Here populations (i.e. cities or communities) were the locus of public health planning, rather than individuals.

1.9. FROM INJURY PREVENTION TO SAFETY PROMOTION

Similarly, the simple biomechanical determinism of modern injury prevention, was increasingly challenged in the late 20th century (Sleet, 1984; Tolsma, 1984, Johnston, 1992; Bonnie et al., 1999; Gielen and Girasek, 2001; Gielen and Sleet, 2006). There was increasing evidence that behavioural, social and economic

factors had a profound impact on the occurrence of injury. (Bonnie et al., 1999; Laflamme, 2001; Petridou and Tursz, 2001; Stokes et al., 2002; Gielen and Sleet, 2006).

Even archetypal "passive" interventions needed to be reinforced by an "active" behavioural response to achieve their full safety potential. Child resistant caps on medication had to be replaced after use. Smoke alarm batteries needed to be changed. Swimming pool fences had to be maintained (Gielen and Sleet 2006; Cunningham et al., 2002). Finally and most importantly, enactment of "passive" solutions required a behavioural response from politicians, bureaucrats and manufacturers, who needed to support these innovations. Sleet (1984) asserted the need for an "active approach to passive protection".

During the second half of the 20th century an important parallel discourse on injury causation was developing outside public health. In 1943 psychologists from the US Army Air Force invented "Critical Incident Analysis" (Flanagan, 1954). In this system analysis model, injury is the predictable outcome of a sequence of predisposing and precipitating environmental determinants that create an injury opportunity. James Reason (1995, 2000) called this an "accident trajectory" in which a critical alignment of pre-existing "upstream" system weaknesses (latent failures), combined with a local "triggering event" and individual behavioural failures (active failures) to create an accident opportunity. In this model, latent failures could be environmental, organisational or social, and usually had their origin in decisions taken by designers, builders, managers and politicians. These system flaws lay dormant for long periods, before they were unmasked by local triggering events. Humans could abort the accident trajectory by detecting the potential hazard and responding in ways that overcame the immediate risk, or reinforced the accident trajectory by counter-productive (active failure) behaviours that increased the chance of an injury event. In this model, individuals were the inheritors rather than the instigators of the accident trajectory.

To focus solely on the biomedical concept of *"injury prevention"* is to underestimate the wholistic nature of human experience, and consequently how the positive state of *"safety"* is achieved. Maurice et al. (2001) defined safety as:

a state in which hazards and conditions leading to physical, psychological, or material harm are controlled in order to preserve the health and well-being of individuals and the community (Maurice et al., 2001, p. 237).

It was as much concerned with the subjective dimension – the perception of safety, as it was with the objective dimension – the absence of injury; as much concerned with the community in which individuals reside, as it was with the individuals that make up the community. Safety was thus a psychological, sociological and environmental phenomenon, rather than just a physiological phenomenon.

1.10. THE NEW MILLENNIUM: COMING TO TERMS WITH COMPLEXITY

The key insight of the ecological paradigm was that the health and safety of individuals must be understood and promoted in the context of their physical, natural and social environment. However, there was potential danger in this wholistic way of thinking. Green and Kreuter (1999) warn:

If the ecological credo that everything influences everything else is carried to its logical extreme, the average health practitioner has good reason to do nothing, because the potential influence of or consequences on other parts of the ecological system lie beyond comprehension, much less control (Green and Kreuter, 1999, p25)

Ackoff (1974, p 21) observed that "no problem ever exists in complete isolation" and coined the term "messy problems" to describe a system of complex interrelated problems (Ackoff, 1974, Chisholm, 1996; Hill, 2002; Keast, 2004).

In the machine age messy problematic situations were approached analytically. They were broken down into simpler discrete problems that were often believed to be capable of being solved independently of one another. We are learning that such a procedure not only usually fails to solve the individual problems that are involved, but often intensifies the mess. The solution to a mess can seldom be obtained by independently solving each of the problems of which it is composed (Ackoff, 1974, p21).

Rittel and Webber (1973) independently coined the term "wicked problems" to describe the same idea.

"We are calling them 'wicked' not because these properties are themselves ethically deplorable. We use the term 'wicked' in a meaning akin to that of 'malignant' (in contrast to 'benign') ... or 'tricky' (like a leprechaun) or 'aggressive' (like a lion). (Rittel and Webber, 1973, p160).

The tools of modern science struggle to address "wicked issues" because the problem itself defies clear scientific definition. The importance ascribed to the different sub-components of the problem is more a matter of perspective than knowledge and it is frequently unclear where the causal chain begins or ends. Rittel and Webber (1973, p159) suggest that "one of the most intractable problems is defining the problem". Overly simplistic solutions may unleash a chain of secondary and tertiary effects that may either compound the original problem or create a totally new problem.

Ackoff (1974) and Rittel and Webber (1973) precipitated an important discourse in governance and organisational literature regarding the importance of complex "messy problems" and "wicked issues" to contemporary society (Harmon and Mayer, 1986; Chisholm, 1996; Clarke and Stewart, 1997; O'Toole, 1997; Agranoff and McGuire, 2001; Keast et al., 2004). This core idea has profound implications for the ecological practice of public health. The complex nature of modern population health problems may render them resistant to investigation and management using modern reductionist scientific techniques (Kickert et al., 1997; McMichael, 2001; Lasker and Weiss 2003; Lewis, 2005).

At a practical level, many of the problems that affect the health and well-being of people in communities – such as substance abuse, poverty, environmental hazards, obesity, inadequate access to care, and terrorism – cannot be solved by any person, organisation, or sector working alone. These problems are complex and interrelated, defying easy answers (Lasker, 2003, p14).

A new approach is required.
1.11. PARTNERSHIPS, COLLABORATIONS AND NETWORKS: THE THEORETICAL IMPERATIVE

Contemporary literature on societal governance and public health argues that the complex nature of social problems has profound implications for the way in which they should be addressed (Rittel and Webber, 1973; Clarke and Stewart, 1997; Jones et al., 1997; O'Toole, 1997, Agranoff and McGuire, 2001; Hill, 2002; Mandell and Steelman, 2003; Keast et al., 2004). The complex, dynamic, multi-causal, multi-level, multi-sectoral nature of contemporary problems mean they are resistant to interventions designed by any one profession or government agency (Rittel and Webber, 1973; Clarke and Stewart, 1997; Kickert et al., 1997; O'Toole, 1973; Clarke and Stewart, 1997; Kickert et al., 1997; O'Toole, 1997). Keast et al. (2004) comment:

There is a growing realization that one of the biggest challenges for contemporary governments centres on resolving highly complex and intractable social problems, ... These 'messy problems" or "wicked issues" present a special challenge to government because they defy precise definition, cut across policy and service areas, and resist solutions offered by the single-agency or "silo" approach (Keast et al., p 363).

It has been proposed that partnerships, collaborations and networks are better suited to this sort of operational environment. They are more innovative, more responsive and better positioned to rapidly generate comprehensive solutions than mono organisational "silo" approaches (Lasker et al., 2001; Agranoff and McGuire, 2001; Keast et al., 2004). O'Toole and Montjoy (1984) observe:

Converting policy intention into action requires that those charged with execution cooperate toward the achievement of policy. ... Implementation is essentially a problem of cooperation (O'Toole and Montjoy, 1984, p 492).

1.12. PARTNERSHIPS, COLLABORATIONS AND NETWORKS: THE POLITICAL AND ECONOMIC IMPERATIVE

After the Second World War most liberal democratic states enlarged government services to ensure the social and physical welfare of their citizens. Egalitarian policies were considered desirable and achievable (Baum, 1998). Public health practitioners, bureaucrats and politicians embraced an era of ambitious public

health policy. In 1978, all World Health Organisation (WHO) member countries endorsed the Alma Alta Declaration "Health for All by the year 2000" which advocated the provision of comprehensive, universal, equitable and affordable health care for all (WHO, 1978; Hall and Taylor, 2003). However, the optimism of the mid 20th century was soon confronted by economic reality. The 1970s Middle East oil crisis put increased financial pressure on the global economy (Baum, 1998; Kickert et al., 1997). As national and international debt escalated, communities and politicians questioned the effectiveness and affordability of interventionist government policy (Kickert et al., 1997). Lead by the conservative Thatcher government in the United Kingdom and the Reagan Administration in the United States, the 1980s saw reduced government involvement in all aspects of society and privatisation of many government services (Kickert et al., 1997). International donors insisted that the governments of developing countries adopted market driven economic reform as a condition of foreign aid relief (Hall and Taylor, 2003). Governments and aid agencies sought to share responsibility for service provision with the communities themselves (Gray and Lawrence, 2001). Collaborative solutions to community problems were favoured because they aligned well with the political rhetoric of "shared responsibility" and "community engagement" but, just as importantly, they became an economic necessity as governments reduced long term financial investment in the community (Gray and Lawrence, 2001).

The convergence of academic theory proposing that networks were a potential solution to complex social problems, political philosophy that advocated small government and community engagement, and the economic reality of reduced community investment, created a social environment in which partnerships, collaborations and networks have become a favoured organisational form in the postmodern era (Lipnack and Stamps, 1994). Agranoff and McGuire (2001) observe that:

Just as the bureaucratic organisation was the signature organisational form of the industrial age, the emerging information or knowledge age gives rise to the network. ... The world is characterised by extreme complexity and diversity, where power is

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dispersed, not centralised; tasks are becoming dedifferentiated, rather than subdivided and specialised; and society worldwide demands greater freedom and individuation, rather than integration. In such a world, an organisational forms based on individuation, dispersed power and dedifferentiation is necessary; the network structure is that form (Agranoff and McGuire, 2001, p22.).

1.13. ADDRESSING THE COMPLEXITY OF THE INJURY ISSUE IN THE MACKAY WHITSUNDAY COMMUNITIES:

In light of the above, it is now appropriate to return to the population health issue identified in Mackay. Data from two local surveillance systems (*Emergency Department Presentations* and *Hospital Separations*) suggested that the incidence of injury in the Mackay community was unacceptably high. The key epidemiological question was "why does this population appear to have a high incidence of injury at this time?"

It would be a fallacy, indeed an "ecological fallacy", to conclude, on the basis of our sentinel observations that the Mackay Whitsunday injury problem could be simply explained by risk factors detected at the level of the individual. The question, "Why did this individual suffer an injury at this time?" may be important, but it cannot be assumed that it would in itself explain the population risk. Population issues such as the physical environment (for example infrastructure and the natural environment) and the social milieu had to be considered and addressed if the problem was to be solved. The Mackay injury problem was also likely to be complex with multiple inter-related causes acting at multiple levels of the community ecological system. There was, therefore, an urgent need to develop theoretical models, research tools, forms of community safety promotion practice, and evaluation tools, that assisted researchers and practitioners involved in the project to achieve some conceptual clarity as they attempted to address the problem of injury in Mackay.

In keeping with contemporary wisdom Mackay Whitsunday Safe Communities (MWSC) responded by forming a collaborative network in an attempt to mobilise sufficient expertise and resources to enable it to adequately address the communities' injury problem.

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This thesis describes the coalition, the theoretical foundations of its research and intervention program, the collaborative social methodology used to address the problem, and a novel sociological methodology used to assess the growth and function of the network. Social network analysis (SNA) is a quantitative sociological tool used to describe and model social systems, or "networks" (Scott, 2000; Borgatti and Forster, 2003). In light of the theoretical and political prominence given to network solutions in solving complex contemporary problems, it is timely to assess whether practice matches rhetoric, and investigate if SNA has the potential to describe and analyse the structure, function and growth of a community-based safety promotion coalition.

1.14. AIMS OF THESIS

This thesis aims to address three critical issues necessary for future development of effective community safety promotion research and practice.

1. Develop a relevant theoretical model to describe and explain the causes of injury in a community ecological system.

Given the apparent complexity of community ecological systems, it would be helpful to develop an ecological model of injury causation that provides some descriptive clarity to this area. Such a model could provide a conceptual framework that would allow researchers and practitioners to describe and understand the dynamic interface between causal factors acting within a community ecological system. This would allow adequate problem definition and facilitate the design of suitable solutions.

2. Describe and critique the use of community collaborative networks as a vehicle to address public health issues.

Given the complexity of the injury issue, no single organisation, professional group or governmental sector has the resources, expertise or skills necessary to adequately address this issue. Thus Mackay Whitsunday attempted to form a sustainable collaborative network, which aimed to develop local social capital which could in turn could be used to promote community safety. While concepts such as sustainability, collaboration, networks and social capital, figure prominently in contemporary discourse on health and safety promotion, it must be acknowledged that they are themselves contested theoretical constructs whose practical application is yet to be clearly documented. It was therefore considered critically important to clarify what they meant and explore how they could be practically applied.

3. Test the validity and utility to public health of Social Network Analysis.

Mackay Whitsunday used a social process, the collaborative network, as an engine to achieve its public health objectives. It was therefore important to identify, develop and test a tool with the ability to document how the social system worked.

1.15. OVERVIEW OF THESIS

Chapter Two: The Genesis, Rationale and Development of Mackay Whitsunday Safe Communities.

This chapter describes the genesis, rationale and history of Mackay Whitsunday Safe Community. The coalition was launched in February 2000 in response to high non-intentional injury rates observed in the region. It sought to reduce injury in the region by being a catalyst for the development of a sustained, systematic, inter-sectorial, community-based safety promotion network by mobilising existing community resources and expertise.

Chapter Three: Collection of NDS-IS Level 2 Injury Surveillance Data for Developing a Community Safety Promotion Program in Regional Queensland.

The research conducted in this chapter was published in:

- Hanson, D, Pitt, WR, Hockey, R, Miles, E & Müller R 2002a, 'Collection of NDS-IS level 2 injury surveillance data in regional Queensland', in R Müller (ed.) *Reducing injuries in Mackay, North Queensland*, Warwick Educational Publishing, Warwick, Queensland, pp. 17-34.
- Hanson, D, Hart, K, McFarlane, K, Carter, A, Hockey, R & Miles, E 2003, 'Addressing childhood injury in Mackay: a safe communities initiative', *Injury Bulletin*, no. 77, pp. 1-6, see Appendix 20.

This chapter describes the development and implementation of a local Emergency Department Injury Surveillance System in the Mackay and Moranbah Health Service District under the auspices of the Queensland Injury Surveillance Unit.

The surveillance system was used to:

- Identify the determinants and distribution of injury in the Mackay and Moranbah Health Service Districts
- 2. Identify strategic areas for intervention
- 3. Monitor the impact of interventions.

Chapter Four: Safe Communities, an Ecological Approach to Safety Promotion

The research conducted for this chapter was published in:

 Hanson, D, Vardon, P & Lloyd J 2002b, 'Safe communities: an ecological approach to safety promotion', in R Müller (ed.), *Reducing injuries in Mackay, North Queensland*, Warwick Educational Publishing, Warwick, Queensland, pp. 35-52. Allegrante, JP, Marks, R & Hanson, DW 2006, 'Ecological models for the prevention and control of unintentional injuries', in AC Gielen, DA Sleet & RJ DiClemente (eds), *Injury and Violence Prevention*, Jossey Bass, San Franscisco, pp 105-126, see Appendix 21.

After providing a brief description of the different injury prevention paradigms used in current injury prevention and safety promotion research and practice, this chapter argues that a more comprehensive approach is necessary. "Safety" is an ecological concept, determined by the relationships between individuals and their physical and social environments. The paper proposes a social ecological model – "the injury iceberg" - as a unifying cognitive framework for developing a Safe Communities Project. The proposed model emphasises the dynamic interface between these three dimensions acting at different levels of the ecological system. It can accommodate and describe a complex web of causation and creates a rich context for planning community safety interventions.

Chapter Five: The Injury Iceberg, an Ecological Approach to Planning Sustainable Community Safety interventions

The analysis conducted for this chapter was published in:

- Hanson, D, Vardon, P & Lloyd J 2002c, 'Becoming Queensland's first safe community: considering sustainability from the outset', in R Müller (ed.) *Reducing injuries in Mackay, North Queensland*, Warwick Educational Publishing, Warwick, Queensland, pp. 17-34, see Appendix 22.
- Hanson, D, Hanson, J, Vardon, P, McFarlane, K, Lloyd, J, Müller, R & Durrheim, D 2005, 'The Injury Iceberg: an ecological approach to planning sustainable community safety interventions', *Health Promotion Journal of Australia*, vol. 16, no. 1, pp. 5-10.

This chapter based on a paper published in the Health Promotion Journal of Australia in 2005 argues that sustainability is an ecological concept determined by the human, environmental and social resources available within an ecological system. While project sustainability is a mandatory piece of politically correct rhetoric, it is less often achieved. Interventions dependent on external resources are vulnerable. To reduce a community's risk of injury and sustain this improvement, the community "ecological system" must have access to the resources necessary to maintain the desired outcome and the ability to mobilise these resources. One potential solution: build sustainability from the outset by maximising a community's capacity to maintain safety initiatives within their own resources.

Chapter Six: Social Networks, from Metaphor to Methodology

This chapter describes the history and scientific foundations of SNA, a quantitative sociological technique used to describe and analyse the pattern of relationships with a social system. The standard approach of epidemiology or sociology is to define a population and then study a representative sample of individuals within this population. A key assumption is that the attributes, or behaviour, of individual actors are independent. SNA takes exception to this assumption. Behaviour is not solely influenced by the beliefs, attitudes and capabilities of an individual, but also by their socio-ecological context. In particular, SNA takes a structural perspective of social interactions. It is not just the interactions between individuals within a social system that determine the function of a social system, but the social structure in which they interact.

Chapter Seven: Social Network Analysis of Mackay Whitsunday Safe Communities, Methodology

This chapter reviews important methodological aspects of the use of SNA to study this community based coalition. A snowballing recruitment methodology was used to allow the identification of external relationships that may be important for the mobilisation of resources. The chain of relationships identified by respondents was progressively followed up though three survey cycles, beginning with the Network Support Group.

Chapter Eight: Structure and Function of Mackay Whitsunday Safe Communities, a Social Network Analysis

This chapter describes and quantifies important structural characteristics of MWSC and its Support Network (SN). SNA has the unique capacity to simultaneously observe the contribution of individuals and groups to network activities. Contrastingly, population health surveys typically collect results at an individual level, aggregate them and analyse them at a population level. In these types of surveys, the contribution of individuals to the process of community safety promotion may be obscured. SNA therefore provided unique insights regarding the structure and function of MWSC. The complimentary contribution of cohesive action groups facilitated by a small number of key individuals who link these groups was clearly observed. The advantages, disadvantages and validity of the snowball sampling method used to collect data was also reviewed.

Chapter Nine: Documenting The Development Of Social Capital In A Community Safety Promotion Network Using Social Network Analysis

The research in this chapter was presented as:

- Hanson, D, Muller, R & Durrheim D 2005, 'Documenting The Development Of Social Capital In A Community Safety Promotion Network Using Social Network Analysis', *International Conference on Engaging Communities*, Brisbane, August 15 to 17th, 2005.
- Hanson, D, Durrheim, D, 'Documenting The Development Of Social Capital In A Community Safety Promotion Network Using Social Network Analysis', 8th World Injury Prevention and Safety Promotion Conference, Durban, South Africa, April 2 to 4th, 2006

Robert Putnam (2000) defined social capital as, "the features of social organisation, such as networks, norms and trust that facilitate coordination and co-operation for mutual benefit." There are two parallel literatures on social capital. One argues social capital is an emergent quality of cohesive social systems that facilitates more effective social exchange between all members of the network, while the other argues social capital is a source of individual competitive advantage enjoyed by particular individuals who develop strategic relationships that cross social boundaries. Both types of social capital were observed in MWSC and its SN. The chapter argues that these different types of social capital are complimentary rather than contradictory and that both types of social capital are necessary to facilitate productive social relationships.

Chapter Ten: Measuring the Sustainability of Mackay Whitsunday Safe Communities using Social Network Analysis

For an ecological system to be sustainable the system must have access to enough financial, physical, human and social resources to maintain productive outputs. This chapter seeks to document the exchange of resources within MWSC and its SN to assess the sustainability of the networks activities.

The paper argues on both theoretic and empirical grounds that MWSC is an open ecological system. Open systems can never achieve equilibrium, a theoretic state in which the resources produced by the system are sufficient to maintain system function, rather, open systems are stable in steady state, a state in which the net flux of resources into and out of the system are sufficient to sustain system function. This key observation has profound implications for the design and maintenance of sustainable safety promotion networks. The social process by which these resources are exchanged is therefore a critical determinant of network sustainability.

Chapter Eleven: Conclusion

In keeping with contemporary theory and practice in community health and safety promotion, a community coalition was mobilised to address the apparently high incidence of injury observed in the Mackay Whitsunday region. This is a community population health problem which must therefore be addressed at a community level. It is by definition an ecological issue.

The injury iceberg is offered as an ecological model of injury causation in the hope of providing some conceptual clarity when describing the multicausal, multi-level, multi-sectoral determinants of community safety.

Coalitions, partnerships and networks are frequently advocated as important social tools to address local population health problems. However, studies documenting the social process used by collaborative networks are lacking. SNA, a novel quantitative sociological tool, has demonstrated utility as a tool to document, analyse and quantify the structure and function of MWSC a community safety promotion collaborative network.

Glossary Of Terms

This thesis has drawn from theory and research from many different social and health disciplines, each utilising their own professional language. As a consequence a number of terms may be either unfamiliar to the reader or may carry a precise scientific definition not immediately obvious from general usage. In particular, a number of terms used in SNA have a precise mathematical definition intended to quantify terms commonly used to describe social systems. This extensive glossary is therefore provided to assist the reader.

Appendices

A number of key documents concerning MWSC and publications arising from this thesis are provided for the reader's perusal:

- Appendix 1: Project Plan MWSC Project March 2000
- Appendix 2: Operating Structure MWSC, 2004
- Appendix 3: Network Support Group Orientation Guide
- Appendix 4: Working Groups
- Appendix 5: MWSC Progress Update 1 June 2000
- Appendix 6: MWSC Annual Report Feb 2000 to Feb 2001
- Appendix 7: MWSC Progress Update 2 June 2001
- Appendix 8: MWSC Annual Report Feb 2001 to Feb 2002
- Appendix 9: MWSC Progress Update 3 March 2002
- Appendix 10: Designation Application 2002
- Appendix 11: MWSC Progress Update 4 June 2003
- Appendix 12: MWSC Annual Update 2002 to 2003
- Appendix 13: MWSC Progress Update 5 December 2003

- Appendix 14: Designation Update, 2004
- Appendix 15: MWSC Progress Update 6 July 2005
- Appendix 16: MWSC Progress Update 7 December 2005
- Appendix 17: MWSC Progress Report March 2006
- Appendix 18: MWSC Progress Report March 2006
- Appendix 19: MWSC Designation August 30th 2004
- Appendix 20: Addressing Childhood Injury in Mackay: A Safe Communities Initiative. Hanson, D., Hart, K., McFarlane, K., Carter, A., Hockey, R., & Miles, E. *Injury Bulletin, 77,* 1–6, 2003.
- Appendix 21 : Ecological Models For The Prevention And Control Of Unintentional Injury, John P. Allegrante, Ray Marks, Dale W. Hanson in Gielen A, Sleet DA, DiClemente R, eds. *Handbook of Injury Prevention: Behavior Change Theories, Methods, and Applications*, Jossey-Bass, New York, 2006
- Appendix 22: Becoming Queensland's First Safe Community: Considering Sustainability from the Outset. Hanson, D., Vardon, P., & Lloyd, J. in R. Muller (Ed.), *Reducing injuries in Mackay, North Queensland* (pp. 35-52). Warwick, Queensland, Australia: Warwick Educational Publishing, 2002c
- Appendix 23: Sample Survey Form
- Appendix 24: Triad Census
- Appendix 25: 8th World Conference on Injury Prevention and Safety Promotion

CHAPTER TWO: THE GENESIS, RATIONALE AND DEVELOPMENT OF MACKAY WHITSUNDAY SAFE COMMUNITIES

2.1. THE MACKAY WHITSUNDAY REGION

Mackay is a major regional centre in Tropical Queensland, 1200 km north of the state capital Brisbane and 360 km north of the Tropic of Capricorn. It serves the Mackay Statistical Division, a region of over 90,000 square kilometres with an estimated population of 141,458¹ and supports diverse industries including coal mining, engineering, sugar cane, cattle, fishing and tourism (OESR, 2005).

The Mackay Statistical Division is comprised of eight local government areas: Belyando Shire, Broadsound Shire, Bowen Shire, Mackay City, Mirani Shire, Nebo Shire, Sarina Shire and Whitsunday Shire (see Figure 2.1).



C = City S = Shire

Figure 2.1 The Mackay Statistical Division (OESR, 2005)

¹ on June 30th 2003 (OESR, 2005).

2.2. DEMOGRAPHICS OF THE MACKAY STATISTICAL DIVISION

The age profile of the Mackay Statistical Division is younger than that of the state of Queensland as a whole (p<0.001, χ^2). Figure 2.2 highlights the differences between the age profiles of the Mackay Statistical Division and Queensland (OESR, 2005). There were proportionally:

- more children: 22.6% of the population were aged between 0 and 14 years compared with 20.9% in Queensland.
- fewer young adults: 13.2% were aged between 15 and 24 years compared with 14.1% in Queensland.
- 30.5% of the population were aged between 25 and 44 years compared with 29.3% in Queensland
- Fewer seniors: 9.7% were 65 years or older when compared with 11.9% in Queensland.



Figure 2.2 Population by age group – Mackay Statistical Division compared with Queensland June 30th, 2003 (OESR, 2005)

Four thousand six hundred and ninety-eight people (3.3% of the population of the Mackay Statistical Division) identify as Aboriginal or Torres Strait Islander (OESR, 2001). However, it is generally believed Indigenous people are not accurately counted in census data (OESR, 2001, ABS, 2005). Mackay also has the largest South Sea Islander population in Australia, estimated at approximately 6,000 people (Mackay City Council, 2006).

2.3. INJURY IN AUSTRALIA

There were 7,802 injury deaths reported in Australia in 2002. The age standardised injury mortality rate was 56.5 per 100,000 (Kreisfeld et al., 2004). Injury and poisoning were the most common causes of death from early childhood through to middle age. In 2002, 3,828 deaths were reported in people aged between 1 and 44 years, accounting for 50% of all deaths (n=7,714) in this age group (Kreisfeld et al., 2004).

In the 2001-2002 financial year there were 333,449 hospital separations due to injury in the community, accounting for 5.2% of all hospitalisations. Age standardised hospital separation rates were 1,718 per 100,000 (Berry and Harrison, 2006).









Regional and remote communities experience high rates of injury mortality (Figure 2.3) and morbidity (Figure 2.4) compared with urban communities (ABS, 2004; Berry and Harrison, 2006).

In the 2001 National Health Survey 12% of respondents reported having sustained an injury in the previous month, which either required treatment or resulted in a reduction of normal activities (ABS, 2003). The study estimated 2,256,300 people living in Australia (12% of the Australian Population) were suffering from a long-term medical condition at the time of the study as the result of a previous injury (ABS, 2003).

Moller (2003) estimated the total cost of injury in Australia at \$13 billion in the 1995/96 financial year. The direct cost (actual expenditure related to injury) was estimated at \$4.3 billion, while the indirect cost (loss of productivity) resulting from injury related deaths was estimated at \$5.0 billion and injury related morbidity at \$4.1 million.



2.4. INJURY IN QUEENSLAND

Figure 2.5 Age-standardised mortality rates for injury in Australian states and territories 2001/2002 financial year (Kreisfeld et al., 2004)

Queensland's injury mortality (Figure 2.5), and morbidity (Figure 2.6) rates are higher than the national average exceeded only by the Northern Territory and Tasmania (Kreisfeld et al., 2004; Berry and Harrison, 2006).



Note: The thick horizontal line shows the rate for Australia.

Figure 2.6 Age-standardised morbidity rates for injury in Australian states and territories 2001/2002 financial year (Berry and Harrison, 2006)

Of the 22,230 deaths reported in Queensland in 1998, 1,507 (6.8%) were due to injury. Injury was the fourth leading cause of death (after cancer, ischaemic heart disease and cerebrovascular disease). Injury was the leading cause of death in people younger than 45 years of age who accounted for 58.5% of all injury deaths (Pike et al., 2000). Reflecting the profound health impact injury has on young people, injury resulted in 32 potential years of life lost (PYLL) per death, compared with 3.4 PYLL for cardiovascular disease and 8.0 PYLL for cancer. Injury accounted for 27% of all PYLL in Queenslanders under 74 years of age.

There were 97,365 hospital separations due to injury in Queensland in the 1998/99 financial year, accounting for 9.0% of all hospital separations. The injury separation rate was 2,816 separations per 100,000 persons. However, hospital separations only represented a fraction of injury events. In 1998, only 12.8% of Emergency Department (ED) injury presentations were admitted (Pike et al., 2000). The direct cost of inpatient hospital care was estimated at \$289.6 million in the 1997/98 financial year (Pike et al., 2000).

2.5. INJURY IN THE MACKAY WHITSUNDAY REGION

In 1998 the Mackay Division of General Practice conducted a community needs analysis which identified that age standardised hospital separation rates for injury and poisoning in 1995/96 were high in the Mackay and Moranbah Health Service Districts² (Figure 2.7). A direct age standardised rate for injury and poisoning of 5,458 per 100,000 was observed, accounting for 15.4% of all hospital separations in the district (Azzopardi et al., 1998). This compared with an average Queensland morbidity rate of 2,832 per 100,000, accounting for 8.5% of all hospital separations (Azzopardi et al., 1998). The population of the Mackay region contributed 6.6% of all injury and poisoning separations in Queensland while only representing 3.1 % of the total Queensland population in the 1996 Australian Census (ABS, 1997).



Figure 2.7 Age standardised hospital separation rates for major diagnostic groups 1995/96 in Mackay and Queensland (Azzopardi et al., 1998)

Figure 2.8 shows age standardised hospital separation rates from injury and poisoning in 1997/98 by Queensland region. The Mackay Statistical Division³ had an injury rate of 4,535 per 100,000 which compares with rates of 2,808 per 100,000 in Rockhampton, 2,755 per 100,000 in Gladstone, 2,705 per 100,000 in Cairns and 2,035 per 100,000 in Townsville (AIHW, 1999).

² Mackay and Moranbah Health Service Districts include seven Local Government Areas: Belyando, Broadsound, Mackay, Mirani, Nebo, Sarina & Whitsunday (but not Bowen). See Figure G.2 in the Glossary for detailed geographical definition.

³ Mackay Statistical Subdivision includes Bowen Shire which is not within the Mackay & Moranbah Health Service Districts.



Figure 2.8 Age standardised hospital separation rates from injury and poisoning by Queensland Statistical Subdivision for 1997/98 (AIHW, 1999)



Figure 2.9 Age standardised injury hospital separation rates per 100,000 with 95% confidence intervals for Queensland and Mackay (TPHU, 1999)

The Mackay manager of the Tropical Population Health Unit (TPHU) of Queensland Health (QH) followed up the Mackay Division of General Practice Community Needs Analysis by commissioning a further study of regional injury hospital separations to ascertain if the apparent excess in injury morbidity could be confirmed. Injury hospital separations from July 1993 to June 1999 were reviewed (TPHU, 1999) and confirmed that over this period reported hospital injury separations were double those observed for the rest of Queensland (Figure 2.9). ED staff, in response to the high injury rates experienced at Mackay Base Hospital (MBH), commenced collection of injury surveillance data⁴ in September 1997, providing a regional sample for the Queensland Injury Surveillance Unit (QISU) network (Hanson et al., 2002a). EDs from all six public hospitals in the Mackay and Moranbah Health Service Districts (Clermont, Dysart, Mackay Base, Moranbah, Proserpine and Sarina Hospitals) have collected injury surveillance data on behalf of QISU since that time. The Mackay Mater Private Hospital's After-hours Medical Clinic was added in September 2000.



Figure 2.10 Age-standardised ED injury presentation rates by gender: Mackay Base Hospital and South Brisbane: 1998 and 1999 (Vardon et al., 2000)

Review of ED injury presentation data at MBH appeared to confirm excess injury morbidity. MBH reported an average of 8,700 injuries per annum constituting one quarter of its caseload (Vardon et al., 2000). ED age-standardised injury presentation rates were double those observed in South Brisbane (Vardon et al., 2000). Age-standardised ED injury presentation rates were 12,584 per 100,000 for males and 6,319 per 100,000 for females. This compared with rates of 6,446 per 100,000 for males and 3,727 per 100,000 for females in South Brisbane (Figure 2.10). Based on the above information, it appeared injury morbidity rates in the Mackay Region were high and that injury was an issue of population health importance to the Mackay Community.

⁴ National Data Standards for Injury Surveillance (NDS-IS) Level 2 data (NISU, 1998).

2.6. THE RATIONALE FOR THE MACKAY WHITSUNDAY SAFE COMMUNITIES

Injuries are preventable. Australia has achieved significant reductions in injury morbidity and mortality in areas where concerted efforts have been made. Road transport related deaths have reduced from 11 per 100,000 in 1992 to 9 per 100,000 in 2000 (AIHW, 2002). The suicide rate in males has reduced from 23.4 per 100,000 in 1997 to 19.4 per 100,000 in 2000 (AIHW, 2002). Hospital admission of children due to poisoning has reduced from 302 per 100,000 in 1991-1992 to 267 per 100,000 in 1999-2000 (AIHW, 2002).

The Mackay community had recognised this problem and begun responding with a number of activities (Table 2.1) but a local needs analysis conducted by the TPHU found that:

"Injury control activities in the Mackay and Moranbah Health Districts areas have been extensive but largely uncoordinated. ... With many of the above programs based on similar principles and strategies a co-operative, systematic and inter-sectoral approach would be more productive (Repper and Vardon, 1999, p3)."

Domain of Activity	Organisations Involved
Farm Safety	TPHU
	Mackay Division of General Practice
	FarmSafe Queensland
Falls prevention in	Home and Community Health Unit (Aged Care)
Seniors	Mackay Health Service District
Water and Alcohol Safety	Alcohol, Tobacco and Other Drugs Service
Safety in Licensed	(ATODS)
Premises	Mackay Health Service District
Toddler Drowning	TPHU
Prevention	Child and Adolescent Health
Child Scald Prevention	Mackay Health Service District
Road and Vehicle Safety	Queensland Transport
	Home and Community Health Unit (Aged Care)
Pedestrian Safety	Mackay City Council
Electrical Safety	Mackay Electricity Board
Injury Surveillance	MBH ED
	Mackay Health Service District

Table 2.1 Injury prevention activities in Mackay prior to 2000 (Repper and Vardon, 1999)

There is a rich tradition of community-based intervention for injury prevention and health promotion (Coggan and Bennett, 2004; Gielen and Sleet, 2006). At the time that the Mackay injury problem was recognised the World Health Organisation (WHO) was beginning to promulgate a systematic, all injury, all age group, all situation, community-based approach to injury prevention and safety promotion (WHO Collaborating Centre, 2005). Their goal was to designate Safe Communities as demonstration sites in community safety promotion. To achieve designation, communities are reviewed based on 12 criteria (Coggan and Bennett, 2004):

- 1. The existence of a cross-sectoral group responsible for injury prevention.
- 2. Involvement of the local community network.
- 3. A program covering all ages, environments and situations.
- 4. Concern for high-risk groups and high-risk environments, and ensuring justice for vulnerable groups.
- 5. Documentation of the frequency and causes of injury.
- 6. Long-term program rather than short-term.

In addition, the community was also required to:

- 7. Utilise appropriate indicators to evaluate process and the effects of change.
- 8. Analyse the community's organisations and their possible participation in the program.
- 9. Involve the health care organisations in registration of injuries and the prevention program.
- 10. Be prepared to involve all levels of the community in solving the injury problem.
- 11. Disseminate experiences both nationally and internationally.
- 12. Be prepared to contribute to a strong network of "Safe Communities".

This simultaneous multiple domains approach sought to create a critical mass of community safety promotion activity that would address local social and physical determinants of injury and ultimately impact the risk behaviour of community members (Hanson et al., 2002b; Hanson et al., 2002c; Hanson et al., 2005). Early studies in Scandinavia and Australasia have been promising, suggesting that up to a 30% reduction in injury is achievable using this approach (Coggan and Bennett, 2004, Spinks et al., 2005).

The local health promotion manager of the TPHU attended the 1st Pacific Rim Safe Communities Conference held in New Zealand in 1999, was inspired, and facilitated local visits by Professor Leif Svanstrom from the WHO Collaborating Centre on Community Safety Promotion at Karolinska Institute Sweden and members of the Shore Regional Organisation of Councils (SHOROC), a coalition of city councils in North Sydney that achieved WHO designation in 1998.

The Safe Communities approach was endorsed by Mackay City Council (MCC). A project officer was appointed by the TPHU, the scope of community consultation expanded and potential strategic partners identified culminating in the formation of the Network Support Group (NSG) in September 1999. Initial project partners included Queensland Health (TPHU, MBH), MCC, Queensland Transport (QT), Queensland Police Service (QPS) and James Cook University (JCU). In late 1999, Whitsunday Shire Council (WSC) expressed an interest in the project and subsequently joined the NSG.

The Mackay Whitsunday Safe Communities (MWSC) was launched in February 2000 with a focus on people living within Mackay and Whitsunday Local Government Areas. At this stage the project consisted of the NSG and four action groups: Senior Safety, Road Safety, Childhood Safety (Whitsunday) and Injury Research.

2.7. BASELINE SURVEY OF HOUSEHOLD PRACTICES, KNOWLEDGE AND PERCEPTION INFLUENCING INJURY IN THE MACKAY WHITSUNDAY REGION

The School of Public Health, Tropical Medicine and Rehabilitation Sciences (SPHTMRS) at JCU conducted a survey of household injury prevention practices, knowledge and perception of injury risk factors in the Mackay Region in 2000 (Carter and Müller, 2002b). A standardised telephone survey was developed and administered to a random sample of 1,510 telephone numbers in the Mackay Region during July and August 2000. Contact was

established with 1,005 of the potential survey sample of whom 970 potential respondents were eligible for inclusion in the study and 461 agreed to participate.

The survey was conducted six months after the launch of MWSC. At this stage only 11.5% of respondents were aware of any accident prevention or safety promotion programs in the Mackay Region and just 6.7% had heard of the MWSC.

Ninety-seven percent of respondents agreed that injuries were preventable and 87.7% believed injuries commonly resulted in people attending hospital. However, the externalisation of this perceived risk was striking. While half believed injury was the most common cause of hospital attendance only 22% believed that an injury would result in their own presentation to hospital in the next 12 months, and ninety percent believed they did not behave in a way that placed them at risk of injury.

Just over half (54.7%) of respondents indicated compliance with three or more household safety practices (Table 2.2). Use of electrical safety switches (82%) and smoke detectors (73%) were the most common household safety practices utilised. Only 18% of households used handrails in the bathroom or toilets. However, there was a significant association between the age of respondents and use of handrails (chi-square, p< 0.001). Thirty-five percent of respondents greater than 55 years of age had handrails fitted. Older respondents were more likely to report using three or more household safety practices (Chi-square, p< 0.05).

Household Safety Practices	Total compliance	18-29 yoa compliance	30-54 yoa compliance	≥ 55 yoa compliance	Chi-square result
Smoke Detectors / Alarms	72.7%	61.4%	77.5%	70.0%	p=0.333
Fire extinguishers / Blankets	43.0%	34.9%	43.4%	47.5%	p=0.084
Handrails in bathroom or toilets	18.2%	18.1%	10.5%	35.0%	p<0.001
Safety switches / circuit breakers	82.0%	75.9%	85.7%	78.3%	p=0.903
Hot water system tempering valve	44.3%	45.8%	41.9%	49.2%	p=0.518
Three or more of the above	54.7%	47.0%	53.9%	61.7%	p=0.036

Table 2.2 Utilisation of household safety practices in the Mackay Region (Carter and Müller, 2002b)

Location	Perceived location of injury greatest injury risk (Carter and Müller 2002b)	Observed location of injury presentations to MBH ED (Carter and Müller 2002a)
Street	29.5%	12.5%
0Home	27.3%	41.1%
Work	21.7%	17.3%
Sport or recreation facility	15.4%	16.5%

Table 2.3 Perceived location of injury compared with observed (Carter and Müller, 2002a; Carter and Müller, 2002b)

Thirty percent of respondents believed that the street or a motor vehicle were the most likely place they would be injured (Table 2.3). Thirty-eight percent believed that regular speeding was likely to result in injury to others. However only 15% believed that it was likely to result in their own injury.

Males correctly perceived that they were most likely to sustain an injury at work.

There was poor awareness that many preventable injuries occur at home. While 41% of injuries presenting to MBH's ED occurred at home (Carter and Müller, 2002a), only 12% of respondents identified the home as an important preventable source of injury. In particular, respondents older than 55 years incorrectly believed that they were most likely to be injured in the street, whereas they were four times more likely to be injured at home. Similarly, females of all ages perceived their motor vehicle to be their greatest source of risk. However, they were four times more likely to present after an injury sustained at home (Carter and Müller, 2002a).

2.8. BASELINE INJURY EPIDEMIOLOGY STUDY

The SPHTMRS also conducted a baseline epidemiological study using injury surveillance data collected in the MBH ED (Hanson et al., 2002b) to identify patterns and causes of non-fatal injury in the Mackay Whitsunday Region (Carter and Müller, 2002a).

From 1998 to 2000 there were a total of 73,509 ED presentations to MBH. Of these 26,104 (24%) were due to injury, resulting in a direct standardised ED injury presentation rate of 8,218 per 100,000 per year.



Figure 2.11 Age standardised ED presentation rates Mackay Base Hospital - 1998 to 2000 (Carter and Müller, 2002a)

Males were twice as likely to present to MBH ED with an injury (male to female ratio 2.1:1). Young males were especially at risk. Males aged 15 to 29 years had an ED injury presentation rate of 20,317 per 100,000 per year, nearly three times higher than females whose ED presentation rate was 7,608 per 100,000 per year (see Figure 2.11).

Eleven percent of ED injury presentations resulted in admission, with a direct standardised injury admission rate of 964 per 100,000 persons per year.





Category	Variable	Percentage
Gender	Male	67.8%
	Female	32.2%
Triage Category	Resuscitation (to be seen within 1 minute)	0.2%
	Emergency (to be seen within 10 minutes)	2.5%
	Urgent (to be seen within 30 minutes)	22.2%
	Semi-urgent (to be seen within 60 minutes)	71.4%
	Non-urgent (to be seen within 120 minutes)	3.7%
Separation status	Admitted	11.1%
	Transfered to another hospital	0.4%
	Discharged home	86.4%
	Did not wait	2.1%
Intent	Unintentional	92.4%
	Alleged assault / maltreatment	5.3%
	Self-harm	1.4%
	Other /unspecified	0.9%
Diagnosis	Wound/bruise	38.9%
5	Sprain/strain	22.0%
	Fracture/dislocation	16.4%
	Chemical/thermal effect	4.6%
	Other	18.1%
Activity	Personal / other work	26.0%
	Leisure	21.5%
	Work for income	17.3%
	Sport	11.0%
	Other / unspecified	24.3%
Place	Home	41 1%
1 1000	Trade / industrial / mine / farm	18.0%
	Sport / recreation	16.5%
	Street	12.5%
	Other / unspecified	12.0%
External Causes	Contact with object (not a person)	33.6%
	Fall	24.9%
	Contact with person	11.4%
	Transport	10.6%
	Other / Unspecified	19.5%
Mechanism	Contact with object (not a person)	27.4%
Weenamon	Fall	27.1%
	Cut / crush / pierce	19.0%
	Contact with person	11.0%
	Chemical / thermal	5.2%
	Other / unspecified	10.5%
Main Injury Factor	Natural object	24.8%
	Furnishings / appliances / personal items	10 3%
	Transport	12.6%
	Materials	12.070
	Tools	Q 1%
	Food / chemical	5.1%
	Sports equipment	5.1%
	Other / unspecified	11 6%
		11.0/0

Table 2.4 All ED injury presentations to Mackay Base Hospital 1998 to 2000 (Carter and Müller, 2002a)

Admission rates for children aged 0 to 4 years were 1,167 per 100,000 per year for males and 1,145 per 100,000 per year for females (see Figure 2.12). Falls (males 32% and females 30%) and poisonings (males 29% and females 35%) accounted for approximately two-thirds of admissions in this age group.

The admission rate for females in the 15 to 19 years age category was 1,000 per 100,000 per year, nearly double that for females in the 10 to 14 (653 per 100,000 per year) and 20 to 24 year age categories (574 per 100,000 per year). Approximately one third of these admissions resulted from self-harm (29.9%) or were caused by poisoning with drugs (33.7%).

There was a substantial increase in admission rates for females in the "over 70 years" category (1,475 per 100,000 per year). Over half (56.8%) of these admissions were due to falls of less than one meter.

The following patterns of injury were identified:

- Forty-one percent of all injuries occurred in the home. This was most evident in children less than 5 years of age (males 7,581 per 100,000 per year, females 6,908 per 100,000 per year) and in people 55 years or older (males 2,072 per 100,000 per year, females 1,789 per 100,000 per year).
- Injury while working for income was the most likely injury activity for males in the 15 to 29 years (5,283 per 100,000 per year) and the 30 to 54 years age categories (3,205 per 100,000 per year).
- Sporting injuries were most frequent in 15 to 29 year old males (3,751 per 100,000 per year).
- Falls were the most frequently identified cause of injury for females of all age categories.

The study identified five strategic issues for the MWSC to consider when planning its prevention programs:

- Injuries in 15 to 29 year old males;
- Injuries in over 55 year old females;
- Fall injuries in the home in 0 to 4 and over 55 year olds;
- Workplace injuries in 15 to 54 year old males;
- Sport and recreational injuries in 5 to 29 year old males.

2.9. IMPLIMENTATION OF THE MACKAY WHITSUNDAY SAFE COMMUNITIES PROJECT

The baseline survey of community perception and injury epidemiology facilitated a strong population health foundation for project planning.

Table 2.5 provides a timeline of key events in the development of MWSC. The initial objective of the NSG was to consolidate currently existing relationship and safety promotion activities in the region. In keeping with WHO Safe Communities Criteria One (see section 2.6 earlier this chapter), it was hoped the formation of a cross-sectoral coordination group would enhance development and effectiveness of the network.

The NSG in collaboration with the TPHU developed initial marketing material and a vision that the project would create a collaborative safety promotion network that would promote an ethic of safety within the Mackay Whitsunday Region.

Three broad objectives were agreed:

- 1. Establish a coordinated, community based, long term safety promotion network in the Mackay Whitsunday Region.
- 2. Develop existing community networks while directly addressing injury prevention issues.
- 3. Reduce injury by 30% over five years.

After the concept of establishing a collaborative safety promotion network was formally endorsed by MCC and WSC, the coalition was launched in February, 2000 aspiring to achieve WHO designation within five years. It was hoped that submitting the coalition to a process of external accreditation based on the 12 WHO criteria would provide a meaningful interim goal that would help to engage local partners, facilitate best practice in safety promotion and enhance the credibility of the network, thereby creating further opportunities to engage government, local organisations and business in the network.

1997	•	Collection of Injury Surveillance Data began in EDs within the Mackay and Moranbah Health Service Districts including, Mackay Base, Proserpine, Sarina, Clermont, Dysart and Moranbah Hospitals.
1998	•	Mackay Division of General Practice needs analysis tabled highlighting injury as a significant health issue in Mackay.
1999	• • • •	Local manager TPHU of Queensland Health attends 1 st Pacific Rim Safe Communities Conference in NZ. Professor Leif Svanstrom from the WHO Collaborating Centre on Community Safety Promotion, Karolinska Institute, Sweden visits suggesting Mackay "can become a Safe Community" to key local stakeholders. Members of SHOROC, a coalition of councils, health and stakeholders in North Sydney who achieved WHO designation in 1998, share their experience of instigating and working within a Safe Communities framework. MCC endorses the Safe Communities framework. NSG forms involving MCC, WSC, QT, QPSs and Queensland Health. Mackay Injury Research Collaboration Group established. WSC endorses the Safe Communities framework.
2000	•	Launch of Mackay / Whitsunday Safe Communities. Working groups established including; Senior Safety Working Group (Mackay), Child Safety Working Group (Whitsunday) and the Road Safety Working Group. "Linked partnerships" established with the Community Crime Prevention Partnerships Mackay (CCPAT), Building Safer communities Action Team Whitsunday (BSCAT) and the Schoolies Week Organising Committee Whitsunday. Collection of Surveillance Data begins at the Mackay Mater After Hours Service. JCU conducts a community consultation on practices, knowledge and perception of injury in the region.
2001	•	Alcohol and Injury Working Group established. JCU conducts an analysis of local ED injury surveillance data.
2002	• • •	Department of Emergency Services engaged as a new stakeholder and represented on the NSG. Child Injury Prevention (ChIPP) Working group established in Mackay. Andergrove Neighbourhood Watch Community Injury Prevention Project established in association with the Department of Emergency Services. Designation Application prepared and submitted to WHO. WHO Conduct site visit with a view to possible designation by the WHO.
2003	•	Occupational Health and Safety Working Group established
2004	•	Barlink (Coalition of Licensees) in Mackay established as a joint project between the Alcohol and Injury Working Group and the Community Crime Prevention Partnership. Updated Designation Application prepared and endorsed by the WHO. MCC and WSCs are designated WHO Safe Communities on the 31 st August during the Local Government Association of Queensland Conference, by Associate Professor Carolyn Coggan from the Injury Prevention Research Centre, University of Auckland, NZ representing the WHO Collaborating Centre for Communities hosts the 2 nd Pacific Rim Safe Communities Conference and the 7 th Australian Injury Prevention Conference from the 15 th to 17 th of September.

Table 2.5 Timeline, Mackay Whitsunday Safe Communities



Figure 2.13 NSG, MWSC Launch February 2000

The existing domains of injury prevention and safety promotion were consolidated to form four initial action groups:

- Road Safety, facilitated by a full-time transport safety officer employed by QT (Appendix Four).
- Seniors Safety, facilitated by the manager of community development, MCC.
- Child Safety (Whitsunday) facilitated by TPHU of QH.
- Injury Research facilitated by an Emergency Physician from MBH (Appendix Four).

Organisations represented on initial working groups included: JCU, QISU, Liquor Licensing Division of Queensland, Department of Main Roads, Whitsunday Neighbourhood Centre, Education Queensland, Mackay Division of General Practice and a number of community representatives.

Queensland Health representation included the TPHU, MBH ED and a number of Community Heath Services, including the Aged Care and Disability Unit, Child Youth and Family Health Service and Alcohol Tobacco and Other Drugs Service (ATODS).

Subsequently, action groups were formed on the basis of perceived need, results of local epidemiological studies and most importantly the availability of a sponsoring organisation able to coordinate and facilitate the action group.

In 2001, the Alcohol and Injury Working Group was established facilitated by a health promotion officer employed by the ATODS (Appendix Four).

In 2002, the Department of Emergency Services (DES) was engaged as a new strategic partner which enabled the formation of two new action groups:

- The Child Injury Prevention Project Mackay (ChIPP) was jointly sponsored by the DES and QH. A full time health promotion officer was funded and appointed to facilitate this group in Mackay (Appendix Four).
- 2. The Andergrove Neighbourhood Watch Injury Project was jointly supported by the DES in collaboration with QPS. This pilot project sought to broaden the focus of three Queensland Neighbour Watch Community Groups beyond crime prevention to incorporate community safety initiatives of DES. Under the auspices of this state project the Andergrove Neighbourhood Watch conducted a number of community safety awareness programs in 2002.

In addition, the coalition developed strategic links with other groups and projects working in the domain of Community Safety in the Mackay Whitsunday Region. While these groups remained autonomous, MWSC worked collaboratively with these "linked projects" to develop and maintain joint initiatives.

Linked projects included:

 Building Safe Communities Action Team (BSCAT) working in the domain of community crime prevention and facilitated by a full time crime prevention officer employed by the Department of Communities. Mackay & Whitsunday have separate BSCAT committees. In Mackay this group is known as the Community Crime Prevention Action Team (CCPAT) to avoid confusion with MWSC.

- Whitsunday Schoolies Week Committee. In November over 1,500 senior school students come to the Whitsundays to celebrate the end of their schooling. The Whitsunday Schoolies Committee aims to provide a safe and fun environment for these students.
- Healthy Island Resorts. QH facilitated the development of a webbased resource to promote a healthy and safe environment at island resorts in the Mackay Whitsunday Region.

The Road Safety Working Group evolved into an inter-sectoral reference group that provided strategic direction to a number of smaller action groups including (Appendix Four):

- Bicycle Education Working Group. Facilitates Bike Education initiatives in the region, in particular the Bike Ed program hosted at the Police Citizens Youth Club.
- Road Accident Action Group (RAAG) which was formed in 2002 to develop initiatives and countermeasures to reduce the number of road accidents caused by driver fatigue
- Young Drivers Group, an informal network between QT, QPS and community youth representatives in 2003 to raise awareness and promote safe driving practices in young adults.

In 2002 MWSC drafted and submitted its Designation Application to the WHO Collaborative Centre for Community Safety Promotion at Karolinska Institute in Sweden addressing the 12 WHO Criteria (Appendix Ten). A site visit was conducted in November 2002 by Moa Sundstrom representing the WHO, who concluded that the MWSC was progressing well towards WHO designation subject to fulfilling Criteria Eleven and Twelve (Contribution to the National and International Safe Communities Movement) with the staging of the 2nd Pacific Rim Safe Communities Conference and 7th Australian Injury Prevention Conference in Mackay in 2004.

The Occupational Health and Safety Working Group was established in late 2003 in collaboration with the Department of Workplace Health and Safety (Appendix Four).

The Alcohol and Injury Working Group in collaboration with the CCPAT formed Barlink, a network of licensees in Mackay formed to promote safe drinking practices and a safe entertainment precinct in the Mackay City Heart.

In late 2002 the WHO simplified its 12 designation criteria to six "indicators" for International Safe Communities. Safe Communities should have:

- An infrastructure based on partnerships and collaborations, governed by a cross-sectional group that is responsible for safety promotion in their community.
- 2. Long-term, sustainable programs covering both genders and all ages, environments and situations.
- 3. Programs that target high-risk groups and environments and programs that promote safety for vulnerable groups.
- 4. Programs that document the frequency and causes of injury.
- 5. Evaluation measures to assess their programs, processes, and the effects of change.
- 6. Ongoing participation in national and international Safe Communities Networks.

A Designation Update (Appendix Fourteen) was prepared and submitted to the WHO Collaborating Centre for Community Safety Promotion in May 2004 addressing the six new indicators with the detailed plans for staging the 2nd Pacific Rim Safe Communities Conference.

MCC (Appendix Nineteen) and WSC (Appendix Nineteen) were designated WHO Safe Communities on the 31st of August 2004 at the Local Government Association of Queensland Conference held in Mackay by Associate Professor Carolyn Coggan, Director of the Injury Prevention Research Centre, The University of Auckland, representing the WHO Collaborating Centre for Community Safety Promotion.

In collaboration with the Australian Injury Prevention Network (AIPN), QH and DES, MCC and WSC, MWSC staged the 2nd Pacific Rim Safe Communities Conference and the 7th Australian Injury Prevention Conference in Mackay from the 15th to 17th September, 2004.



Figure 2.14 NSG members display the WHO Safe Communities Flag

2.10. CONCLUSION

The Mackay Whitsunday Safe Communities Project was launched in February 2000 in response to comparatively high non-intentional injury rates observed in the region. It sought to reduce injury in the Mackay Whitsunday region by being a catalyst for developing a sustained, systematic, inter-sectoral, community-based safety promotion network using existing community resources and expertise.

A community-based response in association with the World Health Organisation International Safe Communities Network was considered to be the most strategic approach. Submitting to an external audit based on the World Health Organisation Designation Indicators was considered worthwhile for engaging local partners, facilitating best practice in safety promotion and enhancing the credibility of the network, thereby creating further collaborative opportunities with government, local organisations and business in the network.

The baseline survey of community perception and injury epidemiology studies conducted by the School of Public Health, Tropical Medicine and Rehabilitation Sciences of James Cook University facilitated a strong evidence base on which to develop its interventions.

After a process of external review Mackay Whitsunday Safe Communities became the 81st Internationally Designated World Health Organisation Safe Community on the 31st August 2004.
CHAPTER THREE

COLLECTION OF NDS-IS LEVEL-2 INJURY SURVEILLANCE DATA FOR DEVELOPING A COMMUNITY SAFTY PROMOTION PROGRAM IN REGIONAL QUEENSLAND

The body of this chapter was published in "Reducing Injuries in Mackay, North Queensland" edited by Reinhold Müller (2002), Warwick Educational Publishing, Warwick, Queensland, Australia (Hanson et al., 2002a). This monograph sought to describe the rationale and epidemiological basis of Mackay Whitsunday Safe Communities.

Three types of Injury surveillance data are collected in the Mackay and Moranbah Health Services Districts:

- Hospital Separation ICD & E Codes, all regional hospitals.
- Emergency Department NDS-IS Level 2 Injury Surveillance Data, all regional public hospitals September 1997, Mackay Mater Private Hospital since September 2000.
- Queensland Trauma Registry, Mackay Base Hospital since 2001.

This chapter was co-authored with Robert Pitt, Director of the Queensland Injury Surveillance Unit (QISU), Richard Hockey, Data Analyst QISU, Elizabeth Miles, Manager QISU and Reinhold Müller my doctoral supervisor. It described the Emergency Department (ED) Injury Surveillance System established in the Mackay and Moranbah Health Service Districts in 1997. The original manuscript was drafted by myself and submitted to my co-authors for comment. The revised manuscript was published in the monograph.

QISU publishes monthly injury bulletins using data collected by its state ED injury surveillance system. QISU also provides dedicated reports on request to interested parties, including Mackay Whitsunday Safe Communities. The immediacy, accessibility and high degree of local relevance of ED injury surveillance data collected in the Mackay and Moranbah Health Service District has meant that Mackay Whitsunday Safe Communities Action Groups frequently access surveillance data from QISU. This data has proved to be an important advocacy tool to empower the coalition to engage local community leaders and the media.

The Queensland Government Human Services Chief Executive Officers' Committee established the Child Injury Prevention Project (ChIPP) in 2002 and project officers were appointed in Mackay and Mt Isa in 2003 because Mackay ED Injury Surveillance Network data had been used to extensively profile childhood injury patterns in the Mackay and Moranbah Health Service Districts. It enabled the project to identify priorities, develop solutions and evaluate outcomes.

In 2003, I conducted an epidemiological analysis of all ED injury presentations in children under 15 years of age over a five year period from 1998 to 2002 in the Mackay and Moranbah Health Service Districts using the Mackay ED Injury Surveillance Data Set . This analysis was published by QISU in June 2003 in collaboration with Kelly Hart, the newly appointed ChIPP project officer and Kathryn McFarlane, Senior Health Promotion Office with the Tropical Population Health Unit in Mackay to ensure that the local facilitators of the project had an intimate knowledge of the underlying epidemiology and, just as importantly, to ensure that the report was drafted in a way that made it accessible and understandable to non health professionals engaged in the ChIPP action group, the local media, and the general Mackay Community (Hanson et al., 2003). See Appendix 20.

PUBLICATIONS:

Hanson, D, Pitt, RW, Hockey, R, Miles, E & Müller, R 2002, 'Collection of NDS-IS level 2 injury surveillance data in regional Queensland', in: R Müller (ed.), *Reducing injuries in Mackay, North Queensland,* Warwick Educational Publishing, Warwick, Queensland, pp. 17-34 (included in this chapter).

Hanson, D, Hart, K, McFarlane, K, Carter, A, Hockey, R, & Miles, E 2003, 'Addressing childhood injury in Mackay: a safe communities initiative', *Injury Bulletin,* no. 77, pp. 1–6, see Appendix 20.

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

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Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

Abstract

Injury is an important public health issue in the Mackay Region. Hospital separations due to injury occur at double the rate observed for the rest of Queensland.

The Mackay Injury Surveillance Network was established in 1997 as part of the Queensland Injury Surveillance Unit's network. This population based network collects data from all public Emergency Departments in the region.

The Emergency Department of the Mackay Base Hospital collects data using the EDIS computer database. All other Emergency Departments use a paper based system.

The Mackay Injury Surveillance Network reported 35,211 Emergency Department presentations due to injury from January 1, 1998 to December 31, 2000. This represents an age standardised rate of 12,584 per 100,000 for males, 2.0 times the rate observed in South Brisbane; and a rate of 6,319 per 100,000 for females, 1.7 times the rate observed in South Brisbane.

High ascertainment rates have been achieved. The Mackay Base Hospital Emergency Department has achieved a case ascertainment rate of 93.5%, with 85% of records complete. Injury Surveillance reports have been stable throughout this study. This combined with the high ascertainment rate highlights the significant advantages of computerised Emergency Department injury surveillance systems.

Annual injury reports from peripheral hospitals have increased over the period as ascertainment rates improve. An overall ascertainment rate of 75% has been achieved in regional hospitals in 2000. Ascertainment rates varied considerably between peripheral hospitals ranging from 48% to 95% in 2000.

The collection of injury surveillance data finds strategic focus in the context of the prevention programs they are designed to inform. The Mackay/Whitsunday Safe Communities Project is a community based safety promotion project which aims to reduce injury in the Mackay Region by 30% over five years. Timely and detailed local injury surveillance data identifying the determinants and distribution of injury in the community are an important tool to enable the project to target strategic areas for intervention and monitor effects of interventions.

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

Introduction

Injury is one of five national health priority areas identified by Ministers for Health¹ with an estimated direct cost to the health care system of \$2.6 billion per year^{1,2}. Queensland's death rate for injuries is higher than the national average^{3,4}.

The Mackay Region has a population of 125,000 and supports a diverse range of industries including sugar cane, grazing, coal mining, fishing and tourism.

In 1998 the Mackay Division of General Practice conducted a community needs analysis which identified that age standardised hospital separation rates for injury and poisoning in 1995/96 were high in the Mackay Region (Figure 1)⁵. A direct age standardised rate for injury and poisoning of 5,458 per 100,000 was observed, accounting for 15.4% of all hospital separations in the district⁶. This compares with an average Queensland morbidity rate of 2,832 per 100,000, accounting for 8.5% of all hospital separations⁶. The population of the Mackay Region produced 6.6% of all injury and poisoning separations registered in Queensland⁶ while representing 3.1% of the total Queensland population in the 1996 Australian Census⁷.

Figure 1. Age Standardised Hospital Separation Rates for Major Diagnostic Groups

00,00 00,000 Mackay Queensland per 5000 Senarations 4000 3000 η Age Standardised Hospit 0000 0000 Circulatory Neoplasms Respiratory Injury and Poisonings Disease Diesease



Subsequent review of Age Standardised Injury Separation Rates by the Tropical Public Health Unit (TPHU) of Queensland Health confirmed that injury separations in Mackay were more than double those observed for the rest of Queensland (Figure 2)⁸.

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland



Figure 2. Age Standardised Morbidity (Hospital Separation) Rates per 100,000 with 95% Confidence Intervals for Queensland and Mackay ⁸

Figure 3 shows age standardized hospital separation rates from injury and poisoning in 1997/98 by Queensland region. The Mackay injury rate of 4,535 per 100,000, compares with rates of 2,808 per 100,000 in Rockhampton; 2,755 per 100,000 in Gladstone; 2,705 per 100,000 in Cairns; and 2,035 per 100,000 in Townsville⁶.





Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

National Injury Surveillance Systems

Meeting national injury control targets^{9,10,11} requires the collection, analysis and timely distribution of local surveillance data regarding the determinants and distribution of injury. Hospital Emergency Departments (EDs) are an excellent source of injury surveillance (IS) data and effective collection systems have been progressively developed in Australia commencing in 1988 with the Injury Surveillance Information System (ISIS)¹².

Computerisation of Australian ED patient management systems in the early 1990's offered a unique opportunity to establish injury data as part of the routine medical record^{12,13,14,15,16}. In order to integrate IS into ED computer systems, the original ISIS coding system was revised to produce the current National Data Standards for Injury Surveillance (NDS-IS) in 1995¹⁷. Two levels of detail are possible. Level 2 coding is preferred over Level 1 because it allows more detailed coding. For example, Level 1 coding of a sporting injury just records that the injury occurred playing sport, whereas Level 2 coding also records the type of sport.

The Queensland Injury Surveillance Unit (QISU) collects Level 2 injury surveillance data from a sample of Queensland Hospitals. In a number of major urban and regional ED's QISU has successfully trailed the computerised collection of Injury Surveillance data using EDIS (Emergency Department Information System). EDIS is a computerised ED patient tracking and management system, marketed by Hospital Administrative Systems (HAS) and initially developed in Queensland¹⁸.

The number of participating hospitals has grown from the original collection based on the former Brisbane South Health Region to include hospitals in rural and remote Queensland¹⁸.

The Mackay Injury Surveillance Network (MISN)

ED staff in the Mackay Region, concerned at the apparent high rates of injury, commenced collection of NDS-IS Level 2 data in September 1997, providing a regional sample for the QISU surveillance network. Emergency Departments from all 6 public hospitals in the Mackay Region ie. in the Mackay and Moranbah Health Service Districts (Clermont, Dysart, Mackay Base, Moranbah, Proserpine and Sarina Hospitals) collect IS data on behalf of QISU. The Mackay Mater Private Hospital's After-hours Medical Clinic was added in September 2000.

In 1999 the TPHU sought to establish a community-based safety promotion network in the Region. The Mackay/Whitsunday Safe Communities Project (MWSCP) was launched in February 2000.

In 1999, an academic research arm was added when the James Cook University Injury Research Group (JCUIRG) founded, together with the Mackay Health Service District and QISU, the Mackay/Whitsunday Injury Research Collaboration.

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

The Injury Research Collaboration aims to collect and analyse high quality Level 2 NDS-IS data from all public hospitals in the Mackay Region and to:

- · Study the impact of injury on a regional Queensland community;
- Identify risk factors that predispose to injury;
- Elucidate the chain of events culminating in an injury;
- · Identify strategic areas for injury prevention programs for the community; and
- Evaluate the impact of injury prevention strategies in the community.

Data Collection

All patients who present with an injury to an ED in the Mackay Region are asked to complete a questionnaire to describe how their injuries occurred. At the Mackay Base Hospital Emergency Department (MBHED) the IS data is coded directly into EDIS. Every month the EDIS database is queried for all ED presentations with an ICD-9 diagnosis¹⁹ for injury and poisoning, to ensure that an IS report has been registered for any new presentation caused by injury. This audit process ensures a high ascertainment rate for IS data reported through MBHED. Data, without any personal identifying information, is electronically forwarded to QISU at the end of the month.

Data is collected manually at all other hospitals in the Mackay Region and forwarded to QISU for coding. This manual system uses standardised IS forms provided by QISU which are self-carbonated, allowing a copy to remain as part of the medical record. The forms contain:

- Self reported demographic and injury event data, and
- Diagnosis and separation status completed by medical or nursing staff.

Completed forms are sent to QISU weekly or fortnightly, checked for completeness and then coded and entered into the QISU database. Incomplete forms are returned to the sites for completion.



Reducing Injuries in Mackay, North Queensland Figure 4. Collection and Processing of Injury Surveillance Data in the Mackay Region.

Figure 4 gives an overview of the regional data collection system. Appendix 1 details data fields contained in the IS data-base and the source of this information. Only the first presentation relating to any injury event is registered. All data is audited to ensure consistent quality before being added to the data-base. Paper forms are stored in a locked filing cabinet until data is entered and are then destroyed. No identifying information is entered into the QISU database. A back-up of the entire database is made daily and stored separately while copies of each month's data from each hospital are also maintained. The QISU database is part of a secure network accessible only by QISU staff. QISU conducts regular data audits of all EDIS collection sites to ensure quality and completeness of IS data.

Data Quality

The MISN reported 35,221 presentations due to injury between January 1, 1998 and December 31, 2000. 32,989 (94%) reports concerned residents of the District. After an initial rapid increase in the number of injury reports between 1998 and 1999, reflecting the increase in reports from peripheral hospitals, reports have now stabilized at approximately 12,200 reports per annum (Figure 5).

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland



Table 1. Annual Injury Surveillance Reports from ED's in the Mackay Region

	1998	1999	2000	Total
Mackay	8,904	8,626	8,574	26,104 (75%)
Moranbah	768	1,168	1,010	2,946 (8%)
Sarina	41	723	1,166	1,930 (5%)
Clermont	677	675	508	1,860 (5%)
Proserpine	241	487	572	1,300 (4%)
Dysart	119	456	429	1,004 (3%)
Total	10,750	12,135	12,259	35,221

MBHED, which generates 75% of regional reports, has been a reliable source of IS data since inception, generating approximately 8,600 reports per annum, with a stable ascertainment rate of approximately 85% (Figure 6). Initial presentations for injury represent 25% of MBHED's caseload. Over the study period MBHED has shown a 2% per annum decline in injury presentations.

Figure 6. Injury Ascertainment Rates: Mackay, Logan & Mt Isa, 1998-2000¹⁸



Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

Figure 7 shows Emergency Department injury registrations and percentage ascertainment rates for peripheral hospitals in the Mackay Region from 1998 until 2000. Progressive increase in injury reports over this time period reflect improving ascertainment rates from these hospitals.





In 1999 QISU performed a validation study of the entire data collection process²⁰ which showed a case ascertainment rate of 93.5% at MBHED, and an overall ascertainment rate of 85% when missing data is taken into account (see also Figure 6).

Emergency Department injury presentations

The Age Standardised Morbidity Rates (ED injury presentations) were 12,584 per 100,000 for males and 6,319 per 100,000 for females. This compares with rates of 6,446 per 100,000 (males) and 3,727 per 100,000 (females) in South Brisbane (Figure 8).

Figure 8. Age Standardised ED Injury Presentation Rates: Mackay Region and South



Brisbane 1998 to 2000

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

Figure 9 shows ED injury presentations per 100,000 by age and gender. Males are especially at risk of injury. 22,546 (68%) injury presentations were reported in males compared with 10,443 (32%) in females. Males aged 10 to 29 years accounted for 34% of injury presentations.

Nine thousand four hundred and eight injury presentations were reported in children under 15 years, accounting for 29% of all injury presentations. Fifty five percent of these injuries occurred in the home. In children under 5 years, 83% of injuries occur in the home.

There were 1,480 injury reports for patients older than 60 years (5% of injury presentations), 45% of injuries resulting from falls, with 62% of falls occurring at home.



Figure 9. Age Standardised ED Injury Presentation Rates by Age and Gender Mackay Region: 1998 to 2000

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

Discussion

The strength of the MISN is that it is a population based network. All ED's in the Mackay Region contribute to the database. It is therefore possible to calculate population-based ED injury presentation rates for the Mackay Region. In the three year period 1998 to 2000,the network reported 35,221 ED presentations due to injury, an age standardised rate of 12,584 per 100,000 for males and 6,319 per 100,000 for females. This is 2.0 times the rate reported to QISU in South Brisbane for males, and 1.7 times the rate for females. The Mackay Region generated 21% of all injury reports to the QISU over this period.

The high ascertainment rate (85%) in MBHED database from inception corroborates the advantages of electronic collection of IS data. Advantages include immediacy of data collection and the ability to audit the database for injury ICD-9 codes to ensure an IS report has been registered. Electronic data collection elsewhere has delivered ascertainment rates from 75% to 100%^{14,18,19,20}. By comparison, ascertainment rates from the Mackay Region's peripheral hospitals, which use a paper-based system, varied from 48% to 95%. This is comparable to a validation study of a paper-based system in Canada which documented the ascertainment rates ranged from 30 to 91% depending on the hospital^{21,22}.

Other authors have highlighted the limitations of ED IS databases^{23,24}. ED utilisation depends on a number of factors including: availability and cost of alternate medical services, gender, ethnic status, socio-economic factors, health insurance status and geographic location^{23,24}. Comparison of ED presentations between rural, regional and urban areas may be biased by different patterns of ED utilisation. Even within a region there is the potential for changing patterns of ED utilisation to affect injury registrations over time. Australia has a compulsory and universal national medical insurance scheme and Queensland has a free public hospital system so Emergency Department utilisation is relatively stable.

It has been suggested that ED surveillance systems are biased by "minor" injuries^{23,24}. Most injuries reported to EDs heal rapidly, have limited long term sequelae and few require admission. In the context of limited resources some authors advocate IS systems that monitor more "significant" injuries (eg. injuries requiring admission, with an injury severity score²⁵ of greater than or equal to three)^{23,24}. However, so called minor injuries may occur as a result of the same, or similar, chain of events that result in a more severe injury. The bigger body of data available to analyse the cause of minor injuries may generate improved understanding of the causes of more severe injuries. More importantly, emergency department based systems, which collect data from all levels of severity, may be better positioned to identify factors that determine why in some circumstances an injury mechanism will result in "minor" injury, yet in others the same mechanism results in "severe" injury. Finally, the large numbers of "minor" injuries mean that the overall cost of managing these injuries is significant and comparable to that of more "severe" injuries, while not requiring admission have a significant social and financial impact on the community.

Different types of injury may be caused by a similar chain of events. For example, a fall from low height may result in a spectrum of injury ranging from soft tissue contusion, ankle sprains and "minor" fractures to more serious long bone fractures. Alternately, the same injury (eg fractured neck of femur) may be caused by a number of different mechanisms, such as: trip and fall, slip in the bath, gait disturbances, orthostatic hypotension or adverse effects of

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

Ch 3. Collection of NDS-IS Level2 Injury Surveillance Data in Regional Queensland

Reducing Injuries in Mackay, North Queensland

medication. While it may be useful to observe a change in the number and type of injury occurring within a community to identify strategic areas for intervention, it is not possible to make assumptions regarding the underlying cause of target injury, and therefore identify strategies to minimize the risk of this injury. As Vimpani²⁸ points out, the purpose of an IS database "is not simply to count injury-causing events, but to facilitate the control of the injury epidemic by providing the data needed to plan, implement and evaluate injury control programs"²⁹. Epidemiological data describing the type and incidence of injury is necessary but not sufficient to control the injury epidemic. IS systems must therefore monitor the chain of events that culminate in injury, as much as they monitor injury outcomes. The crucial question becomes, "Why was this person injured at this time, in this place, in this way, in these circumstances?"28. We propose that a critical characteristic of IS systems is that they have the capacity to identify environmental and sociological predisposing factors and elucidate the chain of events that culminate in an injury. Electronic ED-IS data-bases, because of their immediacy, their practicality, their use of first-hand patient description of the circumstances resulting in injury and their high ascertainment rates, are excellent sources of IS data that identify the underlying mechanisms resulting in injury.

State Mortality and Hospital Separation databases provide excellent population based epidemiological data. However, because data is retrieved retrospectively based on second hand information (a clinician's description of an injury event based on their interpretation of the patient's history), the insight gained into the underlying mechanisms of injury is poor. On occasion, clinical staff fail to record any description of the injury event, and it is not possible to reliably E-code¹⁹ the injury.

ED based IS does not measure long-term severe disability as a consequence of injury³¹, yet clearly these patients impose a significant financial and social burden on their family and society. The Queensland Trauma Registry (QTR)³² has been established to study the effectiveness of emergency medical treatment provided in Queensland Hospitals compared with national and international benchmarking standards, and the long term manifestations of disability due to injury. QTR is essentially a database designed to study the effectiveness of clinical care (tertiary prevention). The QTR may be better positioned to identify the long-term impact of injury.

IS databases find their strategic focus in the context of the intervention programs they are intended to inform. The Mackay/Whitsunday Safe Communities Project (MWSCP) was established in February 2000 in response to the observed excess of injury in the district. It aims to reduce injury in the region by 30% over 5 years. Safe Communities is a World Health Organisation (WHO) supported approach to injury prevention and safety promotion. There are currently 62 WHO Safe Communities, nine of these in Australia. The MWSCP aims to be the first WHO Safe Community accredited in Queensland.

The Safe Communities model seeks to understand injury and intervene at a community level. By involving the community in finding its own solutions, it aims to be a catalyst for environmental, structural, sociological and political change that empowers the community, and ultimately individuals within the community, to change their environment and their behaviours to reduce the risk of injury. Since its inception in Sweden the Safe Community approach has been shown to be an internationally effective means of reducing injury^{33,34}. The Latrobe Valley Better Health Injury Prevention Program demonstrated the utility of this model in Australia, producing a 28% reduction in injury over a five year period³⁵.

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

Setting priorities for a safety promotion program is dependant on identifying the behavioural, environmental and situational factors that produce injury. Local IS data is a critical tool to inform public debate, advocate on behalf of the program, strategically focus interventions, monitor effectiveness of programs and feedback progress to the community.

The sentinel observation that hospital separation rates for injury were high in the region was made in a Community Needs Analysis commissioned by the Mackay Division of General Practice (Figure 1)⁵. These observations triggered a decision to develop a locally based injury prevention program in Mackay. Hospital Separation data proved to be an excellent tool for advocacy and to engage potential network partners during the consensus building phase of MWSCP. However, this data provided poor insight into the underlying situational and environmental factors that produced injury. Therefore, it was not useful for identifying strategic areas for intervention.

The availability of locally-based, high quality EDIS data has proved to be a highly important tool for MWSCP. Local data has empowered the project to identify strategic issues for intervention and provided some insight into the underlying situational and environmental factors that predispose to injury. Strategic issues identified include; falls, especially in children and the elderly; bicycle injuries; injuries in young males and elderly females; home, sport and workplace injuries^{36,37}. Local IS data has proved to be an excellent vehicle for engaging the local media.

While the effectiveness of the Safe Community Model in reducing injury has been well established, it is less clear why it works. Identifying the key characteristics of effective intervention is a major focus for further research. The strong links between the Mackay Injury Research Collaboration, QISU, WHO Injury Research Collaboration's and the MWSCP provide an excellent opportunity to research the links between injury research and injury prevention programs and to monitor the impact of interventions.

As the major improvement in injury mortality and morbidity in the Mackay Region are likely to be achieved through primary and secondary prevention strategies,^{27,28,31,33,34,35} the importance of EDIS data capable of identifying the chain of events that produce injury cannot be understated.

The implementation of the QTR at Mackay Base Hospital in 2001 will further compliment the strengths of the regional injury database, providing a clearer picture of the severity and long-term disability caused by injury in the Mackay Region.

Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland

Conclusions

Injury is an important public health issue in the Mackay Region. The MISN and the MWSCP have been established to address this significant health problem. These projects rely on population based, high standard IS data with high ascertainment rates. The MISN affords an excellent opportunity to study the causes and impact of injury in a regional Queensland community.

The MISN reported 35,211 ED presentations due to injury from January 1, 1998 to December 31, 2000. This represents an age standardised rate of 12,584 per 100,000 for males, 2.0 times the rate observed in South Brisbane, and a rate of 6,319 per 100,000 for females, 1.7 times the rate observed in South Brisbane.

High ascertainment rates have been achieved. The Mackay Base Hospital ED has achieved a case ascertainment rate of 93.5%, with 85% of records complete. IS reports have been stable throughout this study. This, combined with the high ascertainment rate highlights the significant advantages of computerised ED injury surveillance systems.

Injury reports from peripheral hospitals increased during the study as ascertainment rates improved. An overall ascertainment rate of 75% was achieved in regional hospitals in 2000. Ascertainment rates varied between peripheral hospitals, ranging from 48% to 95% in 2000.

The collection of injury surveillance data finds strategic focus in the context of the prevention programs they are designed to inform. Timely and detailed local injury surveillance data identifying the determinants and distribution of injury in the community is an important tool to enable the MWSCP to target strategic areas for intervention and monitor effects of interventions.

The strong links between the Mackay Injury Research Collaboration and the MWSCP provide an excellent opportunity to explore the links between public health research and intervention projects, and to test the impact of the Safe Communities model of safety promotion on injury outcomes in a regional Queensland community.

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Description		EDIS Screen	Completed by	When
Injury Data				
1.	Narrative of Injury Event	Triage	Triage Nurse	At presentation
2.	External Cause	Injury	Registered Nurse	Transcribe form*
3.	Place of Injury	Injury	Registered Nurse	Transcribe form*
	a sub place	Injury	Registered Nurse	Transcribe form*
	b. part of place	Injury	Registered Nurse	Transcribe form*
	4. Activity when injured	Injury	Registered Nurse	Transcribe form*
	a. sub-type of activity	Injury	Registered Nurse	Transcribe form*
5.	Principle Discharge Dx	Clinical	Medical Officer	At ED discharge
6.	Major Injury Factors	Injury	Registered Nurse	Transcribe form*
7.	Mechanism of Injury	Injury	Registered Nurse	Transcribe form*
8.	Date of Injury	Injury	Registered Nurse	Transcribe form*
9.	Time of Injury	Injury	Registered Nurse	Transcribe form*
Gene	ral Data			
1.	Hospital Unit Record No	Clerical	Booking Clerk	At presentation
2.	EDIS patient identifier	Clerical	Booking Clerk	At presentation
3.	Gender	Clerical	Booking Clerk	At presentation
4.	Date of Birth	Clerical	Booking Clerk	At presentation
5.	Postcode	Clerical	Booking Clerk	At presentation
6.	Mode of Separation	Clinical	Medical Officer	At ED discharge
7.	Country of Birth	Clerical	Booking Clerk	At presentation
8.	Aboriginality	Clerical	Booking Clerk	At presentation
9.	Employment Status	Clerical	Booking Clerk	At presentation
10.	Occupation	Clerical	Booking Clerk	At presentation
11.	Preferred language	Clerical	Booking Clerk	At presentation
12.	Date of attendance	Clerical	Booking Clerk	At presentation
13.	Time of attendance	Clerical	Booking Clerk	At presentation
14.	Triage category	Triage	Triage Nurse	At presentation

Table 3.2 Data-fields injury surveillance data-baseMackay Base Hospital Emergency Department

* Patient or accompanying adult completeS Injury Surveillance Form at presentation – Registered Nurse Transcribes onto EDIS Injury Screen at a later date

Y	f ear						
Hospital	1994	1995	1996	1997	1998	1999	2000
URBAN							
Mater Children's	4000	3491	3222	3814	4338	4396	5254
Royal Children's	-	-	-	446	3488	4536	4714
Mater Adult	934	2024	3655	3121	4170	4500	3798
Mater Private	1098	2165	2630	2229	1249	410	-
Logan	1772	2093	3039	3608	10905	10931	6132
Redland	3167	6070	6145	6221	5695	6365	6685
Princess Alexandra	1044	1455	156	2916	7723	7775	9577
Queen Elizabeth II	2291	2941	4435	4176	2204	-	-
Total Urban	14,306	20,239	23282	26,531	39,772	38,913	36,160
REGIONAL							
Mackay	-	-	-	1166	8904	8626	8574
Clermont	-	-	-	14	677	675	508
Moranbah	-	-	-	-	768	1168	1010
Proserpine	-	-	-	-	241	487	572
Sarina	-	-	-	-	41	723	1166
Dysart	-	-	-	-	119	456	429
Mackay Mater (commenced Sept 2000)							77
Total Regional	-	-	-	1180	10,750	12,135	12,336
REMOTE							
Mt Isa	-	-	-	-	3607	6983	6869
Total	14,306	20,239	23,282	27,711	54,129	58,031	55,365

Table 3.3 Number of injury surveillance records received by hospital andyear, 1994-2000.

POSTSCRIPT: REVIEW OF MACKAY HEALTH SERVICE DISTRICT HOSPITAL SEPARATIONS, 1986 - 2004

Initially the epidemiological evidence concerning injury in the Mackay Region seemed straightforward. A five year review of injury hospitalisations from July 1993 until June 1998 indicated that the age standardised hospital separation rates were double the Queensland average and higher than rates observed in regional communities of comparable size (Figure 2). The perception that the incidence of injury was high in the Mackay Region was supported by the observation that ED injury presentation rates to Mackay Base Hospital were double those observed in South Brisbane (Figure 8).

Subsequent review of injury hospitalisations in the Mackay Health Service District from 1986 to 1999 by the Tropical Population Health Unit challenged this interpretation of the available epidemiological data (Queensland Health, 2001; TPHU, 2006a). A sudden doubling of Injury Hospital Separation was observed in the 1992/93 financial year (Queensland Health, 2001), corresponding to the employment of a professional coder at Mackay Base Hospital. Review of admission rates for Injury Diagnosis Related Group X60C (injuries in people aged < 65 years) in the 2003/2004 financial year suggested that injury admission rates for injury were high in the Mackay Health Service District while the average length of stay was low when compared with other regional centres, suggesting a selection bias towards relatively low acuity injury admissions in the Mackay Health Service District (TPHU, 2006b).

Health Service District	Episodes of care (DRG X60C: Inj. people < 65yoa)	Patient days	Average Length of Stay
Mackay	968	1006	1.0
Townsville	294	474	1.6
Cairns	283	349	1.2

Table 3.4 Episodes of care DRG X60C (injuries in people aged < 65 year)</th>2003/04 financial year: Mackay Health Service District compared withTownsville and Cairns Health Service Districts (TPHU, 2006b)

The apparent excess in admissions was, at least in part, attributed to better statistical capture of ED short stay admissions in the Mackay Health Service District. ED short stay admissions refer to episodes of ED care that require more intensive treatment or a period of extended observation, that are eligible for day surgery admission under federal funding agreements. Typically they include minor surgical procedures performed in the ED (for example, fracture and dislocation reductions or suturing of large deep wounds). The implementation of DRG case-mix funding provided a financial incentive for hospital administration systems to record all ED procedural admissions eligible for day surgery funding. This finding called into question the conclusion that the comparatively high rates of injury hospitalisations observed in the Mackay Health Service District indicated a higher incidence of injury in the region.

While hospital separation data is favoured by injury researchers for national injury surveillance systems (Stone et al., 1999; Langley and Cryer, 2000), local administrative issues may confound interpretation of this dataset in Mackay. While ED injury surveillance systems are generally believed to be more vulnerable to confounding by local administrative and service utilisation issues (Stone et al., 1999; Langley and Cryer, 2000), the Queensland ED injury surveillance (QISU) system appears to provide a more robust representation of the local injury problem. Unfortunately, because ED injury surveillance was not universal in Queensland (or indeed Australia) it was not possible to compare Mackay's ED injury presentation rates with other regional centres of similar size.

Epidemiologically, the ability to generate robust statistics allowing comparison of the incidence of injury between communities is critical as it facilitates the monitoring of national disease patterns and thereby the setting of public health priorities. However, this may make the issue unnecessarily complex from a community perspective for whom an "age standardised hospital separation rate" is an opaque concept. What is a hospital separation? What is a rate? What does age standardised mean? Absolute numbers of injury events are more understandable and meaningful to the lay public. The ability to compare Mackay with similar regional communities was of interest but only of secondary

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importance to members the Mackay Whitsunday Safe Community. From their perspective the key epidemiological question was more straight forward, "was there sufficient evidence to indicate injury was an important public health issue in Mackay?"

Every year there were approximately 8,700 ED injury presentations to Mackay Base Hospital. On average, every year 1 in 8 males and 1 in 16 females attended an ED seeking treatment following an injury event. Furthermore, Mackay ED injury presentation rates were higher than observed in South Brisbane. Despite the uncertain significance of the comparatively high incidence of injury hospital separations compared with other regional centres, these observations were consistent with the general finding that Australian regional centres had relatively high rates of injury compared with urban centres (ABS, 2004; Berry and Harrison, 2006) and that Queensland experienced an unacceptably high incidence of injury (Pike et al., 2000). Against a backdrop of the best available local, state and national evidence there was convincing evidence that Mackay, like other Queensland Regional Centres, had an important injury problem. While epidemiologists might prefer more accurate and consistent local surveillance data, such data was not necessary to justify the need to intervene. Given growing community resolve to address the problem in Mackay, it would have been unethical to stall this program in the hope of obtaining better baseline epidemiological data.

CHAPTER FOUR SAFE COMMUNITIES: AN ECOLOGICAL APPROACH TO SAFETY PROMOTION

This manuscript was published in "Reducing Injuries in Mackay, North Queensland" edited by Reinhold Müller (2002), Warwick Educational Publishing, Warwick, Queensland, Australia (Hanson et al., 2002b). This monograph sought to describe the rationale and epidemiological basis of Mackay Whitsunday Safe Communities.

This chapter was co-authored with Paul Vardon, who at that time was Senior Health Promotion Officer in Mackay with the Tropical Population Health Unit, Queensland Health, and Jacqui Lloyd, Director of Health Promotion Services, Tropical Population Health Unit, Queensland Health. As lead author I drafted the original manuscript which after comment by my co-authors and doctoral supervisors underwent substantial revision. The section of the history of injury prevention and safety promotion was drafted after an extensive literature review into the scientific basis of current health and safety promotion practice. The injury iceberg was conceived by myself as a visual metaphor to illustrate Green and Kreuters (1999) social ecological model of health promotion, though the concept was refined in collaboration with my co-authors.

I have since been invited to present "Safe Communities: An Ecological Approach to Safety Promotion" as keynote speaker at three conferences:

- Safe Communities in New South Wales: Building a Stronger Foundation, NSW Health, Sydney, 26th of March 2003.
- Taking it to the Streets: Queensland Health Promotion Conference, Australian Health Promotion Conference (Queensland Branch), Mackay, Queensland, 25th of August, 2003.
- Available in Widescreen: Seeing the Complete Picture on Young People's Health and Safety Choices, Youthsafe Forum, Sydney, 31st May, 2006.

As a result of this manuscript I was invited by David Sleet (associate director for science in the Division of Unintentional Injury Prevention at the National Center for Injury Prevention and Control at the Centers for Disease Control and Prevention [CDC]) to co-author a chapter entitled "Ecological Models for the Prevention and Control of Unintentional Injury" with John Allegrante (senior professor of health education at Teachers College, Columbia University and President of the National Centre for Health Education) and Ray Marks (associate professor of health education at Columbia University), in "Injury and Violence Prevention: Behavioural Science, Theories, Methods and Applications", edited by Andrea Gielen, David Sleet and Ralph DiClemente published by Jossey Bass in April 2006. A number of concepts (including the "injury iceberg") initially presented in "Safe Communities: An Ecological Approach to Safety Promotion" were incorporated into this book chapter. See Appendix 21.

PUBLICATIONS:

Hanson, D, Vardon, P & Lloyd, J 2002b, 'Safe communities: an ecological approach to safety promotion', in R. Müller (ed.), *Reducing injuries in Mackay, North Queensland,* Warwick Educational Publishing, Warwick, Queensland, pp. 17-34 (included in this chapter).

Hanson, D, Hanson, J, Vardon, P, McFarlane, K., Lloyd, J, Müller R. & Dürrheim, D 2005, 'The injury iceberg: an ecological approach to planning sustainable community safety interventions', *Health Promotion Journal of Australia*, vol. 16, no. 1, pp. 5-10, see Chapter 5.

Allegrante, J, Marks, R & Hanson D 2006, 'Ecological models for the prevention and control of unintentional injury', in A Gielen, DA Sleet & R DiClemente, (eds), *Handbook of Injury Prevention: Behavior Change Theories, Methods, and Applications*, Jossey-Bass, New York, see Appendix 21.

Safe Communities:

An Ecological Approach to Safety Promotion

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Safe Communities: An Ecological Approach to Safety Promotion

Abstract

Injury is like a multifaceted crystal. It may be viewed from a number of different perspectives, each unique, each important, each contributing a different truth, but none sufficient in isolation to generate a comprehensive understanding of the problem.

Injury Prevention has been dominated by a number of different, and at times opposing, paradigms: the Medical Paradigm, the Health Education Paradigm, the Public Health Paradigm, the Bioengineering Paradigm, the System Engineering Paradigm and more recently the Sociological Paradigm. Each paradigm brings a unique perspective to the injury problem. Progress is now limited by the cultural division between paradigms which impairs the ability of different professional groups to understand and appreciate the contribution of other groups.

This article proposes a social ecological model as a unifying cognitive framework within which to develop a Safe Communities Project. To focus solely on the medical concept of "injury prevention" is to misunderstand the fundamental nature of the human experience, and hence how the positive state of "safety" is achieved. For safety is a psychological, environmental and sociological phenomenon, as much as it is physiological. Safety is an ecological concept, determined by the relationship between an individual and their physical and social environment. The proposed social ecological model emphasises the *dynamic interface* between these three dimensions.

This ecological system provides a complex web of causation, creating a rich context for intervention. Looking for the most effective leverage points within the system reduces complexity and ensures strategic action.

Safe Communities: An Ecological Approach to Safety Promotion

Introduction

Injury is like a multifaceted crystal. It may be viewed from a number of different perspectives, each unique, each important, each contributing a different truth, but none sufficient to generate a comprehensive understanding of the problem.

The science of safety promotion has evolved through the contribution of a number of different injury paradigms: the Medical Paradigm, the Health Education Paradigm, the Public Health Paradigm, the Bioengineering Paradigm, the Systems Engineering Paradigm and the Sociological Paradigm. Each paradigm brings a unique perspective to the injury problem. Progress is now limited by the cultural division between paradigms which impairs the ability of different professional groups to understand and appreciate the contribution of others. Like a crystal, each facet of the injury problem must be studied to appreciate the whole picture, and thereby generate a comprehensive solution.

This paper is an attempt to facilitate improved dialogue between paradigms and define common ground on which to build a community based safety promotion program.

Safety promotion

"Safety", like "health", is an elusive concept that defies straightforward definition. While safety may be hard to define and therefore to measure, it is an important determinant of "Quality of Life"¹.

The United Nations in their 1994 report on human development⁴ assert safety is a "fundamental human right and an essential condition for the sustainable development of societies". The Queensland Government lists "safer and more supportive communities" as one of seven key policy priorities⁵.

According to Maslow's Hierarchy of Needs^{2,3}, safety is one of the basic needs of human beings, and a prerequisite for fulfilling higher psychological needs (Figure 1).

Safe Communities: An Ecological Approach to Safety Promotion



To focus solely on the medical concept of "injury prevention" is to misunderstand the fundamental nature of the human experience, and hence how the positive state of "safety" is achieved. For safety is a psychological, environmental and sociological phenomenon, as much as it is physiological.

Maurice et al⁶ define "safety" as a "state in which hazards and conditions leading to physical, psychological or material harm are controlled in order to preserve the health and well being of individuals and the community. It is an essential resource for everyday life that an individual and a community need in order to realise their aspirations."

The positive state of "safety" is as much concerned with the subjective dimension – the perception of safety, as it is with the objective dimension – the absence of injury⁶. A dynamic, and often paradoxical relationship, exists between these two dimensions⁷. This is part of the problem! People feel inappropriately secure in dangerous situations, and fail to take appropriate action to minimise their risk of injury. Contrastingly, they may feel needlessly frightened in relatively safe situations.

Sections of the community are highly fearful of the risk of unprovoked violence, yet this fear is not substantiated by documented epidemiological data. In Mackay, 91% of injury results from non-intentional injury, while only 5% of injury results from assault⁸. By contrast, risk behaviours and environments around the home are not perceived as dangerous by Mackay residents⁹, while the epidemiological data indicates 40% of injuries occur in the home⁸.

Therefore, to promote the concept of community safety, we need to address the community's perception of "safety" and "danger" while simultaneously intervening to reduce the behavioural, environmental and sociological factors that produce injury.

Safe Communities: An Ecological Approach to Safety Promotion

The Medical/Health Education Paradigm

Despite a history dating back to John Snow that emphasised the importance of social systems to maintaining health, a pervasive ideology of individualism has colonised public health science¹⁰. This takes for granted a reductionist view that the individual is the basic unit of investigation. Thinking has been dominated by the "Medical Model"^{10,11,12}, which perceives the individual as a natural entity whose existence is unproblematically physical, and largely independent of social context¹⁶.

Epidemiology focused on the identification of "individualised" risk factors, while health promotion has attempted to "prevent people from adopting high-risk lifestyles"^{13,14}. Kickbusch¹⁵ observes, "the link between social change, pressure for social reform and public health has been lost…public health has over time lost its broad-gauged approach and moved into a phase of medical dominance and concern for behavioural epidemiology, preventative medicine and health education."

The medical education/behavioural paradigm understands a person and their injury risk in terms of individual behaviour, leading many to conclude that education is the major, if not the only tool with which one can address safety promotion issues¹⁶.

A widespread societal bias toward "individual accountability" approaches injury as a consequence of personal failure. This "victim blaming" approach^{6,16,17}, allows society to evade its collective responsibility for injury as a sociological phenomenon.

While it is true that an individual can exert some control over their behaviour and their immediate environment, it is also clear that they are not completely free agents. We may suffer injury as a consequence of the intentional or unintentional actions of others. We may suffer injury as a result of the physical environment in which we live, or the social environment in which we behave. Thus events culminating in injury can at times be outside an individual's direct sphere of influence, and in this regard somewhat "unpredictable". This results in a "fatalistic" attitude to injury, "bad things happen" and, "it is not my fault because events were not under my control"^{6,16,17}.

The combination of society blaming the individual, and the individual blaming fate allows everyone to evade responsibility for injury. With no willingness to take personal or collective responsibility, there is no motivation for change and in the event action is taken, it may be misdirected. In reality, a balance between acknowledging personal responsibility and societal duty is required^{16,18}.

Safe Communities: An Ecological Approach to Safety Promotion

The Public Health Paradigm

The pioneering work of Gordon¹⁹, De Haven²⁰ and Haddon²¹ radically transformed how injury was conceptualised. Significant progress has been made by the application of principles from the sciences of epidemiology and bioengineering²¹.

Gordon^{19,21} hypothesised that epidemiological concepts of infectious disease could be generalised to an injury event, resulting from the interaction between a host (human), agent (hazard) and the environment^{19,21,22,23}. McGraven²⁶ and Barry²⁷ reasserted the strategic importance of taking a population (rather than an individual) approach to public health interventions and injury prevention.

William Haddon demonstrated the application of epidemiological principles to injury²¹, developing Haddon's Matrix^{21,24}. In its original form (Figure 2) it cross-tabulated a trichotomy of injury factors (human, vehicle, and environment) against time (pre-event, event, and post-event)²⁴. A key innovation was concept of an agent of injury^{21,22}, initially conceived to be the product or device that caused the injury. Gibson²⁵ refined the concept, proposing that the agent of injury is energy, and Haddon²¹ further developed this idea proposing the injury vector was the carrier (eg motor car, knife) of the agent (energy)^{21,23,27}. This epidemiological framework with its emphasis on the interactions between the host, the agent, the vector and the environment has since dominated thinking in injury prevention.

Figure 2. Haddon's Matrix fo	or a Motor Vehicle Accident
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	Human (host)	Vehicle (vector)	Environment
1. Pre-crash	FatigueAlcohol use	Tire blowoutsMechanical failures	Signs/signalsPolicing
2. Crash	Packaging of humans eg. seat belts	 Crumple zones Energy absorbing steering wheel 	 Trees, ditches, poles, bridges Soft shoulders on roadside
3. Post-crash	Haemorrhage	Cost of vehicle damage repair	 Emergency telephones Emergency response systems

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The Bioengineering Paradigm

De Haven and Haddon championed a change in strategic focus away from accident prevention to harm minimisation through bioengineering modification to injury vectors and the environment²¹.

In 1942, Hugh de Haven²⁰ published his classic case-series of eight survivors from high falls (50-150 feet), concluding that energy from high force impacts can be effectively dissipated, thereby preventing significant injury. This key observation signalled the birth of the bioengineering paradigm of injury prevention. Engineering modification of the physical environment provided an excellent opportunity to minimize harm from an accident event. As de Haven later observed, "people knew more about protecting eggs in transit than they did about protecting heads"²⁰.

Haddon²⁸ contrasted passive engineering solutions which require no action on the part of the individual (eg automotive airbag) with active solutions which require co-operation of the individual requiring protection (eg seat belt). Active interventions are usually more difficult to maintain over extended periods of time²⁹. Calls for structural and environmental changes which avoided the need to modify people's behaviour were frequently found in the literature^{23,30}. Legislation and enforcement were seen as major tools of social manipulation.

The System Paradigm

Harms-Ringdahl³¹ introduced the concept of Risk Analysis, which focused on addressing the inherent risks of a system, rather than focusing on an individual's safety performance under abnormal conditions. A systems approach to safety promotion concentrates on the milieu in which individuals behave and attempts to strengthen system defences to avert errors or mitigate their effects. In this model, individuals are the inheritors rather than the instigators of an accident sequence³².

James Reason^{32,33} proposes the concept of an accident trajectory, where a critical alignment of pre-existing "upstream" of system weaknesses (latent failures) combine with local triggering factors and individual behaviour (active failures) to create an accident opportunity. Latent failures may be environmental, organisational or social, and often have their origin in decisions taken by designers, builders, procedure writers, managers and politicians. These system flaws may lie dormant for long periods, before they are unmasked by local triggering events. Active failures refer to the behaviour of individuals, often in response to a local triggering event, which create an immediate accident opportunity.

An injury event rarely occurs as a consequence of the isolated failure of an individual or system. Rather it is the combination of latent system weaknesses, triggering factors, and behavioural errors which conspire together to create an accident opportunity. While the active failure of individuals may be the last and most obvious link in this chain, it does not follow that this is the most strategic place to act. Indeed, individual behaviour is often the hardest part of the system to change^{21,24,28,32,33}</sup>. Identifying and rectifying latent weakness within the system has the potential to improve system defences, and thereby reduce harm to individuals.

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The Active versus Passive Controversy

The relative merits of a bioengineering/systems approach versus behaviour modification have been an ongoing source of debate^{28,29}. There has recently been a re-emphasis of the importance of behavioural change as an injury prevention strategy. Tolsma³⁵ comments, "There seems to be a curious and unproductive debate in certain public health circles. Some advocate bioengineering approaches, others argue for educational approaches. The debate is pernicious because it rests on the false premise that we must choose between these strategies, as though they are mutually exclusive."

Geilsen et al²³ observes that "virtually no change – in structure, design, or environment – is achievable without changing peoples' behaviour". Even an archetypal passive strategy (automotive airbags) requires the support of active strategies (wearing of seat belts) for maximum protection. Enactment of passive solutions often requires political advocacy for behavioural and cognitive change at an organisational, political and societal level. Sleet asserts the need for an "active approach to passive protection".

There is a growing appreciation that behavioural and cognitive change is necessary at many levels within the system. While the target audience has traditionally been the host (the individual at personal risk within the system), it may be more strategic to target those with authority to control the structural determinants of system risk. Interestingly, those who hold this authority may carry little personal risk should the system fail. This, combined with the widespread belief in "individual accountability", means they may be resistant to any proposal to reduce structural risk, particularly if there is a cost involved. Syme³⁷ observes that health behaviour change "is difficult and unlikely to be successful when many forces in the social, cultural and physical environment conspire against such change."

The Sociological Paradigm

Recently, the importance of the social environment in the aetiology of injury has been reemphasised^{6,38,39,40,41}. When John Snow removed the handle from the parish pump to control an epidemic of cholera in London, he was addressing a sociologically based structural determinant of illness¹⁰. There is a need for Public Health to rediscover the importance of the sociological determinants of disease.

McKinlay⁴² asserts "While still largely overlooked in epidemiological thinking, social system influences...may account for as much (if not more) of the variation in health and/or illness statistics as do environmental influences, or even the attributes and lifestyles of individuals."

Despite this theoretical pre-eminence of the individual and their immediate physical environment, there is a lot of evidence that indicates social factors have profound influence on injury occurrence within a community.

Social indicators such as absolute income, income inequality, employment, educational attainment, social standing, social capital, political stability, and ethnicity have been shown to be important predictors of injury risk⁴⁰.

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In Australia, studies have confirmed lower socio-economic status is associated with an increased risk of death, hospitalisation and emergency department presentations due to injury^{38,39}. Persons of lower socio-economic status were more likely to commit suicide, suffer death from homicide, or be injured through self-harm or assault. Those of higher socio-economic status were more likely to suffer sporting injuries, and in old age suffer significant injuries after a severe fall. Those in the mid-range socio-economic groups suffered higher rates of transport related injury.

In Queensland, the 1999 Report, "Health of Queenslanders – Status Report" identified socioeconomic disadvantage, increasing rurality and Aboriginality are associated with increased risk of injury⁴³.

An Eclectic Approach to Safety Promotion

There is a need to be eclectic. Each injury paradigm has its own vocabulary and different ways of understanding reality⁶. Each can contribute to understanding, and different types of professional expertise are necessary to produce whole-of-system change. Within a problem driven context, all approaches are relevant within the confines of their theoretical framework. The challenge is to find the most strategic approach, or combination of approaches, with which to address the target issue^{29,44}.

Unfortunately, absence of a common cognitive thread between paradigms, may result in misunderstanding between professional groups and compromise the achievement of common goals⁶. There is an urgent need to synthesize key concepts from these different paradigms into a unified cognitive framework.

An Ecological Paradigm for Safety Promotion

In 1986, the First International Conference on Health Promotion held in Ottawa⁴⁵ reemphasised the environmental and social determinants of health, redefining health promotion as the "process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social wellbeing, an individual or group must be able to realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living." The goal of Public Health is to address inequity and thereby, "reduce differences in health status and ensure equal opportunities and resources to enable all people to achieve their fullest potential." This cannot be achieved within the health sector alone, but requires co-ordinated action by all concerned.

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Focusing down on the detail of individual injury risk within a single cognitive framework leaves us less able to perceive the big picture. Despite the intense scientific scrutiny of individual risk of injury and the factors associated with this risk, it is almost impossible to predict when, if, or how a specific individual is likely to sustain an injury. The individual is, metaphorically speaking, only the "tip of the injury iceberg". Like an iceberg, they may behave in unexpected ways if interpreted out of context.

By contrast, when we consider the rates of injury at a community level these trends become highly consistent and therefore predictable. Environmental and sociological determinants hidden "below the water line" impose significant constraints upon individual behaviour. Thus a population approach is often more enlightening and injury more effectively understood as an environmental and sociological phenomenon.

McMichael⁴⁶ observes "Modern epidemiology is thus orientated to explaining and quantifying the bobbing of corks on the surface waters, while largely disregarding the stronger undercurrents that determine where, on average the cluster of corks end up on the shoreline of risk."

Park and Burgess first coined the term human ecology extrapolating the theoretical paradigm of plant and animal ecology to the study of human communities⁴⁷. Last⁴⁸ defines ecology as "the study of relationships among living organisms and their environment", while human ecology refers to the "study of human groups as influenced by environmental factors, including social and behavioural factors." ^{47,48}.

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Green and Kreuter⁴⁷ propose a social ecological model of health promotion where health and safety are understood in the context of the whole ecological system (Figure 3).

Three dimensions to this system can be identified^{29,44}:

- 1. The individual and their behaviour;
- 2. The physical environment; and
- 3. The sociological environment.

Each dimension can in turn be analysed across five levels^{17,44,49}:

- 1. Intrapersonal level;
- 2. Interpersonal level;
- 3. Organisational level;
- 4. Community level; and
- 5. Societal factors and public policy.



Figure 4. The Injury iceberg – An Ecological Model of Injury Causation

The *Intrapersonal level* is concerned with characteristics of the individual, their knowledge, skills, life experience, attitudes, and behaviours as they interface with the environment and society^{17,44}.

The *Interpersonal level* refers to the immediate physical environment and social networks in which an individual lives, their family, friends, peers and work mates^{17,44}.

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The *Organizational level* refers to commercial organizations, social institutions, associations and clubs, which have formal (and informal) structure, rules and regulations operating in the pursuit of specific objectives, and to the physical environment and social networks contained within the direct control of these organizations^{17,44,49,50}.

A *Community* may be defined in both structural and functional terms^{17,44,47,49}. Structurally, a community can be defined within geographic or political boundaries. Functionally, a community may share demographic, cultural, ethnic or social characteristics such that its members "have a sense of identity and belonging, shared values, norms, communication and helping patterns." ⁵¹

Societies are larger systems, often defined along political boundaries, possessing the means to apportion resources and control the lives and development of their constituent communities^{17,44,49}.

Each level is embedded within an upstream level^{17,29}. This nested structure¹⁷ allows for influences vertically across levels or horizontally within levels⁴⁴. Upstream levels impose significant constraints upon levels embedded within them. Upstream interventions can therefore magnify the impact of a program, impact being a function of the effectiveness, reach and duration of the program⁵². Thus, a program of moderate effectiveness, which acts on the whole community (increased reach) may have a greater impact than more effective programs which can only reach a small segment of the community.

The social ecological paradigm emphasises the dynamic interface between the three dimensions - the individual, the physical environment and the social environment - acting at five levels - intrapersonal, interpersonal, organizational, community and societal. These impact on the individual maintaining them in their ecological context. Attempts to modify injury risk at one level in isolation (eg individual behaviour) will be resisted by the rest of the system, which will attempt to maintain its own internal stability (homeostasis).

It follows that to change the risk profile of the individual it is necessary to address the environmental and sociological issues "hidden beneath the water line" which determine individual behaviour. By modifying the risk profile of the whole system and thereby empowering behavioural change, interventions are more likely to be successful and outcomes sustained.

This ecological model provides a complex web of causation and creates a rich context for intervention. It can be used to map the key links in an accident sequence, identifying upstream "latent failures" along with the more obvious "active failures". Breaking the chain at any point will reduce the risk of the accident sequence culminating in an injury. Identifying the most strategic links (leverage points) will ensure effective action. The model also accommodates the often overlooked, but extremely important, positive aspect of safety promotion - identifying and reinforcing the protective characteristics of the ecological system which minimise the occurrence and adverse effects of unsafe behaviours^{32,33}.

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What are Safe Communities?

Safe Communities is a World Health Organisation (WHO) supported approach to injury prevention and safety promotion⁴¹.

The safe community model seeks to understand injury and intervene at a community level. By involving the community in finding its own solutions, it aims to be a catalyst for environmental, structural, sociological and political change that empowers the community, and ultimately individuals within the community, to change their environment and their behaviors to reduce the risk of injury and increase the perception of safety. It is therefore an ecological paradigm of injury causation and safety promotion.

Communities may apply for designation as a WHO Safe Community, through the WHO Collaborating Center for Community Safety Promotion (based at the Karolinska Institute in Stockholm, Sweden). Applications are assessed on 12 criteria⁵³ (Figure 5). However, the Safe Community approach is more a process than a program, and designation more a commitment to the ongoing process of becoming a Safe Community, than a statement of what the community has achieved at the time of designation.

WHO designated Safe Communities are demonstration communities which others can model when seeking to establish their own community safety program. There are currently 63 WHO formally designated Safe Communities, nine of these in Australia: four in New South Wales, three in Victoria and one each in South Australia and Western Australia.

Figure 5. WHO Criteria for Safe Communities⁴⁸

- 1. Formation of a cross sectoral group that is responsible for injury prevention.
- 2. Involvement of the local community network.
- 3. The program will address all ages, surroundings, and situations.
- The program will address the concerns of high-risk groups (such as children and the elderly), high
 risk environments and aim to ensure equity for vulnerable groups.
- 5. The program should have a mechanism to document the frequency and causes of injuries.
- 6. Program must be a long-term approach, not one of brief duration.
- The program evaluation should include indicators which show effects and provide information on the process as it advances.
- Each community will analyse its organisations and their potential for participation in the program.
- Participation of the health care community in both the registration of injuries and the injury prevention program is essential.
- 10. Be prepared to involve all levels of the community in solving the injury problem.
- 11. Disseminate information on the experience both nationally and internationally.
- 12. Be willing to contribute to the overall network of "Safe Communities".

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Effectiveness of Safe Community Programs

Since its inception in Sweden the Safe Community approach has been internationally shown to be an effective means of reducing injury⁴¹.

The Falkoping Accident Prevention Program^{41,54} was the first evaluated community-based safety promotion program addressing all types of injuries, in all agents and all environments. An injury register was commenced in the city of Falkoping in 1978 followed by the intervention program the next year. After three years, total injuries had fallen by 23%, home injuries by 27%, occupational injuries by 28% and traffic injuries by 28%. Injury incidence was 113 reports per 1,000 prior to the commencement of the program in 1978, compared with 95 reports per 1,000 in 1983.

The program ceased in 1982. While the number of injuries treated in ambulatory setting remained stable, there was a rebound in injuries requiring hospital admissions, showing an increase of 8.7% for females and 4.9% for males compared with 2.3% for females and 0.5% for the rest of Sweden. The program was re-established in 1992.

In Australia, the Latrobe Valley Better Health Injury Prevention Program^{41,55} was a community based injury prevention program in regional south east Victoria (population of 75,000), targeting injuries in the home, sport and playground, and alcohol misuse in youth. Effectiveness of the program was monitored using a quasi-experimental design based on pre and post evaluation of five years of Emergency Department injury surveillance data collected in the Latrobe Valley. Age standardised Emergency Department presentation rate per 100,000 persons for all targeted injury fell from 6,594 in the first year of the program to 4,821 in the final year. There were significant reductions in home injuries, playground injuries, sporting injuries and in the number of assaults among 10-24 year olds. The direct program cost per injury prevented was \$272.

Mackay/Whitsunday Safe Communities Project

A community needs analysis conducted by the Mackay Division of General Practice in 1998 made the sentinel observation that age standardised hospital separation rates for injury and poisoning were high in the Mackay Region⁵⁶. A subsequent review by the Tropical Public Health Unit of Queensland Health confirmed that age standardised injury separation rates were more than double those observed for other Queenslanders⁵⁷.

The Mackay Injury Surveillance Network was established in 1998 as part of the Queensland Injury Surveillance Unit's Emergency Department injury surveillance network⁵⁸. This network has confirmed that Emergency Department injury presentations in the Mackay Region occur at double the rate observed in South Brisbane⁵⁸.

The Mackay/Whitsunday Safe Communities Project was launched in February 2000 in response to the excessive rates of injury observed in the region⁵⁷. The WHO Safe Communities Model was considered to be the most strategic approach to the injury problem in the region. The project aims to co-ordinate a systematic, inter-sectorial, sustained response to injury within the region^{57,59}. It seeks to build the Mackay/Whitsunday community's

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capacity to address its injury problem from within its own resources, strengthening the resilience of the community system against harm through injury and creating an environment that empowers individuals to behave safely.

Conclusions

The pervasive ideology of individualism has colonised public health science, which has taken for granted a reductionist view that the individual is the basic unit of investigation. Even bioengineering with its emphasis on the interface between an individual and their environment has seen the individual as a pre-eminent source of system failure. This reinforces a societal bias of "individual accountability" allowing society to evade its collective responsibility for injury.

There has recently been a rediscovery of the need to view the individual as just one part of a system. Any attempt to understand an individual in isolation from their physical and social environment is only seeing the "tip of the injury iceberg".

The social ecological paradigm of safety promotion emphasises the dynamic interface between three dimensions: the individual, the physical environment and the social environment. These act at five levels: intrapersonal, interpersonal, organizational, community and societal. Attempts to modify individual risk in isolation will be resisted by the system, which will try to maintain its own internal homeostasis. It follows that the most effective way to reduce an individual's risk profile is to systematically address the environmental and sociological issues "hidden beneath the water line", thereby modifying the risk profile of the whole system.

This paradigm provides a complex web of causation, creating a rich milieu for intervention. Looking for the most effective leverage points within the system reduces complexity and ensures strategic action. Lomas¹⁴ observes, "This is not 'new public health', it is a return to the 'old public health' of John Snow that recognised social systems as integral to public health".

The Mackay/Whitsunday Safe Communities Project aims to understand injury and intervene at a community level. By involving key community stakeholders in finding their own solutions, it hopes to be a catalyst for structural, sociological and political change that empowers the community, and ultimately the individuals within the community, to change their environment and their behaviour to reduce the risk of injury and increase the perception of safety.

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Reducing Injuries in Mackay, North Queensland

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CHAPTER FIVE

THE INJURY ICEBERG: AN ECOLOGICAL APPROACH TO PLANNING SUSTAINABLE COMMUNITY SAFETY INTERVENTIONS

This journal article was co-authored with colleagues, Jan Hanson, Paul Vardon, Kathryn McFarlane, Jacqui Lloyd and my doctoral supervisors, Reinhold Müller and David Dürrheim. The article further develops the concept of ecological safety promotion and applies these principles to provide a scientific foundation for the design of sustainable safety promotion interventions. While interventions targeting individual behaviour are undoubtedly important, the desired behaviour is unlikely to be sustained unless it is well grounded in the social and physical environment that reinforces and maintains this behaviour.

From the outset, there was a conscious effort to design sustainability into Mackay Whitsunday Safe Communities by utilising and developing local resources where ever possible.

A literature review regarding intervention and coalition sustainability was undertaken by me and in collaboration with Paul Vardon and Jacqui Lloyd, was published as a chapter entitled "Becoming Queensland's First Safe Community: Considering Sustainability from the Outset", in "Reducing Injury in Mackay North Queensland" edited by Reinhold Müller and published by Warwick Educational Publishing in 2002 (Hanson et al., 2002c). It became clear that sustainability is an ecological concept. To be sustainable an ecological system must have access to the resources necessary to maintain the desired outcome and the ability to mobilise these resources. The key to designing sustainable, safe communities is a comprehensive socio-ecological analysis of the target community, the environmental and social determinants of injury in that community and the natural, man made, financial, human and social resources that community will need to mobilise to maintain its safety and wellbeing.

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I therefore undertook a further literature review into the ecological foundations of sustainability in environmental systems and subsequently drafted the manuscript that forms the basis of this chapter. After comment from my co-authors the paper was refined and submitted to the Health Promotion Journal of Australia. As this was the first time the ecological principles of sustainable community safety was published in a hard copy health promotion journal, it was necessary to restate many of the key concepts previously published, but not widely circulated, in Chapter Four, Safe Communities: An Ecological Approach to Safety Promotion, as this provided the conceptual foundation for the ideas developed in the article.

PUBLICATIONS:

Hanson, D, Vardon, P & Lloyd, J 2002c, 'Becoming Queensland's first safe community: considering sustainability from the outset', in R. Müller (ed.), *Reducing injuries in Mackay, North Queensland,* Warwick Educational Publishing, Warwick, Queensland, Australia, pp. 35-52, see Appendix 22

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Article

The injury iceberg: an ecological approach to planning sustainable community safety interventions

Dale Hanson, Jan Hanson, Paul Vardon, Kathryn McFarlane, Jacqui Lloyd, Reinhold Muller and David Durrheim

Introduction

William Haddon, the father of modern injury prevention, introduced the concept of ecological injury prevention with his foundation paper *On the Escape of Tigers: an Ecological Note.*¹ He was seeking to emphasise a comprehensive approach to injury causation in response to the prevailing paradigm of accident prevention. While human behaviour was perceived to be the pre-eminent cause of an accident, Haddon argued it did not follow that changing behaviour was the most effective way to prevent injury. He highlighted opportunities for harm reduction through redesign of the physical environment. By preventing or dissipating the adverse release of energy, it was possible to minimise the chance of injury without necessarily preventing the accident.² Haddon precipitated a major paradigm shift from accident prevention to injury prevention. Much has been achieved on the strength of this fundamental change.

Now, 30 years later, health promotion has embraced an

ecological understanding of health, realising the importance of both the physical and social environment. A number of recent studies have emphasised the importance of the social determinants of injury.^{3,4} It is time to revisit Haddon's original thesis and reappraise the best opportunities for harm reduction within an ecological system. Can we capitalise on what has been achieved through re-engineering the physical environment by simultaneously re-engineering the social environment?

Method

A literature review was undertaken of English-language articles addressing the topics of 'ecological injury prevention or safety promotion', 'ecological health promotion', 'sustainable economic, health or ecological systems' and 'steady state' using Medline, Sociological Abstracts, Social Service Abstracts and the Web of Science, Social Science Citation Index and Science Citation Index, with 143 articles retrieved and reviewed.

Abstract

Issue addressed: A systematic ecological framework in which to design sustainable, community-based, safety promotion interventions is presented.

- **Method:** A literature review was undertaken of English-language articles addressing the topics of 'ecological injury prevention or safety promotion', 'ecological health promotion', 'sustainable economic, health or ecological systems' and 'steady state', with 143 articles retrieved and reviewed.
- **Results:** Injury prevention is a biomedical construct, in which injury is perceived to be a physical event resulting from the sudden release of environmental energy producing tissue damage in an individual. This reductionist perspective overlooks the importance of psychological and sociological determinants of injury. Safety has physical, psychological and sociological dimensions. It is inherently an ecological concept. Interventions aiming to achieve long-term improvements in community safety must seek to develop sustainable safety promoting characteristics within the target community.
- **Conclusion:** To reduce a community's risk of injury and sustain this lowered risk, the community 'ecological system' must have access to the resources necessary to maintain the desired outcome and the ability to mobilise these resources.

Key words: Safety promotion, injury prevention, sustainability, ecological health promotion.

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Safety promotion

'Injury prevention' is a biomedical construct, based on a reductionist view that injury is a physical event resulting from a sudden release of environmental energy producing tissue damage in an individual.² This approach underestimates the importance of the psychodynamic and social determinants of injury.^{3,5} Is there benefit in reframing the issue in more holistic terms?

Park and Burges⁶ first coined the term *human ecology*, extrapolating the theoretical paradigm of plant and animal ecology to the study of human communities. Last⁷ defines ecology as "the study of relationships among living organisms and their environment", while *human ecology* refers to the "study of human groups as influenced by environmental factors, including social and behavioural factors".

In 1986, the First International Conference on Health Promotion, held in Ottawa,⁸ emphasised the environmental and social determinants of health, redefining health promotion as the "process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to realise aspirations, to satisfy needs, and to change or cope with the environment". The Ottawa Charter (see Figure 2) advocates a co-ordinated, intersectoral approach that empowers individuals to adopt healthy lifestyles through the creation of supportive environments and health promoting public policy, facilitated by effective community action in collaboration with a proactive, outward looking health sector. Maurice et al. define safety as "a state in which hazards and conditions leading to physical, psychological or material harm are controlled in order to preserve the health and well-being of individuals and the community".⁹ It is as much concerned with the subjective dimension – the perception of safety – as it is with the objective dimension – the absence of injury. It is as much concerned with the community in which individuals reside as it is with the individuals that make up the community. It is evident that safety is a psychological, sociological and environmental phenomenon, as much as it is physiological. It is inherently an ecological concept.¹⁰

'The injury iceberg' – an ecological approach to safety promotion

Green and Kreuter propose a socio-ecological model of health promotion where health and safety are interpreted in the context of the whole (ecological) system.¹¹ We propose a visual metaphor, the 'injury iceberg', to assist understanding of the important characteristics of this model (see Figure 1).

Three dimensions to this system can be identified:

- 1. The individual and their behaviour.
- 2. The physical environment.
- 3. The social environment.

Each dimension can, in turn, be analysed at five levels:11

- The *intra-personal* level is concerned with characteristics of the individual, their knowledge, skills, life experience, attitudes and behaviours as they interface with the environment and society.
- 2. The inter-personal level refers to the immediate physical



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environment and social networks in which an individual lives (family, friends, peers and colleagues).

- 3. The organisational level refers to commercial organisations, social institutions, associations and clubs. They have structures, rules and regulations enabling them to pursue specific objectives and have direct influence over the physical and social environments maintained within their organisation.
- 4. A community may be defined in both structural and functional terms. Structurally, a community can be defined within geographic or political boundaries. Functionally, a community may share demographic, cultural, ethnic, religious or social characteristics with its members "having a sense of identity and belonging, shared values, norms, communication and helping patterns".¹¹
- Societies are larger systems, often defined along political boundaries, possessing the means to distribute resources and control the lives and development of their constituent communities.

The individual is, metaphorically speaking, the 'tip of the iceberg', just one part of a complex ecological system. While they may be the most visible component of this system, important determinants of their behaviour and environmental risk are 'hidden below the waterline'. Attempts to modify injury risk at one level in isolation (e.g. individual behaviour) will be resisted by the rest of the system, which will attempt to maintain its own internal stability (homeostasis). Syme¹² observes that health and behavioural change "is difficult and unlikely to be successful when many forces in the social, cultural and physical environment conspire against such change".

The socio-ecological paradigm emphasises the *dynamic interface* between the three dimensions – the individual, the physical environment and the social environment – acting at five levels: intrapersonal, interpersonal, organisational, community and societal. They provide the ecological context in which the individual behaves. Each level is built on the foundation of a 'deeper' level. As these deeper levels are larger and exercise more inertia, they are harder to change, but once changed are more likely to sustain the desired outcome.¹³

An injury event rarely occurs as a consequence of an isolated failure at one level of the system. Reason¹⁴ argues that a critical combination of latent system failures, unmasked by a local triggering event, exacerbated by active behavioural failures, conspire together to create an injury event. *Latent failures* may be environmental, organisational or social. They have their origin in decisions taken by designers, builders, managers and politicians. These system flaws lie dormant for long periods until they are unmasked by a *triggering event*. *Active failures* are the counterproductive behavioural responses of individuals to a

Figure 2: The Ottawa Charter for Safety Promotion.



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triggering event. In this systems approach to injury causation, individuals are the inheritors rather than the instigators of the injury sequence. Identifying and rectifying latent weaknesses within an ecological system has the potential to improve deeper level system defences, making the system more resilient and therefore reducing the risk of injury.

Cohen et al. observe that, "complex problems require comprehensive solutions".15 It is important for coalition members to think strategically about their sphere of influence.^{13,16} More will be achieved if each group concentrates on those components of the problem under their direct sphere of influence.13 Community coalitions are best placed to engage the local community. Organisations have control over internal policy. Bureaucrats and politicians can implement safe public policy. By forming a coalition of like-minded members who between them have strategic influence over multiple levels of the socio-ecological system, it is possible to create a suite of interventions in which the "overall strategy results in a whole that is greater than the sum of its parts".¹⁵ This ecological model provides a complex web of causation and creates a rich context for intervention. It can be used to map the key links in an accident sequence, identifying upstream latent failures along with the more obvious active failures. Identifying the most strategic links (leverage points) will ensure effective action.

Sustainable safety promotion

Sustainable safety promotion programs deliver lasting improvements in the health status of individuals or the communities they target.¹⁷ Sustainability has been a neglected area of safety promotion research. Sadly, many promising initiatives do not survive.

Failure to sustain desirable project outcomes is counterproductive. Not only is it a waste of the human and financial resources invested in the project,^{17,18} it also erodes community trust in the responsible organisations.¹⁷⁻¹⁹

Sustainability is an attractive concept to political and administrative systems that are anxious to achieve long-term outcomes from their social investments. While 'sustainability' is at present a mandatory piece of politically correct rhetoric, it is less often achieved. In 1998, the World Bank conducted a review of 550 projects it had funded and found that 48% had sustainability problems.²⁰ Rissel et al., in their study of 78 projects funded under the Minnesota Heart Health Program, found that only 52% of these project were still functioning after six years.²¹ Yate reported that 50% of community-based coalitions became inactive after they had performed initial simple tasks.²² Prestby and Wandersman studied 17 community-based coalitions and found that only eight were still functioning after one year.²³

There is an urgent need to move beyond the rhetoric and deliver sustainable outcomes.

Sustain - a definition

The Oxford Dictionary defines sustain as "(1) to maintain or keep going continuously, (2) to support or bear the weight of especially for a long period, or (3) to give strength to encourage or support".²⁴ The concept is one of *assuming responsibility* to expend *sufficient resources* to maintain the *desired outcome*. Three key questions are evident:

- 1. What is the desired outcome?
- 2. Are there sufficient resources?
- 3. Who is responsible?

Sustain what?

It is important to be clear about the ultimate objective. What needs to be sustained?¹³ The project itself? The outcome the project sought to achieve? The ability of the target community to maintain this outcome? Is the ongoing survival of interventions implemented by the project necessary to maintain this outcome? Is it possible to embed safety-promoting characteristics in the physical and social environment so that these interventions become superfluous?^{13,16} While answers to these questions will vary from project to project, intervention to intervention, a clear definition of the desired outcome is imperative when trying to identify and mobilise the resources required.

Sufficiency

Sustainability is an ecological concept. Lowe suggests a system is ecologically sustainable "when it has at its disposal an amount of land that supplies all the resources it consumes and absorbs all the waste it produces".²⁵ The essential idea is that the system must have access to the energy necessary to be self-sustaining in the long term and to deal with any adverse by-products it produces while utilising this energy.

This concept has been adopted by public health practitioners. McMurray suggests, "a community can be viewed as an ecosystem, with resources, opportunities and threats to health and healthy lifestyles".²⁶ Sustaining a process to enhance community safety depends not only on the community having the resources necessary to maintain a safe physical and social environment,²⁷⁻²⁹ but also the ability to identify and rectify any features of the environment that compromise safety.³⁰⁻³²

Interventions dependent on external resources are vulnerable. In an age of financial accountability, economic rationalism and aggressive competition for funding, short-term funding is the norm in Australia. Interventions come and go depending on their ability to secure ongoing funding. The solution is to maximise the ability of a community to maintain an outcome within its own 'ecosystem'.

Capacity building is the process by which a project attempts to enhance a community's capacity to identify, mobilise, co-ordinate and develop local resources to solve local issues.^{30,33-36} Bush

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et al. define *community capacity* as "a collection of characteristics and resources which, when combined, improve the ability of a community to recognise, evaluate and address key problems".³⁶ While at face value a project may mobilise local resources to achieve a specific health objective, it can also be a vehicle to develop sustainable, health-promoting qualities (capacity) within the community itself.^{30,33,35,36}

The dynamic quality of community capacity cannot be overstated. What we do today affects the capacity of the ecological system we are working with tomorrow. Projects that develop capacity and enhance self-efficacy activate an important amplifying effect on the community's ability to implement and sustain desirable safety outcomes in the future.³⁰

While building local social and physical capacity is undoubtedly important, it is not necessarily sufficient to ensure sustainability. Sustainability is not directly determined by the resources invested during the development phase of the project, but rather by the resources available to maintain the desired outcome. Rarely are the key questions asked.^{13,37,38} Are there sufficient resources within the ecological system to *maintain* the desired outcome? What resources are required? Does the community have access to these resources and the authority to mobilise them? If there is a gap between the resources required and the resources available then the situation is, by definition, unsustainable.

Sustainable ecological systems must adapt to constantly changing internal and external environment.^{18,30,36,38} Olsen³⁷ identifies three important factors that determine sustainability:

- 1. Community capacity.
- Contextual factors. These external environmental, social or political factors are not under the control of the community.
- 3. Activity. The greater the activity, the greater the resources required to maintain this activity.

An important characteristic of sustainable health promotion networks is their capacity to reinvent themselves in the face of changing environmental, social and political contextual factors. Rissel et al.²¹ in their review of 78 projects funded under the Minnesota Heart Health Program found that of the 41 projects that had been successfully sustained, 57% had required substantial modification since implementation.

Who is responsible?

Who is responsible for mobilising these resources? Partnerships cannot be sustained unless all partners contribute. This principle applies equally to horizontal partnerships (within a community system) and vertical partnerships (between state-based political administrative systems and communities).

Those planning community interventions need to actively build self-sufficiency into projects using local resources as far as possible while developing the local advocacy skills necessary to mobilise external resources where required. External sponsors also need to seriously consider their responsibilities. Professionally driven, externally initiated projects have the potential to exacerbate community dependency if they do not build community capacity, encourage self-sufficiency and foster self-efficacy in the target community. When the external investment is withdrawn there is no local ownership or infrastructure to maintain the project. Administrative and political systems have responded by attempting to engage local communities in the development of their projects, ultimately delegating responsibility to the community after a period of infrastructure and social investment.^{17,37-40} However, to delegate responsibility for sustaining an outcome to a community under the guise of capacity building without ensuring that the community has access to the resources and expertise required to maintain the desired outcome and the authority to mobilise these resources is both ineffective and unethical.

Ecological sustainability

There are a number of important implications of this ecological approach to sustainability. First, while interventions targeting individual behaviour are undoubtedly important, the desired behaviour is unlikely to be sustained unless it is well grounded in a social and physical environment that reinforces and maintains this behaviour. Second, for outcomes to be sustained, the community must have access to the human, physical, social and financial resources necessary to maintain these outcomes. Finally, projects must be able to adapt to a constantly changing internal and external environment if outcomes are to be sustained. This requires careful forward planning based on a sound understanding of the ecological system and the resources required to implement and maintain change.

Given the prevailing focus on individual accountability for injury, central control of financial resources, and a system of short-term funding, most interventions concentrate on what is achievable within a short time frame. Few have the inclination, much less the time required for the strategic planning necessary to produce change grounded deeply within an ecological system. Few have control over the resources they need to sustain community action, but are dependent on the patronage of external agencies. In this pressured environment, sustainability becomes an afterthought precipitated by the crisis of funding withdrawal. Sadly, if the ecological foundations for sustaining the outcome have not already been laid, it is often too late to rescue the situation.

Conclusion

Haddon's original thesis should be expanded to embrace a socioecological view of injury causation and prevention. Safety has physical, psychological and sociological dimensions. It is intrinsically an ecological concept.

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We propose a visual metaphor, 'the injury iceberg', as an ecological metaphor of injury causation. In this system the individual is only the 'tip of the iceberg'. The most enduring way to reduce an individual's risk of injury is to systematically address the environmental and sociological issues 'hidden beneath the water line'.

Sustainability is also an ecological concept. To be sustainable an ecological system must have access to the resources necessary to maintain the desired outcome and the ability to mobilise these resources. Interventions dependent on external resources are vulnerable. The solution: build sustainability from the outset by maximising a community's capacity to maintain safety initiatives within their own resources.

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CHAPTER SIX SOCIAL NETWORKS: FROM METAPHOR TO METHODOLOGY

"For the last thirty years, empirical social research has been dominated by the sample survey. But as usually practiced, using random sampling of individuals, the survey is a sociological meat grinder, tearing the individual from his social context and guaranteeing that nobody in the study interacts with anyone else in it. It is a little like a biologist putting his experimental animals through a hamburger machine and looking at every hundredth cell through a microscope; anatomy and physiology get lost, structure and function disappear, and one is left with cell biology. ... If our aim is to understand people's behaviour rather than simply record it, we want to know about primary groups, neighbourhoods, organisations, social circles, and communities; about interaction, communication, role expectations, and social control" (Barton, 1968, p1).

6.1. THE CASE FOR NETWORKS

If we are to understand why populations experience different injury rates, then research techniques that focus on individuals will not be effective. The individual is only the "tip of the injury iceberg" (Hanson et al., 2000b and 2005). A host of interdependent environmental and social contextual determinants "hidden below the water line" interact with the physiology and psychology of individuals to determine the incidence of injury experienced by a population.

While this comprehensive, wholistic, model of injury causation suggests many opportunities to address a community's injury problem, it also offers special challenges. Green and Kreuter (1999) observe that:

If the ecological credo that everything influences everything else is carried to its logical extreme, the average health practitioner has good reason to do nothing, because the potential influence of or consequences on other parts of the ecological system lie beyond comprehension, much less control (Green and Kreuter, 1999, p25).

An ecological model of injury causation is necessarily a "complex" model of injury causation. However, "complex" does not just mean "complicated", but rather a system of interrelated mutually interdependent causal determinants (Buckley, 1998; Byrne, 1998, Lewis, 2005). Complex systems are resistant to

investigation by traditional reductionist scientific methods that seek to understand system function by disaggregating the system into its component parts. Not because the system does not have components, but rather because the components are so mutually interdependent that isolating a component from its contextual influences may seriously misconstrue how the system works (Ackoff, 1974; Buckley, 1998; Byrne, 1998).

Ackoff (1974, p 21) argued that "no problem ever exists in complete isolation" and coined the term "messy problem" to describe a complex system of interrelated problems (Ackoff, 1974; Chisholm, 1996; Hill, 2002; Keast et al., 2004). Rittel and Webber (1973) independently proposed the term "wicked problems" to describe a challenging set of interrelated problems (Clarke and Stewart, 1977; Keast et al., 2004). Ackoff (1974) observed that:

In the machine age messy problematic situations were approached analytically. They were broken down into simpler discrete problems that were often believed to be capable of being solved independently of one another. We are learning that such a procedure not only usually fails to solve the individual problems that are involved, but often intensifies the mess. The solution to a mess can seldom be obtained by independently solving each of the problems of which it is composed (Ackoff, 1974, p21).

The highly complex, dynamic, multi-causal, multi-level, multi-sectoral nature of contemporary social problems also mean that they are resistant to interventions designed by any single profession or government agency (Rittel and Weber, 1973; Clarke and Stewart, 1997; O'Toole, 1997). Cohen and Swift (1999) observe that "complex problems require comprehensive solutions (p203)". No single professional group, community group, organisation, or government sector possesses the expertise or resources to design or implement a comprehensive multi-level and multi-sector solution (Cohen et al., 2003). The USA Institute of Medicine (Bonnie et al., 1999) report "Reducing the Burden of Injury: Advancing Prevention and Treatment" observes:

The determinants of health are beyond the capacity of any one practitioner or discipline to manage. ... We must collaborate to survive as disciplines and as professionals attempting to help our communities and each other (Bonnie et al., 1999).

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In this regard, complex problems have been characterised as "problems of cooperation" (O'Toole and Montjoy, 1984). If a sufficiently comprehensive definition of the problem and its key sub-components can be established by pooling the expertise of different professional groups, and if a socially acceptable solution can be negotiated by politicians, bureaucrats and the community, then the problem can be productively addressed (Rittel and Weber, 1973; Clarke and Stewart, 1997; O'Toole, 1997). Stone et al. (1999) suggested that:

Social forces (and societies most vexing problems) are characterised by a lack of coherence In this type of situation, the main concern is how to bring about enough cooperation among disparate community elements to get things done. This is a 'power to' that, under many conditions of ultracomplexity, characterises situation better than 'power over'. (Stone et al., 1999, p354).

Contemporary literature on societal governance and public health argues that this has profound implications for the way complex problems should be addressed (Rittel and Weber, 1973; Clarke and Stewart, 1997; O'Toole, 1997; Agranoff and McGuire, 2001; Lasker and Weiss, 2003; Mandell and Steelman, 2003; Keast et al., 2004).

6.2. NETWORKS: A METAPHOR FOR COLLABORATIVE COMMUNITY ACTION

Organisational theory suggests that the design and structure of an organisation, or inter-organisational network, must reflect the complexity of its operating environment (Hill, 2002). Hierarchical organisations are efficient structures for addressing problems which can be reliably broken down into a predictable sequence of independent sub-tasks for which the required human, technical and resource inputs can be dependably accessed (Rittel and Weber, 1973). It is possible, and indeed efficient, for a hierarchy to design structures, policies and processes to address problems of this nature (Powell, 1990). However, hierarchical mono-organisational structures have difficulty responding to situations where the underlying problem evades clear definition, is rapidly changing, or the required inputs and outputs are unpredictable (Rittel and Webber, 1973, Clarke and Stewart, 1977; Agranoff and McGuire, 2001).

It has been proposed that non-hierarchical patterns of organisation are better suited to complex operational environments (Jones et al., 1997; Lasker et al., 2001; Agranoff and McGuire, 2001; Keast et al., 2004). Through networking, the knowledge, expertise and resources of different professional groups and organisations can generate the critical mass of activity, resources and expertise necessary to solve multifaceted complex problems (Bonnie et al., 1999; Cohen et al., 2003; Lasker et al., 2001). Networks are believed to be more innovative, more responsive and better positioned to rapidly generate comprehensive solutions than mono organisational "silo" approaches (Leavitt, 1951; Guetzkow and Simon, 1955; Granovetter, 1973; Granovetter, 1985; Powell, 1990; Jones et al., 1997; Bonnie et al., 1999; Lasker et al., 2001; Agranoff and McGuire, 2001; Keast et al., 2004).

Networks have therefore emerged as a favoured form of social organisation in the postmodern era (Lipnack and Stamps, 1994; Alter and Hage, 1993; Castells, 2000). Lipnack and Stamps (1994) observe:

The network is emerging as the signature form of organisation in the information age, just as bureaucracy stamped the industrial age, hierarchy controlled in the agricultural era, and the small group roamed in the nomadic era (Lipnack and Stamps, 1994, p3).

6.3. NETWORKS, COLLABORATIONS AND PARTNERSHIPS

It is illustrative that the nomenclature describing this social process is itself complex. Many different professional groups offer their own classifications using the same terms to describe different things, and different terms to describe the same thing (Mignus, 2001).

The terms "networks", "collaborations" and "partnerships" are frequently used interchangeably to describe the overall process by which organisations or people work together for mutual benefit (Mandell and Steelman, 2003). All authors agree that within this spectrum of activity there are some important distinctions:

- Intra-organisational systems versus inter-organisational systems (Mandell and Steelman, 2003; O'Toole and Montjoy, 1984).
- Hierarchical systems versus non-hierarchical systems (Powell, 1990;
 O'Toole, 1997; Jones et al., 1997; Nutbeam, 1998; Agranoff and McGuire, 2001).

- Formal systems vs informal systems (Lasker and Weiss, 2003; Mandell and Steelman, 2003).
- Systems with a high degree of mutual dependence versus systems with a low degree of mutual dependence (Gilroy and Swan, 1984; Swan and Morgan, 1992; Cigler, 2001; Himmelman, 2001; Mandell and Steelman, 2003).

Organising effective shared action within an organisation is logistically different to organising effective shared action involving people or organisations that are politically or organisationally autonomous (Powell, 1990; O'Toole, 1997; Jones et al., 1997; Agranoff and McGuire, 2001). Within an organisation compliance can generally be expected by virtue of its hierarchical structure. This is an efficient mechanism to facilitate shared action, assuming the managers have the administrative, technical and leadership skills to provide effective direction to their subordinates. However, once the bureaucratic boundaries of an organisation are crossed, it is no longer possible to assume the compliance of other actors, except by mutual consent (Powell, 1990; O'Toole, 1997; Jones et al., 1997; Agranoff and McGuire, 2001). In this circumstance, intra-organisational hierarchical methods of ensuring cooperation are neither possible nor appropriate.

On occasion, autonomous organisations or people may decide to enter into formal partnerships to share resources and to cooperate for mutual benefit. More commonly, organisations or people cooperate informally, unrestrained except by social convention and general legal statute.

Both within and between organisations there can be more intense patterns of shared work, depending on the strength, formality and history of relationships, and the extent and duration of resource sharing. There is general agreement that there is a continuum between forms of shared action in which actors are more independent and autonomous and those that involve increasing levels of commitment, trust and mutual interdependence (Gilroy and Swan, 1984; Swan and Morgan, 1992; Cigler, 2001; Himmelman, 2001; Mandell and Steelman, 2003). However, different authors use different classifications to describe this continuum (Figure 6.1).

A process of engaging in various efforts that alter or smooth the relationships of independent organisations, staffs, or A process of working together to achieve the Is more jointly planned and intensive day to day goals of the organisation. resources. nteragency Coordination Interagency Cooperation Collaboration Interagency organisations, Strong linkages among members. The purpose is specific, often complex, and usually very stable. Formal process and structural patterns of collaboration are and agreements that can range from Relatively low levels of intensity in linkages maintain their organisational autonomy. Members join or disconnect with ease, ... the collaboration. stable. specific shared, common goals established Require commitment of resources beyond do not generally have marginal costs. can cooperate on one or more activities but informal to somewhat formal. Organisations Informality governs procedural and structural unit has delegated considerable autonomy to usually expressed in writing ... each member **Collaborative Partnership** by the member units. Membership is more information sharing and generally entail Coordinating Partnership patterns: Usually existing for information exchange. Cooperative Partnership member organisations can Exchanging information, altering activities, sharing resources and a willingness to and sharing resources for mutual benefit and and altering activities for a common purpose: Exchanging information for mutual benefit Ę amounts of time, and extensive sharing of the highest level of trust, considerable benefit and a common purpose: it requires enhance the capacity of others for mutual significant sharing of turf. amounts of time, high levels of trust, and a common purpose: it requires significant Exchanging information, altering activities, include sharing turf. it requires more time and trust but does not sharing of turf. does not require much time or trust or the Exchanging information for mutual benefit: it Collaborating Coordinating Cooperating

Figure 6.1 Comparison of different classifications of inter-organisational networks

Mandell and Steelman (2003)

Himmelmann (2001)

Networking

Swan and Morgan (1992)

Networking Partnership

Gilroy and Swan (1984)

accomplish an objective. Members may cooperate on a number of activities, but the organisations are adjusted mutually to commitment to each other is at arms length. The policies and procedures of two or more Intermittent coordination

Temporary Task Force

on a specific and limited purpose and will accomplish a purpose. It is set up to work Ad hoc activity among organisations to disband that purpose is accomplished.

Regular coordination

in limited activity to achieve a common purpose. This requires commitment of Two or more organisations agree to engage resources beyond information sharing.

Coalition

sequential or simultaneous activity of participant organisations. The purpose is specific and involves long term commitment. organisations themselves or involve All actions occur within the participant taken, but the purpose is narrow in scope. Occurs when interdependent actions are

Network

that reach beyond the simultaneous actions strategically interdependent action. of independently operating organisations structural arrangement takes on broad tasks Typified by a broad mission and joint and The

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The definitions authors offer for a "network" is illustrative (Table 6.1). Most authors suggest network is a generic term to describe any reasonably stable group of actors and the relationships that link them (Wasserman and Faust, 1994; Moore, 1997; Borgatti and Forster, 2003; Goodwin et al., 2004). Nutbeam (2001) and O'Toole (1997) specify that networks are necessarily non-hierarchical. Himmelman (2003) and Cigel (2003) specify that a network implies relatively loose linkages between members who do not share significant resources. In contrast Mandel and Steelman (2003) argue that a network implies a "strong commitment to overriding goals and members agree to share significant resources over a long period of time". To overcome this confusion it is worth returning to the dictionary definition and linguistic derivation of some key terms.

A group of people who exchange information, contacts, and experience for professional or social purposes (Moore, 1997, p899).

A social network consists of a finite set or sets of actors and the relation or relations defined on them. The presence of relational information is a critical and defining feature of a social network (Wasserman and Faust, 1994, p20).

Any moderately stable pattern of ties or links between organisation and individuals, where those ties represent some form of recognisable accountability (however weak and however often overridden) whether formal or informal in character, whether weak or strong, lose or tight, bounded or unbounded (Goodwin et al, 2004, p13).

Networking is defined as exchanging information for mutual benefit, it does not require much time or trust nor the sharing of turf. It is very useful strategy for organisations that are in the initial stages of working relationships (Himmelman, 2001, p277).

Organisations working together with very loose linkages are networking partnerships, usually existing for information exchange. Members join or disconnect with ease, without threatening the partnership's existence. Informality governs procedural and structural patterns; member units can maintain their organisational autonomy. Resource sharing primarily involves the exchange of ideas news and reports (Cigler, 2003, p 74).

A grouping of individuals, organisations and agencies organised in a non-heirachical basis around common issues or concerns, which are pursued proactively and systematically, based on commitment and trust (Nutbeam, 1998, p361).

Structures of interdependence involving multiple organisations or parts thereof, where one unit is not merely the formal subordinate of the others in some larger hierarchical arrangement (O'Toole, 1997, p 45).

A Network structure is typified by a broad mission and joint and strategically interdependent action. The structural arrangement takes on broad tasks that reach beyond the simultaneous actions of independently operating organisations (i.e. action that may include, but reaches beyond, coordination, task force or coalition activity. There is a strong commitment to overriding goals and members agree to commit significant resources over a long period of time (Mandel and Steelman, 2003, p 197).

Table 6.1: Literature definitions for "network"

6.4. DEFINING NETWORKS

The Oxford dictionary defines a network as "a group of people who exchange information, contacts and experience for professional or social purposes" (Moore, 1997, p 899). Network is a derivation of "net" which emphasises the interlaced pattern of interaction between people and organisations. This is consistent with the definition of network offered in social network analysis "a finite set or sets of actors and the relation or relations defined on them" (Wasserman and Faust, 1994, p20). This thesis adopts "network" as the general term for any reasonably stable group of actors that interact or exchange information or resources around a specific relationship or set of relationships. No particular type or structure of these relationships is implied. Networks may be intra-organisational or inter-organisational, hierarchical or non hierarchical, formal or informal, depending on the type of relationship studied and the social structure in which the relationship is embedded.

6.5. INTRA-ORGANISATIONAL NETWORKS

Intra-organisational networks may be classified as either:

- hierarchical (vertical) networks: Hierarchical networks are common in organisations. They are efficient for managing clearly specified tasks that can be facilitated by central co-ordination of a management team, and through the drafting of formal written policies and procedures (Powell, 1990; O'Toole, 1997).
- non-hierarchical (horizontal) networks: In domains of rapid technological change and uncertain inputs and outputs, organisations are increasingly using non-hierarchical (horizontal) networks to respond to their complex operational environment (Jones et al., 1997; Pedler, 2001; Hill, 2002). In these circumstances, the efficiency gained by centralised hierarchical coordination may become a bottleneck when the speed, amount and type of information processing necessary to complete a designated task exceeds the expertise and capacity of the centralised management system. Non-hierarchical networks are more flexible and innovative in these circumstances (Leavitt, 1951;

Powell, 1990; Jones et al., 1997; Lasker et al., 2001; Keast et al., 2004).

6.6. FORMAL INTER-ORGANISATIONAL NETWORKS: COALITIONS, ALLIANCES AND PARTNERSHIPS

Formal inter-organisational networks can be classified in terms of the degree and scope of the ongoing commitment to work together:

- Coalition: The Oxford Dictionary defines a coalition as "a temporary alliance for combined action, especially of distinct parties forming a government or of nations" (Moore, 1997, p 245) and implies a formal agreement between parties. However, no long term relationship is necessarily assumed.
- Alliance: An alliance is defined as *"a union or agreement to cooperate, especially of nations by treaty or families by marriage"* (Moore, 1997, p 34). Members of an alliance typically act independently, except under the terms specified by the alliance agreement.
- Partnership: A partner is defined as "a person who shares or takes part with another or others, especially in a business firm with shared risks or profits", or "either member of a married couple, or an unmarried couple living together" (Moore, 1997, p978). It is a derivation of the Middle English parcener – "joint heir". Based on this derivation, a partnership implies a longstanding relationship between partners with mutual obligations mandated by contractual agreement or by common law that relates to most aspects of their shared work.

6.7. INFORMAL INTER-ORGANISATIONAL NETWORKS: KNOWLEDGE NETWORKS, CO-OPERATING NETWORKS, CO-ORDINATING NETWORKS, COLLABORATIVE NETWORKS

Inter-organisational networks are frequently based on informal relationships. They can be classified in terms of the degree of commitment of time, expertise and resources shared to maintain network activities. *Knowledge networks* share information but there is no commitment of resources beyond the exchange of information, brochures and reports. The terms *co-operate*, *co-ordinate* and *collaborate* imply that actors are actively working together. However, *co-ordinate* implies that this co-operation results in the improved *order* of network activities, while *collaborate* implies sharing the burden ("labour" or toil") as well as the benefits of working together (Moore, 1997).

Based on the this analysis, this chapter adopts the following classification to describe the continuum of informal inter-organisational network activities:

- Knowledge Networks exchange information for mutual benefit.
 Members maintain organisational autonomy. Resource sharing is limited to the exchange of information, brochures and reports.
- Co-operative Networks exchange information and members acknowledge and accommodate the overall objectives of the network and other network members.
- Co-ordinating Networks exchange information and members adopt common objectives after negotiation between network members.
 Membership is more stable, with attention given to who joins and who leaves. Network members pool resources to meet shared objectives, but maintain autonomous control over the assignment of their organisation's resources.
- Collaborating Networks display ongoing commitment to other network members and the shared objectives of the network. The purpose is specific, often complex and typically long term. Membership is stable and the addition or loss of network members may have significant detrimental effects on the network. Members share resources to meet network objectives and are willing to delegate some responsibility for the assignment of these resources to the network itself. There may be attempts to formalise network activities through written objectives, policies and reporting processes, however these do not necessarily imply binding legal agreements between network members.

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Increasing commitment

Figure 6.2: The network pyramid - a model of intra-organisational and inter-organisational networks

6.8. A CLASSIFICATION OF NETWORK ORGANISATION: THE NETWORK PYRAMID

In an attempt to provide some clarity to this perplexing area, this chapter proposes the "Network Pyramid" (See Figure 6.2), a typology to facilitate dialogue when discussing different types of networks and to dispel the myth that there is a single network type that is ideal in all circumstances. Different network structures are useful for different purposes, and the type of network that can be mobilised is dependent on the history and social structure of a community.

All human networks are built on a foundation of informal social structure and convention. While organisational hierarchies, coalitions, alliances and partnerships may formalise this social structure, they cannot supersede it. Whether enforced by intra-organisation structure or by inter-organisational contractual agreement, formalised patterns of network interaction cannot breach the deeply embedded social conventions of the social network or the common law principles of their society. A manager, despite their

organisational authority, is not entitled to expect a subordinate to undertake illegal or fraudulent activity, or act in a way that intentionally harms other employees or the community. Similarly, a contract between organisations is not legally enforceable if it breaches the common law statutes of a society. Social convention whether informal (social expectations) or formal (common law) are the foundation on which all other patterns of interaction are built.

Provided formal networks do not breach underlying social convention and are organisationally capable of meeting their objective they can be efficient. Most actors will comply with reasonable direction within the legitimate domain of organisational authority or inter-organisational agreement. In contrast, informal social systems require more "on the go" negotiation to achieve sufficient consensus to act. However, networks that have a history of successful interaction and a shared understanding of the problem may be able to develop sufficient consensus to act in an efficient and timely manner.

Within any network at any specific time, the pattern of social relationships may vary substantially between different individuals, subgroups and organisations. While certain individuals, groups or organisations may collaborate very closely, others may cooperate but maintain their autonomy, others merely exchange information, while others may not interact at all. Relationships within a network may be formal or informal. Networks may also change over time. In particular, informal networks can rapidly remodel themselves in response to their environment.

While acknowledging the fluidity of human social networks, this typology is proposed as a tool to characterise the general pattern of relationships observed within a network.

6.9. FROM METAPHOR TO METHDOLOGY: SOCIAL NETWORK ANALYSIS

If indeed networks are important vehicles for the promotion of community safety, it is necessary to develop methodolgies able to describe and analyse how these social systems work (Wellman, 1988; Wasserman and Faust, 1994).

The standard approach of epidemiology and sociology was to define a population and study a representative sample of individuals within this

population. A key assumption was that the attributes and behaviour of these individuals were independent (Wasserman and Faust, 1994). When researchers were confronted with interdependent observations they sought to remove these "confounding variables". At best they were a nuisance, at worst they undermined the validity of their models. However, in human systems, the interdependence of actors and their environment (the capacity of individuals to influence each other, modify their environment and be influenced by their environment) is not just a methodological inconvenience, but an essential characteristic of social interaction (Robins and Pattison, 2005b).

Social Network Analysis (SNA) takes a structural perspective of social interactions, arguing that behaviour is not solely influenced by the beliefs, attitudes and capabilities of individuals, but also by their socio-ecological context. There has been a recent growth of interest in SNA. Published studies have grown exponentially since the 1970's (Figure 6.3).



Figure 6.3: Growth of publications indexed by sociological abstracts containing "social network" in the abstract or title (Borgatti and Foster, 2003)

6.10. SOCIAL NETWORK ANALYSIS: A SHORT HISTORY

The importance attributed to social structure as a determinant of the behaviour of social systems and individuals embedded within these social systems has a history dating back to the genesis of sociology. Auguste Comte (1798-1857), the founder of modern sociology, argued there were two key elements to the study of sociology, statics and dynamics (Abercrombie et al. 1994; Freeman, 2004). While dynamics studied the "general laws of social development", statics studied the "anatomy" of society or the "laws of social interconnection". Émile Durkheim (1858 – 1917) insisted that society was more than the sum of its parts. In contrast to utilitarian tradition of British social thought which concieved of society as nothing more than an collection of individuals united by self interest, Durkheim argued that individuals were moulded and constrained by social phenomenon. These "social facts" could not be explained in terms of the actions and motivation of individuals (Abercrombie et al. 1994). Georg Simmel (1858 – 1918) argued "Society exists where a number of individuals enter into interaction" and went on to specify that:

A collection of human beings does not become a society because each of them has an objectively determined or subjectively impelling life content. It becomes a society only when the vitality of these contents attains a form of reciprocal influence; only when one individual has an effect, immediate or mediate upon another, is mere spatial aggregations or temporal succession transformed into society. If therefore, there is to be a science whose subject matter is society and nothing else, it must exclusively investigate these interactions (Simmel 1908, cited Freeman 2004, p 15).

In the 20th century, a number of diverse strands independently shaped the development of present day SNA.

The "gestalt" school of psychology had a critical influence on the genesis of SNA. At the beginning of the century a number of German pyschologists became interested in the way the human mind transformed sensory stimuli into perceptions. They were intrigued by the tendency of the mind to impose form on sensory stimuli, especially visual stimuli (Bootzin et al., 1986). It became clear that the brain recognised overall patterns of sensory stimuli, or "gestalts" (the German word for "form", "shape" or "whole"). A gestalt may

have properties that cannot be inferred from observation of its component parts. In social psychology, this school of thought emphasised the importance of social context (the whole) on the behaviour of individuals (a component part).

In the 1930's many leading gestalt theorists fled Nazi Germany for the United States of America. Jacob Moreno, Kurt Lewin and Fritz Heider became important proponents of gestalt social psychology (Scott, 2000).

Many identify a 1934 publication by Jabob Moreno's (1889-1974) "Who Shall Survive" as the signal event in the history of SNA (Wasserman and Faust, 1994; Freeman, 2004). Moreno argued the importance of social structure or "psychological geometry", which he later called "sociometry". Along with his collaborator, Helen Jennings, he conducted a number of systematic studies of social systems in the 1930's. He "invented", the sociogram (a graphic representation of a social system) to describe and interpret his results (Wasserman and Faust, 1994; Freeman, 2004).

Kurt Lewin (1890-1947) established a research centre at Massachusetts Institute of Technology (MIT) that focused on "field theory", the internal and external "forces" that impact on individual behaviour. A social field consisted of a combination of "points" (individuals) connected by "paths" (interactions), a concept not dissimilar to Moreno's sociometry (Scott, 2000). Lewin's advocacy of mathematical modelling of group relationships, provided a critical foundation for later work (Scott, 2000).

Fritz Heider researched how "cognitive balance" impacted on interpersonal relationships. Heider was especially interested in "interpersonal balance", in which there was congruence in the attitudes held by members of an individual's immediate social environment.

After Lewin's unexpected death in 1947, most of his research group moved to the University of Michigan, where Dorwin Cartwright collaborated with mathematician Frank Harary to develop a formal mathematical model of Heider's "cognitive balance" theory (Cartwright and Harary, 1956). Together they pioneered the application of "Graph Theory" to group behaviour (König, 1936 cited in Scott, 2000; Cartwright and Zander, 1953; Harary and Norman, 1953) an innovation that formed the mathematical foundation of modern SNA. Graph theory isn't necessarily concerned with the representation of mathematic relationships diagrammatically, but rather with the mathematical description of the properties of a set of points (nodes) connected by a set of lines (edges). Using graph theory it became possible to mathematically describe and analyse group structure (Scott, 2000).

Before moving to the University of Michigan, Cartwright supported Alex Bavelas, one of Lewin's graduate students, in the completion of his doctoral dissertation (Scott, 2000; Freeman, 2004). Bavelas remained at MIT and went on to design a landmark study in SNA, which demonstrated the importance of an actor's network centrality (the degree to which they are central to network communication) to their personal influence and to overall network function (Bavelas, 1950).

At the beginning of the 20th century, Alfred Radcliffe-Brown (1881-1955) was an eloquent advocate for a structural perspective of social systems. Based on his anthropological studies of indigenous people in the Andaman Island in the Bay of Bengal and in Western Australia he emphasised the importance of kinship and social subgroups (cliques) within social systems. He travelled extensively and taught in Cape Town, Sydney, Chicago, Birmingham and Oxford and in so doing influenced the development of two early schools of Social Network Analysis at Harvard University and Manchester University (Freeman, 2000).

The main intellectual thrust for the study of social structure at Harvard University came from W. Lloyd Warner (1898-1970). Warner worked with Radcliffe-Brown in the anthropological study of Australian Aborigines and returned to the United States keen to apply ethnographic field methods to the study of industrial communities (Freeman, 2004). Warner moved to Harvard where he collaborated with Australian psychologist Elton Mayo on a number of important studies of factory and community life in America and attempted to apply the structural ideas of Radcliffe-Brown.

The Western Electrical Company enlisted Mayo's support and subsequently Warners's, to study determinants of worker productivity. The so called

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"Hawthorne Study" used ethnographic methods to study the effect of group dynamics on worker productivity (Freeman, 2004). Later, the "Yankee City Study" confirmed the critical importance of social subgroups on social structure (Scott, 2000). In the "Deep South Study" Warner studied the effect of social class and race on social stratification. These studies are notable for their use of sociograms to report group structure (Scott, 2000; Freeman, 2004). Their strong focus on the effect of subgroups or cliques on social interaction laid the foundation for an important new domain of SNA research (clique identification and block modelling). Unfortunately, when Warner and his students moved on to other universities, the initial Harvard thrust was lost (Freeman, 2004).

The Manchester Group were even more strongly influenced by the structural ideas of Radcliffe-Brown than the Harvard group. However, instead of emphasising social integration and cohesion they were interested in the effect of conflict, power and change on social structure. While pursuing this interest, they managed to integrate concepts relating to the impact of social network structure with important contemporary sociology theory, especially the impact of personal values of actors, internalised from the norms and values of their social context (Scott, 2000).

In the 1960s, Harrison White precipitated a renaissance of social network research at Harvard University. White had studied mathematics and science at MIT, obtaining his PhD in theoretical physics in 1955. However, within one year of completing his PhD he pursued a longstanding interest in the social sciences, ultimately obtaining a second PhD in sociology in 1960. His dissertation was a social network study that involved the application of algebra in modelling organisational behaviour. White moved to Harvard in 1963 armed with exemplary training in physics, mathematics and structural sociology. Reza Azarian notes:

It is the schooling in theoretical physics rather than in classical sociology which, at least initially, provides the main frame of reference in his analysis of social phenomena (Azarian, 2000 cited Freeman, 2004, p 124).

His research regarding the algebraic description of actor roles resulted in a number of notable papers on block modelling (Lorraine and White, 1971;

White et al., 1976; Boorman and White, 1976; Heil and White, 1976), a suite of mathematical techniques used to analyse social structure (Wasserman and Faust, 1994). However, it was White's outstanding skills as an educator that made him such a critical catalyst for the development of modern SNA. Abbott (1994, cited in Freeman, 2004, p127) described White "as a man who has started sociological revolutions, introduced new techniques, and trained one of the finest groups of students in the discipline". Freeman (2004) comments:

A list of White's students is a virtual who's who in social network analysis. ... From the beginning, White saw the broad generality of the structural paradigm, and he managed to communicate both that insight and his own enthusiasm to a whole generation of outstanding students. Once this generation started to produce, they published so much important theory and research focused on social networks that social scientists everywhere, regardless of their field, could no longer ignore the idea. By the end of the 1970s, then, social network analysis came to be universally recognised among social scientists (Freeman, 2004, p 127).

Under White's tutelage, SNA had finally come of age. As his students pursued their international careers, the work of White and his British counterparts were united into a complex but increasingly coherent framework that formed the basis of modern SNA (Scott, 2000). However, it is important to understand that "social network analysis is not, in itself, a specific theory or set of theories" but rather "a series of mathematical concepts and technical methods" (López and Scott, 2000). The field is essentially defined by a suite of methodological techniques utilised by its proponents to quantitatively analyse social systems. Freeman (2004) suggests that four key concepts together define the field:

- 1. Social network analysis is motivated by a structural intuition based on ties linking social actors.
- 2. It is grounded in systematic empirical data.
- 3. It draws heavily on graphic imagery.
- 4. It relies on the use of mathematical and/or computational models.

6.11 CONCLUSION

Networks have been proposed as an effective response to the complex problems that plague modern society. Health practitioners, researches and administrators have enthusiastically embraced the network metaphor. By networking, sharing knowledge, expertise and resources, it is argued communities can be empowered to comprehensively and effectively promote their own health and safety. If this is indeed the case, it is important to move beyond the network metaphor to develop methodologies able to describe and analyse how this social process works.

Social Network Analysis is a suite of quantitative sociological research tools which analyse how individuals interact to create the structure and function within social systems, and just as importantly, how the contextual social characteristics of a social system determine the behaviour of individuals. This thesis seeks to test whether SNA could be used to describe the growth and structure of the Mackay Whitsunday Safe Communities, the mobilisation of human and other resources utilised by the network, and offer insight into how the coalition functions.

CHAPTER SEVEN SOCIAL NETWORK ANALYSIS OF MACKAY WHITSUNDAY SAFE COMMUNITIES: METHODOLOGY

7.1 SOCIAL NETWORK ANALYSIS

Social Network Analysis (SNA) in a quantitative sociological technique that seeks to map and analyse the patterns of relationship observed in a social network. In SNA the unit of analysis is not an individual actor but rather the relational ties that link a pair of actors, or dyad (Scott, 2000). By collating the set of relationships observed at a dyad level it is possible using graph theory (König, 1936 cited Scott, 2000; Cartwright and Zander, 1953; Harary and Norman, 1953) to mathematically describe a social system.

Social Network Analysis (SNA) takes a structural perspective of social interactions, arguing that behaviour is not solely influenced by the beliefs, attitudes and capabilities of an individual, but also by their socio-ecological context. Wasserman and Faust (1994) suggest four underlying theoretical principles that distinguish SNA from other research paradigms:

- Actors are interdependent, rather than independent autonomous units.
- Relational ties between actors are channels for the transfer or flow of information and resources (either material or nonmaterial).
- The social structure created by the pattern of relationships linking actors provides opportunities and constrains individual action.
- Network models conceptualise structure as lasting patterns of relations among actors.

However, the field of SNA is more accurately defined as a suite of mathematical concepts and techniques used to describe, quantify and analyse social systems, rather than a specific theory.

7.2 MATHEMATICAL FOUNDATIONS

A network can be represented as a *graph* G = (N,E) comprised of a set of social actors or *nodes* (N) and a set of relationships or *edges* (E) that connect a pair of nodes, where:

- N = {1,2, g} denotes a set of nodes. These actors can be persons, teams, organisations, countries, machines, or concepts.
- 2. E = {a,b, g} denotes a set of edges. Each edge represents a particular relationship linking a pair of actors. Data is collected in pairs or *dyads*. e_{ij} indicates the presence or absence of an edge or relational *tie* linking a pair of actors (i,j). When e_{ij} = 1, this indicates the presence of a tie, whereas if e_{ij}= 0, no tie was observed. Ties represent channels of information, resources, social exchange or associations connecting actors in a network (Wasserman and Faust, 1994). While typically these "ties" are relational, any type of interaction can be measured, including financial, informational or conceptual associations (Borgatti and Foster, 2003).

Depending on the type of relationship, ties can be:

- Directed in directional ralationships the reporting of a relationship e_{ij} by actor n_i does not necessarily imply that actor n_j will report the reciprocal relationship e_{ji} (e_{ij} ≠ e_{ji}). For example, the fact that actor n_i gives advice to actor n_i does not imply n_i gives advice to n_i,
- Undirected in undirected relationships the reporting of a relationship by one member of a pair of actors (dyad) n_i implies actor n_j has the same relationship (e_{ij} = e_{ji}). For example, the observation that n_l is married to actor n_j implies that n_j must also be married to n_l,
- Binary or dichotomous a relationship is either observed to exist (e_{ij} = 1) or not to exist (e_{ij} = 0),
- *Valued* in which the strength or frequency of an interaction is assigned a numerical value,
- Signed the relationship is observed to either be positive (e_{ij} = ⁺1), or negative (e_{ij} = ⁻1).
Data can be displayed graphically. A line indicates the presence of a relational tie linking two nodes or actors. Arrows are used if the relationship is directional. In social networks this graph is called a *sociogram* (Figure 7.1). A sociogram provides a spatial representation of the relationships identified by respondents.



Figure 7.1 Sociogram: Mackay Whitsunday Safe Communities Network Support Group, 2004

A network of social interactions can also be represented by a g x g *adjacency matrix* (Figure 7.2). In this matrix (M), the rows and columns correspond to individual actors or nodes (N) of the network graph (G). Each entry (m_{ij}) in the matrix, indicates whether a relationship is directed from an individual actor (n_i) to another actor in the network (n_j) . The entry equals 1 if the pair of actors (i,j) is a member of the set of edges or ties (E) observed in the network. In a dichotomous graph:

 $m_{ij} = 1$ if $(i,j) \in E$ (i.e. a tie is observed directed from i to j) $m_{ij} = 0$ if $(i,j) \notin E$ (i.e. no tie is observed directed from i to j)

The rows in the adjacency matrix represent the outgoing ties emanating from each actor, whereas the columns represent incoming ties. If the relationship is undirected, the matrix will be symmetrical.

	Actor 1	Actor 2	Actor 3	Actor 4	Actor 5	Actor 6	Actor 7	Actor 8	Actor 9	Actor 10	Actor 11	Actor 12	Actor 13
Actor 1		1	0	1	1	1	0	0	0	0	0	0	0
Actor 2	0		1	1	1	1	1	0	1	1	1	1	0
Actor 3	0	1		1	1	1	1	0	0	0	1	1	0
Actor 4	0	1	1		1	1	0	1	0	0	0	0	0
Actor 5	1	1	1	0		1	0	0	0	0	0	0	0
Actor 6	1	1	1	1	1		0	0	0	0	1	1	0
Actor 7	1	0	1	0	1	1		0	0	0	1	0	0
Actor 8	0	0	1	1	1	0	0		0	0	0	0	0
Actor 9	0	0	0	0	1	1	0	0		1	1	1	0
Actor 10	0	0	0	0	1	1	0	0	1		1	1	0
Actor 11	1	0	0	0	1	1	0	0	0	0		0	0
Actor 12	0	0	1	0	1	1	0	0	0	0	1		1
Actor 13	0	0	0	0	1	0	0	0	0	0	0	0	
NB. Data is directional and binary $(0 = no relationship, 1 = relationship)$													

Figure 7.2 Directional Adjacency Matrix: Mackay Whitsunday Safe Communities Network Support Group

When attention is focused on an individual actor, the actor is referred to as *ego* and the actors who have ties with ego are called *alters*. The ensemble of ego, their alters, and all the relationships that link them is called an *ego network*.

This mathematical representation can be used to calculate the effect of social interactions at the interpersonal level on the structure and characteristics of larger social systems. Conversely, it can also be used to calculate the effect of larger social systems on the individual and their interpersonal relationships.

While SNA is characterised by the collection of relational data, it is also possible to collect individual actor attribute data.

7.3 METHODOLOGICAL ISSUES

A critical decision during the design phase of any study, including a SNA, is defining the population under study. Two questions are of particular importance:

- 1. How will members of the social network be identified?
- 2. How will the boundary of the social network be defined?

Lauman et al (1983) reviewed strategies used to define a network. They distinguished between *realist approaches* (where the study population is empirically defined based on the network's perception of itself), and *nominalist approaches* (where investigators determine the study population based on theoretical considerations or the analytic purpose of the study). The network could be defined using one of three essential network characteristics: actors, relationships or activities (Lauman et al., 1983; Marsden, 1990).

- 1 Actors. Network membership may be defined by the group itself (for example, schools, clubs, workplace, department, organisations, or community group). Alternatively, network members may occupy a defined role within an organisation or social system (for example, professional communities or elites).
- 2 Relationships. Social relationships may themselves be used to identify the network (for example, friendship networks, support networks or snowballing procedures).
- 3 Activities. Participation in a shared activity (for example, attendance at an event, participation in a forum or publication in a specific journal) may be used for defining the network.

Networks do not exist in isolation and depending on the purpose of the study, relationships with external actors may be an important part of network function. Laumann et al. (1983) suggest that the partial system fallacy (omitting important actors from the study population) is potentially one of the most serious flaws in SNA study design.

If the purpose of this study was to investigate community affairs, or the relational or structural characteristics of Mackay Whitsunday Safe Communities (MWSC), then a "closed" design which investigated a network defined by a group of actors who were formal members of the MWSC would be meaningful. As the aim was to investigate how MWSC achieved its objectives, interaction with external actors was considered a critical part of its activities so a closed design was considered to have serious limitations. Given that important, in-kind, human and financial resources were likely to be accessed through both internal and external

relationships, it was decided that a network defined by the chain of relationships used to access and distribute these resources within MWSC would be more meaningful.

Snowballing is a methodology that progressively follows a chain of relationships emanating from an initial sample of key informants (Wasserman and Faust, 1994; Scott, 2000). This methodology was selected as it allowed respondents to delineate a network of relationships they believed made a significant contribution to the function of MWSC. Snowballing methodologies are traditionally used to identify "hidden populations". Typically these are hard to reach sub-populations of a larger study population; for example, criminal networks or illicit drug users (Thompson, 1997; Atkinson and Flint, 2001; van Meter, 1990; Petersen and Valdez, 2005; Kossinets, 2006). However, snowballing lends itself to identifying the "hidden population" of external actors who make a significant contribution to MWSC. As some of these actors may not even reside in Mackay Whitsunday, they may not be discovered using traditional population survey techniques.

A number of authors argue that SNA is especially vulnerable to bias introduced by missing data (van Meter, 1990; Griffiths et al., 1993; Scott, 2000; Atkinson and Flint, 2001; Chattoe and Hamill, 2005; Kossinetts, 2006). Missing data may be of two types, missing actors or missing relationships, and may occur in three ways:

- 1 Selection bias,
- 2 Non-participation bias,
- 3 Recall bias.

Kossinets (2006) demonstrated that network-level statistics can be dramatically affected by selection bias related to boundary specification issues. He conducted a sensitivity analysis of an empirical dataset (a scientific collaborative network) and demonstrated that failure to identify all members of a network would result in overestimation of network parameters, while failure to identify all relationships would result in an underestimation of network parameters. Borgatti (2004, personal communication) suggests that participation rates of at least 80% are necessary for network attribute calculations to be representative. Conscientious follow up of all network members is imperative if one is to conduct a successful SNA, particularly as non-participants may not arise randomly. Less engaged members of the network may either be less motivated to participate in the study or more difficult to contact.

The third source of bias is recall bias. Self reporting of relationships with other members of the network is the most common method used to collect network data. A number of researchers (Bernard and Killworth, 1977; Bernard et al., 1980, 1982 and 1984; Hammer, 1984; Sudman, 1985; Freeman et al., 1987; Sudman, 1988; Marsden, 1990; Feld and Carter, 2002) have reported marked discrepancies between the number of relationships respondents report during interviews (typically 20 or less) and their true network (typically hundreds of relationships), as estimated by daily logs of social contact, intensive probing techniques, extrapolation from indirect contacts, or "small world" studies. Importantly, there are systematic rather than random discrepancies between self reported and observed network data (Freeman et al., 1987; Marsden, 1990). Recognition methods (in which participants are offered a list of network members and asked to nominate who they know) are more complete than recall methods in which participants must actively recall other network members without prompting (Sudman, 1985, Sudman, 1988; Marsden, 1990). Network data that concern relationships that are frequent, closer or stronger are more likely to be accurately reported than relationships that are infrequent, distant or weak (Hammer, 1985; Marsden, 1990). While participants may struggle to accurately report social interactions within a specific time frame or context (Bernard and Killworth, 1977; Bernard et al., 1980, 1982 and 1984), they are able to report their "typical" social interactions with other network members (Freeman et al., 1987; Marsden, 1990). It is therefore meaningful to report participants' perceptions of their network. However, this does pose a challenge to researchers attempting to calculate network parameters based on this type of data.

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There are significant theoretical disadvantages to snowball samples:

- Snowballing follows a chain of *memorable* relationships emanating from the key informants used in the initial sample. It may therefore overlook less connected members at the periphery of the network (van Meter, 1990; Griffiths et al., 1993; Scott, 2000; Atkinson and Flint, 2001) and thereby overestimate network parameters (Kossinets, 2006).
- Snowball samples use a *recall* method. The network is defined by following the chain of relationships participants recall, rather than by a predetermined list of network members used to prompt participants. Given recall methods have been shown to systematically under-report network relationships (Sudman, 1985, Sudman, 1988; Marsden, 1990), they may underestimate network parameters (Kossinets, 2006).
- Snowball samples may give undue prominence to the personal networks of the key informants used in the initial sample (van Meter, 1990; Griffiths et al., 1993; Scott, 2000; Atkinson and Flint, 2001).

In light of the advantages of a snowballing approach but also these important disadvantages, a hybrid technique was adopted. MWSC members who had not been identified during the first snowball survey wave were added to the wave two sample. A MWSC member was defined as anyone minuted as having attended one or more meetings of one of the project's action groups. This ensured that all members of the MWSC were included; yet allowed respondents to identify external relationships they considered relevant to the function of MWSC. This methodology identified MWSC and its Support Network (MWSC and SN), a network of relationships involving community and external actors who cooperated to promote safety in the region.

This study seeks to assess the utility and validity of SNA as a tool to describe and analyse the function of MWSC and SN.

7.4 METHOD

The initial sample was conducted by surveying members of the MWSC Network Support Group (NSG). This phase of the study was undertaken in November 2003. Network members nominated by the NSG were surveyed during wave one of the study. This phase of the study was conducted in the first half of 2004. New actors nominated by wave one respondents were surveyed during wave two. The final phase of the study was conducted in the second half of 2004. At this stage, MWSC members not identified by wave one respondents were also surveyed. New actors nominated by wave two respondents were recorded, but not included in the study population.

Respondents were asked to actively recall and name individuals with whom they interacted in their work of promoting safety in the community. These people did not necessarily need to be members of the MWSC. This allowed all contacts within the sphere of influence of the MWSC to participate in the survey.

Participants were reassured that their participation was voluntary and all personal identifying information was kept confidential.

Network members who did not respond to the original mail survey were followed up in writing and if necessary a minimum of two attempts were made to contact them by telephone. Network members contacted by telephone were offered the opportunity to complete the survey over the telephone.

After the initial data collection phase, actors were identified by organisational role rather than individual contribution. In those intances where a particular role was undertaken by more than one individual over the course of the study, relationships were recorded by organisational role, not individual identity.

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Respondents were asked five questions in relation to the actors they identified as members of their personal MWSC & SN ego network (see Appendix Twenty-Three for sample questionnaire)

Q1. What relationship do you <u>currently have</u> with this person?

- No contact (0).
- Some contact (1) you share flyers and advertising materials, ask questions or refer clients to each other.
- Interagency meetings (2) you meet to share information and discuss mutual goals but work independently.
- Working committee (3) you collaborate at committee level to meet shared objectives agreed by the group.
- In depth collaboration (4) you collaborate to develop joint funding proposals, plans or projects, sharing time and resources to actively work together.
- Q2. What relationship did you have with this person <u>prior to your</u> <u>involvement</u> with the Mackay Whitsunday WHO Safe Communities (Note: this data was being recorded retrospectively)?
 - No contact (0).
 - Some contact (1).
 - Interagency meetings (2).
 - Working committee (3).
 - In depth collaboration (4).

Q3. Has this relationship changed as a *consequence* of the project?

- Worse (-1) our relationship has deteriorated as a consequence of our involvement in the project.
- Unchanged (0) our relationship remains unchanged, or any changes that have occurred are unrelated to the project.
- Better(+1) our relationship has improved as a consequence of our involvement in the project.

- Q4. What resources do you share with this person as a <u>consequence</u> of your involvement in the project?
 - We do not share resources.
 - We share *in kind resources* e.g. printing, photocopying written materials, library access, desk space, computer software or hardware.
 - We share *human resources* to collaborate on joint projects. This does not include attendance at meetings unless your involvement in the group requires you to commit extra time to meet shared objectives set by the group.
 - We share *financial resources* to collaborate on joint projects. That is, your organisation shared significant financial resources (> \$100) that once given are no longer under your direct control.

Q5. On balance have you found this relationship?

- Unhelpful (-1) the benefit obtained by working together does not justify the extra effort and resources required to maintain the relationship.
- Neutral (0) the extra effort and resources required is balanced by the benefit obtained by working together.
- *Beneficial (+1)* the benefit obtained by working together outweigh any extra effort and resources required to maintain the relationship.

Respondents were also asked to identify the type and extent of resources they shared, or shared on behalf of their organisation with Mackay Whitsunday Safe Communities as a whole.

- a. In kind resources
 - i. Photocopying (> 25 copies).
 - ii. Printing or resource materials(> 25 copies).
 - iii. Access to computing equipment.
 - iv. Desk space.
 - v. Office space.
- b. Staff time:
 - i. None.
 - ii. < 5 hours per week.
 - iii. 5 to 15 hours per week.
 - iv. 15 to 25 hours per week.
 - v. 25 to 35 hours per week.
 - vi. > 35 hours / week.
- c. Financial resources
 - i. None.
 - ii. < \$100.00 per annum.
 - iii. \$100.00 to \$500.00 per annum.
 - iv. \$500.00 to \$1000.00 per annum.
 - v. \$1,000.00 to \$5,000.00 per annum.
 - vi. \$5,000 to \$10,000.00 per annum.
 - vii. \$10,000 to \$50,000 per annum.
 - viii. \$50,00.00 to \$100,000 per annum.
 - ix. > \$100,000 per annum.

Directional adjacency matrices and sociograms were constructed for each question:

- Q1. Relational matrix and sociogram for 2004 (valued),
- Q2. Relational matrix and sociogram for 2000 (valued),
- Q3. Changed relationship matrix (signed),
- Q4. Resource sharing matrices and sociograms,
 - a. In-kind resources (2004) matrix and sociogram (binary),
 - b. Human resources (2004) matrix and sociogram (binary),
 - c. Financial resources (2004) matrix and sociogram (binary),
- Q5. Beneficial relationship matrix and sociogram, 2004 (signed).

7.5 INDIVIDUAL NETWORK ATTRIBUTES

These matrices were used to calculate the following network attributes of individual actors and their relational ties using UCINET 6.74 software (Borgatti et al., 2002):

- Degree. The degree of an individual actor (ego) is the number of ties linking them to other actors in the network (Scott, 2000). In directed networks *in degree* can be distinguished from *out degree*. *In degree* is the number of ties directed towards ego by other actors in the network (i.e. the sum of the column for an individual actor in the adjacency matrix). *Out degree* is the number of ties directed from ego to other actors in the network (the sum of the row for that actor).
- Path. A path is a sequence of ties joining two actors in a network. A number of different paths may be possible. The path length d_{ij} is the number of ties traversed to connect the two actors (Degenne and Forsé, 1999).
- Geodesic path. The shortest path connecting two actors (Degenne and Forsé, 1999).
- Distance. The geodesic distance is the length of the geodesic path (Degenne and Forsé, 1999).

	Diagrammatic Representation	Description
Degree Centrality		The absolute count of the number of relationships maintained by an actor. It is a measure of an actor's immediate sphere of influence. In directional matrices "in-degree centrality", the number of times ego is nominated by other actors, can be distinguished from "out-degree centrality", the number of relationships nominated by ego.
Closeness Centrality		The "farness" of an actor is the sum of the shortest path (geodesic) between this actor (ego) and all other actors within the network. The reciprocal of farness is closeness centrality. Actors with higher scores are closer to the rest of the network and can thereby communicate more efficiently. Closeness can be normalised by dividing the maximum closeness score (n-1) by absolute closeness. It is then expressed as a percentage of the maximum possible closeness score.
Betweeness Centrality		The number of occasions an actor is situated on a geodesic pathway connecting two other actors in the network. Actors with high betweeness scores are therefore in a better position to control the flow of information. They can either act as brokers (facilitators of information exchange) or as gatekeepers (i.e. they selectively prevent the passage of information).

Table 7.1 Freeman's (1979) Measures of Actor Centrality

5. Centrality. Centrality is one of the most important and widely used conceptual tools for studying the prominence of individual actors within a network (Everett and Borgatti, 2005). Empirical studies have confirmed theoretical suspicions that the most "central" actors are also the most powerful actors (Markovsky et al., 1988; Brass and Burkhardt,1993). They possess the greatest leadership potential in a social network. Freeman (1979) proposed three measures of actor centrality: degree centrality, closeness centrality and betweeness centrality (Table 7.1).

- 6. *Isolate*. Actors who do not have a relationship with any other network members (Scott, 2000).
- Local Clustering Coefficient C_i of an actor is the proportion of dyads to whom actor i is connected that are connected to each other (Robins et al, 2005a).

7.6 GLOBAL NETWORK CHARACTERISTICS

Global network characteristics were also calculated using UCINET 6.74 software (Borgatti et al., 2002):

 Density is a commonly calculated measure of network cohesion. The density of a group is defined as the number of edges or relationships observed divided by the total number of possible relationships. For a directed graph (Scott, 2000):

Density =
$$\frac{l}{N \times (N-1)}$$

Where *I* = the number of ties or *lines* joining all actors in the network

N = total number of actors in a network

 Average Degree Some authors (Friedkin, 1981) have questioned the value of density as a measure of cohesion given that it is logarithmically dependent on the size of the network (large networks typically demonstrate very low densities). Average Degree is another commonly cited measure of cohesion. Degree is the number of ties observed for an individual actor. Average degree is therefore the average number of relationships observed for each actor in the network (Scott, 2000).

Average Degree =
$$\frac{1}{N}$$

- 3. Average distance. The average geodesic distance between all nodes.
- Distance weighted fragmentation. The average of the reciprocal of the distances between all actors, which ranges between 1 and 0. Larger values indicate more fragmentation of the network (Borgatti et al., 2002).

- Distance based cohesion. Equals 1 minus the distance weighted fragmentation. Larger values indicate the network is more cohesive (Borgatti et al., 2002).
- Clustering Coefficient C is the average value of the local clustering coefficient across all nodes (Robins et al, 2005a; Watts 1999; Borgatti et al., 2002).
- Centralisation. A measure of how tightly a network is organised around its most central point, i.e. a central actor or group of actors (Scott, 2000). For a given binary network with vertices v₁....vn and maximum degree centrality c_{max}, the network degree centralization measure is ∑(c_{max} c(v_i)) divided by the maximum value possible (n 2), where c(v_i) is the degree centrality of vertex v_i (Borgatti et al, 2002).
- 8. *Core periphery structure*. The tendency of a network to form around a core group of central actors who themselves have cohesive (i.e. dense) relationships with each other (Borgatti and Everett, 1999).
- 9. Triad Census. A Triad is a (sub-) network consisting of three nodes and the ties that connect them (Scott, 2000). While the dyad represents an interpersonal interaction between two actors, the triad is the first and most basic manifestation of social interaction in which the presence of a third actor may influence the interaction between the other two actors in the triad. It is argued that triadic structures are the building blocks of larger social systems (Scott, 2000). Thus, the balance of social interactions observed at the triad level may be used to predict the structure and properties of the overall network (Degenne and Forsé, 1999). The *Triad Census* is the frequency distribution observed for the sixteen possible permutations of relationships connecting any group of three actors (de Nooy et al., 2005). The Triad census was calculated using Pajek 1.02 (Batagelj and Mrvar, 2004; deNooy et al., 2005).

Sociograms were drawn using NetDraw 1.45 software (Borgatti et al., 2002). A block-model of MWSC & SN was drawn by modelling the known membership of network action groups actors. Where an actor was active in more than one group they were assigned to the group with which they had the greatest number of relationships. Action group members who were simultaneously members of the NSG were assigned to the NSG.

7.7 CONCLUSION

Social Network Analysis was used to describe, quantify and analyse the MWSC social system. It was considered an appropriate methodology for this study because it takes a structural perspective of social interactions, arguing that behaviour is not solely influenced by the beliefs, attitudes and capabilities of individuals, but also by their socio-ecological context.

The network was delineated using a snowballing technique to follow up the chain of relationships emanating from the Network Support Group through three survey waves between November 2003 and December 2004. Respondents were asked to actively recall actors with whom they interacted in their work of promoting community safety, including people who were not members of Mackay Whitsunday Safe Communities, thus allowing all contacts within the sphere of influence of the coalition to be identified and importantly, allowing assessment of the mobilisation of resources, whether in kind, human, social or financial resources mobilised by Mackay Whitsunday Safe Communities.

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CHAPTER EIGHT STRUCTURE AND FUNCTION OF MACKAY WHITSUNDAY SAFE COMMUNITIES: A SOCIAL NETWORK ANALYSIS

8.1 INTRODUCTION

In 1986, the First International Conference on Health Promotion held in Ottawa re-emphasised the environmental and social determinants of health, redefining health promotion as the process of enabling people to increase control over, and improve, their health. It was recognised that could not be achieved by the health sector alone but required the co-operative action of "individuals, community groups, health professionals, health service institutions and governments" (WHO, 1986). The Ottawa Charter highlighted the importance *of strengthening community action*, one of its five domains of health promotion action:

"Health Promotion works through concrete and effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. At the heart of this process is the empowerment of communities. ... Community development draws on existing human and material resources in the community to enhance self help and social support, and to develop flexible systems for strengthening public participation in and direction of health matters (WHO, 1986)."

The Mackay Whitsunday Safe Communities (MWSC) was implemented under this community development health promotion model. Evaluation of the network therefore required a research tool capable of describing, analysing and assessing the effectiveness of this community development process.

Social Network Analysis (SNA) was applied as an evaluation tool. Although Sefton and Hawe (2002) undertook a simple SNA as one strategy in an suite of evaluation tools used to assess three pilot Safe Community programs, the present study is the first to conduct a comprehensive SNA of a safety promotion coalition.

This study seeks to assess the utility and validity of SNA as a tool to describe and analyse the function of MWSC and its external Support Network (SN).



8.2 Mackay Whitsunday Safe Communities and Support Network

The twelve members of the NSG identified 85 additional network members who were surveyed in *wave one*. The 52 network members identified by wave one respondents were surveyed in wave two (Figure 8.1). Minutes of MWSC action groups were reviewed to identify any MWSC members not yet nominated. An additional 21 MWSC members were identified. Seven could not be contacted while three refused the opportunity to participate. Two of these non-participants did not receive any subsequent nominations during wave two of the study. As the study was unable to identify any evidence of relationships involving these two actors, or "isolates", they were excluded from further analysis. The remaining 19 actors joined the Wave Two Network to form the study population, the MWSC and SN. This provided a network of 168 members. One hundred and twelve (67%) were members of the MWSC while 56 (33%) were external actors. One hundred and forty-eight individuals agreed to participate, giving an overall response rate of 87%. Notably, one half of non participants were network. members included in the study as a result of reviewing the project minutes. In this group the participation rate was only 52%.

Wave two respondents identified a further 74 additional actors, who were not surveyed (in accordance with study protocol). Ten (14%) of these were members of the MWSC but had joined the network after the completion of wave one (July 2004). The remaining 64 (86% of new actors identified during wave two) were not members of the MWSC. Forty-seven (64%) of these individuals were identified by actors who were themselves external to the project. Indeed, 23 (31%) were identified by 3 actors who were not members of the MWSC. Two actors, non members of the MWSC, were identified as part of the network in 2000 but were no longer involved in 2004. They therefore appear as isolates in Figure 8.1.

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The sociogram of MWSC and its SN is shown in Figure 8.2. Actors were categorised according to the action groups they were affiliated with. Actors who were members of more than one action group were assigned to the group with which they maintained the most relationships. Members of the NSG who were also members of an action group were assigned to the NSG.

At the time of the study MWSC consisted of eight action groups:

- Network Support Group (NSG),
- Child Injury Prevention Mackay (ChIPP),
- Child Injury Prevention Whitsunday,
- Alcohol and Injury Group,
- Occupational Health and Safety Group,
- Road Accident Action Group (RAAG),
- Young Drivers Group.

MWSC also maintained relationships with a number of local, state, national and international organisations and groups, including:

- The Building Safer Communities Action Team (BSCAT) Whitsunday,
- Community Crime Prevention Partnership (CCPAT) Mackay,
- Mackay Alcohol and Other Drugs Community Partnership,
- Queensland Injury Surveillance Network (QISU),
- Queensland Child Injury Prevention Project (ChIPP) in association with Injury Prevention and Control Australia (IPCA),
- School of Public Health, Tropical Medicine and Rehabilitation Science (SPHTMRS), James Cook University,
- Tropical Population Health Unit (TPHU), Queensland Health,
- Walking Bus Program, Queensland University of Technology,
- Australian Injury Prevention Network (AIPN),
- World Health Organisation Collaborating Centre on Community Safety Promotion (Karolinska Institute, Stockholm, Sweden).

The observed structure of the MWSC and its SN is shown in Figure 8.2.



Ch 8. Structure and Function of Mackay Whitsunday Safe Communities: A Social Network Analysis

8.3 TRIAD CENSUS

Triad number	Description	Observed frequency	Expected frequency	Ratio Obs / Exp
Triad 1 003*	Empty Triad	663,086	624,046	1.06
Triad 2 012*	Unreciprocated relationship	71,658	138,677	0.52
Triad 3 102*	Reciprocated relationship	28,284	2,569	11.01
Triad 4 021D*	Heirachy "out star"	752	2568	0.29
Triad 5 021U*	Heirachy "in star"	2314	2568	0.90
Triad 6 021C*	2 path "mixed star"	1898	5136	0.40
Triad 7 111D*	Reciprocated relationship & incoming tie	3504	190	18,44
Triad 8 111U*	Reciprocated relationship & outgoing tie	1697	190	8.93
Triad 9 030T*	Transitive triad	287	190	1.51
Triad 10 030C*	Cycle	19	63.41	0.30
Triad 11 201*	Reciprocated heirachy	1521	3.52	432.10
Triad 12 120D*	Triangle	338	3.52	96.03
Triad 13 _{120U} *	Triangle	139	3.52	39.49
Triad 14 120C*	Triangle	153	7.05	21.70
Triad 15 210*	Triangle	343	26	1319
Triad 16 300*	Triangle	223	0.002	138,441

* for description of triad classification system, please see entry entitled "triad census" in Glossary

Table 8.1 Triad census

Triads describe relationships within a group of three actors (deNooy et al., 2005). Whereas dyadic forces concern interpersonal forces acting between a pair of actors, triadic forces are the first manifestations of social interaction, where interpersonal relationships are modulated by the presence of the third party. The *Triad Census* is the frequency distribution of the triads observed in a network. There are sixteen possible permutations of relationships connecting any group of three actors (de Nooy et al, 2005). Table 8.1 compares the observed frequency of each triad in the MWSC and SN with the expected frequency if relationships in the network were randomly distributed. It is clear that the relationships within MWSC and SN are not randomly distributed. Triads 2, 4 and 10 occur less frequently than would be expected by chance, whereas triads 3, 7, 8, 9 and 11 through 16 occur more frequently than would be expected by chance.

Empty triad	1 - 003 obs/exp = 1.1				
Paths	6-021C	10 - 030C			
	obs/exp = 0.4	obs/exp = 0.3			
Unreciprocated ties	2 - 012	6 - 021C	10 - 030C		
	obs/exp = 0.5	obs/exp = 0.4	obs/exp = 0.3		
Hierarchies	5 - 021U	4 - 021D			
	obs/exp = 0.9	obs/exp = 0.3			
Reciprocated ties	3 - 102	8-111U	7-111D	11 - 201	
	obs/exp = 11	obs/exp = 8.9	obs/exp = 18	obs/exp = 432	
Transitivity (triangles)	9 - 030T obs/exp = 1.5				
Triangles with reciprocated ties	14 - 120C	13 - 120U	12 - 120D	15 - 210	16 - 300
	obs/exp = 22	obs/exp = 40	obs/exp=96	= 1319	=138,441

obs/exp = the ratio of the observed frequency of triads in the MWSC and SN to the expected frequency if relationship were randomly distributed.

Table 8.2 Classification of triads in terms of Interpersonal forces

Table 8.2 classifies triads in terms of the local social forces acting within them. It is important to note that more than one interpersonal force may be acting in each triad. Accordingly triads may be listed more than once in Table 8.2. Three local triad configurations were observed less frequently than would be expected by chance:

- Paths a path is a sequence of ties joining two actors in a network. Actors generally prefer to interact directly with other actors if possible, as intermediaries may on occasion, by omission or commission, fail to transmit information accurately. The longer a path, the more inefficient this channel of communication becomes.
- Unreciprocated relationships only one member of a dyad nominates the relationship. Unreciprocated relationships (triads two, four, six and ten) occurred at less than half the rate expected by chance.
- 3. Hierarchies either one actor reports relationship with two other actors (triad 4, the "out star") or the two other actors report to this actor (triad 5, the "in star"). Bevelas (1950) empirically confirmed the theoretical suspicion these "central" actors gain social leverage from this structural opportunity. If possible, other actors prefer to relate directly to other members of network, thereby circumventing the social leverage gained by these central actors.

Contrastingly, two types of local forces occur more frequently than expected by chance:

 Reciprocity - the tendency for social actors to share two way relationships is the most important dyadic force. Reciprocated relationships (triads 3, 7, 8 and 11) occurred at least nine times more frequently than would be expected by chance. Note there are other dyadic forces. For example, homophily - the tendency of similar actors to form relationships, or heterophily - the tendency for opposites to attract (e.g. gender based relationships). These types of dyadic forces were not studied in this analysis. 2. Triangles – the tendency of actors to cluster in small groups. The transitive triad (Triad 9) describes the introductory social force. If actor a knows actor b, and actor b knows actor c, then it is likely that actor b might introduce actor a to actor c who may subsequently form a relationship. A number of other triangle configurations are possible with varying degrees of reciprocation (triads 12, through 16) and were observed far more frequently than would be expected if relationships in MWSC and SN were randomly distributed.

8.4 NETWORK ATTRIBUTES

Key attributes of the networks under study in 2004, Mackay Whitsunday Safe Communities (MWSC), its Support Network (SN) and the combined network (MWSC and SN) are listed in Table 8.3.

	MWSC	SN	MWSC and SN
Network Members	112	56	168
Reciprocity	33%	29%	30%
Transitivity	33%	44%	26%
Density			0.036
- directed matrix	0.048	0.043	
- symmetrised matrix	0.069	0.067	
Average Degree			5.9
- directed matrix	5.5	2.2	
- symmetrised matrix	8.3	3.4	
Average Distance	2.7	2.5	2.8
Distance based cohesion	0.29	0.10	0.34
Centralisation	40%	18%	43%
Clustering co-efficient	0.50	0.44	0.50

Table 8.3 Network attributes of the MWSC and SN, 2004

The density of the MWSC and SN networks are similar. However, members of the SN identified fewer relationships among themselves (average degree = 2.2) than members of the MWSC (average degree = 5.5). Relationships within the MWSC are more centralised through a core group of actors (centralisation = 40% for the MWSC compared with 18% for the SN).

8.5 VERIFICATION OF NETWORK ATTRIBUTE ESTIMATES

Table 8.3 compares network attributes estimated by data collected during each stage of the study. In the *Initial Sample* the 12 members of the NSG were surveyed and asked to nominate network members they knew. They nominated 85 additional network members who were then surveyed in wave one of the study. Together with the 12 members of the NSG already surveyed, they formed the *Wave One Network*. In wave two 52 additional actors nominated during wave one were surveyed. Together with the initial sample and wave one respondents, they formed the *Wave Two Network*.

	Initial	Wave One	Wave Two	MWSC and
	Sample	Network	Network	SN
Number of network	12	97	149	168
members				
Reciprocity	76.6	42.1%	33.1%	30 %
Transitivity	90.1%	28.8%	26.2%	26 %
Density	0.86	0.066	0.042	0.036
Average Degree	9.4	6.4	6.3	5.9
Average Distance	1.1	2.3	2.7	2.8
Distance based	0.93	0.42	0.36	0.34
cohesion				
Centralisation	3.6%	53%	47%	43 %
Clustering co-efficient	0.86	0.60	0.53	0.50

Table 8.4 Network attribute estimates compared for the four study stages

Table 8.4 and Figure 8.4 compare the network attributes of the four snowballing study networks. These network attributes are all measures of group cohesion. Network analysts (Wasserman and Faust, 1994; Scott, 2000) propose that the cohesion of a social group is reflected by:

- the mutuality of relationships (i.e., reciprocity, transitivity, centralisation and clustering coefficient),
- the closeness of relationships (i.e., distance based cohesion), and
- the frequency of relationships (i.e., density and average degree).

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Figure 8.4 Estimates of network cohesion compared for the four study stages

The 19 actors entered in the study after review of group minutes (rather than by nomination during wave one), were less active network members. While constituting 11.3% of the total network they only accounted for 2.3% of the relationships. Eight were not recalled by any other actors during wave two. Eleven who were subsequently nominated had an average in-degree of 1.7 compared with 6.4 in the *Wave Two Network*. Consequently, networks created solely using the snowballing methodology overestimated cohesion of the MWSC and SN (Table 8.3 and Figure 8.4). The density of the combined MWSC and SN was estimated to be 0.042 using the wave two snowballing network, 16% higher than the observed density of the MWSC and SN (0.036). Similarly, the estimated average degree of the wave two network was 6.3 or 7% higher than that observed in the MWSC and SN (5.9). Each wave of the study more closely approximated the final network parameters.

8.6 DEPTH OF RELATIONSHIP

Network members were asked to nominate the context of the relationships they shared as a proxy measure of the degree of collaboration (Table 8.4):

- In depth relationships were defined as those in which network members "collaborate to develop joint funding proposals, plans or projects, sharing time and resources to actively work together". Twenty-four percent of relationships were described as *in depth*, involving 126 actors. This indepth network reported an average of 1.4 relationships.
- 2. Working groups were defined as groups who "collaborate at committee level to meet shared objectives". Forty-two percent of relationships were in the context of working groups. Sixty-six percent of relationships were at least at working group level, creating a network of 153 members. This "working group network" had an average degree of 3.9 relationships.
- 3. An *interagency meeting* was defined as that in which members "meet to share information and discuss mutual goals, but work independently". Eleven percent of relationships were in the context of *interagency meetings*. Seventy-seven percent of relationships were at least at interagency group level, creating a network of 155 members. "Interagency network" members averaged 4.6 relationships.
- 4. Some contact was defined as relationships in which network members "share flyers and advertising material, ask questions or refer clients to each other". Twenty-three percent of relationships were described as some contact. This created a total network of 168 actors who reported at least some contact with other network members. The MWSC and SN members averaged 5.9 relationships with other network members.
- 5. No contact. Respondents reported no contact in two circumstances. Firstly, the actor was known to them in 2000, but they had no contact in 2004. Alternately, some respondents nominated actors who might potentially be know to them (perhaps using action group minutes) but record that they had no contact with this actor in either 2000 or 2004.

	In Depth Relationship (23%)	Working Group (42%)	Interagency Meeting (11%)	Some Contact (22%)	No Contact (2%)
Cumulative actors	126	153	155	168	
Density	0.008	0.024	0.028	0.036	
Average Degree	1.4	3.9	4.6	5.9	
Centralisation	10%	22%	25%	43%	
Clustering Coefficient	0.28	0.46	0.45	0.50	

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Table 8.5 Depth of relationships 2004

The number of network members, the number of relationships, network density and average degree all increased as the definition of a relationship became less stringent (Table 8.5), ranging from the most stringent definition "in depth relationship", to the least stringent definition "some contact". Centralisation of the network decreased as more stringent definitions of network relationships were applied.



Table 8.6 reports the concordance observed at each relational depth. With the exception of interagency relationships, the degree of concordance, when both actors report a relationship, is 46% or more. However, even relationships reported by one respondent to be "in depth" were not reciprocated more than 36% of the time. With the exception of interagency relationships, stronger relationships were more likely to be reciprocated.



8.7	ACTOR CENTRALITY
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	2004
Minimum	0.6%
10 th Percentile	0.6%
25 th Percentile	1.8%
Median	3.6%
Mean	5.5%
75 th Percentile	6.6%
90 th Percentile	10.8%
Maximum	47.9%

Figure 8.5 Histogram of normalised degree centrality, 2004



	In-Degree	Out Degree
Min	0%	0%
10 th %ile	0.6%	0%
25 th %ile	0.6%	1.2%
Median	1.8%	2.4%
Mean	3.6%	3.6%
75 th %ile	3.6%	4.8%
90 th %ile	7.8%	7.2%
Max	38%	34%
Std. Dev.	5.7%	4.1%
Correlation with proportion of ties reciprocated ¹	0.248 (p< 0.01)	0.145 not sig.

Figure 8.6 Normalised in-degree centrality vs out-degree centrality, 2004

¹ Correlation of Normalised Degree with the proportion of ties that were reciprocated. A measure of expansiveness and attractiveness bias (see discussion).

Figure 8.5 is a frequency histogram of normalised degree centrality in the MWSC and SN in 2000 (Note, to allow comparison of different measures of network centrality and networks of different size, centrality was normalised). This is a skewed distribution biased towards a small number of network members with very high degree centrality. Sixty-four actors (38%) had a normalised degree centrality of 2.5% or less and together accounted for 11% of relationships observed in the network, whereas the six most connected actors (3% of the network) had a normalised degree centrality of 20% or above, together accounting for 44% of all relationships observed in the network. Actors with higher degree generally gave more time to network activities (Pearson Correlation Coefficient = 0.72, p < 0.01) and were more likely to maintain stronger relationships (Pearson Correlation Coefficient = 0.17, p < 0.05).

Figure 8.6 compares the number of nominations an actor received (in-degree) with the number of nominations they made (out-degree). Actors below the equivalence line have underestimated the number of relationships they maintain relative to their peers (in-degree > out-degree). The more connected actors underestimated their relationships, while the less connected actors tended to overestimate their relationships. The standard deviation of in-degree is greater than out-degree, indicating greater variability in incoming nominations.



	2004
Minimum	0%
10 th Percentile	0%
25 th Percentile	0%
Median	0.04%
Mean	0.9%
75 th Percentile	1.4%
90 th Percentile	1.6%
Maximum	33.0%

Figure 8.7 Histogram of normalised betweeness centrality, 2004

Figure 8.7 indicates that betweeness centrality was more skewed than degree centrality. One hundred and eleven actors (66%) had a normalised betweenness centrality of 2% or less, together accounting for only 2.3% of the total brokerage potential observed in the network. The six most connected actors had a normalised betweenness centrality of 5% or higher, together accounting for 60% of the brokerage potential observed in the network.



	2004
Minimum	23%
10 th Percentile	30%
25th Percentile	37%
Median	40%
Mean	40%
75 th Percentile	44%
90th Percentile	49%
Maximum	63%

Figure 8.8 Histogram of normalised closeness centrality, 2004





Figure 8.8 shows the distribution of normalised closeness centrality. While superficially this may appear a normal distribution, the UCINET algorithm for calculating normalised centrality symmetrises matrix data and in the case of closeness centrality this masks the underlying morphology. In-Closeness centrality is a biphasic distribution² (Figure 8.9) consisting of a small group of 14 relatively poorly connected actors with an in-closeness centrality ranging between 0.5 and 0.6 and second larger group of relatively well connected actors with a in-closeness centrality ranging between 3.3 and 3.6 with a mode of 3.4.



Figure 8.10 Multidimensional scaling diagram of normalised degree centrality and normalised betweeness and closeness centrality

Figure 8.10 is a multidimensional scaling diagram comparing normalised degree centrality with normalised closeness and betweenness centrality. Six actors, all members of the NSG, had high scores in all measures of centrality.

² Out-closeness centrality is also a biphasic distribution.

8.8 VERIFICATION OF ACTOR CENTRALITY ESTIMATES



Snowballing methodology may induce sampling bias by following the chain of connected actors emanating from the initial study sample, in this case the NSG. It is evident from this analysis that the most connected members of the network are also members of the NSG. Thus it is important to assess whether the snowballing methodology resulted in undue prominence of members of the NSG.

Figures 8.11, 8.12 and 8.13 are multi-dimensional scaling (MDS) diagrams comparing degree centrality of actors observed in the MWSC and SN during each stage of the study. Networks created solely using the snowballing methodology overestimated the prominence of the most central actors. However, each phase of the study more closely approximated the final degree distribution and waves one and two successfully identified the six most prominent actors. The observed prominence of these actors therefore appears to reflect their network activity rather than being an artefact of the study design. Estimates of normalised centrality from wave two of the study were within 15% of the final degree centrality calculated for the most prominent members of the MWSC and SN.

Figures 8.14, 8.15 and 8.16 are box and whisker diagrams comparing degree, betweenness and closeness centrality distributions from the snowball waves with the final MWSC and SN network. As with degree centrality, the snowballing methodology tended to overestimate closeness and betweenness centrality. However, wave two of the study provided reasonable estimates of all forms of centrality and successfully identified the most prominent actors.

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Figure 8.17 MWSC and SN comparing mail and telephone respondents

One hundred and forty-eight actors agreed to participate in the study, giving an overall response rate of 87%. Seventy (47%) responded to the original mail out, while the remaining 78 (53%) agreed to participate during telephone follow up. Mail respondents were more likely to be a member of the MWSC (73%) than telephone respondents (58%). In general telephone respondents occupied more peripheral positions in the network (Figure 8.17).

	Mail	Phone
	Respondent	Follow Up
	Network	Network
Density ⁺	0.031	0.028
Average Degree ++	5.2	4.7
Network Centralisation	36%	13%

+ Difference = 0.003 (p = 0.50, not sig)

++ Difference = 0.5 (p = 0.79, not sig, Wilcoxon 2 tailed)

Table 8.7 Mail and telephone respondents selected network attributes, 2004




Figure 8.18 shows that telephone respondents were less likely to report relationships with the most central actors in the network. Similarly, Table 8.7 demonstrates a one third reduction in network centralisation when 'telephone respondents' are included in the analysis. However, there was not a statistically significant difference in either density or average degree. Thus, telephone respondents were less likely to be a member of a MWSC and less likely to report relationships with the most active network members.

It is important to note that while the researcher (who conducted the telephone interviews) is a member of the MWSC, telephone respondents were less likely than mail respondents to report a relationship with the researcher. The researcher's degree centrality in the telephone network was only 35% of that reported in the mail network.

8.10 NON-PARTICIPANTS

Most research tools record and report little information about non-participants. This is not the case in SNA where a network member may be nominated by other study participants regardless of whether or not they agree to participate in the study.

	Non Participants	Participants
Minimum	0%	0%
10 th Percentile	0.4%	0.6%
25 th Percentile	0.6%	1.3%
Median *	0.6%	1.8%
Mean	1.3%	3.8%
75 th Percentile	1.8%	4.2%
90 th Percentile	2.4%	8.2%
Maximum	7.8%	38.3%

* Difference = 3 (p< 0.002, Wilcoxon 2 tailed)





Figure 8.19 Normalised in-degree centrality participants compared with non-participants Bow and Whisker Plot (10th,25th, 50th, Mean, 75th, 90th Percentiles) There were 20 non-participants in this study, constituting 12% of the network. Nine (5%) declined the opportunity to participate. A further eleven (7%) could not be contacted despite two mail-outs and at least two telephone calls.

Table 8.7 and Figure 8.19 compare the In-Degree Distribution of non-participants and participants. Non participants were significantly less connected (p< 0.002, Wilcoxon 2-tailed) with a mean normalized In-Degree of 1.8%, compared with a mean in degree of 4.2% for participants.

	MWSC and SN	Respondent Network
Number	168	148
Density	0.036	0.044
Average Degree	5.9	6.4
Average Distance	2.8	2.7
Distance based cohesion	0.34	0.37
Clustering co-efficient	0.50	0.51

Table 8.9 Network attributes MWSC and SN, respondents and non-respondents, 2004

Table 8.9 compares the respondent network with the MWSC and SN network (including non-participants). As non-participants were less connected than participants, their exclusion from the network would have resulted in overestimation of network cohesion.

The respondent network overestimated the observed density of the MWSC and SN by 22%. The density in the respondent network was 0.044 whereas the density of the full MWSC and SN was 0.036. Similarly, the respondent network overestimated average degree by 8%. Average degree in the respondent network was 6.4 compared with 5.9 in the full MWSC and SN, including non-respondents.



8.11 QUALITY OF RELATIONSHIPS

Figure 8.20 Depth of relationship in relation to reported perceived benefit

	Number of relationships	r of Number of Percentage nips "Unhelpful" "Neutral" Relationships Relationships		Number of "Beneficial" Relationships
No Contact	22	3 (13%)	16 (74%)	3 (13%)
- Previously known	9	0	6 (66%)	3 (33%)
- Named, but no contact	13	3 (23%)	10 (77%)	0
Some Contact	230	6 (3%)	95 (41%)	129 (56%)
Interagency Meeting	111	7 (6%)	20 (18%)	84 (76%)
Working Group	425	2 (0.5%)	106 (25%)	317 (75%)
In Depth	236	1 (0.5%)	23 (10%)	212 (90%)

Table 8.10 Depth of relationship compared with perceived benefit

Respondents were asked to assess the net benefit of relationships they maintain. Relationships could be reported as:

- 1. *Unhelpful*. The benefits obtained by working together did not justify the extra effort and resources required to maintain the relationship,
- 2. *Neutral*. The extra effort and resources required to maintain the relationship was balanced by the benefits of working together, or
- 3. *Beneficial*. The benefits of working together outweigh any extra effort and resources required to maintain the relationship.

Two percent of relationships were reported to be unhelpful, 25% neutral and 73% beneficial. Closer relationships were more likely to be reported as beneficial (Table 8.10 and Figure 8.20) with 90% of *in-depth* relationships described as beneficial and 10% neutral.

8.12 RECIPROCITY

Thirty percent of relationships were reciprocated (i.e. both network members identified the same relationship), while 70% were not reciprocated. Five scenarios are worthy of special mention, together accounting for one third (36%) of the non-reciprocated relationships:

- There were 20 non-participants. However, non-participants could still be nominated by other actors, resulting in a non-reciprocated relationship. Non-participants accounted for 4% of non-reciprocated relationships.
- Six respondents agreed to participate in the study but did not identify any outgoing relationships. However, other actors in the network still identified an average of 1.5 incoming relationships with these network members, accounting for 1% of the non-reciprocated relationships.

- 3. Nineteen people had not been nominated during wave one of the study but were surveyed during wave two because they were identified as a MWSC member. Eleven were subsequently nominated during wave two. However, eight did not receive a nomination. They had an average outdegree of 5.0 compared with 5.9 for the rest of the network. They accounted for 3% of the non-reciprocated relationships observed.
- 4. Actors with high in-degree centrality underestimated the number of relationships they maintained compared to their peers (Figure 8.6). The 14 highest ranking actors had an average in-degree of 31 compared with an out-degree of 20. They under-estimated the number of relationships they maintained by 37%, accounting for 15% of the non-reciprocated relationships.
- Actors with low in-degree centrality tended to overestimate the number of relationships they maintained compared to their peers (Figure 8.7). Seventy-seven actors had an in-degree of 2 or less. Their mean outdegree was 3.3 compared with an in-degree of 1.3, thus overestimating the number of relationships they maintained by 150%. This accounted for 13% of the non-reciprocated relationships.

	In-Degree	Av. Depth of Relationships (In-Degree)	Beneficial Relationships (In-Degree)	Proportion of Reciprocated Relationships
In-Degree	1	0.171 *	0.981 **	0.248 **
Average Depth of Relationships (In-Degree)		1	0.178 *	0.282 **
Beneficial Relationships (In-Degree)			1	0.242 **
Proportion of Reciprocated Relationships				1

* Pearson Correlation p < 0.05 ** Pearson Correlation p < 0.01

Table 8.11 Correlations between in-degree, relationship depth, relationship benefit and reciprocated relationships

Table 8.11 reviews the correlation between the proportion of reciprocated relationships maintained by each network member and three other attributes, indegree, the average depth of incoming nominations, and the number of beneficial nominations they received. It is evident that:

- The network members who on average had the strongest relationships maintained a greater proportion of reciprocated relationships (Pearson Correlation Coefficient = 0.28, p < 0.01).
- The most connected network members (high in-degree) on average maintained stronger relationships (Pearson Correlation Coefficient = 0.17, p < 0.05) and a greater proportion of reciprocated relationships (Pearson Correlation Coefficient = 0.25, p , 0.01).
- The network members who received more frequent nominations classified as beneficial relationships maintained a greater proportion of reciprocated relationships (Pearson Correlation Coefficient = 0.24, p < 0.01).

Interestingly, an actor's own perception of the number of the relationships they maintained (out-degree) correlated with nomination of a beneficial relationship by other network members (Pearson Correlation Coefficient = 0.20 p < 0.01) and an increased proportion of reciprocated relationships (Pearson Correlation Coefficient = 0.34, p < 0.01).

8.13 DISCUSSION

Human relationships in the MWSC and SN were not randomly distributed. The triad census for MWSC and SN listed sixteen possible triad configurations (de Nooy, 2005) (Tables 8.1 and 8.2). Reciprocated relationships and the tendency towards triad triangulation (small group formation), occurred far more frequently than would be expected by chance. Similarly, relationships were not randomly directed among actors in the network. Degree, betweenness and closeness distributions were all highly skewed (Figures 8.5 to 8.10). Thirty-eight percent of actors had a normalised degree centrality of 2.4% or less, accounting for 11% of relationships observed in the network, while six actors (3% of the network) had a normalised degree centrality of 20% or more accounting for 44% of relationships

observed in the network. These same six actors accounted for 60% of the brokerage potential existing in the network. As relationships in social systems, such as MWSC and SN, are not randomly distributed, it is meaningful to study the pattern of distribution of these relationships and how this contributes to the overall structure and function of the network.

SNA proved a powerful tool for measuring, describing and analysing relationships within the MWSC and SN and the social structure they created. It was possible to quantify important global network attributes (for example, cohesiveness), as well as the contribution of individual actors to the network (for example, social influence as measured by degree centrality, brokerage as measured by betweenness centrality, and efficiency of communication as measured by closeness centrality) and to describe some of the interpersonal forces acting within MWSC and SN (for example, reciprocity, transitivity and social closure).

SNA was able to provide diagrammatic representation of the social structure observed in the MWSC and SN (Figures 8.2 and 8.3). Criteria One of the WHO Designation Guidelines states that WHO Safe Communities must have, "an infrastructure based on partnership and collaborations, governed by a cross sectional group that is responsible for safety promotion in their community" (Coggan, 2004, p 351). It is clear from Figure 8.3, that the MWSC and SN is built on a network of relationships clustered into shared domains of activity facilitated by members of a cross sectoral group, in this instance the NSG.

SNA demonstrated a core periphery structure (Borgatti and Everett, 1999; Scott 2000) in which a core group of highly connected actors appeared to play a central role in MWSC and SN relationships. More connected network members generally gave more time to network activities (Pearson Correlation Coefficient = 0.72, p < 0.01), maintained stronger relationships (Pearson Correlation Coefficient = 0.17, p < 0.05), more beneficial relationships (Pearson Correlation Coefficient = 0.20, p < 0.01) and more reciprocated relationships (Pearson Correlation Coefficient = 0.34, p < 0.01). Six actors appeared to play a

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particularly prominent role. They maintained 44% of all relationships observed in the network and 60% of its brokerage potential. It is important to note that these actors did not have any innate administrative authority when they joined the network. Rather, their combined role of action group and NSG members offered them an important structural opportunity to act as intermediaries and facilitators. The prominence of these six core actors may in part be related to the time they invested in the network, with four working a minimum of half time on network activities. It is perhaps concerning that such a small group of leaders are disproportionately influential. While hopefully these actors use their influence for the benefit of the network, it is also possible they could exploit it for personal gain at the expense of network activities. However, it is evident that their contribution is valued by other members of the network. On average, 85% of the relationships they maintain were reported by peers to be beneficial, compared with 62% for other network members.

While this study highlights the importance of the relational contribution of network members, it should not be assumed that more relationships are necessarily better. In this study, respondents were asked to describe the strength of relationships they maintain. Twenty-four percent of relationships were described as "in depth", 42% "working group", 11% "interagency" and 22% "some contact". Network members who maintain stronger relationships were more likely to be perceived as making a beneficial contribution (Pearson Correlation Coefficient = 0.20, p < 0.01) and their relationships were more likely to be reciprocated (Pearson Correlation Coefficient = 0.34, p < 0.01). Ninety percent of "in depth" relationships were reported as beneficial, compared with 75% of "working group" and "interagency" relationships, and 56% of "some contact" relationships.

Similarly, it should not assumed that only relational contributions to the network are valuable. A community harbours many different types of resources, including financial capital, physical capital and human capital, which are exchanged across the network. It is conceivable that the actors active in the exchange of these non-relational resources may not be the same actors responsible for facilitating social interaction. SNA was also used to describe and analyse the exchange of these important resources (Chapter 10).

The importance of adequate delineation of the network boundary is demonstrated in this study.

At the completion of wave two, the study had identified a network of 168 members. Wave two respondents identified a further 74 actors who were not surveyed in accordance with study protocol. However, this arbitrary cut off point proved reasonable. While 10 new members of MWSC were nominated during phase three, they had all joined the coalition after the study was commenced in 2004. The remaining 64 actors (86%) were not members of MWSC. Forty-seven (64%) of these were nominated by external actors. As the purpose of including actors external to the MWSC was to identify in-kind, human and financial resources mobilised on behalf of MWSC there seemed little point in following up external agents who did not have a direct relationship to the MWSC. Thus the three phase snowball study design did appear to identify external agents who made a direct contribution to the project.

Nineteen MWSC members were not identified by the snowball design. They were included in the study after review of action group minutes indicated that they had attended one or more meetings under the auspices of MWSC. While constituting 11.3% of the total network they only accounted for 2.3% of relationships. The snowball sampling technique had overlooked less connected members of the MWSC and as a result overestimated cohesion (Table 8.3 and Figure 8.4), confirming Kossinets (2006) observation that network cohesion will be overestimated when peripheral members of a social network are not identified. However, each wave of the study more closely approximated final network parameters (Figure 8.4). Density showed the greatest variation over the three study phases. While density is the most commonly cited measure of social cohesion it has significant disadvantages (Friedkin, 1981; Marsden, 1990). Density is inversely proportional to the logarithm of the number of actors in the network (see glossary for the mathematic definition of density). As a result, large

networks will have substantially lower density even though network members maintain the same number of relationships (Friedkin, 1981). While density may be useful for comparing networks of similar size, or the same network over time (see Chapter Ten), it is not useful for comparing cohesion in networks of different size. In this instance average degree is a more useful measure of cohesion. Average degree has the added advantage of a more intuitive definition, "the average number of relationships maintained by each member of the network".

Conscientious follow up of all potential participants in a SNA is a prerequisite for ensuring a representative SNA. Borgatti (2004, personal communication) suggested that participation rates of at least 80% are necessary for calculations of network attributes to be truly representative. Only 70 actors (41%) agreed to participate in the original mail survey despite a second reminder letter. Seventyeight (46%) actors subsequently agreed to participate during telephone follow up, providing a total response rate of 87%. Mail respondents were more engaged members of the network, reporting more relationships and in particular more relationship with the most central actors. The most engaged members of the network were more likely to agree to participate in the study, firstly by mail and secondly by telephone. The omission of telephone respondents would have significantly confounded results (the density of the mail network was 0.031 compared with 0.036 in the MWSC, average degree 5.2 compared with 5.9 and centralisation 36% compared with 43%). Thus network studies should ensure participation of as many network members as possible. Informal feedback during the telephone interviews indicated that many respondents were unfamiliar with the methodology and unsure of how to complete the survey without assistance. Many commented that the survey was easier to complete when telephone assistance was available. The attempt to use a mail survey may have been naive given the unfamiliar nature of the research technique. The initial use of either a personal or telephone interview may have been helpful to expedite early participation of the maximum number of respondents and ensure consistency of survey technique.

As the researcher is a member of the MWSC, it was concievable that telephone follow up may have resulted in excessive nominations of the researcher. These concerns were not realised. The researcher's degree centrality in the telephone network was only 35% of that observed in the mail network.

SNA reports relationships involving a *pair of actors*. This raises an important ethical issue unique to network analysis. Non-participants can still be nominated by other study participants. As a result, network studies gather data about relationships involving non-participants. It might be argued that it is unethical to report data concerning non-participants as they have not given their permission to be involved in the study. However, many researchers argue participants are doing no more than offering their personal perception of their relationships (Borgatti and Molina, 2003). This perception is meaningful and valid even when it concerns non-participants. It can therefore be argued that it is unethical to allow non-participants to effectively veto other participants' right to accurately report their perceptions of the network by excluding relationships involving nonparticipants (Borgatti and Molina, 2003). Given the particular sensitivity of SNA to missing data, exclusion of non-participants poses a further ethical issue for investigators. While data collected in any research sample is ultimately an imperfect representation of the true population, the impact of any missing data is usually unknown. In SNA, researchers actually know something about this missing data. If this data is excluded, researchers may end up reporting results they *know* to be inaccurate or misleading.

In this study relationships involving non-participants have been reported and clearly illustrate the effect of withholding this information. Active members of the network were more likely to agree to participate than less active members (Figure 8.19). The mean normalised in-degree of non-participants was 1.3% compared with 3.8% for participants (p< 0.002, Wilcoxon 2 tailed). As a result the exclusion of relationships involving non-participants would significantly bias calculation of network parameters and interpretation. Average degree in the respondent network was 6.4 an 8% increase over that observed in the MWSC

and SN (5.9). Similarly, the density of the MWSC and SN was estimated at 0.44 in the respondent network, 22% higher than observed in the MWSC and SN network (0.036).

In this study, the six most prominent MWSC and SN actors (see figures 8.2 and 8.10) were all members of the NSG and therefore participants in the initial survey sample. This raises the important question of whether their prominence was an artefact of the snowball design. The snowball samples did overestimate the prominence of the six lead actors (Figures 8.11 to 8.13). However, it is evident from Figures 8.13 and 8.14 that the wave two snowballing network provided a reasonable estimate of the distribution of actor degree centrality in the complete MWSC and SN. Both wave one and wave two networks successfully identified the six lead actors. With the exception of betweenness centrality in the initial sample, all measures of actor centrality were overestimated by the snowballing networks. However, wave two estimates did provide a reasonable approximation of the final distributions observed in the MWSC and SN network. Estimates of actor centrality using the wave one network (i.e. actors identified by the NSG) provided a credible thumb-nail sketch of the MWSC and SN. The most prominent actors tended to underestimate their personal influence (Figure 8.6). It therefore seems reasonable to conclude the observed prominence of the six lead actors is a true reflection of their network activity rather than an artefact of the snowballing design.

Two types of recall bias may impact on the analysis of relationships observed within a social network. Respondents may either under report or over report relationships. A number of researchers have observed that respondents commonly under-report their personal networks (Bernard and Killworth, 1977; Bernard et al., 1980, 1982 and 1984; Hammer, 1984; Sudman, 1985 and 1988; Marsden, 1990). Network data that concern relationships that are more frequent, closer or stronger are more likely to be reported accurately than relationships that are infrequent, distant or weak (Hammer, 1984, Marsden, 1990). In this study, actors that on average maintained stronger relationships, or more beneficial relationships, had a greater proportion of their relationships reciprocated (Pearson Correlation Coefficient = 0.28, p < 0.01 and 0.24, p < 0.01, respectively).

The snowball design meant that MWSC and its SN was "discovered" by asking participants to recall "people they knew or work with that are part of the Mackay Whitsunday Safe Communities Project" but also a second recall opportunity by asking them to nominate those people "who had an impact (either negative of positive) on their contribution to the project". That is, the study used an active recall technique. This is not typical of most network studies, where the network under study is usually identified prior to commencement of the study either by using a formal list of network members (if available) or key informant interviews (Scott, 2000). Participants are prompted with this list to assist them to identify all members of their personal ego network. An active recall strategy may result in respondents underreporting relationships (Hammer, 1984; Sudman, 1985; Sudman, 1988; Marden, 1990). Sudman (1985, 1988) demonstrated that the number of nominations offered using a recall strategy were generally lower than nominations using a recognition method, particularly for networks of more than 50 members.

Only 30% of relationships were reciprocated (i.e. nominated by both members of the dyad) raising suspicion that there may be significant under-reporting of relationships in this study. A minimum of 20% of non-reciprocated relationships can be clearly attributed to under-reporting of relationships.

- Four percent can be accounted for by the 20 non-participants (who were not surveyed and therefore offered no nominations, yet could still be nominated by other participants).
- A further six actors agreed to participate but did not offer any nominations. However, they still received an average of 1.5 incoming nominations, accounting for 1% of non-reciprocated relationships.
- 3. In Figure 8.6 it is evident that the most connected members of the MWSC and SN underestimated the number of relationships they maintain relative to their peers (out-degree < in-degree). For example the 14 highest</p>

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ranking actors had an average out-degree of 20 compared with in-degree of 31. They underestimated the number of relationships they maintained by 37%, accounting for 15% of non-reciprocated relationships observed in the network. It is worth noting that the six most prominent actors received between 34 and 64 nominations. For these actors, remembering and documenting all the relationships they maintained within the network would have been a daunting task. It is not surprising that they may have overlooked significant relationships or tired of completing the survey.

Relationships may also have been over-reported. Feld and Carter (2002) suggest two types of systematic bias are associated with over-reporting of relationships. Expansiveness bias refers to the tendency of some actors to systematically over report their relationships with others (out-degree). Attractiveness bias refers to the tendency of some actors to be systematically over reported by others (in-degree). They suggest that expansiveness bias is particularly common in social networks. However, in this study more connected actors tended to under report their relationships compared with their peers, while less connected actors tended to over-report relative to their peers, raising a suspicion of attractiveness bias. Sixteen percent of non-reciprocated relationships were clearly related to relative over-reporting of relationships by poorly connected network members:

- Seventy-seven poorly connected MWSC and SN members had an indegree of two or less. They had a mean out degree of 3.3 compared with a mean in-degree of 1.3, overestimating their influence by 150%, accounting for 13% of the non-reciprocated relationships observed in the network.
- Eight network members identified using action group minutes nominated relationships (average out degree = 5.0) but did not themselves receive any nominations. They accounted for 3% of non-reciprocated relationships.

The suspicion of attractiveness bias is heightened by the relatively high variability of in-degree centrality (standard deviation = 5.7%) compared with out-degree centrality (standard deviation = 4.1%) (Feld and Carter, 2002). Feld and Carter hypothesise that if a network is subject to attractiveness bias, then actors who receive a lot of nominations (because they are particularly noticeable or popular) would be less likely to reciprocate these nominations. Actor in-degree would therefore be inversely correlated to the proportion of reciprocated relationships (Feld and Carter, 2002). We have already seen in this study that the more prominent actors were more likely to have high reciprocated relationships (see Figure 8.6, Pearson Correlation Coefficient = 0.25, p < 0.01). Thus, the evidence of attractiveness bias is inconsistent in this dataset. There is no evidence of expansiveness bias in this study.

Kossinets (2006) suggests on the basis of his sensitivity studies that the inadequate enumeration of all relationships will result in measures of network cohesion being underestimated. Accordingly, some network analysts symmetrise relational matrices, arguing that if either member of a dyad recalls the relationship then some form of relationship must exist (Scott, 2000; Kossinets, 2006). In this study, symmetrising the MWSC and SN matrices resulted in a 50% increase in estimates of network cohesion (density increased from 0.036 to 0.054 and average degree increased from 5.9 to 9.1). Other analysts argue that the observation of a non-reciprocated relationship gives an important indication of the asymmetric quality of the social interaction. As one of the key objectives of this analysis was to report changes in the MWSC and SN network over time (Chapter Nine), it was decided that it was most appropriate to report network attributes using the observed directional matrices rather than symmetrised results. This ensured direct comparison of network attributes over time. There are currently no comparable published network studies of health or safety promotion networks. However, future researchers seeking to compare their networks with MWSC and SN should give serious consideration to whether comparison of symmetrised measures of cohesion would be appropriate.

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8.14 CONCLUSION

The Ottawa Charter for Health Promotion emphasised the importance of community collaboration, suggesting that *strengthening community action* was one of five key health promotion strategies. To develop the theory and practice of safety promotion, it is critical to gather a comprehensive understanding of how social systems work and the social forces they access and mobilise. Social Network Analysis proved a useful tool to evaluate the structure and function of Mackay Whitsunday Safe Communities and its Support Network. It provided a graphic representation of social structure and quantified important aspects of network function, interpersonal interaction and individual actor contributions.

CHAPTER NINE

DOCUMENTING THE DEVELOPMENT OF SOCIAL CAPITAL IN A COMMUNITY SAFETY PROMOTION NETWORK USING SOCIAL NETWORK ANALYSIS

A formative version of this paper was presented at the "International Conference on Engaging Communities", an initiative of the United Nations and the Queensland Government, which was held in Brisbane from the 14th to the 17th of August, 2005. A written version of that presentation was peer reviewed and is available at: <u>http://www.engagingcommunities2005.org/ab-theme-6.html</u>

Aspects of this research which emphasised the relevance and application of social capital to the practice of Injury Prevention and Safety Promotion were presented at the 8th World Conference on Injury Prevention and Safety Promotion held in Durban, South Africa from the 2nd to the 5th of April, 2006, and at the 15th International Safe Communities Conference held in Cape Town, South Africa from the 10th to the 11th of April 2006.

Over 2,000 abstracts were submitted for consideration by the Scientific Committee of the 8th World Conference on Injury Prevention and Safety Promotion Conference. Three hundred and fifty of these were offered an oral presentation. Authors of abstracts considered to be of particular merit were approached and asked to submit a written version of their paper for consideration for the award of best paper presented at the conference. The International Scientific Committee reviewed this manuscript and assessed the oral presentation delivered at the conference, awarding it the prize for best oral presentation delivered during the 8th World Conference on Injury Prevention and Safety Promotion (Appendix 25).

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9.2 ABSTRACT

Problem under study

The transition from researching "what works" (efficacy) to researching "how to make it work" (effectiveness) in a complex social setting is not straightforward. Efficacy trials test whether an intervention does more good than harm when administered under optimum conditions. By isolating the experimental variable from the influence of contextual factors a clear relationship between the control and experimental variable can be elucidated. On the other hand, effectiveness trials test whether an intervention does more harm than good in real world conditions. Here the outcome of the trial may be influenced by extraneous contextual factors. Efficacy research may offer little insight into the practical challenges of implementation in a community social system if it has conceptually avoided the impact of contextual factors on outcome. If injury prevention is the science of controlling context, safety promotion is the art of managing context.

To successfully promote safety in a community context a sophisticated understanding of these social forces is necessary. "Social Capital" is one concept proposed in an effort to describe and understand these social forces.

Objectives

Mackay Whitsunday Safe Communities (MWSC) was established in February 2000 to address high levels of non-intentional injury documented in the region. By involving the community in finding its own solutions, the MWSC aims to be a catalyst for structural, social and political change that empowers the community and ultimately individuals within the community to change their

environment and behaviours to reduce the risk of injury. This study uses Social Network Analysis (SNA) to document and analyse the social forces harnessed by the network.

Method

A questionnaire exploring the nature and quality of network relationships was distributed throughout the network and analysed using UCINET software. Respondents were asked to name individuals with whom they interacted in their work of promoting safety in the community. Using a snowballing methodology the chain of social relationships was documented moving outwards from the network support group (NSG) of the MWSC.

Results

In February 2000, the seven founding members of the NSG had a direct sphere of influence on 78 actors. By 2004 this had increased to include a network of 152 members, who in turn had contact with a further 16 actors, creating a total network of 168 members. The network had become more cohesive, with the average number of relationships between network members increasing from 3.3 to 5.9 (p<0.000) and a significant increase in the density of relationships [0.022 in Feb 2000 cf 0.036 in Aug 2004 (p < 0.0002)]. However, relationships were not evenly distributed. In 2004, 44% of all relationships observed in the network involved the six most influential actors, compared with 32% in 2000. More strikingly, in 2004 these same six actors maintained 60% of the brokerage potential observed in the network, compared with 39% in 2000.

Conclusion

SNA proved a useful tool for documenting the growth of social capital within a community safety promotion coalition. Two distinct forms of social capital were documented: firstly, the growth of network cohesion and secondly, the critical role played by a small number of key actors who performed an important brokerage function in the network.

9.3 ACCIDENT PREVENTION AND INJURY PREVENTION

The pre-modern era viewed disease and injury from a fatalistic ecological perspective. Helpless against the ravages of war, plague, pestilence, famine and disaster, man was at the mercy of the forces of nature, and subject to the whims of "the gods" (McMichael, 2001). Injury, in particular, was perceived to be the result of an accident, "an unfortunate event that is without apparent cause" (Moore, 1997).

The enlightenment brought the advent of empiricist science and a shift away from ecological dependency towards a reductionist approach to disease (Schneiderman and Speers, 2001). In particular, René Descartes advocated a reductionist approach to science, with humans considered as machines that could be understood by systematically investigating the function of their component parts.

"And so that the reader will have from the beginning a general notion of the whole machine which I have to describe. I shall say here that it is the heat of the heart which is ... the mainspring and origin of all the movements of the body; and that the veins are the pipes which carry the blood from all parts of the body towards the heart, where it serves as nourishment" (Descartes, 1640, p226-7).

Importantly, Descartes also argued the separation of mind and body, thought and matter:

"The knowledge that I think therefore I am is the first and most certain of all items of knowledge which anyone will arrive at if they philosophise in the right order. This is also the best approach for understanding the nature of mind, and its distinction from body" (Descartes, 1644, Principles 1.7 and 1.8).

Descartes' philosophical thinking laid the conceptual foundations of the modern biomedical paradigm (Engel, 1977) in which thought, emotions and social interaction are separate from bodily processes. Disease could be explained in terms of physical processes that could be understood and manipulated by modern scientific investigation (Schneiderman and Speers, 2000).

In the 20th century the science of injury prevention displayed this shift away from resigned fatalism towards biomechanical determinism. In 1942 De Haven (2000) published his classic case series of eight survivors from high falls (50-150 feet), concluding that energy from high force impacts could be dissipated, thereby preventing serious injury. This key observation precipitated the birth of the bioengineering paradigm of injury prevention.

Gordon (1949) hypothesised that the epidemiological concepts of infectious disease could be generalised to an injury event, which resulted from the interaction between host (human), agent (hazard) and the environment. Gibson (1961) refined the concept, proposing that the agent of injury was energy. Haddon (1963, 1980) further developed this idea, postulating that the injury vector (for example a motor car) was the carrier of the agent (energy). Haddon demonstrated the application of this epidemiological framework. developing Haddon's Matrix (Haddon, 1972 & 1980). This epidemiological framework with its emphasis on the interaction between host, agent, vector and environment has since dominated thinking in injury prevention. Haddon particularly highlighted opportunities for harm reduction through redesign of the physical environment arguing that by preventing or dissipating the adverse release of energy, it was possible to minimize the chance of injury without necessarily preventing the accident. Haddon precipitated a major paradigm shift from accident prevention to injury prevention. Much has been achieved on the strength of this fundamental change in thinking.

In keeping with this bioengineering paradigm, injury has been defined as:

"Any unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical or chemical energy or from the absence of such essentials as heat or oxygen" (National Committee for Injury Prevention and Control, 1989, p4).

Descartes' separation of the physical from the psychosocial is striking in this definition. The possibility that an individual's thinking, behaviour or social situation may place them in an environment where energy may be released is neither acknowledged nor addressed. Practice reflected the epistemology:

"On the whole, effective countermeasures are those that do not require any action by individuals intended to be protected by them. This principle, first articulated in the 1960s but recognised to have particular resonance for the practice of injury prevention, focuses on the extent to which an intervention is built into the environment, having an effect regardless of human activation" (Stevenson et a., 2004, p37). "Passive" interventions - those that require no action by the individual being protected (for example, occupant protection zones used in modern automotive engineering) were preferred over "active" interventions - those that required an active behavioural response (for example, buckling a seatbelt) (Haddon, 1974). However, this epistemological blind spot to the psychological and social determinants of injury is increasingly being challenged.

There is overwhelming evidence that behavioural, social and economic factors have a profound impact on the occurrence of injury. (Bonnie et al., 1999; Laflamme, 2001; Petridou and Tursz, 2001; Stokes et al., 2002; Gielen and Sleet, 2006). Even archetypal "passive" interventions must be reinforced by an "active" behavioural response if they are to achieve their full safety potential. Child resistant caps on medication must be replaced after use. Smoke alarm batteries must be changed. Swimming pool fences must be maintained (Gielen and Sleet 2006; Cunningham, 2002). Finally and most importantly, implementation of so called "passive" solutions requires a behavioural response from politicians, bureaucrats and manufacturers, who must be motivated to support these innovations. Sleet (1984) asserts the need for an "active approach to passive protection".

9.4 INJURY PREVENTION AND SAFETY PROMOTION

To focus solely on the biomedical concept of *"injury prevention"* is to underestimate the wholistic nature of human experience, and consequently how the positive state of *"safety"* is achieved. Maurice et al. (2001) defined safety as:

"a state in which hazards and conditions leading to physical, psychological, or material harm are controlled in order to preserve the health and well-being of individuals and the community" (p. 237).

It is as much concerned with the subjective dimension – the perception of safety, as it is with the objective dimension – the absence of injury; as much concerned with the community in which individuals reside, as it is with the individuals that make up the community. Safety is a psychological, sociological and environmental phenomenon, rather than just physiological. It is inherently an ecological concept (Hanson et al., 2005).

The transition from researching "what works" (efficacy) to researching "how to make it work" (effectiveness) is not straightforward (Howat et al., 2004). Efficacy trials assess "the extent to which a specific intervention, procedure, regimen, or service produces a beneficial result under ideal conditions" (Last, 1995, p 52). To ensure internal validity, contextual factors are carefully controlled. By isolating the experimental variable from the influence of contextual variables a clear relationship between the control and experimental variable can be determined (Flay, 1986; Glasgow et al., 2003; Allegrante et al., 2006). In contrast, effectiveness trials assess "the extent to which a specific intervention, procedure, regimen or service, when deployed in the field in routine circumstances, does what it is intended to do for a specified population" (Last 1995, p 52). Here the focus is on external validity and whether the intervention is effective when tested in real world conditions where contextual variables (that may have been excluded from analysis in efficacy trials) may impact on outcome (Cochrane, 1972; Flay, 1986; Glasgow et al., 2003). Efficacy research may offer little insight into the practical challenges of implementation in a community social system if it has conceptually avoided the impact of contextual factors (Allegrante et al., 2006).

If injury prevention is the science of controlling context, safety promotion is the art of managing context. This should not be taken to imply that safety promotion is "unscientific". On the contrary, good safety promotion practice is built on a foundation of good science. However, the safety promotion practitioner must be able to integrate this evidence with the specific contextual needs of the target community if they are to transform efficacious science into effective safety promotion practice.

9.5 THE "GREAT SYMPHONY" PARADOX

"Here is the paradox: you need a great team of people with diverse skills to perform a symphony well, but no team has ever written a great symphony." (Leifer et al, 2000).

The "Great Symphony" paradox succinctly articulates the challenge facing theoreticians, researchers and practitioners studying and working with communities to promote health, safety and welfare. The interface between the individual and their social environment appears to be a critical quality of

productive social systems. A social system appears to be much more than the sum of the individual human resources it contains.

9.6 SOCIAL CAPITAL

Social Capital is one concept proposed to describe this interface between the individual and society. Robert Putnam (1995) defines social capital as *"the features of social organisation, such as networks, norms and trust that facilitate co-ordination and co-operation for mutual benefit"* (p 67).

"Social Capital" has been associated with numerous desirable social outcomes including:

- lower crime rates (Halpern cited in National Statistics 2001),
- improved health (Wilkinson, 1996; Kawachi, 1999; Szreter and Woolcock, 2004),
- longevity (Putnam, 2000),
- improved educational achievement (Coleman, 1988; Halpern, 2005),
- improved child welfare and decreased child abuse (Cote and Healy, 2001),
- effective governance (Putnam, 1995), and
- enhanced economic achievement (Fukuyama, 1995).

Social capital is a metaphor regarding the importance of social resources framed in the language of capitalism to capture the attention of political bureaucratic systems that weigh social good in financial terms (Hanifan, 1920; Jacobs, 1961; Putnam, 1993; Cox, 1995; Stevenson cited in Borgatti, 1998, Putnam, 2000). There is opportunity, but also risk, in using this metaphor. While the concept may promote useful dialogue between different professional groups, different frames of reference can confuse the issue. Ronald Labonte (1999) comments:

"The present popularity of social capital rests in its combining the gluey stuff of social cohesion with the economic stuff of capital. It can easily be occupied by either side of the ideological divide" (p432).

Public health and community development researchers view social capital through a lens that seeks to promote community wellbeing, health and safety

through more equitable distribution of financial and physical resources. In this frame of reference, "social capital" is a stabilising social force that counters the excesses of the capitalist market, which can produce environmental, structural and social inequalities that are associated with poor health and reduced community wellbeing (Lomas, 1998; Kawachi, 1999; Labonte, 1999; Baum, 2000; Lynch, 2000). A cohesive social network creates an environment in which social norms facilitate a pattern of reliable social interchange by restraining the fragmenting forces of social difference (different values, different ideas, and differential distribution of resources). Network members are constrained to behave in a predictable and socially acceptable way, enhancing trust between group members and thereby reducing the emotional, social and monetary cost of co-operating with other group members. This cohesive type of social capital is associated with social systems that have a network of strong, dense relationships that link members (Scott, 2000; Lin, 1999).

Others view social capital through an entirely different lens, where social capital is understood as a manifestation of the competitive advantage enjoyed by certain groups or individuals within a specific group (Granovetter, 1973; Lin, 1999; Burt, 2001). Burt (2000) argues:

"Society can be viewed as a market in which people exchange all variety of goods and ideas in pursuit of their interests. Certain people, or certain groups of people do better in the sense of receiving higher returns for their efforts" (p2).

Mark Grannovetter (1973) in his noteworthy paper "The Strength of Weak Ties" argued that some relationships are more strategic than others. Relationships that span the boundaries between social groups offer unique information and are an important source of innovation. Paradoxically, these bridging relationships are usually "weak ties". Burt (1992) developed the idea further, arguing that Granovetter's "weak ties" are a manifestation of the "structural holes" in a social network. Rather like an insulator in an electrical circuit, "structural holes" are areas of sparse relationships separating different subgroups contained within the network. Each social "sub-circuit" carries its own "current" (different flows of information). Individuals that reside on the bridges that connect the different social sub-circuits assume importance because, like an electronic switch, they can control how the social system works by switching on or off interactions between different sub-groups. As a consequence, they assume a central role in any social interaction that depends on the productive exchange of information or expertise between subgroups.

Despite the intuitive appeal of a concept that has successfully transcended the boundaries of politics, economics and sociology, it is evident there has been controversy regarding its definition and application. Two very different constructs of social capital have been promulgated. The "communitarian" construct is a quality of social systems. Communities with stronger, denser relationships are more cohesive, promoting equity and minimising difference. The "entrepreneurial" construct is a quality of individuals, or special subgroups within a social system, who are able to extract additional social benefit by forming strategic bridges across areas of reduced relational density. Thus, a key theoretical and empirical issue is whether these two apparently contradictory constructs of social capital are mutually exclusive or complimentary. Woolcock (2001) voices these concerns:

"Conceptualising social capital across units of analysis ranging from individuals to institutions and nations ... renders it susceptible to the criticism that it is all things to all people (and hence nothing to anyone)" (p12).

9.7 MACKAY WHITSUNDAY SAFE COMMUNITIES

The Mackay Whitsunday Safe Communities (MWSC) was launched in February 2000 in response to the excessive rates of injury observed in the region (Vardon et al., 2000). The project consists of a number of action teams (Child Safety, Senior Safety, Road Safety, Occupational Health and Safety, Safe Alcohol Use) overseen by the Network Support Group (NSG). It seeks to understand the causes of injury from a socio-ecological perspective (Hanson et al., 2005) and thereby co-ordinate a systematic, inter-sectorial response to injury within the region. The MWSC aims to achieve this by mobilising safety promoting forces contained within the community social system. By involving the community in finding its own solutions, the MWSC attempts to catalyse structural, social and political change that empowers the community and ultimately, individuals within the community, to change their environment and their behaviours to reduce the risk of injury. It is therefore vitally important to understand these social phenomena. The MWSC has used Social Network Analysis (SNA) as a tool to describe the growth of this community safety promotion network.

9.8 METHOD

In the initial survey sample a questionnaire was distributed to all members of the NSG. Respondents were asked to actively recall other individuals with whom they interacted in their work of promoting safety in the community. They were also asked to retrospectively identify if they had a relationship with this person prior to their involvement in MWSC. These people did not necessarily need to be members of the MWSC. This allowed all contacts within the sphere of influence of the MWSC to participate in the survey. Group members identified by the NSG were then followed up in wave one of the study. Using a snowballing technique (Scott, 2000) the chain of contacts was followed up through two survey waves, at which point recruitment was terminated. During wave two, members of the MWSC not already identified by wave one respondents were also included in the survey. A MWSC member was defined as anyone recorded as having attended one or more meetings of one of the MWSC's action groups.

Participation in the survey was voluntary and any personal identifying information was kept confidential. Participants who had not returned their survey forms were initially followed up in writing and subsequently by telephone to ensure an optimum response rate. The three stages of the survey were conducted over a period from December 2003 (initial sample) until December 2004 (wave two completed).

Adjacency matrices and sociograms were constructed for both the 2000 and 2004 networks (Scott, 2000).

Network and actor attributes were calculated using UCINET 6.74 and NetDraw1.45 software (Borgatti et al, 2002). These included:

- Measures of network cohesion, in particular network density and average degree, calculated for the 2000 and 2004 relational matrices. (Hanneman and Riddle, 2005).
- 2. Comparing the density of the 2000 and 2004 relational matrices using the algorithms described by Snidjers and Borgatti (1999).
- Calculation of sphere of influence and leadership potential of individual actors including degree centrality and betweeness centrality (Freeman, 1979) using the 2001 and 2004 relational matrices.
- Construction of a block-model of the 2000 and 2004 relational matricies to model relationships involving key facilitators from the NSG, MWSC and its external support network (SN).

9.9 RESULTS

At the time of the project launch in February 2000, the seven founding members of the NSG had a direct sphere of influence of 78 actors. These actors in turn identified relationships with a further 67 actors, creating a network of 152 members. Thus, at the time of project launch, the founding NSG had a direct relationship with only 56% of the network. By 2004 the direct sphere of influence of the NSG had nearly doubled to include 152 network members who in turn had access to a further 16 actors, creating a total network of 168, 90% of whom maintained a direct relationship with a member of the NSG. See Figures 8.1, 8.3 and 8.4.

Figure 9.1 compares the sociograms of the network at the time of project launch in 2000 with the network at the time of the study in 2004. The network had grown, but largely through increasing the number of relationships maintained by pre-existing members of the network. While the number of active network members increased from 152 in February 2000 to 168 by December 2004, the number of relationships doubled from 500 to 1002.

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February 2000 (Project Launch)

2004

Figure 9.1 Sociogram of the MWSC in 2000 compared with 2004

	2000	2004
Active members	152	168
Relationships	500	1002
Reciprocity	20%	30%
Transitivity	20%	26%
Cohesion		
- Density	0.022	0.036 (p < 0.0002)
- Average degree	3.3	5.9 (p < 0.000)
- Distance based	0.18	0.34
cohesion		
Average distance	3.9	2.8
Core / periphery		
- Density of core block	0.14	0.59
- Density of periphery	0.01	0.02
- Final model fitness	0.25	0.40
Centralisation	18%	43%
Clustering co-efficient	0.30	0.50

Table 9.1 Network cohesion: 2000 compared with 2004

Cohesion within the network had increased substantially between 2000 and 2004 (Table 9.1). Density increased from 0.022 at the time of project launch to 0.036 at the time of the study, a statistically significant difference (p=0.0002) using the algorithms described by Sneijder and Borgatti (1999). The average number of relationships maintained by each actor (average degree) increased from 3.3 to 5.9 (p < 0.000, Wilcoxon 2 tailed). The average distance separating actors reduced from 3.9 to 2.8. The project had a strong core periphery structure centred on the NSG in 2004, with the core group

density increasing from 0.14 to 0.59. Similarly the centralisation index increased from 18% to 43%. Members of the network were much more likely to be clustered in groups (clustering coefficient 0.30 in 2000 compared with 0.50 in December 2004).



Figure 9.2 indicates that degree centrality is a skewed distribution biased towards a small number of actors with very high degree. Sixty-four actors (38% of the network) had a normalised degree centrality of 2.5% or less, together accounting for 11% of relationships observed in the network, whereas the six most connected actors (3% of the network) had a normalised degree centrality of 20% or above, together accounting for 44% of all relationships observed in the network.

Figure 9.3 compares in-degree centrality with out-degree centrality. Actors below the equivalence line have underestimated the number of relationships they maintain compared with nominations by their peers (in-degree > out-degree). Importantly, the more connected actors tended to underestimate the number of relationships they maintained.

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Figure 9.4 indicates that betweeness centrality was even more skewed than degree centrality. One hundred and fifty-six actors (93%) had a normalised betweeness centrality of 2% or less, together accounting for 26% of the brokerage potential observed in the network. In contrast, the six most connected actors accounted for 60% of the brokerage potential observed in the network.

Figure 9.5 is a multi-dimensional scaling diagram comparing normalised degree centrality with normalised closeness and betweeness centrality. It is evident that the same six actors (all members of the NSG) had high scores on all measures of centrality and appear to play an important facilitative role in network activities.



	2000	2004
Minimum	0.7%	0.6%
10 th Percentile	0.7%	0.6%
25 th Percentile	1.3%	1.8%
Median	2.6%	3.6%
Mean	3.6%	5.5%
75 th Percentile	4.6%	6.6%
90 th Percentile	7.7%	10.8%
Maximum	21.2%	47.9%

Table 9.2 Normalised degree centrality 2000 compared with 2004

Figure 9.6 and Table 9.2 compare normalised degree centrality for all actors at the time of project launch (2000), with that at the time of the study (2004). The number of relationships in the network had doubled from 500 to 1002 and the median normalised degree centrality increased from 2.6% in February 2000 to 3.6% by December 2004 (p < 0.000. Wilcoxon 2-tailed).





Regression:

In-Degree 2004 = 1.9 x In-Degree 2000 + 0.1

Pearson Correlation Coefficient = 0.84p < 0.000, R² = 0.90

N.B. In-degree (Figure 9.7) is a directional measure of centrality which documents the number of times an actor is nominated by other members of the network. Normalised degree centrality (Figure 9.6) is non directional – a relationship is deemed to exist if either the actor or other members of the network nominate the relationship.

Figure 9.9 In-degree centrality 2000 compared with 2004

The doubling of relationships in the overall network was in large part related to the doubling of personal networks (Figure 9.9). Accordingly, actors who were already well connected developed more new relationships than other network members. Of the 502 new relationships formed by 2004, 157 (31%) were by the 6 network facilitators (Figures 9.8 and 9.9). As a result they increased the proportion of relationships they maintain from 32% of the network in 2000 to 44% in 2004. However, for every new relationship formed by the network facilitators, two new relationships were formed by other members. The cohesive social capital of the network increased as a consequence.

There is clearly a strong tendency for members of the MWSC, and the external support networks to direct relationships via the network facilitators (Figures 9.8 and 9.9). Figure 9.9 provides compelling evidence of the relational burden this imposed on the 6 network facilitators. As a group they received 258 incoming relationships (43 relationships per facilitator). Contrastingly MWSC members received 201 incoming relationships, shared between 112 actors (1.8 per actor). Members of the Mackay Whitsunday local support network received 42 incoming relationships shared between 23 members (1.8 per actor) and members of the state / national support network received 53 incoming relationships shared between 27 actors (2.0 per actor). Thus for every relationship received by a member of the MWSC, network facilitators received twenty-four.



	2000	2004
Minimum	0%	0%
10 th Percentile	0%	0%
25 th Percentile	0%	0%
Median	0.15%	0.04%
Mean	1.5%	0.9%
75 th Percentile	1.3%	1.4%
90 th Percentile	4.4%	1.6%
Maximum	34.9%	33.0%

Table 9.3. Normalised betweeness centrality 2000 compared with 2004

As the network became more connected, the opportunity for the majority of actors to act as intermediaries decreased (Figure 9.10 and Table 9.3). Accordingly the median betweeness centrality decreased from 0.15 in February 2000 to 0.04 by December 2004 (p<0.000, Wilcoxon 2 tailed). However, against this trend, three actors had increased their intermediary role. In February 2000 the six most connected actors possessed 39% of the brokerage potential observed in the network. By December 2004 this had increased to 60%.

	Number	Percent
Worse	6	0.6%
Unchanged	433	43%
Better	563	56%

Table 9.4: Changed relationships

Actors were asked if the relationships they identified had changed since the coalition was launched in February 2000 (Table 9.4). Fifty-six percent of relationships were said to have improved, whereas 0.6% were said to be worse.

Network members were asked to nominate the context of the relationships they shared as a proxy measure of the degree of collaboration:

- 1. *In depth relationships* were defined as those in which network members "collaborate to develop joint funding proposals, plans or projects, sharing time and resources to actively work together".
- 2. *Working groups* were defined as groups who "collaborate at committee level to meet shared objectives".
- 3. An *interagency meeting* was defined as that in which members "meet to share information and discuss mutual goals, but work independently".
- 4. Some contact was defined as relationships in which network members "share flyers and advertising material, ask questions or refer clients to each other".

	2000	2004			
	all relationships	all new relationships relationships		pre-existing relationships	
No Contact	520 (51%)	22 (2%) *		12 (2%)	
Some contact	235 (23%)	230 (22%)	99 (20%)	131 (25%)	
Interagency	53 (5%)	111 (11%) 48 (10%) 63		63 (12%)	
Working Group	72 (7%)	425 (42%)	184 (38%)	241 (46%)	
In Depth	140 (14%)	236 (23%)	159 (32%)	77 (15%)	

* 22 (2%) actors reported no relationships in 2004, 10 (1%) reported a relationship in 2000, 12 (2%) reported no relationships in 2004 or 2000

Table 9.5 Type of collaboration in February 2000 compared with 2004

Table 9.5 documents the degree of collaboration in February 2000 compared with 2004. In 2004 network members were six times more likely to be collaborating at the level of a working group (7% in 2000 compared with 42% in 2004), and almost twice as likely to report an in depth relationship (14% in 2000 compared with 23% in 2004). In depth relationship were twice as likely to develop as new relationships (32% of new relationships were described as in depth in 2004 compared with 16% of pre-existing relationships).

Ch. 9: Documenting the Development of Social Capital in a Community Safety Promotion Coalition Using Social Network Analysis

Collaboration in 2004					Increased	Decreased	
		Some contact	Interagency	Working Group	In Depth	Collaboration	Collaboration
2000	Some Contact	91 (40%)	18 (8%)	77 (33%)	44 (9%)	139 (60%)	n/a
on in 2	Interagency	2 (4%)	23 (45%)	25 (49%)	1 (2%)	26 (51%)	2 (4%)
aborati	Working Group	2 (3%)	2 (3%)	61 (86%)	6 (8%)	6 (8%)	4 (6%)
Coll	In depth	4 (3%)	5 (4%)	21 (15%)	108 (78%)	n/a	30 (22%)

Table 9.6 Change in collaboration for pre-existing relationships

Thirty-six percent of pre-existing relationships increased the degree of collaboration in 2004. Fifty-five percent remained unchanged while 9% reported a reduction in their degree of collaboration. Table 9.6 compares the degree of collaboration in February 2000 with that observed in 2004. Sixty percent of relationships reported as "some contact" in 2000 are now interacting at group or in depth level in 2004. Forty-nine percent of relationships reported as "interagency" had increased to "working group" indicating there is increased preparedness to work together collaboratively on joint projects. Interestingly, "in depth" relationships were more likely to develop in the context of relationships previously described as "some contact" than "working group" relationships, while pre-existing "in depth" relationships showed the greatest propensity to show decreased collaboration.

9.10 DISCUSSION

A key initial objective of MWSC was to consolidate and better coordinate a network of community groups already working in the domain of community safety promotion. This network analysis provides quantitative evidence that the coalition has been successful in engaging further partners and building social cohesion. While the number of actors involved in the network increased from 152 in February 2000 to 168 by December 2004, the number of relationships maintained by members of the network had doubled from 500 to 1002. More importantly, 56% of relationships were said to have improved as a consequence of MWSC. Aside from the 502 new relationships, 36% of pre-existing relationships increased their level of collaboration. In particular,
60% of relationships described as "some contact" in 2000 cooperated at group level¹ by 2004. As a result the proportion of relationships collaborating at group level increased from 26% in 2000 to 76% by 2004.

At an interpersonal level the average number of relationships maintained by network members (average degree) increased from 3.3 to 5.9. Reciprocity² increased from 20% to 30% and transitivity³ from 20% to 26%. Network members demonstrated a stronger tendency to group formation (clustering coefficient increasing from 30% to 50%) and the network displayed increased potential for coordination by a central group of actors (centralisation index increased from 20% to 43%). All measures of network cohesion had increased. In particular, density increased from 0.022 to 0.036 (p < 0.0002) and median normalised degree from 2.6% to 3.6% (p < 0.003, Wilcoxon 2 tailed). The coalition had succeeded in building cohesive social capital.

SNA also provided evidence that a small number of well connected actors have disproportionate social influence within the network (entrepreneurial social capital). Figure 9.2 (degree centrality) and Figure 9.4 (betweeness centrality) indicate that social relationships within the network were not randomly or equitably distributed. Whether measured in terms of direct social influence (degree centrality) or brokerage potential (betweeness centrality), a small group of six actors, all members of the NSG, demonstrated disproportionate social influence (Figure 9.7). Furthermore their social influence had increased over the course of the study. By 2004, they maintained 44% of all relationships observed in the network compared with 32% in 2000. They also possessed 60% of the brokerage potential of the network compared with 39% in 2000. These network members linked the NSG to action groups and the action groups to each other. They were also distinguishable by the number of relationships they maintained external to the MWSC, linking the project to the outside world (Figures 9.7 and 9.8). They were therefore an important point of access to external information and resources. Thus, in keeping with Granovetter (1973) and Burt's (2000)

¹ Interagency meeting, working group or in-depth collaboration.

² Both actors nominate each other.

³ A measure of introduction: if A knew B and B knew C, then transitivity measures the likelihood A will know C

construct of social capital, entrepreneurial social capital was not evenly distributed across the network. Indeed, this social asymmetry became more marked over time.

It is perhaps concerning that a small group of actors were disproportionately influential within the MWSC as there is a potential for them to abuse this power. Even if their motivation was altruistic, in their efforts to get things done, they may steal initiative from other network members.

It should not be naively assumed that social capital is innately moral. Many authors emphasise the "dark side" of social capital (Putnam, 2000; Hawe and Shiell, 2000; Woolcock, 2001). The same cohesive forces that maintain desirable behaviours within a community can also maintain undesirable behaviours. The Mafia and the Ku Klux Klan are examples of cohesive social networks with strong internal "standards" of behaviour.

The competitive advantage certain individuals or groups enjoy within social systems may be used to promote the common good or exploited to acheve personal gain.

Health advocates and political champions may use their political leverage (social capital) to promulgate health promoting public policy (Carlisle, 2000). Social marketing programs frequently use the public profile (social capital) of prominent media or sporting personalities to promote safe or healthy behaviours in the community (Donovan & Henley, 2003).

Both Granovetter and Burt hypothesise that the strategic position enjoyed by specific actors offers them special opportunities to control the flow of information and resources. This not only makes them more influential, but more effective in completing their work. Granovetter's (1973) original paper documented the link between weak ties and success in finding employment. Burt (2000) and colleagues have conducted a number of studies that demonstrated the link between entrepreneurial social capital and peer recognition, cost efficient management, successful job seeking, personal promotion, salary and bonus payments. This social leverage may either be used to enhance the efficiency and effectiveness of the coalition they lead or

be exploited by individuals seeking to advance their own political, bureaucratic, organisational or financial power.

It is reassuring to note that in MWSC the contribution of the six most connected network members appeared to be valued by other network members. On average 85% of the relationships they maintained were reported "beneficial" compared with 62% for other network members. As a result, relationships were strongly focused towards the network facilitators. However, the relational pressure this placed on the network facilitators was evident. As a group they process 258 incoming relationships (43 relationships per facilitator). Contrastingly, other members only process an average of 1.8 incoming relationships. Thus, for every incoming relationship maintained by other members of the network, the facilitators maintain 24. It is questionable if this facilitator role is sustainable in its present form if they continue to acquire new relationships at the same rate (that is, doubling every four years).

This study has clearly demonstrated the presence of both forms of social capital: cohesive social capital and entrepreneurial social capital. Based on the findings of this study, the polarisation of theoretical discourse regarding social capital into "cohesive social capital" and "entrepreneurial social capital" is misleading and unhelpful. Both forms of social capital were present and appeared important in this social system. Perhaps we are observing opposite sides of the same coin. On the one hand cohesive social capital is produced within regions of a network that are characterised by groups of actors that maintain frequent, strong and dense relational ties. On the other hand, entrepreneurial social capital is produced by relationships that bridge the regions of reduced relational density that separate different groups within a social network. Van der Gaag and Snidjers (2005) argue "the strength of strong ties" as well as the "strength of weak ties". The issue is not one of resolving which is correct, but rather understanding how each is generated, their key social features and how they can be most effectively used.

A synthesis is possible between these apparently contradictory constructions of social capital (Lin, 1999; Putnam, 2000; Burt, 2000). Putnam (2000) distinguished between bonding, bridging and linking social capital. *Bonding social capital* (cohesive social capital), refers to the cohesive bonds (strong

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ties) that facilitate social relations within relatively homogenous social groups (for example, families, ethnic groups, religious cliques). *Bridging social capital* (a form or entrepeneurial social capital) refers to the weaker horizontal ties that exist between distant friends, associates or colleagues (for example civil rights movements and religious organisations). Bonding social capital is good for "getting by", whereas bridging social capital is good for "getting ahead". *Linking social capital* (another form of entrepreneurial social capital) refers to vertical relationships bridging social strata within a hierarchy where power, social status and wealth are differentially accessed (for example health advocates and project champions use linking social capital).

High Entrepreneurial Social Capital	Disintegrated group characterised by diverse perspectives, skills and resources	Maximum performance i.e. high cohesive social capital & high entrepreneurial social capital	
Low Entrepreneurial Social Capital	Minimum performance low cohesive and low brokering social capital	"Group Think" Cohesive group containing only one perspective, skill of resource	
	Low Cohesive Social Capital	High Cohesive Social Capital	

Table 9.7 Synthesis of the relationship between cohesive and brokeringsocial capital (Burt, 2000)

Burt (2000) has developed three-dimensional models of social capital demonstrating that cohesive social capital is complimentary to entrepreneurial social capital. Combining these two social forces strategically optimises output (Table 9.7). Lin (1999) proposes that cohesive social capital is a force of social stability that maintains group standards, whereas entrepreneurial social capital is an important force of innovation and creativity and thereby social change. This is a tantalising theory for those planning safety promotion interventions. Perhaps the social forces required to induce change (entrepreneurial social capital) are different from the social forces required to

maintain desirable social behaviours (cohesive social capital). This theory, if confirmed, has profound implications for the practice of safety promotion which must seek to use both forms of social capital. A key objective of community safety interventions is to enhance safe community standards of personal and group conduct (a manifestation of cohesive social capital), while the means to achieve this positive change is through the use of entrepreneurial social capital. For example, the United States and Australia have achieved dramatic reductions in road trauma mortality (Isaacs and Schroeder, 2001; ATSB, 2004) and while this improvement is multifactorial, and bioengineering innovations (including vehicle and road design) have unarguably made an important contribution to this reduction, it is also clear that changes in community standards have been important. These standards are both formal (legislative) and informal (social expectation). Since seat belt use became compulsory in Victoria in 1970, compliance increased from 25% to 97% in 2004 (ATSB, 2004). Compulsory seat belt legislation was introduced throughout Australia in 1972. Nationwide, 90% of Australians now wear seat belts (ATSB, 2004). In the USA, seat belt use increased from 11% in 1981 to 68% in 1997 (Centers for Disease Control and Prevention, 1999). Drink driving is increasingly perceived to be socially unacceptable (Isaacs and Schroeder, 2001). In Australia, Random Breath Testing (RBT) legislation was introduced in Victoria in 1976 and was progressively introduced in all states by 1988. RBT is well accepted in Australia and enjoys a 97% approval rate (ATSB, 2004). While formal social standards (legislation and enforcement) have undoubtedly contributed to changes in informal social standards (community expectation), these changes in community social expectations have meant that aggressive legislation and enforcement of seat belt and drink driving legislation have become socially acceptable. It is evident that community standards (cohesive social capital), both formal (legislation, manufacturing and infrastructure standards) and informal (social expectation), are an important amplifying force for interventions that seek to change behaviour. However, it is also illustrative to consider the contribution of key individuals in achieving these changes in community standards. Political champions (for example William Haddon as director of the U.S. National Highway Safety Bureau), consumer advocates (for example Ralph Nader in

his "Unsafe at Any Speed" campaign) and community activists (for example Doris Aitken, founder of Remove Intoxicated Drivers – "RID", and Candy Lightner, founder of Mothers Against Drink Driving – "MADD"), made a critical contribution to changes in community standards and ultimately road trauma mortality (Isaacs and Schroeder, 2001; Allegrante et al. 2006).

This study confirms it is possible to measure cohesive social capital and entrepreneurial social capital within a community safety promotion coalition. With the recent innovations in stochastic and temporal modelling of social networks (Robins et al., 2006a, 2006b; Snijders, 2005; Snijders et al., 2006) it will soon be possible to test if cohesive social capital is a force that maintains social standards, thereby ensuring social stability and whether entrepreneurial social capital is a source of innovation and change in social systems.

9.11 CONCLUSION

A "great symphony" is a creative synthesis of many different social resources: composer, conductor, musicians and audience. It is a combination of excellence in composition, technical excellence in interpreting and performing the music, and talented leadership that can draw out the best in the musicians. But ultimately a great symphony is a social event in which all these components are combined to create a performance. Excellence in human endeavour is no different in other domains. It is a critical mix of financial, physical and human capital in which social capital, the ability of individuals to work creatively with groups, and of groups to draw out the best in individuals, is the crucial success factor.

The definition of social capital has been controversial. Two seemingly contradictory constructs of social capital have been promulgated. The "communitarian" construct championed by Cox (1995) and Putnam (1995) is a quality of social systems. Communities with stronger, denser relationships are more cohesive and better positioned to co-operate for mutual benefit. The "entrepreneurial" construct of social capital championed by Lin (1999) and Burt (2000) is a quality of individuals or special sub-groups, who are able to extract extra social benefit by forming strategic bridges across areas of

reduced relational density and thereby mobilise useful resources, access novel information and develop innovative solutions.

Our study identified both forms of social capital, cohesive social capital and entrepreneurial social capital. Like a great symphony, a great community coalition is a creative synthesis of two complimentary social resources: the collaborative power of a diverse, talented, committed and co-ordinated team of individuals and organisations, combined with innovative entrepreneurial energy of individuals, political and administrative champions, health advocates and community activists.

While a robust theoretical definition of social capital is undoubtedly important, the best way to understand social capital is to observe it in action. Empirical research combined with an informed theoretical discourse is the most productive way to develop a meaningful definition of social capital. Perhaps the "great symphony paradox" can offer us one more important insight. While there is value in the careful academic study of the music, to really understand what turns great music into a great symphony, the easiest way is still the best. Sit back, relax and enjoy the music.

CHAPTER TEN

MEASURING THE SUSTAINABILITY OF MACKAY WHITSUNDAY SAFE COMMUNITIES USING SOCIAL NETWORK ANALYSIS

10.1. SUSTAINABLE SAFETY PROMOTION

Sustainable safety promotion programs deliver lasting improvements in the health status of individuals or the communities they target (Olsen, 1998; Sheddiac–Rizkallah, 1998). Sustainability is an attractive concept to political and administrative systems that are anxious to achieve long-term outcomes from their social investments. While "sustainability" is common rhetoric, it is less often achieved. Approximately half of all community initiatives are not sustained beyond the initial development phase (Hanson et al., 2005).

Failure to sustain desirable project outcomes is counterproductive. It wastes the human and financial resources invested in the project and erodes community trust in the responsible organisations (Goodman and Steckler, 1989; O'Loughlin et al., 1998; Sheddiac–Rizkallah, 1998).

10.2. ECOLOGICAL SUSTAINABILITY

Brinkerhoff and Goldsmith (1992, p 371) note that sustainability "is not an end state but an ongoing input-output process". It is an ecological concept (Hanson, 2005), concerning the flux of resources through an ecological system (von Bertalanffy, 1950; Brush, 1975; Lowe, 1994; Sciubba, 1995)

This concept has been adopted by public health practitioners. McMurray (1999, p56) suggests, "a community can be viewed as an ecosystem, with resources, opportunities and threats to health and healthy lifestyles." Interventions dependent on external resources are vulnerable, as they depend on the ability to secure ongoing funding. The solution is to maximise the ability of a community to maintain an outcome within its own "ecosystem".

10.3. SUSTAIN: A DEFINITION

The Oxford Dictionary (Moore, 1997) defines sustain as " (1) to maintain or keep going continuously, (2) to support or bear the weight of especially for a long period, or (3) to give strength to encourage or support." The concept is one of *assuming responsibility* to expend *sufficient resources* to *maintain* the *desired outcome*. Four questions are evident:

- 1. What is the desired outcome?
- 2. Are there sufficient resources to implement the outcome?
- 3. Are there sustainable resources to maintain the outcome?
- 4. Who is responsible?

10.4. DEFINING THE DESIRED OUTCOME

It is important to be clear about the ultimate objective (Swerissen, 2004). What is one seeking to sustain?

- The desired social outcome?
- The intervention used to achieve the outcome?
- The organisation or network used to implement the intervention?

In a particular situation, each of these objectives may be valid, but they require different approaches to sustainability. For example, if the objective was to improve public awareness of an injury risk and promote behaviours that reduce this risk, then an ongoing public education program by the organisation responsible for the program may be necessary to maintain the desired behaviour. On the other hand, if the objective was to implement an environmental modification that reliably reduces the risk of injury on an ongoing basis, it may not be necessary to maintain the advocacy program once the appropriate design standard had been enshrined in legislation or the appropriate infrastructure installed. Accordingly, injury prevention researchers have historically preferred "passive" environmental modifications that are not dependant on a behavioural response, over "active" behaviour modification programs (Haddon, 1974; Stevenson et al., 2004).

10.5. EMBEDDEDNESS

It may be possible for an intervention to embed safety-promoting characteristics in the physical and social environment in a way that means continuation of the program itself is no longer necessary.

The individual is, metaphorically speaking, the "tip of the iceberg", just one part of a complex ecological system (Chapter Four). The most enduring way to reduce an individual's risk of injury is to systematically address the environmental and social determinants of injury "hidden beneath the water line".

10.6. SUFFICIENCY

A prerequisite for sustainability is sufficiency. Before an outcome can be sustained, it must be successfully implemented. This implies the investment of sufficient time and resources to induce the desired outcome. In the current climate of economic constraint, politicians and administrators are very aware of the dangers of extravagant waste – investing more resources than are necessary to implement the desired outcome. However, it is easy to underestimate the time, resources and resolve required to change the behavioural, environmental or social determinants of injury. It is important not to overlook the dangers of miserly waste – investing insufficient resources to achieve the desired change.

10.7. SUSTAINABILITY

The investment of sufficient resources to implement the desired outcome does not necessarily imply adequate operational resources to maintain the outcome (Stefanini and Ruck, 1992; La Fond, 1995; Olsen, 1998). Just as a new building requires ongoing maintenance to remain operational, social interventions require ongoing maintenance to remain functional (Thompson, 1993; Hill, 2002). Importantly, the resources required to maintain the outcome may be different in type and quality from the resources required to implement the outcome. These resources may even need to be accessed from a different source.

10.8. UNIVERSAL DOMESTIC POOL FENCING LEGISLATION: A CASE STUDY IN SUFFICIENCY AND SUSTAINABILITY

Australia is an affluent country with a warm climate. The introduction of prefabricated fibre-glass domestic pools in the early 1970's made domestic swimming pools affordable. Drowning in children under 5 years of age increased dramatically in the early 1970's from 7.30 per 100,000 in 1970 to 10.76 per 100,000 in 1973, with an average of 43 additional drowning deaths in this age group every year (Scott, 2003).

In Queensland, the problem was particularly concerning. Pern and Nixon (1977) calculated the drowning rate for children under 5 years as 15.69 per 100,000 in 1977. Half of these occurred in the family pool, and in three quarters of cases no barrier prevented toddlers from accessing the pool.

By the late 1970's the issue had achieved prominence in the media and strong advocacy efforts by public health physicians, the Consumer Association of Australia (1977), the Child Accident Prevention Foundation of Australia (Kidsafe) and the NSW Water Safety Council (Pearn cited Scott, 2003) were underway.

A viable environmental solution was rapidly identified. In the early 1970's, the South Australian and Australian Capital Territory governments introduced legislation requiring that pools be enclosed (Scott, 2003). The effectiveness of this intervention was quickly established (Pearn and Nixon, 1977; Ferguson and Harwood, 1984; Present, 1987). Development of a suitable Australian Standard for Domestic Pool Fencing and the passage and enforcement of universal foursided isolation fencing had the potential to dramatically reduce the incidence of toddler drowning.

In 1979 Standards Australia published a design standard. These standards were drafted after negotiation between injury prevention researchers, child safety advocates, industry representatives and community representatives, which included members of the anti pool fencing lobby. Unfortunately, in spite of the advice of researchers and child safety advocates, a flawed standard was

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published which failed to address an issue of critical importance – the position of the fence. Four-sided dedicated pool fencing that isolated the pool from the rest of the property and the house was necessary to ensure the safety of small children living in the house, but this was not specifically addressed in the original design standard. As a result, legislation and ordinances drafted on the basis of this standard in NSW (1992) and Victoria (1988) were flawed (Scott, 2003).

Amidst great controversy, Brisbane City Council passed a pool fencing ordinance in 1977 only to see the ordinance struck down by the conservative state government the following year. In NSW the Minister for Local Government (whose child had nearly drowned in a domestic pool) oversaw the passage of an act requiring all domestic pools be fenced in 1990. However, the government faced vocal opposition during an election campaign the next year. The Minister for Local Government lost his seat and the government majority was reduced to one. As a result NSW legislation was repealed even before it was enacted (Scott, 2003).

Sadly, it was 20 years after the identification of the problem and 15 years after the identification of the solution before best practice legislation was enacted in any jurisdiction (Scott, 2003). Best practice pool fencing standards were not published by Standards Australia until 1993.

After an intense period of public education and political advocacy, universal foursided, isolation pool fencing legislation was eventually enacted by the Queensland Government in 1992. This was associated with a dramatic decline in toddler drowning. Only four children drowned in domestic pools in the 24 month period after the legislation was enacted, compared with an average of 15 per year prior to the legislation (Pitt and Balanda, 1991). Similar legislation was introduced in Western Australia in 2002.

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Figure 10.1 All Queensland drowning deaths, by year in children 0-4 years, <u>1983-2001 (Cunningham et al., 2002 – used with permission)</u>

Cunningham et al. (2002) estimated that the legislation had saved an estimated 70 lives by 2001. However, the incidence was again rising (Figure 10.1). Over the ten year period since enactment of the legislation, 73 children under 5 years of age drowned, three quarters in in-ground pools. In 21% the pool was unfenced, in 46% the gate had been propped open or did not close automatically and in 13% the child had entered through the house door (three-sided fencing was permitted in pools approved prior to 1991).

Cunningham et al. (2002) concluded that pool fencing legislation had been effective, but compliance had faltered because of lack of maintenance of fences, deliberate propping open of gates and a lack of enforcement by local government. They pointed to the ongoing need for public health programs to maintain public awareness of toddler drowning in domestic pools, ensure adequate supervision of children in pool compounds, and maintain enforcement of existing legislation. A number of important lessons can be learned from this case study:

- It may take a long time to generate sufficient administrative and political resolve to implement an effective intervention.
- Effective lobbying targeting those in responsibility may be circumvented by those opposing the intervention if there is not adequate consensus within the community that legislation is justified.
- Even an archetypal passive intervention (pool fencing) must be reinforced by ongoing public health campaigns to maintain community compliance and sufficient consensus to ensure enforcement of the legislation.

Injury is a complex problem. It has multiple inter-related causes that cut across policy and service areas and defy single strategy, single agency "silo" approaches (Keast et al., 2004). Sleet (1984) emphasised the importance of an "active approach to passive interventions". A suite of interventions simultaneously targeting behavioural, environmental and social determinants are more likely to be effective (Gielen and Sleet, 2006).

If comprehensive interventions that systematically address behavioural, environmental and social determinants of injury are to be designed, a new way of working is required that bridges traditional boundaries and unlocks expertise and resources already existing in communities (Ackoff, 1974; Rittel and Weber, 1973; Clarke and Stewart, 1997; Lasker et al., 2001; Keast et al., 2004).

In recent years, "settings based" approaches have been proposed as a way to embed comprehensive solutions to complex social problems within a target social system (Ashton, 1992; Whitelaw et al., 2001; Coggan and Bennett, 2004; Welander et al., 2004). If communities can be assisted to identify and address their own problems using their own resources, this may engender self sufficiency to sustain a safe environment (Hawe et al., 1997; Green and Kreuter, 1999; Hanson et al., 2002 and 2005; Coggan and Bennett, 2004; Welander et al., 2004).

10.9. COMMUNITY CAPACITY

Capacity building uses an intervention as a vehicle to identify, mobilise, coordinate and develop existing community resources to address local issues. This increases the community's capacity to mobilise sufficient resources to induce and ultimately sustain change (Hawe, 1997; Hawe et al., 1998; Coggan and Bennett 2004; Gielen et al., 2006). If this process can be adequately embedded within the community social system, the intervention itself may ultimately become superfluous (King, 1990; Labonte 1991a and 1991b; Swerissen, 2004).



Figure 10.2 Community capacity building – magnifying the effect of a safety promotion intervention

There is more to a community than can be purely measured in dollar terms. Cox (1995) identified four types of community resources or "capital":

- Financial Capital: the economic resources available to a community or program. While clearly important, it is frequently overemphasised at the expense of other forms of capital.
- 2. Physical Capital: the natural environment and man-made resources (including buildings and equipment) available to a community.

- 3. Human Capital: the skill and knowledge of the individuals contained within a community.
- Social Capital: "the features of social organisation, such as networks, norms and trust, that facilitate co-ordination and co-operation for mutual benefit" (Putnam, 1993).

Communities have access to many different resources, all part of the mix necessary to implement and sustain safe communities.

Certain authors argue that social capital is a critical forgotten element of successful social interventions (Putnam, 1993; Cox, 1995). Two complimentary forms of social capital deliver different social outcomes (Lin, 1999; Burt, 2000; Putnam, 2000). Entrepreneurial social capacity is a source of innovation and advocacy. It is necessary to produce sufficient consensus to implement a desirable social outcome (Lin, 1999; Lasker et al., 2001). Cohesive social capital is a source of social stability and is necessary to maintain the consensus necessary to sustain a desirable outcome (Lin , 1999, Putnam, 2000). Entrepreneurial social capital is important to achieve sufficiency, while cohesive social capital is important to maintain sustainability.

10.10 RESPONSIBILITY

Multi-level, multi-sector, multi-agent collaborative networks have been proposed as vehicles for promoting social change. However, networks cannot be sustained unless all network members contribute. This principle applies equally to horizontal networks (within community systems) and vertical networks (between politico-administrative systems and communities).

In an age of financial accountability, economic rationalism and aggressive competition for funding, short term development funding is now the norm. Governments and organisations are reluctant to commit to ongoing operational investments, preferring to delegate this responsibility to local communities or non government agencies (NGOs). As a result, a paradigm has gained credence that explicitly or implicitly defines sustainability as, "the ability of a health project or

programme to deliver health services or sustain benefits after major technical, managerial and financial support has ceased" (United States Agency for International Development, cited La Fond, 1995). However, this paradigm is contingent on a critical assumption; the target community will, after a period of infrastructure and social development, have the authority and ability to mobilise enough resources to maintain the desired outcome. Many authors question if this assumption is realistic, given that administrative control over the necessary resources is often retained by agencies external to the target community (Stefanini, 1992; La Fond, 1995; Olsen, 1998; Swerissen and Crisp, 2004; Hanson et al., 2005).

All network members must seriously consider their responsibilities:

- Community networks planning local interventions need to actively build self sufficiency into their processes using local resources as far as possible while developing the advocacy skills necessary to mobilise external resources when required.
- 2. External agents sponsoring community interventions need to seriously consider if it is realistic to delegate long term responsibility for intervention maintenance to a community network. If the community does not have the authority to access the resources necessary to maintain the desired outcome, the intervention is, by definition, unsustainable. In this circumstance, to delegate responsibility under the guise of capacity building without ensuring local self-sufficiency, is both ineffective and unethical.

10.11. MEASURING SUSTAINABILITY USING SOCIAL NETWORK ANALYSIS

Sustainability "is not an end state but an ongoing input-output process" (Brinkerhoff and Goldsmith,1992, p 371), contingent on the flux of resources though a social system (von Bertalanffy, 1950; Brush, 1975; Lowe, 1994; Sciubba, 1995).

Social Network Analysis (SNA) records and analyses interactions between members of a network. It may therefore be a useful tool to describe how this process of resource exchange occurs within a social system (Emerson, 1976; Cook and Whitmeyer, 1992) and thereby make some useful inferences about the sustainability of the process.

Cox identified four important community resources: financial, physical, human and social capital. In Chapter Nine, SNA was used to analyse the development of social capital in the Mackay Whitsunday Safe Communities (MWSC) and its Support Network (SN). This study seeks to analyse the exchange of in-kind (physical), human and financial resources within MWSC and its SN.

10.12. METHOD

The methodology used by this study was described in Chapter Seven. In addition to asking respondents to describe the relationships they maintained, respondents were asked to identify the resources they shared in the context of these relationships.

- 1. *In-kind resources* (including printed material, library access, desk space, office space, computer hardware or software).
- 2. *Human resources* to collaborate on joint projects. This did not include attendance at a meeting unless involvement in the group required the commitment of extra time to meet shared objectives set by the group.
- 3. *Financial resources* to collaborate on joint projects. Significant financial resources were defined as sums greater than \$100.00 that once given were no longer under the direct control of the actor or their organisation.

They were also asked to describe the type and extent of resources they shared with the project as a whole (Chapter 7, Appendix 23).

As the financial resources identified by respondents may be transferred between actors, the financial network of each actor was reviewed by the three investigators¹ who by consensus decided on the original source of any funds contributed to the network. It was thereby possible to estimate the total value of financial contributions made to the network. An adjacency matrix documenting the sharing of financial resources was estimated by first assigning salaries to the appropriate employees and then by sharing any remaining financial resources given to the network by an individual actor equally among any other actors they identified they shared resources with.

Participation in the survey was voluntary and any personal identifying information was kept confidential.

Directional adjacency matrices were constructed for the following interactions:

- 1. Sharing of in-kind resources (2004) matrix and sociogram.
- 2. Sharing of human resources (2004) matrix and sociogram.
- 3. Sharing of financial resources (2004) matrix and sociogram.

Network and actor attributes were calculated using UCINET 6.74 and NetDraw1.45 software (Borgatti et al., 2002).

10.13. **RESULTS**

The study identified 168 members of MWSC and its SN. One hundred and fourteen (67%) were members of the MWSC, while 56 (33%) were external actors with whom project members maintained a relationship. One hundred and forty-eight agreed to participate in the study, a response rate of 87%.

¹ Dale Hanson - School of Public Health and Tropical Medicine, James Cook University. Paul Vardon - Statewide Health Promotion Unit, Queensland Health. Kathryn McFarlane - Tropical Population Health Unit, Queensland Health.

10.14 SOCIAL CAPITAL

In Chapter Nine, SNA was used to quantify indicators of increased social capital in the MWSC &SN. Since the project was launched the project had developed:

- More relationships. The number of relationships observed in the network doubled from 500 to 1002, largely by increasing the connectedness of existing network members. At an interpersonal level, the average number of relationships maintained by network members increased from 3.3 in February 2000 to 5.9 by December 2004.
- Closer connections. The average distance (average number of intermediary relationships) separating network members decreased from 3.9 to 2.7.
- Increased cohesion. The density of network relationships doubled from 0.022 in February 2000 to 0.036 by December 2004.
- 4. Better relationships. Fifty-six percent of relationships were said to have improved as a consequence of the project.
- 5. Increased reciprocity. In February 2000, 20% of relationships were reciprocated, increasing to 30% by December 2004.
- Increased group formation. The clustering coefficient increased from 0.30 in February 2000 to 0.50 by December 2004.
- More centralised structure. The centralisation index increased from 18% in 2000 to 43% in 2004. In February 2000 the founding members of the NSG had a direct relationship with 51% of the network. By December 2004 this had increased to 90% of the network.

MWSC had succeeded in developing cohesive social capital – the ability of a network to work collaboratively for mutual benefit.

While Chapter 9 demonstrated clear evidence of enhanced group function it also provided compelling evidence of the prominent role played by 6 network facilitators who support the MWSC and its SN. Figures 9.7 and 9.8 model the role these actors play in connecting local MWSC members to the external support networks (the Mackay Whitsunday Support Network, and the State/National and International Support Network). Figure 9.9 demonstrated that network relationships grew by most network members doubling their relationships. Accordingly, actors who already had a prominent role in 2000, developed more new relationships than other network members. Of the 502 new relationships formed by 2004, 157 (31%) were by the 6 network facilitators. Accordingly, their capacity to broker relationships increased from 39% in 2000 to 60% in 2004. However, this social influence came at a cost. As a group they received 258 incoming relationships (43 relationships per facilitator). Other network members only process an average of 1.8 incoming relationships.

	Any Relationship	No sharing of resources	In-Kind Resources	Human Resources	Financial Resources
Actors	168	114	117	123	59
Relationships within MWSC &SN	1002	350 (35%)	467 (47%)	538 (54%)	151 (15%)
- Average Degree	5.9	2.1	2.7	3.2	0.9
- Reciprocity	30%	14%	14%	19%	10%
- Transitivity	26%	8%	18%	25%	2%
Relationships solely within MWSC	638	274 (43%)	232 (36%)	296 (46%)	70 (11%)
Relationships spanning between 249 MWSC & SN		53 (21%)	159 (64%)	168 (68%)	49 (20%)
Relationships solely within the SN	115	23 (20%)	76 (66%)	74 (65%)	32 (29%)

10.15 RESOURCE SHARING

Table 10.1: Network characteristics of resource sharing networks

Thirty-five percent of relationships did not share any resources, 47% shared inkind resources, while 54% shared human resources. Only 15% of relationships resulted in the sharing of significant financial resources.

Table 10.1 details attributes of the three exchange networks. On average network members maintained 2.1 relationships that did not share resources, 2.7 that shared in-kind resources, 3.2 that shared human resources and 0.9 that shared financial resources. The sharing of financial resources was not associated with social forces such as reciprocity (10%) or transitivity (2%). In contrast, the sharing of human and in kind resources were more likely to be associated with reciprocity (19% and 14% respectively) and transitivity (25% and 18% respectively).

Relationships within MWSC were less likely to share resources than relationships involving external agents. Whereas 36% of internal relationships shared in-kind resources, 62% of bridging relationships (between the MWSC and its SN) and 67% of external relationships, shared in-kind resources. Forty-six percent of internal relationships reported sharing time outside of formal meetings, compared with 66% of bridging relationship and external relationships. While 10% of internal relationships shared financial resources, 20% of bridging relationships and 30% of external relationships shared financial resources.



Figure 10.3 Sharing in-kind resources

Actors were asked to nominate what in-kind resources they shared with the network as a whole. Thirty-seven percent of actors indicated that they were not in a position to share in-kind resources. Approximately half indicated they shared printed materials or photocopies, while 20% shared computer equipment or office space (Figure 10.3).



Figure 10.4 Block diagram of MWSC and SN in 2004: Sharing of in-kind resources facilitators, MWSC, Mackay Whitsunday Support Network and State / National International Support Network

Figure 10.4 documents the sharing of in-kind resources within MWSC and SN. There is a net movement of in-kind resources into the project. One hundred and twenty-six relationships deliver in-kind resources to MWSC, compared with 43 outgoing relationships. Of the in-kind resources entering the project, 48% were directly accessed by members of MWSC while 52% were accessed via the network facilitators. Within MWSC, 55% of in kind resource sharing was brokered by the network facilitators.





Fifty-four percent of relationships shared human resources, mobilising an estimated 10 full-time equivalents (FTE) across the whole network. 6.5 FTE were mobilised within MWSC. However, 30% of actors indicated that they did not share human resources, while half shared less than five hours per week. Only 6% were in a position to share more than 15 hours per week (Figure 10.5).

A significant correlation was observed between the time respondents invested in the network and degree centrality (p < 0.000, Pearson Correlation Coefficient = 0.72, $R^2 = 0.52$, Figure 10.6). 3.6 FTE were provided by six key leaders of MWSC accounting for 56% of time invested by members of MWSC.

Figure 10.7 documents the sharing of human resources within the MWSC and SN. The net human investment in the MWSC network is evident. One hundred and thirty-one incoming relationships were documented compared with 49 outgoing relationships. However, there is more intense sharing of human resources within MWSC. Forty-six percent of relationships shared human resources compared with 36% that shared in-kind resources and 10% that shared financial resources. Within MWSC, 55% of relationships sharing human resources involve the network facilitators.



Figure 10.8 Sharing of financial resources



Figure 10.9 Block diagram of MWSC and SN in 2004: Sharing of financial resources facilitators, MWSC, Mackay Whitsunday Support Network and State / National International Support Network

The MWSC mobilised an estimated \$910,000 dollars. \$660,000 funded activities directly related to MWSC. \$250,000 was invested in local infrastructure advocated by the MWSC to enhance community safety.

Seventy-six percent of respondents were not in a position to share financial resources (Figure 10.8). Eighteen percent shared sums greater than \$1000 dollars, 8% shared between \$10,000 and \$100,000 while 6% shared greater than \$100,000 per annum.

Figure 10.9 documents the sharing of financial resources within MWSC and SN. The net passage of financial resources into the MWSC is clear. \$500,000 (78%) is accessed through the State / National / International Support Network, \$130,000 (20%) from the Mackay Whitsunday Support Network and \$10,000 (2%) from within MWSC itself. Of the financial resources entering the project, \$200,000 (34%) was directly accessed by members of the MWSC while \$390,000 (66%) was accessed via the network facilitators. Three quarters of the financial resources accessed for MWSC activities were used to fund salaries of MWSC members (an estimated 3.6 FTE for the network facilitators and 2.9 FTE for other MWSC members). Within MWSC, 70% of financial resource sharing involved the network facilitators.

	In-kind resources	Human resources	Financial resources
Some Contact	0.124 ***	0.097 ***	0.024 *
Interagency Meeting	0.105 ***	0.081 ***	0.069 ***
Working Group	0.248 ***	0.295 ***	0.087 ***
In-Depth	0.290 ***	0.358 ***	0.257 ***

Quadratic Assignment Procedure (QAP) Correlation (Jaccard Coefficient) * p<0.05, ** p< 0.01, *** p < 0.001

Table 10.2: Correlation matrix, resource sharing by depth of relationship

Table 10.2 is a correlation matrix identifying the association between the depth of collaboration and the sharing of resources. The Jaccard Coefficient was employed to estimate correlation using a Quadratic Assignment Procedure (Hanneman and Riddle, 2005). The sharing of resources, whether in-kind, human or financial was associated with closer collaboration. Interagency meetings were defined as those in which members "meet to share information and discuss mutual goals but work independently", while members of working groups "collaborate at committee level to achieve shared objectives". In keeping with this definition a stronger association was observed between working group relationships and resource sharing than relationships in the context of interagency meetings. Financial resources were most strongly associated with in-depth relationships.

10.16 RESOURCE SHARING AND BENEFICIAL RELATIONSHIPS

Respondents were asked to assess the net benefit of relationships they maintained. Relationships could be reported as:

- 1. *Unhelpful*. The benefits obtained by working together did not justify the extra effort and resources required to maintain the relationship,
- 2. *Neutral*. The extra effort and resources required to maintain the relationship were balanced by the benefits of working together,
- 3. *Beneficial*. The benefits of working together outweighed any extra effort and resources required to maintain the relationship.

Two percent of relationships were reported to be unhelpful, 25% neutral and 73% beneficial.



Figure 10.10 Resource sharing by perceived benefit

Relationships reported as beneficial were strongly associated with the sharing of resources. Ninety percent of relationships that shared resources, whether in-kind, human or financial, were reported as beneficial and 10% neutral. No relationships that shared resources were described as unhelpful. In contrast, 5% of relationships that did not share resources were reported as unhelpful, 54% as neutral, while only 42% were considered beneficial (Figure 10.10).



<u>facilitators, MWSC, Mackay Whitsunday Support Network</u> and State / National International Support Network

Figure 10.11 describes the distribution of beneficial relationships within MWSC and SN. The strong preference of network members for the six facilitators is evident. Eighty-six percent of relationships directed towards the network facilitators were perceived as beneficial. In contrast, only 62% of outgoing relationships were perceived as beneficial by the network facilitators. Similarly, 85% of direct relationships between MWSC and its SN were considered beneficial but only 67% of relationships within MWSC that did not involve network facilitators were considered beneficial. Seventy-eight percent of relationships among the support network were considered beneficial.

10.17 DISCUSSION

The MWSC was launched in February 2000 in response to perceived excess injury morbidity in the region. During the project planning stage a local needs analysis concluded that "Injury control activities in the Mackay and Moranbah Health District areas have been extensive but largely uncoordinated ... A systematic and inter-sectorial approach would be more productive" (Repper and Vardon, 1999, p 3). Thus a key initial objective of MWSC was to better

coordinate relationships within a pre-existing network of community agents and in so doing, enhance the capacity of the community to collaborate effectively and thereby to sustain an ongoing safety promotion program in the Mackay Whitsunday Community.

In Chapter Nine, SNA was used to quantify indicators of social capital in the MWSC & SN. Since the network was established it has doubled the number of relationships (500 to 1002), decreased the relational distance separating network members (average distance reduced from 3.9 to 2.7) and as a result increased the cohesiveness of the network (density increased from 0.022 to 0.036, while average degree increased from 3.3 to 5.9). There was an increased tendency for group formation (clustering coefficient increased from 0.30 to 0.50) and a more centralised structure, allowing more opportunity for co-ordination of group activities (centralisation index increased from 18% to 43%). When the network was established, founding members of the NSG had a direct relationship with 51% of the network; by December 2004 this had increased to 90% of the network. MWSC had clearly succeeded in developing cohesive social capital – the ability to collaborate for mutual benefit.

Given that approximately half of all "community-based coalitions became inactive after they had performed initial simple tasks" (Yates, 1973; World Bank, 1990; Rissel et al., 1995; Hanson et al., 2005), the fact that the network had persisted for four years and established an ethic of community collaboration in which 73% of all relationships were considered beneficial is a substantial achievement. As Hill (2002) notes, "In some ways, the literature implies that assembling or establishing a network is a huge success, in itself" (p43). However, if we are to invest the time and effort necessary to facilitate the development of a functional community network it is necessary to deliver something more substantial than a cohesive "beneficial" social system. Collaborative community networks have been proposed as vehicles to mobilise and develop community capacity that can be used to sustain public health outcomes.

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SNA enabled quantification of the exchange of resources within the MWSC & SN. In 2004 the network mobilised an estimated 6.5 FTE within the MWSC and \$910,000 dollars, \$660,000 for direct network activities and \$250,000 for safety infrastructure advocated by members of the MWSC. Given that MWSC is a collaborative network, not a financially incorporated body or a formal partnership bankrolled by government, this is a significant achievement.

Unfortunately this study did not measure the exchange of resources in 2000 and so it is impossible to determine whether sharing of resources was enhanced by the development of the network. However, it is worth noting that sharing of resources was associated with relationships at the level of working groups and in-depth collaborations (Table 10.2). The coalition converted 42% of relationships described as some contact to either working group (33%) or in-depth relationships (9%) during the period under review. Similarly 51% of interagency relationships were converted to either working group (49%) or in-depth relationships (2%).

While the network has mobilised sufficient human and financial resources to establish itself as a credible and productive community safety promotion coalition, if the MWSC is to be sustainable it is important to identify the origin of these resources and means by which MWSC has accessed them.

The majority of network members were not in a position to share large amounts of resources. Indeed, 35% of network members did not share any resources. Fifty-four percent shared human resources, 47% in-kind resources but only 15% shared financial resources. Relationships with external agents were more likely to involve resource sharing. While 36% of relationships within MWSC shared in-kind resources, 62% of bridging relationships between the MWSC and its SN shared in-kind resources. Similarly, 46% of internal MWSC relationships shared time, compared with 66% of bridging and external relationships. Importantly, five of the six most prominent actors (who together account for 56% of the time invested in the network) were externally funded. Finally, while 10% of internal

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relationships shared finances, 20% of boundary spanning relationships and 30% of external relationships shared financial resources. Ultimately 98% of financial resources mobilised by MWSC were sourced externally, \$500,000 (78%) from the State / National / International Support Network and \$130,000 (20%) from the local Mackay Whitsunday Support Network.

These observations highlight an important sustainability principle:

From the physical point of view, the characteristic state of the living organism is that of an open system. A system is closed if no material enters or leaves it; it is open if there is import and export ... Living systems are open systems, maintaining themselves in exchange of material with environment (von Bertalanaffy, 1950, p 23).

Communities are open systems; a community produces outputs (taxes, work, products and natural resources) and in return receives inputs (services, salaries and payment). Importantly, open systems never achieve equilibrium², a state in which the resources required to sustain a system equals the energy produced by the system itself. Natural systems only achieve equilibrium when there is no output; when they are dead (von Bertalanffy, 1950; Svirezhev, 2000). Living natural systems are stable when they are in steady state, when the net flux of resources into and out of the system are sufficient to sustain the function of the system. To define sustainability as "the ability of a health project or programme to deliver health services or sustain benefits after major technical, managerial and financial support has ceased" (United States Agency for International Development, cited La Fond, 1995) is an oxymoron. Closed system sustainability does not exist. Of course, energy efficient ecological systems, which require minimum inputs to maintain productive outputs, are more likely to be sustained. Wise communities aim to be as self-sufficient as possible.

² A theoretical state of closed systems that in practice is never achieved. The first law of thermodynamics states that energy can neither be created or destroyed, or in colloquial terms, "you cannot get something for nothing". The second law of thermodynamics states that no process for converting energy is 100% efficient or "you cannot break even". The third law of thermodynamics states that absolute zero cannot be reached, that is equilibrium can never be achieved. Stated simply, physical and biological systems performing work require a constant input of energy.

Ultimately, all ecological systems require inputs to maintain their output. There are two important implications of this observation:

- MWSC is an open social system. The sustainability of this network could only be understood by studying MWSC and its SN. To study MWSC in isolation would have been a partial system fallacy (Lauman et al., 1983). Relationships with external actors were clearly an important part of network function.
- Sustainability is not just an issue of making the system self sufficient, but of also ensuring the community has the capacity to maintain an adequate flow of resources to sustain the desired outcome.

SNA provided one more interesting insight into the social process that mobilises resources on behalf of MWSC. The bridging relationships between MWSC and its SN (entrepreneurial social capital) were the conduit by which MWSC accessed the resources it required to maintain network activities. It was encouraging to note that members of MWSC had developed productive relationships with their SN, directly accessing 48% of in kind resources, 46% of the human resources, and 34% of the financial resources invested in the project. However, entrepreneurial social capital was not evenly distributed. Six network facilitators maintained 44% of all relationships, 57% of bridging relationships between MWSN and its SN, and as a result, 60% of the brokerage potential in the network (See Chapter 9). They used their entrepreneurial social capital to good effect, facilitating 52% of the in-kind investment, 54% of human investment and 66% of the financial in MWSC.

Many authors emphasise the voluntary horizontal nature of collaborative network relationships (Mitchell and Shortell, 2000; Gilchrist, 2000; Pedler, 2001; Hill, 2002; Mandell and Steelman, 2003; Keast et al., 2004). There is no innate vertical administrative hierarchy and nothing formally constraining network members to remain involved. For network members to remain engaged they must be motivated by the overall network objectives and find their involvement rewarding (Mitchell and Shortell, 2000; Pedler, 2001; Hill, 2002). Collaborative partnerships therefore require boundary spanning leaders that facilitate the creation of a synergistic social space in which network members can work together to meet common goals yet at the same time fulfill their personal and organisational aspirations (Alter, 1993; Gilchrist, 2000; Lasker et al., 2001, Keast et al., 2004). In the MWSC & SN, 73% of relationships were described "beneficial", 25% "neutral" and 2% "unhelpful". Beneficial relationships were associated with sharing resources, closer collaboration and the facilitative role played by some members of the NSG.

Maintaining a functional social network has a cost. It takes time to develop and maintain relationships, a social investment known as "transaction costs" (Thompson, 1993; Hill, 2002; Mandell and Steelman, 2003). In this study the number of relationships maintained by network members (degree centrality) was strongly correlated with the amount of time members invested in network activities (Pearson Correlation Coefficient = 0.72, R² = 0.52, p < 0.000). However, the relational pressure this placed on the network facilitators was evident. Network relationships were strongly focused towards the facilitators (Figure 9.8). As a group they processed 258 incoming relationships (43 relationships per facilitator). Other members only process an average of 1.8 incoming relationships.

It is questionable if the facilitator role is sustainable in its present form if they continue to acquire new relationships at the same rate (that is, doubling every four years). More importantly, network function would be highly compromised if their role were rationalised by the SN on the assumption that the network ought to be self sustaining after a four year period of capital investment. Given the Mackay Whitsunday communities limited financial capacity at this time (Figure 10.9) it is not credible to suggest that this level of relational output could be maintained by unfunded community agents. While the network may survive without its facilitators, its capacity would effectively be halved. They maintained 44% of all relationships in the MWSC & SN, 57% of bridging relationships between MWSC and its SN, and mobilised 52% of in-kind, 54% of human and 66% of financial investments in MWSC.

Collaborative networks are not necessary or expedient to solve all community problems. For any given problem, there will be a break point at which the transaction cost exceeds the value of the outcomes achieved. A network of collaborative relationships built on mutual trust and synergistic goals takes time to develop (Hill, 2002). Collaborative networks whose unique attribute is the ability to assimilate complex contextual determinants of social problems and produce innovative local solutions may have little to offer preconceived top down interventions that must be implemented in a short time frame.

MWSC was launched in February 2000 in response to perceived excess in injury morbidity and mortality in the region. It is a "bottom up" project initiated in response to a local problem. To achieve its objectives it needed to co-ordinate local agents already acting in the field of injury prevention and safety promotion, and build a common vision that the injury problem could be solved. This collaborative network was then used as a vehicle to get safety promotion on the agenda at a local and state level, and advocate for and co-ordinate the mobilisation of resources to address the issue. From this perspective the network has been successful as it has strengthened relationships, built cohesion, enhanced collaboration and used the coalition as a platform to attract resources to run safety promotion programs. It spearheaded the formation of the Safe Communities movement in Queensland, it successfully staged the 2nd Pacific Rim Safe Communities Conference and the 7th Australian Injury Prevention Conference, and after a process of external peer review achieved designation as a WHO Safe Community. However, in-kind rersources, salaries that fund human resources and financial resources are largely accessed outside the MWSC. From the perspective of external agencies seeking to tap into local community resources as a way to enhance their financial investments in community, this coalition may be disappointing. While a rich source of social capital, the discretionary in-kind, human and financial resources moblised within MWSC appear to be limited.

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A number of important weaknesses of this study deserve comment:

- 1. This analysis documented the exchange of resources in MWSC and SN as a way of reviewing the sustainability of the network. However, sustaining MWSC & SN may not necessarily be an absolute requirement to maintain safety in the Mackay Whitsunday Region. Were the network able to adequately embed behavioural, environmental and social safety promotion characteristics in the community, MWSC may become superfluous. On the other hand, it cannot be assumed that sustaining MWSC & SN will necessarily ensure the safety of the community. Nevertheless by studying MWSC & SN it has been possible to identify general principles of how a social safety promotion process has been implemented and sustained over a period of four years.
- 2. The measures of physical, and human capital utilised were rather simplistic. There may be physical resources accessible to network members that need to be exchanged to support and promote safety in the region. A formal audit of physical capital accessible to the network would compliment a study that documents the exchange of these resourses. More importantly, humans bring much more to the network than just time, the attribute measured in this study. They contribute their previous experience, skills and training. The most commonly cited constructs of community capacity identify the importance of the exchange of information through social networks (Goodman et al., 1998; Hawe et al., 1997, Bush and Mutch, 1999). While the relational network by which innovations, knowledge and information are exchanged was mapped in this study, it must be stressed that this exchange of information was not formally assessed. Documenting the social capital the entrepreneurs have at their disposal to disperse information does not necessarily imply that they actually do this. It would be illustrative to formally measure the exchange of information in any future social network studies of a health coalition.
3. This paper has emphasised the dynamic quality of sustainability. Sustainability is an ongoing process, contingent on the ongoing exchange of enough resources to maintain the productivity of the network. It is not a stable quality of a social network that once achieved remains indefinitely. This study only measured the exchange of resources at one point in time and therefore offers little insight into the true dynamic quality of sustainability. While this once-off audit of resource exchange within MWSC and SN has offered useful observations regarding the social process by which resource exchange occurs, it would be far more useful to use tools able to analyse this exchange on an ongoing basis. Recent innovations in stochastic modeling of social networks using p*models (Robbins and Pattison, 2001; Snijders, 2005; Wasserman and Robbins, 2005) mean that it is now possible to create temporal stochastic models of social networks. This methodology therefore has potential to further elucidate how sustainability is achieved in social systems.

10.18 CONCLUSION

Project sustainability is not always achieved. Interventions dependent on external resources are vulnerable. In an age of financial accountability, economic rationalism and aggressive competition for funding, short-term capital development funding is the norm. Embedding behavioural, environmental and social safety promotion characteristics in a community maximises the potential of a community to sustain its own safety.

Ecological systems are open systems that achieve steady state when the flux of incoming and outgoing resources is adequate to maintain the function of the system. Sustainability is therefore a dynamic state contingent on the on-going supply of enough resources to sustain the productivity of the system.

Cohesive social capital may be an important social resource required to sustain safety promotion networks and maintain the safe community standards they promote. Entrepreneurial social capital may be the social resource required to generate sufficient community capacity to implement these standards and if necessary, maintain the community network that promotes them.

Social Network Analysis indicates that Mackay Whitsunday Safe Communities is rich in social resources, but in-kind, human and financial resources are largely accessed and controlled by its external support network. As six key broker leaders play a key facilitative role in mobilising these resources, the sustainability of the coalition is vulnerable to the changing priorities of its sponsoring agents and critically dependent on the advocacy skills of its leaders.

CHAPTER ELEVEN

11.1 COMING TO TERMS WITH THE CHALLENGE

In Australia, injury is the fourth leading cause of death and the leading cause of death in those under 45 years of age (Kreisfeld et al., 2004). Every year approximately 7,800 Australians die (Kreisfeld et al., 2004) and 330,000 are hospitalised (Berry and Harrison, 2006) due to injury. Injury rates in Queensland are higher than the Australian average, while in Australia, regional and rural communities experience greater morbidity and mortality due to injury than occurs in major cities (ABS, 2004; Berry and Harrison, 2006).

A community needs analysis conducted by the Mackay Division of General Practice in 1998 suggested that injury rates in the Mackay region were high (Azzopardi et al. 1998). Mackay Base Hospital reported an average 8,700 Emergency Department (ED) injury presentations per annum in 1998 and 1999, constituting 25% of the ED caseload. Age standardised ED presentation rates were double those observed in South Brisbane (Vardon et al., 2000). In response, Mackay Whitsunday Safe Communities (MWSC) was established in late 1999.

Injury has a complex aetiology that demands a multifaceted complex response (Baker, 1972; NCIPC, 1989; Bonnie et al., 1999). Complex problems are made up of a system of interrelated mutually interdependent problems (Buckley, 1998; Byrne, 1998, Lewis, 2005) and are resistant to investigation by reductionist scientific methods that seek to understand system function by disaggregating the system into its component parts (Ackoff, 1974; Rittal and Weber, 1973; Kickert et al., 1997; McMichael, 2001; Lasker and Weiss, 2003; Lewis 2005).

This thesis describes key learnings in coming to understand and address the complexity of Mackay's injury problem, its epidemiology and aetiology, the complexity of intervening at a community level and evaluation of this social process.

11.2 LOCAL INJURY SURVEILLANCE: NOT AS SIMPLE AS IT SEEMS

Initially the epidemiological evidence concerning injury in the Mackay Region seemed straightforward. A five year review of injury hospitalisations from July 1993 to June 1998 indicated that the age standardised hospital separation rates in the Mackay Region were double the Queensland average, as were ED injury presentation rates.

Subsequent review of injury hospitalisations in the Mackay Health Service District (THPU, 2006a) called into question the conclusion that the high injury separation rate at Mackay Base Hospital implied a high incidence of injury in the Region. A doubling of Injury Hospital Separation was observed in the 1992/93 financial year. The apparent excess in injury separations was attributed, at least in part, to better statistical capture of short stay ED admissions in the Mackay Health Service District¹.

The ability to generate robust statistics that allow comparison of injury incidence between communities is very useful as it allows monitoring of disease patterns and trends, and facilitates setting of public health priorities. However, from the perspective of the Mackay community, the key question was not one of comparison with other communities, but rather whether there was sufficient evidence to indicate that injury was an important local issue.

The average 8,700 ED injury presentations annually to Mackay Base Hospital, meant that Mackay ED injury presentation rates were higher than those observed in South Brisbane. This finding was consistent with the general observation that regional communities have higher injury morbidity rates than urban communities (ABS, 2004; Berry and Harrison, 2006). Thus there was evidence that injury was an important public health issue in Mackay.

¹ Short Stay ED admissions refer to episodes of care that require more intensive treatment or a period of extended observation in the ED. Typically they concern minor surgical procedures performed in the ED (e.g. fracture and dislocation reductions or suturing of deep wounds).



Figure 11.1 Age standardized emergency department injury presentation rates: Mackay Base Hospital, 1998 to 2004

It is encouraging to note that over the four year period since the launch of MWSC in February 2000 age standardised emergency department injury presentations to Mackay Base Hospital have reduced from 76.4 per 1,000 in 2000 to 67.5 per 1,000 in 2004 (Figure 11.1), a 12% reduction. Injury now constitutes 21% of ED caseload rather than 25%. Over the same period Mackay experienced a 5% reduction in age standardised injury separations relative to the Queensland (TPHU, 2006b). However because of the multi-causal nature of injury and local service utilization and data ascertainment issues it is not possible at this time to attribute this reduction to MWSC. Further research is required.

11.3 ECOLOGICAL SAFETY PROMOTION

The individualistic presuppositions of modern Western society (Lukes, 1971) and the reductionist epistemology of modern biomedicine (Engel, 1977; McMichael, 2001) resulted in early researchers attempting to understand injury causation by atomising the problem down to its most basic component – the individual. Rose (1985) argued that it was important to address the question, "Why does this population have a high incidence of disease at this time."

A population based construct of injury causation was required. To focus solely on the biomedical concept of "injury prevention" underestimates the wholistic nature of human experience and how the positive state "safety" is achieved at a community level. Safety is a psychological, sociological and environmental phenomenon, as well as a biophysical one.

Communities can be viewed as an ecosystem, with resources, opportunities and threats to their safety (McMurray, 1999). While interventions targeting individual behaviour are undoubtedly important, these behaviours are unlikely to be sustained unless they are embedded in supportive physical and social environments. Syme and Balfour (1998) observed that "it is difficult to expect that people will change their behaviour easily when many forces in the social, cultural and physical environment conspire against it."

The individual is, metaphorically speaking, just the "tip of the iceberg," the pinnacle of a complex ecological system. While they may be the most visible component, important determinants of their behaviour and environmental risk are "hidden below the waterline." Attempts to modify the risk of injury at one level in isolation (for example individual behaviour) will be resisted by the rest of the ecological system, which will attempt to maintain its status quo. A comprehensive population based approach that simultaneously targets behavioural, environmental and social determinants of injury is necessary to promote and sustain the safety of the target community.

11.4 SAFETY PROMOTION NETWORKS

Contemporary literature on societal governance and public health argues that the complex nature of social problems, such as injury, has profound implications for the way they should be addressed (Rittel and Webber, 1973; Clarke and Stewart, 1997; Jones et al., 1997; O'Toole, 1997, Agranoff and McGuire, 2001; Hill, 2002; Mandell and Steelman, 2003; Keast et al., 2004). It has been proposed that networks are well suited to complex operational environments. They are more innovative, more responsive and better positioned to rapidly generate comprehensive solutions than individual organisational approaches (Lasker et al., 2001; Agranoff and McGuire, 2001; Keast et al., 2004). Network solutions to community problems have achieved

political favour because they align well with the contemporary ideology of "shared responsibility" and "community engagement". More importantly, they became an economic necessity as governments reduce long-term financial investment in communities (Gray and Lawrence, 2001). The convergence of academic theory, political philosophy, and economic reality, have created a social environment in which networks have become the signature organisational form of the post-modern era (Alter and Hage, 1993; Lipnack and Stamps, 1994; Castells, 1996; Agranoff and McGuire, 2001). Accordingly, MWSC responded to its perceived injury problem by forming a collaborative network.

A comprehensive understanding of how networks function and the social forces they access and mobilise requires scientific tools that facilitate description, analysis and evaluation of community based health promotion networks. This thesis sought to assess whether Social Network Analysis (SNA) could usefully describe and analyse the structure, function and development of MWSC and its Support Network (MWSC and SN).

11.5 SOCIAL NETWORK ANALYSIS OF MACKAY WHITSUNDAY SAFE COMMUNITIES AND ITS SUPPORT NETWORK

SNA proved a powerful tool for describing and analysing relationships within the MWSC and SN. It provided diagrammatic representation of the social structure (Figures 8.2 and 8.3) and quantified important changes in the structure and function of MWSC and SN. Since the network was established in February 2000, it had doubled the number of relationships (500 to 1002), decreased the relational distance separating network members (average distance reduced from 3.9 to 2.7) and as a result increased the cohesiveness of the network (density increased from 0.022 to 0.036). There was an increased tendency for group formation (clustering coefficient increased from 0.30 to 0.50) and a more centralised structure (centralisation index increased from 18% to 43%). MWSC had clearly succeeded in developing cohesive social capital – the ability to collaborate for mutual benefit. However, the SNA also provided overwhelming evidence that a small number of well-connected social entrepreneurs played a prominent role in network activities (entrepreneurial social capital). Whether measured in terms of direct social influence (degree centrality), efficiency of communication (closeness centrality) or brokering potential (betweeness centrality), six actors, all members of the NSG, were disproportionately influential (Figure 9.7). Furthermore their social influence increased over the course of the study. By 2004, they maintained 24% of all relationships observed in the network compared with 17% in 2000 and they possessed 60% of the brokering potential of the network compared with 39% in 2000. These network members linked the NSG to action groups, the action groups to each other and the MWSC to its external Support Network. They were an important conduit for the exchange of information and resources.

SNA proved useful for quantifying the resources mobilised by the MWSC and SN. In 2004 the network accessed an estimated 6.5 FTE of staff time and \$0.9 million dollars. However, these resources were largely accessed externally.

The entrepreneurial social capital of six MWSC leaders appeared to be important for facilitating access to resources. While accounting for 44% of network relationships, they accounted for 52% of relationships that shared inkind resources, 54% of relationships that shared human resources and 66% of relationships that shared financial resources. Their role as brokers appeared critical to the function of MWSC.

These observations highlight an important sustainability principle. MWSC is an open system. Its ongoing function is critically dependent on the interface between MWSC and its external SN. Ecological systems never achieve equilibrium² except when they are dead (von Bertalanffy, 1950; Svirezhev, 2000). Rather, they are stable in steady state, a state in which the flux of resources in and out of the system are sufficient to maintain productivity. To

² a theoretic state of closed systems, when the outputs produced by a system are sufficient to sustain it.

define sustainability as "the ability of a health project or programme to deliver health services or sustain benefits after major technical, managerial and financial support has ceased" (United States Agency for International Development, cited La Fond, 1995) is an oxymoron. Closed system sustainability does not exist.

Many authors emphasise the voluntary horizontal nature of collaborative network relationships (Mitchell and Shortell, 2000; Gilchrist, 2000; Pedler, 2001; Hill, 2002; Mandell and Steelman, 2003; Keastet al., 2004). For network members to remain engaged they must be motivated by the network objectives and find their involvement rewarding (Mitchell and Shortell, 2000; Pedler, 2001; Hill, 2002). Collaborative partnerships therefore require leaders that provide a synergistic social space in which network members can work together to meet their common goals and organisational objectives (Alter and Hage, 1993; Lasker et al., 2001, Keast et al., 2004).

Maintaining a functional social network has a cost. Coalitions require social maintenance to ensure they remain operational. It takes time to develop and maintain relationships, a social investment known as "transaction costs" (Thompson, 1993; Hill, 2002; Mandell and Steelman, 2003). In this study the number of relationships maintained by network members (degree centrality) was strongly correlated with the amount of time key leaders invested in network activities (Pearson Correlation Coefficient = 0.72, R^2 = 0.52, p < 0.001). However, the relational pressure this placed on the network facilitators was evident. As a group they process 258 incoming relationships (43 relationships per facilitator), while other members only process an average of 1.8 incoming relationships. Maintaining a large community network is hard work.

Given the limited financial capacity of MWSC at this time it is not credible to suggest that this level of relational output could be maintained by unfunded community agents. While the network may survive without its facilitators, its capacity would effectively be halved. Network facilitators maintain 44% of all relationships, 57% of bridging relationships between MWSC and its SN, and broker 52% of in-kind, 54% of human and 66% of financial investments made in MWSC.

Sustainability is not just an issue of making the network self sufficient, but also ensuring that the network has the entrepreneurial social capital required to unite network members around a cause and to enable them to access the inkind, human and financial resources necessary to maintain network productivity.

11.6 WHERE TO FROM HERE?

Designing stochastic models of social networks has been a longstanding aspiration of network analysts. However, managing the interdependence of human social interactions posed an important technical and cognitive challenge. Most statistical models are built on the assumption that observations are independent. However, in human systems, the interdependence of actors and their social environment (their capacity to influence each other, modify their environment and be influenced by their environment) is an essential characteristic of social interaction (Robins and Pattison, 2005b). These social interdependencies must become a core component of future public health research if we aspire to modify social environments as a vehicle for promoting health and safety.

By postulating different patterns of conditional dependence amongst network members a researcher can investigate the interpersonal processes that ultimately create social systems. Three characteristics of the current network configuration (Markov³ properties) have been shown to be useful predictors of a network's future configuration (Robins and Pattison, 2005b).

 Global network properties. These network characteristics equally affect all actors (Robins et al., 2006a). Size is particularly important. As a network becomes larger the number of possible relationships increases exponentially, as does the transaction cost of maintaining these relationships, with network members less likely to have the capacity or the inclination to maintain these relationships.

³ In probability theory, a stochastic process has a Markov property if the conditional probability of the future state of a process only depends on its current state and is independent of any past state (the path of the process up until the present is not necessary to predict future outcomes). In the context of SNA, current network properties could be used to predict the future structure of the network.

- Dyad properties (Dyadic or the p¹ and p² class of models). Patterns of relationships observed between a pair of actors that affect the likelihood they will form new relationships (Robins et al., 2006a). Important examples include reciprocity, exchange and homophily (the tendency of actors to form relationships with people of similar characteristics).
- 3. Local social properties (Exponential Random Graph or the p* class of models). The immediate social context of a pair of actors that affect the likelihood they will form new relationships; in particular, the star-like relational patterns associated with social entrepreneurs and the triangular patterns associated with cohesive social capital are perceived to be important (Snijders et al. 2006).

The Hammersley-Clifford theorem (Besag, 1974) provided a mathematical framework for developing stochastic models of social systems in which mutually dependent social attributes can be specified and their contribution to the structure and function of a social network estimated (Handcock, 2003; Wasserman and Robins, 2005; Robins and Pattison, 2005b).

$$\Pr(X = x) = \frac{1}{K} \exp\left(\sum_{T \subseteq C} \theta_T \prod_{st \in T} x_{st}\right)$$

Where: X is a network consisting of a set of relationships (x₁, x₂, x₃, ...x_g) joining a set of actors (a₁, a₂, a₃, ...a_g)

- x is a particular realization of this network
- x_{st} is a binary variable indicating the presence or absence of a relational tie joining a pair of actors (or couple) "s" & "t"
- C is the set of couples
- K is a normalizing constant
- T is a "clique" or a specific configuration of local relationships involving a pair of actors¹³
- θ_T the parameter, or the sufficient statistic, indicating the extent to which a specific clique configuration is actually observed in the network

 $\prod_{st \in T} x_{st}$ a specific clique configuration involving the pair of actors "s" & 't"

NB There is one, and only one, parameter for each clique.

This theorem allows factorisation of various social explanatory variables that may impact on overall social structure, including general network attributes, actor attributes, dyadic forces and local social forces. It thereby provided the mathematical platform for an important new innovation – exponential random

graph (p*) models for social networks (Frank and Strauss, 1986; Wasserman and Pattison, 1996; Pattison and Wasserman 1999; Robins et al., 1999; Robins et al., 2006a). This innovation, combined with the increased availability of powerful desktop computers, has meant that it is now possible to estimate the relative contribution of various interdependent explanatory social variables using Markov chain Monte Carlo⁴ maximum likelihood estimation (Frank and Strauss, 1986; Handcock, 2003; Wasserman and Robins, 2005; Robins and Pattison, 2005b; Goodreau, 2006; Hunter, 2006; Robins et al. 2006a; Robins et al., 2006b, Snijders et al. 2006).

A striking characteristic of the MWSC and SN was the presence of two complimentary social forces, cohesive social capital and entrepreneurial social capital. This raises a number of interesting and important questions. How are these social forces produced? What is their effect on the structure and function of community safety promotion networks? How can these social forces be used to promote safety at a community level?

It has been hypothesised that cohesive social capital is produced by areas of dense cohesive relationships within a group, while entrepreneurial social capital is produced by relationships that cross boundaries between these groups (Lin, 1999; Burt, 2000; Putnam 2000). Lin (1999) hypothesised that cohesive social capital maintains the social status quo, while entrepreneurial social capital promotes change. Future research elucidating these hypotheses is critical to the future development of community safety promotion. If confirmed, safety promotion practitioners will attempt to develop cohesive social capital as a vehicle for maintaining desirable safety promoting behaviours (for example wearing seat belts and safety helmets) while simultaneously developing entrepreneurial social capital to promote the acquisition of these behaviours. Exponential Random Graph p* models may provide the scientific vehicle that empowers researchers to address these important questions.

⁴ Monte Carlo method refers to a statistical sampling technique used to approximate solutions to quantitative problems that cannot be easily solved. A Monte Carlo simulation calculates multiple scenarios of a model by repeatedly sampling values from the probability distribution of an unknown variable until a stable model is created.

This thesis concludes that sustainability is a dynamic quality of social systems contingent upon the ongoing influx of sufficient resources to maintain network outputs. In this study, entrepreneurial social capital appeared to be an important social asset that facilitated the network's access to expertise and resources. This is in contrast to current literature on social capital that associates cohesive social capital with sustainable community social systems (Leonard and Onyx, 2004; Dale and Onyx, 2005) and raises an important question: is cohesive and/or entereneurial social capital necessary to sustain community social systems? Given that sustainability appears to be a dynamic rather than a static quality of social networks, temporal studies of community networks using p* stochastic models (Snidjers, 2005) may be useful to explore how different forms of social capital contribute to the sustainability of community networks.

11.7 SUMMARY

Injuries are preventable. However, discrepancy between academic, practitioner, community and political perceptions regarding injury causation remain an important barrier to mounting an effective response. Injury is a complex issue caused by multiple interrelated determinants. It demands a multifaceted comprehensive response. The dynamic, multi-causal, multi-level nature of injury means that it is resistant to interventions designed by any one profession or agency. In this regard, safety promotion can be characterised as a cooperative challenge. If key stakeholders can achieve consensus regarding the definition of a community's injury problem and negotiate a socially acceptable solution, the problem can be addressed.

Networks have been advocated as an effective response to the complex problems that plague modern society. They may be more innovative and responsive, and better able to generate comprehensive solutions. By pooling the expertise and resources of multiple local organizations it is possible to generate the critical mass of activity necessary to solve multifaceted complex problems such as injury.

The Mackay Whitsunday Safe Communities was launched in February 2000 in response to high non-intentional injury rates observed in the region. It responded to this perceived injury problem by forming a community network to enhance the capacity of the community to collaborate and sustain an ongoing safety promotion program in the Mackay Whitsunday Community.

This thesis evaluated Mackay Whitsunday Safe Communities and its Support Network using social network analysis, which proved useful for quantifying the growth of the network, describing the interpersonal and social forces acting within it, documenting important global attributes of the network and identifying the contribution of key network members.

Two complimentary types of social resource were identified, cohesive social capital and entrepreneurial social capital. Both are necessary to promote community safety. It is hypothesised that cohesive social capital is a force of social stability, produced in those parts of a social network that contain strong, dense, relational ties. It is useful to maintain safe standards of personal, environmental and social conduct. Entrepreneurial social capital is a force promoting change, produced by relationships that bridge the sparse social spaces that separate different groups within a social network. It is useful to propagate information and innovative ideas and thereby promote desirable changes in community safety standards.

Social network analysis also demonstrated that Mackay Whitsunday Safe Communities is an open system. Like all open systems it is not totally self sufficient, but rather, critically dependent on external support network from which it draws the in-kind, human and financial resources necessary to maintain the network's productivity. Entrepreneurial social capital was shown to be an important social conduit for the ongoing exchange of resources necessary to develop and sustain this community safety promotion network.

GLOSSARY

Accident:

"An event without apparent cause, or an unfortunate event, especially one causing physical harm or damage, brought about unintentionally, or occurrence of things by chance; the working of fortune" (Moore, 1997, p8).

Actor

"Social entities are referred to as actors. Actors are discrete individuals, corporate or collective social units. ... Social network analysis is concerned with understanding the linkages among social entities (actors) and the implications of these linkages" (Wasserman and Faust, 1994, p17)

Adjacency Matrix

A set of social interactions can be represented by a g x g adjacency matrix. In this matrix (M), the rows and columns correspond to individual actors or nodes (N) of the network graph (G). Each entry (m_{ij}) in the matrix, indicates if a relationship is directed from an individual actor (n_i) to another actor in the network (n_j) . The entry equals 1 if the pair of actors (i,j) is a member of the set of edges or ties (E) observed in the network. In a dichotomous graph (see entry "Network"):

$m_{ij} = 1 if(i,j) \in E$	(i.e a tie is observed directed from i to j)
m _{ij} = 0 if (i,j) ∉ E	(i.e no tie is observed directed from i to j)

Matrices may either by directed (where the direction of relationship between actors is specified), or undirected (where the direction of relationships between two actors is unspecified). In a directed matrix the rows list the outgoing ties emanating from each actor, whereas the columns list incoming ties. If the relationship is undirected the matrix will be symmetrical.

Alliance

"A union or agreement to cooperate, especially of nations by treaty or families by marriage" (Moore, 1997, p 34). Members of an alliance typically act independently, except under the terms specified by the alliance agreement.

Alter

A member of an ego network that has a tie to ego – the focal actor under study. See Ego Network.

Average Degree

Average Degree is a commonly cited measure of cohesion. Degree is the number of ties observed for an individual actor. Average degree is therefore the average number of relationships observed for each actor in the network (Scott, 2000).

Where: I = "lines" i.e. the number of relationships, N = number of members of the network

Blockmodel

A blockmodel consists of two things:

- 1. A partition of actors into discrete subsets called positions
- 2. For each pair of positions a statement of the presence or absence of a tie within or between the positions (or subsets) on each of the relationships

A blockmodel is thus a model, or a hypothesis about a multirelational network. It presents the general features of the network, such as the ties between positions (subsets of the network), rather than information about individual actors (Wasserman and Faust, 1994).

Broker

"A middleman" (Moore, 1997, p 162)

George Simmel noted that the "terius" role offers certain actors an important structural advantage to negotiate desirous social outcomes (Simmel, 1923 cited Burt, 1992). "Terius Gaudens", or "the third who benefits" refers to the observation that actors gain social power when they can act as a middleman between two unconnected actors or groups who are unable to negotiate with each other directly. How actors use this social opportunity depends on their motivation. They may choose to act as a facilitator who assists other actors to negotiate mutually beneficial social objectives, or as gatekeepers who by selectively transmitting information or resources gain social or commercial advantage. An actor's brokerage potential can be estimated using "Betweeness Centrality" (see entry "Centrality"), which measures the number of occasions an actor is situated on the shortest relational pathway joining other actors in the network.

Centrality

Centrality is one of the most important and widely used conceptual tools for studying the prominence of individual actors within a network (Everett and Borgatti, 2005). Empirical studies have confirmed theoretical suspicions that the most "central" actors are also the most powerful actors (Markovsky et al., 1988; Brass and Burkhardt, 1993). They possess the greatest leadership potential in a social network. Freeman (1979) proposed three measures of actor centrality: degree centrality, closeness centrality and betweeness centrality (Table G1).

	Diagrammatic Representation	Description
Degree Centrality		The absolute count of the number of relationships maintained by an actor. It is a measure of an actor's immediate sphere of influence. In directional matrices "in- degree centrality", the number of times ego is nominated by other actors, can be distinguished from "out-degree centrality", the number of relationships nominated by ego. Degree centrality can be normalised by dividing an actor's degree by the maximum possible degree and expressed as a percentage.
Closeness Centrality		The "farness" of an actor is the sum of the shortest path (geodesic) between this actor (ego) and all other actors within the network. The reciprocal of farness is closeness centrality. Actors with higher scores are closer to the rest of the network and can thereby communicate more efficiently. Closeness can be normalised by dividing the maximum closeness score (n-1) by absolute closeness. It is then expressed as a percentage of the maximum possible closeness score.
Betweeness Centrality		The number of occasions an actor is situated on a geodesic pathway connecting two other actors in the network. Actors with high betweeness scores are therefore in a better position to control the flow of information. They can either act as brokers (facilitators of information exchange), or as gatekeepers (i.e. they selectively prevent the passage of information).

Table G.1 Freeman's (1979) measures of actor centrality

Centralisation

A measure of how tightly a network is organised around its most central point, i.e. a central actor or group of actors (Scott, 2000). For a given binary network with vertices $v_1....v_n$ and maximum degree centrality c_{max} , the network degree centralization measure is $\sum (c_{max} - c(v_i))$ divided by the maximum value possible (n - 2), where $c(v_i)$ is the degree centrality of vertex v_i (Borgatti et al., 2002).

Clustering coefficient

"Is the average value of the local clustering coefficient across all nodes" (Robins et al, 2005a; Watts, 1999; Borgatti et al., 2002). Local Clustering Coefficient C_i of an actor is the proportion of dyads to whom node i is connected which are connected to each other (Robins et al, 2005a).

Coalition

"A temporary alliance for combined action, especially of distinct parties" (Moore, 1997, p245). It implies a formal agreement between parties. However, no long term relationship is necessarily assumed.

Cohesion

"The act or condition of sticking together" (Moore, 1997, p 249). In social network analysis, "cohesive groups are groups of actors among whom there are relatively strong, direct, intense, frequent or positive ties" (Wasserman and Faust, 1994, p 149-250). Many authors use network cohesion as an important explanatory variable in social theory. "The more tightly that individuals are tied into a network, the more they are affected by group standards" (Friedkin, 1981, p41). Many different measure of cohesion are proposed in social network analysis essentially based on four concepts: frequency (of contact between actors), adjacency (direct contact between members for example, density and average degree), connectivity (for example transitivity, clustering coefficient, centralisation and core periphery indices) and distance (for example distance based cohesion).

Collaborating Networks

Collaborating Networks display ongoing commitment to other network members and the shared objectives of the network. The purpose is specific, often complex, and usually long term. Membership is very stable and the addition of loss of network members may have significant detrimental effects on the network. Members share resources to meet network objectives and are willing to delegate some responsibility for the assignment of these resources to the network itself. There may be attempts to formalise network activities through written objectives, policies and reporting processes. However, these do not necessarily imply binding legal agreements between network members.

Community

"A collective of people identified by common values and mutual concern for the development and wellbeing of their group or geographical area" (Green and Kreuter, 1999, p504)

Construct

The representation of concepts within a causal explanation or theoretical framework, for example, predisposing, enabling and reinforcing factors are constructs for the representation of more specific concepts or variables such as health beliefs, attitudes, skills and rewards (Green and Kreuter, 1999, p 504).

Cooperative Networks

Co-operative Networks exchange information and members acknowledge and accommodate the overall objectives of the network and other network members, provided this does not significantly interfere with their own objectives. However network members form policy independently.

Coordinating Networks

Coordinating Networks exchange information and members adopt common objectives after negotiation between network members. Membership is more stable, with attention given to who joins and who leaves. Network members pool resources to meet shared objectives, but maintain autonomous control over the assignment of their organisation's resources.

Core periphery structure

"The tendency of a network to form around a core group of central actors who themselves have cohesive (i.e. dense) relationships with each other" (Borgatti and Everett, 1999).

Degree

The degree of an individual actor (ego) is the number of ties linking them to other actors in the network (Scott, 2000). In directed networks "in degree" can be distinguished from out degree. "In degree" is the number of ties directed towards ego by other actors in the network (i.e. the sum of the column for an individual actor in the adjacency matrix). "Out degree" is the number of ties directed from ego to other actors in the network (the sum of the row for that actor). The normalised degree of an actor is their degree divided by the maximum possible degree (if the actor knew every member of the network) expressed as a percentage.

Density

Density is a commonly calculated measure of network cohesion. The density of a group is defined as the number of edges or relationships observed divided by the total number of possible relationships. For a directed graph (Scott, 2000):

Density =
$$\frac{I}{N \times (N-1)}$$

Where I = the number of ties joining all actors in the network N = total number of actors in a network

Determinants of Health

"The forces predisposing, enabling, and reinforcing lifestyles, or shaping the environmental conditions of living, in ways that affect the health of populations" (Green and Kreuter, 1999, p504).

Determinism

"The doctrine that all events, including human action, are determined by causes regarded as external to the will" (Moore, 1997. P 359).

Discourse

A domain of language use that is unified by common assumptions. There may be similarities between discourses of different topics at any one time. The discourse of political economy in the eighteenth and nineteenth century, for instance, takes the same form as the discourse of natural history. However, it is also important to stress that although discourses may overlap or reinforce each other, they may also conflict. For example at certain moments in the history of Western societies, different, and often, contradictory discourses of the individual have coexisted, some of which stress the freedom to act, while others emphasise the individual's duty to society. Sociological attention also concentrates on the social function of discourses, most importantly on their ability to close off possibilities. Within a discourse, there are some things that cannot be said. This means that discourses may have an effect similar to ideology. That is, a discourse, as a ready made way of thinking, can rule out alternative ways of thinking and hence preserve a particular distribution of power (Abercrombie, 1994, p 119).

Distance

The geodesic distance or distance is the length of the geodesic path – the shortest path connecting two actors (Degenne and Forsé, 1999). A path is a sequence of ties joining two actors in a network. A number of different paths may be possible. The path length d_{ij} is the number of ties traversed to connect the two actors (Degenne and Forsé, 1999). The average distance is the average geodesic distance between all nodes.

Distance weighted fragmentation

The average of the reciprocal of the distances between all actors. Ranges between 1 and 0. Larger values indicate more fragmentation of the network (Borgatti et al., 2002).

Distance based cohesion

Equals 1 minus the distance weighted fragmentation. Larger values indicate the network is more cohesive (Borgatti et al., 2002).

Dyad

A dyad consists of a pair of actors and the ties between them. At the most basic level, a linkage or relationship establishes a tie between two actors. The tie is inherently a property of the pair and therefore not thought to pertain simply to an individual actor.

Dyadic analyses focus on the properties of pairwise relationships, such as whether ties are reciprocated or not, or whether specific types of multiple relationships occur together. The dyad is frequently the basic unit for the statistical analysis of social networks (Wasserman and Faust, 1994, p18).

Ecology

"The study of the relationships among living organisms and their environment. Human ecology means the study of human groups as influenced by environmental factors, including social and behavioural factors" (Last, 1995, p 52).

Ecological fallacy / aggregation bias / ecological bias

"The bias that may occur because of an association observed between variables on an aggregate level does not necessarily represent the association that exists at an individual level. An error in inference due to failure to distinguish between different levels of organization. A correlation between variables based on group (ecological) characteristics is not necessarily reproduced between variables based on individual characteristics: an association at one level may disappear at another, or even be reversed" (Last, 1995, p51).

Edge see tie

Effectiveness

"The extent to which a specific intervention, procedure, regimen or service, when deployed in the field in routine circumstances, does what it is intended to do for a specified population" (Last 1995, p 52).

Efficacy

"The extent to which a specific intervention, procedure, regimen, or service produces a beneficial result under ideal conditions" (Last, 1995, p 52).

Ego

A particular actor under study in a personal network (see Ego Network).

Ego Network

An ego-centered network consists of a focal actor, termed ego, and the set of actors (alters) who have ties to ego, and the measurement of ties among these alters. For example, when studying people, one samples respondents, and each respondent reports a set of alters to whom they are tied, and on the ties among these alters. Such data is often referred to as a personal network data. Clearly these data are relational, but limited, since ties from each actor are measured only to some (usually only a few) alters. ... Ego–centered networks have been widely used by anthropologists to study the social environment surrounding individuals. Ego-centered networks are also quite often used in the study of social support.

Empiricism

This is an epistemological doctrine based on the supposition that the only source of knowledge is experience. In sociology it is used positively to describe that style of sociology that tries to avoid untested theoretical speculation and to aim always for the provision of quantitative, empirical evidence. Negatively, ... it is suggested that empiricism tends to reduce the importance of theory on the one hand and, on the other, underestimates the technical and theoretical difficulties of gathering reliable data (Abercrombie, 1994, p 142).

Enlightenment

A European philosophical and social movement of the eighteenth century, often referred to as the "Age of Reason". Enlightenment philosophers developed a variety of progressive ideas: freedom of thought and expression, the criticism of religion, the value of reason and science, a commitment to social progress and the significance of individualism. These critical, secular ideas played a crucial role in the emergence of modern sciences (Abercrombie, 1994, p144).

Epistemology

In philosophy this concept is used technically to mean the theory of knowledge of the external world. The term is used more loosely in sociology to refer to methods of scientific procedure which would lead to the acquisition of sociological knowledge (Abercrombie, 1994, p147).

Equilibrium

Societies or social systems are said to be in equilibrium when forces acting within them are balanced and the society is consequently stable. Parsons holds that societies are systems which always tend to equilibrium, even if they do not reach it. He conceives of social change as the movement from one equilibrium position to another (or one tendency to another) as the internal forces are changed and rebalance themselves. This is referred to as dynamic equilibrium (Abercrombie, 1994, p149).

Ethnography

The direct observation of the activity of members of a particular social group, and the description and evaluation of such activity, constitute ethnography. The term has mainly been used to describe the research technique of anthropologists, but the method is commonly used by sociologists as well (Abercrombie, 1994).

Gestalt

In Psychology, an organised whole that is perceived as more than the sum of its parts. In German, gestalt = form or shape (Moore, 1977, p555).

Graph

A network can be represented mathematically as a graph G = (N,E) comprised of a set of nodes (N) and a set of edges (E) that connect a pair of nodes (see network).

- N = {1,2, g} denotes a set of nodes or actors. These actors can be persons, teams, organizations, countries, machines, or concepts.
- E = {a,b, g} denotes a set of edges. Each edge represents a particular relationship linking a pair of actors. Data is collected in pairs or dyads. e_{ij} indicates the presence or absence of an edge or relational tie linking a pair of actors (i,j). When e_{ij} = 1 this indicates the presence of a tie, whereas if e_{ij}= 0, no tie was observed (Borgatti et al., 2002).

Health

"A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948).

Health Promotion

"The combination of educational and environmental supports for actions and conditions of living conducive to health" (Green and Kreuter, 1999, p14)

Holism

"The theory that certain wholes are to be regarded as greater than the sum of their parts cf Reductionism (q.v). Or the treating of the whole person including mental and social factors rather than just the symptoms of a disease" (Moore, 1997, p634).

Hospital Separation

A term used in commentaries on hospital statistics to describe the departure of a patient from hospital without distinguishing whether the patient departed alive or dead. The distinction is unimportant from a statistical perspective of hospital activity such as bed occupancy (Last, 1995, p79).

Human Ecology

"The study of human groups as influenced by environmental factors, including social and behavioural factors" (Last, 1995, p 52).

Individualism

A term used to describe a moral, political, or social outlook which stresses human independence and the importance of individual self-reliance and liberty. Individualists promote the unrestricted exercise of individual goals and desires. They oppose any external interference with an individual's choices - whether by society, the state, or any other group or institution. Individualism is therefore opposed to collectivism, which stresses community and societal goals over individual goals (Wikepedia, 2006a).

Injury

"Any unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical, or chemical energy or from the absence of such essentials as heat or oxygen" (NCIPC, 1989, p. 4).

Intersectoral

"In health promotion, health-oriented policy affecting and involving sectors outside health services (such as employment, housing, food production, social care), but usually evolved in collaboration with the health sector. Also used to refer to collaboration between levels of various sectors – for example government health authorities plus local transport authority plus community education" (Hawe et al., 1990, p209).

Isolate

"Actors who do not have a relationship with any other network members" (Scott, 2000).

Knowledge Networks

Knowledge networks exchange information for mutual benefit. Minimal ongoing commitment to network activities is expected. Members maintain organisational autonomy. Resource sharing is limited to the exchange of ideas, news and reports.

Lifestyle

"The culturally, socially, economically, and environmentally conditioned complex of actions characteristic of an individual, group, or community as a pattern of habituated behaviour over time that is health related but not necessarily health directed" (Green and Kreuter, 1999, p507).

Lifestyle Diseases / Chronic Diseases of Lifestyle

Diseases that trace mainly to imprudent living, such as poor diet, obesity, lack of exercise, and cigarette smoking. The six major "lifestyle" diseases—that is, coronary heart disease, stroke, lung cancer, colon cancer, diabetes and chronic obstructive pulmonary disease—were responsible for 43 percent of all (American) deaths in 1998 (Doyle, 2001, p30).

Lifestyle diseases are diseases that appear to increase in frequency as countries become more industrialised and people live longer. They include Alzeimer's disease, atherosclerosis, cancer, chronic liver disease or cirrhosis, chronic obstructive pulmonary disease, diabetes mellitus, heart disease, nephritis or chronic renal failure, osteoporosis, stroke and obesity. Factors in diet, lifestyle, and the environment are thought to influence susceptibility to the diseases listed above. Smoking, alcohol and drug abuse as well as the lack of exercise may increase the risk of certain diseases in later life (Wikipedia, 2006b).

Mackay Statistical Division

The Mackay Statistical Division as defined by the Australian Bureau of Statistics is a region comprising of eight local government areas See Figure G.1:

- 1. Belyando
- 2. Bowen
- 3. Broadsound
- 4. Mackay
- 5. Mirani
- 6. Nebo
- 7. Sarina
- 8. Whitsunday

The region covers a total area of 90,340 square kilometres, or 5.2% of the total area of Queensland. The estimated population of the region at June 2003 was 141,548 persons, or 3.7% of the total Queensland Population of 3,796,244 persons (OESR, 2005).

The Mackay Statistical Division is served by the Bowen, Mackay and Moranbah Health Service Districts.



C = City S = Shire

Figure G.1 Mackay Statistical Division

Mackay City (Local Government Area)

Mackay is a costal city located 1000km north of the Queensland state capital Brisbane and 360km north of the Tropic of Capricorn. It serves the Mackay Statistical Division, a region of over 90,000 square kilometres with an estimated population of 141,458 on June 30th 2003 and supports diverse industries including coal mining, engineering, sugar cane, cattle grazing, fishing and tourism (OESR, 2005).

The Mackay Local Government Area had a population of 82,288 persons on the 30th of June 2005, representing 2.1% of Queensland's population. It covers an area of 2,897 km² including approximately 100 km² of islands (Lindeman, Smith Group, Newry Group, Brampton, Carlisle, Keswick and St Bees) and extends from Alligator Creek in the south to O'Connell River in the north (OESR, 2006a).

Mackay Health Service District



Figure G.2: Boundaries of the Mackay and Moranbah Health Service Districts

The Mackay Health Service District (Figure G.2) serves a population of 111,058 (estimated population 30th June 2003) living in five Local Government Areas (Queensland Health, 2006a):

- 1. Broadsound Shire (The costal part of the Shire, east of Connors Range)
- 2. Mackay City
- 3. Mirani Shire
- 4. Sarina Shire
- 5. Whitsunday Shire

Three Public Hospitals are maintained within the Mackay Health Service District:

- 1. Mackay Base Hospital (serving Mackay City and Mirani Shire, but also acting as the Base Hospital, providing specialist support services for all hospitals within the Mackay and Moranbah Health Service Districts)
- 2. Proserpine Hospital (serving Whitsunday Shire)
- 3. Sarina Hospital and Primary Care Centre (serving Sarina Shire and the costal portion of Broadsound Shire)

Mackay Injury Surveillance Network (MISN)

Emergency Departments from all six public hospitals within the Mackay and Moranbah Health Service Districts (Clermont, Dysart, Mackay Base, Moranbah, Proserpine and Sarina) and the Mackay Mater Private Hospital's after-hours medical clinic, collect NDS-IS Level 2 Injury Data providing a regional sample for the Queensland Injury Surveillance Network. Data is not collected within the Bowen Health Service District.

Markov Property

In probability theory, a stochastic process has the Markov property if the conditional probability distribution of the future state of that process depends only on the current state and is independent of past states, that is the path of the process up until the present (Wikipedia, 2006c). In social networks the current network structure can be used to predict the future structure of the network. Stochastic models using current triad configurations to predict the future structure of a network are known as Markov Random Graphs.

Monte Carlo Method

Monte Carlo method refers to a statistical sampling technique used to approximate solutions to quantitative problems that cannot be easily solved. A Monte Carlo simulation calculates multiple scenarios of a model by repeatedly sampling values from the probability distribution of an unknown variable until a stable model is created. This method is often used when the model is complex, non-linear or involves more than a couple of uncertain parameters (Wikipedia, 2006d). The simulation typically involves multiple iterations (> 10,000) and therefore is heavily dependent on computer power.

Moranbah Health Service District

The Moranbah Health Service District (Figure G.2) serves a population of 19,505 (estimated population 30th of June 2004) living in four Local Government Areas (Queensland Health, 2006b):

- 1. Belyando
- 2. Broadsound Shire (The hinterland part of the Shire, West of Connors Range)
- 3. Nebo
- 4. Peak Downs (that part of the shire which is in the town of Tieri)

Six health facilities are maintained within the Moranbah Health Service District:

- 1. Clermont Multi-Purpose Health Service
- 2. Dysart Hospital
- 3. Glenden Community Centre
- 4. Middlemount Community Health Centre
- 5. Moranbah Hospital
- 6. Tieri Community Health Centre

Modern / Modernity

A term describing the particular attributes of modern societies. A good deal of sociological work is based on the assumption of a sharp divide between pre-modern and modern societies. Modernity is distinguished on economic, political, social and cultural grounds. For example, modern societies typically have industrial capitalist economies, democratic political organisation and a social structure founded on the division into social classes. There is less agreement on cultural features, which are said to include a tendency to the fragmentation of experience, a commodification and rationalisation of all aspects of life, and a speeding up of the daily pace of life. There is disagreement about the periodisation of modernity, some writers associating it with the appearance and spread of capitalism from the fourteenth to the eighteenth centuries, some with the religious changes of the fifteenth century onwards (which provided the basis for rationalization) others with the onset of industrialisation in the late eighteenth and nineteenth centuries, and still others with the cultural transformation at the end of the nineteenth and the beginning of the twentieth century coinciding with modernism (an arts movement between about 1880 and 1950). Recently it has been argued that contemporary societies are no longer modern but postmodern (Abercrombie, 1994, p269).

National Data Standards for Injury Surveillance (NDS – IS)

The National Injury Surveillance Unit, in conjunction with injury surveillance and prevention practitioners in Australia, has defined data standards for public health injury surveillance. This provides for two levels of surveillance data.

- Level 1 is proposed for use in basic, routine public health surveillance.
- Level 2 surveillance data builds on the first level with more extensive classification of some items and several additional data items. This dataset is suitable for use in emergency departments in hospitals and in other settings where at least some resources are available for injury surveillance data collection (NISU, 1998).

Network

"A group of people who exchange information, contacts, and experience for professional or social purposes" (Moore, 1997, p899).

A social network consists of a finite set or sets of actors and the relation or relations defined by them. The presence of relational information is a critical and defining feature of a social network (Wasserman and Faust, 1994, p20).

Networking

"Exchanging information for mutual benefit. It does not require much time or trust nor the sharing of turf" (Himmelman, 2001, p277).

New Public Health

The new public health is the totality of the activities organised by societies collectively (primarily lead by governments) to protect people from disease and to promote their health. These activities occur in all sectors and include the adoption of policies which support health. They ensure that social, physical, economic and natural environments promote health. The new public health is based on the belief that the participation of communities in activities to promote health is essential to the success of these activities as is the participation of experts. The new public health works to ensure that practices of the government and private sector (including the health sector) do not detract from health and wherever possible promote health (Baum, 1998, p510).

Old Public Health

The old public health model is based on the discipline of epidemiology and the subject matter of the biomedical and behavioural sciences. It analyses the cause of disease in terms of factors in the individual and factors in the social and physical environment. Strategies are aimed at interrupting the chain of causation, with the traditional tools being education, the provision of services and legislation (O'Connor and Parker, 1995, p20).

Partner

A partner is defined as "a person who shares or takes part with another or others, especially in a business firm with shared risks or profits, or either member of a married couple, or an unmarried couple living together" (Moore, 1997, p978). It is a derivation of the Middle English parcener – "joint heir". Based on this derivation, a partnership implies a longstanding relationship between partners with mutual obligations mandated by contractual agreement or by common law that relates to most aspects of their shared work.

Partnership

"The state of being a partner or a joint business or a pair or group of partners" (Moore, 1997, p 978).

Population Health

Population health refers to the health of a population as measured by health status indicators and as influenced by social, economic, and physical environments, personal health practices, individual capacity and coping skills, human biology, early childhood development, and health services. As an approach, population health focuses on interrelated conditions and factors that influence the health of populations over the life course, identifies systemic variations in their patterns of occurrence, and applies the resulting knowledge to develop and implement policies and actions to improve the health and well being of those populations. (Dunn and Hayes, 1999, p57).

Positivism

A doctrine in the philosophy of science, positivism is characterised mainly by an insistence that science can only deal with observable entities known directly by experience. The positivist aims to construct general laws or theories which express relationships between phenomena. Observation and experiment will show whether the phenomena fits the theory (Abercrombie, 1994, p322).

Reciprocity

In directed relationships, reciprocity refers to the situation where both actors nominate each other. With directed data there are four possible dyadic relationships: A and B are not connected, A nominates B ($A \rightarrow B$), B nominates A ($B \rightarrow A$), or A and B nominate each other ($A \Leftrightarrow B$). Some theorist argue that there is an equilibrium tendency towards dyadic relationships that are either null or reciprocated. A network that has a predominance of null or reciprocated ties over asymmetric ties may be a more "equal" or "stable" network than one with a predominance of asymmetric ties (which might be more of a hierarchy).

There are (at least) two different approaches to indexing the degree of reciprocity in a network (Hanneman and Riddle, 2005):

- The dyadic method calculates the number of reciprocated dyads as a proportion of the number of dyads with any tie (this in the method used in this study)
- 2. The arc method calculates the proportion of ties observed in the network that are reciprocated ties.

Reductionism

"The tendency to or principle of analysing complex things into simple constituents. The doctrine that a system can be fully understood in terms of its isolated parts or an idea in terms of simple concepts" (Moore, 1997, p 1131).

Relation

"The collection of ties of a specific kind among members of a group" (Wasserman and Faust, 1994, p20). For any group of actors, we might measure several different relationships (for example, in addition to formal diplomatic ties among nations, we might also record the dollar amount of trade in a given year). (Wasserman and Faust, 1994, p 20).

Relational Tie see tie

Risk Factors

"Characteristics of individuals (genetic, behavioural, and environmental exposure and sociocultural living conditions) that increase the probability that they will experience a disease or specific cause of death as measured by population relative risk ratios" (Green and Kreuter, 1999, p509).

Risk Ratio

The mortality or incidence of a disease or condition in those exposed to a given risk factor divided by the mortality of incidence in those not exposed.

Safety

"A state in which hazards and conditions leading to physical, psychological or material harm are controlled in order to preserve the health and well-being of individuals and the community" (Maurice, 2001, p238).

Snowball Sampling

"A technique of finding research subjects. One subject gives the researcher the name of another subject, who in turn provides the name of a third, and so on" (Vogt, 1999).

Social Capital

"The features of social organization, such as networks, norms and trust that facilitate coordination and co-operation for mutual benefit" (Putnam, 1995, p 67).

Sociogram

Network data can be displayed as graphs, where a line indicates the presence of a relational tie linking two nodes or actors. Arrows are used if the relationship described is directional. In social networks this graph is called a sociogram. A sociogram gives a spatial representation of the relationships identified by respondents.

Structural Equivalence

"Two actors are structurally equivalent if they have identical ties to and from all other actors in the network" (Wasserman and Faust, 1994, p 356).

Structural Holes

A concept promulgated by Ronald Burt (1992) to explain the social power gained by social entrepeneurs acting at the interface between other disconnected actors or groups. Rather like an insulator in an electrical circuit, "structural holes" are areas of sparse relationships separating different subgroups. Each social "sub-circuit" carries its own "current" (different flows of information). Individuals that reside on the bridges that connect the different social sub-circuits assume importance because, like an electronic switch, they can control how the social system works by switching on or off interactions between different sub-groups contained within the social system. As a consequence, they assume a central role in any social interaction that depends on the productive exchange of information, expertise or resources between sub-groups.

Sustain

"Support, bear the weight of, especially, for a long period or give strength to; encourage, support or give nourishment to or endure, stand; bear up against or maintain or keep" (Moore, 1997, 1376).

Tie, Relational Tie, Edge

Actors are linked to one another by social ties. The range and type of ties can be quite extensive. The defining feature of a tie is that it establishes a linkage between a pair of actors (Wasserman and Faust, 1994, p 18).

Transitivity

Transitivity is a measure of closure in social relationships. In a group of three actors "A", "B", and "C" (Triad), if actor "A" knows "B" (A \rightarrow B), and "B" knows "C" (B \rightarrow C), it is likely that over time A will be introduced to C and ultimately develop a relationship (i.e. if A \rightarrow B and B \rightarrow C then it is more likely that A \rightarrow C). This tendency for relationships between three actors to close is called transitivity (Scott, 2000).

Triad

Many important social network methods focus on the triad: a subset of three actors and the ties among them. Balance theory has informed and motivated many triadic analyses. Of particular interest is whether the triad is transitive (if actor i "likes" actor j, and j in turn "likes" actor k, then actor I will also "like" actor k), and whether the triad is balanced (if actors I and j like each other, then I and j should be similar in their evaluation of a third actor k, and if I and j dislike each other, then they should differ in their evaluation of a third actor, k). (Wasserman and Faust, 1994, p 19).

Utilitarianism

This social philosophy placed the satisfaction of the individual's wants (utility) at its core. Consequently the greatest good was defined simply as the greatest happiness for the greatest number of people. Its main impact on the social sciences has been via its model of social action in which individuals rationally pursue their own self interests, and its conception of society as the aggregation of atomised individuals united by self interest (Abercrombie et al., 1994, p 442).

Whitsunday Shire (Local Government Area)

The Whitsunday Shire is located about 1,100 km north of Brisbane in Queensland, Australia. The Shire encompasses the rural town of Proserpine, the coastal settlements of Cannonvale, Airlie Beach and Shute Harbour, and 74 resort and national park islands. The shire covers an area of 2,679 km² and had a population of 17,512 persons on the 30th of June 2005 (OESR, 2006b).

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APPENDICIES

COMMUNITY SAFETY PROMOTION NETWORKS: FROM METAPHOR TO METHODOLOGY

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Date: February 2007

APPENDIX ONE

PROJECT PLAN: MACKAY WHITSUNDAY SAFE COMMUNITIES PROJECT – MARCH 2000

Outcome Area: Injury

Project Title: Mackay / Whitsunday Safe Community Project

Date developed: November 1998

Last updated: March 2000

1.0 PROJECT DEFINITION AND CONTEXT

1.1 Project Summary

This project aims to reduce the incidence of non-intentional injury in Mackay City and Whitsunday Shire through the establishment of an intersectoral working group and the development of sectoral safety plans. The project will be guided by the criteria and processes of the World Health Organisation's (WHO) *Safe Communities* program with the view of establishing a formally designated safe community within 5 years of the commencement of this project. The *Mackay / Whitsunday Safe Community Project* is multisectoral in scope, collaborative in strategies and ecological in perspective.

1.2 Project Rationale

Injury as a Health Issue

Injury is a leading cause of premature mortality in Australia and is the predominant threat to life for children and young adults. While injury accounted for 5.7% of all deaths in Australia in 1994, it accounted for 62% of deaths at ages 1 - 24 years (males 72%; females 48%) (*AIHW 1996: 87*). Each year in Australia, over 7,000 people die from injury and between 350,000 - 400,000 people are admitted to hospital. The lifetime cost of injury in 1995/96 was over 13 billion dollars (*NIPAC 1998: 3*).

Target /at-risk groups

There are significant differences in injury rates within the Australian population. Males, particularly young males, experience far greater levels of mortality and morbidity than females. The death rate ratio for males to females being 3:1 in 1996 (*Queensland Health 1998*).

Differences also occur in the types of injury experienced by different age and ethnic groups in the community. Falls are primarily experienced by young children and older people, injury due to transport accidents effect mainly young adult males and homicides and injury due to interpersonal violence is disproportionately experienced by indigenous people. Indigenous Australians also experience high levels of mortality and morbidity compared to all other Australians at approximately three times the non-indigenous rate (*Queensland Health 1998*). Similarly people who reside in rural and remote areas have higher rates of death and hospitalisation due to injury than do urban residents (*Queensland Health 1998*).

National Trends

Injury related death rates have **declined** substantially over the past two decades. Between 1986 and 1994, the age - standardised death rate for all injuries in the total population declined by an average 3.4% per year. Much of the decline, however, took place between 1988 and 1994, see **Graph 1** below.

Graph 1: National trends for deaths per 100,000 population



National trends

Note: The target reflects a 20% reduction in the baseline, as indicated in the BHO report Source: AIHW mortality database

About 40 hospital separations occur for every death due to injury. Between 1991-92 and 1992-3, the aged standardised hospital separation rates for all injuries in the total population *increased* by 2.7%. Hospital separations are a reasonable indicator of acute injuries, but are not a precise measure of injury incidence or prevalence (AIHW 1996: 94).

Interstate Comparisons

A large variation, more than two-fold, occurs in the death rate for injury and poisoning among States and Territories. As detailed in **Table 1** below, the Australian Capital Territory and the Northern Territory, respectively, had the lowest and the highest injury deaths rates, over both periods (1986-1988 and 1992-94). Between the two periods, mortality from injuries declined in all States and Territories. Greater rates of decline in death rate were recorded for the Australian Capital Territory (36.2%), Victoria (28.6%) and the Northern Territory (26.2%). Rates of decline substantially lower than the national average occurred for Tasmania (5.0%), Western Australia (6.7%) and South Australia (9.6%) (AIHW 1996: 93).

Queensland rates are significantly higher than the Australian average for both periods. Rates for the second period (1992 - 1994) were closer to the national average than during the first period although this remained above by 5.5 deaths per 100,000 population. The decline, however, is only marginally below the national average, which is significantly better than the comparable state of Western Australia.

State/Territory	Average 1986 - 88	Average 1992 - 94	Per cent change
NSW	48.7	39.0	-19.9
VIC	48.4	34.6	-28.6
QLD	56.3	45.6	-19.1
WA	45.7	42.6	- 6.7
SA	46.1	41.7	- 9.6
TAS	53.2	50.6	- 5.0
ACT	43.4	27.7	- 36.2
NT	117.8	87.0	- 26.2
Australia	49.9	40.1	- 19.6

Table 1: Number of deaths per 100,000 population

Source: AIHW mortality database

Prevention

Primary prevention is the most effective means of injury control. Causal mechanisms and risk factors for many types of injury are now understood well enough to enable sound preventative measures to be designed. 'Injury' encompasses diverse conditions and circumstance of occurrence. A characteristic shared by them all is that a physical or chemical object or substance, external to the body of the person concerned, is a direct cause of the condition (*AIHW 1996: 87*).

From the point of view of primary prevention, classes of injury which arise in similar circumstances are of interest because they are amenable to the same preventative intervention. Examples of such classes are toddler drowning in swimming pools, injuries resulting from house fires, poisoning by pharmaceuticals, and neck injuries in rugby. Successful prevention generally depends on intersectoral collaboration, involving sectors which have responsibility for, or special interest in, which a particular type of injury occurs (*AIHW 1996: 88*).

The application of a community based approach to "all age all injury prevention" has been applied increasingly in various parts of the world, following the first successful pilots in Sweden during the 1980's. Controlled evaluations of these programs have identified varying degrees of success with respect to the intended health outcomes with significant decreases in injury relative to control communities being reported in Sweden and Norway.

The 'Safe Communities' Approach

The '*Safe Community*' approach is an important strategy in the National Institute of Public Health's national injury prevention program and the World Health Organisation's international injury prevention program and provides a model for injury prevention work in local areas. One of the fundamental principles is that the work should have a long term perspective and be incorporated into daily work schedules.

In order to be accredited as an international '*Safe Community*' the target community must comply with the following specific criteria and achieve an overall reduction in all injury of 20%:

- Formation of a cross sectoral group that is responsible for injury prevention.
- involvement of the local community network.
- the program will address all ages, surroundings and situations.
- the program will address the concerns of high-risk groups, high risk environments and aim to ensure equity for vulnerable groups.
- the program should have a mechanism to document the frequency and causes of injuries
- the program must be a long term approach, not one of brief duration
- program evaluation should include indicators which show effects and provide information on the process as it advances
- each community will analyse its organisations and their potential for participation in the program

App 1: Project Plan Mackay Whitsunday Safe Communities Project - March 2000

- participation of the health care community in both the registration of injuries and the injury prevention program is essential
- be prepared to involve all levels of the community in solving the injury problem
- disseminate information on the experience both nationally and internationally
- be willing to contribute to the overall network of safe communities (WHO 1997).

Mackay / Whitsunday as a pilot site.

Injury prevention and control activities in the Mackay and Whitsunday areas have been extensive in the last five years but largely uncoordinated. Previous areas of injury addressed include: farm safety with adults and children (Tropical Public Health Unit, Mackay Division of General Practice and Farmsafe Queenlsand), falls prevention in people over 60 years of age (Home and Community Health Unit, Mackay District Health Services), water and alcohol and safety in licensed premises (Alcohol, Tobacco and Other Drugs Services, Mackay District Health Services), toddler drowning and child scalds prevention (Tropical Public Health Unit and Child Health Services, Mackay District Health Services), road and vehicle safety (Queensland Transport and Home and Community Health Unit), electrical safety (Mackay Electricity Board) and pedestrian safety (Mackay City Council). Mackay and Proserpine Hospital's Emergency Departments are currently two of the five non-metropolitan hospital sites that is collecting injury context data for the Queensland Injury Surveillance Unit (QISU).

With many of the above programs based on similar principles and strategies a co-operative, systematic and intersectoral approach would be more productive.

As a potential pilot site for such a developmental and collaborative project Mackay City has a long history of achievements in community development and citizen participation programs that dates back to the Australian Assistance Plan (AAP) of the mid 1970's.

A precipitating and catalysing issue for the Mackay / Whitsunday Safe Community Project was a report by the Mackay Division of General Practice (MDGP 1998: 21-24) which cited standardised hospital admissions for accidents and injuries in the Mackay Health District during 1995/96 at more than twice the Queensland rate for both males and females. This pattern is the continuation of a trend which commenced in 1993 (EHIB 1995: 116) and may be the result of SLA boundary changes, improved coding practices, decreasing rates of private health insurance or a real increase in injury events. Further investigation and analysis of hospital activity data and comparisons with the Queensland Injury Surveillance Unit information will be incorporated into the evaluation component of this project.

References

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1.3 Scope

This project is designed to reduce the incidence and severity of unintentional injuries in the City of Mackay and Shire of Whitsunday. It will not directly address intentional injury (violence and suicide). The project will encourage cooperation to eliminate duplication, increase public awareness of injury as a preventable
App 1: Project Plan Mackay Whitsunday Safe Communities Project – March 2000 health issue and foster participation in community based responses. It will also serve as a pilot project to evaluate the process, impact and outcomes of implementing the *Safe Communities* approach within a Queensland provincial centre.

1.4 Target Group/s

Primary: Community members of all ages, gender and ethnicity, within the City of Mackay and Whitsunday Shire.

Secondary: Agencies encountering high rates of injury in their professional field, workplace or environments.

1.5 Key partners/stakeholders

Mackay City Council Whitsunday Shire Council Mackay District Health Service Queensland Transport Farmsafe Queensland **Education Queensland** Mackay Division of General Practice Division of Workplace Health and Safety Mackay Regional Council for Social Development Queensland Housing Queensland Ambulance Service Building Designers Association of Qld Inc. Queensland Master Builders **Oueensland Building Professionals Ptd Ltd.** City Heart Association Inc. Canelands Shoppingtown Mt Pleasant Shopping Centre Office of Sport and Recreation **Queensland Police Service** Queensland Injury Surveillance Unit James Cook University

1.6 Geographical Reach

This project is a pilot being conducted in the City of Mackay (SLA's 4726 & 4765, approximate population 77,000) and the Whitsunday Shire (SLA's ?, approximate population 15,000)

1.7 Related Activities/Projects

DrinkRight/Safe Health Promoting Schools • Giddy Goanna

- Kidpower
- Rural Injury Prevention Program Education Resource (RIPPER)

Safety Action Hot Water Burns like Fire

Pool Drownings

Falls in people over 60 Years

BP Bike Education Program

2.0 PROJECT DETAILS

2.1 Goal

To reduce the incidence of non-intentional injuries, using the World Health Organisation's Safe Communities Framework, in the City of Mackay and the Shire of Whitsunday.

Performance Indicator/s (*Target/s*): Reduction of 20% in all injury over 5 years as indicated by Queensland Injury Surveillance Unit (QISU) data.

2.2 Objectives and related strategies

1. To provide baseline data on non-intentional injury in the City of Mackay and Shire of Whitsunday

Performance Indicator/s (target/s): Completion of a Mackay & Whitsunday Injury Profile report.

Strategies

- 1.1 Collect and analyse data from a variety of relevant sources (QISU, Mackay Base Hospital, Proserpine Hospital, Queensland Transport, Worksafe Queensland).
- 1.2 Identify and confirm priority areas to be addressed by the program.
- 1.3 Conduct survey, focus group research and / or 'phone in' to identify community perceptions of injury as a significant issue.
- 1.4 Develop a presentation of the findings.
- 2. To negotiate the participation of a primary target community to support the Mackay / Whitsunday Safe Community Project.
 - *Performance Indicator/s (target/s)*: Target community involvement established within identified project timeframes.

Strategies

- 2.1 Develop a presentation and briefing of the concept of *Safe Communities* and the Injury Profile of Mackay City and Whitsunday Shire
- 2.2 Negotiate an ongoing and lead support role by the Mackay City Council and Whitsunday Shire Council
- 2.3 Submission of application for Mackay City & Whitsunday Shire to become a member of the WHO Safe Community Network.

3. To ensure that the project is effectively planned and managed.

Performance Indicator/s (target/s): Establishment of an intersectoral Project Management Team.

Strategies

- 3.1 Negotiate roles with committed key partners.
- 3.2 Establish a project management team
- 3.3 Establish a research and evaluation working group
- 3.4 Provide ongoing resources and support role for the Project Management Team.

App 1: Project Plan Mackay Whitsunday Safe Communities Project – March 2000

- 3.5 Project Management Team to establish Injury Sector Working Groups for each area of injury in each community.
- 3.6 Project management team to initiate a community capacity and resources audit

4. To comprehensively and systematically respond to causal factors and contexts of injury in the City of Mackay and Shire of Whitsunday.

Performance Indicator/s (target/s): Completion of action plans for each sector of injury to be addressed.

Strategies

- 4.1 Provide background information and project management proformas for each area of injury.
- 4.2 Project Management Team to assist injury sector working groups to develop objectives, strategies and evaluation plans.
- 4.3 Plans to be forwarded for best practice assessment by the Injury Prevention Research Unit, University of Queensland.

5. To increase community awareness of injury as a preventable health issue.

Performance Indicator/s (target/s): Pre and post survey of community agencies identifying injury as a major health issue with a 20% increase from pre to post states.

Strategies

- 5.1 Project Management Team to develop and implement a project media / communications plan with Communications Officer TPHU.
- 5.2 Obtain input from marketing consultant/s where appropriate
- 5.3 Assist TPHU Graphic Artist to develop promotional resources.
- 5.4 Project Management Team to identify existing communication pathways and negotiate access to them (e.g. 60 & Better monthly newsletter)
- 5.4 Distribute resources through channels identified by the Project Management Team.

6. To promote community ownership and involvement of the program.

Performance Indicator/s (target/s): 70% of all identifiable sector groupings participating in the program by 2001.

Strategies

- 6.1 As necessary, conduct public forums to encourage community involvement and ownership
- 6.2 Injury Sector Working Groups to develop strategies that will promote community ownership.
- 6.3 Explore corporate and community promotion of innovative concepts that result in injury reduction.
- 6.4 Design the media campaign to encourage maximum community support and participation.

3.0 DATA COLLECTION AND ANALYSIS REQUIREMENTS

- Collection, analysis and dissemination of data from QISU, Queensland Health, Kid Power, Worksafe and Mackay Division of General Practice.
- Pre and post surveys of community agencies nominating injury as a major health issue.
- Survey and focus group research to identify community perceptions of injury as a significant issue.
- Monitoring of community individuals and groups participating in various activities of the project.

4.0 BUDGET

Description

Item		\$
Base labour-related costs		46,000.00
PHS staff base salaries (incl. oncosts) working directly on the project		
(estimate of FTE equivalent from all relevant		
PHS staff involved in the project - excl. temp staff specifically funded by this project)		
Project specific costs (including temporary project staff)		
Presentation resources	100.00	
Promotional resources	500.00	
Refreshments	150.00	
Telephone	1000.00	
Travel	1000.00	
Office supplies, postage & photocopying	400.00	
Motor vehicle	800.00	
subtotal - project specific costs		3950.00
Total Cost		49,950.00

Budget Justification

The majority of the budget (92%) has been allocated to salaries. The remainder covers general running costs. A Coordinating Project Officer is required for this project due to its size, scope and the timeframe identified for its establishment.

5.0 PROJECT MANAGEMENT

Management Structure

Project Coordinator

• Paul Vardon, Health Promotion Officer, TPHU - Mackay

Accountabilities

- Manage the various components of the project.
- Monitor project cost centre monthly.
- Collate and forward monthly reports to the Health Promotion Coordinator, and major stakeholders.
- Ensure State and Regional injury prevention programs are addressed within the framework of this program.

App 1: Project Plan Mackay Whitsunday Safe Communities Project – March 2000 <u>Project Evaluation and Research Working Group</u>

- Dr Dale Hansen, Emergency Physician, Accident and Emergency Department, Mackay Base Hospital
- Pr John McIntosh, Mackay Division of General Practice Ltd
- Mr Adrian Horth, Manager of Queensland Injury Surveillance Unit
- Dr David Farlow, Medical Superintendent, Proserpine Hospital
- Paul Vardon, Health Promotion Officer, TPHUN Mackay
- Dr Reinhold Muller, James Cook University

Accountabilities

- To collect, collate and analyse injury data from relevant sources.
- To develop an injury profile of Mackay City and Whitsunday Shire.
- To monitor injury trends.
- To report findings and recommendations to Project Management Team.
- To assist with the overall evaluation of the project.
- To evaluate the process of implementation.

Project Management Team

- Paul Vardon, Health Promotion Officer, TPHU Mackay
- Nicole O'Bryan, Road Safety Consultant, Queensland Transport
- Dr Dale Hansen, Emergency Physician, Accident and Emergency Department, Mackay Base Hospital
- Jan Kilbourne, Senior Community Development Officer, Mackay City Council
- Peter Day, Manager of Environmental Health Unit, Whitsunday Shire Council
- Peter Driemel, Environmental Health Officer, Whitsunday Shire Council
- Kevin Harrigen, Officer in Charge, Proserpine Police

Accountabilities

- To ensure relevance and appropriateness of the strategies developed.
- To review direction of project regularly.
- To support and advise the program Co-ordinator.

Injury Sector Working Groups

• Community members and agencies with an interest in reducing injury within a specific environment.

Accountabilities

- To identify existing injury control activities where appropriate promote their integration into the safe community framework through development of partnerships
- Using a collaborative approach, apply health promotion and good practice principles to develop, implement and evaluate child safety strategies
- To inform the project management team of working group progress
- Maintain commitment to the working group and its goal
- To consult with the broader community to promote the project and encourage involvement.

6.0 DISSEMINATION OF RESULTS AND RECOMMENDATIONS

- Project final report (copy to the WHO Collaborating Centre on Community Safety Promotion, Karolinska Institutet, University of Stockholm, Sweden).
- Community and local government feedback sessions.
- Conference presentation/s on process and implementation issues with the *Safe Communities* concept in a Queensland rural centre
- Articles for Australian Journal of Public Health and Health Promotion Journal of Australia.

APPENDIX TWO OPERATING STRUCTURE MACKAY WHITSUNDAY SAFE COMMUNITIES, 2004



ORIENTATION GUIDE NETWORK SUPPORT GROUP

WELCOME TO THE NETWORK SUPPORT GROUP

Your membership on this overall steering committee is appreciated, given your interest and /or your organisations core business involving safety. Your contribution will assist in the establishment of Queensland's first internationally recognised Safe Community.

Why the Safe Communities Approach?

- 1. From the available injury data it is evident that there is a need for safety promotion / injury prevention activities in the Mackay /Whitsunday area.
- 2. The World Health Organisation Safe Communities Program has been proven to be effective in reducing injury by up to 50 per cent. It has been identified by other 'Safe Communities' that the key to success of 'Safe Communities' is community participation and the working together of many local organisations. Inter-sectoral working groups provide such an opportunity.

Goal / aim of the Network Support Group

- To operate within the World Health Organisation's *Safe Communities* framework which states that Safe Communities have:
 - 1. An infrastructure based on partnership and collaborations, governed by a cross-sectorial group that is responsible for safety promotion in their community;
 - 2. Long-term, sustainable programs covering both genders and all ages, environments, and situations;
 - 3. Programs that target high-risk groups and environments, and programs that promote safety for vulnerable groups;
 - 4. Programs that document the frequency and causes of injuries;
 - 5. Evaluation measures to assess their programs, processes and the effects of change;
 - 6. Ongoing participation in national and international Safe Communities networks.

(Stockholm, May 2002)

- To develop and maintain sustainable processes to ensure a community response to causal factors and contexts of injury in the City of Mackay and Shire of Whitsunday.
- To increase community awareness of injury as a preventable health issue.
- To promote community ownership of and involvement in the project.
- To achieve World Health Organisation accreditation.
- To increase and sustain working group

Roles / Functions of the Network Support Group:

- To increase community awareness of injury as a preventable health issue
- To be advocates for the project.
- To regularly evaluate the Network Support Group and Working Groups.
- To support and advise on local safety issues.
- To review identified strategies to relevant working groups.
- To share organisational expertise.
- To work collaboratively on safety promotion.
- For a minimum of one Network Support Group member to be involved on each working group to provide direction and communication between PMT and working groups. If appropriate to work area, each PMT member will be involved on a Working Group.
- To provide six monthly progress updates to the progress update editor by 1st April and 1st October to ensure the continual profile of the project in the community.
- Maintain commitment to the Network Support Group and its goal

WHY THE MACKAY / WHITSUNDAY SAFE COMMUNITIES PROJECT?

The Mackay / Whitsunday Safe Communities Project was prompted by a report by the Mackay Division of General Practice which showed that hospital admissions for injuries in the Mackay Health Service District (which includes the Whitsunday area) during 1995/96 that were above the state average for both males and females.

WHAT IS THE MACKAY / WHITSUNDAY SAFE COMMUNITIES PROJECT?

The Mackay / Whitsunday Safe Communities Project is a World Health Organisation supported approach to community injury control, that aims to reduce injuries in the Mackay-Whitsunday area by 30% over the next four to five years. It will be guided by the criteria and processes of the World Health Organisation's Safe Communities framework, which has been proven to be an effective means of reducing injury throughout the world, including Australia.

OPERATING STRUCTURE OF MACKAY / WHITSUNDAY SAFE COMMUNITIES PROJECT

The operating structure of the Mackay / Whitsunday Safe Communities Project consists of a Network Support Group and a number of Project Working Groups.

<u>Network Support Group</u> - includes representatives from Mackay City Council, Whitsunday Shire Council, Queensland Transport, Queensland Police Service, Queensland Health, James Cook University, Department of Emergency Services and the Mackay Bulk Sugar Terminal.

Currently, these representatives are:

Ms Jan Kilbourne (Senior Community Development Officer with Mackay City Council);

Mr Peter Day (Manager of Environmental Health Unit at Whitsunday Shire Council);

Mr Bruce Green (Community and Youth Officer with Whitsunday Shire Council):

Ms Jenny Hocken (Road Safety Consultant with Queensland Transport);

Mr Steve O'Connell (Officer in Charge of Proserpine Police Station);

Dr Dale Hanson (Emergency Physician, Mackay Hospital, James Cook University representative);

Ms Kathryn McFarlane (Senior Health Promotion Officer with Tropical Public Health Unit, Queensland Health);

Mr Ray Bohlsen (Area Director with Queensland Fire and Rescue Service);

Mr Peter Warrener (Area Manager with Queensland Ambulance Service);

Mr Rod Usher (Occupational Health and Safety, Mackay Bulk Sugar Terminal);

Ms Colleen Gunning (Prevention Officer with Alcohol Tobacco and Other Drug Services, Queensland Health) and Ms Kelly Hart (Senior Project Officer Child Injury Prevention with Tropical Public Health Unit, Queensland Health)

<u>Project Working Groups</u> - there are several project working groups currently involved in the Mackay / Whitsunday Safe Communities Project including Senior Safety, Whitsunday Child Safety, Mackay Alcohol and Injury, Whitsunday Alcohol and Injury, Road Safety, Child Safety 0-4 years of age and a Collaborative Research Working Group. Given that this is a long-term initiative, further project working groups are planned.

- <u>Senior Safety Working Group</u>: This working group is currently based in Mackay and is addressing falls prevention in seniors 60 years and above. For further information contact Ms Jan Kilbourne, Senior Community Development Officer with Mackay City Council (phone: 4968 4433)
- <u>Collaborative Research Working Group:</u> Injury data is collected from Mackay, Proserpine, Sarina, Moranbah, Clermont, Dysart and the Mackay Mater Hospital. The data collected and analysed by this working group will guide the direction of injury control activities, as well as assist in the evaluation of the Mackay / Whitsunday Safe Communities Project by providing an ongoing injury profile for Mackay and Whitsunday. For further information contact Dr Dale Hanson, James Cook University (phone: 4968 6000)
- <u>Whitsunday Child Safety Working Group</u>: This working group is based in Whitsunday and is addressing bicycling injuries in primary school aged children. For further information contact Mrs Laura Brown, Coordinator of Whitsunday Community Health Centre (phone: 4946 5633)

- <u>Mackay Alcohol and Injury Working Group</u>: This working group is based in Mackay and is addressing alcohol-related injury. For further information contact Ms Colleen Gunning, Alcohol Tobacco and Other Drugs Service (phone: 4968 3858)
- <u>Whitsunday Alcohol and Injury Working Group</u>: This working group is based in Whitsunday and is addressing alcohol-related injury. For further information contact Mr Steve O'Connell, Proserpine Police Service (phone: 4945 1333)
- <u>Road Safety Reference Group</u>: This working group has identified the following areas for strategic action driver fatigue, data collaboration and coordination, driver education, train crossings, target groups (especially young males), cyclists, alcohol, footpaths / bicycle paths and drug driving. Specific action groups have been formed in the areas of Fatigue and Bike Ed. For further information contact Ms Jenny Hocken, Queensland Transport (phone: 4951 8330).
- <u>Child Safety Working Group 0-4 years</u>: This project is a 3-5 year trial funded by the Department of Emergency Services and Queensland Health. A Project Officer has been employed to facilitate a local working group to address the priority injury areas occurring in this age group in Mackay/ Whitsunday including falls, drowning, poisoning and burns. For further information contact Ms Kelly Hart, Tropical Public Health Unit, Queensland Health (phone: 4968 3961).
- <u>Andergrove Neighbourhood Watch Project</u>: This project looked at using the crime prevention strategies of neighbourhood watch groups to also include home safety in relation to injury prevention. For further information contact Mr Peter Warrener, Queensland Ambulance Service (phone: 4967 1044).

Linked Projects - As the Mackay/ Whitsunday Safe Communities Project focuses on unintentional injury links have been made to other projects and strategies in the region to keep informed of all injury strategies.

• <u>Building Safer Community Action Teams:</u> This is a whole of government crime prevention strategy involving collaboration with the community to address local crime issues. Jan Kilbourne and Bruce Green are the Network Support Group members who informs the Safe Communities Project of Mackay and Whitsunday strategies respectively, of interest to MWSCP. For further information on this project contact Mr John Mallet, Department of Premier and Cabinet (phone: 4967 1020).

• <u>Healthy Island Resorts Project</u>: This project is a public health risk management approach aimed at isolated resorts, in particular island resorts. For further information on this project contact Ms Kathryn McFarlane, Tropical Public Health Unit, Queensland Health (phone: 4968 3840).

GOOD PRACTICE - WHAT IS IT & WHY IS IT IMPORTANT?

Good practice is best described as the process used in order to achieve quality. Quality is important, as it not only effects functioning but performance as well. Good practice has a research basis. Further, good practice is demonstrated by the achievement of a number of key principles / criteria (which will be further elaborated on).

GOOD PRACTICE IN SAFETY PROMOTION & INJURY PREVENTION

Using an approach based on good practice, the Australian Injury Prevention Network uses two sets of established health promotion principles to rate / assess injury prevention programs. When developing, implementing and evaluating your injury prevention strategies, it is expected that each working group will utilise the following two sets of principles. It is important to realise that not all these principles may be relevant / appropriate at all times, but it is equally important to recognise that these principles provide essential benchmarks that indicate effective and successful strategies. These principles will now be further outlined in terms of safety promotion.

These are based on the following five action areas:



GOOD PRACTICE PRINCIPLES

- <u>Evaluation</u> Programs should aim to have process, impact and outcome evaluation integrated into its practice where appropriate. This requires the development of clear, measurable and achievable goals, objectives and strategies.
- <u>Equity</u> Programs should promote equity in health, to raise the level of safety needs or greatest risks to injury (e.g. Aboriginal, Torres Strait and South Sea Islander people, women, older persons, unemployed, persons from lower socio-economic background)
- <u>Multi-strategy</u> Programs should use a range of approaches and strategies, including working in parallel to develop the environments and structures supporting safer communities (structural approach) and educating people to make choices to prevent / reduce injury (behavioural approach)
- <u>Working across sectors</u> Programs should bring together those sectors or parts of a sector that have strategic roles to play in addressing injury issues
- <u>Consultation with target groups</u> Programs should ensure that all stages of development, implementation and evaluation, involves real consultation with the target group. This is vital in promoting relevance, effectiveness, efficiency, community ownership and personal development which lead to a greater likelihood of program outcomes being achieved and action being sustained
- <u>Needs and priorities</u> Programs should ideally be based on thorough needs assessment so that sub-groups in the population with greatest needs are targeted using the most suitable strategies documented
- <u>Clear design</u> Programs should always be set out in a clear strategic plan which identifies the context, purpose, strategies and other key aspects of the program
- <u>Cost effective</u> Programs should be cost-effective to outweigh economic and human costs (such as time and effort)
- <u>Sustainable programs for effects</u> Programs should work towards sustainability. Sustainability has a number of aspects:
 - sustainability of change structures which support safety promotion, but which can be adapted to suit the changing needs of the population;
 - sustainability of the effects of programs; and
 - sustainability of the programs themselves
- <u>Adequately funded and supported</u> Programs should be funded adequately to achieve both short and long term goals and be consistent with best practice
- <u>Consistency of content</u> Programs should check where possible that clear and consistent safety messages are used

Reference: St Leger, L., Fawkes, S., Marshall, B., Smith, G., & Litchfield, A. (1993). Health promotion and the implementation of the National Health Goals and Targets. School of Nutrition & Public Health, Deakin University, p.7.

Project Proforma



Project title / description:

Rationale – why is this project being undertaken:

Date created: Planned completion date: Team members:

Goal / purpose:

Who are you targeting?

.

- Activities (tasks):
- •
- •
- •
- •

Partners / Stakeholders:

- •
- •
- •
- •
- •

How do you plan to measure the success of your project?

- .
- •
- •
- •

APPENDIX FOUR

WORKING GROUPS

Safe Communities Working Groups

A Working Group is a group of people brought together to undertake a specific set of activities. The members of working groups are selected for their specific knowledge, skills, and abilities relative to the activities to be undertaken.

Safe Communities Working Groups are formed to address specific injuryrelated areas and report regularly to the Network Support Group. A Safe Communities Working Group should have:

- Terms of reference which clearly explain the purpose of the Working Group and which are reviewed at least annually
- Written minutes of each meeting
- Documentation relating to specific projects, i.e. project plans and project evaluations

Safe Communities Working Group Projects

A project

- Is temporary (that is, it has a definite start and finish date).
- involves doing something that is unique.
- results in something being delivered
- involves time, cost and resources.

Safe Communities Working Group Projects should have a focus on injury reduction and be:

- Planned
- Implemented
- Evaluated, and this process should be
- Documented

Safe Communities Working Group Projects should include a rationale. That is:

- Why it is important to do the project (the identified need, frequency, priority etc.)
- How the project will make a positive contribution to reducing injury
- How the issue has been addressed to date
- Evidence of the effectiveness of the proposed approach
- Evidence of, or consistency with, best practice.

Safe Communities Reference Group

A reference group is a group of experts/ stakeholders established to provide advice to Working Groups. It is not a decision-making body, nor are its members required to undertake project activities.

Safe Communities Linked Groups

A Safe Communities Linked Group is a group of people brought together to undertake a specific set of activities in areas which contribute to the overall goal of injury reduction, e.g. BSCAT, CCPAT and Schoolies Week Committee.



kay/Whitsunday Safe Communities Project with The Injury Research Group supports the Macrelevant research.

the Mackay Whitsunday Safe Communities Proand determinants of injury in Mackay Whitsunday region and evaluating the effectiveness of This has included documenting the frequency ject.

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demiology of injury in the region, and provide evidence for developing and measuring the effectiveness of safety promotion programs imple-

mented as part of the project.

Current Research:

Surveillance data is analysed to document the epi-

The Issue

The Mackay Injury Surveillance Network was established in September 1997 and collects injury surveillance data from all Emergency Departments (EDs) in the Mackay and Moranbah Health Service

The Mackay Injury Surveillance Network reported 33.211 Emergency Department presentations due to injury from 1 January 1998 to 31 December 2000. This represents an age standardised rate of 12,584 per 100.000 for males, 2.0 times the rate observed in South Brisbane; and a rate of 6,319 per 100,000 for females, 1.7 times the rate observed in South Brisbane.

The Group

in house or forwarded to School of Public Health

and Tropical Medicine, JCU or Injury Prevention

and Control Australia (IPCA) for further analysis.

Data collected in regional EDs is collated and cleaned by the QISU before being either analysed

Districts.

The Injury Research Croup includes collaborators from the Mackay Whitsunday Safe Communities Prolect. James Cook University (JCU). Queensland Injury Surveillance Unit (QISU), Injury Prevention and Control Australia and Queensland Health. The group was established in February 2000 to assist the Mackay Whitsundays Safe Communities Project to

IPCA is undertaking an onging evaluation of

-

the Child Injury Prevention Program in Mac-

kay (ChIPP).

JCU is undertaking ongoing action research

ci

Project itself. The current study is using Social Network Analysis to study the growth opera-

tion of the project.

into the operation of the Mackay Whitsunday





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App 4: Working Groups

Working Group

and and water sports and recreational activities, and Drinking alcohol has been associated with risk of inaccidents, incidents involving pedestrians, falls, fires, jury in many settings, including vehicle and cycling violence. In response to the risks posed by unsafe consumption of alcohol, the Alcohol and Injury Working Group was formed in 2001.

Over the years, Choices has become a selfapproach to promote safer partying.

people of the Mackay region.

This Working Group includes representatives of the and the Tropical Public Health Unit Network Mac-Health (Alcohol Tobacco and Other Drugs Service kay) whose role involves the promotion of the re-Queensland Police Service, Queensland Transport, the Division of Liquor Licensing, and Queensland sponsible service and/ or consumption of alcohol.

Choices

Queensland University's Mackay Conservatorium of Music students, is based on messages supplied by the Choices is a drama presentation designed to encourage safer celebrations during Schoolies Week. The agencies represented on the Alcohol and Injury production, written and performed by Central Working Group.

and alcohol education students have received during their school years, incorporating Basic First Aid infor-Essentially the production aims to reinforce the drug Proserpine, Moranbah and Mackay areas since 1999. The show has been performed for students from State, Catholic and Independent schools in the





options are limited.





App 4: Working Groups





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MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS UPDATE 1 – JUNE 2000

MACKAY / WHITSUNDAY SAFE COMMUNITIES PROJECT

Progress Update 1 June 2000

This is the first of regular progress updates that will be released on a six monthly basis.

Background:

As a response to above average injury rates identified in the Mackay / Whitsunday area, the Mackay / Whitsunday Safe Communities Project was established to address the issue and help the area become Queensland's first internationally recognised safe community.

The Mackay / Whitsunday Safe Communities Project is a World Health Organisation supported approach to community injury control that has been proven to be an effective means of reducing injury throughout the world, including Australia.

Project Management Team:

In September 1999, an intersectoral project management team was established with representatives from Mackay City Council, Whitsunday Shire Council, Queensland Transport, Queensland Police Service and Queensland Health.



Members of Project Management Team (Left to right): Peter Day (Manager, EnvIronmental Health, Whitsunday Shire Council); Paul Vardon (Health Promotion Officer, Tropical Public Health Unit, Queensland Health – Mackay); Nicole O'Bryan (Road Safety Consultant, Queensland Transport); Kevin Harrigan (Officer in Charge, Proserpine Police); Jan Kilbourne (Chief Community Development Officer, Mackay City Council) & Dr Dale Hanson (Emergency Physician, Mackay Base Hospital, Queensland Health). Absent: Peter Driemel (Environmental Health Officer, Whitsunday Shire Council).

Launches:

On 3 February 2000, Mackay Mayor Julie Boyd officially launched the project at the Mackay Council Chambers, supported by Mackay Health Service District Manager Mr David Yule, Mackay Hospital Emergency Department Physician Dr Dale Hanson and the Manager of the Queensland Injury Surveillance Unit Mr Adrian Horth.



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(Left to right) Dr Dale Hanson, Adrian Horth, David Yule and Julie Boyd.

Photo courtesy of: Mackay Daily Mercury)

On 7 February 2000, Whitsunday Mayor Mario Demartini officially launched the project at the Proserpine Cultural Centre, supported by Mackay Hospital Emergency Department Physician Dr Dale Hanson.



(Left to right) Dr Dale Hanson and Mario Demartini

These launches represented the first step in establishing Queensland's first internationally recognised 'World Health Organisation Safe Community'.

Professor Lief Svanstrom (Head of the World Health Organisation Collaborating Centre on Community Safety Promotion at the Karolinska Institute in Stockholm, Sweden which co-ordinates the Safe Communities program at an international level) commended Mackay and Whitsunday for undertaking and supporting this important initiative.



Project Working groups:

There are several project working groups currently involved in the project. Given this is a long term initiative, further project working groups are planned.

<u>Collaborative injury research working group</u>:

Membership includes representatives from Queensland Injury Surveillance Unit, Queensland Health and James Cook University. This working group currently collects injury data from Mackay and Proserpine Hospitals. The data is then analysed to guide the direction of injury control activities, as well as to assist in the evaluation of the project. For further information regarding this working group please contact: Dr Dale Hanson, Emergency Physician, Mackay Base Hospital ph: 4968 6000

Senior safety working group in Mackay:

Membership includes: representatives from Mackay City Council, Mackay Community Health Services, Queensland Health's Tropical Public Health Unit and local community members. This working group plans to address the issue of falls prevention. Activities of this working group to date include: the release by the Mackay City Council of a seniors information directory, the launch of the Healthy Homes Party Program and the launch of the Just Walk It Program. For further information regarding this working group please contact: Ms Jan Kilbourne, Chief Community Development Officer, Mackay City Council, ph: 4968 4433.

<u>Violence Prevention:</u>

SAFETY

Mackay Crime Prevention Partnership and the Mackay / Whitsunday Safe Communities Project are sharing resources, to conduct an audit of violence in the Mackay / Whitsunday region. The aim of the audit is to document what is recorded of unacceptable violence in our community and identify causes of violent behaviour. The audit will provide a starting-point for the communities of Mackay / Whitsunday to develop strategies to prevent violence, and a baseline against which to evaluate the effectiveness of initiatives in reducing violence. For further information regarding this, please contact: Mr John Mallett, Regional Coordinator, Mackay Crime Prevention Partnership, ph: 4968 4548

<u>Child safety working group in Whitsunday:</u>

Membership includes: representatives from Whitsunday Shire Council, Whitsunday Community Health Centre, Education Queensland, Queensland Police Service, Queensland Transport, Whitsunday Neighborhood Centre and Queensland Health's Tropical Public Health Unit. This working group plans to address the issue of bike injury using a multi-strategic approach. The first step being taken in Whitsunday to reduce child injury associated with bicycles, is the BP Bike Ed Program.

A BP Bike Ed train the trainer program was conducted by Queensland Transport in Proserpine in April. Eleven people attended this course including teachers, police and parents. For further information regarding this working group please contact Mrs Laura Brown, Coordinator of Whitsunday Community Health Centre ph: 4946 5633.



(Left to right) Nicole O'Bryan; Road Safety Consultant, Old Transport, Jodie McSweeney; Proserpine Police, Richard Floyd; PE Teacher, Cannonvale State School.

(Photo courtesy of: Whitsunday Times)

Conference Attendance:

Dr Dale Hanson and Paul Vardon recently attended a World Health Organisation Safe Communities International Symposium in Melbourne that included: the formal accreditation ceremony of Melbourne, a 2 day seminar on community safety and three one day site visits to study community safety initiatives implemented in a range of settings.

Planned future Safe Communities activities include:

- Compilation of a baseline injury report for 1999
- Conducting a telephone survey
- Child safety workshops
- Development of a web-site
- Injury prevention activities at local primary schools in Whitsunday

To find out more, to be involved, or to let the project management team know of existing local injury prevention and safety promotion activities please contact the project facilitator: Mr Paul Vardon, Health Promotion Officer, Tropical Public Health Unit – Mackay, Queensland Health, ph: 4968 3858



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APPENDIX SIX

MACKAY WHITSUNDAY SAFE COMMUNITIES ANNUAL REPORT 2000 TO 2001

Mackay/Whitsunday Safe Communities Project 12 monthly report February 2000 to February 2001





Introduction:

As a response to above average injury rates identified in the Mackey / Whitsundey region, the Mackey / Whitsundey Safe Communities Project was established to address this issue and help the region become Queensiand's first internationally recognized safe community.

This project is a World Health Organisation (WHD) supported approach to community injury control that aims to reduce injury in the Mackay / Whitsunday region by 3D per cent over the next 4-5 years. It will be guided by the criteria and processes of the WHD's safe communities framework which has been proven to be an effective means of reducing injury throughout the world, including Australia.

While a number of single issue safety promotion projects have been conducted over recent years, this project aims to coordinate a systematic sustained response to injury in the region that is multisectoral in scope, collaborative in strategies and ecological in perspective.

This first annual report is a reflection on achievements and challenges of the Mackay / Whitsunday Safe Communities Project from February 2000 to February 2001.

Leunch

In February 2000, the Mackey / Whitsunday Safe Communities Project was officially isunched in both Mackey and Whitsunday.

Operating Structure

The Operating Structure of the Mackay / Whitsunday Safe Communities Project consists of a part-time Project Facilitator, Project Management Team and a number of Project Working Groups.

Part-time Project Facilitator

Tropical Public Health Unit Network, Queensiend Health is providing funding for a part-time project officer to facilitate / coordinate the establishment of the project. Limited funding to support injury prevention interventions / strategies has also been made available by Queensiand Health. This financial commitment by Queensiand Health will be available for the next 3-5 years but in a reducing capacity.

Project Management Team

In September 1999, an intersectoral project management team was established with representatives from Mackay City Council, Whitsunday Shire Council, Queensland Transport, Queensland Police Service, James Cook University and Queensland Heath.

Terms of Reference for the Project Management Team have been established.

Over the last 12 month period, the Project Management Team have met regularly at 4-6 weekly intervals. A logo and the slogan 'Safety is Everyone's Business' was developed by the Project Management Team.

Project Working Groups

There are several project working groups currently involved in the Mackey / Whitsunday Safe Communities Project including a senior safety working group in Mackey; a child safety working group in Whitsunday, a collaborative injury research working group; and a road safety working group. Given that this a long-term initiative, further project working groups are planned to target other areas of significant injury.

Collaborative research working group:

Membership includes representatives from Queensiand injury Surveillance Unit (QISU), Queensiand Health and James Cook University (JCU).

Surveillance data is collected at all public hospitals in the region [Clermont, Dysart, Mackay, Moranbah, Proserpine and Sarine] and the Private Medical Service at the Mackay Mater (from September 2000). This surveillance data is analysed at a state level by QISU and at a regional level by School of Public Health and Tropical Medicine James Cook University in collaboration with Queensiend Health and QISU. This provides a powerful epidemiological tool to study the causation and Impact of Injury and evaluate the effectiveness of Interventions.



Initiatives include – ongoing analysis of local data to identify strategic areas for intervention; presentation of papers at injury 2000 national conference; baseline public perception telephone survey of 461 local residents conducted by JCU PhD student, sponsored by the Tom and Dorothy Cook Fellowship; and injury builetin [December 2000] by GISU outlining Mackey / Whitsunday Safe Communities Project as a demonstration / case study.

Telephone survey results - The following identifies the major findings from this survey

- Participants overwheimingly agreed that injuries can be prevented. However few were aware of specific accident
 prevention or safety programs. The majority of participants perceived prevention to be the responsibility of the
 individual experiencing the injury.
- The street and the motor vehicle were perceived as the most likely locations for injury, whereas most injuries
 occur at home.
- Mejority of participants compiled with 3 or more safety practices [eg smoke detector, handrails, hot water
- tempering valve). Increased compliance with household safety practices was associated with increasing age. The 10-29 year age group were correctly perceived as the most likely group to be injured.

Future initiatives planned include - preparation of a baseline monograph of injury in the Mackay / Whitsunday region.

Senior safety working group in Mackay:

Membership includes representatives from Mackey City Council, Gueensiand Health and local community members. This working group has utilised a multi-strategic approach to address the issue of fails prevention, as well as address perceptions of safety for older persons.

Initiatives include – release of 3000 seniors information directories by Mackay City Council; community displays and distribution of home safety information; implementation of Healthy Homes Party Program; promotion of physical activity through integration of Just Weik it and Sitting Dance Programs and Implementation of Safe Shop Program.

Healthy Homes Party Program

Volunteer based peer education fails prevention program supported by the Aged Care and Disability Unit of Mackay Community Health Centre. Three volunteer facilitators have been recruited and trained, with six Healthy Homes Party Programs planned [3 conducted and 3 postponed]. Telephone follow-up of consenting attendees has identified that all fait that the party was worthwhile.

All participants identified that their knowledge of fells prevention had increased as a result of attending the party. Following the Healthy Homes Parties, many participants had taken steps to prevent fells such as removing cords and mats.

Just Walk It Program

Four community based waiking groups have been established, one in Slade Point (with approximately 10 waikers), two in Andergrove (with approximately 10 waikers each) and a workplace group (with approximately 6 waikers)

Safe Shop Program

In December 2000, a pliot safe shop program (based on a concept developed and utilised effectively by a local Government authority in Victoria) was implemented in the Mackey Central Business District / City Heart to enhance perceptions of safety particularly for older persons. More than 60 local businesses are participating in this program.

Child safety working group in Whitsunday:

Membership includes representatives from Whitsunday Shire Council, Queensiand Health, Education Queensiand, Queensiand Police Service, Queensiand Transport and Whitsunday Neighborhood Centre. This working group has utilised a multi-strategic approach to address predominantly the issue of bike safety.



Initiatives include – Integration of Queensiand Transport's BP Bike Ed Program into local schools; share the road campaign; development and implementation of Operation BikeSafe; liaison with local Government to discuss supportive infrastructure / environments for safe bike riding and provision of seeding funding for local schools to implement KidPower.

Queensland Transport BP Bike Ed Program

The Gueensland Transport BP Bike Ed Program is a comprehensive practical bicycle education program designed to give children aged B to 13 years (years 4-5) the practice and knowledge they need to survive on the roads, Training was provided in April 2000 for persons to become instructors. Eleven local persons including teachers (from all mainland schools excluding Whitsunday Christian Community School), police and parents attended the training. Proserpine State School Implemented the Gueensland Transport BP Bike Ed Program in 2001. Other local schools identified that before proceeding, further training is required for additional facilitators. Further training planned by Gueensland Transport in 2001.

Operation BikeSafe (July-December 2000)

Operation BikeSafe was a proactive program to promote safe bike riding behaviour by 9-13 year olds on the roads of the Whitsunday region, that used positive reinforcement rather than reactive enforcement as its strategy, utilising police, schools and the media.

From July-December 2000, 30 local Whitsunday 9-13 year olds were nominated by local Police for wearing heimets, obeying road rules and riding sensibly and defensively.

Prior to Operation BikeSafe, an observation and survey tool were developed to evaluate Operation BikeSafe and identify / measure changes in behaviour. Pre Project evaluation of Operation BikeSafe identified that the majority of local children observed wore their heimet properly, however it was observed that many (particularly in Proserpine) failed to wear appropriate footwear. Approximately 37% of a convenient sample of 51 local community members rated the bike riding behaviour of local children as poor or very poor. Overall, it was identified there was room for improvement in the bike riding behaviour of local children (aged 9-13 years) when riding on the road, with the findings from observation supported by the findings from the survey tool. Post evaluation of Operation BikeSafe is planned for March 2001.

KidPower

KidPower is a innovative new injury prevention resource elimed at significantly reducing the number of school based injuries in young people aged 10-14 years. KidPower uses a wholistic approach based on the health promoting schools process that includes - an injury committee (including students) and an injury database. The KidPower resource was provided to 4 of the 6 local Whitsunday primary schools. Seeding funding was provided for supportive injury prevention initiatives for 3 of the 4 schools.

Road Safety Working Group

In June 2000, a road safety community meeting was conducted in Mackay by Queensland Transport. At this meeting, the decision was made by attendees to establish a road safety working group as a component of the Mackay / Whitsunday Safe Communities Project.

Membership includes representatives from Gueensiand Transport, Queensiand Police Service, Queensiand Health, Mackey City Council, Industry / community member and Department of Main Roads.

Initiatives: Identification of the following areas for strategic action – driver fatigue, data collaboration and coordination, driver education, train crossings, target groups (especially young males), cyclists, elcohol, footpaths / bicycle paths and drug driving; development / implementation of a safe party kit; and promoting responsible drinking of elcohol through integration of Drink Rite Program.



Safe Party Kit

In December 2000, a pliot safe party kit (based on a concept developed and utilised effectively by a local Government authority in Victoria) was implemented across the region. The safe party kit, Steps to a Smarter Party', provides tips for holding successful, enjoyable and safe parties specifically addressing antisocial behaviour, road safety and alcohol consumption issues. During the party season of the festive / new year season, party convenors were given the opportunity to register their party with the Police. Approximately 119 safe party kits were taken from various distribution points in Mackay / Whitsunday. Unfortunately it is unknown how many parties were registered. Post evaluation of the safe party kit is planned for March 2001 with follow-up of consenting party convenors who registered their party (7 completed party registration forms received). It is planned that 'Steps to a Smarter Party' will be evaluable on an ongoing basis prior to peak party times from local councils, police, transport, community health offices and schools.

Drink Rites

From October – December 2000, 3 Drink rites were conducted in licensed premises of the Mackey / Whitsunday region by Queensland Police Service, Queensland Transport and Queensland Health staff to promote the responsible drinking of alcohol.

Planned future working groups in 2001 Child safety working group in Mackay Working group to address injuries related to alcohol in the region

Partnerships

Links have been established with the Mackay Grime Prevention Partnership as demonstrated by. a Violence Audit Workshop conducted in June 2000 and the Safe Shop Initiative.

Proposed Second Pacific Rim Safe Communities Conference

Two members of the Project Management Team (from Gueensland Health) attended a World Health Organisation Safe Communities International Symposium in Melbourne (April 2000). At this symposium, the two staff were approached by international and national safe communities officials and asked whether Mackay / Whitsunday would consider hosting the Second Pacific Rim Conference for Safe Communities in 2001. The decision was made by the Project Management Team to look at the feasibility of hosting the conference.

Feasibility study: A professional conference organiser was commissioned by Gueensiend Health to conduct a feasibility study. The feasibility study identified the prospect of success of staging the proposed conference as very high, however it was relient on obtaining seeding funding to establish a conference secretariat. Funding application with Gaming Machine Community Benefit Fund unsuccessful in first round of consideration (December 2000). Further consideration of funding application will occur in next three rounds of 2001. If proposed conference was to proceed will now be in 2002.

Communications Plan

The Communications Officer from the Tropical Public Health Unit, Gueensiand Health assisted the Project Management. Team to develop a Communications Plan for the Mackay / Whitsunday Safe Communities Project. Each member of the Project Management Team and working groups have assumed the responsibility of providing ongoing communication of the projects' progress through their own networks and updating their own organisations and workplaces.

Active components of the communication plan include

- Information resource kit to provide to interested service providers, community members etc.
- Progress update for maintain profile of project and ensure communication with key stakeholders. First progress
 update released in June 2000, next progress update planned for February / March 2001.
- Maintenance of a media log identifying media coverage of the project



A total of 47 positive known media 'hits' were identified regarding the Mackay / Whitsunday Safe Communities Project or associated program.

Evaluation of Project

Evaluation is planned of the processes of the project. This evaluation will be undertaken on an annual basis and include interviews of and surveys to members of working groups and the project management team. At the time of this report, only evaluation of the Project Management Team has occurred. Conclusions from the evaluation of the Project Management Team were: "overall, all project management team members fet positive about the project, and seemed to enjoy the opportunity to adopt a collaborative approach in promoting a safe community within the Mackay/Whitsundey region. Most regretted that their personal contribution to the project was limited by time, however all indicated that they were committed to the group and positive about the outcome of the project.

Pool fence inspection research project

Gueensiand Health and Mackay City Council in collaboration participated in a research project that was completed in 2000 to determine whether the inhouse model (inspections conducted by local council officers) was an acceptable method for determining the compliance of pool owners with current pool fencing standards.

The results of this study demonstrated that despite legislation requiring pool owners to ensure their pool fence compiled with uniform pool fencing requirements compilence is still quite low. Further, the findings of this study indicated that whilst the inhouse model appeared to be an acceptable [to the majority of pool owners] but costly method of pool fence inspection, regular inspection of pool fencing, and enforcement of pool fencing ordinances may be necessary to ensure compilence.

Distribution of CPR Wall Chart / Poster to new pool owners

Both Mackey and Whitsunday Councils are providing a CPR Wall Chart / Poster (provided by Queensiand Heelth) with an accompanying letter from the Mackey / Whitsunday Safe Communities Project to all new pool owners. The letter congratulates the new pool owner on their acquisition, identifies ways to keep pools safe and provides local contacts for persons to access in regards to resuscitation training (as a chart is a guide only and not a substitute for essential training in resuscitation).

Conferences

- Attendance: Two members of the Project Management Team (both from Gueensiand Health) attended a World Health Organisation Safe Communities International Symposium in Melbourne (April 2000) that included: the formal accreditation caremony of Melbourne, a 2 day seminar on community safety and three one day site visits to study community safety initiatives implemented in a range of settings.
- Presentation: Five papers were presented at the recent National injury Prevention Conference in Canberra (November 2000): Becoming Queensiend's First Sefe Community – considering susteinability from the outset (verbal presentation by Dale Hanson); Non-fatal accident and injury in a north Queensiand rural community (Mackay) (poster presentation by Tony Carter); injury experienced by women in Mackay (Queensiand) in 1998 (oral presentation by Vicki Taylor); Intentional acts of self herm in 10-14 year olds in three Queensiand regions (QISU) and Contribution of an emergency department to the Mackay / Whitsunday Sefe Communities Project (poster presentation).



MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS UPDATE 2 – JUNE 2001

MACKAY / WHITSUNDAY SAFE COMMUNITIES PROJECT (MWSCP) Progress Update 2 June 2001

This is the second of regular progress updates that will be released on a six monthly basis.

Background:

As a response to above average injury rates identified in the Mackay / Whitsunday area, the MWSCP was established to address this issue and help the region become Queensland's first internationally recognised Safe Community.

This long-term project is a World Health Organisation (WHO) supported approach to community injury control that aims to reduce injury in the Mackay / Whitsunday region by 30 % over the next 4-5 years. It will be guided by the criteria and processes of the WHO's Safe Communities framework which has proven to be an effective means of reducing injury throughout the world, including Australia.

Telephone Survey

In July/August 2000, a random public perception telephone survey of 461 local residents was undertaken by a PhD student from James Cook University through sponsorship by the Tom and Dorothy Cook Fellowship. The major findings of this survey were as follows:

- Subjects overwhelmingly agreed that injuries can be prevented. However few were aware of specific accident prevention or safety programs. The majority of subjects perceived prevention to be the responsibility of the individual experiencing the injury.
- The street and the motor vehicle were perceived as the most likely locations for injury, whereas most injuries occur at home.
- The majority of subjects complied with three or more safety practices (eg smoke detector, handrails, hot water tempering valve). Increased compliance with household safety practices was associated with increasing age.
- The 16-29 year age group were correctly perceived as the most likely group to be injured.

For a complete copy of survey results please contact: Tony Carter, James Cook University PhD student on 4722 5749.

Collection of Injury Surveillance Data

collected at the emergency departments of all public hospitals in the region (Clermont, Dysart, Mackay, Moranbah, Proserpine and Sarina) and now the Private Medical Service at the Mackay Mater (from



September 2000). This surveillance data is analysed

at a state level by the Queensland Injury Surveillance Unit (QISU) and at a regional level by the School of Public Health and Tropical Medicine,

James Cook University, in collaboration with Queensland Health and QISU. This provides a powerful tool to study the cause and impact of injury and evaluate the effectiveness of interventions.

Healthy Homes Plan Program

The Senior Safety Working Group in Mackay has established a Healthy Homes Plan Program to share information with older people about falls and their prevention in a fun and non-threatening way using a group setting. The program is tacilitated by volunteers, with support from the Aged Care and Disability Unit of Mackay Community Health Centre. If you would like to know more about the program or refer older people to the educational session, please contact Jane Paine, Clinical Nurse Consultant Aged Care and Disability Unit, Mackay Community Health Centre, Queensland Health - phone 4968 3823.



Mackay City Council as an initiative of the Senior Safety Working Group launched a Safe safe shop

Shop Program in December 2000. Over 60 local businesses in the Mackay City Heart have joined the program, which aims to provide a safer shopping environment, particularly for older people. Participating retailers provide information services to shoppers, as well as offering to call emergency services if a customer is concerned about their personal safety. Shops are identified by a bright orange Safe Shop sticker. If you would like to know more about the Senior Safety Working Group and/or the Safe Shop Program, please contact Jan Kilbourne, Manager Community Development, Mackay City Council - phone 4968 4444.





The Just Walk It Program began in Mackay in April 2000 to raise the profile of walking, particularly among older residents. Just Walk It is a



community based walking program developed and supported by the National Heart Foundation. Currently five walking groups in Mackay are operating, including two at local workplaces. If you would like to know more about the Just Walk It Program, be a walk organiser or just join a walking group, please contact Jan Kilbourne, Manager Community Development, Mackay City Council - phone 4968 4444.

Operation BikeSafe

Operation BikeSafe, an initiative of the Child Safety Working Group in Whitsunday, was conducted from July to December 2000. Operation BikeSafe was a proactive program that used positive reinforcement as its strategy, utilising police, schools and the media. During the program, 30 local Whitsunday children aged 9-13 years were nominated by local police for their safe bike riding on local roads. A special thankyou to police and local schools for their collaboration on this project, plus ESA-Alpha Epsilon, Proserpine Lions and Whitsunday Toyworld for providing the major prizes.

Members of Child Safety Working Group (L to R): Constable Jodie McSweeney (Proserpine Police); Sergeant Kevin Harrigan (Officer in Charge, Proserpine

Police): Laura Brown (Co-ordinator, Whitsunday Community Health Centre, Queensland Health): Paul Vardon, Nicole O'Bryan and Neil Tynan (Technical Officer, Works, Whitsunday Shire Councei) with Monique Jerram (first student in Whitsunday to be nominated by Police for her safe bike riding). Some members absent. Phoserpine Guardian.



Cannonvale, Hamilton Island, Proserpine and Whitsunday Christian Community Schools have joined the MWSCP to

reduce injury. These schools are using KidPower, a new injury prevention resource kit. KidPower uses an injury committee that includes students and other members of the school community as a means of identifying potentially dangerous areas and behaviours within the school, and

developing strategies to prevent injuries occuring. For further details, contact Paul Vardon, Senior Health Promotion Officer, Tropical Public Health Unit - Mackay, Queensland Health phone 4968 3858.

New Working Group

SAFETY

In June 2000, a road safety community meeting was conducted in Mackay by Queensland Transport. At this meeting, the decision was made to establish a Road Safety Working Group as a component of MWSCP. Membership of this newly formed working group includes representatives from Queensland Transport, Queensland Police Service, Queensland Health, Education Queensland, Mackay City Council,

industry/community members and Department of Main Roads. This working group has identified a number of key areas for strategic action, including driver fatigue, data collaboration and co-ordination, driver education, train crossings, target groups (especially young males), cyclists, alcohol, footpaths/bicycle paths and drug driving. For further information contact Nicole O'Bryan, Road Safety Consultant, Queensland Transport - phone 4951 8330.



Members of Road Safety Working Group (L to R): Dr Dale Hanson (Emergency Physician, Mackay Base Hospital, Queensland Health); Ian Single (Operator, Singles Transport); Nicole O'Bryan, Councillor Sel Payne (Mackay City Council); Gerhard Joubert (Manager Infrastructure Design Services, Mackay City Council) & Colleen Gunning. Some members absent.

A safe party kit has been developed by Queensland Transport, Queensland Health and the Queensland Police Service. The safe party kit 'Steps to a Smarter Party',



provides tips for holding successful, enjoyable and safe parties specifically addressing antisocial behaviour, road safety and alcohol consumption issues. The kit will be available prior to peak party times from local

councils, police, transport, community health offices and schools. For further information contact Colleen Gunning - Alcohol Tobacco



and Other Drugs Prevention Officer, Mackay Community Health, Queensland Health - phone 4968 3858.

Planned future activities include:

- preparation of a baseline monograph of injury in the Mackay/Whitsunday region
- child safety working group for Mackay
- working group to address injuries related to alcohol in the region
- senior safety working group for Whitsunday
- community safety week in Mackay, Sept 3 9, 2001

To find out more, to be involved, or to let the project management team know of existing local injury prevention and safety promotion activities please contact the project facilitator: Mr Paul Vardon, Health Promotion Officer, Tropical Public Health Unit - Mackay, Queensland Health phone 4968 3858 or Email: paul_vardon@health.qld.gov.au



APPENDIX EIGHT

MACKAY WHITSUNDAY SAFE COMMUNITIES ANNUAL REPORT 2001 TO 2002

Mackay/Whitsunday Safe Communities Project 12 monthly report February 2001 to February 2002





INTRODUCTION

As a response to above average injury rates identified in the Mackay/Whitsunday region, the Mackay/Whitsunday Safe Communities Project (MWSCP) was established to address this issue and help the region become Gueensiand's first internationally recognised safe community. In February 2000, the MWSCP was officially launched in both Mackay and Whitsunday.

This project is a World Health Organisation (WHO) supported approach to community injury control that aims to reduce injury in the Mackey/Whitsunday region by 3D per cent over a five year period. It will be guided by the criteria and processes of the WHO's safe communities framework which has been proven to be an effective means of reducing injury throughout the world, including Australia.

While a number of single issue safety promotion projects have been conducted over recent years, this project aims to coordinate a systematic sustained response to injury in the region that is multi-sectorial in scope, collaborative in strategies and ecological in perspective.

This is the second annual report for the MWSCP and will focus on the achievements over the last year from February 2001 to February 2002.

OPERATING STRUCTURE

The Operating Structure of the MWSCP consists of a part-time Project Facilitator, Project Management Team and a number of Project Working Groups.

Part-time Project Facilitator

Tropical Public Health Unit Network, Queensiend Health is providing funding for a part-time project officer to fecilitate/coordinate the project. Kathryn McFariene started in this position January 2002. Paul Vardon was previously in this position. Limited funding to support injury prevention interventions/strategies has also been made available by Queensiand Health. This financial commitment by Queensiand Health will be available for the next 2-4 years but in a reducing capacity.

Project Management Team

Jan Kilbourne: Manager Community Development, Mackey City Council Peter Dey: Menager of Environmental Health, Whitsunday Shire Council Peter Driemet: Environmental Health Officer, Whitsunday Shire Council Bruce Green: Youth Development Officer, Whitsunday Shire Council Kevin Harrigen: Officer in Charge, Proserpine Police Or Dele Henson: Emergency Physician, Mackey Base Hospital - Gueensland Health Nicole Madam: Road Safety Consultant, Gueensland Department of Transport Bruce Smith: Area Director, Gueensland Fire and Rescue Service Jamie Cunington: Gueensland Ambulance Service Kethryn McFerlane: Senior Health Promotion Officer, Tropicel Public Health Unit Network - Gueensland Health

The project management team (PMT) consists of representatives from Mackey City Council, Whitsunday Shire Council, Gueensland Transport, Gueensland Police Service, James Cook University, Gueensland Health and more recently the Department of Emergency Services. Representatives of DES have been actively involved on the Project Management Team from January 2002.

Over the last 12 month period, the PMT have met regularly at 4-5 weekly intervals.

Project Working Groups

There are several project working groups currently involved in the MWSCP including a Senior Safety Working Group in Mackay; a Child Safety Working Group in Whitsunday; a Collaborative injury Research Working Group; a Road Safety Working Group; and an Alcohol and injury Working Group. Given that this a long-term initiative, further project working groups are planned to target other areas of significant injury.



WORKING GROUP UPDATES

Senior Safety Working Group

An inter-sectoral group made up of representatives from the Mackay City Council, Mackay Community Health Services, Tropical Public Health Unit, Mackay Division of General Practice and local community members aged 60 years and above. This working group has utilised a multi-strategic approach to address the issue of fails prevention, as well as address perceptions of safety for older persons. This working group is currently based in Mackay. Achievements include – ongoing Healthy Homes Party Program; promotion of physical activity through integration of Just Welk It and Sitting Dance Programs; Safe Shop initiative; and GP Fails Prevention Resource.

Healthy Homes Plan

Volunteer based peer education fails prevention program supported by the Aged Care and Disability Unit of Mackey Community Health Centre. Three volunteer trained facilitators have conducted 8 parties. Parties were initially aimed at small peer groups but feedback revealed that using existing settings such as University for the Third Age (U3A) groups were less intrusive. With this setting change the group renemed the project from 'Healthy Homes Party' to 'Healthy Homes Plan'. An estimated 200 seniors have attended on information session.

Feedback from volunteer facilitators identified that they were able to use the knowledge gained from participation in the Healthy Homes Plan Program in their work areas (including: community options, home care and blue care respite). While feedback from those who attended stated that their knowledge of fails prevention had increased markedly following the program and some had actively taken suggested steps to prevent fails. In Fabruary 2002 the volunteers requested some revision of training in relation to new products available and also to coincide with the orientation of one new volunteer facilitator. The focus of the group over the next 12 months will be at targeting older persons who do not attend organised groups.

Just Walk It

The four community based weiking groups established in 2000 continued during 2001, one in Siede Point (with approximately 10 weikers), two in Andergrove (with approximately 10 weikers each) and one workplace group (with approximately 5 weikers). Near the end of 2001 attendence dropped in all locations. Verbal feedback suggests this was due to other end of year commitments by the weik organisers and the heat of summer. No weiks have resumed in 2002. However, Mackay Community Health is committed to starting weiks up again in 2002.

Safe Shop Program

In December 2000, a pliot safe shop program (based on a concept developed and utilised effectively by a local Government authority in Victoria) was implemented in the Mackay Central Business District/City Heart to enhance perceptions of safety particularly for older persons. More than 80 local businesses are participating in this program. Participating ratellers provide information services to shoppers, as well as offering to call emergency services if a customer is concerned about their personal safety.

Shops are identified by a bright orange 'Safe Shop' sticker. Evaluation in July 2001, revealed that the majority of businesses involved had a good understanding of the kt and thought it was a good strategy particularly in promoting customer relations. 30 percent of businesses had been utilised by customers as a 'Safe Shop'. It is difficult to evaluate the effectiveness of the compaign as persons using the Central Business District may feel safer knowing that 'Safe Shops' exist but never use the service. However, older people particularly have commented that they feel more safe and comfortable knowing that 'Safe Shops' are willing to give them assistance when required.


Medication Disposal

Given that medications can be a risk factor for fails, in July 2001, the Senior Safety Working Group surveyed local pharmacles regarding availability and use of the national safe medication disposal strategy OPAL/RUM. This survey revealed that all pharmacles in the area were interested in participating in an awareness raising campaign to remind community members of the medication disposal services available at pharmacles. OPAL/RUM posters and pamphiets were distributed to all pharmacles and the OPAL/RUM program was promoted during Community Safety Week 2001.

Sitting Dance

The Sitting Dance project aims at increasing physical activity in older people. The program focuses on gentle exercises and participants remain sected in chairs. The popularity of this group has increased during 2001 with approximately 60 people attending each session. An alternative venue to the Mackey Community Health Centre is currently being sort. As not all venues have appropriate sects, the Mackey City Council has offered to purchase suitable chairs to promote the use of their new Andergrove Community Heil.

GP Fall Prevention Resources

The Mackay Division of General Practice recently launched a Fails Desktop Guide for General Practitioners together with a Fails poster and patient information kit. These were developed in collaboration with other Divisions in response to the Enhanced Primary Care Fails initiative. The main focus of the information contained in the guide relates to identifying the major risk factors for fails and disseminating relevant information to patients in an effort to provide intervention, management and support. Evaluation of this resource is planned.

Collaborative Injury Research Working Group

Membership includes representatives from Queensiand Injury Surveillance Unit (QISU), Queensiand Health and James Cook University (JCU). Surveillance data is collected at all public hospitals in the region (Clermont, Dysert, Mackay, Moranbah, Proserpine and Sarina) and the Private Medical Service at the Mackay Mater (from September 2000). The surveillance data is analysed at a state level by QISU and at a regional level by the School of Public Health and Tropical Medicine, JCU, in collaboration with Queensiand Health and QISU. This provides a powerful epidemiological tool to study the causation and Impact of Injury and evaluate the effectiveness of Interventions, while also providing an ongoing Injury profile for the MWSCR

The working group identifies potential focus areas for the MWSCR Over the past 12 months, the data has been analysed to reveal that Mackey/Whitsundey has significant injury presentations in relation to: sports injuries; young males involved in motor vehicle accidents; bicycle injuries in children; and household injuries.

The group has been able to assist the other working groups with specific data requests, for example, the Alcohol and injury Working Group requested data on the injury statistics that occurred at licensed premises in Mackay.

Over the last twelve months the working group has been preparing articles for an injury monograph for the Mackey/Whitsunday area planned for publishing in June 2002. The six papers currently in draft form are:

- "Sefe Communities: An ecological approach to safety promotion";
- 'Becoming Queensiend's First Safe Community:
- Considering sustainability from the outset';
- ¹Collection of NDS-IS level 2 injury Surveillence Data in Regional Queensiend;
- Practices, Knowledge and Perceptions Towards Accident and Injury In the Mackay/Whitsunday community;
- Petterns and Causes of Injuries During Organized Sporting Activities in the Mackey/Whitsunday Region 1958/99;
- Non-Fatel Injury Presentations to the Mackey Base Hospital Emergency Department 1998/99'



Since 2001 the Tom and Dorothy Cook Grant, JCU, specifically supporting research in the Mackey area has been promoted by highlighting the injury database evaluable for research in partnership with the MWSCP. The grant is evaluable at the time of this report.

'Health indicators for Queensiand: Northern Zone 2001' Queensiand Health, report has been released. The data complied will be used by the Collaborative Research Working Group and details the health differences between the Mackay area in comparison to the Northern Health Zone and to Queensiand.

Child Safety Working Group

An inter-sectorel group made up of representatives from Whitsunday Community Heath Centre, Education Queensiend, Queensiend Police Service, Queensiend Transport, Whitsunday Neighbourhood Centre (Department of Family, Youth and Community Care), Tropical Public Health Unit and the Whitsunday Shire Council. This working group is currently based in Whitsunday and is addressing bicycling injuries. Initiatives include – integration of Queensiend Transport's Bike Ed Program into local schools; share the road campaign; development, implementation and evaluation of Operation BikeSafe; liaison with local Government to discuss supportive infrastructure/environments for safe bike riding and provision of seeding funding for local schools to Implement KidPower.

Queensland Transport Bike Ed Program

The Queensiend Transport Bike Ed Program is a comprehensive practical bicycle education program designed to give children aged 8 to 13 years (grades 4-5) the skills, practice and knowledge they need to survive on the roads. In this twelve month period, the Proserpine and Cannonvele State Primary Schools have both comprehensively implemented Bike Education to Grade Four students. This is expected to be an ongoing activity in the Grade Four curriculum in both schools.

Operation BikeSafe

Operation BikeSafe is a proactive program to promote safe bike riding behaviour to 9-13 year olds on the roads of the Whitsunday region. This project uses positive reinforcement rather than reactive enforcement as its strategy, utilising police, schools and the media. 2001 was the second time operation BikeSafe had occurred in the Whitsunday region. Police nominated children demonstrating safe bike riding. All students nominated were placed in a draw to win bicycles donated by two service clubs in the region, and these prizes were drawn prior to Christmas.

Share the Road

Locelly produced Share the Road Resources were distributed to Driving Schools in the Whitsunday Region for dissemination to Learner Drivers. The resource outlines strategies for motorists, cyclists and pedestrians in safe use of the road.

KidPower

In 2001 the KidPower resource was implemented in 4 of the 6 local Whitsunday primary schools - Cannonvale, Hamilton Island, Proserpine and Whitsunday Christian Community Schools. KidPower is an innovative injury prevention resource aimed at significantly reducing the number of school based injuries in young people aged 10-14 years. KidPower uses a holistic approach based on the health promoting schools process.

An injury committee is established that includes students and other members of the school community as a means of identifying potentially dangerous areas and behaviours within the school, and developing strategies to prevent injuries occurring. Schools involved reported that Kidpower had provided practical guidance for establishing sustainable action to address injury.

Alcohol and Injury Working Group

An inter-sectorial group made up of representatives from Mackey Health Service District, Liquor Licensing Division, Queensiand Transport, Queensiand Police Service, Whitsunday Shire Council and Tropical Public Health Unit. This working group is based in Mackey and is addressing injuries involving Mackey and the Whitsundays.



Safe Party Kit

The safe party kit [based on a concept developed and utilised effectively by a local Government authority in Victoria] was promoted for the second year leading up to the fastive season [November to January]. The safe party kit, "Steps to a Smarter Party", provides tips for holding successful, enjoyable and safe parties specifically addressing antisocial behaviour, road safety and alcohol consumption issues. Party convenors were given the opportunity to register their party with the Police Service.

This was the second year the safe party kit had been promoted and was hugely successful. 44 parties were registered with the Police Service between the period of November 2001 to February 2002. The reasons for success is seen to be due to an incident widely publicised in the local media of an unsafe party in November 2001, from which there was much community concern and an effective response from the Police Service in promoting this resource. Parties are continuing in smaller numbers to be registered with the Police post the festive season. The Police are continuing with promoting the project throughout the year rather than just the festive season.

Drink Rites

3 Drink rites were conducted in licensed premises of the Mackey/Whitsunday region by Queensiend Police Service, Queensiend Transport and Queensiend Health staff to promote the responsible drinking of elcohol. One of the Drink Rites was a "special" Community Safety Week event involving 3 Mackey City Councillors and 3 executive Council staff.

Drawing the Line on Standard Drinks

Alcohol is a major contributor to road accidents, and anti-social behaviour. The Standard Drink measurement tool provides a mechanism for drinkers to monitor their consumption of alcohol. The Queensiand Transport/Queensiand Police Service recommendation is that men and women can monitor their alcohol consumption to stay below 0.05 Blood Alcohol Consumption. Of the elcohol bevarages available, it is wine which is served in glasses of varying sizes, which generally hold in excess of the 100ml standard serve.

The Drawing the Line on Standard Drinks pilot project at Sorbeilo's restaurant was launched in November 2001. The pilot was conducted during the Christmas/New Year period, and almed to encourage local diners to learn about standard drink measures, and so monitor their elcohol consumption in order to stay below the 0.05 Blood Alcohol Consumption level.

Specifically the project aimed to promote the safer consumption of wine. As part of the project, Sorbelio's staff and management were trained about standard drinks and the responsible service of alcohol. Selected glasses at the restaurant had a line etched at 100ml and standard drink information cards were produced for the restaurant's tables.

Evaluation of the project revealed that overall the majority of customers interviewed were surprised by the size of a standard drink. Although customers interviewed did not have a good understanding of standard drink measures, they did have a good understanding of elcohol's effect on driving and many stated they would choose not to drink any elcohol if they were the designated driver. Sorbelio's staff enjoyed their involvement in the project, and were perceived by their customers as being a responsible licensed restaurant for participating in the project.

Negotiations are currently under way to trial this project at Hog's Breath Cafe (a franchised restaurant). It is hoped that if the initial trial with the restaurant is successful then the project will be adapted into their other restaurants throughout Australia.



Whitsunday Safe Schoolies Week 2001

Schooles Week in the Whitsundays enhanced its reputation for being a sefe schooles week destination in 2001. A number of strategies were developed to maximise the fun and minimise the harm for young people celebrating the end of year twelve.

During schooles week a Chill Out 'safe place' site operated into the early hours of each morning. Schooles registered at the Chill Out site. Upon registration, schooles received a wallet sized information card containing emergency numbers and a personal photo Whitsundey Schooles ID Card. The ID card provided access to all of the plenned schooles-only events. All events were drug and alcohol free.

The new Airlie Beach Lagoon was made available to schoolles, with errangements made for two lifeguards to be on duty all night as well as the lagoon lights for the whole week.

2001 was the biggest schooles week ever in the Whitsundey with around 1,500 young people celebrating. There were no arrests and no mejor incidents all week.

Choices

The Choices project won a Silver Commissioner's Lentern award from Queensiend Police Service. The project specifically targets Year 12 students who are embarking on schoolies week activities and highlights the need to be safe while still having a good time. Choices revolves around a 45 minute production acted out by members of the Conservatorium of Music, Central Queensiend University highlighting the risks associated with schoolies week such as drink-driving, excessive alcohol consumption, unsafe sex, first aid, and breaking the law.

The Choices project is affiliated with the Alcohol and injury working Party but has been running within the Mackay district high schools for the past three years.

Road Safety Working Group

An inter-sectorel group made up of representatives from Gueensland Transport, Gueensland Police Service, Gueensland Health, Mackay City Council, Education Gueensland; Industry/community member and Department of Main Roads. This working group has identified the following areas for strategic action - driver fatigue, data collaboration and coordination, driver education, train crossings, target groups [especially young males], cyclists, elcohol, footpaths/bicycle paths and drug driving.

The Road Safety Working Group has assisted in the prioritisation of local road safety issues by reviewing local Hospital and Queensiand Transport WebCrash 2 data. These have contributed to the design of the 2002 - 2003 Road Safety Action Plan for the Queensiand Transport Central Region and in turn the State Road Safety Action Plan.

The purpose of this group (currently being discussed) is that of a reference group on road safety with smaller sub action groups forming including the existing Road Awareness Group and Bicycle Education Working Group.

Road Awareness Group

The Road Awareness Group formed in January 2002 and involves Central Queensiend University, Queensiend Transport, Mein Roads, Local Authorities, Royal Automotive Club of Queensiend, local industry and the Queensiend Police Service to address the Issue of fatigue on the Bruce Highway between Mariborough and Sarina. A number of actions to address this issue are currently being investigated.

Bicycle Education Working Group

The Bicycle Education Working Group includes representation from Gueensiand Transport, Gueensiand Police Service [Mackey Police Citizen Youth Club], Education Gueensiand and Gueensiand Health. The goal of the group is to establish within twelve months a sustainable means of providing a 10 hour Bike Ed program (six hours at the Mackay Police Citizen Youth Club and a four hour in class' component) to 30 percent of Mackay children in Year 4. To achieve this, the group has successfully applied for \$13,000 funding from the State Cycle Unit of Gueensiand Transport, to employ a Project Worker to facilitate this project, which will now commance in June 2002.



Other Activities of the Mackey/Whitsunday Safe Communities Project

Andergrove Neighbourhood Watch Injury Project

The Department of Emergency Service (DES) and Gueensiand Police Service are working collaboratively on a plot project in three communities across the state to broaden the focus of the existing Neighbourhood Watch crime prevention program, to incorporate the community safety initiatives of DES. Andergrove is one of the three plot sites across the state. The project will be conducted over a three month period, from March to May 2002.

Representatives from Queensiend Ambulance Service, Queensiend Fire and Rescue Service, Counter Disaster and Rescue Service and the Queensiend Police Service will work closely with the Andergrove Neighbourhood Wetch. The sefety issues identified by their community will be addressed as well as providing details of how to access free services such as basic first aid, cardio-pulmonary resuscitation training, home fire safety audit and home security information. A survey to determine the current level of safety awareness has been distributed to rendom residents in the Andergrove community, and these responses will assist DES and Police to review the current level of safety in their community.

Andergrove was chosen as a one of the pilot locations to maximise the community safety focus created by the MWSCR

Community Safety Week 2001

3-7 September was the inaugural Community Safety Week (instigated by the MWSCP, Mackay City Council and Mackay Crime Prevention Partnership). Community Safety Week is an initiative of the Victorian Safe Communities. Network. Mackay's participation was one of two areas involved in the event outside of Victoria. The week of activities began with a 'Quest for Community Safety' Forum attended by approximately 10D people including community and agency representatives. Community safety awareness was heightened during the week by comprehensive information displays in key locations. Information available ranged from crime prevention and security issues through to fails prevention and cyclone and storm preparedness. Representatives of Domestic Violence Resource Service, Sports Medicine and Queensiand Ambulance Service (who offered free child restraint safety checks) manned these displays.

Other activities during the week included free pool fence safety inspections by Mackay City Council a Drink Rite event conducted by Queensland Health, Queensland Police Service and Queensland Transport and the launches of Operation Stop Theft and GP Fells Prevention Resources.

Feedback from the services involved in community safety week revealed that they appreciated the opportunity to promote their resources and services to the community.

Both Mackey and Whitsunday are planning Community Safety Week events in 2002.

Distribution of CPR Wall Chart/Poster to new pool owners

Both Mackey and Whitsundey Councils continued providing a Cardio-Pulmonary Resuscitation (CPR) Wall Chart/Poster (provided by Queensiand Health) with an accompanying letter from the MWSCP to all new pool owners. The letter congretulates the new pool owner on their acquisition, identifies ways to keep pools safe and provides local contacts for persons to access in regards to resuscitation training [as a chart is a guide only and not a substitute for essential training in resuscitation].



Proposed Second Pacific Rim Safe Communities Conference

As a result of numerous funding applications submitted to seek seeding funding to establish a conference secretariat, some funding was secured from Department of Emergency Services, Gueensiand Health, and Mackay City Council, with Gueensiand Transport also offering support for conference requirements. A funding application with the Commonwealth Governments stronger families and communities strategy is still pending. Despite accessing some funding, short time frames and the lack of an overall auspice/host organisation precluded proceeding ahead with the conference this year. As there is already an Australian National Injury Prevention Conference and a New Zealand Injury Prevention Conference in 2003, it is hoped to stage a conference in 2004 possibly under the auspices of the Australian Injury Prevention Network. It is hoped instead that later this year a representative from the World Health Organisation will visit Mackay/Whitsundey and a local safe community event will be staged.

Planned future working groups in 2002/2003 Sports Safety Working Group Home Safety Working Group

Child Safety Working Group in Mackay

COMMUNICATIONS PLAN

Each member of the Project Management Team and working groups has assumed the responsibility of providing ongoing communication of the projects' progress through their own networks and updating their own organisations and workplaces.

Active components of the communication plan include:

- Information resource kit to provide to interested service providers, community members etc.
- Progress update 2 released in June 2001, next progress update planned for March 2002.
- A media log identifying media coverage of the project each month is kept. A total of 44 positive known media 'hits' were identified regarding the MWSCP or associated program over the last 12 months.

 A series of 0 media articles written by the MWSCP were printed in the Midweek newspaper. MWSCP now features on the World Health Organisation's Collaborating Centre on Community Safety Promotion website. http://www.phs.kl.se/csp/safecom/mackay.htm

EVALUATION OF PROJECT

Evaluation is a planned process of the project. The evaluation will be undertaken on an annual basis and includes an interview and survey to members of working groups and the project management team. The Senior Safety Working Group, Child Safety Working Group and the Project Management Team have undergone a 12 month evaluation of the effectiveness and overall motivation of the team/groups. The result from each evaluation area is aimed to be feedback to the Project Management Team and Working Groups in March 2002 to provide direction for the next 12 months.

Project Management Team

Evaluation of the Project Management Team [PMT] was conducted in February 2001 to review group function after 12 months of participation. The methodology used assessed members perceptions, expectations and satisfaction in order to determine the level of effectiveness of the PMT. Overall, all PMT members feit positive about this project, and seemed to enjoy the opportunity to adopt a collaborative approach in promoting a safe community within the Mackey/Whitsunday region. Most regretted that their personal contribution to the project was limited by time, however all indicated that they were committed to the group and positive about the outcome of the project.

Some members indicated concern about the sustainability of the project, and some are planning strategies to ensure the project continues in the future. From these concerns, and the dedication expressed by members it could be suggested that the PMT should review the project in terms of sustainability strategies.

At the time of this report the PMT is undergoing its second 12 month evaluation. The results from this review will again assess the PMT's effectiveness and will be compared to the results found February 2001.



App 8: Mackay Whitsunday Safe Communities Annual Report 2001 to 2002

Senior Safety Working Group

Evaluation of the Senior Safety Working Group occurred in September/October 2001. In regards to group dynamics all respondents were positive as to how the group was going. Group morale was only hindered in the fact that the mejority of respondents feit that the group was not sufficiently prepared for meetings. Members agreed with the roles and responsibilities of the group. Specifically it was feit that the type of tasks the group became involved in should be local, should elieviate the problems faced by seniors and should be inclusive of the greatest proportion of the senior population.

Overall, people generally feit positive about being a team member. The most common feelings about being involved were rewarding; committed; enthusiastic; hopefut; happy; and new skills learnt.

From participation in the group, members felt

- an increased knowledge of the target group and their problems
- satisfaction with the achievement of the group
- an increase in their organisational skills
- an increased ability in their group skills
- an increase in capacity building skills
- a sense of being useful to the community

Some group members felt that the group had the potential to achieve a lot more than it had and that there should be more sharing of responsibilities within the group.

The majority of the group stated that they thought the group was very effective and were satisfied that the group was achieving its goals. Achievements of the group were an increased awareness in the community and in the group of the problems facing seniors, but the major achievement stated by most team members to date was the introduction and, in some instances, the integration of senior programs into the life of their community.

Child Safety Working Group

Evaluation of the Child Safety working Group occurred in September/October 2001. The majority of participants fait that the working group was effective in getting things done, and fait that their contribution to the group was valued.

The respondents agreed that the role of the group was to investigate the public safety of children with a view to reducing injury, with the majority of members emphasising bike safety. All respondents stated that they feit their responsibility was to actively participate in the group by attending meetings and carrying out allocated tasks. Nearly all stated that they feit that it was their responsibility to participate in the meetings by bringing their knowledge, opinions and views of the organisation they represented. The members also feit responsible for dividing of tasks so as to maximise the chance that the task would be completed.

All members stated that they felt the identification of child safety issues in their community was a role of the group. Several also stated that the response to issues identified should focus on being proactive rather than reactive.

In regards to the meetings, all stated that they enjoyed the dynamics of the group. Almost all members feit that the late circulation of minutes was a problem. More than half the group feit that there was too much information distributed. All members feit they were an equal member in discussions and decisions, and were overall happy with the group process.



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Overall members feit positive about being a team member. The most common feelings about being involved were committed; hopefut; rewarding; enthusiastic; excited and learning new skills.

The things the group felt they had gained from participating in the group were:

- knowledge about the extent of child cycling injuries
- a sense of satisfaction about the achievements of the group
- satisfaction from the response of children to the program
- creation of contacts with people from the community and other organisations within the community
 appreciated involvement with health promotion rather than just education

Members tended to agree that although they shared ideas with others outside the group, they did not do as much as they could.

The majority of the group feit that the group was effective in achieving its goals, however it was noted that momentum had decreased and there is a need to refocus the group. The group feit they had achieved: an increased awareness of bike safety within the 0-14 population; an increased community awareness of bike safety; and increased community involvement of child injury issues; cross-departmental cooperation; input into council planning; and a reduction in child cycling injury statistics.

Everal, members reported being very satisfied with their experiences as a group member and the accomplishments of the group. It was recognized that some members were more outwardly enthusiastic than others were but that everyone had a role.

Overall, group members appeared positive about their experiences and the nature of the group they had created. The majority felt the group had a role to play in future health promotion programs. While the slow pace frustrated some, they recognized that this was part and parcel of group decision making and discussion.

CONFERENCES

Attendance:

Paul Vardon (Project Facilitator) attended the NSW Safe Communities Symposium in October 2001. Paul also received a scholarship to attend a short course in injury prevention and epidemiology at Monash University Accident Research Centre July 2001.

Presentation:

Dele Henson (PMT member) presented 2 orei papers at the Warnambool National Injury Prevention Conference September 2001. The papers were titled 'Addressing Bike injuries in the Whitsundays' and 'An Ecological Approach to Injury Prevention'.

PLANNED FUTURE ACTIVITIES FOR THE MACKAY/WHITSUNDAY SAFE COMMUNITIES PROJECT

- Submit an application for accreditation as a Safe Community to the World Health Organisation [WHD]
- Possible visit from a WHD representative October/November 2002
- Postponement of Pacific Rim Safe Communities Project to 2004
- Promote MWSCP to state/national stake holders

SAFE COMMUNITIES ACCREDITATION BY THE WORLD HEALTH ORGANISATION

A decision was made to pursue accreditation for the MWSCP to coincide with the planned 2nd Pacific Rim Safe Communities Conference. As the conference has been postponed the PMT has decided to continue proceeding with accreditation and will be submitting an application to WHD in March/April 2002. Negotiations are under way to link accreditation with a visit planned by a WHD representative to Australia in October/November 2002.



APPENDIX NINE

MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS UPDATE 3 – MARCH 2002

MACKAY / WHITSUNDAY SAFE COMMUNITIES PROJECT (MWSCP) Progress Update 3 March 2002

This is the third of regular progress updates that will be released on a six monthly basis.



Background:

As a response to above average injury rates identified in the Mackay / Whitsunday region, the MWSCP was established to address this issue and help the region become

Queensland's first internationally recognised safe community.

This long-term Project is a World Health Organisation (WHO) supported approach to community injury control that aims to reduce injury in the Mackay / Whitsunday region by 30 per cent over the next 4-5 years. It will be guided by the criteria and processes of the WHO's safe communities framework which has been proven to be an effective means of reducing injury throughout the world, including Australia.

New Working Group

The Alcohol and Injury Working Group has met several times since August 2001, and consists of representation from Local Government (Whitsunday Shire Council), Queensland Transport, Queensland Police Service, the Liquor Licensing Division and Queensland Health (Alcohol Tobacco and Other Drugs Services). The Group seeks to raise awareness of alcohol and injury issues, and reduce the rate of alcoholrelated injury, in the Mackay/ Whitsundays. It aims to provide a forum for meaningful discussion and mutual support between agencies/ individuals engaged in activities, which promote the responsible service and/or consumption of alcohol.

The Alcohol and Injury Working Group is facilitating the progress of a number of projects, including taking a lead role in the coordination of Schoolies Week and Drawing the Line on Standard Drinks



Drawing the Line on Standard Drinks

The Drawing the Line on Standard Drinks pilot project at Sorbello's Restaurant, an initiative of the Alcohol and Injury Working Group, was launched in November 2001. The pilot was conducted at Sorbello's Restaurant during the Christmas/ New Year period, and aimed to encourage local diners to learn about standard drink measures, and so monitor their alcohol consumption in order to stay below the 0.05 BAC



specially marked wine glasses. As part of the project, Sorbello's staff and management were trained about standard drinks and the responsible service of alcohol. Selected glasses at the restaurant had a line etched at 100ml and standard drink information cards were produced for the restaurant's

tables.

Whitsunday Safe Schoolies Week 2001

Specifically the project aimed to

Schoolies Week in the Whitsundays enhanced its reputation for being a safe Schoolies Week destination in 2001. A number of strategies were developed to maximise the fun and minimise the harm for young people celebrating the end of year 12.

During Schoolies Week a Chill Out 'safe place' site operated into the early hours of each morning. Schoolies registered at the Chill Out site. Upon registration, schoolies received a wallet sized information card containing emergency numbers and a personal photo Whitsunday Schoolies ID Card. The ID card provided access to all of the planned schoolies-only events. All events were drug and alcohol free.

The new Airlie Beach Lagoon was made available to schoolies, with arrangements made for two lifeguards to be on duty all night and the lagoon lights to be switched on for the whole week.

2001 was the biggest Schoolies Week ever in the Whitsundays with around 1,500 young people celebrating. There were no arrests and no major incidents all week



promote the safer consumption of wine through using

'Choices' Project Wins Silver

The Choices project won a Silver Commissic award from Queensland Police Service.



The project specifically targets Year 12 stude embarking on Schoolies Week activities and

need to be safe while still having a good time. Choices revolves around a 45 minute production acted out by members of the Conservatorium of Music, Central Queensland University highlighting the risks associated with Schoolies Week such as drink-driving, excessive alcohol consumption, unsafe sex and breaking the law, and provided them with some practical first aid strategies.

The Choices project is affiliated with the Alcohol and Injury Working Group but has been running within the Mackay district high schools for the past three years.

New Members

MWSCP welcomes Department of Emergency Services (DES) as new key partners. Representatives of DES are now actively involved on the Project Management Team.

DES and Queensland Police Service are currently working collaboratively on a safe communities project which will broaden the focus of the existing Neighbourhood Watch crime prevention program, to incorporate the community safety initiatives of DES. Andergrove is one of the pilot sites. The project will be conducted over a three month period, from March to May 2002.

Representatives from Queensland Ambulance Service, Queensland Fire and Rescue Service, Counter Disaster and Rescue Service and the Queensland Police Service will work closely with the Andergrove Neighbourhood Watch to address whatever safety issues that are identified in their community, and will provide details of how to access free services such as basic first aid, CPR training, home fire safety audit and home security information. A survey to determine the current level of safety awareness has been distributed to random residents in the Andergrove community, and these responses will assist DES and Police to review the current level of safety in their community.

Andergrove was chosen as one of the pilot locations to maximise the community safety focus created by the MWSCP.

GP Falls Prevention Resources

The Mackay Division of General Practice recently launched a Falls Desktop Guide for General Practitioners together with a Falls poster and patient information kit. These were developed in collaboration with other Divisions in response to the Enhanced Primary Care Falls initiative and overwhelming evidence that falls are now responsible for more hospitalisations each year than motor vehicle accidents. The main focus of the information contained in the guide relates to identifying the major risk factors for falls and disseminating relevant information to patients in an effort to provide intervention, management and support.

WHO website

Mackay/Whitsunday Safe Communities Project now features on the World Health Organisation's websitehttp://www.phs.ki.se/csp/safecom/mackay.htm



September 3-7 was the inaugural Community Safety Week (an initiative of Mackay/Whitsunday Safe Communities Project, Mackay City Council and Mackay Crime Prevention Partnership).

The week of activities began with a 'Quest for Community Safety' Forum attended by approximately 100 people including community and agency representatives. Community safety awareness was heightened during the week by comprehensive information displays in key locations. Information available ranged from crime prevention and security issues through to falls prevention and cyclone and storm preparedness. Representatives of Domestic Violence Resource Service, Sports Medicine and Queensland Ambulance Service (who offered free child restraint safety checks) staffed these displays.

Other activities during the week included free pool fence safety inspections by Mackay City Council a Drink–Rite event conducted by Queensland Health, Queensland Police Service and Queensland Transport and the launches of Operation Stop Theft and GP Falls Prevention Resources.

Planned future Safe Communities activities include:

- Possible visit by WHO in October/November 2002
- Mackay/Whitsunday to submit an application to become an accredited WHO Safe Community, thus stating ongoing commitment to injury prevention
- Community Safety Week September 2002
- PCYC and Queensland Transport coordination for bike safety in Mackay
- The Alcohol and Injury Working Group will be focussing on issues in the Mackay central business district.

To find out more, to be involved, or to let the project management team know of existing local injury prevention and safety promotion activities please contact the project facilitator: Ms Kathryn McFarlane, Health Promotion Officer, Tropical Public Health Unit – Mackay, Queensland Health phone: 4968 3858, or email:

Kathryn_Mcfarlane@health.qld.gov.au



APPENDIX TEN DESIGNATION APPLICATION 2002

Application to the World Health Organisation for accreditation as a

Safe Community









Information on Mackay / Whitsunday Safe Communities Project

Initiated in 1999 by the Tropical Public Health Unit Network, Gueensland Health. Endorsed by Mackey City Council In November 1999 and Whitsunday Shire Council in February 2000. The Mackey / Whitsunday Safe Communities Project includes the region of Mackey City Council and Whitsunday Shire Council.



Overview of Region

Profile

This tropical sub-reinforest region is stuated approximately 1000 kilometres north of Brisbane (capital of Queensiand) and approximately 800 kilometres south of Cairns. The region supports diverse industry including tourism, sugar cane and other crops, grazing, and coal mining. This region is Australia's largest producer of sugar. As this region includes more than 70 islands and an extensive section of the Great Barrier Reef, the region is a popular tourist destination.



		pulation: 108,805 (estimated resident population 30 June 2000)			
e Distribution:					
Age	District (numbers, %)	Queensland (%)			
0-14 years	24,954 (22.9%)	21.15			
15-34 years	32,132 (29.5%)	29.5%			
35-49 years	25,695 (23.6%)	22.3%			
BD-B4 vears	10,050 (14.8%)	15.6%			
SO-O4 years	71576562772073333337				

Source: ABS cat.3217.3, Health Information Centre, August 2001

Ethnic Diversity

Within the Mackey Health Service District 3.1 per cent of the population identify as Indigenous persons (whole of Queensiand 2.9 per cent). From the 1996 Census it is predicted that this amount is under represented as a significant proportion of the Mackey population identify as South Sea Islander which was not an indigenous category on the census. The Mackey area has the largest population of South Sea Islanders outside of the Pacific Islands. People form a Culturally and Linguistically Diverse Background make up 3.0 per cent of the population (whole of Queensland 5.3 per cent).



Injury Profile

Australia

In Australia in 1999, injury was responsible for 0 per cent of all deaths, 7 per cent of all hospital separations / admissions and approximately 2 million Emergency Department presentations. The estimated direct cost to the health care system is \$2.0 billion per year with a total cost of \$13 billion per year (including indirect cost). Injury is one of six national health priority areas, the others being, Cardiovascular Health, Cancer Control, Mental Health, Diabetes and Asthma.

Queensland

Gueensiand's death rate for injuries from transport related accidents, fails, homicide and accidental drowning are higher than the national average. Justifiably, injury is an identified health priority area for Gueensiand.



App. 10: Designation Application

Mackay / Whitsunday Region

In 1998 the Mackey Division of General Practice conducted a community needs analysis which identified that hospital separation / admission rates for injury and poisoning in 1995 / 1995 were high in the Mackey region.

Subsequent review of Age Standardised Injury Separation Rates by the Tropical Public Health Unit Network of Gueensland Health confirmed that injury separations were more than double those observed for other Gueenslanders.



As Figure 1 shows, the Mackey Health Service District has a similar injury rate to more remote areas of Queensiand and not other coastal urban areas (eg. Townsville, Rockhampton) as might be expected.

Breakdown of Injury in the Mackay / Whitsunday Region

Local data has empowered the project to identify strategic issues for intervention and provided some insight into the underlying situational and environmental factors that predispose to injury. Strategic issues identified include; fails - especially in children and older persons, pushbike injuries, injuries in young males, injuries in older females, injuries in the home, transport related injuries, sport injuries and workplace injuries.

Young males in 1999 are especially at risk of presenting with injury. 22,346 (68 per cent) injury presentations were reported in males compared with 10,441 (32 per cent) in females. Young males in the 10 to 29 year age group accounted for 34 per cent of all injury presentations. This is double the rate in comparison to the rest of Gueensland.

In 1999, 9408 injury presentations were reported in children under 15 years of age [29 per cent of all injury presentations], 35 per cent of these injuries occurred in the home. For children under 5 years of age, 83 per cent of injuries occur in the home.

There were 1480 reports of injury for patients older than 60 years (5 per cent of all injury presentations), 45 per cent of injuries resulting from fails, with 62 per cent of fails occurring at home.

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Community Consultations

Community consultations were conducted by a James Cook University PhD student using a phone survey focussing on practices, knowledge and perceptions towards accident and injury in the Mackey / Whitsunday community.

Objective:

To essess household injury prevention practices, knowledge and perception of injury risk factors and safety in the Mackey / Whitsunday community as a basis for the implementation of a Safe Community project.

Methods:

A standardised telephone survey was developed by James Cook University and administered to a random sample of 1510 Mackey / Whitsundey phone numbers during July / August 2000.

Results:

A total of 451 completed questionneires were obtained resulting in a second-stage response rate of 47.5 per cent.

The majority (54.7 per cent) of study subjects compiled with three or more household safety practices. The street [29.5 per cent], the motor vehicle (47.9 per cent) and the 15 \cdot 29 years age group (71.5 per cent) were perceived as the most likely locations and the most likely age group for injury in the region. The majority of participants (87.7 per cent) agreed that injuries resulting in people going to hospital are common, and 97.4 per cent agreed that injuries can be prevented. Household safety practices were independent of the perception of the home as the most likely location of injury (p=0.39), home structures and furnishings as the most likely cause of injury (p=0.42), and injury as the most likely cause of people going to hospital in Mackay (p=0.30).

Conclusions:

Household safety practices were independent of subjects' knowledge of injury risk factors and perception of safety. Consequently, any successful injury prevention strategy cannot be restricted to increasing the knowledge of injury risk, but has rather to focus on the development of injury prevention skills while controlling at the same time the cognitive, affective and environmental forces that influence injury prevention behaviour. These findings, in the context of the relatively high injury mortality and morbidity rates in the region, indicate that the Mackay / Whitsunday community will benefit from a specifically tellored concerted community based injury prevention project.





1997	 Injury Data began collection at Hospital Emergency Departments within the Mackay Health Service District.
1998	 Mackay Division of General Practice report was released highlighting injury as a significant health issue in Mackay.
1999	 Visit by Leif Svanstrom from the World Health Organisation suggesting "Can Mackay Become a Safe Community?" to local key stakeholders. Visit from representatives of other Australian accredited Safe Communities sharing their experiences of instigating and working to a Safe Communities framework. Mackay City Council endorsed the Safe Communities Project. Project Management Team formed involving (Mackay City Council, Whitsunday Shire Council, Queensiand Transport, Queensiand Police Service and Queensiand Health). Mackay injury Research Collaboration Working Group established.
2000	 Whitsunday Shire Council endorsed Safe Communities Project. Launch of Mackay / Whitsunday Safe Communities. Working Groups established including Senior Safety Working Group in Mackay, Child Safety Working Group in Whitsunday, and the Road Safety Working Group. Injury data collection commenced at the Mackay Mater Medical After Hours Service. James Cook University community consultation on practices, knowledge and perceptions on Injury was conducted.
2001	 Alcohol and Injury Working Group established.
2002	 Department of Emergency Services Involved as new key stakeholders and represented on the Project Management Team.

World Health Organisation Indicators for a Safe Community

Criteria 1: Formation of a cross sectoral group that is responsible for injury prevention.

The Mackey / Whitsunday Safe Communities Project was established to address above average injury rates identified in the Mackey / Whitsunday area. An intersectorial Project Management Team has been established with local key stakeholders in injury prevention represented. The project involves a number of state and local government departments including Mackey City Council, Whitsunday Shire Council, Queensiand Police Service, Queensiand Transport, Department of Emergency Services and Queensiand Health working in pertnership with the local community to reduce injury and promote safety.

Other organisations that are represented on working groups include James Gook University, Gueensiand Injury Surveillance Unit, Liquor Licensing Division of Gueensiand, Department of Main Roads, Whitsunday Neighbourhood Centre, Education Gueensiand, Mackay Division of General Practice, plus community representatives.

Within Gueensiand Health areas represented and involved are: Tropical Public Health Unit Network and Mackay Health Services District including the Emergency Department of Mackay Base Hospital, and the following Community Health Services: Aged Care and Disability Unit, Child, Youth and Family Health Service, and Alcohol Tobacco and Other Drugs Service.

Criteria 2: Involvement of the local community network.

Many representatives of local organisations are participating in the Mackay / Whitsunday Safe Communities Project through membership on the Project Management Team and/or Project Working Groups (Refer to Flowchart Page 7).

CASE STUDY

Andergrove Neighbourhood Watch Injury Project

The Department of Emergency Service and Queensiand Police Service are working collaboratively on a plot project in three communities across the state to broaden the focus of the existing Neighbourhood Watch crime prevention program, to incorporate the community safety initiatives of the Department of Emergency Services. Andergrove, a suburb of Mackay, is one of the pliot sites. The project is being conducted over a three month period, from March to May 2002.

Representatives from Bueensiand Ambulance Service, Bueensiand Fire and Rescue Service, Counter Disaster and Rescue Service and the Bueensiand Police Service are working closely with the Andergrove Neighbourhood Watch community group. The safety issues identified by Andergrove are being addressed as well as providing details of how to access free services such as basic first aid, cardio-pulmonary resuscitation training, home fire safety audit and home security information. A random household survey to determine the current level of safety evareness has been distributed to residents in the Andergrove community, and these responses will assist Department of Emergency Services and Police to review the current level of safety in the community.

Andergrove was chosen as one of the pilot locations to maximise the community safety focus created by the Mackey / Whitsundey Safe Communities Project.



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Criteria 3: The program will address all ages, surroundings, and situations. injury priorities for the region were identified through a process of community consultation and data analysis of the injuries presenting at the local hospitals within the region. The project aims to cover all ages, environments and situations. It has working groups in children's safety, road safety, alcohol safety and senior safety. Whitsunday Child Safety Working Group Goal: To reduce / control injury by promoting safety for children aged 0-14 years. Road Safety Working Group Goal: To reduce / control injury by promoting safety on the roads. Alcohol and Injury Working Group Goal: To reduce / control injury by promoting responsible alcohol consumption. Mackay Senior Safety Working Group Goal: To reduce / control injury by promoting safety for older adults aged 60 years and over. Potential Working Groups Working groups are based on priority areas of need for Mackay / Whitsunday, but are also dependent on opportunities and the existing capacity of current partners and stakeholders to work in safety promotion. The Macksy Injury Research Collaboration continually identifies areas for future action from the data collected. Future working groups will include: Sports Safety Working Group Home Safety Working Group Senior Safety Working Group in Whitsunday Child Sefety Working Group in Meckey Occupational Safety Working Group Criteria 4: The program will address the concerns of high-risk groups (such as children and the elderly), high risk environments and aim to ensure equity for vulnerable groups. Project Working Groups have been formed in response to the injury data. Injury data analysis has included the identification of high risk situations and groups. Children and older people have been identified by the project because they are over represented in the injury date and are particularly vulnerable groups in the community. Older people and children need additional assistance to protect themselves and require a focus on environmental strategies that are not reliant on behaviour change. Examples of Projects undertaken by the working Groups: Whitsunday Child Safety Working Group Queensland Transport Bike Ed Program Shere the Road (See Appendix 1) KidPower

BUSINES

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CASE STUDY 1

Operation BikeSafe

Departion BikeSafe, an Initiative of the Child Safety Working Group In Whitsunday, was conducted from July to December 2000 and 2001. Operation BikeSafe was developed to be a pro-active program to promote safe bike riding behaviour to children 9 - 13 years of age on the roads of the Whitsunday region. This project used positive reinforcement rather than reactive enforcement as its strategy, utilising police, schools and the media. During the project, local police nominated 80 local Whitsunday children for their safe bike riding on local roads. All students nominated were placed in a draw to win bicycles donated in 2000, by two service clubs in the region



[ESA-Alpha Epsilon and Procerpine Lions], and in 2001, by Gueensland Transport and Whitsunday Toyworld.

Alcohol and Injury Working Group - Safe Party Kit

- [See Appendix 2]
- Drink Rite
- Drawing the Line on Standard Drinks





CASE STUDY 2

 Whitsunday Safe Schoolies Week 2001
 In Gueensiend et the end of eech school yeer, young school leavers seek out party destinations in which to celebrate the completion of their final yeer of schooling. Schooles Week in the Whitsundays enhanced its reputation for being a safe schooles week destination in 2001. A number of strategies were developed to maximise the fun and minimise the harm for young people celebrating the end of 12 years of schooling.

During schooles week a Chill Out 'safe place' site operated into the early hours of each morning. Schooles registered at the Chill Out site and received a wallet sized information card containing emergency numbers and a personal photo Whitsunday Schooles identification (ID) card. The ID card provided access to all of



the planned schoolies-only events. All events were drug and alcohol free.

The new Legoon at Airlie Beach was made available to schoolies, with arrangements made for two lifeguards to be on duty all night as well as the legoon lights for the whole week.

2001 was the biggest schooles week ever in the Whitsundays with around 1300 young people celebrating. There were no serious injuries, no major accidents and no arrests all week.





CASE STUDY 3 • Safe Shop Program

In December 2000, a pliot safe shop program (based on a concept developed and utilised effectively by a local Government authority in Victoria) was implemented in the Mackey Central Business District / City Heart to enhance perceptions of safety perticularly for older persons. More than 60 local businesses are perticipating in this program. Perticipating retailars provide information services to shoppers, as well as offering to call emergency services if a customer is concerned about their personal safety. A bright orange 'Safe Shop' sticker identifies perticipating shops. Evaluation in July 2001, revealed that the majority of businesses involved hed a good understanding of the project and thought it was a good strategy perticularly for promoting customer relations. Thirty per cent of businesses had been utilised by customers as a 'Safe Shop'. Information on use patterns may not provide a comprehensive picture of the effectiveness of the campaign as persons using the Central Business District may feel safer knowing that 'Safe Shops' exist but never use the service. Older people particularly have commented that they feel safer and more comfortable knowing that 'Safe Shops' ere willing to give them assistance when required.

Road Safety Working Group

- Road Awareness Group
- Bicycle Education Working Group

Criteria 5: The program should have a mechanism to document the frequency and causes of injuries.

Injury Surveillance data is collected at the Emergency Departments of all public hospitals in the region and the one major private health institution servicing the region. Injury data is analysed by collaboration of Gueensiand Health, Gueensiand Injury Surveillance Unit (QISU) and James Cook University (JCU). This information is provided to the Project Management Team and working groups.

Staff of the Emergency Departments of the Meckey Region, concerned at the apparent high injury rates established the Mackey injury Surveillance Network (MISN), in collaboration with the GISU, in September 1997. All public Emergency Departments in the region collect injury surveillance data from all patients who present with an injury. The Mackey Mater Medical After-hours Service was added to the Network in September 2000. MISN forms a regional semple for the statewide injury surveillance system maintained by GISU.

The Mackey injury Research Colleboration was established as part of the Mackey / Whitsunday Safe Communities Project in 1999. Pertners include; the Mackey Health Service District, QISU, JCU School of Public Health and Tropical Medicine and the Tropical Public Health Unit Network. The collaboration aims to collect and interpret high quality Level 2 National Data Set - injury Surveillance [NDS-I5] data from all public hospitals in the Mackay Region.

The Level 2 NDS-IS data is being used to study the impact of injury on a regional Gueensiand community, identify risk factors that predispose to injury, elucidate the chain of events cuiminating in an injury and highlight strategic areas for injury prevention programs.

All patients who present with an injury to an Emergency Department in the Mackay region are asked to complete a questionnaire to describe how their injury occurred. At the Mackay Base Hospital Emergency Department the IS data is coded directly into the Emergency Department Information System (EDIS), a computer based patients tracking and quality assurance system. Data is collected manually at all other hospitals in the region (Clermont, Dysart, Mater, Moranbah, Proserpine, Sarina) and forwarded to the GISU for coding.



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page 1



Criteria 6: Program must be a long-term approach, not one of brief duration.

Sustainability is a foundation principle of the Mackay / Whitsunday Safe Communities Project and was incorporated into the framework from the outset. Apart from developing, implementing and evaluating injury prevention projects, the Mackay / Whitsunday Safe Communities Project is advocating for the Integration of Injury prevention into the core business / work practices of partner organisations, and also provides a framework for organisations to effectively address injury.

The Mackey / Whitsunday Safe Communities Project seeks to echieve this by being a catalyst for development of a sustained, systematic, inter-sectoral, community based safety promotion network utilising existing community based networks, resources and expertise.

The Project Management Team recognises that to improve health outcomes in the long term it is necessary to produce sustained change in the community system. The Mackey / Whitsunday Safe Communities Project has endeevoured to consider nine levels of sustainability:

- 1. Sustain improved lifestyle outcomes (community safety)
- 2. Sustain improved injury outcomes (injury prevention)
- 3. Sustain altered perception of safety
- 4. Sustain personal change
- 5. Sustain ecological change
- 6. Sustain change within member organisations through institutionalisation
- 7. Sustain change within community networks through capacity building
- 8. Sustain societal change through advocacy and empowerment
- 9. Sustain structurel change through formalisation

A systematic ecological conceptualisation of sustainability, which aims to develop and maintain innovations at all levels of the community acological system, is the key to delivering sustainable programs.



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Criteria 7: The program evaluation should include indicators which show effects and provide information on the process as it advances.

Evaluation of projects is a core component of the project management framework adopted by the Mackay / Whitsunday Safe Communities Project. Each injury project has its own evaluation plan and indicators based on capacity building have been developed to evaluate the processes involved on an ongoing basis.

Twelve monthly evaluations of the working groups and the Project Management has been undertaken to monitor the effectiveness of team processes. The evaluation includes an interview and a survey. The Mackey Senior Safety Working Group, the Whitsunday Child Safety Working Group and the Project Management Team have undergone an initial 12 month evaluation of the effectiveness and overall motivation of the team / groups. The results from each evaluation will provide feedback and direction for the next 12 months.

CASE STUDY Project Management Team

Evaluation of the Project Management Team (PMT) was first conducted in February 2001 to review group function efter 12 months of participation. The methodology used assessed members perceptions, expectations and satisfaction in order to determine the level of effectiveness of the PMT. Overall, all PMT members feit positive about this project, and seemed to enjoy the opportunity to adopt a collaborative approach in promoting a safe community within the Mackey/Whitsundey region. Most regretted that their personal contribution to the project was limited by time, however all indicated that they were committed to the group and positive about the outcome of the project.

At the time of printing the PMT is undergoing its second 12 month evaluation. The results from this review will again assess the PMT's effectiveness and will be compared to the results found February 2001.

Criteria 8: Each community will analyse its organisations and their potential for participation in the program.

A limited community capacity audit was undertaken in the planning phase of the Mackay / Whitsunday Safe Communities Project. A deliberate effort has been made to enlist the support and resources of various community / service organisations so that the workload of injury prevention and safety promotion is spread across the community in an ongoing and sustainable way.

Regular presentations on the project are offered to key stakeholder organisations. This provides feedback and direction to the organisations particularly in their planning meetings. A community forum was held during Community Safety Week 2001 with over 100 community members attending. Presentations and forums such as these provide regular information to the general community and to representatives from organisations who may not currently be active in the project.



Criteria 9: Participation of the health care community in both the registration of injuries and the injury prevention program is essential.

The Mackey / Whitsunday public health care community is involved in the registration of injuries as well as in the Mackey / Whitsunday Safe Communities Project being represented on the Project Management Team and all Working Groups. The Tropical Public Health Unit Network, Queensiand Health has been heavily involved in the program including its initiation and provision of funding for staff and project resources.

Injury Surveillance data is collected at Emergency Departments of all public hospitals in the region and the major private health institution servicing the region. Injury data is analysed by collaboration of Queensiand Health, Queensiand Injury Surveillance Unit and James Cook University.

This information is provided to Project Management Team and working groups. Staff involved in collecting the data in the Emergency Departments are regularly updated as to what the major injury issues are in Mackay and Whitsunday and how the Safe Communities project is addressing those issues locally. A representative from the Mackay Health Service District Emergency Department is involved on the Project Management Team and the Mackay Injury Research Collaboration.

Within Queensiend Heelth services represented on the Project Management Team and / or Working Groups are: Tropical Public Heelth Unit Network and Mackey Heelth Service District including the Emergency Department, and the following Community Heelth Services: Aged Care and Disability Unit, Child, Youth and Family Heelth Service, and Alcohol Tobacco and Other Drugs Service.

Criteria 10: Be prepared to involve all levels of the community in solving the injury problem.

Where possible, all levels of the community are involved in injury prevention. There are many organisations involved in the Mackey / Whitsundey Safe Communities Project. Community involvement is encouraged in the project and the Project Management Team and Working Groups to continuelly identify and invite the participation of relevant organisations and interested community volunteers.

(Refer to Flowchart Page 7)

Community promotion through events such as Community Safety Week and media updates are conducted promoting both safety strategies and the Mackay / Whitsunday Safe Communities Project Itself.



SAFETY IS EVERYONE'S BUSINESS

CASE STUDY

Community Safety Week 2001

3 - 7 September 2001 was the insugural Community Safety Week (instigated by the Mackay / Whitsunday Safe Communities Project, Mackay City Council and Mackay Crime Prevention Pertnership). Community Safety Week is an initiative of the Victorian State Government. Mackay was one of two areas involved in the event outside the State of Victoria.

The week of activities began with a 'Guest for Community Safety' Forum attended by approximately 100 people including community and agency representatives. Community safety awareness was heightened during the week by comprehensive information displays in key locations.

information evallable ranged from crime prevention and security issues through to fails prevention and cyclone and storm preparedness. Representatives of Domestic Violence Resource Service, Sports Medicine and Gueensland Ambuience Service (who offered free child restraint safety checks) staffed these displays.

Other activities during the week included free pool fence safety inspections by Mackay City Council, a Drink Rite event conducted by Queensiand Health, Queensiand Police Service and Queensiand Transport and the launches of Operation Stop Theft and General Practitioner Falls Prevention Resources.

Feedback from the services involved in community safety week revealed that they appreciated the opportunity to promote their resources and services to the community.

Both Meckey and Whitsunday are planning Community Safety Week events in 2002.

Criteria 11: Disseminate information on the experience both nationally and internationally.

Every opportunity is taken to disseminate information on the Project and the concept of Safe Communities. The Mackay / Whitsunday Safe Communities Project is a member of the Australian Injury Prevention Network and the Victorian Safe Communities Network. Or Dale Hanson (Project Management Team member) is on the executive for the Australian Injury Prevention Network as the State representative.

The experience of the Mackay / Whitsundey Safe Communities Project as a developing Safe Community has been shared at a national level through presentations at the National Injury Prevention Conferences in 2000 and 2001, and at an international level at the '11th International Conference of Safe Communities, Rainy River, Canada' and the '6th World Conference on Injury Prevention and Control, Montreal, Canada' in 2002.

The Mackey Injury Research Collaboration has drafted six monograph papers on Mackey / Whitsunday Safe Communities Project. The papers are planned for publication mid 2002.

- 'Safe Communities: An ecological approach to safety promotion';
- · 'Becoming Queensiend's First Safe Community: Considering sustainability from the outset';
- 'Collection of NDS-IS level 2 Injury Surveillance Data in Regional Queensiand';
- 'Practices, Knowledge and Perceptions Towards Accident and Injury in the Mackay / Whitsunday community';
- 'Patterns and Causes of Injuries During Organised Sporting Activities in the Mackay / Whitsunday Region 1998 / 1999';
- 'Non-Fatal Injury Presentations to the Mackay Base Hospital Emergency Department 1998 / 1999'

The Mackey / Whitsundey Safe Community Project is planning to co-host the 2nd Pacific Rim Safe Communities Conference in collaboration with the Australian Injury Prevention Network's National Injury Conference in 2004. Negotiations are presently under way.





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MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS UPDATE 4 – JUNE 2003

MACKAY / WHITSUNDAY SAFE COMMUNITIES PROJECT [MWSCP] Progress Update 4 June 2003

This is the fourth of regular progress updates that will be released on a six monthly basis.

Background:

As a response to above average injury rates identified in the Mackay/Whitsunday region, the MWSCP was established to address this issue and help the region become Queensland's first internationally recognised safe community.

This long-term Project is a World Health Organisation (WHO) supported approach to community injury control that aims to reduce injury in the Mackay/Whitsunday region by 30% over the next 4-5 years. It will be guided by the criteria and processes of the WHO's safe communities framework which has been proven to be an effective means of reducing injury throughout the world, including Australia.

PMT Planning Day

The Mackay/Whitsunday Safe Communities Project was launched in February, 2000 and since that time has developed and expanded to incorporate new stakeholders and working groups.



The object of the Planning Day was for the Project Management Team (PMT) to identify what the project had achieved since Feb. 2000, and what were the priorities for the future. The team members intensely discussed the

Strengths, Weaknesses, Opportunities and Threats in relation to the Project, Project Management Team and Working Groups. Priority areas/threats that the PMT need to focus on are:-Re-engage/motivate working groups; Focus on priorities; Organisational support; Reporting; Grants; Making a difference to injury; WHO accreditation; Wise resource management; Replication; Not moving forward; Political interests; Loss of government support; Evaluation; Financial contribution.

The PMT is extremely happy with what was achieved at the Planning Day and is enthusiastic about the future direction of the Mackay/Whitsunday Safe Communities Project.

New Member Profile:

Kelly Hart has worked as an Environmental Health Officer with the Mackay City Council for over five years and has recently joined the Mackay/Whitsunday Safe Communities Project Management Team as the Project Officer for the Child Injury Prevention Project. Kelly has enjoyed changing her focus from enforcement activities, which can often be perceived as negative, to the positive activities involved with health promotion. However this in itself creates a challenge as she can no longer simply tell people to 'just do it' but must encourage and support others in choosing the best option for themselves. Kelly has enjoyed living in the Mackay area for the last six years and when not working spends as much time as she can exploring its natural beauty. We warmly welcome Kelly to the Project Team.

National Award puts Dale in the Spotlight:

Dr Dale Hanson, founding member of the Project Management

Team, was awarded the '2002 Australian Injury Prevention Network Award for meritorious practice in injury prevention at

Nenton as the initial provides that at the recent National Injury Conference April N II I S U 2003. In Perth one award is given to a researcher and one to a practitioner. This award recognised Dale's hard work and ongoing commitment to not only the Mackay/Whitsunday Safe Communities Project, but also his ongoing contribution to safety promotion Nationally and



This award really highlights how fortunate we are in having Dale's expertise and creative energy so passionately committed to the MWSCP.

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Research Fellowship for Dr Dale Hanson: In April, Dr Dale Hanson was

appointed as the Tom and Dorothy Cook Research Fellow in Public

vet to meet our

International

contribution however

were impressed that

the conference

planned in September

Health at James Cook University. This Mackay based research fellowship will enable Dr Hanson to undertake full time research into the causation of injury in Mackay Whitsunday community and the effectiveness of the Mackay Whitsunday Safe Communities project in addressing this public health issue.

Moa Sundstrom's Visit

Moa Sundstrom, Coordinator of the World Health Organisation (WHO) Collaborating Centre on Safety Promotion, visited Mackay /Whitsunday November 2002. The Mackay/Whitsunday Safe Community applied for designation by the WHO as a Safe Community and Ms Sundstrom spent 2 days inspecting projects from each of the working groups and assessing our readiness to commit to be a Safe Community. The visit was very exciting for all involved, and the Project Management Team would especially like to thank all members of the project who assisted in reports, meetings, promotion of the project and everything else that made the visit very welcoming to Moa while also show casing our many achievements. Feedback from Moa, stated that she had an enjoyable time in Mackay and Whitsunday and she reflected that we had made many achievements on our way to setting up an infrastructure to become a Safe Community. The WHO felt that we were



significant international contribution.

Child Injury Prevention Project 0-4:

Project Officer Kelly Hart has recently attended a 5 day orientation program in Brisbane which included one and



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a half days of meeting with members of the Reference Group for the Project and one and a half days attending a short course on Injury Prevention and Control.

A project Workshop was conducted on June 24th 2003 at North Mackay Library.

The workshop included presentations from the following; • Dr Dale Hanson and Dr Rob Pitt - epidemiology of the local chid injury data, and

 Associate Professor Rod McClure - effective injury prevention.
 Paul Harris from Qld Health conducted an audit on the Community capacity of the Mackay/Whitsunday stakeholders involved in the Project to establish a baseline for evaluation.

Road Accident Action Group - Fatigue Sucks Initiative The Road Accident Action Group focus on initiatives and countermeasures in reducing road trauma where fatigue has been identified as a major contributing factor of accidents on the Bruce Highway between North Rockhampton and Proserpine in Central Queensland.

Fatigue Sucks initiative was identified in November 2002 as a novel, cost effective, yet simple way to relay to motorist fatigue messages.

Seniors Safety Working Group:

The activities of the Seniors Safety Working Group continue however there is shortly to be a big resurrection of the Just Walk It Program. With the opening of the Botanic Gardens and the construction of the River Boardwalk it has given some renewed enthusiasm and reason for introducing the program all over again. It is anticipated that we will be having a joint walk with Moranbah and Dysart at the beginning of spring at The Botanic Garden to promote the Program - "Step into Spring"

Alcohol and Injury Working Group

The Whitsunday Alcohol and Injury Working Group first met in January 2003, and identified a number of local issues which could be addressed. Representatives from Queensland Police Service, the Division of Liquor Licensing, Whitsunday Shire Council and



Queensland Health's Alcohol, Tobacco and Other Drugs Service have contributed to the Group. To date the Group has completed an "activity audit" of current and possible alcohol-related interventions, and is planning to contribute to Proserpine State High School's *Choices 2003* presentation, and that school's Health Promoting Schools Drug and Alcohol Committee.

Mackay and District Bike Ed. Trial

A Bike Ed. Trial is currently occurring in Mackay combining the Queensland Transport Bike Ed. (30 hour) course with the Police Citizens Youth Club Bike Ed. (1.5 hour) course to see if a 10 hour course can develop responsible behaviours, attitudes and decision making skills of children that will reduce bicycle related injury due to inappropriate use. Year 4 students are the identified target group in response to the higher rates of emergency department presentations for bicycle related injury in Mackay.

Children who have permission to participate will receive an in-class four hour preliminary Bike Ed. instruction. These children will then attend a six (6) hour Bike Ed course at the Mackay Police Citizens Youth Club.

North Queensland Injury Research Collaboration: The School of Public Health and Tropical Medicine of James Cook University, in collaboration with the Mackay/Whitsunday Safe



Communities Project, have recently published a monograph entitled "reducing Injuries in Mackay, North Queensland". This 116 page text is the culmination of years of research by the North Queensland Injury Research Collaboration, into causation of injury in the Mackay/Whitsunday communities and how to implement effective safety programs at a community level. The book is available in hard copy, but may also be accessed on the web at http:/www.wepi.org/rimnq this

site has already been visited by over 890 national and international colleagues seeking information about our project.

7th Australian Injury Prevention Conference, Mackay, Australia, September 15th - 17th 2004:

The Mackay Whitsunday Safe Communities Project in collaboration with the Australian Injury Prevention Network, Mackay City Council, Queensland Health and the Department of Emergency Services has undertaken to stage the 7th Australian Injury Prevention

Conference and the 2nd Pacific Rim Safe Communities Conference at the Mackay Entertainment Centre from the 15th -17th of September 2004. The conference organising committee have been working hard to lay the foundation for what promises to be an outstanding national and international conference. Entitled "Safe Living on the Edge" the conference seeks to;



pool expertise across professional and national boundaries, gain a richer understanding of what safety is and how it is achieved, discover new insights into the meaning of risk and the means of controlling risk, share interventions, research and policy that are cutting edge in safety promotion.

This is an excellent opportunity to showcase the considerable achievements of the Mackay Whitsunday Safe Communities Project and exchange expertise with national and international colleagues visiting Mackay for the conference.

Write the date in your diaries. Start thinking about what you could present about your contribution to our project.

Visit the conference web site at:

http://wwnisu.flinders.edu.au/aipn/conference2004.html



MACKAY WHITSUNDAY SAFE COMMUNITIES ANNUAL REPORT 2002 TO 2003

Mackay/Whitsunday Safe Communities Project Report March 2002 to June 2003



The Safe Community Approach

Safe Communities have:

- 1. An infrastructure based on partnership and collaborations, governed by a cross- sectional group that is responsible for safety promotion in their community;
- 2. Long-term, sustainable programs covering both genders and all ages, environments, and situations;
- 3. Programs that target high-risk groups and environments, and programs that promote safety for vulnerable groups;
- 4. Programs that document the frequency and causes of injuries;
- 5. Evaluation measures to assess their programs, processes and the effects of change;
- 6. Ongoing participation in national and international Safe Communities networks.

Stockholm May 2002

The following report outlines the progress to date of the Mackay/Whitsunday Safe Communities Project in relation to the WHO accreditation criteria.

INTRODUCTION

As a response to above average injury rates identified in the Mackay/Whitsunday region, the Mackay/Whitsunday Safe Communities Project (MWSCP) was established to address this issue and help the region become Queensland's first internationally recognised safe community. In February 2000, the MWSCP was officially launched in both Mackay and Whitsunday.

This project is a World Health Organisation (WHO) supported approach to community injury control that aims to reduce injury in the Mackay/Whitsunday region by 30 per cent. It will be guided by the criteria and processes of the WHO's safe communities framework which has been proven to be an effective means of reducing injury throughout the world, including Australia.

While a number of single issue safety promotion projects have been conducted over recent years, this project aims to coordinate a systematic sustained response to injury in the region that is inter-sectoral in scope, collaborative in strategies and ecological in perspective.

This is the third annual report for the MWSCP and will focus on the achievements over the last year from March 2002 to June 2003. This report covers 16 months to move the annual report into a financial report cycle.
OPERATING STRUCTURE

The Operating Structure of the MWSCP consists of a part-time Project Facilitator, Project Management Team (PMT) and a number of Project Working Groups. All positions provide in-kind time to the project as it is seen as core business by their respective organisations represented.

Part-time Project Facilitator

Tropical Public Health Unit Network (TPHUN), Queensland Health is providing a Health Promotion Officer to facilitate the project on a part-time basis. This commitment by Queensland Health has been gradually reduced over a five year period and the PMT will be responsible for the facilitation of the project from July 2004.

Project Management Team

Over this period the PMT has farewelled four members and welcomed seven new members to the team. The PMT is: Jan Kilbourne Manager Community Development, Mackay City Council Peter Day Manager of Environmental Health, Whitsunday Shire Council Bruce Green Community and Youth Development Officer, Whitsunday Shire Council Steve O'Connell (replacing Kevin Harrigen, January 2003) Officer in Charge, Proserpine Police Service Dr Dale Hanson Tom and Dorothy Cook Research Fellow, James Cook University (JCU) Jenny Hocken (replacing Nicole Madam, December 2002) Road Safety Advisor, Queensland Transport Ray Bohlsen (replacing Bruce Smith, March 2003) Area Director, Queensland Fire and Rescue Service Peter Warrener (replacing Jamie Cunington, May 2002) Queensland Ambulance Service Kathryn McFarlane Senior Health Promotion Officer, TPHUN of Queensland Health Rod Usher Workplace Health and Safety Officer, Mackay Bulk Sugar Terminal Colleen Gunning Prevention Officer, Alcohol Tobacco and Other Drug Services (ATODS) of Queensland Health Kelly Hart Senior Project Officer, Child Injury Prevention Project, TPHUN of Queensland Health.

The PMT consists of representatives from Mackay City Council, Whitsunday Shire Council, Queensland Transport, Queensland Police Service, James Cook University, Queensland Health, Department of Emergency Services, and the Mackay Bulk Sugar Terminal.

Over this period, the PMT have met regularly at 4-6 weekly intervals, alternating between Mackay and Proserpine.

Project Working Groups

There are several project working groups currently involved in the MWSCP including a Senior Safety Working Group in Mackay; a Child Safety Working Group in Whitsunday; a North Queensland Injury Research Working Group; a Road Safety Working Group and an Alcohol and Injury Working Group. Given that this a long-term initiative, further project working groups are planned to target other areas of significant injury.

WORKING GROUP UPDATES

Senior Safety Working Group

An inter-sectoral group made up of representatives from the Mackay City Council, Mackay Health Service District, TPHUN, Mackay Division of General Practice and local community members aged 60 years and above. This working group has utilised a multi-strategic approach to address the issue of falls prevention, as well as address perceptions of safety for older persons. This working group is currently based in Mackay. Achievements include – ongoing Healthy Homes Party Program; promotion of physical activity through integration of Just Walk It and Sitting Dance Programs; and the ongoing Safe Shop initiative.

Healthy Homes Party

Volunteer based peer education falls prevention program supported by the Aged Care and Disability Unit of Mackay Health Service District.

Just Walk It

Just Walk It continues to operate during the winter months.

Sitting Dance

The Sitting Dance project aims at increasing physical activity in older people. The program focuses on gentle exercises and participants remain seated in chairs. The popularity of this group has continued attracting a high number of participants since 2001 with approximately 60 people attending each session.

North Queensland Injury Research Working Group

This working group was initially a working party of the MWSCP. In late 2002 the group decided to broaden its scope to work collaboratively with other Safe Communities in North Queensland.

The group draws its membership from a number of strategic partners with an interest in injury research in North Queensland including: MWSCP, Townsville/Thuringowa Safe Communities Project, Mt Isa Safe Community Project, Queensland Injury Surveillance Unit, Injury Prevention and Control Australia, School of Public Health and Tropical JCU and Queensland Health.

The group has set itself the following goals:

- To set priorities for epidemiological research into the cause of injury in North Queensland and the opportunities for intervention
- Co-ordinate research into Safe Communities projects
- Provide assistance to Safe Communities with evaluation of projects

In collaboration with the MWSCP, JCU published a 116 page monograph, "Reducing Injuries in Mackay, North Queensland" in November 2002. The monograph contains chapters describing the Emergency Department (ED) Surveillance System in the Mackay region, two literature reviews regarding the rationale of community based safety promotion programs, a base line community attitude survey, and two papers regarding the epidemiology of injury in the region as reported by the ED surveillance system. Approximately 100 hard copy versions have been distributed, however the text is also available on the net at: http://www.wepi/rimnq where the site has had 1,600 visits.

Queensland Injury Surveillance Unit in conjunction JCU, MWSCP and Mt Isa Safe Community Project have published two reports regarding childhood injury in the region.

In May 2003 Dr Dale Hanson was appointed as the Tom and Dorothy Cook Research Fellow of the School of Public Health and Tropical Medicine JCU. Dr Hanson will undertake action research into the utility of the WHO Safe Communities Model as applied in Mackay. His study proposal "Social Network Analysis – the MWSCP" has been provisionally approved by the ethics committee of JCU and should begin in November 2003. This study aims to document and formation and strength of relationships developed as part of the MWSCP.

The Childhood Injury Prevention Project (CHIPP) was launched in October 2002 and is jointly funded by the Department of Emergency Services and Queensland Health. Injury Prevention and Control Australia was awarded the contract to conduct the evaluation of the project. The evaluation methodology has been approved and will include:

- A qualitative assessment conducted by "a panel of experts" of a process log maintained by the Child Injury Prevention Officers working in Mt Isa and Mackay.
- Community Capacity audit at baseline and three years
- Telephone survey of home safety practices supported by a household safety audit at baseline and three years.
- Review of Emergency Department, Hospital Separation and Death data-bases for three years prior to and three years subsequent to initiation of the project.

Publications in 2002/2003

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- 4. Barker R., Hockey R., Hanson D., Pitt R., Carter T., Miles E., Addressing Childhood Safety in Mt Isa: A Safe Communities Initiative, *Injury Bulletin*, Queensland Injury Surveillance Unit, 2003, 78, 1-6.

Child Safety Working Group

An inter-sectoral group made up of representatives from Whitsunday Health Services, Education Queensland, Queensland Police Service, Queensland Transport, Whitsunday Neighbourhood Centre (Department of Family, Youth and Community Care), TPHUN and the Whitsunday Shire Council. This working group is currently based in Whitsunday and is addressing bicycling injuries. Initiatives include – integration of Queensland Transport's Bike Ed Program into local schools; bicycle crime prevention; and liaison with local Government to discuss supportive infrastructure/environments for safe bike riding.

Queensland Transport Bike Ed Program

The Queensland Transport Bike Ed Program is a comprehensive practical bicycle education program designed to give children aged eight to 13 years the skills, practice and knowledge they need to survive on the roads. In this 12 month period, the Proserpine and Cannonvale State Primary Schools have both comprehensively implemented Bike Education to Grade four students. This is the second year this project has been implemented in both schools and is planned to be an ongoing activity in the Grade four curriculum.

Bicycle Crime Prevention

To support the promotion of children riding to school, the local Police have been involved in engraving all students bicycles for identification purposes if stolen. Police attended all schools in the Proserpine and Cannonvale areas.

Alcohol and Injury Working Group

This Working Group includes representatives of Queensland Police Service, Queensland Transport, the Division of Liquor Licensing, and Queensland Health (ATODS and TPHUN) whose role involves the promotion of the responsible service and/or consumption of alcohol. This working group exists to:

- a. promote, encourage and support the development of a local network of persons whose work involves the promotion of the responsible service and/or consumption of alcohol in order to reduce the rate of alcohol-related injury in Mackay.
- b. raise awareness of alcohol and injury issues in the wider community
- c. provide a forum for meaningful discussion and mutual support between agencies/ individuals engaged in activities which promote the responsible service and/or consumption of alcohol
- d. provide an opportunity for interaction between workers with a commitment to activities which are grounded in best practice

THE GROUP

A number of changes to the composition and working of the group marked the February 2002 to June 2003 period. Initially the Group had a Mackay <u>and</u> Whitsunday focus, but it became apparent that the alcohol-related safety issues, and responses to these issues, were not uniform across both communities. Consequently, a separate Whitsunday Group was formed.

In terms of personnel, the Mackay Group experienced a number of changes. Sgt. Jacinta Hodgetts from the Mackay Crime Prevention Unit was on leave during this period, and four different Officers filled her position on a rotating basis. Nicole Madam from Queensland Transport left the Group and Jenny Hocken has replaced Nicole. Paul Lahtinen replaced Dave Ferrar from the Division of Liquor Licensing. In May, Sgt. Richard Turner from the Traffic Branch joined the Group. Thank you to all who have contributed to the Group, especially during times of staff change-over.

DRAWING THE LINE ON STANDARD DRINKS

The evaluation report of this project was finalised. A number of outlets were approached to be involved in the replication of this project, but to date, another site has yet to be finalised.

CHOICES 2002

The show was delivered to schools in the Proserpine, Moranbah and Mackay areas, and the process and impact evaluation was extremely positive.

CHOICES 2003

Planning has been in progress since early 2003 for this year's production. It is to be presented to ten schools in the Proserpine, Moranbah and Mackay areas in late October and early November.

STEPS TO A SMARTER PARTY

Party registrations have been constant since this project was initiated. Document stands containing the resources and registration forms are now in bottleshops, and the resource has been reprinted. This will be the final reprint since the Police Drug and Alcohol Unit (Brisbane) has developed another safe party document for statewide distribution which will be utilised in a similar fashion to the Mackay resource.

DRINK RITE

Drink Rite events have been held across the Mackay and Moranbah Health Service Districts. Specifically these were held in Airlie Beach (August 2002, June 2003) Glenden (August 2002) Mackay (October 2002) and Farleigh (June 2003).

MACKAY ALCOHOL AND OTHER DRUGS COMMUNITY PARTNERSHIP

Best practice in drug education working group

With Education Queensland, a fridge magnet (postcard style) is in development. The resource is aimed at parents of pre-schoolers to remind them about the importance of role-modelling (alcohol) and the safe storage of medicines (drugs). It is anticipated the Child Injury Prevention Project Worker may be able to assist in the development of the resource.

Road Safety Working Group

An inter-sectoral group made up of representatives from Queensland Transport, Queensland Police Service, Queensland Health, Mackay City Council, Education Queensland; industry/community member and Department of Main Roads. This working group has identified the following areas for strategic action – driver fatigue, cyclists and footpaths/bicycle paths.

The purpose of this group is that of a reference group on road safety with smaller sub action groups forming including the existing Road Accident Action Group and Bicycle Ed Working Group.

Road Accident Action Group

The Road Accident Action Group formed in January 2002 and involves Central Queensland University, Queensland Police, Queensland Transport, Main Roads, Local Authorities, Royal Automotive Club of Queensland, local industry, heavy vehicle transport, and tourism. The Group focuses on initiatives and countermeasures in reducing road trauma where fatigue has been identified as a major contributing factor of accidents on the Bruce Highway between North Rockhampton and Proserpine in Central Queensland.

FATIGUE WEEK

Members of the Road Accident Action Group staffed a display one week before the Christmas holidays in the local shopping centre. The display included road safety information on fatigue and speed, children's activity pages on road safety, and maps for motorists listing all Driver Reviver sites in Queensland. Photographs of accidents were on display, with Police Officers available for the public to ask questions, and so on. During the week, the Police ran media releases in the local papers and sessions on the radio giving advice to motorists about staying safe on the roads over the holiday period.

FATIGUE SUCKS

The Fatigue Sucks initiative was identified in November 2002 as a novel, cost effective, yet simple way to relay to motorists fatigue messages. This initiative allowed group participation by way of the provision of:

- Sponsorship (\$2000)
- Maps
- Fatigue brochures

Local community involvement

5,000 bags of lollies, containing five lollies to each bag, with a fatigue message attached were required for the initiative. 25,000 lollies and 5,000 bags were purchased locally.

Endeavour Foundation, Mackay was given payment to package the lollies and staple the fatigue message to the bags. Their employees parcelled the lollies into boxes for distribution.

Implementation of Initiative

Police and Transport Inspectors spoke briefly to motorists and heavy vehicle operators on the Bruce Highway and Peak Downs Highway to discuss fatigue issues, such as the warning signs of fatigue, the requirement to stop, revive and survive - then giving the motorist the lollies, map and fatigue brochure. The Waverley Creek Driver Reviver site was also involved in the distribution on lollies, maps and brochures.

Response from Motorist / Evaluation

Feedback received from motorists was very positive. The initiative created discussion between motorists and throughout the community. Children in the vehicles especially thought the lollies were great, and gave them a holiday experience to remember.

As many of the motorists approached with this initiative were from outside this region, it is difficult to evaluate the full effect of this initiative.

This approach was adopted by RACQ in March. The Road Accident Action Group is proud to see this initiative expanded to other methods of delivery across Queensland.

Bicycle Ed Working Group

Queensland Transport Bike Ed Program

The Bike Ed course is a national initiative produced by the federal Office of Road Safety (the forerunner of the Australian Transport and Safety Bureau) Vic Roads 1996. A Bike Ed Trial commenced in Mackay in September 2002, combining the Queensland Transport Bike Ed (30 hour) course with the Police Citizens Youth Club Bike Ed (1.5 hour) course to see if a 10 hour course could develop responsible behaviours, attitudes and decision making skills of children in order to reduce bicycle related injury due to inappropriate use. Grade 4 students are the identified target group in response to the higher rates of ED presentations for bicycle related injury in Mackay (as measured by injury surveillance data collected at all ED in the Mackay Area). The Bike Ed project identified the need to empower children to be competent in riding safely and independently on the road.

Children who had permission to participate received an in-class four hour preliminary Bike Ed instruction. These children then attended a six hour Bike Ed course at the Mackay Police Citizens Youth Club conducted by the Project Coordinator.

The cost per student was \$10. It is anticipated that 1000 children will undertake the training in the first year, and that these funds will be used to reemploy the Project Coordinator to ensure sustainability.

Schools which have already participated in the project include Fitzgerald State School, North Mackay Primary State School, Andergrove State School, Dundula State School, and Bucasia State School. Terms 1, 2 and 3 of 2003 have been heavily booked, with bookings secured for 2004.

Queensland Transport provided \$15 000 to the Police Citizens Youth Club for the employment of the Project Coordinator for the duration of the trial. The Police Citizens Youth Club provided office space, and the use of a bus for the Project Coordinator to collect the children from their schools for the track component of the course.

The bitumen track at the Police Citizens Youth Club simulates on road situations, complete with traffic signals, give way signs, stop signs, roundabouts and a one-way street.

Mackay City Council provides in-kind support by way of maintenance to the track.

Main Roads provide in-kind support by way of provision of traffic signals and maintenance of the signals.

Funding of \$5000 was provided by Queensland Health to employ an assistant to assist with the thorough evaluation to determine the success of the trial of this project.

Child Injury Prevention Project

An inter-sectoral group made up of representatives from Mackay City Council, Education Queensland, Mackay Child Youth and Family Health Service, Queensland Police Service, Queensland Transport, Andergrove Neighbourhood Watch, Mackay Family Day Care Scheme, Good Beginning Home Based Family Support Program, James Cook University, Mackay Base Hospital, Mater Misericordiae Hospital, Queensland Ambulance Service, Queensland Fire Service and Queensland Health. This group is currently based in Mackay and is addressing injuries caused by falls, burns/scalds, drowning/immersions, poisoning and transport issues with a focus on children aged 0-4 years. The Human Services (CEO) Child Injury Prevention Project is a three year project jointly sponsored by the Department of Emergency Services and Queensland Health.

A consultation meeting for the Project was held in May 2002 and presented an opportunity to provide community representatives from a large cross section of Mackay's community with information regarding the proposed project and to seek support and participation in the Project. The PMT of the MWSCP and other organisational representatives agreed that it would be beneficial for the project to fit within the Safe Communities model.

A following meeting was held in June 2002 with representatives of the evaluation team who consulted with the community to develop a broad project plan for Mackay. This project plan was incorporated into the final discussion paper produced by Injury Prevention and Control Australia (IPCA). IPCA also completed the project evaluation plan.

The Project was officially launched on 25th October 2002 by Tim Mullherin (on behalf of Hon. Wendy Edmonds), and the Hon. Mike Reynolds (Minister for Emergency Services). Rob Pitt (Queensland Injury Surveillance Unit) and Cr. Julie Boyd (Mayor) also spoke at the launch. The launch was well attended (40 people) and it was acknowledged that the MWSCP provided a structure for the Child Injury Project to occur.

In April 2003 Queensland Health appointed a Project Officer to facilitate the community based Project. Following this appointment a local key stakeholder planning day was held in June 2003. Stakeholders were provided with thorough information on the extent of childhood injury in Mackay. The planning day has formed the basis for the current working group who is initially focusing on fall related injuries in the 0-4 age group.

Other Activities of the Mackay/Whitsunday Safe Communities Project

Andergrove Neighbourhood Watch Injury Project

In 2002, in partnership with the Queensland Police Service, Department of Emergency Services (DES) piloted a Community Safety Project in three Neighbourhood Watch (NHW) communities in Queensland. The aim of the project was to broaden the current crime prevention focus of the Neighbourhood Watch program by incorporating the home and community safety initiatives of DES.

The Andergrove NHW community in Mackay was chosen as one of the three pilot communities to ascertain the impact of the combined "top-down/bottomup" approach to community capacity building by positioning a small, Government sponsored project in a community currently operating under the WHO Safe Communities model.

The Andergrove NHW is a community of approximately 700 homes, and has had an established NHW program for approximately three years.

The local managers of the project in Mackay were DES representatives on the Mackay/Whitsunday PMT.

The project benefited from the community engagement processes already developed through the Safe Communities model, and the Andergrove pilot was the most successful of the three communities incorporating a range of community safety initiatives into their NHW community.

Some of the significant achievements of the three month implementation of the trial project in Andergrove were:

- "Adopt an Ambo" at the local primary school. This program provides a basic introduction to first aid and injury prevention, recognition of an emergency situation, and training in the use of the 000 number targeted at lower primary school children.
- Visits to the local pre school by 'Blazer the Bear', the Queensland Fire and Rescue Services' mascot designed to teach fire safety and awareness to young children.
- Presentation of the Fight Fire Fascination (FFF) program to staff of the local public and private primary schools. The program is based on education and personal development, targeted at child fire setters and their families, conducted by specially trained firefighters to promote awareness of fire safety. FFF was also presented to the staff/families of the local Day Care Centre.
- Kerbside numbering project. The local community identified a need to ensure their neighbourhood was kerbside numbered to assist with the accurate location of homes by emergency services vehicles. The stencils and paint were provided by the local Council, and students from the local State High School have taken on the task. The whole of the Andergrove area was kerbside numbered by the end of 2002. The local Rotary Club also assisted in this project.
- 700 cyclone preparation booklets were letterboxed. Mackay is in a cyclone and storm surge prone area, and the survey results indicated that many residents were unaware of information available to help protect themselves and their property against natural disasters.
- 9 NHW Block Coordinators are being trained in cardiopulmonary resuscitation (CPR) by the Local Ambulance Committee and a further four were trained as Peer Trainers.
- 700 CPR pamphlets and wallet size CPR charts were delivered to the Andergrove community.

The project was so successful that the Andergrove NHW community is committed to continuing to work with DES and other MWSCP partners in addressing injury prevention initiatives within their community.

Whitsunday Safe Schoolies Week 2002

Once again, Schoolies Week was a success in the Whitsundays, with well planned strategies developed to maximise the fun and minimise the harm for young people celebrating the end of year 12.

During Schoolies Week a Chill Out 'safe place' site operated into the early hours of each morning. Schoolies registered at the Chill Out site. Upon registration, schoolies received a wallet sized information card containing emergency numbers and a personal photo Whitsunday Schoolies ID Card. The ID card provided access to all of the planned schoolies-only events. All events were drug and alcohol free.

Community Safety Week 2002

20-26 October was the inaugural Community Safety Week (instigated by the MWSCP and the Mackay City Council). Community Safety Week is an initiative of the Victorian Safe Communities Network. Mackay's participation was one of two areas involved in the event outside of Victoria.

Community safety awareness was heightened during the week by various displays throughout the community. A Safe Driving forum targeting seniors in the Mackay community was conducted by RACQ and was very well attended.

7th Australian Injury Prevention/ 2nd Pacific Rim Safe Communities Conference 15-17 September 2004

The Australian Injury Prevention Network (AIPN) accepted the PMT's request to co-host the National Injury Prevention Conference with a Safe Communities conference to assist the MWSCP in achieving the hosting of a national/ international conference. Mackay City Council, Queensland Health and the Department of Emergency Services contributed seeding funding. A Conference Organising Committee was established August 2002 and involves representatives from the MWSCP (Queensland Health, JCU, Mackay City Council and the Whitsunday Shire Council), the DES, Queensland Health and the AIPN.

A conference organiser and Chair for the Scientific Committee have been appointed. The Organising Committee is progressing well with promotion of the conference material distributed at numerous injury prevention and safe communities conferences nationally and internationally.

It is planned that during the conference event the MWSCP will be designated a WHO Safe Community.

Planned future working groups in 2003/2004

Occupational Safety Working Group

COMMUNICATIONS PLAN

Each member of the PMT and working groups has assumed the responsibility of providing ongoing communication of the projects' progress through their own networks and updating their own organisations and workplaces.

Active components of the communication plan include:

- Information resource kit to provide to interested service providers, community members etc.
- Progress Update 3 released in March 2002.
- A media log is kept identifying media coverage of the project each month.

MWSCP features on the World Health Organisation's Collaborating Centre on Community Safety Promotion website and includes many files of reports and resources developed by the MWSCP. These include: MWSCP application for designation; Progress Updates 1-3; 'Steps to a Smarter Party' resource; 'Share the Road' pamphlet; 'Reducing injuries in Mackay, North Queensland' monograph.

EVALUATION OF PROJECT

Evaluation is a planned process of the project. The evaluation will be undertaken on an annual basis. The PMT underwent their second evaluation in March 2002.

In 2003, the PMT decided to measure the capacity created by the project using the Community Capacity Index. This was administered late June 2003 and is currently being compiled at the time of this report. A Social Needs Analysis will be conducted with all members of the PMT and working groups in 2003/2004.

Project Management Team

Evaluation of the PMT was conducted in March 2002 to review group function after two years of participation. The methodology used assessed members perceptions, expectations and satisfaction in order to determine the level of effectiveness of the PMT.

The majority of PMT members saw their role as keeping an eye on the big picture and keeping the project on course. The members of the team saw themselves doing this by sharing information with various groups and coordinating and directing working party activity. One member stressed that such coordination and direction should be proactive as well as reactive.

In 2002, all team members rated the setting up of working groups and gaining commitment by the working group members as one of the management teams greatest achievements. The increase in community awareness of safety issues and the coordinating role played by the management team were also mentioned. Most respondents stated that they felt the team was effective in achieving its goals. All team members reported being satisfied with the groups achievements.

Working Groups

No working groups have undergone group evaluation during this period. Most working group membership has changed over this period, and the PMT and working group representatives felt that working group evaluation should occur once membership has stabilised and is consistent for a 12 month evaluation. Also, the PMT is aware that the Social Network Analysis will evaluate the working group members planned 2003/2004.

Planning Day 2003

The PMT conducted a planning Day in May 2003. The role of this planning day was to orientate new members to the PMT, to review the progress of the MWSCP both internally and externally since it began in 2000, and to set priorities for the future. The PMT intensely discussed the strengths, weaknesses, opportunities and threats in relation to the Project, PMT and Working Groups. Priority areas/ threats that the PMT identified to focus on over the next 12 months were: to re-engage and motivate working groups; recement organisational support; work effectively with the resources we have (not spreading ourselves too thinly); address financial needs through community grants; and ensure evaluation of projects continues.

The PMT was extremely happy with what was achieved at the Planning day and is enthusiastic about the future direction of the MWSCP.

CONFERENCES

Attendance:

Kathryn McFarlane (PMT member) attended a short course in injury prevention and epidemiology at Monash University Accident Research Centre July 2002.

Presentation:

Dale Hanson (PMT member) presented at the 11th International Conference of Safe Communities, Rainy River, Canada (May 2002):

'Safe Communities: An Ecological Approach to Safety Promotion'

Dale Hanson (PMT member) presented at the 6th World Conference on Injury Prevention and Control, Montreal, Canada (May 2002):

- 'Becoming Queenslands First Safe Community: Considering sustainability from the outset'
- 'The Injury Iceberg: An Ecological Approach to Safety Promotion' (poster presentation)

Award:

Dr Dale Hanson, a founding member of the MWSCP PMT, was awarded the '2002 Australian Injury Prevention Network Award for meritorious practice in injury prevention' at the National Injury Conference held in Perth in April 2003. The AIPN recognises one researcher and one practitioner in this category. This award acknowledges Dale's hard work and ongoing commitment to not only the MWSCP, but also his contribution to safety promotion nationally and internationally.

PLANNED FUTURE ACTIVITIES FOR THE MACKAY/WHITSUNDAY SAFE COMMUNITIES PROJECT

• 7th Australian Injury Prevention/ 2nd Pacific Rim Safe Communities Conference. 15-17 September 2004.

SAFE COMMUNITIES ACCREDITATION BY THE WORLD HEALTH ORGANISATION

In 2002 the PMT decided to submit an application to the World Health Organisation (WHO) to pursue designation of the MWSCP as a recognised Safe Community. An application was compiled and submitted to the WHO Collaborating Centre on Safety Promotion in June 2002, addressing the then 12 criteria.

Moa Sundstrom, Coordinator of the WHO Collaborating Centre on Safety Promotion, visited Mackay /Whitsunday November 2002 for a site inspection of the MWSCP. Moa spent two days inspecting projects from each of the working groups and assessing our readiness to commit to be a Safe Community. At least one project was show cased from each of the working groups this included: Senior Safety - Sitting Dance and Safe Shop Program; Road Safety – Fatigue presentation, Bike Ed Project; Alcohol and Injury – Drawing the Line on Standard Drinks; Whitsunday Child Safety – Bike Paths. Moa also attended a pre school fire safety talk and the schoolies 'Chill Out' site.

Moa met with the Mayors of both the Mackay City Council and the Whitsunday Shire Council. A presentation of the history of the MWSCP was given by the PMT, and Moa was able to ask questions in relation to her inspection at this meeting with the PMT and throughout the two days.

An enjoyable dinner function was held in Moa's honour, with static displays from all projects undertaken by the MWSCP. The visit was very exciting for all involved.

Moa, stated that she had an enjoyable time in Mackay and Whitsunday and she reflected that we had made many achievements on our way to setting up an infrastructure to become a Safe Community. The WHO felt that we were yet to meet our international contribution however were impressed that the conference planned in September 2004 would be a significant international contribution.

APPENDIX THIRTEEN

MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS UPDATE 5 – DECEMBER 2003

MACKAY / WHITSUNDAY SAFE COMMUNITIES PROJECT (MWSCP) Progress Update No. 5, December 2003



This is the fifth of regular progress updates that will be released on a six monthly basis.

BACKGROUND:

As a response to above average injury rates identified in the Mackay/Whitsunday region, the MWSCP was established to address this issue and help the region become Queensland's first internationally recognised safe community.

This long-term Project is a World Health Organisation (WHO) supported approach to community injury control that aims to reduce injury in the Mackay/Whitsunday region by 30% over a 4-5 year period. It will be guided by the criteria and processes of the WHO's safe communities framework which has been proven to be an effective means of reducing injury throughout the world. Including Australia.

ROAD SAFETY REFERENCE GROUP Young Drivers Expo

RAAG initiated the Young Drivers Expo due to the overrepresentation of young drivers (17–24yrs), in accidents on Mackay District roads. The purpose of the event was to address issues as they relate to young drivers and the vehicles they drive. The organisers formed partnerships with local driving schools, community youth groups, Queensland Transport, Main Roads, Queensland Health, Queensland Police, Emergency Services, local government and RACQ.

The event was held on Saturday 15 November 2003 at



Canclands Park, Mackay and it formed part of the Mackay City Council Community Safety Week, which was conducted from 8th November to 15th November 2003.

A wide range of activities

and displays were held on the day with a large crowd of younger drivers attending and gaining valuable information on legislation, drivers licensing and modification of motor vehicles. Surveys were conducted throughout the day so that organisers could better understand the issues concerning the young drivers. Constable Matt Gerry (Mackay Traffic Branch) explained the workings of the Speed Camera.

Activities on the day included; a Booze Bus where people talked to the police, receive information on standard drinks, and consequences of drink driving information; a Speed Camera van and hand held radar with information on speeding and fines; Emergency Services, Queensland Fire and Rescue conducted a simulated rescue from a wrecked vehicle; Safety checks and noise testing on vehicles by RACQ and Queensland Transport Compliance Team; a Classic Car Club display; a Show and Shine for age group 17–24 (legal vehicles only); a Road Accident Action Group display with fatigue information; Displays from Driving Schools; and Displays by local vehicle performance businesses.

As a result of the expo there has been great interest shown in the concept and greater understanding of the issues that relate to young drivers not only by the members of the RAAG but also the young drivers themselves. The event has opened the way for better communication between local car clubs, Police and Queensland Transport Compliance Officers.



A further expo is planned for 2004, which will have greater input from young drivers and other members of car clubs within Mackay. This involvement will ensure that the

target audience will receive information that they require to assist them through their driving life.

It is hoped that initiatives such as this will reduce traffic accidents generally but in particular ones involving young drivers of our community

SAFE COMMUNITIES CONFERENCE IN HELSINKI

Project Management Team Member Jan Kilbourne was fortunate enough to be able to attend the 5th Nordic Safe Communities Conference held in Helsinki, Finland, from 26 - 29 August 2003. Jan presented a paper on the Mackay/Whitsunday Safe Communities model which discussed how effective partnerships can promote project sustainability through transfer of knowledge, skills and



practice within partner organisations, thereby enhancing the capacity for injury prevention in these organisations. The paper was well received and Jan's attendance was the perfect opportunity not only to promote the

Mackay/Whitsunday safe Communities Project, but also the 7th Australian Injury Prevention Conference and 2nd Pacific Rim Safe Communities Conference which will be held in Mackay in September, 2004.

EMERGENCY SERVICES WORKING GROUP Road Awareness & Accident Prevention Program The Old Fire & Rescue Service delivers the Road

Awareness & Accident Prevention Program to all grade 12



students in Old schools. This program involves firefighters visiting the school and performing a vehicle cut up using the jaws of life and a class session talking to students about road

accident prevention in Mackay & the Whitsunday's. Firefighters have visited 10 schools and performed RAAP to approx. 1200 students. In the five years that RAAP has been conducted, statistics show that accidents Involving drivers in the 17 to 24 year old age group have been reduced.

ALCOHOL AND INJURY WORKING GROUP 1. "Choices 2003"

Congratulations to the talented and dedicated cast of Choices 2003! Eleven students of Mackay's Central Queensland University Conservatorium of Music wrote,



directed and produced the show based on information supplied by Queensland Health (Alcohol, Tobacco and Other Drugs Service), Queensland Police

Service, Queensland Ambulance Service, Queensland Transport, and the Division of Liquor Licensing. This year marks the fifth year that drama has been

used to convey safety messages to the Year Twelve students of the Mackay/ Whitsunday and Moranbah areas. Ten schools hosted Choices and the feedback from all was positive. 2.



Whitsunday The Mackay/ Safe Communities Project Alcohol and Injury Working Group (Mackay) launched its Think Drive campaign on Friday, 5th September. The campaign was a response to an identified local drink driving issue: statistics

indicate that 484 persons were charged with drink driving in the Mackay Police Division between January and August 2003. Seventy-five per cent (366) of these drink drivers were detected within a two kilometre radius of the Mackay City Heart.

Think Drive embraced three key strategies- the promotion of Random Breath Testing (RBT) through distribution of a flyer by Mackay Police, the establishment of a Designated Driver program at the Platinum Lounge, and the engagement of media outlets to maintain the profile of the issue

RBT: The deterrence value of RBT lies in enhancing the perceived probability of being apprehended for driving while over the legal Blood Alcohol Concentration (BAC) limit and the understanding that, once apprehended, penalties are inevitable and severe. According to one research study, approximately four in five (82%) people believed that they are likely to be caught by the police if they drink and drive.

Designated Driver: Research suggests that about a fifth of males would choose to nominate a driver in the group to stay under the limit. In light of this, the Platinum Lounge Designated Driver program was developed in partnership with this licensed premises. This component of the project aimed to identify drivers who agree to not drink alcohol and drive their companions home. This designated driver is 'rewarded' for their effort by being provided with free soft drinks.

Media: The objectives of the Think Drive project's media campaign were to; reinforce the social unacceptability of drink driving; to maintain awareness of RBT and the consequences of being caught; to reinforce the risks and consequences of crashing; to increase awareness of drink driving issues; and to inform the community about alternatives to drink driving.

Evaluation of Think Drive has yet to be completed, but the results to date are promising.

3 Schoolies Week



This year's schoolies week was again a huge success. We had a 25% increase in numbers from last year, with around two thousand five hundred (2,500) Year 12 School leavers descending on Airlie Beach. We were particularly pleased with the 30-40% increase in participation rates of all major activities. This shows that our safety and activity program is becoming even more popular with schoolies. Apart from some very minor incidents, these young people were very well behaved. There were no arrests and no major incidents.

Responding to feedback from last year, additional day activities were organized. They included Laser Skirmish, Lagoon activities, The Awesome Foursome and a highly discounted trip to the Reef. All of these activities were well attended. All day trips to the islands and the reef were booked out and most schoolies enjoyed the excellent facilities of the Airlie Beach Lagoon.

Additional security employed by the Schoolies committee assisted in keeping the schoolies program safe this year. Our strategy of registering every schoolie and providing them with their own Schoolies Photo ID Card also minimized problems. Registrations showed attendance around 70 schoolies from in and around Brisbane, 10 schoolies from New South Wales, the majority from the Mackay region and many coming from Cairns, Townsville and Rockhampton.

NEW OCCUPATIONAL HEALTH AND SAFETY WORKING GROUP

Every year approximately 2,000 people attend an Emergency Department in the region after being injured at work. This accounts for 1/4 of all injuries seen in people over 14 years of age. In November, the new Occupational Health and Safety Working Group was established under the umbrella of the Mackay Whitsunday Safe Communities Project. The group has identified a number of particularly vulnerable groups; our young workers, the self-employed and workers in small business. By linking expertise held by some of our bigger companies with schools, TAFE and local business associations, the group hopes to work together, so we can work smarter and work safer in the Mackay / Whitsunday region.



The Occupational Health and Safety Working Group, Nov-2003

APPENDIX FOURTEEN DESIGNATION UPDATE, MAY 2004

Designation Application for accreditation as a World Health Organisation Safe Community



Mackay Whitsunday Safe Communities Project

May 2004

Working together to make Mackay/ Whitsunday Safe



Safety is everyone's business



Reinhold Muller (Editor) Foreword by Leif Syanstrom The Mackay/ Whitsunday Safe Communities Project was launched in February 2000 in response to high injury rates observed in the region. Since establishment, the Project has grown considerably and now consists of a network of over 100 members, representing 47 government, business and community organisations.

The Project is co-ordinated by a cross-sectoral Project Management Team (PMT) that oversees 11 Working Groups and maintains close ties with three linked projects.

We have attempted to design sustainability into the Project by building on a foundation of community resources to support our interventions. These interventions aim to produce sustained change in the behaviour of individuals and to create a social and physical environment more conducive to safe behavioural choices.

The Project has developed a suite of interventions targeting both genders, all ages, environments and situations, including: child safety, youth safety, road safety, safer alcohol and drug use, occupational health and safety and seniors safety.

Priorities have been based on injury surveillance data collected from all Emergency Departments (EDs) in the region. Accordingly, the Project launched a number of new working groups in 2003 targeting vulnerable groups in the community:

- Child Injury Prevention Project (ChIPP) Mackay.
- Workplace Health and Safety Working Group.
- Young Drivers Group.

The Project has built strong links with a number of injury research centres including Queensland Injury Surveillance Unit, James Cook University and Injury Prevention and Control Australia. It has an active research program into the rationale and processes of community based safety promotion interventions and the impact of these interventions on health outcomes in the region.

The Mackay/ Whitsunday Safe Communities Project was the first Safe Communities Project established in Queensland and has had a critical role in laying the foundation for the rapidly growing Safe Communities movement within Queensland.

We are proud to host the 2^{nd} Pacific Rim Safe Communities Conference and the 7^{th} Australian Injury Prevention Conference to be held at the Mackay Entertainment Centre from the $15^{th} - 17^{th}$ of September. "Safe living on the edge" is the theme of the conference that will bring together safe communities and injury prevention researchers, practitioners, policy makers and advocates from Australasia and beyond, in the beautiful tropical City of Mackay,

It is a great challenge for a small team of people to set themselves the task of making Mackay/ Whitsunday a safer community. While much remains to be done, it is evident that things that were once inconceivable are now possible. Our resolve to do all we can to make the Mackay/ Whitsunday as safe as possible has grown as we have learnt the benefits of working together and see the fruit of our efforts.

Bruce Green Chair, Project Management Team Mackay/ Whitsunday Safe Communities Project

CRITERION ONE: An infrastructure based on partnership and collaborations, governed by a cross-sectoral group that is responsible for safety promotion in their community.

The Mackay Whitsunday Safe Communities Project (MWSCP) was launched in February 2000 in response to high injury rates observed in the region.



A cross-sectoral Project Management Team (PMT) was established in September 1999 to oversee the Project and included representatives from Mackay City Council, Whitsunday Shire Council. Queensland Health. Queensland Transport, and Queensland Police. Four Working Groups were initially established in 2000 to address the areas of Seniors Safety. Childhood Safety in the Injury Research Whitsundays, and Road Safety.

The Project has since undergone considerable expansion and the PMT now also includes representatives from Education Queensland, Department of Emergency Services, Department of Main Roads, James Cook University and Mackay Bulk Sugar Terminal. The PMT now oversees 11 working groups and maintains close ties with three linked projects (See Appendix One: Operating Structure).



James Cook University in collaboration with the PMT is conducting an analysis of the growth and functional structure of the MWSCP.

The initial network of 34 people, largely drew its membership from three sub groups: Local Government, Police and Emergency Services. The network has now expanded to include over 100 members, representing 47 Government, business and community organisations.

Members of the PMT undertake an important bridging role, not only linking network members to the PMT but also to each other. Two leaders with expertise in population health occupy central positions in the network, each with different but complementary leadership styles. A champion, agenda setting, leader maintains the largest number of relationships within the network. A coalitionbuilding leader maintains the strongest reciprocating relationships within the network. Their authority is informal rather than organisational. It is interesting to reflect that the growth and structure of the network indicates a shift from a focus on crime prevention and emergency response, towards population health, with an emphasis on community development.

Fig One: Social Network Analysis Mackay / Whitsunday Safe Communities Project February 2000 (Project launch) compared to February 2004



CRITERION TWO: Long term sustainable programs covering both genders and all ages, environments and situations.

The MWSCP has attempted to design sustainability into the project by building on a foundation of community resources to support its interventions. These interventions aim not only to produce sustained change in the behaviour of individuals, but also to create a social and physical environment more conducive to safe behavioural choices.

The Project has developed a suite of interventions targeting both genders, all ages, environments and situations, managed by a number of working groups:

- Senior Safety Working Group
- Road Safety Reference Group overseeing three subcommittees, the Bike Education Group, a Fatigue Group and a Young Driver Group
- Mackay Alcohol and Injury Working Group
- Whitsunday Child Safety Working Group
- Andergrove Neighbourhood Watch
- Injury Research Working Group

Priorities have been set based on injury surveillance data collected from all Emergency Departments (ED's) in the region since 1998. Accordingly the Project launched three new working groups in 2003:

- Child Injury Prevention Project (ChIPP) Mackay. Every year one in 10 children under 15 years of age will present to an ED with an injury, accounting for 29% of all ED injury reports in the region.
- Workplace Health and Safety Working group. Occupational Injury accounts for 29% of ED injury presentations in those aged 25 to 65 years.
- Young Drivers Group. Queensland Transport reports 26 deaths and 355 hospitalisations resulting from 1549 road traffic accidents involving drivers in the 17 to 24 year age group over the five year period from 1998 to 2002. This age group accounts for 43% of all road accidents reported in the region.

CRITERION THREE: Programs that target high-risk groups and environments, and programs that promote safety for vulnerable groups.

ChIPP - Childhood Injury Prevention Project

ChIPP is a three-year project jointly sponsored by the Department of Emergency Services and Queensland Health.

Analysis of ED presentations within the Mackay and Moranbah Health Service Districts revealed that there were 16,715 injury presentations to regional EDs involving children over a 5 year period from 1998- 2002, 5007 (30%) of which occurred in children aged zero to four years. Every year one in nine toddlers (one to two years) presented to an ED after sustaining an injury. Over 80% of these injuries occurred within a home environment.



Figure Two: Emergency Department Childhood Injury Presentation Rates by Age – Mackay and Moranbah Health Service Districts 1998 to 2002

The Project aims to develop inter-sectoral injury prevention strategies focussed on specific injury priority areas for zero to fours in the Mackay and Moranbah Health Service Districts, by targeting physical and social environments, especially the home environment.



Local ownership of the injury problem is fostered by involving key stakeholders as part of a working group, in developing and actioning strategies associated with the reduction of injuries related to drowning, immersion, falls, poisoning, burns, scalds and transportation, in children aged zero to four years age group.

The Project further aims to:

- Increase the awareness and adoption of efficient, effective and sustainable action for the prevention of priority injury areas, by key stakeholders.
- Increase awareness about issues relating to injury in the zero to four years age group among retailers of nursery furniture, builders, building designers, local governments, health care providers, pharmacists, community groups and childcare workers.
- Increase community awareness of unintentional childhood injury in the zero to four years age group as a preventable health issue.
- Ensure credible information regarding the prevention of specific categories of injury is continually available and can be easily and opportunistically accessed by parents and carers of children
- Support and promote State initiatives that relate to the prevention of priority area injuries as they apply locally.
- To develop or modify, where applicable, policy and infrastructure to support the prevention of unintentional injury in children aged zero to four years.

Occupational Health and Safety Working Group

Over the five year period from 1998 to 2002, 9821 ED injury presentations due to occupational injury were reported in the Mackay and Moranbah Health Service Districts. Occupational Injury accounted for 29% of ED injury presentations in those aged 25 to 65 years.

Young males are especially vulnerable. Males aged 15 to 29 years have an ED injury presentation rate of 6,033 per 100,000 per year due to occupational injury (one in 17 males per year).

The four industries with the highest rates of workplace injury are:

- Construction industry: 22% of work related ED presentations
- Agriculture: 12% of work related ED presentations
- Mining industries: 11% of work related ED presentations
- Engineering: 11% of work related ED presentations

Fig Three: Emergency Department Workplace Injury Presentation Rates by age Mackay and Moranbah Health Service Districts, 1998 to 2002



In November 2003, the Occupational Health and Safety Working Group was established. The group is targeting a number of vulnerable groups, including: young workers, the selfemployed and those working in small business. By linking expertise held by some of our bigger companies schools, with the Central Queensland Institute of TAFE (Technical and Further Education) and local business associations, the group hopes to "work together, so we can work smarter and work safer" in the Mackay/ Whitsunday region



Young Drivers Group

Young adult road users (17 to 24 years) are our most vulnerable road users. For every 100,000 young adults in Queensland, 20 die in a road crash annually. This rate is three times higher than for other age groups. Young adult road users in rural areas are even more at risk.

Queensland Transport reports 26 deaths and 355 hospitalisations resulting from 1549 road traffic accidents involving drivers in the 17 to 24 year age group in the Mackay/ Whitsunday Region over the five-year period from 1998 to 2002. This



age group accounts for 43% of all road accidents in the region. Sixty-three per cent of road accidents in this age group involve young males. Eighty-six per cent occur on flat level roads. Thirty-five per cent are single vehicle crashes. Major contributors to accidents in young drivers include alcohol, speed and fatigue.

The Road Accident Action Group held a Road Safety Expo targeting young drivers in November 2003 to raise awareness of road safety issues. The expo provided an excellent vehicle for Police, Queensland Transport and Emergency Services to establish contact with young drivers. A number of youths identified themselves as being interested in forming an alliance with the Road Accident Action Group. This network is now known as the 17 - 24 Young Drivers Group and initially focussed on breaking down the barriers between youth and the authorities. This has resulted in improved communication and has opened up excellent opportunities to engage young drivers in promoting safe driving behaviours and compliance with vehicle safety standards.

Think Drive Project

Mackay Police data indicated that one in 37 Mackay drivers stopped for Random Breath Testing (RBT) were over the 0.05 Blood Alcohol Concentration (BAC) legal driving limit, compared to a state average of one per 100. Furthermore, a significant number of these "over the limit" drivers were leaving the CBD between midnight and 4.00 a.m. on weekends.

The purpose of the Think Drive project was to provide local countermeasures to this identified drink driving problem. The project was conducted during September/ October 2003 and evaluated during November and December 2003 and January 2004.

Key strategies of the project were:

- 1. local media campaign (print, radio, television)
- 2. enhanced RBT activities, promoted by flyer distribution by Mackay Police
- 3. implementation of Designated Driver program in a local licensed premises.

A key indicator was the number of drink drivers intercepted during random breath testing operations during the Think Drive campaign.

Drink Drivers intercepted (Mackay Division) 2003

August	66
September	56
October	48
November	61



Drink Drivers detected in target area (City Heart)

September 2003:	30
October 2003:	13
Total for campaign:	43

The Media Perspective

A brief questionnaire was distributed to participating media outlets. Media representatives from the five participating outlets responded, either by self-completing (by e-mail) or interviewer administration (by telephone). All responded positively to the initiative.

Licensees and Patrons (Designated Drivers)

A convenience sample of nominated designated drivers was contacted and the participating licensees were interviewed after the completion of the project. Valuable feedback was received regarding the acceptability of the resources used and the promotion of the project

CRITERION FOUR: Programs that document the frequency and causes of injuries.

James Cook University Injury Monograph



In December 2002, James Cook University in Collaboration with the Mackay/ Whitsunday Safe Communities Project, published a 116 page monograph describing the rationale of the Project, the regional surveillance system and the results of three baseline epidemiological studies¹.

The foreword was written by Professor Leif Svanstrom, Head of the WHO Collaborating Centre on Community Safety Promotion, Karolinska Institute.

Over 150 copies of the Monograph have been distributed and an electronic version is available for download at <u>www.wepi.org/rimnq/index.html</u> This web site has had over 3000 visitors since publication.

The monograph includes six original research papers:

1. Collection of NDS-IS Level 2 Injury Surveillance Data in Regional Queensland. This paper describes the implementation of the regional ED injury surveillance system and discusses the utility of this system to support local community safety promotion initiatives.

- 2. Safe Communities: An Ecological Approach to Safety Promotion. This literature review discusses the evolution of the paradigm "Accident Prevention" through "Injury Prevention" into "Safety Promotion", and describes the rationale for Safe Communities, a whole of system ecological approach to community safety promotion.
- 3. Becoming Queenslands First Safe Community: Considering Sustainability from the Outset. While sustainability is a mandatory element of safety promotion rhetoric, it is less frequently achieved. This literature review proposes a systematic rationale for designing sustainability into community based safety promotion projects and describes the application of these principles in formulating the Mackay/ Whitsunday Safe Communities Project.
- 4. Practices, Knowledge and Perceptions Influencing Accident and Injury in the Mackay/ Whitsunday Community. 461 people agreed to participate in a baseline telephone survey, conducted by James Cook University in 2000. It was found that household safety practices were independent of respondents' knowledge of injury risk factors and their perception of safety. Thus a successful injury prevention strategy must encompass more than just increasing injury risk knowledge.
- 5. Non-Fatal Injury Presentations to the Mackay Base Hospital Emergency Department 1998-2000. A baseline review of 26,104 ED presentations to Mackay Base Hospital between 1998 and 2000. Results reveal a direct standardised injury presentation rate of 8,218 per 100,000 person years (every year one in 12 Mackay residents). Males are twice as likely to present than females. Young males are particularly at risk, with an injury presentation rate of 20,317 per 100,000 per person year (every year one in five males aged 15 to 29). Forty-one per cent of injuries occur in the home. Children under four years of age and those over 55 years are especially likely to be injured at home. Working for income is the most likely injury activity for males aged 15 to 29 years.
- 6. Patterns and Causes of Injuries during Organised Sporting Activities in the Mackay Region (North Queensland) 1998-2000. There were 2,849 presentations to Mackay Base Hospital ED as a result of injuries occurring during organised sporting activities between 1998 and 2000, accounting for 11% of all injury ED injury presentation. More than half of these injuries occurred in those aged 19 years or less. Males were 3.5 times more likely than women to sustain a sporting injury. Football (Rugby, Australian Rules and soccer) are responsible for 58% of sporting injuries and over two-thirds (68%) of male sporting injuries. Netball and basketball (31%) are the most common sports for women.

Childhood Injury Prevention Program



James Cook University in collaboration with the Queensland Injury Surveillance Unit and the Mackay/ Whitsunday Safe Communities Project undertook a five year review of childhood ED injury presentations within the Mackay and Moranbah Health Service Districts.

Results were published² in June 2003 by the Queensland Injury Surveillance Unit in their "Injury Bulletin" No 77 available on line at: <u>www.qisu.org.au</u>.

Childhood injury results in an average of four deaths, 1260 hospitalisations and 3343 ED presentations per year in the region.

There were 16,715 injury presentations to regional EDs involving children during the five year study period, 5,007 (30%) in children aged zero to four years¹. ED injury presentations initially peaked in the toddler age group, and after a slight reduction in early primary school children, rose again in adolescence.²

A number of priority areas were identified for intervention including drowning, falls, poisoning, burns and scalds and transport related injuries.

Falls were found to be the leading cause of documented unintentional injury in children and accounted for 33% of all ED presentations.²

CRITERION FIVE: Evaluation measures to assess their programs, processes and the effects of change.

Community Capacity Assessment – Project Management Team

The MWSCP has attempted to design sustainability into the Project by building on a foundation of community resources to support its interventions.

Capacity building seeks to empower a community to identify, mobilise, coordinate and develop local resources to solve local issues and build social capital.

Bush et al³ defines community capacity as "a collection of characteristics and resources which, when combined, improve the ability of a community to recognise, evaluate and address key problems". While at face value a project may mobilise local resources to promote safety, it can also be a vehicle by which community leaders can seek to develop sustainable safety promoting qualities (capacity) within the community itself.

Bush et al³ identify four domains of capacity:

- 1. **Network partnerships.** The formal and informal relationships between key players in an ecological system. The identification of mutual benefit by network partners increases commitment. As relationships become stronger and more reliable, they become embedded or "institutionalised" within the normal business of the network.
- 2. **Knowledge transfer.** Dissemination of knowledge is an important tool to mobilise and develop a network. The strategic sharing of expertise and information around the network results in the development of mutually agreeable, locally relevant solutions. A combination of academic "best practice" with local "street knowledge" is necessary.
- 3. **Problem solving** concerns the development of adaptive skills that enable network partners to plan, implement, sustain and evaluate a health promotion program, mediate conflict between partners and maximise the resourcefulness of the network.
- 4. **Infrastructure development**. A project needs to identify, mobilise and invest in the development of local physical, financial, human and social resources.

Figure Four: Capacity building - enhancing the health & safety promoting characteristics of community systems



The PMT has conducted two capacity audits to assess whether it has succeeded in its aim to develop community resources to promote safety in the Mackay/ Whitsunday region.

- An audit of current capacity conducted in June 2003.
- A retrospective audit of capacity at the time of Project launch conducted by members of the initial PMT, held in August 2003.

The PMT scored itself in each capacity domain after facilitated discussion around on a series of questions posed in an audit tool designed by Bush et al³. The study confirmed that the Project has succeeded in its aim to develop community safety promotion capacity (Figure Five).

Figure Five: Community Capacity Audit - Project Management Team of the Mackay/ Whitsunday Safe Communities Project, February 2000 vs June 2003.



The apparent "decrease" in financial capacity within the infrastructure domain is interesting. This paradoxical result reflects the perceived financial challenges the PMT faces in staging the Second Pacific Rim Safe Communities Conference. While the Project is now mobilising comparatively large sums of money compared with the time of the Project launch, the PMT also has higher expectations of what it can reasonably expect to achieve.

While community capacity audits are excellent formative assessment tools, many authors now emphasise that because community capacity is a quality of a specific social context, it is not valid to compare capacity between communities. Our study further suggests that even within a project, changing perceptions of what is achievable affect perception of community capacity. It may not be valid to compare capacity over time within a single project.

ChIPP– Childhood Injury Prevention Project

Evaluation of the ChIPP is being undertaken by Injury Prevention and Control Australia, a nation wide coalition of injury researchers established in 2002.

Specific injury priority areas were chosen after baseline child injury rates were established using data collected from ED presentations, hospital separations and coroners' reports⁴.

A process log documenting the development of the Project and each of the steps involved in its establishment and function is updated daily by the Project Officer. Baseline data indicates that the majority (almost 60%) of the Project activities in this early stage of the Project relates to coalition building. Reported activities⁵ during the first seven months in Mackay also indicate:

- support for the Project from the local media,
- information and training sessions provided to community members and community workers as a result of the Project,
- resources generated for the community to increase awareness of the Project,
- action initiated by local council,
- positive changes to planned funded projects, and
- action initiated by hospital-based health professionals associated with the Project and subsequent changes incorporated into their clinical practice.

A Community Capacity Index administered to the strategic partners within the Project's working group has been used to assess initial community capacity in regard to the prevention of childhood injuries. This tool will be administered again at years three and five of the Project as a means of documenting underlying community changes.

A baseline household survey has been administered in the initial stages of the Project to quantify home-based hazards specific to the injury priority areas. In addition, the instrument was used to gather information on home safety management practices, risk acceptance and social factors. The survey was administered using three methodologies: telephone, mail and interviewer-administered. Direct interviews were conducted primarily to ascertain community views on the Project and validate the self-report forms of the safety surveys⁵. Where possible this information was also obtained from the control community. This survey will be administered again in the third and fifth years of the Project. The ultimate goal of this Project is expressed in terms of measurable changes in the injury-related health of the children aged zero to four years in the community⁵.

Bike Ed program evaluation

A quasi-experimental research study was conducted from April 2002 to June 2003 to evaluate the impact of the Bike Ed program on the bike road safety skills and bike use habits of Year Four (eight years old) schoolchildren in Mackay attending a one-day road safety education program conducted at the Police Citizens Youth Club (PCYC) in Mackay⁶.

The Bike Ed program was delivered to twelve classes from four schools in the first school term of 2003. The program consisted of four hours of classroom based instruction delivered by school teachers and a six-hour practical skills training session delivered by the Project Officer with assistance from the teachers. Standardised self-administered questionnaires for participants and their parents detailed bicycle use and behaviours prior to the commencement,

and three months after completion of the Bike Ed program. The bicycle skills of participants were graded immediately before and after the practical bicycle skills session. Self-administered questionnaires to participants and their class teachers assessed the content and delivery of the skills session.

A total of 261 participants attended the Bike Ed education and skill sessions between 11^{th} February 2003 and 8^{th} April 2003. The response rates for the pre-Bike Ed questionnaires were approximately two-thirds for participants (59.0%; n=154) and their parents (60.5%; n=158). The response rate for the post-Bike Ed questionnaire was 14.2% (n=37) for both participants and their parents. Following a practical skills based bike safety session, significant improvements from pre-test scores in all road safety skills, with the exception of riding straight across an intersection, were observed in this study. Almost half (48%; n=126) of the participants improved their straight line riding, while one-third or more improved their starting (33%; n=86), slow riding (33%; n=85), scanning (34%; n=89), and braking and dismounting (31%; n=90). Feedback from both participants and their teachers on the content and implementation of the Bike Ed program was overwhelmingly positive.

The results of the study demonstrated that a program combining skill training and education strategies was well received by participants, and resulted in rapid improvements in safety skills of children. Following dissemination of results, the Bike Ed program format used in the Mackay trial will now be rolled out throughout the State by Queensland Transport.

CRITERION SIX: Ongoing participation in national and international Safe Communities Networks

The MWSCP was the first Safe Communities Project established in Queensland and had a critical role in laying the foundation for the rapidly growing Safe Communities movement in Queensland. The last two years have seen the establishment of Safe Communities Projects in Townsville/ Thuringowa, Toowoomba and Mt Isa. Strong interest is being shown in establishing Projects in West Moreton and Cairns.

Queensland has for some years experienced comparatively high injury mortality and morbidity rates compared with the rest of Australia. There was therefore a huge potential to realise significant improvements in Queenslands injury mortality and morbidity using a community-based approach to safety promotion.

The MWSCP has actively pursued opportunities to mobilise support for the Safe Communities movement in Queensland not only to realise its own objectives in Mackay/ Whitsunday, but also to assist in the establishment of an energetic and effective Safe Communities movement in Queensland.



Members of our PMT have been invited as keynote speakers to the launch of every new Safe Communities Project in Queensland. Our organisational, process, and designation documentation has been widely disseminated to health workers working in community safety around Queensland and some communities have used these as templates to assist in the development of their formal processes and documentation.

Current and past members of our PMT currently occupy senior positions on the National Executive of the Australian Injury Prevention Network (Paul Vardon-National Secretary, Dale Hanson- Queensland Representative/ Conference Officer).

Jan Kilbourne, a founding member of the PMT was fortunate to attend the Fifth Nordic Safe Communities Conference held in Helsinki, Finland in August 2003. Jan presented a paper on the Mackay/ Whitsunday Safe Community Model which discussed how effective partnerships can promote project sustainability through the transfer of knowledge, skills and practice organisations, within partner thereby enhancing the capacity safety for promotion within member organisations.





Dale Hanson, one of the founding members of the PMT was awarded the "2002 Australian Injury Prevention Network Award for Meritorious Practice in Injury Prevention" at the Sixth Australian Injury Prevention Conference held in Perth in April 2003. The presentation of this award highlights the nation-wide interest and esteem the MWSCP has been able to generate.

In 2002 the Mackay/ Whitsunday Safe Communities Project entered into a coalition with the Australian Injury Prevention Network, the Queensland Department of Emergency Services and Queensland Health to stage the Second Pacific Rim Safe Communities Conference and the Seventh Australian Injury Prevention Conference in Mackay from 15th to 17th September 2004.



Over three days, we will explore the theme Safe Living on the Edge using a combination of plenary sessions, concurrent sessions, workshops and forums. The conference will bring together safe communities, injury prevention researchers, practitioners, policy makers and advocates from Australasia and the Indo Asian Pacific. It is hoped that combining the Pacific Rim Safe Communities Conference with the Australian Injury Prevention Conference will facilitate cross fertilisation of current best practice between researchers and practitioners working in the field injury prevention and safety promotion.

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APPENDIX FIFTEEN

MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS UPDATE 6 – JULY 2005

MACKAY / WHITSUNDAY WHO SAFE COMMUNITIES

Progress Update 6 July 2005

This is the sixth regular progress update that will be released on a six monthly basis.

Background

As a response to above average injury rates identified in the Mackay / Whitsunday region, the MWSCP was established to address this issue and help the region become Queensland's first internationally recognised safe community.

This long-term Project is a World Health Organisation (WHO) supported approach to community injury control that aims to reduce injury in the Mackay / Whitsunday region by 30 per cent.

It will be guided by the criteria and processes of the WHO's safe communities framework which has been proven to be an effective means of reducing injury throughout the world, including Australia.

Fatigue Sucks

The Fatigue Sucks initiative was identified in November 2002 by the Road Accident Action Group (RAAG) as a novel, cost effective, yet simple way to relay to motorist fatigue messages. The initiative was so successful in drawing public attention to the dangers of driving while tired, it has been conducted on a state-wide basis for the past 2 years by the Royal Automobile Club of Queensland (RACQ). In May 2005, the initiative was adopted by The Huntsville O.P.P. and the Huntsville Lioness Club Canada, who announced that they are pleased to work together and with their road safety partners "down under" on this life saving initiative.





WHO Website

Mackay/Whitsunday Safe Communities Project now features on the World Health Organisation's websitehttp://www.phs.ki.se/csp/safecom/mackay.htm

Drawing the line on standard drinks



Mackay City Councillors and Sonya Parris at the launch of Drawing the line on standard drinks. (Front: Cr. Kevin Casey, Mayor Cr. Julie Boyd, Sonya Parris, Cr. Alison Jones, Cr. Joan Williamson Back: Cr. Don Rolls, Cr. Dave Perkins)

The 2004/05 festive season saw the launch of the *Drawing the line on standard drinks* project by the Mackay Alcohol and Injury Working Group at the Foodspace. Thanks to Sonya Parris and her team of friendly and efficient staff, patrons at the Foodspace were able to learn more about standard drinks in the relaxed dining atmosphere of the Artspace eatery.

The National Alcohol Action plan reflects the experience of many workers in the drug and alcohol field: there is a need for community education about what constitutes a standard drink, the measurement tool which provides a mechanism for drinkers to monitor their consumption of alcohol. Because different alcoholic drinks have different strengths, the size of a standard serve depends on the type of alcohol being measured. A standard drink contains ten grams of alcohol, that is, for example, 30ml of spirits, a 375 ml. bottle of mid-strength beer, or 100 ml of wine. Since different venues serve wine in different sized glasses, it's no wonder patrons get confused!

For example, a woman who has **two glasses** of wine may consider herself to be "safe to drive". However, she may have consumed **three or more standard drinks**, since many wine glasses have a capacity of at least 150 ml.

This confusion is especially problematic for patrons who wish to monitor their alcohol consumption for driving purposes. Guidelines to stay under 0.05 suggest that women should drink no more than one standard drink an hour and that men should consume no more than two standard drinks in the first hour, then one every hour after that.

However these are GUIDELINES only, and, if planning to drive, the safest way to stay under 0.05 is not to drink at all.

The evaluation of the project demonstrated its effectiveness with staff and patrons learning more about standard drinks and safer drinking levels through being involved in the project.

Girlfriends



The Alcohol and Injury Working Group is collaborating with the Community Crime Prevention Action Team to enhance and promote safety in licensed premises.

The *Girlfriends* project is based around a number of strategies, most of which are being implemented through the Barlink licensees forum, and builds on the messages of Queensland Health's Women and Alcohol Campaign. This Campaign is founded on a national study highlighting that more Queensland women aged 18-22 years consume alcohol at risky levels than their counterparts in other states.

"This Campaign is founded on a national study highlighting that more Queensland women aged 18-22 years consume alcohol at risky levels than their counterparts in other states. However, the news is not all bad. Whilst young Queensland women may be drinking dangerously, some of them are considering changing their habits. Research conducted by Queensland Health found that some young women in Queensland are reluctantly still stuck in a state of risky drinking because of social pressures.

The Women and Alcohol campaign has been designed to encourage young women in Queensland to make up their own minds about alcohol, and the Girlfriends project has a strong focus on making drinking environments safer. Strategies include signage in City Centre venues, television advertising and the development of resources which highlight safety initiatives in place (e.g. taxi marshals and safety audits).

7th Australian Injury Prevention Conference & 2nd Pacific Rim Safe Communities Conference

Nearly 200 delegates from as far afield as the United Kingdom, Egypt, Canada, USA, Hong Kong, Vietnam and New Zealand along with practitioners and researchers from all around Australia attended the 7th Australian Injury Prevention Conference and the 2nd Pacific Rim Safe Communities Conference held recently in Mackay.

Entitled "Safe Living on the Edge" the conference aimed explore the impact of risk on our lives and how we can work together to effectively manage risk in our communities.



The scientific program was complemented by an energetic social program with strong local flavour. There was hardly a dry eye during the opening ceremony featuring a performance by the Northview Primary School Signing Choir after which keynote speaker Paul Kells set the scene for the conference during a brief discussion with choir members in which he clearly demonstrated the impact of injury on our most precious social resource - our children.


Keynote speakers included; Carolyn Coggan from the Injury Prevention Research Centre of Auckland University, Paul Kells from the Canadian Safe Communities Foundation, David Sleet from the Centre for Disease Control USA, and Rob Lee Director of the Bureau of Air Safety Investigation.

Over 100 papers were presented along with eight workshops exploring topics as diverse as research methods, working with the media and using musical drama to convey safety messages to teenagers with live performances by the Central Queensland University's Conservatorium of Music.



The conference had a strong media impact, with ABC Radio Tropic North broadcasting live from the conference foyer. Delegates were often been seen sitting in the corner conducting interviews with print, radio & TV media from around the nation. The conference achieved the front two pages in the Courier Mail and an item on Trampoline Safety on Channel 9's A Current Affair.



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Kathryn McFarlane receives National Award

Kathryn McFarlane's outstanding work in community safety promotion received national recognition when

she accepted the biennial Australian Injury Prevention Network award for Excellence in Safety Promotion. Kathryn is now working with the Tropical Public Health Unit of Queensland Health in Cairns where she assists the Cairns Safe Community coalition. Congratulations Kathrvn.



Social Network Analysis

James Cook University recently undertook a Social Network Analysis of the Mackay Whitsunday Safe Communities.



The study documented significant growth in the coalitions sphere of influence the cohesion of its members. In February 2000, the seven founding members of the Mackay Whitsunday Safe Communities Co-ordination Team had a direct sphere of influence of 78 actors. By 2004 this had increased to include a network of 168 members representing 47 government, business and community origanizations. More importantly, the network has become more cohesive, with the average number of relationships between network members increasing from five to nine and a doubling in the density of relationships contained within the network.

Thank you to all who contributed to this study.

Mackay Whitsunday Safe Communities receive WHO recognition



Associate Professor Carolyn Coggan, the Director of the Injury Prevention Research Centre at Auckland University represented the WHO award to Mackay Mayor Julie Boyd and Whitsunday Mayor Mario Demartini on behalf of the coalition.

In recognition of a four year campaign to reduce injury in our region, the World Health Organization designated Mackay and Whitsunday "WHO Safe Communities" at a ceremony held during the Local Government Association of Queensland Conference in Mackay on the 31st of August 2004. Associate Professor Carolyn Coggan, the Director of the Injury Prevention Research Centre at Auckland University represented the WHO. The award was proudly accepted by Mackay Mayor Julie Boyd and Whitsunday Mayor Mario Demartini on behalf of the coalition.

Mackay Whitsunday were the first communities to achieve WHO designation in Queensland and the first in Australia for four years. We should not overlook the importance of what is this achievement. International recognition of the Mackay Whitsunday Safe Communities by the WHO indicates we are on the right track. But safety is an ongoing process. WHO Designation make us all the more determined to go on doing all we can to make Mackay Whitsunday Region a safer place to live.



New Members

MWSCP welcomes Adrienne Burke as a new member of the Management Team.

Currently Adrienne is A/Principle Service Officer at the Planning, Engagement & Coordination Unit of the Department of Communities. Formerly, she was the Regional Engagement Officer at the Department of the Premier and Cabinet. She has also worked with the Ministerial Regional Community Forum program since its inception in Mackay/Whitsunday in 1999.



To find out more, to be involved, or to let the project management team know of existing local injury prevention and safety promotion activities please contact the project chair: Bruce Green 49450215, 0407965827 or email

bruce.green@whitsunday.qld.gov.au



To find out more about the Mackay Whitsunday Safe Communities visit:

http://www.safecommunitiesqld.org/modcore/HomeP age/frontend/index.asp

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Girlfriends



The Alcohol and Injury Working Group is collaborating with the Community Crime Prevention Action Team to enhance and promote safety in licensed premises.

The *Girlfriends* project is based around a number of strategies, most of which are being implemented through the Barlink licensees forum, and builds on the messages of Queensland Health's Women and Alcohol Campaign. This Campaign is founded on a national study highlighting that more Queensland women aged 18-22 years consume alcohol at risky levels than their counterparts in other states.

"This Campaign is founded on a national study highlighting that more Queensland women aged 18-22 years consume alcohol at risky levels than their counterparts in other states. However, the news is not all bad. Whilst young Queensland women may be drinking dangerously, some of them are considering changing their habits. Research conducted by Queensland Health found that some young women in Queensland are reluctantly still stuck in a state of risky drinking because of social pressures.

The Women and Alcohol campaign has been designed to encourage young women in Queensland to make up their own minds about alcohol, and the Girlfriends project has a strong focus on making drinking environments safer. Strategies include signage in City Centre venues, television advertising and the development of resources which highlight safety initiatives in place (e.g. taxi marshals and safety audits).

7th Australian Injury Prevention Conference & 2nd Pacific Rim Safe Communities Conference

Nearly 200 delegates from as far afield as the United Kingdom, Egypt, Canada, USA, Hong Kong, Vietnam and New Zealand along with practitioners and researchers from all around Australia attended the 7th Australian Injury Prevention Conference and the 2nd Pacific Rim Safe Communities Conference held recently in Mackay.

Entitled "Safe Living on the Edge" the conference aimed explore the impact of risk on our lives and how we can work together to effectively manage risk in our communities.



The scientific program was complemented by an energetic social program with strong local flavour. There was hardly a dry eye during the opening ceremony featuring a performance by the Northview Primary School Signing Choir after which keynote speaker Paul Kells set the scene for the conference during a brief discussion with choir members in which he clearly demonstrated the impact of injury on our most precious social resource - our children.



Keynote speakers included; Carolyn Coggan from the Injury Prevention Research Centre of Auckland University, Paul Kells from the Canadian Safe Communities Foundation, David Sleet from the Centre for Disease Control USA, and Rob Lee Director of the Bureau of Air Safety Investigation.

Over 100 papers were presented along with eight workshops exploring topics as diverse as research methods, working with the media and using musical drama to convey safety messages to teenagers with live performances by the Central Queensland University's Conservatorium of Music.



The conference had a strong media impact, with ABC Radio Tropic North broadcasting live from the conference foyer. Delegates were often been seen sitting in the corner conducting interviews with print, radio & TV media from around the nation. The conference achieved the front two pages in the Courier Mail and an item on Trampoline Safety on Channel 9's A Current Affair.



eanne Edmistone	University of Technology.	is safe. We've come a long
EALTH REPORTER	reflect the expected decline	concrete, but we need to
CHILDRICN were still being turt in playgrounds despite tational playground surfac- ng standards, a standards committee member said centerias	in frequency of severaly of playground injuries, which ranged from concustion to broken bones. He said more stringent testing procedures were needed to prevent injuries	go lutiner." Dr Eoger will present his research at the 7th Aust- ralian Injury Prevention Network Conference in Markay tomorrow. He said the common rub-
Dr David Eager said there were more than 100,000 thild dmissions to emergency de- partments every year for hayeround injurtes, despite the introduction of the Aus- ralia and New Zealand Playground standard in 1906.	and deaths, and compliance levels had to be boosted. "These istandards) were enly designed to stop deaths. What we want to do is lower the 100,000 admissions a year." Dr Eager raid. "We want kids to go and	ber surfacing caused more long-tone breaks than bark because of impact rebound, where the impact of the fall was initially absorbed by the rubber, then bounced back through the bone, often sev- eral times, causing the bone
ering lecturer at Sydney's	to do it in a playeround that	Contract Page 2

Kathryn McFarlane receives National Award

Kathryn McFarlane's outstanding work in community safety promotion received national recognition when

she accepted the biennial Australian Injury Prevention Network award for Excellence in Safety Promotion. Kathryn is now working with the Tropical Public Health Unit of Queensland Health in Cairns where she assists the Cairns Safe Community coalition. Congratulations Kathrvn.



Social Network Analysis

James Cook University recently undertook a Social Network Analysis of the Mackay Whitsunday Safe Communities.



The study documented significant growth in the coalitions sphere of influence the cohesion of its members. In February 2000, the seven founding members of the Mackay Whitsunday Safe Communities Co-ordination Team had a direct sphere of influence of 78 actors. By 2004 this had increased to include a network of 168 members representing 47 government, business and community origanizations. More importantly, the network has become more cohesive, with the average number of relationships between network members increasing from five to nine and a doubling in the density of relationships contained within the network.

Thank you to all who contributed to this study.

Mackay Whitsunday Safe Communities receive WHO recognition



Associate Professor Carolyn Coggan, the Director of the Injury Prevention Research Centre at Auckland University represented the WHO award to Mackay Mayor Julie Boyd and Whitsunday Mayor Mario Demartini on behalf of the coalition.

In recognition of a four year campaign to reduce injury in our region, the World Health Organization designated Mackay and Whitsunday "WHO Safe Communities" at a ceremony held during the Local Government Association of Queensland Conference in Mackay on the 31st of August 2004. Associate Professor Carolyn Coggan, the Director of the Injury Prevention Research Centre at Auckland University represented the WHO. The award was proudly accepted by Mackay Mayor Julie Boyd and Whitsunday Mayor Mario Demartini on behalf of the coalition.

Mackay Whitsunday were the first communities to achieve WHO designation in Queensland and the first in Australia for four years. We should not overlook the importance of what is this achievement. International recognition of the Mackay Whitsunday Safe Communities by the WHO indicates we are on the right track. But safety is an ongoing process. WHO Designation make us all the more determined to go on doing all we can to make Mackay Whitsunday Region a safer place to live.



New Members

MWSCP welcomes Adrienne Burke as a new member of the Management Team.

Currently Adrienne is A/Principle Service Officer at the Planning, Engagement & Coordination Unit of the Department of Communities. Formerly, she was the Regional Engagement Officer at the Department of the Premier and Cabinet. She has also worked with the Ministerial Regional Community Forum program since its inception in Mackay/Whitsunday in 1999.



To find out more, to be involved, or to let the project management team know of existing local injury prevention and safety promotion activities please contact the project chair: Bruce Green 49450215, 0407965827 or email

bruce.green@whitsunday.qld.gov.au



To find out more about the Mackay Whitsunday Safe Communities visit:

http://www.safecommunitiesqld.org/modcore/HomeP age/frontend/index.asp

APPENDIX SIXTEEN

MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS UPDATE 7 – DECEMBER 2005

MACKAY / WHITSUNDAY WHO SAFE COMMUNITIES

Progress Update 7: December 2005

This is the seventh regular progress update that will be released on a six monthly basis.

Background

As a response to above average injury rates identified in the Mackay / Whitsunday region, the MWSCP was established to address this issue and help the region become Queensland's first internationally recognised safe community.

This long-term Project is a World Health Organisation (WHO) supported approach to community injury control that aims to reduce injury in the Mackay / Whitsunday region by 30 per cent.

It will be guided by the criteria and processes of the WHO's safe communities framework which has been proven to be an effective means of reducing injury throughout the world, including Australia.

Did You Know?

- Mackay Whitsunday was the first Safe Communities project established in Queensland and the first to achieve WHO designation.
- Since the coalition was established in February 2000 Emergency Department injury presentations have reduced by 18%.
- Since Barlink was established in 2004, street assaults in the city heart have reduced by 31%.
- Social Network Analysis indicates that our coalition is now twice as cohesive, more closely connected and three times more coordinated than it was when the project began.
- The coalition mobilised 6.5 full time equivalents (FTE) and 0.9 million dollars though its network to address local safety issues in Mackay Whitsunday Region in 2004.
- The "Fatigue Sucks Campaign" designed by the Road Accident Action Group to address the issue of driver fatigue has been replicated in Canada.



'Hot Water BURNS Like Fire'

To help reduce the incidence of scalds in young children within the Mackay and Whitsunday Districts, the Childhood Injury Prevention Project (ChIPP) launched the 'Hot Water *BURNS* Like Fire' campaign in Mackay on 21 July 2005. The campaign has been developed to alert parents and carers to the dangers of hot liquids in the home.

Between 1998 and 2002 more than 170 young children were treated in emergency departments in the Mackay, Sarina, Whitsunday and Moranbah areas after being scalded by hot liquid. On average over 600 children are treated in Queensland emergency departments each year for scald related injuries and a third of these are admitted to hospital for further treatment.

Many of the children hospitalised require skin grafts, long stays in hospital and years of treatment. The pain and suffering to the victim and the cost and disruption to families can be devastating for this type of injury.

Most scalds occur in the home and can be prevented by taking certain precautions. As part of the 'Hot Water *BURNS* Like Fire' campaign, local real estate agents, hardware stores and plumbers, in conjunction with the ChIPP, are distributing resources to homeowners and parents and carers of young children. These resources have been designed to help people to identify and remove or reduce the risks associated with scald hazards, which exist in their own home.



JCU Tom & Dorothy Cook Fellow, Dr Dale Hanson, discusses the rea life impact of burns on children in the Mackay Whitsunday Region

Poisonous Plants Resource

To help raise awareness about the dangers of common plants in Mackay, the Childhood Injury Prevention Project (ChIPP), in conjunction with the Mackay Regional Botanic Gardens, have launched a new Poisonous Plants Resource developed by Queensland Health and the Environmental Protection Agency.

The 'Plants and fungi poisonous to people in Queensland' resource has been developed to help the public identify which plants are dangerous and shouldn't be planted in the garden.

This resource includes full colour photographs identifying potentially poisonous plants, flowers and mushrooms common to Queensland, and provides information on the symptoms that people and children can experience after ingesting, or coming into contact with each specimen.

In support of the new resource, the Mackay Regional Botanic Gardens will incorporate poisonous plants demonstration gardens into Stage 2. These display gardens will provide people with an opportunity to view a life-size sample of potentially poisonous plants common to Mackay.

To access a copy of 'Plants and fungi poisonous to people in Queensland' contact Mackay City Council, the Mackay Regional Botanic Gardens or visit <u>www.health.qld.gov.au/PoisonsInformationCentre</u>.



CHOICES 2005!

Mackay's Alcohol and Injury working group has once again overseen the delivery of safe schoolies week messages to Year 12 students across the Mackay and Moranbah Health Service Districts. "Choices" drama project took place during late October and early November delivering an interactive theatre production with a harm minimisation message for the seventh consecutive year. As anticipated, the show received great reviews from the ten participating secondary schools.

Once again the performers demonstrated their creativity and versatility to remind students about the risks associated with Schoolies Week and presented a variety of strategies to stay safe.

In line with a number of key strategy documents including the National Drug Strategy and Queensland Health's and Education Queensland's Drug Education Policies, the intersectoral project conveyed a number of important issues around safer alcohol consumption.

Thank you to the participating schools for allowing us to stage Choices and to those agencies who gave of their time and energy, in particular, Queensland Police Service, Queensland Ambulance Service, Division of Liquor Licensing and Queensland Health.

Finally, a very special thank you must go to the students of the CQU Central Queensland Conservatorium of Music without whose talents this project would be impossible.





Bachelor of Music students from CQU Central Queensland Conservatorium of Music perform Choices 2005.

NEW CAMPAIGN TO KEEP YOUNG WOMEN "SAFE IN THE CITY"

A new campaign to encourage safer drinking among young women in Mackay was launched on Friday October 21 2005 as a direct response to a national study indicating that more Queensland women aged 18-22 years consumed alcohol at risky levels than their counterparts in other states.

Girlfriends: Safe in the City is the latest venture of the Mackay / Whitsunday Safe Communities Alcohol and Injury Working Group and has been developed in partnership with the Barlink licensees' forum.

The Girlfriends: Safe in the City project aims to:

- make drinking environments in Mackay safer for young women by providing signage to identify staff female patrons can go to if they feel vulnerable.
- give recognition to venues which undertake comprehensive safety audits of factors such as lighting and security.
- educate young women on the safer use of alcohol, through targeted distribution of brochures and local screenings of the Young Women and Alcohol television advertisement.

The project also included the launch of a new brochure developed in collaboration with Shaping Mackay, showcasing the work being done to make the Mackay city centre a safer and more pleasant entertainment precinct for residents and visitors.

Funded by Queensland Health, the *Girlfriends* project has brought together a diverse group of Mackay agencies and businesses to develop an initiative to promote safety in Mackay city centre's licensed premises, and educate young women about their drinking choices.

It is to be hoped that by communicating with young women, and by working with the staff and proprietors of licensed premises, we can make Mackay an even safer place for young women who choose to consume alcohol.

Congratulations to all the working group members and associated agencies for their commitment to this valuable new initiative.



Sgt. Jacinta Hodgetts (QPS), Colleen Gunning (QH) and David Aprile (Shaping Mackay) at the launch of Girlfriends: Safe in the City.



Members of Barlink Licensees Forum at the launch of Girlfriends: Safe in the City

INAUGURAL QUEENSLAND SAFE COMMUNITIES CONFERENCE

Organised by the Queensland safe communities support centre, this conference was held in Brisbane on 24-25 October 2005. The conference aimed to support the growth of existing and new Safe Communities in Queensland, support networking opportunities, raise the profile of the WHO Safe Communities Program, and identify synergies between government, non-government and Queensland businesses. The six themes of the conference were crime prevention, media engagement, environmental design, product safety, sustainability/partnerships and interface between ASCF and territory networks.

The conference was very successful providing delegates with a forum for sharing ideas, experiences and safety strategies. Keynote speakers included Dr. Carolyn Coggan, Director, Safe Communities Foundation, New Zealand; Rick Draper, Director, Amtac Professional Services; David Fagan, Chief Editor, The Courier Mail and Henk Harberts, Chairman Australian Safe Communities Foundation, Community Safety Promotion Practitioner.

Dr. David Campbell, Director for Dept. of Local Government and Planning officially opened the conference on behalf of Hon. Desley Boyle MP. Dr. Campbell implored Council's to be more diligent stating that backyard pools need to be properly fenced. He offered his department's support to Council's wishing to address this important safety issue.

Dr. Carolyn Coggan talked about the work of Safe Communities in New Zealand. Dr. Coggan also spoke of the challenges of safety promotion including establishing a credible identity, obtaining sustainable funding, and government support and finally being recognised and accredited by the World Health Organisation.

Mr. Rick Draper addressed the conference in respect to the real and perceived environments of safety. He raised the important issue of Crime Prevention Through Environmental Design (CPTED) and making sure new infrastructure considers safety issues such as visibility, lighting, access and aesthetics.

Mr. David Fagan encouraged delegates to note the power of the media eg: CMC enquiry into the Dept. of Families, asbestos in schools, etc. He also revealed that the internet is changing the ways newspaper editors and reporters think as the community are now able to have more of a say by responding directly to the writers.

Henk Harberts advised that legislation is not enough to establish a safe community. Improving safety starts with talking to your neighbour/friend and then encouraging them to pass the message around. He stated that there is no such thing as accidents but predictable preventable events. The cost of injuries to the Australian community is over \$34 billion.

There were a number of concurrent sessions and a media panel during the conference, which all proved, very interesting and very informative. In all, some 70 delegates from all over Australia thoroughly enjoyed the two full days; building valuable partnerships and discovering new ways to improve community safety. Bruce Green, Chair, Mackay Whitsunday Safe Communities Coordination Team

FOR MORE INFORMATION

Or contact

To find out more about the Queensland Safe Communities Support Centre or to download conference powerpoint presentations visit: <u>http://www.safecommunitiesqld.org/modcore/HomePage/frontend/index.asp</u>

Bruce Green 49450215, 0407965827 or email <u>bruce.green@whitsunday.qld.gov.au</u>

WHO Website

Mackay/Whitsunday Safe Communities Project now features on the World Health Organisation's website: <u>http://www.phs.ki.se/csp/safecom/mackay</u>



The Occupational Health and Safety Group in collaboration with Thiess Pty Ltd are proud to announce the implementation of *Passport to Safety* in Mackay in 2006.

Approximately 50% of senior high school students are already in the workforce. Unfortunately, school age workers are twice as likely to get injured at work! This situation is totally unacceptable.

Passport to Safety is a web based Occupational Health and Safety (O H & S) training resource aimed at teenagers. Originally developed in Canada, content has been Australianised by Workcover South Australia in collaboration with the Australian Safe Communities Foundation.

Thanks to the generous support of Thiess we will be able to offer *Passport to Safety* free to an estimated 600 senior students at Pioneer High, Mackay High and North Mackay High in 2006.

Passport to Safety is one part of a suite of OH&S educational resources that will be offered to schools along with a half-day workshop facilitated by OH&S professionals from the region.

Students who successfully complete the program will be given a *Passport to Safety* certificate to include in their CV and thereby hopefully increase their prospects of safe employment.

Like to find out more? Visit: http://www.passporttosafety.com/australia/

DATE CLAIMER:

3 FEBRUARY 2006 DOLPHIN HEADS RESORT

Sixth Birthday Mackay Whitsunday WHO Safe Communities Strategic Planning Day



Come and join us as we celebrate the past and plan for the future. Six years ago to the day we launched the Mackay Whitsunday Safe Communities Project. Much has been achieved, but our best years are still ahead.

Please put this important day in your diaries and plan to come along and share you expertise, enthusiasm and vision as we set our goals for the future.

All welcome. RSVP 23/1/06: Rob Ryan Ph 4968 4451

MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS REPORT – MARCH 2006

MACKAY / WHITSUNDAY WHO SAFE COMMUNITIES Progress Report - March 2006

This is the first in a series of quarterly reports to update the Mackay Whitsunday communities of the Safe Communities project.



Background

In August 2004 the Local Government Areas of Mackay and Whitsunday became Queensland's first World Health Organisation (WHO) designated Safe Communities.

The Mackay Whitsunday WHO Safe Communities Project was established in 2000 as a response to above average injury rates identified in the region. The WHO Safe Communities framework has proven to be an effective means of reducing injury throughout the world, and the criteria and processes of this framework have guided the activities of a number of Working Groups which have addressed specific injury issues in our region. By continuing to observe these criteria the Mackay Whitsunday WHO Safe Communities plan to continue their work on local injury reduction. 1. An infrastructure based on partnership and collaborations,

- An infrastructure based on partnership and collaborations, governed by a cross-sectional group that is responsible for safety promotion in their community.
- 2. Long-term, sustainable programs covering both genders and all ages, environments, and situations.
- Programs that target high-risk groups and environments, and programs that promote safety for vulnerable groups.
- 4. Programs that document the frequency and causes of injuries.
- 5. Evaluation measures to assess programs, processes and effects of changes.
- Ongoing participation in national and international Safe Communities networks.

Planning Day

The World Health Organisation (WHO) Safe Communities of Mackay and Whitsunday celebrated their sixth birthday on the 3rd February by acknowledging the activities of their diverse Working Groups.

Thank you to facilitator, Dawn Spinks, of the Queensland Safe Communities Support Centre, who guided us through a day of reflection and prepared us to focus on the work required to maintain and enhance our community safety initiatives.

Working Group representatives and partners from linked projects (Community Crime Prevention and Building Safer Communities Action Teams and the Mackay Alcohol and Other Drugs Community Partnership) set the scene for later discussion by delivering brief but engaging presentations about their specific areas of focus in injury prevention.

Later activities encouraged the Safe Communities participants to consider what could be improved in 2006 to build on the foundations established since the coalition's inception in 2000. Finally, members were encouraged to consider what their personal commitment to community safety would be in the coming twelve months. Since this Strategic Planning Day the WHO Safe Communities Coordination Group has reviewed its purpose and relationship to the industrious Working Groups. Expect to see some changes in 2006 as the WHO Safe Communities focuses on "spreading the word" about community safety. The Coordination Group plans to keep the Working Groups "connected", raise the profile of injury and the Safe Communities approach to reducing injury, encourage ALL who are working to make our community safer to consider integrating the designation criteria into their practices and celebrate the work of ALL who are working to make our community safer.



Passport to Safety

Young people are especially vulnerable to workplace injury. Every year approximately one in ten male workers aged 20 to 24 years in the Mackay Region will present to an Emergency Department after sustaining an injury at work. The situation is even more concerning for school aged workers. Fifty percent of senior school students are already in the workforce and the Queensland Injury Surveillance Unit estimates that these workers are injured at twice the rate of other workers.

Passport to Safety (Mackay) is an Occupational Health and Safety (O H & S) Promotion program targeting senior school students. The program is offered by the Occupational Health and Safety Working Group of Mackay Whitsunday WHO Safe Communities in collaboration with Thiess Australia Pty Ltd.

The project will be officially launched at Mackay North High School on 3rd April.

Senior secondary school students at the three state high schools will undertake the program.

- Mackay State High School 200 year 10 students
- Mackay North State High School 65 year 12 students undertaking Vocational Studies
- Pioneer State High School 200 year 10 students

Passport to Safety is web based O H & S training program designed to raise the awareness of teenagers of the personal importance of safe work practice, to teach hazard identification and the basic rights and responsibilities of employees to ensure a safe working environment.



Schools are also being offered a 70 minute O H& S workshop designed and conducted by members of the O H & S Working Group of Mackay Whitsunday WHO Safe Communities. Local O H & S educators and professionals in conjunction with Thiess O H & S interns and Year 6 JCU medical students will deliver the workshop. The seminars will hopefully include a strong element of peer education.

Child Injury Prevention Project (ChIPP) Working Group

Judy Rose commenced work as the new Project Officer for ChIPP in February. Kelly Hart has moved on to Breast Screen Services in Nambour and we thank her for all her hard work in bringing the project to its current stage and creating a solid foundation for further development.

The ChIPP Working Group met in March to review progress and to begin planning for 2006. The focus for this year will be on falls prevention and group members have the task of examining evidence-based strategies and making recommendations for action in the five priority action areas outlined in the Ottawa Charter for health promotion.

Dale Hanson reported to the group that preliminary analysis of data indicates that hospital admissions for injury in children aged under five in Mackay have fallen by 19.5% in females and by 25.1% in males since the project's implementation. This is an extremely promising outcome.



Alcohol and Injury Working Group

The first months of 2006 have seen the Alcohol and Injury Working Group devoting their energies to finalising projects undertaken in 2005. The Working Group is currently finalising the evaluation report for *Choices 2005*, and has developed the evaluation framework for the *Girlfriends* project. *Choices 2005* was a pre-Schoolies Week drama presentation designed to encourage safer behaviours during the celebratory period, and the *Girlfriends* project encompassed a number of strategies to enhance safety in licensed premises.

After the planning and implementation stages of the project cycle, where practical, the Group evaluates at two levels: process and impact.

Process evaluation assesses a program's quality, the way the program was run, and whether the target group was reached.

Process evaluation usually focuses on the following key areas:

Is the program reaching the target group?

- Are participants satisfied with the program?
- Are the activities of the program being implemented as planned?
- Are the materials and components of the activity of good quality?

For example, when evaluating Choices 2005 two survey instruments were used by the Alcohol and Injury Working Group to answer these process evaluation questions. This enables feedback to be gathered from teachers and students in participating schools, and so can inform the future development of the project.

If feasible, impact evaluation is also undertaken. This level of evaluation measures the short term effects of a program and is concerned with whether the objectives were met. Impact evaluation measures changes in behaviour, environments, knowledge, lifestyle or risk factors.

Although not possible in 2005, in previous years interviewing Year 12 school-leavers at Airlie Beach during Schoolies Week has formed the *Choices* project's impact evaluation and has demonstrated the high level of recall of the program's key messages.

The Alcohol and Injury Working Group has also been instrumental in developing the evaluation framework to be used by the Barlink licensees forum to assess the maintenance of this network.

Senior Safety Working Group

The Senior Safety Working Group has met a number of times since its initial meeting on 6th September 2005, the first meeting since 2003.

Membership consists of representatives of Mackay City Council, the Department of Communities, Queensland Police Service, Diversicare and a community representative. Two members of the Group (Department of Communities and Queensland Health representatives) were fortunate to be able to attend the Active Ageing Conference held in Hervey Bay in November 2005 and have identified potential projects which could be replicated here.

In late 2005, the Senior Safety Working Group produced a falls prevention calendar which has been distributed by Mackay City Council and at Mackay Community Health Centre.

The first meeting for 2006 will explore the possibility of incorporating crime prevention initiatives into its falls prevention activities.

A scan of other activities undertaken by Senior Safety Working Groups around the world has also highlighted potential areas of activity for 2006.



FOR MORE INFORMATION

To find out more about the Mackay Whitsunday Safe Communities visit: http://www.safecommunitiesald.org/modcore/HomePage/frontend/index. asp Or contact Bruce Green 49450215, 0407965827 or email

bruce green@whitsunday gld gov au

MACKAY WHITSUNDAY SAFE COMMUNITIES PROGRESS REPORT – JUNE 2006

MACKAY / WHITSUNDAY WHO SAFE COMMUNITIES Progress Report - June 2006

This is the second in a series of quarterly reports to update the Mackay Whitsunday communities of the Safe Communities project.



Background

In August 2004 the Local Government Areas of Mackay and Whitsunday became Queensland's first World Health Organisation (WHO) designated Safe Communities.

The Mackay Whitsunday WHO Safe Communities Project was established in 2000 as a response to above average injury rates identified in the region. The WHO Safe Communities framework has proven to be an effective means of reducing injury throughout the world, and the criteria and processes of this framework have guided the activities of a number of Working Groups which have addressed specific injury issues in our region. By continuing to observe these criteria the Mackay Whitsunday WHO Safe Communities plan to continue their work on local injury reduction.

- An infrastructure based on partnership and collaborations, governed by a cross-sectional group that is responsible for safety promotion in their community.
- Long-term, sustainable programs covering sexes and all ages, environments, and situations.
- Programs that target high-risk groups and environments, and programs that promote safety for vulnerable groups.
- 4. Programs that document the frequency and causes of injuries.
- Evaluation measures to assess programs, processes and effects of changes.
- Ongoing participation in national and international Safe Communities networks.

Occupation Health and Safety Working Group Passport to Safety – School Seminars

Young people are especially vulnerable to workplace injury. Fifty percent of senior school students are already in the workforce and the Queensland Injury Surveillance Unit estimates that these workers are injured at twice the rate of other workers.

Passport to Safety (Mackay) is an Occupational Health and Safety (O H & S) Promotion program targeting senior school students. The program is offered by the Occupational Health and Safety Working Group of Mackay Whitsunday WHO Safe Communities in collaboration with Thiess Australia Pty Ltd.

The project was launched in April with members of the Occupational Health and Safety Group and Medical Students from James Cook University facilitating Workplace Safety Workshops at Mackay North State High School and Mackay State High School. A multimedia presentation combined with student role playing of the ripple down effects of a workplace injury engaged the students. Teacher in-services on the Passport to Safety Website have also been conducted. Students started the web page training module in early May and we look forward to the first group of graduates of the program in early June.

South African Safari

Dr Dale Hanson represented Mackay Whitsunday WHO Safe Communities at two International Safety Promotion Conferences which were held on the African Continent in April.

Dr Hanson said that "South Africa faces huge challenges in ensuring the safety of its citizens, with very high rates of intentional and non intentional injury. However, one advantage of these problems being so "in your face" is that Government, communities and citizens all acknowledge the problem and there is a high level of commitment to address the issues. It is very pleasing to report that ten years post apartheid, substantial progress has been made. In particular, rates of crime and intentional injury are falling. This is no small achievement. However, significant challenges remain with unintentional injury, particularly road traffic injuries".



The conferences were a great opportunity for Dr Hanson to network with colleagues from Norway, Sweden, USA, New Zealand and Australia. "We all face the same challenges in trying to build commitment, mobilise resources and maintain momentum. While we are proud to be the first WHO designated Safe Community in Queensland, the ongoing process of becoming a safe community takes long term commitment and tenacity".

"Professor Leif Svanstrom (father of the International World Health Organisation Safe Communities Network) personally congratulated us on our efforts locally, nationally and internationally, promoting community safety. Well done, Mackay Whitsunday!"

Senior Safety Working Group Update on Projects

The Senior Safety Working Group has ratified its Terms of Reference, identifying its potential to develop existing safety promotion activities for older persons. The group will also seek to increase community awareness of safer behaviours and environments for seniors.

The Working Group has been updated on local projects funded through the *Queensland Health Active Ageing Grants* which include a number of initiatives, the focus of which is on helping seniors to stay physically active. (*Physical activity increases bone strength, flexibility and balance, and so reduces the risk of a fall injury*).

Future activities for the Senior Safety Working Group include exploring opportunities to:

- undertake an audit of local shopping centres (thank you to Townsville Thuringowa Safe Communities for sharing your survey);
- work with Council to enhance footpath safety; and
- collaborate with local builders in the establishment of display home which incorporates safety features.

Alcohol and Injury Working Group Current Projects

The Group has three current projects.

- 'Choices' is an interactive drama presentation by the Mackay Conservatorium of Music to prepare year 12 students for Schoolies Week. The cast, crew, and other stakeholders of 'Choices' began work in May on the 2006 production, in order to be ready for end of school year.
- 'Think Drive', is a project to address the issue of drink driving and its 'designated driver' component shows signs of having become an established custom in many Mackay City Centre licensed premises.
- 'Girlfriends' is a multistrategic pilot project to enhance the safety of young female drinkers in the Mackay City Centre. The trial was completed in 2005 and is awaiting finalisation of a number of evaluation processes and production of a final report.

5 Ways to Safety Workshop

Congratulations to facilitators Pam Longland, from the Department of Emergency Services and Sergeant Rodney Bell, the State Neighbourhood Watch Coordinator who organised a very successful community safety workshop in Mackay on the 12th May.

The team of presenters, who included local representatives from the Department of Emergency Services and the Queensland Police Service, provided an overview of the programs which are available to enhance community safety.

These programs are:

- 1. CPR for Life
- 2. Safehome
- 3. Disaster Preparedness
- 4. Personal Safety Strategies Training
- 5. Home Security Assessment

Later there was the opportunity for the audience, many of whom were community members involved in local Neighbourhood Watches, to learn more about safety networks which exist in the Mackay and Whitsunday areas. Bruce Green, Chair of the Mackay Whitsunday Safe Communities Network Support Group, provided an overview of this WHO injury-prevention program, and John Mallett updated all on the Building Safer Communities Action Teams, which are implementing the Strategic Framework for Community Crime Prevention.

The Regional Managers Coordination Network presentation from Adrienne Burke enabled the audience to learn more about how Government departments work together to improve community outcomes.

For more information contact your local DES or QPS Crime Prevention Unit.



Childhood Injury Prevention (ChIPP) Working Group Working Towards Sustainability

The ChIPP Working Group continues to work on its falls prevention project. To date the group has examined data on Emergency Department presentations and consulted with its client group to identify the following objectives:

- Increase community awareness of situations in which serious injury can result from a fall.
- Ensure appropriate choice of toys for children in this age group.
- Increase community awareness of, and compliance with, Australian Standards for nursery furniture and equipment.
- Skill primary carers and care providers in choosing and correctly using safe nursery furniture and equipment.
- Promote "Smart House" design and increase use of safety devices and practices.
- Advocate for the installation and maintenance of safe playgrounds.

Sustainability is a key consideration in program development and the Working Group is to be congratulated on their forward thinking in developing a five-year plan to reduce falls related injuries in children aged under five years in Mackay.

Sustainability is also the focus of the ChIPP Mid-term Evaluation Report which will be produced by Injury Prevention and Control Australia Ltd. and made available in June.

FOR MORE INFORMATION

To find out more about the Mackay Whitsunday Safe Communities visit: http://www.safecommunitiesqld.org/modcore/HomePage/ frontend/index.asp Or contact Bruce Green 49450215, 0407965827 or email bruce.green@whitsunday.qld.gov.au

APPENDIX NINETEEN MWSC DESIGNATION – 30th AUGUST 2004



KAROLINSKA INSTITUTET Department of Public Health Sciences Division of Social Medicine



WHO COLLABORATING CENTRE

COMMUNITY SAFETY PROMOTION

Councillor J Boyd, Mayor Mackay City Council Civic Centre Gordon Street Mackay, Qld Australia

2004-06-23

Karolinska Institutet, Department of Public Health Sciences, Division of Social Medicine, WHO Collaborating Centre on Community Safety Promotion has decided to appoint Mackay City / Whitsunday Shire as a "Safe Community".

The appointment will take effect in connection to the signing of the agreement during the 108th Queensland Local Government Association (LGAQ) Conference in Mackay 31 August 2004.

Named representatives from Mackay City and Whitsunday Shire are assumed to be present, signing the agreement.

The accreditation will be performed by Associate Professor, Carolyn Coggan, Director, Injury Prevention Research Centre, The University of Auckland, New Zealand in it's capacity as an Affiliate Safe Community Support Centre to the WHO Collaborating Centre on Community Safety Promotion at the Karolinska Institute, Stockholm, Sweden.

Leif Svanström Professor, Chairman WHO Collaborating Centre on Community Safety Promotion

CC: Honowrable Peter Beattie MP Premier Queensland & Minister for Trade Har Warship Julio Boyd Mayor, Mackay City Council His Worship Mario Demartini Mayor, Whitsunday Shire Associate Professor Carolyn Coggan. Director, Injury Prevention Research Centre, The University of Auckland, New Zealand Dale Hanson, Dr. Staff Emergency Physician, Emergency Dept. Mackay Base Hospital

Portal Address SE-171 76 Stockholm Sweden Visiting Address Norrbacka Phone Fax Org. no +46.8.517779.48 +46.8.33.46.93 01.202100.2973.01 Monu/VAT n

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APPENDIX TWENTY ADDRESSING CHILDHOOD INJURY IN MACKAY: A SAFE COMMUNITIES INITIATIVE

The Queensland Government Human Services CEO's Committee established the Child Injury Prevention Project (ChIPP) in 2002. Project Officers were appointed in Mackay and Mt Isa in 2003. This project exemplified the utility of the QISU Injury Surveillance Network to local interventions. The data set has been used extensively to profile childhood injury patterns in the Mackay and Moranbah Health Service Districts and to enable the Mackay ChIPP project to identify priorities, develop solutions and evaluate outcomes.

In 2003 I conducted a epidemiological analysis of all ED injury presentations in children under 15 years of age over a five year period from 1998 to 2002 in the Mackay and Moranbah Health Service Districts using the Mackay ED Injury Surveillance Data Set . This analysis was published by QISU in June 2003 in collaboration with Kelly Hart the newly appointed ChIPP project officer and Kathryn McFarlane, Senior Health Promotion Office with the Tropical Population Health Unit in Mackay to ensure that the local facilitators of the project had an intimate knowledge of the underlying epidemiology but just as importantly to ensure that the report was drafted in a way that made it accessible and understandable to non health professionals engaged in the ChIPP action group, the local media, and the general Mackay Community (Hanson et; al., 2003).

Publications:

Hanson D., Hart K., McFarlane K., Carter A., Hockey R., & Miles E. (2003) Addressing Childhood Injury in Mackay: A Safe Communities Initiative. *Injury Bulletin, 77,* 1–6

Barker R., Hockey R., Hanson, D., Pitt R., Carter, A., & Miles, E. (2003) Addressing Childhood Injury in Mt Isa: A Safe Communities Initiative. *Injury Bulletin, 78,* 1–6

Queensland Injury Surveillance Unit



INJURYBULLETIN

Level 2 Mater Children's Hospital South Brisbane 4101 Phone 07 38408569 Facsimile 07 38401684 Email mail@qisu.org.au URL www.qisu.org.au

QISU collects and analyses data from emergency department injury presentations on behalf of Queensland Health. Participating hospitals represent three distinct areas of Queensland.

QISU publications and data are available on request for research, prevention and education activities.

HOSPITALS:

Mater Children's, Mater Adult, Queen Elizabeth II Jubilee, Princess Alexandra, Redland, Logan, Royal Children's, Mount Isa, Mackay Base, Mackay Mater, Proserpine, Sarina, Clermont, Dysart and Moranbah.

QISU STAFF

Director – A. Prof. Rob Pitt, Paediatric Emergency Director, QISU Director, Mater Children's Hospital Manager – Elizabeth Miles

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Coding /Admin -Patricia Smith, Linda Horth

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No 77 June 2003

Addressing Childhood Injury in Mackay: a Safe Communities Initiative

Dr Dale Hanson, Tom & Dorothy Cook Research Fellow, James Cook University, Kelly Hart, Senior Project Officer, CHIPP, Tropical Public Health Unit Network, Queensland Health, Kathryn McFarlane, Senior Health Promotion Officer, Tropical Public Health Unit Network, Queensland Health, Anthony Carter, Ph.D. Candidate, James Cook University, Richard Hockey, Data Analyst, QISU, Elizabeth Miles, Manager, QISU.

Summary

- Injury is the leading cause of death in children, accounting for one-third of all deaths in those aged 1 to 14 years (compared with 3% of deaths in adults).
- Q In the Mackay and Moranbah Health Service Districts, childhood injury results in an average of 4 deaths, 1,260 hospitalisations and 3,343 Emergency Departments (EDs) presentations per year.
- Q There were 16,715 injury presentations to regional EDs involving children during the 5-year study period (1998 to 2002), 5,007 (30%) in children aged 0-4.
- Immersion incidents (drowning / near drowning) resulted in 4 deaths and 13 ED presentations.
- Transport incidents resulted in 14 deaths and 1,998 ED presentations in children. Three deaths and 231 ED presentations occurred in children aged 0-4. Leading causes of ED presentation in children of this age were bicycle (41%), motor vehicle passenger (34%), & pedestrian (13%) injuries.
- Q Falls resulted in one death and 5,550 ED presentations. 1,953 occurred in children aged 0-4. The most important causes of falls in children of this age were nursery equipment, playground equipment, stairs, balconies and windows, trampolines, and beds including bunk beds.
- Q Poisoning resulted in 398 ED presentations, 313 in children aged 0-4. Half were the result of poisoning by medications and half due to household chemicals.
- Burns resulted in 486 ED presentations, most commonly from hot object burns (214), scalds (174) and flame burns (53).
- Childhood development is rapid and dynamic. Accordingly, the type of injury children suffer is equally dynamic. Each type of injury has its own distinctive age demographic. Significant causes of injury in children aged 0-4 also involve children of primary school age. Interventions targeting young children may be more effective in the context of interventions simultaneously aimed at older children.

QISU is funded by Queensland Health with the support of the Mater Health Service Brisbane

Introduction

Injury is the leading cause of death in children (persons under the age of 15)¹. It is responsible for one third of childhood deaths in Queensland, half of these occurring in children aged 0-4². Childhood injury death rates in Queensland are higher than all other Australian states with the exception of the Northern Territory¹.

Children aged 0-4 years are at greater risk of being hospitalised due to injury than any other age group³.

Three of the four priority injury prevention issues endorsed in the National Injury Prevention Plan⁴ are concerned with injury prevention in childhood:

- falls in children,
- drowning in children,
- poisoning in children.

The Queensland Government's Human Services CEO's Committee Child Injury Prevention Project (CHIPP) ³ jointly sponsored by the Department of Emergency Services and Queensland Health is establishing two demonstration child injury prevention projects in Mackay and Mt Isa using the WHO Safe Communities model. This project provides an excellent opportunity to reduce harm through injury to children living in the Mackay and Moranbah Health Service Districts (MMHSD).

The Mackay Whitsunday Safe Communities Project⁹ is a community based safety promotion project established in February 2000. The project aims to co-ordinate a systematic, inter-sectoral, sustained response to injury in the region. Queensland Injury Surveillance Unit (QISU) is assisting by profiling injury patterns in the MMHSD so that the community can identify priorities and develop solutions.

This report reviews the patterns of childhood injury in the MMHSD. It seeks to identify strategic opportunities to reduce childhood injury in the region, with a particular focus on injury affecting children aged 0-4.



Results

The MMHSD reported 26 childhood deaths due to injury during the period from 1994 to 2000, an average of 4 deaths per year. In children aged 0-4 the leading causes of death were drowning (4) followed by transport (3) and falls (1).

In the 4 year period from July 1998 until June 2002 there were 5,040 hospitalisations in the MMHSD due to injury in children (an average of 1260 hospitalisations per year). 1,331 (26%) were in children less than 5 years of age.

The Mackay Injury Surveillance Network was established in September 1997 as part of the QISU's network⁵. This population based network collects surveillance data from all Emergency Departments (EDs) in the MMHSD. The network reported 57,532 injury presentations to the region in the five year study period (January 1998 to December 2002). 16,715 (29%) were in children less than 15 years old (an average of 3,343 presentations per year). Childhood ED injury presentation rates in the MMHSD are high compared with a similar surveillance network in South Brisbane (Figure 1).

In the MMHSD ED injury presentations initially peak in the toddler age group, and after a slight reduction in early primary school children, rise again in adolescence (Figure 2).

Drowning

Four deaths due to drowning were reported in the MMHSD in the 5 year period from 1994 to 2000; all were children aged 0-4 years. Three of these incidents occurred in domestic swimming pools while one occurred in the bath.

There have been 13 presentations to regional EDs due to near drowning between 1998 and 2002, 10 occurring in children less than 5 years of age (Table 1).



Figure 2: QISU ED injury presentation rates MMHSD by age (1998 - 2002)

	ED presentations			
	0-4 years	0-14 years		
Domestic swimming pool	5 (45.5%)	5 (38%)		
Public / resort pool	1 (9%)	3 (25%)		
Bath	4 (36.5%)	4 (31%)		
Garden Pond	1 (9%)	1 (8%)		

Table 1: QISU near drowning ED presentations for 0-4 years and 0-14 years by place (1998 - 2002)

A number of interventions have been shown to reduce pool drownings ^{3, 6}:

- Review state legislation to improve standards for domestic swimming pool fencing and enforce these standards,
- Obtain local government support for regular pool fence inspections.
- 3 Develop and distribute information regarding fencing requirements to pool builders and real estate associations,
- 4 Promote CPR training and the installation of CPR instruction charts around all domestic pools.

The occurrence of a drowning death and three ED presentations from near drowning in the bath is of concern. Awareness of the need for adequate supervision of any small child in the bath needs emphasis along with the dangers of baby bath seats.

Transport

The region reported 14 transport related deaths in children between 1994 and 2000. Three occurred in children aged 0-4 (2 motor vehicle passengers, 1 go-kart).

In this period there were 1,998 ED presentations of childhood transport injury (12% of childhood ED injury presentations). Of these 1,273 (7.6% of all childhood injury presentations) and 2 deaths were due to bicycle injuries. 655 (51%) occurred on a public road, of these 40 (3%) involved a collision with a motor vehicle.

231 ED presentations occurred in children aged 0-4 (5% of ED presentations in this age group). The leading causes of transport related injury in children in this age group were:

- Motor vehicle passengers 2 deaths and 77 (34%) ED presentations,
- Bicycles 94 (41%) ED presentations,
- Pedestrian 30 (13%) ED presentations, including 11 low speed driveway runovers.

While children aged 0-4 are more likely to experience a bicycle injury at home (56%) than on the road (32%), it is of concern that similar to older children 2% of injuries occur after a collision with a motor vehicle on a public road.

Strategies to reduce bicycle related injury include7:

- Bike Education programs (currently offered to primary school children in the region through the Police Citizens Youth Club),
- 2 Lobby for the provision of bike paths and safe riding areas,
- 3 Encourage parents to stop children under 5 years of age from riding bicycles on roads,
- 4 Promote the use of bike helmets.

The best opportunity for reducing harm from motor vehicle crashes is to increase the effective use of child restraints^{3, 7}:

- Promote use of Queensland Ambulance Service program for the correct fitting of baby capsules and child restraints,
- 2 Encourage the disposal of old capsules and restraints and educate target groups of the dangers of using equipment that has been involved in an impact.

Strategies aimed at reducing pedestrian injury include7:

- 1 Education programs teaching safe road use for pedestrians.
- 2 "Walking bus" programs, providing adult supervised walking from home to school,
- 3 Promotion of the new Department of Housing 'Smart House' design for all new dwellings which recommends driveways and garages be situated separately from child accessible areas,
- 4 Encourage installation of fencing between driveways and play and living areas in houses.

Falls

Falls are the leading cause of ED injury presentations in children. There were 5,550 ED presentations due to falls in the region over the study period which accounted for 33% of all ED injury presentations. 1,953 of these occurred in children aged 0-4 (39% of ED injury presentations in this age group).

High falls (> 1 metre) are more likely to result in hospitalisation and occur in younger children at a rate almost double that of older children (367.7 vs 688.3 per 100,000 per year). Examination of the causes of high falls provides a strategic focus for initial analysis and planning of interventions. Table 3 (page 4) lists the major injury factors associated with high falls by age group.

	ED Presentations	Hospitalisations
Low Falls	4496	425 (9.5%)
High Falls	1054	217 (20.6%)

Table 2: QISU ED presentations and hospitalisations, children (0-14 years) by type of fall (1998 - 2002)

Major injury factor	4	All ages			<1 yoa			1-4 yoa		5-	11 yoa		12-	14 yoa	
Nursery Product	No	%	Rates*	No	%	Rates*	No	%	Rates*	No	%	Rates*	No	%	Rates*
Pram	3	0.3	1.7	1	1.5	8.9	2	0.6	4.3	0	0	0.0	0	0	0.0
Baby walker	18	1.7	10.0	18	27.7	160.7	0	0	0.0	0	0	0.0	0	0	0.0
High Chair	8	0.8	4.4	4	6.2	35.7	4	1.2	8.6	0	0	0.0	0	0	0.0
Cot	5	0.5	2.8	0	0	0.0	5	1.5	10.7	0	0	0.0	0	0	0.0
Change Table	11	1	6.1	8	12.3	71.4	2	0.6	4.3	1	0.2	1.1	0	0	0.0
Other			0.0			0.0			0.0			0.0			0.0
Total	45	4.3	25.0	31	47.7	276.8	13	3.9	27.9	1	0.2	1.1	0	0	0.0
Toy / Playaround Equip													_		
Tree House	20	1.9	11.1	0	0	0.0	5	1.5	10.7	15	2.7	17.2	0	0	0.0
Tricycle	3	0.3	1.7	0	0	0.0	3	0.9	6.4	0	0	0.0	0	0	0.0
Other Toy	1	0.1	0.6	0	0	0.0	0	0	0.0	1	0.2	1.1	0	0	0.0
Flying Fox	15	1.4	8.3	0	0	0.0	1	0.3	2.1		2.5	16.0	0	0	0.0
Monkey Bars	89	8.4	49.4	0	0	0.0	16	4.8	34.3		12.3	79.0	4	4.1	11.4
Slide	36	3.4	20.0	0	0	0.0	19	5.7	40.8	17	3	19.5	0	0	0.0
Swing Other Disurround Equin	34	3.2	18.9	0	0	0.0	9	2.7	19.3	22	3.9	20.2	3	3.1	8.6
Other Playground Equip	24	2.3	13.3	0	0	0.0	62	18.6	19.3	153	2.1	175.1	7	72	20.0
Furnishina	LLL	21	123	0	0	0.0	02	10.0	155.0	100	21.5	113.1		1.2	20.0
Bed	17	1.6	9,4	2	3.1	17.9	9	2.7	19.3	6	1.1	6.9	0	0	0.0
Bunk Bed	60	5.7	33.3	0	0	0.0	23	6.9	49.3	36	6.4	41.2	1	1	2.9
Cabinet	5	0.5	2.8	0	0	0.0	3	0.9	6.4	2	0.4	2.3	0	0	0.0
Chair	15	1.4	8.3	0	0	0.0	10	3	21.5	5	0.9	5.7	0	0	0.0
Sofa	9	0.9	5.0	1	1.5	8.9	4	1.2	8.6	4	0.7	4.6	0	0	0.0
Table	20	1.9	11.1	5	7.7	44.6	12	3.6	25.7	3	0.5	3.4	0	0	0.0
Other Furniture	4	0.4	2.2	0	0	0.0	3	0.9	6.4	1	0.2	1.1	0	0	0.0
Total	130	12.3	72	8	12.3	71.4	64	19.2	137.3	57	10.2	65.2	1	1	2.9
Appliance	2	0.2	11	1	1.5	8.0	1	0.2	2.1	0	0	0.0	0	0	0.0
I Itensil or container	2	0.2	1.1	1	1.0	0.9	1	0.5	Z.1	0	0	0.0	0	0	0.0
Clothes line	3	0.3	17	0	0	0.0	2	0.6	4.3	1	0.2	11	0	0	0.0
Shopping Trolley	15	1.4	8.3	1	15	8.9	14	4.2	30.0	0	0	0.0	0	0	0.0
Other	3	0.3	1.7		0	0.0	1	0.3	2.1	1	0.2	1.1	1	1	2.9
Total	21	2	11.7	1	15	89	17	51	36.5	2	04	23	1	1	29
I ransport related fails		-			1.0	0.0		0.1	00.0	_	0.1	2.0			2.0
Car	6	0.6	3.3	0	0	0.0	3	0.9	6.4	2	0.4	2.3	1	1	2.9
Truck	5	0.5	2.8	0	0	0.0	0	0	0.0	3	0.5	3.4	2	2.1	5.7
Utility	6	0.6	3.3	0	0	0.0	2	0.6	4.3	4	0.7	4.6	0	0	0.0
Trailer	4	0.4	2.2	0	0	0.0	2	0.6	4.3	2	0.4	2.3	0	0	0.0
Pushbike	6	0.6	3.3	0	0	0.0	0	0	0.0	5	0.9	5.7	1	1	2.9
Other	2	0.2	1.1	0	0	0.0	0	0	0.0	1	0.2	1.1	0	0	0.0
Total	29	2.7	16.1	0	0	0.0	7	2.1	15.0	17	3	19.5	4	4.1	11.4
Sport	105			<u> </u>	0			10.0			10.0	00.4	40		04.0
Prost other	125	11.8	14.4	0	0	0.0	36	10.8	11.2	17	13.8	00.7 10.5	12	12.4	34.3
Sport - Ouler Total	151	1/1 3	14.4	0	0	0.0	20	11 /	4.3	0/	16.9	19.5	20	20.6	57.2
Tool	101	14.0	04	0	0	0.0		11.4	01.5	04	10.0	101.0	20	20.0	51.2
Ladder	13	1.2	7.2	0	0	0.0	4	1.2	8.6	8	1.4	9.2	1	1	2.9
Scaffolding	2	0.2	1.1	0	0	0.0	0	0	0.0	0	0	0.0	2	2.1	5.7
Total	15	1.4	8.3	0	0	0.0	4	1.2	8.6	8	1.4	9.2	3	3.1	8.6
Natural Object / animal															
Tree / plant	156	14.8	87	0	0	0.0	18	5.4	38.6	113	20.2	129.3	25	25.8	71.4
Dropped by human	13	1.2	7.2	4	6.2	35.7	4	1.2	8.6	3	0.5	3.4	2	2.1	5.7
Other natural object	15	1.5	0.3	1	1.5	0.9	2	0.6	4.3	122	1.3	0.0	22	5.Z	14.3
Structure	104	17.4	102	5	1.1	44.0	24	1.2	51.5	123	22	140.0	32		91.4
Window	16	1.5	8.9	1	1.5	89	10	3	21.5	5	0.9	57	0	0	0.0
Stairs	98	9.3	54.4	16	24.6	142.9	53	15.9	113.7	23	4.1	26.3	6	6.2	17.1
Fence / wall	39	3.7	21.6	0	0	0.0	7	2.1	15.0		4.3	27.5	8	8.2	22.9
Balcony	37	3.5	20.5	1	1.5	8.9	20	6	42.9	14	2.5	16.0	2	2.1	5.7
Roof	20	1.9	11.1	0	0	0.0	3	0.9	6.4	12	2.1	13.7	5	5.2	14.3
Other structure	21	2	11.7	1	1.5	8.9	6	1.8	12.8	12	2.4	13.7	3	3.1	8.6
Total	231	21.9	128	19	29.2	169.6	99	29.8	212.3	90	16.1	103.0	24	24.7	68.6
	0	0.0		0	0	0.0	4	0.0	0.4	A	0.7	10	2	2.4	57
Miscellaneous	ŏ	U.8	4.4	U	U	0.0	I	0.3	2.1	4	U.7	4.0	2	2.1	J.1
Total	17	1.6	9.4	0	0	0.0	2	0.6	4.3	11	2	12.6	3	3.1	8.6
Grand Total	1054			65	-		332			560	_		97		

Six strategic areas for intervention are evident. In order of priority, they are:

- 1 Falls involving nursery equipment 45% of high falls in children under 1 year old. Of particular importance were falls from baby walkers (28%), change tables (12%) and high chairs (6%). Falls from prams and strollers account for 11% of low falls in children under 1 year old.
- 2 Falls from stairs 25% of high falls in children less than 1 year old, 16% of high falls in children aged 0-4.
- 3 Falls from playground equipment 15% of high falls in children aged 0-4. Leading causes include slides (6%), monkey bars (5%) and swings (3%).
- Falls from trampolines 14% of high falls in children aged 0-4.
- 5. Falls from balconies and windows 1 death, 9% of high falls in children aged 0-4.
- Falls from beds bunk beds account for 7% of high falls in children 0-4. Falls from beds account for 22% of low falls in children less than 1 year old and 7% of low falls in children aged 0-4.

Effective interventions to prevent falls include :

- 1 Nursery furniture³
 - Promote the removal of baby walkers and unsafe nursery equipment
 - Educate and motivate local retailers and second-hand dealers to supply goods which are compliant with current Australian Standards
 - Devise checklists for consumers to assist in the identification of unsafe nursery products.
- 2 Playground equipment 3, 6
 - Obtain support from Local Government and State and Private Schools for the installation and maintenance of 'safer playgrounds'
 - Conduct an audit of playgrounds situated in public parks, schools, preschool and childcare centres.
 - Devise a playground safety checklist to be distributed to all child care centres and home carers.
- 3 Stairs ³
 - Promote the use of stair guards.
- 4 Trampolines⁸
 - Encourage supervision of children aged 0-4
 - Clarify and promote rules for using trampolines
 - Promote the use of protective padding
 - Provide advice on appropriate positioning of trampolines including safe fall zone.

(Facing page - p4)

Table 3: QISU child (0-14 years) ED presentations for high falls (> 1 metre) by major injury factor (1998 - 2002) *Rates per 100,000 per year

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- 5 Balconies & windows 3.6
 - Encourage builders and property owners to comply with Australian standards for balcony rails and window guards.
- 6 Bunk Beds 3
 - Encourage retailers and second hand dealers to comply with Australian standards and provide point of sale advice,
 - Discourage use by children aged less than 6 years.

Poisonings

There were 398 ED presentations due to poisoning over the 5 year study period. 313 occurred in children aged 0-4 (6.3% of all ED injury presentations in this age group). Half were the result of poisoning by medications and half due to household chemicals. Fifty four percent of ED poisoning presentations were admitted to hospital. Poisoning accounted for 11.9% of all ED injury admissions in children.

Interventions useful in reducing unintentional poisonings include³:

- 1 Extend the use of child resistant closures to include essential oils and all household chemicals,
- 2 Promote the installation of and use of child resistant poisons cabinets in all homes,
- 3 Promote use of non toxic household chemicals for cleaning, pest control and personal hygiene,
- 4 Encourage the effective disposal of unwanted household chemicals and medications,
- 5 Provide poisons centre information and contact numbers to households.

Burns

There were 486 ED presentations due to burns (Table 4). Of the 441 thermal burns, 219 were in children aged 0-4 (4.3% of injury presentations in that age group). 8.1% of ED thermal burn presentations required admission to hospital.

A disproportionate number of hot object burns (eg irons, vehicle exhausts) presented to the non-urban hospitals in the MMHSD (Table 5).

	ED presentations
Hot object burns	214 (44.0%)
Scalds	174 (35.8%)
Flame burns	53 (10.9%)
Chemical burns	19 (3.9%)
Sunburn	17 (3.5%)
Friction burns	9 (1.9%)

Table 4: QISU child (0-14 years) ED presentations by type of burn (1998-2002)

Hospitals	ED presentations	ED presentation rate (per 100,000 per year)
Mackay city	94	290.4
Non-urban	119	702.9

Table 5: QISU child (0-14 years) ED presentations for hot object burns, Mackay city and non-urban hospitals (1998 - 2002)

Effective interventions to reduce the occurrence of burns include^{3, 6}:

- 1 Promote installation of smoke alarms and safety switches in rental properties and older dwellings,
- 2 Increase number of homes with hot water temperature regulation (thermostat reduction / tempering valves),
- 3 Educate and engage support of local plumbers and electricians to promote safety devices,
- 4 Encourage local retailers/suppliers to stock and promote safety products (eg. stove guards),
- 5 Encourage installation of stove top rail guards,
- 6 Promote and provide samples of spill proof mugs for use around young children.

Discussion

In the MMHSD injury resulted in an average of 4 deaths, 1260 hospitalisations and 3343 ED presentations per year.

This paper identifies strategic opportunities to reduce harm from injury to children living in the MMHSD, particularly injury affecting children aged 0-4.

While the predominate focus of this analysis has been on children aged 0-4, it is clear that many significant causes of injury in children in this age group also effect children of primary school age. Childhood development is rapid and dynamic; the patterns of injury observed in this study reflect this dynamism. Each injury type has a unique demographic footprint. It is unhelpful to analyse injury causation and plan interventions based on 5 year age groups in a phase of human development that is so rapidly evolving.

Queensland Injury Surveillance Unit. 2000;63:1-4.

Some interventions targeting children aged 0-4 may be more effective in the context of interventions simultaneously aimed at older children.

Mass media campaigns and targeted education programs work best in the context of a broad integrated approach. Effective interventions seek to develop and strengthen community self-sufficiency while at the same time producing social and environmental changes that reduce the risk of injury.

The Mackay Whitsunday Safe Communities Project⁹ is a community based safety promotion project established in February 2000. The project aims to co-ordinate a systematic, inter-sectoral, sustained response to injury in the region. By involving the community in finding their own solutions, it hopes to be a catalyst for structural, sociological and political change that empowers the community, to change their environment and their behaviour to reduce the risk of injury.

In Mackay a unique combination of: QISU population based local surveillance system to inform strategic planning, the expertise of two tertiary universities (James Cook University and University of Queensland), an established credible community based action group, state government commitment and a full time local project co-ordinator, provide our community with its best opportunity to work together to reduce the incidence of chidhood injury in our community.

Conclusion

Injury is an important cause of morbidity for children living in the Mackay and Moranbah Health Service District. The Human Services CEO's Committee Child Injury Prevention Project³ provides an excellent opportunity to reduce harm through injury to children in the Mackay community.

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APPENDIX TWENTY ONE ECOLOGICAL MODELS FOR THE PREVENTION AND CONTROL OF UNINTENTIONAL INJURY

This chapter discussing the ecological basis of injury prevention and safety promotion was published in the textbook "Injury and Violence Prevention: Behavioural Science Theories, Methods, and Applications" edited by Andrea Gielen, David Sleet and Ralph DiCemente, and published by Jossey Bass in April 2006.

Editor David Sleet was a keynote speaker at 6th Australian Injury Prevention Conference and 2nd Pacific Rim Safe Communities Conference held in Mackay in September 2004, which I co-convened with Kathryn McFarlane. During the conference, I discussed my research and gave Dr Sleet a copy of "Reducing Injuries in Mackay North Queensland" edited by Associate Professor Reinhold Muller and published in 2002 by Warwick Educational Publishing. Dr Sleet was particularly interested in the chapter entitled "Safe Communities: an Ecological Approach to Safety Promotion" authored myself in collaboration with Paul Vardon and Jacqui Lloyd (see chapter five of this thesis). As a result I was invited to co- author a chapter on Ecological Models of Unintentional Injury Prevention with John Allegrante, senior professor of health education at Teachers College, Columbia University and President of the National Centre for Health Education(USA), and Ray Marks, associate professor of health education at Columbia University.

The initial draft of the chapter had already been completed by John Allegrante and Ray Marks when I became involved in the project. I contributed a number of new sections to the manuscript, which were ultimately incorporated into the introduction and the conclusion, resulted in a major revision of the section of ecological models, and new sections on Community Safety Promotion and WHO Safe Communities. John Allegrante as senior author retained final editorial control over the manuscript. However as noted above, my contribution to the final version of the manuscript was substantial.



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Dale W. Hanson is the Tom and Dorothy Cook Research Fellow in Public Health with the School of Public Health and Tropical Medicine at James Cook University of Australia. He graduated from Flinders University of South Australia in 1982 with a degree in medicine. Hanson initially worked as a community family physician before returning to the hospital system to train in emergency medicine. He was awarded a fellowship of the Australasian College for Emergency Medicine in 1996. He has since worked as staff emergency physician at Mackay Base Hospital in regional Queensland. Concerned with the high rate of injury he observed during his clinical practice, he developed an interest in injury research and safety promotion, completing a master's degree in public health and tropical medicine at James Cook University in 2000. His research interests include ecological models of safety promotion with a particular focus on inducing and sustaining change within community social systems. In 2002 the Australian Injury Prevention Network awarded him its biennial award for meritorious practice in injury prevention.

Ray Marks is associate director at the National Center for Health Education and adjunct associate professor of health education at Teachers College, Columbia University. In 2000, she was the recipient of a SOPHE/CDC Injury Prevention Fellowship Award. Marks has been an Andrew Stewart Research Scholar and a Province of Alberta Fellow in Canada, a John Dewey Scholar at Teachers College, and the recipient of a New York Arthritis Foundation Dissertation Research Fellowship Award. She has conducted numerous professional presentations worldwide, authored or coauthored many publications, and served as a consultant to numerous universities, research groups, and consortia across the globe in the areas of chronic arthritis management and prevention of arthritis-related disability. She currently cochairs the Society for Public Health Education Ethics Committee.



CHAPTER SIX

ECOLOGICAL MODELS FOR THE PREVENTION AND CONTROL OF UNINTENTIONAL INJURY

John P. Allegrante, Ray Marks, Dale W. Hanson

We generally accept the notion that optimal health status and high quality of life enable humans to lead productive lives and contribute to the overall social and economic stability of society. Achieving the utopian ideal of optimal health, however, is not a simple task. The task is made complex because health is not merely a product of individual biological, psychological, and behavioral factors; it is the sum of collective social conditions and the nexus of transactions that is created when people interact with the environment in which they live, work, and play. Simply knowing the pathological causes of a disease or unintentional injury is not enough to achieve the goal of improving health status (Haignere, 1999). Improving health and preventing unintentional injury require attention to the entire social system.

Despite a history dating back to John Snow, whose intervention to stem the 1854 cholera epidemic in London demonstrated the importance of social systems for maintaining human health (Centers for Disease Control and Prevention, 2004), a pervasive ideology of individualism has increasingly colonized public health science and practice (Lomas, 1998). Much of our thinking about health and disease causation has been dominated from almost the start of the twentieth century by the prevailing medical model (Engel, 1977). By extension, injury prevention has been conceptualized as a biomedical construct in which injury is perceived to be a physical event resulting from the sudden release of environmental energy that produces tissue damage in an individual. This reductionist perspective is not only

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narrow and ill conceived, it overlooks the importance of the psychological, environmental, and sociocultural factors as individual and collective contributory determinants of injury.

William Haddon, the father of modern injury prevention, prophetically introduced the concept of ecological injury prevention with publication of his seminal paper, "On the Escape of Tigers: An Ecological Note" (Haddon, 1970). Until then, individual behavior was perceived to be the preeminent cause of an accident. But Haddon argued it did not follow that changing individual behavior was the most effective means by which to prevent injury. In the context of the prevailing epidemiological model of causation in which the agent, host, and environment interact, he highlighted the opportunities for harm reduction through redesign of the physical environment. Moreover, he argued that by preventing or dissipating the adverse release of energy, it was possible to minimize the chance of injury without necessarily preventing the accident (Haddon, 1980). By doing so, Haddon precipitated a major paradigm shift from accident prevention to injury prevention.

Now, three decades later, much has been achieved on the strength of this change in paradigm. Health promotion has embraced an ecological perspective on health that realizes the importance of both the physical and social environments and the interaction of the individual with the environment. Mounting evidence suggests that the social and economic environments exert profound and lasting effects on health status and on the incidence, prevalence, and severity of discase and unintentional injury (Laflamme, 2001; Petridou & Tursz, 2001). However, despite evidence suggesting that influences outside the individual play an important role in determining health, the application of this knowledge has not yet been a major focus of intervention policy in the context of the prevention and control of unintentional injury. Perhaps we need to revisit Haddon's original thinking, reappraise the best opportunities for harm reduction within the ecological framework, and ask whether we can capitalize on what has been achieved through reengineering the physical environment by going a step further and simultaneously reengineering the social environment (Hanson et al., 2005).

In this chapter, we describe the potential of the ecological model for understanding the antecedent causes of unintentional injuries and guiding intervention for their prevention and control. First, we briefly review the scope and impact of unintentional injuries. Second, we review the origins and conceptualize the elements of the ecological model, using the injury iceberg as a useful metaphor for understanding the multiple levels of intervention required in an ecological approach to injury. We conclude with some applications of the ecological model to the prevention and control of unintentional injury and community safety promotion.

Ecological Models for the Prevention and Control of Unintentional Injury

Scope and Impact of Unintentional Injuries

According to the U. S. National Academy of Sciences (2003), unintentionial injury is under-recognized as a major public health problem. Regardless of gender, race, or economic status, injuries are a leading cause of premature death for people of all ages in the United States and other nations with advanced economies.

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Deaths due to unintentional injury are only part of the picture. Millions of Americans are injured each year and survive. Sustaining an injury not only causes temporary pain and inconvenience for many; for some, a single injury can result in lifelong disability, chronic pain, and a profound change in the individual's lifestyle. However, although scientific advances and medical technologies have significantly improved the overall health status of advanced nations in the past forty years, unintentional injuries continue to threaten the health of millions. This is largely due to the fact that injury prevention and control have not been perceived as a major public health issue. Rather, injuries have been viewed as unavoidable accidents that are part of everyday life.

A large body of epidemiological and medical research, however, shows that injuries, unlike accidents, do not occur by chance. The science of injury prevention has clearly demonstrated that injuries, and the events leading up to them, are not random. Like disease, the risk of injury follows a predictable pattern. Studying these patterns has made it possible to prevent injuries from occurring and has the potential to decrease injury-related death, disability, and financial burden (Krug, 1999).

Two types of unintentional injury constitute much of the burden of injuryrelated death and disability in the United States and in most other nations with advanced economies: injuries due to falls and road traffic injuries that result from motor vehicle crashes. These two mechanisms of unintentional injury, both of which have complex antecedents, suggest an array of potential prevention and control strategies that can be aimed at the individual, as well as at the environmental setting in which these injuries occur. Thus, strategies that target both the individual and the environment are more likely to be successful in lowering the prevalence of injuries than any single preventive strategy.

Injuries Due to Falls

Data on injuries due to falls in the United States show that falls are the leading cause of injury deaths among people sixty-five years and older and that one in every three Americans sixty-five years old or older falls each year (Cesari et al.,

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2002). Of those who fall and survive, 20 to 30 percent suffer moderate to severe injuries that often reduce mobility and limit independence (Sattin et al., 1990). Falls also result in hip fractures, which have devastating impacts on survival and health outcome among the elderly (Marks, Allegrante, MacKenzie, & Lane, 2003) and increase the risk of premature death (Alexander, Rivara, & Wolf, 1992). Preliminary data for 2003 show that over fifty-eight thousand people, most of whom are elderly, will have died (an age-adjusted rate of 19.9 per 100,000) from fall-related injuries (Hoyert, Kung, & Smith, 2005). Falls are also the leading cause of nonfatal unintentional injuries and emergency department visits for children between the ages of zero and fourteen (Barnes, Adams, & Schiller, 2001). Each year in the United States, falls among this age group account for an estimated 2.5 million emergency department visits (Centers for Disease Control and Prevention, 2005b). In addition to the costs in terms of physical disability, the direct economic costs of treating fall-related injuries are substantial (Englander, Hodson, & Terregrossa, 1996).

A growing body of research evidence now indicates that among the elderly, factors likely to contribute to initial and subsequent falls and fall-related injuries include physical frailty, muscle weakness (Branch, Katz, Kneipmann, & Papsidero, 1984; Tinetti, Speechley, & Ginter, 1988), visual impairments, use of psychoactive medications, and difficulties with gait and balance (Sorock, 1988; Tinetti & Speechley, 1989; Tinetti, Doucette, Claus, & Marottoli, 1995; Wolfson, Judge, Whipple, & King, 1995). In addition to these individual predisposing factors, environmental risk factors for falling include slippery floor surfaces, uneven floors, poor lighting, loose rugs, unstable furniture, obstacles, and objects on floors (Speechley & Tinetti, 1990). Among children, fall-related risk factors are similarly multidimensional for falls from windows and beds and falls that occur on the playground (Dal Santo, Goodman, Glik, & Jackson, 2004). Such falls are due to a combination of human and environmental factors. Thus, what emerges from the epidemiological research that has been conducted to date is that the etiology of falls is sufficiently complex to warrant a falls prevention model that addresses both environmental factors, such as the physical setting in which people live, and individual determinants, such as the physiological and physical status of the individual and behaviors that place the individual at risk for a fall. Multifactorial intervention approaches have shown promise in reducing the risk of falling in community settings (Tinetti et al., 1994; Tinetti & Speechley, 1991).

Road Traffic Injuries

Although road traffic death rates declined dramatically throughout the twentieth century, motor vehicle crashes are the leading cause of injury mortality in the United States for people aged one to thirty-four. The Centers for Disease Control and Pre-

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vention (CDC) reports that more than 41,000 people die on the nation's roads and highways, with more than 3 million suffering nonfatal injuries (Centers for Disease Control and Prevention, 2005a). Of those who died in motor vehicle crashes, 5,586 were teenagers, 2,055 were children, and nearly 8,000 were sixty-five years of age and older. Annually, this results in approximately 500,000 hospitalizations and over 4 million visits to the emergency department. Moreover, motor vehicle–related deaths and injuries account for more than \$150 billion in costs each year.

Like falls, motor vehicle crashes and their associated injuries have multiple determinants; however, because of the weak behavioral technologies of the past, efforts to prevent injuries have largely focused on passive approaches. Nonetheless, with the decline in the potential for further engineering improvements, it has become clear that in addition to other considerations, behavioral modification is essential to effective road safety (Lonero & Clinton, 1997).

Because of the evidence from a wide variety of studies that have shown that even the simplest behavior is determined by a complex mix of biological, psychological, and sociocultural factors, the consensus among experts is that behavior change is most likely to occur in the context of comprehensive, multisectoral, participative, and socially supportive interventions (Lonero & Clinton, 1997). Road safety interventions thus need to incorporate an ecological approach (a mix of behavioral, environmental, and policy approaches) if we are to continue to make progress in the prevention of motor vehicle crashes and associated injuries.

The Ecological Model

Concepts underlying the ecological model date back to the early twentieth century when Park, Burgess, and McKenzie (1925) are believed to have coined the term *human ecology*, extrapolating the theoretical paradigm of plant and animal ecology to the study of human communities. More recently, Last (1995) defined *ecology* as "the study of relationships among living organisms and their environment" (p. 52), while *human ecology* refers to the "study of human groups as influenced by environmental factors, including social and behavioral factors" (p. 52).

Interventions that simultaneously influence multiple levels and multiple settings of an ecological system may be expected to lead to greater and longer-lasting changes in health outcomes (Cohen & Swift, 1999). This notion is supported by emerging data indicating that multiple determinants account for premature deaths occurring in the United States and other advanced economies. McGinnis, Williams-Russo, and Knickman (2002) have attempted to enumerate and quantify these determinants. They have estimated that genetic predisposition accounts for 30 percent of early deaths; social circumstances, 15 percent; environmental

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factors, 5 percent; behaviors, 40 percent; and shortfalls in medical care for 10 percent of all premature deaths. It follows, then, that the most effective interventions to address multiple influences occur at multiple levels (Smedley & Syme, 2000).

Despite growing acceptance of the multiple determinants of health, according to Stokols (1992, 1996), health promotion programs often lack a clearly specified theoretical foundation or are based on narrowly conceived conceptual models that fail to take into account the individual's interactions with the physical and social environments. This perspective has grown out of rich history and conceptual background that underlies contemporary thinking about ecological models and is grounded in both psychology (Sells, 1969) and the science of public health (Sallis & Owen, 2002). For example, B. F. Skinner's work (1953) showing how the environment could shape animal behavior, Kurt Lewin's concept (1966) of ecological psychology and environmental forces, and Albert Bandura's notion (1977) of reciprocal determinism and person-environment interactions in social learning theory all constitute psychology's recognition of the multiple influences of the environment on human behavior.

Although the ecological approach was inherent in Snow's decision to take the handle off the Broad Street pump and thus constitutes the first true application of ecological thinking in public health, Edward Rogers (1960) was one of the first to advance the conceptual and potentially pragmatic value of ecological models in organized public health efforts. This ecological perspective—especially as applied to changing health behavior—was furthered by Moos (1980), Green and McAlister (1984), and McLeroy, Bibeau, Steckler, and Glanz (1988). As noted by McLeroy et al., "The purpose of an ecological model is to focus attention on the environmental causes of behavior and to identify environmental interventions" (1988, p. 366) that can be used to improve health. Green and Kreuter (2005) have expanded on this by proposing a socioecological program planning model of health promotion where health and safety can be interpreted in the context of the whole (ecological) system. There are three dimensions to this system: (1) the individual and his or her behavior, (2) the physical environment, and (3) the social environment. According to Green and Kreuter, each dimension can be analyzed at five levels:

- 1. The *intrapersonal level*, which is concerned with characteristics of the individual, that is, his or her knowledge, skills, life experience, attitudes, and behaviors as they interface with the environment and society.
- 2. The *interpersonal level*, which refers to the immediate physical environment and social networks in which an individual lives, including family, friends, peers, and colleagues and coworkers.
- 3. The *organizational level*, which refers to commercial organizations, social institutions, associations, clubs, and other mediating structures. They have structures, rules, and regulations enabling them to pursue specific objectives and

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have direct influence over the physical and social environments maintained within their organization.

- 4. A community, which may be defined in both structural and functional terms. Structurally, a community can be defined within geographical or political boundaries. Functionally, a community may share demographic, cultural, ethnic, religious, or social characteristics, with its members having "a sense of identity and belonging, shared values, norms, communication and helping patterns" (Green & Kreuter, 2005, p. 256).
- Societies, which are larger systems, often defined along political boundaries, possessing the means to distribute resources and control the lives and development of their constituent communities.

To better understand the multiple levels of intervention required in an ecological approach to injury prevention and control, Hanson and colleagues (2005) have proposed a visual metaphor, the *injury iceberg*, showing the relationship of the individual to the physical and social environment and levels of intervention (Figure 6.1).

The individual is, metaphorically speaking, the tip of the iceberg—just one part of a complex ecological system with many levels. While the individual may be the most visible component of this system, important determinants of their behavior and environmental risk are "hidden below the waterline." Attempts to modify the risk of injury at one level in isolation (for example, individual behavior) will be resisted by the rest of the system, which will attempt to maintain its own internal stability (homeostasis). Syme and Balfour (1998) have observed that "it is difficult to expect that people will change their behavior easily when many forces in the social, cultural, and physical environment conspire against such change. If successful behavior modification programs are to be developed to prevent disease, more attention will need to be given not only to the behavior and risk profiles of individuals, but also to the environmental context in which people live" (p. 796). Such a statement constitutes a strong argument for ecological approaches to change.

The socioecological paradigm emphasizes the dynamic interface among the three dimensions—the individual, the physical environment, and the social environment—acting at five levels: intrapersonal, interpersonal, organizational, community, and societal. They provide the ecological context in which the individual acts. Each level is built on the foundation of a "deeper" level. As these deeper levels become larger and exercise more inertia, it becomes more difficult to change them. But once changed, these levels are more likely to sustain the desired outcome (Swerissen, 2004). This ecological model provides a complex web of causation and creates a rich context for multiple avenues of intervention. It can be used to map the key links in an accident sequence, identifying upstream latent failures, along



App. 21. Ecological Models for the Prevention and Control of Unintentional Injuries

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with the more obvious downstream active failures. Identifying the most strategic links thus ensures effective action.

Applications of the Ecological Model in Health Promotion and Injury Prevention and Control

Now that there are ecological models of health promotion, behavior modification, and identified potential strategies for intervention, the ultimate challenge remains: applying what we have learned in the real world. The transition from researching what works (efficacy) to researching how to make it work in a complex social setting (effectiveness) is not as straightforward as many assume (Howat, Cross, & Sleet, 2004). At the heart of the problem is how researchers and practitioners address the problem of complexity conceptually and methodologically (Glasgow, Lichtenstein, & Marcus, 2003). An ecological construct of injury causation is necessarily complex.

Efficacy trials test whether an intervention does more good than harm when administered under optimum conditions (Flay, 1986). To ensure internal validity, contextual factors are carefully controlled. A standardized intervention program is delivered in a uniform fashion to a specific, and usually homogeneous, target audience. Isolating the experimental variable from the influence of contextual factors can elucidate a clear relationship between the control and experimental variable. Effectiveness trials test whether an intervention does more harm than good in real-world conditions. Here the focus is on ensuring external validity. The population tested is unlikely to be homogeneous, and the outcome of the trial may be influenced by many extraneous contextual factors (Glasgow et al., 2003). Efficacy research may offer little insight into the practical challenges of implementation in a community social system if it has conceptually avoided the impact of contextual factors on outcome. Thus, if injury prevention is the science of controlling context, safety promotion is the art of managing context.

While the use of behavioral and social science theories in the context of injury prevention and control has been limited to a selected few (Trifiletti, Gielen, Sleet, & Hopkins, 2005), there has been increasing interest in ecological models in population health and safety promotion (Gielen & Sleet, 2003). A number of published studies have demonstrated the growing importance of this approach in a range of areas of health promotion. For example, recent studies designed to promote physical activity (MacDougall, Cooke, Owen, Willson, & Bauman, 1997; Sallis, Bauman, & Pratt, 1998; Sallis et al., 2001); improve health status of low-income, multiethnic women (Peterson et al., 2002); stimulate environmental change to support physical activity and dietary behavior change among adolescents in
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schools (Dzewaltowski, 1997; Dzewaltowski, Estabrooks, & Johnston, 2002); and prevent obesity among young people (Booth et al., 2001; Davison & Birch, 2001; Longjohn, 2004) have all used a broad ecological framework with which to design intervention strategy that addresses the health problem under study at the individual, familial, community, and societal levels. The application of the ecological model in injury prevention and control has shown the most promise in falls injury prevention, road traffic injury prevention, and community safety promotion.

Falls Injury Prevention

In addition to the prevention of road traffic injury, there is increasing support for the application of multifactorial interventions that target at-risk populations in reducing falls among both children and adults (Marks & Allegrante, 2004). A goodexample of a multifaceted community-based program for reducing the incidence of falls injury in the elderly is that published recently by Clemson et al. (2004). This group studied the impact of improving individual falls self-efficacy and lower limb balance and strength, while improving home and communal environmental and behavioral safety. Attention to regular visual screening and medication reviews was encouraged. Compared to a control group, the intervention group experienced a 31 percent reduction in falls. A similar home-based intervention to prevent falls among community-dwelling frail older people that included a home environmental assessment, the facilitation of any recommended changes, and training in the use of adaptive equipment reduced falls rates, especially among previously frequent fallers (Nikolaus & Bach, 2003).

A number of studies have demonstrated that multifaceted community-based approaches are more effective than single-strategy intervention approaches (for example, Dyer et al., 2004; Huang & Acton, 2004). Moreover, an ecological approach that focuses on the multiple causative factors that put people at risk for falls, as well as health promotion policies that foster high-quality screening and intervention programs, are indicated. As outlined in the ecological model, the need to train personnel, who can implement preventive interventions and risk asscssment processes, as well as counsel individual clients, will also be required if we are to reduce falls. Moreover, legislation to optimize safety in the home and its environment and adequate medical coverage and funding for counseling are needed for achieving successful preventive outcomes (Marks & Allegrante, 2004).

Road Traffic Injury Prevention

There is general consensus that single interventions do not have the same impact as multiple interventions in efforts to reduce or prevent injury. Health promotion approaches to road traffic injury prevention have been advocated for this reason

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(Sleet, 1984; Sleet, Wagenaar, & Waller, 1989). Indeed a CDC report describing motor vehicle safety as one of the twentieth century's important public health achievements strongly suggested that this was due to the fact that the interventions that were successful in improving motor safety were those that were designed to account for the multiple risk factors involved in motor vehicle injuries (Centers for Disease Control and Prevention, 1999; Dellinger, Sleet, & Jones, in press; Gielen & Sleet, 2003). The changes held responsible for the improvements in motor safety included legislative policies, educational programs, and changes in the physical and social environment (Gielen & Sleet, 2003; see also Chapters Ten and Eleven).

As early as 1989, Simons-Morton et al. (1989) proposed that taking an ecological perspective of individuals within their social and physical environments, a diagnostic framework identifying factors associated with drinking and driving injuries, and applying a conceptual intervention model with multiple components and four phases, plus evaluation criteria for societal and practice settings, would prove beneficial. This has been subsequently supported by Howat, Sleet, Elder, and Mayock (2004). These investigators have suggested that while health education interventions alone may not be effective for preventing alcohol-related traffic injury, ecological approaches may be beneficial. This is because in ecological intervention approaches, each intervention builds synergistically on the strengths of every other one. More specifically, given the complexity of issues that have an impact on driving under the influence of alcohol, ecological approaches to reducing alcohol-impaired driving that use all four components of the health promotion model proposed by Howat and his colleagues are likely to be especially effective. Lonero and Clinton (1997) listed four broad classes of tools with which to influence driver behavior: legislation, enforcement, education, and reinforcement. Moreover, the World Health Organization (WHO), in its report on preventing road traffic injuries (Peden et al., 2004), focuses on a systems approach to prevention, including the interaction among its elements—vehicles, roads, and road users and their physical, social, and economic environments.

There are five main elements of the ecological model in injury prevention and control:

- 1. Unintentional injury is determined by many different factors.
- 2. Behavior that leads to unintentional injury has both situational and psychological influences.
- 3. There are powerful sociological and environmental factors influencing injury.
- 4. Because safety is an ecological concept, determined by the relationship between an individual and his or her physical and social environment (Hanson, Vardon, & Lloyd, 2002b), prevention programs need to be sufficiently comprehensive to account for the dynamic interface between these dimensions.

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- 5. Interventions must address beliefs, attitudes, behaviors, and environmental fac-
- tors and involve community stakeholders in finding their own solutions.

Community Safety Promotion

To focus solely on the biomedical concept of injury prevention is to misunderstand the fundamental nature of the human experience, and hence how the positive state of "safety" is achieved. Maurice et al. (2001) define *safety* as "a state in which hazards and conditions leading to physical, psychological, or material harm are controlled in order to preserve the health and well-being of individuals and the community" (p. 237). The United Nations, in its 1994 report on human development, has asserted that safety and security is a fundamental human right and an essential condition for the sustainable development of societies (United Nations Development Program, 1994). Safety is as much concerned with the subjective dimension—the perception of safety—as it is with the objective dimension—the absence of injury. It is as much concerned with the community. Thus, it is evident that safety is a psychological, sociological, and environmental phenomenon, as much as it is physiological. As such, safety is inherently an ecological concept (Labonte, 1991).

Moller (2004) states, "The community-based model for injury prevention is an explicit approach to achieving reductions in the incidence of injury at the population level by the application of multiple countermeasures and multiple strategies in the context of community defined problems and community owned solutions" (p. 1). Thus, community-based safety promotion is not a single intervention but rather a set of processes that are implemented simultaneously and synergistically in the hope of promoting safety in a specific community. In each community, the mix and type of interventions used will differ because communities differ (Moller, 1991, 2004). Effectively managing context by implementing the most appropriate mix of strategies to address the specific injury problems faced by an individual community is the critical factor determining the success of community-based interventions. Most important, the community must be involved in the process of defining the problem, identifying practical solutions, and mobilizing the resources necessary to implement and sustain the solution (Coggan & Bennett, 2004). Few would dispute this principle, but a real shift toward community empowerment has been hard to achieve. While it is easy for politicians, bureaucrats, and senior researchers to "talk the talk," it is more difficult for them to "walk the walk" when this entails sharing control over the social or research agenda and especially difficult when it involves surrendering absolute control over the assignment of resources.

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The reality is that power is asymmetrical, especially for poor or disenfranchised communities. In an era of financial accountability, economic rationalism, and aggressive competition for funding, short-term, project-based funding is the norm. Projects come and go depending on their ability to secure and maintain ongoing funding. This perpetuates a cycle of dependency in which short-term political agendas assume more importance than long-term community development. Professionally driven, externally initiated, and exogenously funded interventions have the potential to exacerbate this dependency if they do not build community capacity, encourage self-sufficiency, and foster self-efficacy in the prioritized target community (Hanson, Vardon, & Lloyd, 2002c).

We should not overlook the research implications of sharing control with a community coalition. In the context of community-based participatory research, this means a researcher has no innate right to set the parameters of a community effectiveness study; rather, this must be negotiated with the community (Green & Mercer, 2001). Stated another way, researchers must learn to work with community contextual factors rather than against them. However, researchers can have a significant influence on the community agenda. Communities appreciate and respect timely, relevant, and credible scientific information. Access to local injury surveillance data is a powerful tool for focusing the agenda of community safety promotion coalitions on strategic epidemiological issues (Hanson et al., 2003; Hanson, Vardon, & Lloyd, 2002a).

If population gains in health and safety are to be achieved and sustained, then this is contingent on the identification, mobilization, and development of local resources (McLeroy, Norton, Kegler, Burdine, & Sumaya, 2003). Outcomes dependent on external resources are vulnerable. The solution is to maximize the capacity of a community to institutionalize and maintain an outcome within its own "ecosystem" (Hanson et al., 2005). Eva Cox (1995) has identified four types of community resources that enable such capacity:

Financial capital: The economic resources available to a community. While clearly important, it is frequently overemphasized at the expense of other forms of capital.

Physical capital: The natural environment and man-made resources (for example, buildings and equipment) available to a community.

Human capital: The skill and knowledge of the individuals contained within a community.

Social capital: The "features of social organization such as networks, norms, and trust that facilitate co-ordination and co-operation for mutual benefit" (Putnam, 1995, p. 67).

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Despite the controversy regarding the definition and operationalization of social capital (Labonte, 1999; Lin, 1999), the concept does highlight the important fact that a community is more than the sum of its parts and that the way communities organize and mobilize their social resources is an important resource in itself. Different types of social capital have been identified by Putnam (1995):

- The societal norms that define the community's expectations of the behavior of individuals and organizations within the community
- The ability of individuals and organizations within a community to form relationships of trust and thereby work collaboratively to identify and solve health, environmental, and sociological problems.
- The strength and effectiveness of individual, organizational, and social networks contained within a community (Hanson, Muller, & Durrheim, 2005)

Lin (1999) has suggested that the type of social capital necessary to maintain desirable social behaviors is different from the type of social capital necessary to change them. Social capital based on group cohesion (societal norms and community expectations of acceptable behavior) is useful to maintain desirable behavior (Hanson, Muller, & Durrheim, 2005). For example, wearing seat belts is now normative behavior. In the United States, seat belt use increased from 11 percent in 1981 to 68 percent in 1997 (Centers for Disease Control and Prevention, 1999). Drunk driving is also increasingly perceived to be socially unacceptable (Isaacs & Schroeder, 2001). While legislation and enforcement have undoubtedly contributed to this change in community standards, changes in community standards have meant that aggressive legislation and enforcement of child restraint, seat belt laws, and drunk-driving laws is considered politically acceptable by majorities of the American population.

In contrast, the type of social capital necessary to induce change is different in quality. Rather than being a function of group cohesion, it is a function of relationships that span boundaries and thereby induce change by producing social, political, and bureaucratic leverage (Hanson, Muller, & Durrheim, 2005; Burt, 2001; Granovetter, 1973). Here, individuals—whether political champions (for example, William Haddon as director of the U.S. National Highway Safety Bureau), consumer health advocates (for example, Ralph Nader in his "Unsafe at Any Speed" campaign of the 1960s), or community activists (for example, Doris Aitken, founder of Remove Intoxicated Drivers and Candy Lightner, founder of Mothers Against Drunk Driving)—can be important agents of change (Isaacs & Schroeder, 2001). This is because of the strategic relationships such individuals are able to build with others in the community and the way they use these relationships to advocate for organizational, social, and structural change (Pitt & Spinks, 2004).

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WHO Safe Communities

Safe Communities is an approach to injury prevention and safety promotion that is supported by the World Health Organization (WHO, 2005; Svanstrom, 1999). The safe community model seeks to understand injury and intervene at a community level. By involving people in finding their own solutions to community problems, the community aims to be a catalyst for environmental, structural, sociological, and political change. This empowers the community, and ultimately individuals within a community, to change their environment and their behaviors to reduce the risk of injury and increase the perception of safety. It is therefore an ecological paradigm of safety promotion (Hanson, Vardon, & Lloyd, 2002b). WHO-designated Safe Communities are demonstration communities, which others can model when seeking to establish their own communities (WHO Collaborating Center on Community Safety Promotion, 2005). Communities are assessed for WHO designation based on six indicators, designed to encourage best practice in safety promotion:

- 1. An infrastructure based on partnerships and collaborations, governed by a crosssectoral group that is responsible for safety promotion in their community
- 2. Long-term, sustainable programs covering both genders and all ages, environments, and situations
- 3. Programs that target high-risk groups and environments and programs that promote safety for vulnerable groups
- 4. Programs that document the frequency and causes of injury
- 5. Evaluation measures to assess their programs, processes, and the effects of change
- 6. Ongoing participation in national and international Safe Communities Networks

Spinks, Turner, Nixon, and McClure (2005) conducted a systematic review of the WHO Safe Communities approach on behalf of the Cochrane Collaboration. They identified seven community-controlled evaluations using populationbased injury morbidity and mortality data. These studies were conducted in four countries from two geographical regions: Scandinavia (Sweden and Norway) and Australasia (Australia and New Zealand). Although the authors concluded that the WHO model is effective in reducing injuries in whole populations, important methodological limitations were present in all studies. Perhaps this is not surprising given the methodological, organizational, political, and financial challenges of conducting large, robust studies of this type.

Programs conducted in Scandinavia demonstrated stronger population outcomes than those conducted in Australasia. Falkoping, a city in Sweden demonstrated a 23

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percent decrease in all injury morbidity rates at the time the community coalition was active (Schlep, 1987). Motala, also a city in Sweden, demonstrated a 13 percent reduction in injury rates (Timpka, Lindqvist, Schelp, & Ahlgren, 1999). Harstad, (a city in Norway), produced significant reductions in child burns and scalds, and traffic injury rates (Ytterstad, 2003; Ytterstad, Smith, & Coggan, 1998). In New Zealand, the Waitakere Safe Communities Project documented a significant reduction in child injury admission rates, but was unable to demonstrate a significant reduction in hospitalization rates for all ages and all injuries (Coggan, Patterson, Brewin, Hooper, & Robinson, 2000). In Australia, the Shire of Bulla (later to become the Hume Safe Communities) was unable to demonstrate a significant reduction in injury rates (Ozanne-Smith, Day, Stathakis, & Sherrard, 2002). The Latrobe Valley Better Health Injury Prevention Program (Day, Ozanne-Smith, Cassel, & Li, 2001) was able to demonstrate reductions in agestandardized emergency department presentation rates using a quasi-experimental design (6,594 per 100,000 persons in the first year of the program to 4,821 in the final year), but there was no control community, and this study did not fulfill the selection criteria for the Cochrane Review.

No studies were identified of WHO Safe Communities in poorer countries, so any generalization of these results to the international community must be undertaken with caution. However, Spinks et al. (2005) conclude it is time to conduct an appropriately funded and rigorously conducted global multicommunity trial of the Safe Communities approach.

Conclusion

This chapter began by highlighting injury prevention as a biomedical construct based on a reductionist view that injury is a physical event resulting from a sudden release of environmental energy producing tissue damage in an individual. Such a conceptualization of injury underestimates the effect of environmental and social contextual factors on population-level injury outcomes and narrows the possibilities for the design and effectiveness of intervention. Injury prevention and control and the promotion of safety have physical, psychological, and sociological dimensions and thus should be considered an ecological concept.

To better understand that concept, Hanson's injury iceberg is a useful metaphor for an ecological system of injury causation. In this system, the individual is just the tip of the iceberg, the most visible and identifiable component of a complex system in which the individual interacts with the physical and social environment. The most enduring means to reduce an individual's risk of injury in such a system is to systematically address the physical and social environmental

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factors hidden beneath the waterline, which ultimately shape individual and social behaviors that give rise to injury.

While much has been achieved in the past fifty years, we face a new frontier of challenges in the prevention and control of injury at the outset of the twentyfirst century. The epidemiological evidence is converging to tell us that social influences have profound impact on population health and injury outcomes. We must use this evidence to attack the problem of the social and environmental determinants of injury with the same energy, urgency, and intellectual rigor that our predecessors attacked the physical determinants of injury in the late 1900s. This will provide fertile new ground to advance injury prevention and control in the future. However, we must accept that current reductionistic scientific methods have limitations in their ability to deal with the complexity of socioecological systems. Scientists, administrators, and practitioners need to move out of the complacency of their comfort zone and embrace research tools, theories, methodologies, and types of evidence and safety promotion practice that can accommodate, elucidate, and manage this complexity. Some of these techniques already exist; others are yet to be developed and tested.

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APPENDIX TWENTY TWO BECOMING QUEENSLANDS FIRST SAFE COMMUNITY: CONSIDERING SUSTAINABILITY FROM THE OUTSET

A literature review regarding intervention and coalition sustainability was undertaken by myself and after comment from my colleagues Paul Vardon and Jacqui Lloyd was published as a chapter entitled "Becoming Queensland's First Safe Community: Considering Sustainability from the Outset', in "Reducing Injury in Mackay North Queensland" edited by Reinhold Muller and published by Warwick Educational Publishing in 2002 (Hanson et. al., 2002).

The manuscript develops the concept of ecological safety promotion and attempts to apply these principles to provide a scientific foundation for the design of sustainable safety promotion interventions. From the outset, there has been a conscious effort to design sustainability into Mackay Whitsunday Safe Communities by utilising and developing local resources where ever possible.

I undertook a further literature review in 2004 into the ecological foundations of the concept of sustainability in environmental systems and refined the manuscript with a view to publication in the Health Promotion Journal of Australia. After comment from my co-authors Jan Hanson, Paul Vardon, Kathryn McFarlane, Jacqui Lloyd and my doctorate supervisors Reinhold Muller and David Dürrheim. the paper was submitted to the Health Promotion Journal of Australia and accepted for publication.

Publications:

Hanson, D., Vardon, P., & Lloyd, J. (2002). Becoming Queeensland's First Safe Community: Considering Sustainability from the Outset. In R. Muller (Ed.), *Reducing injuries in Mackay, North Queensland* (pp. 35-52). Warwick, Queensland, Australia: Warwick Educational Publishing. See Appendix Eighteen

Hanson, D., Hanson, J., Vardon, P., McFarlane, K., Lloyd, J., Muller, R., Dürrheim D. (2005). The injury iceberg: An ecological approach to planning sustainable community safety interventions. *Health Promotion Journal of Australia*, *16* (1), 5-15. Reducing Injuries in Mackay, North Queensland

Becoming Queensland's First Safe Community: Considering Sustainability from the Outset.

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Reducing Injuries in Mackay, North Queensland

Abstract

While sustainability has become a mandatory piece of public health rhetoric, delivering sustainable programs has proved elusive.

Injury has been identified as an important public health priority in the Mackay Region where hospital separation rates for injury are double those observed for the rest of Queensland. The Mackay/Whitsunday Safe Communities Project is a community-based safety promotion project that aims to reduce injury in the Mackay Region by 30% in five years. It seeks to achieve this by being a catalyst for development of a sustained, systematic, inter-sectoral, community-based safety promotion network using existing community-based resources and expertise. The project has sought to build sustainability into the network from the outset.

This article proposes an ecological framework as a construct for conceptualising sustainability in the context of a community-based Safety Promotion Program and as a tool for systematically designing sustainability.

To improve health outcomes in the long term it is necessary to produce sustained change in the community system that delivered the improved outcome. Nine levels of sustainability are identified:

- 1. Sustain improved lifestyle outcomes: Community Safety.
- 2. Sustain altered perception of safety: Safety Perception.
- 3. Sustain improved injury outcomes: Injury Prevention.
- 4. Sustain personal change: Behaviour Modification.
- 5. Sustain ecological change: Environmental & Sociological Modification.
- 6. Sustain change within member organizations: Institutionalisation.
- 7. Sustain change within community networks: Capacity Building.
- 8. Sustain societal change: Advocacy & Empowerment.
- 9. Sustain structural change: Formalisation.

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Sustainable Health Promotion Projects

Program sustainability has been a neglected area of health promotion research and practice. Researchers and practitioners increasingly appreciate many projects do not survive. Hawe¹ suggests the *impact* of a health promotion program is the product of three factors.

- 1. Effectiveness the effect of an intervention on the target audience.
- 2. *Reach* the penetration of the intervention within a target population.
- 3. Duration of the effect.

The addition of a time dimension is an important reminder that the impact of a program is as much dependent on sustaining an intervention as it is on establishing an effective program in a strategic population.

Failure to sustain a program is counterproductive. Not only is it a waste of the resources invested in the program, it is disruptive of the organisational investment staff made in the program and may undermine the trust the organisation had established within the client community².

While "project sustainability" is a mandatory piece of politically correct rhetoric, it is less frequently achieved^{3,4,5}. Yate⁴ reports that 50% of community-based coalitions became inactive after they had performed initial simple tasks. Prestby and Wandersman studied 17 community-based coalitions and found that only 8 of these were still functioning after 1 year⁵.

There is an urgent need to get beyond the rhetoric and deliver sustainable projects.

Sustainability - An Ecological View

Sustainability is an ecological concept. Lowe⁶ suggests a system is ecologically sustainable "when it has at its disposal an amount of land that supplies all the resources it consumes and absorbs all the waste it produces". The essential idea is that the system must have access to the resources necessary to maintain its lifestyle in the long term and to resolve any adverse by-products of this lifestyle. This concept has been extrapolated into the public health domain. McMurray⁷ suggests, "a community can be viewed as an ecosystem, with resources, opportunities and threats to health and healthy lifestyles." Sustaining a community safety process depends not only on the community having the resources necessary to maintain a safe physical and social environment, but also the capacity to identify and rectify any features of this environment that compromise safety.

Interventions dependent on external resources are vulnerable. In an age of financial accountability, economic rationalism and aggressive competition for project funding, short-term project-based funding is the norm in Australia. Projects come and go at political whim, depending on the ability to secure ongoing funding. The solution is to maximize the ability of a community to maintain a project within its own "ecosystem".

This article proposes a systematic ecological conceptualisation of sustainability, which aims to develop and maintain innovations at all levels of a community ecological system. The nine levels are outlined in Figure 1.

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Figure 1. Levels of Sustainability for Safety Promotion

By systematically identifying and addressing the different sub components necessary to maintain the desired outcome within the ecological system, attempts to sustain a program are

Level 1. Sustain lifestyle change: "community safety"

more likely to be successful.

Safety is an ecological concept⁸, concerned with a positive state of wellbeing of individuals within the context of society and their physical environment. It is as much concerned with a subjective dimension – the perception of safety, as it is with the objective dimension – the absence of injury^{8,11,12}. Therefore, to develop a "Safe Community", we need to address the community's perception of "*safety*" while simultaneously intervening to reduce the behavioural, environmental and sociological factors that produce injury.

Level 2. Sustain altered perception of safety: "community feedback"

Maintaining an ambience of safety requires ongoing effective channels of communication, and careful use of the media. Without marginalising the concerns of the community, their energies need to be focused onto the real issues. Local surveillance data is an excellent tool with which to stimulate media interest, engage the community, and generate informed public debate that will keep the community "on task" as it attempts to address safety issues¹³.

Level 3. Sustain improved injury outcomes: "injury prevention"

A whole of system approach is necessary to achieve and maintain a reduced incidence of injury⁸. An injury event rarely occurs as a consequence of the isolated failure of either an individual or system. Rather, it is the critical combination of social and environmental predisposing factors, triggering factors, and behavioural errors, which conspire together to

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create an accident opportunity. Furthermore, not all accidents result in injury, as characteristics of the immediate physical environment may either exacerbate (eg. slippery road) or minimise (eg. seat belt) the consequences of such an event. Achieving a sustained reduction in injury depends on identifying the individual, environmental and sociological factors that produce injury within the target community and then empowering individuals and the community to produce sustained change in these determinants.

Level 4. Sustain personal change: "behaviour modification"

Until recently, safety promotion has largely focused on addressing the behaviour of the individual and their immediate environment. Health education has been the dominant strategy used to address these issues⁸. While informing an individual of risk behaviours and environmental dangers are undoubtedly important, it does not follow that this educational message is sufficient to produce behavioural change¹⁷. As desirable as changes in behaviour may be, an individual may not posses the motivation, confidence, personal skill, or control over their environment necessary to enact these changes.

The Transtheoretical Model¹⁸ identifies five stages of behavioural change:

- 1. *Precontemplation* an individual has no intention of changing their behaviour.
- 2. *Contemplation* an individual is considering changing behaviour within six months.
- 3. Preparation an individual is planning to change their behaviour in the short term.
- 4. *Action* an individual is in the process of changing their behaviour.
- 5. *Maintenance* an individual has performed the new behaviour for more than six months.

There are three important implications of this construct:

- 1. To achieve change, it is necessary to facilitate the movement of the target audience through this process of change to a point where they are motivated to change their behaviour.
- 2. Different strategies are required for different stages.
- 3. At any one time only a small percentage of the target audience are at a stage where they would contemplate or enact desirable behavioural change. This substantially limits the reach of a Safety Promotion program when delivered over a short time frame. Sustaining a program increases reach by increasing the likelihood of delivering a safety message at a time when people are susceptible to behavioural change.

Change in the individual behaviour is notoriously hard to achieve¹⁴ and harder still to sustain. Structural change, if achieved, is more likely to be self-sustaining¹⁵. However, these contrasting approaches are complimentary rather than mutually exclusive¹⁶.

Level 5. Sustain ecological change: "environmental & sociological modification"

A safety promotion program must be cognisant of its environmental, economic and social milieu, taking into account the resources available (community capacity) and the constraints placed upon a project by the ecological system (context)⁵.

The Ecological Paradigm of Safety Promotion emphasises the dynamic interface between the individual, the physical environment and the social environment^{8,18}. These dimensions may in turn be analysed at five levels: intrapersonal, interpersonal, organisational, community and

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societal^{8,17,18}. Interventions directed at "upstream levels" will affect lower levels, increasing the *reach* of a safety intervention.

As the scope of a safety promotion program increases to involve upstream levels, it is necessary to develop consensus among an increasing number of actors with strategic influence at that level. This increases the complexity of an intervention and consequently the lead time. Success is therefore dependent on the intervention being sustained long enough for structural change to be achieved. However, once the ecological system has been successfully changed, homeostasis with the system will maintain the safety gains achieved⁸.

Often a combination of strategies is expedient. Initially targeting a simple downstream issue, with a short lead time, will generate a "quick success", increasing the motivation, self efficacy and credibility of the network. This empowers the network to address more complex upstream issues which require increased skill, dedication and time¹⁹.

In Australia, a combination of mandatory seat belt and drink driving legislation, combined with a public education program and strategic enforcement, are excellent examples of safety interventions conducted "upstream" (societal level) resulting in a dramatic reduction in injury²⁰.

Level 6. Sustain change within member organizations: "institutionalisation"

To ensure longevity of a desired health outcome, it is necessary to institutionalise the practice of safety promotion within a member organisation. Institutionalisation is a process where the values, processes and cooperative relationships developed within an intervention are incorporated into the legitimate ongoing practice of the organisation².

Goodman and Steckler² identify 6 critical factors necessary to establish program institutionalisation (see Table 1 and Figure 2). Key members of the organisation need to conclude that the program fulfils the goals of the organisation (good fit) and through mutual adaptation of program and organisational norms, incorporate the program into the standard operating routines of the organisation. This mutual adaptation of actor's aspirations is frequently brokered by a program champion who leads the organisation/s through 6 critical developmental stages (critical precursor conditions), culminating in a fair trial point where members form a judgement whether or not the perceived benefits of a program outweigh the cost of involvement. For the sake of clarity, we have drawn a distinction between institutionalisation (the process of internalising a program within a member organisation) and capacity building (the process of developing local resources in a community network so that it is self sustaining). However, the principles applied to the process of developing consensus for a program within a member organisation can equally be applied to the process of developing consensus among network partners within a community collaboration.

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Table 1. Critical Factors for Program Intitutionalisation²

- 1. Incorporation of a program into standard operating routines of actors within the host organisation
- 2. A cluster of 6 critical precursor conditions need to be fulfilled;
 - i. awareness of the problem
 - ii. concern for the problem
 - iii. receptivity to change
 - iv. availability of solutions
 - v. adequacy of program to address the identified problem
 - vi. perceived benefits of the program outweigh the costs
- 3. Mutual adaptation of actors aspirations
- 4. Program champion
- 5. Mutual adaptation of program and organisational norms
- 6. A good fit between the program and organisation mission and core operations





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Level 7. Sustain community networks: "capacity building"

To improve health outcomes in the long term it is necessary to produce sustained change in the community.

A community may be viewed from the perspective of its strengths or weaknesses. When focusing on the deficiencies, the community becomes a "half empty cup", unable to solve its own problems but for professional intervention supplied through paternalistic political action^{21,22}. Alternately, a community may be viewed as a "half full cup" which, through strategic professional and political support can be mobilised and empowered to address its own problems²¹. Programs that are developed utilising existing community resources are more likely to be sustained^{23,24}.

Figure 3: Community Capacity Building - Magnifying the Effect of a Health Promotion

Program through Sustainability & Generalisation



Capacity building uses an intervention project as a vehicle to identify, mobilise, co-ordinate and develop existing community resources to address local issues. This will increase the community's capacity to sustain change^{1,25}. The project itself may become superfluous, as the community becomes capable of maintaining the desired outcome within it own resources (Figure 3). In the long term, it is possible this capacity could be mobilised to address new health problems²³.

Eva Cox in her 1995 Boyer Lectures identified 4 types of community resources or "capital"^{26,27}:

- 1. Financial Capital: the economic resources available to a community or program. While clearly important, it is frequently overemphasised at the expense of other forms of capital.
- 2. Physical Capital: the natural environment and man made resources (eg. buildings and equipment) available to a community.

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- 3. Human Capital: the skill and knowledge of the individuals contained within a community.
- 4. Social Capital: the "features of social organisation such as networks, norms and trust, that facilitate co-ordination and co-operation for mutual benefit".

Thus, Community Capacity refers not only to financial, physical and human resources contained within a community but also to its social resources, in particular:

- 1. The societal norms which define the communities expectations of the behaviour of individuals and organisations within the community.
- 2. The ability of individuals and organisations within a community to identify health, environmental and sociological problems, and work together for mutual benefit.
- 3. The strength and effectiveness of individual, organisational and social networks contained within a community.

It has been increasingly appreciated that while social capital can be a positive resource^{27,29,30,31,32,33,34}, it also provides the context (characteristics of a community have an adverse effect on health outcomes)^{28,34}.

Bush identifies 4 domains of capacity building²⁵:

- 1. *Network partnerships* are formal and informal relationships between key actors in an ecological system. The identification of mutual benefit by network partners increases sustainability and maximises the capacity of the network^{5,34,36}.
- 2. *Knowledge Transfer*. Dissemination of knowledge is an important tool to mobilise and develop a network. A combination of academic "best practice" with local "street knowledge" is necessary.
- 3. *Problem Solving* concerns the development of adaptive skills, empowering network partners to plan, implement, sustain and evaluate a health promotion program, mediate conflict between partners and maximise the resourcefulness of the network.
- 4. *Infrastructure development*. A project needs to identify, mobilise and invest in the development of local physical, financial, human and social resources^{1,23,25}. To this end, it needs to develop sufficient infrastructure to achieve it strategic goals.

Level 8. Sustain societal change: "advocacy and empowerment"

A community-based safety promotion project is nested within the wider politico-social system. Some member organisations are accountable to their statewide bureaucracy, constrained by policy set outside the community, and dependent on resources allocated outside the community. This is both an opportunity and a threat to sustainability. While local initiatives may be left stranded by changes in corporate policy or rationalisation of resources, there is also an opportunity for local members to advocate within their organisation for resources and changes in policy that acknowledge local issues.

Historically, inadequate short term funding has perpetuated "the poverty cycle of health promotion"^{17,35}. Intense competition for funds encourages proposals which understate the cost and overstate the benefits of a project. Shallow short-term projects, with poorly articulated objectives, result in vague outcomes of questionable benefit. This, in turn, results in poor funding at the next round (Figure 4). There is an urgent need to break the cycle.

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This cycle of dependency has both subjective and objective dimensions. The objective reality is that network partners are subject to sociological factors beyond their sphere of influence. However, a subjective perception that the community is totally unable to influence its societal context will compromise the community's ability to advocate on its own behalf.

Professionally driven, externally initiated interventions have the potential to exacerbate community dependency if they do not build community capacity, encourage self sufficiency, and foster self efficacy in the target community²². Projects should be used as a vehicle for the community to assume control and mastery over itself, using the democratic process as an opportunity to produce social and environmental change to the benefit of the community³⁶.

Wallerstein³⁶ defines *empowerment* as a "social process that promotes participation of people, organisations, and communities towards the goals of increased individual and community control, political efficacy, improved quality of community life, and social justice". Strengthening community capacity makes a community more self sufficient, less dependent on external resources and less susceptible to sudden changes of policy or withdrawal of resources. Empowering the community to develop skills of advocacy and astute political efficacy, widens the sphere of influence of community members. This strengthens its ability to act in concert and maximise opportunities to extract commitment and draw resources.

Level 9. Sustain structural change: "formalisation"

Once a network has been established and collaborative relationships developed, formalising these relationships, has been identified as an important characteristic of sustainable community coalitions¹⁹.

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Formalisation refers to the clear statement of network goals, roles, structures and procedures and the degree of adherence to these systems by the network. Examples of formalisation include defined goals, memoranda of understanding, minutes of meetings, and formal reporting systems. It increases the accountability of the project to its member organisations and promotes the accountability of network partners to each other, reinforcing commitment to the project⁴⁸. This, in turn, increases the resources invested by network partners into the project³⁷. Chavis et al^{19,38} observed that community coalitions that were more structured and task oriented were likely to survive longer.

There is currently a re-appraisal of the most appropriate evaluation strategies for health promotion projects. Until recently, it has been assumed that external evaluation is absolutely necessary to ensure objectivity. The NHMRC "Quality of evidence ratings"³⁹ used by the scientific research community advocates methodologies such as randomised control trials, cohort studies, and case control studies, and stipulates the use of external quantitative methodologies. But, is externally driven evaluation consistent with a Health Promotion Paradigm that seeks to return control to local communities, empowering them to solve their own problems?

Fetterman⁴⁰ has coined the term empowerment evaluation for a process where stakeholders control the evaluation, to "continually assess their program towards self determined goals and to reshape their plans and strategies according to this assessment. In the process, self determination is fostered, illumination is generation and liberation actualised." Evaluation is not the endpoint of a program, but part of the ongoing process of program improvement, capacity building, and community empowerment^{19,40,41}. Internally driven evaluation methodologies ensure relevance to the community. Credible outcome data is an important tool for advocacy on behalf of the project.

An Ecological Model for Project Sustainability

There are a number of important implications of this ecological model. Firstly, for a project to be sustained, the community system must have access to the human, physical, social and financial resources necessary to maintain the project. Projects that are dependent on external resources are vulnerable. Secondly, while interventions targeting individual behaviour are undoubtedly important, the desired behaviour is unlikely to be sustained unless it is well grounded in the social and physical environment that reinforces and maintains the desired behaviour and ultimately the desired outcome – reduced injury. Structural change is necessary to minimise the likelihood of an injury should an adverse event occur. However, interventions targeting a community ecological system are necessarily more complex and time consuming.

Given the pre-eminence given to individual accountability for an injury and central statebased control of financial resources, combined with a system of short term project-based funding, most interventions necessarily concentrate on what is achievable within a short time frame. Few have the inclination, much less the time, for the strategic thought and planning that is required to produce change grounded deep within an ecological system. It is therefore not surprising that improvements in outcomes generated by many projects are not sustained.

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Case Study: The Mackay Whitsunday Safe Communities Project

In 1998 the Mackay Division of General Practice⁴² conducted a community needs analysis, which identified injury as an important public health issue in the region. Subsequent review of hospital separation statistics by the Tropical Public Health Unit confirmed this sentinel observation⁴³.

The Mackay/Whitsunday Safe Communities Project (MWSCP) was established to address this important public health priority⁴³. It seeks to reduce injury in the Mackay Region by being a catalyst for development of a sustained, systematic, inter-sectoral, community-based safety promotion network using existing community resources and expertise.

The project has sought to build sustainability into the network from the outset. Rather than concentrating on attracting external financial resources, the MWSCP has attempted to focus its attention on developing local, human, physical and social resources under the auspices of strategic partners within the Mackay Whitsunday community. In this way it aims to enhance the capacity of the community to solve its own problems, ultimately empowering the community to develop enough expertise, confidence and credibility to be able to effectively attract external resources to address the community's needs.

At the time the project was established, a number of injury prevention programs were being run by various community organisations.

- Farm safety; Tropical Public Health Unit, Mackay Division of General Practice & Farmsafe Australia.
- Falls prevention in the elderly; Home and Community Unit, Mackay Health Service District.
- Water and alcohol safety in licensed premises; Alcohol, Tobacco and Other Drugs Services & Water Police Service.
- Toddler drowning and child scalds prevention; Tropical Public Health Unit, Child and Adolescent Health Services.
- Road & vehicle safety; Queensland Transport, Home and Community Health Unit.
- Electrical safety; Mackay Electrical Board.
- Pedestrian safety; Mackay City Council.

While these programs were based on similar principles and strategies, they were conducted in relative isolation, usually around a single issue. If the motivation and energy existing within the community could be harnessed, and resources already invested pooled, then the process of safety promotion would be more likely to become self-sustaining.

Level 1. Sustain lifestyle change: "safety promotion"

The MWSCP has sought to take a very broad view of safety as a function of the community social system and its environment. Clearly, the priority for this project is to reduce the high incidence of injury observed within the community. However, it has been increasingly appreciated that this goal is more likely to be achieved if the project simultaneously engages the community at the level of community concern - the fear of unprovoked violence and invasion of personal property. To this end the project has established co-operative relationships with the Mackay Crime Prevention Partnership and the Andergrove Neighbourhood Watch. Strategic use of local surveillance data has been important in focusing community debate on the real epidemiological issues.

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Level 2. Sustain altered perception of safety: "community feedback"

A baseline public perception telephone survey conducted by James Cook University (JCU) identifies there is a mismatch between community perception of risk and the epidemiological data^{44,45}. The street and the motor vehicle were perceived as the most likely location for injury, whereas most injury occurs in the home. Increased compliance with safety practices was associated with increasing age, while most injury occurs in the young.

Realising that strategies aimed at enhancing the public perception of safety are required alongside activities aimed at reducing the epidemiological risk the Mackay Senior Safety Working Group introduced the "Safe Shop" program⁴⁶. This project aims to reassure older members of our community that the Mackay city centre is safe. Safe Shops are identified by a sign at the door, and visitors are welcome to seek information or help should they feel unwell or vulnerable. Review of the project indicates that while community members rarely seek help, they do feel safer.

Level 3. Sustain improved injury outcomes: "injury prevention"

The project is fortunate to have access to an excellent injury surveillance network^{13,43}. Since September 1997, all public hospital Emergency Departments (ED's) in the Mackay/Whitsunday region have been collecting high quality injury surveillance data on behalf of the Queensland Injury Surveillance Unit (QISU)^{13,43}. Analysing this data at a local level and disseminating it through local networks, provides a firm strategic foundation for the project. This data confirms the sentinel observation that injury rates appear to be high in our community. In 1998/99 there were 17,531 injury presentations to the ED of the Mackay Base Hospital⁴⁵, a crude rate of 8,433 presentations per 100,000, two and a half times that observed by QISU in South Brisbane⁴³. Males are more at risk than females (11,161 vs 5,635 per 100,000)⁴⁵. Strategic issues identified include falls (especially in children and the elderly), bicycle injuries, injuries in young males, elderly females, injuries in the home, sporting injuries and workplace injuries^{43,45}. This information has been important in the consensus building stage of the program, strengthening the resolve of network partners to work collaboratively and address these issues.

Levels 4 and 5. Personal change supported by ecological change

As the behaviour of individuals is just one component of an ecological system that results in injury, the MWSCP has deliberately adopted a multi-strategic, multi-sectorial approach in its interventions. The Whitsunday Child Safety Working Group initially targeted bike safety in primary school children. Residents of the Mackay/Whitsunday region are 1.9 times more likely to present to an ED with a bike injury than residents of South Brisbane⁴³. Multiple strategies to address this issue were used, with programs targeting behaviour ("Bike Ed" program⁴⁷) used in concert with programs seeking to augment behavioural change through social reinforcement and structural modification. "Operation Bike Safe" is a positive reinforcement program run by the police as part of the Whitsunday Bike Safety Project. Police issued children identified wearing a helmet and using safe riding behaviours with a certificate. Those children receiving a certificate went into a draw to win one of two brand new pushbikes with safety equipment. The working group also successfully lobbied for structural change to the road environment around local schools. The behaviour of other road users was also targeted with a community education program. Preliminary results are promising showing an increase in helmet wearing and improved safety behaviours. This combination of strategies needs to be more formally tested in a bigger population (such as Mackay).

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Level 6. Sustain change within member organizations: "institutionalisation"

In an attempt to encourage institutionalisation, there has been a deliberate attempt to develop projects strategically aligned with the core business of member organisations. The Whitsunday Child Safety Working Group sought to develop a multi-strategic approach to childhood injury utilising expertise already existing within the network and using interventions aligned with the normal business of network partners:

- Queensland Transport; Bike Ed⁴⁷.
- Queensland Police; Operation Bike Safe.
- Queensland Education; Bike Ed and Kidpower (a school based safety program)⁴⁸.
- Whitsunday Shire; infrastructure development and maintenance of roads and footpaths.
- Queensland Health; incorporate child safety promotion into Child Health Clinics.

Level 7. Sustain community networks: "capacity building"

Building the network was a crucial step in laying a sustainable foundation to the project. In 1999 Tropical Public Health Unit of Queensland Health (TPHU-QH) employed a health promotion practitioner to facilitate an injury prevention program in Mackay. A process of community consultation was instituted, a review of available community capacity undertaken, and potential network partners identified. The Project Management Team was established in September 1999 and included representatives of TPHU-QH, Mackay City Council, Whitsunday Shire Council, Queensland Transport, Queensland Police and Mackay Health Service District of Queensland Health. The establishment of the network has permitted the pooling of resources, extending the resource base of the project, while building self-sufficiency into the network.

Level 8. Sustain societal change: "advocacy and empowerment"

The MWSCP is nested within the wider politico-social system of the state. The challenge is to use the political agenda as a vehicle for change rather than fall victim to it. The Queensland Government has identified Community Safety as one of seven governmental priorities⁴⁹. Mackay City Council has recently completed a process of community consultation in which community safety was identified as a priority issue, which has been incorporated into the council strategic plan⁵⁰. While current community debate, focused on fear of injury from unprovoked violence, has not been supported as a significant epidemiological issue in local surveillance data²², the issue does provide an excellent opportunity for the MWSCP to harness political energy within the community and the government.

The MWSCP seeks to position itself as a positive community force to be utilised by bureaucrats and politicians. Focused and effective programs, backed up by credible data and ongoing evaluation create an accountable environment that attracts confidence and investment by socio-political systems.

Level 9. Sustain structural change: "formalisation"

Realising the strategic importance of clearly articulated goals and structure the MWSCP has elected to create a formal, clearly articulated network structure. All working parties generate written objectives and report to the Project Management Team, which meets four to six weekly to monitor progress and co-ordinate activities of the network. The project management team reports in turn to member organisations. An annual report is issued, and oral presentations given to the Mackay Health Service District, Mackay City Council and Whitsunday Shire Council.

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Reducing Injuries in Mackay, North Queensland Figure 5. Organisational Structure of the Mackay/Whitsunday Safe Communities Project **OPERATING STRUCTURE OF** MACKAY/WHITSUNDAY SAFE COMMUNITIES PROJECT **Project Management Team** Queensland Transport Linked Projects Mackay City Council **Project Facilitator** · Queensland Police Service Mackay Crime Queensland Health . Whitsunday Shire Council Prevention Partnership . Queensland Health · James Cook University Mackay Senior Safety Working Group Future / Potential Working Road Safety Working Group Whitsunday Collaborative Child Safety Working Group Injury Research Working Group Queensland Queensland Groups Queensland Mackay Transport Health City Council Health Queensland Whitsunday Queensland Queensland Police Service Injury Surveillance Unit Neighbourhood Health Department of Main Roads Centre Community Whitsunday representative Mackay James Cook Shire Council City Council University Community representative / Queensland Transport trucking industry Queensland representative Police Service Education Queensland Community representative

· Denotes team leader

Current as at October 2000

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Conclusion

The MWSCP aims to reduce injury in our community by 30% over 5 years. It seeks to achieve this by being a catalyst for development of a sustained, systematic, inter-sectoral, community-based safety promotion network utilising existing community-based networks, resources and expertise.

To improve health outcomes in the long term it is necessary to produce sustained change in the community system that delivered the improved outcome. Nine levels of sustainability have been identified. A systematic ecological conceptualisation of sustainability, which aims to develop and maintain innovations at all levels of the community ecological system, is the key to delivering sustainable programs.

Articulating a rhetoric of sustainability is one thing, but producing and maintaining a sustained injury reduction in our community is entirely a different matter. This paper will be much more impressive if it transpires in ten years that we have achieved and maintained our goal of a 30% reduction in injury within the Mackay/Whitsunday community. However, we have made a start. We trust that by attempting to understand our community ecological system and by seeking to identify and address strategic factors which serve to maintain safety in our community, we have a much greater chance of being successful.

Becoming Queensland's First Safe Community: Considering Sustainability from the Outset

Reducing Injuries in Mackay, North Queensland

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Becoming Queensland's First Safe Community: Considering Sustainability from the Outset



Mackuy Whitmeduy Safe-Osemunides Poylest: Social Network Survey

Completing the Questionnaire

- There are eight questions in this questionnaire: 1. What relationship do you carrently have with this person?
- What relationship did you have with this person <u>prior to your involvement</u> in the Machay Whitsunday Safe Communition Project³ ei
 - Has this relationship changed as a connequence of the project? di.
- umor of your involvement in the project? What precures do you share with this person as a conse-4
- On hullmare, have you found this relationship hanglicit! with regard to mosting the ensatigic goals of the blockpy. Whitmeday Safe Communities Project?
 - What resources do you share with the Mackay Whitemplay Safe Communities Project an a whold?
- List those people or cognizations who might contribute to the Machay Whitesadey Safe Communities Project but who are actimeted on far as you are searce.
- List what you would consider to be the five most important characteristics of effective health promotion social networks? vi vi ri of

Please white down the names of all the parget yau know a work with dark are part of the defaulty. Withmachy Right Communities Project but also those parties do have an inpact deflor negative of partient for an though they are not directly involved with the project. They might be a personal field, a work colleague, a member of succher cognitisation. Club, Community Organisation, Local Oceannaet, State Department, Federal Department) a work colleague, a member of succher cognitisation (Club, Community Organisation, Local Oceannaet, State Department, Federal Department) a work colleague, a member of succher cognitisation (Club, Community Organisation, Local Oceannaet, State Department, Federal Department).

Once you have compliand your list of people, then describe the relationship you have with each person by isting the box that best describe your relationship with that person for each of the 5 quantions.

Cn occasion, a separametric of an organization may resign or the separabolic the two employoes together, and describe your coupling relationship (CP to Co) in turns of the relationship you maintain with that organization through the post occupied by the two separatives, relationship to the non-separative employed in the organization through the post occupied by the two separatives, relationship to the non-separative employed in the organization through the post occupied by the two separatives, relationship to the non-separative employed in the organization through the post occupied by the two separatives, relationship to the non-separative employed in the organization through the post occupied by the two

<u>(you with</u> you also have the opportunity at the and of this survey to make some general commune about the Mackay Whiteanday Sade Community & about this study.

Example	QL What Parties	shutomidy - colorizati tu mity Preject	did you have a the Mackay C	with this part Whiteonday	rom print in r Safe	inda and	irdathendig u2	and you date	andje hane w		of the state	kir reintionakip jodi av a <u>communu</u> vjeci ⁰	3	at researces som as a crean diverset in th	s project in A project in A project in	ah da	An of the second	attend for y	ou front
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APPENDIX TWENTY THREE SAMPLE SURVEY FORM

APPENDIX TWENTY FOUR TRIAD CENSUS

A *Triad* is a (sub-) network consisting of three actors and the ties that connect them (Scott, 2000). While the dyad represents an interpersonal interaction between two actors, the triad is the first and most basic manifestation of social interaction in which the presence of a third actor may influence the interaction between the other two actors in the triad. It is argued that triadic structures are the building blocks of larger social systems (Scott, 2000). Thus, the balance of social interactions observed at the triad level may be used to predict the structure and properties of the overall network (Degenne and Forsé, 1999).

There are 64 possible permutations of triadic structure, however many of these triads are *isomorhic* or structurally indistinguishable (for example, they may be a mirror image of each other). Ultimately, 16 isomorphic classes of triads are possible. They are classified by the "M-A-N" system, which describes triads in terms of the dyadic states observed within them (Wasserman and Faust, 1994). This classification is based on sentinel papers published by Holland and Leinhardt (1970) and Davis and Leinhardt (1972). Four characteristics are used to classify triad structures

- M. The first character gives the number of *mutual* or reciprocated dyads in the triad
- A. The second character gives the number of *asymmetric* or unreciprocated dyads in the triad
- N. The third character gives the number of null dyads in the triad
- 4. The fourth character is used to further distinguish those triads in which the M-A-N classification is insufficient. The fourth character if listed is "D" for down, "U" for up, "T" for transitive and "C" for cyclic

App. 24: Triad Census

The triads are typically displayed in terms of the number of relational ties observed within them

0 ties	• 1 - 003 triad 1			
1 tie	2 - 012 triad 2			
2 ties	3 - 102 triad 3	4 - 021D triad 4	5 - 021U triad 5	6 - 021C triad 6
3 ties	7 - 111D triad 7	8 - 111U triad 8	9 - 030T triad 9	10 - 030C triad 10
4 ties	11 - 201 triad 11	12 - 120D triad 12	13 - 120U triad 13	14 - 120C triad 14
5 ties	15 - 210 triad 15			
6 ties	16 - 300 triad 16			

Table App 23.1 Classification of Triads

App. 24: Triad Census



Table App 23.2 Classification of Triads

The *Triad Census* is the frequency distribution observed for the sixteen isomorphic triads (de Nooy et al, 2005). It was introduced by David and Leinhardt in 1972. It is a convenient way to summarise an entire socio-matrix using 16 summary statistics. Moreover, a number of triadic structures can be equated to important interpersonal social processes such as: reciprocation, hierarchies, structural balance, transitivity, and triangulation (clustering).

Theorists have therefore been interested in the triad census as a way to describe how social process occurring at the micro level of the triad can account for the overall structure of a network. In this study, the Triad census was calculated using Pajek 1.02 (Batagelj and Mrvar, 2004; deNooy et. al., 2005).
Presented the following paper at the 8th World Conference on Injury Prevention and Safety Promotion held at This paper was also selected as best oral presentation at The 8th World Conference on Injury "Documenting the Development of Social Capital in a Community Safety Promotion the International Convention Centre, Durban, South Africa from 2 – 5 April 2006 **Presenters** Certificate Prevention and Safety Promotion. **Conference Chairperson** Dr Dale Hanson **Prof Mohamed Seedat** This is to certify that Coalition"

APPENDIX TWENTY FIVE 8th WORLD CONFERENCE ON INJURY PREVENTION