EVIDENCE OF EFFECTIVE INTERVENTIONS TO IMPROVE THE SOCIAL AND ENVIRONMENTAL FACTORS IMPACTING ON HEALTH:

Informing the development of Indigenous Community Agreements

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Office for Aboriginal and Torres Strait Islander Health
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SUMMARY

Background

This literature review was designed to summarise evidence of effective interventions which have been shown to have positive impacts on selected social and environmental factors that are relevant to Aboriginal and Torres Strait Islander people and communities. The review was conducted to provide information which would assist staff in Indigenous Coordination Centres in the development of Regional Partnership Agreements (RPAs) and Shared Responsibility Agreements (SRAs).

A range of social and environmental factors are acknowledged to be important in the poorer health outcomes for Aboriginal and Torres Strait Islander people compared to non-Indigenous Australians. Since 2004, the Australian Government has supported increased engagement with Indigenous communities by all levels of government to address identified local issues through RPAs and SRAs. Many of these agreements involve programs or activities which address social and environmental factors that impact on health. A need was identified for information to support those involved in the development of these agreements.

Seven databases and 12 websites were searched for the period 1980-2006 for Australian reports and five databases were searched for the period 1996-2006. Search terms included a combination of Aboriginal/Indigenous subject terms and nutrition, education, early intervention, sports facilities and programs, swimming pools, housing, cultural programs, alcohol, community services subject terms. The search strategy combined these terms with program evaluation or outcomes in a multi-step process. There was a qualitative review of relevant literature; studies were included if they reported impacts or outcomes relevant to health or the social, economic or environmental determinants of health. Studies were classified using the levels of evidence classification system published by the National Health and Medical Research Council (NHMRC). The early childhood development and education section was based on previous reviews with only limited analysis of primary studies due to the extent of literature in this area and the number of recent reviews.
completed recently. Sections were peer reviewed by relevant Australian experts.

Results

The review identified a limited number of effective interventions in social and environmental factors in Aboriginal and Torres Strait Islander communities or Indigenous communities in New Zealand, the United States or Canada. These interventions were mostly Level III-3: comparative studies with historical controls or Level IV: case series evaluations.

Nutrition

A number of comprehensive nutrition programs were identified which reported positive health impacts (decreased weight, improved child growth, decreased insulin and cholesterol) or changes in dietary behaviour (decreased fat/sugar intake, increased fruit/vegetable intake) in Aboriginal and Torres Strait Islander communities and Indigenous communities in NZ, Canada and the USA. There were a number of common factors that appeared to be important in the success of these programs. Common features were:

» effective assessment and feedback to individuals;
» programs addressed community priorities;
» program strategies addressed both individual and community issues (eg, growth monitoring, improving food supply networks, subsidised healthy meals, supportive nutrition policies, physical activity sessions and cooking classes);
» long-term partnerships between the community and program staff; and

» strong community engagement and capacity building.

Large supplementary feeding programs for children and pregnant women in the USA have been widely accepted in disadvantaged mainstream and Native American communities. There is some evidence that these programs improved the nutritional status of participants, and the behaviour and learning in young children. School meals programs in the USA involve large numbers of children in disadvantaged communities. Evaluations of these programs have shown improved nutrition in these children, with limited evidence of improvement in their attendance and school performance.

Education/Early Life

There was evidence from international studies in disadvantaged communities, particularly in the USA, which confirmed the positive impact (improved cognitive development and behaviour) of preschool and early intervention for younger children. Longer-term follow-up confirmed improved educational outcomes with more limited evidence suggesting economic benefits. Evidence supports the need for early intervention programs to be multi-faceted incorporating early childhood education, parenting support and facilitating access to other services. The most effective programs were well resourced, utilised a mixture of centre and home based activities, had well trained staff and were focussed on the child’s development.

Community involvement and a culturally appropriate approach are necessary for Indigenous programs. It can be difficult to define culturally appropriate. However, ensuring a program is culturally appropriate refers to the need for local consultation to ensure that this program is acceptable in this community.

There was evidence that Australian and international parenting programs reduced both behavioural and emotional problems in children and dysfunctional parenting practices. An adaptation of the Triple P Positive Parenting program in an urban Aboriginal community showed similar positive impacts.

There was limited evidence that more positive expectations in schools and the community resulted in improved attendance and educational outcomes for Aboriginal and Torres Strait Islander students. This was linked to cultural understanding and engagement between teachers and local communities.

Housing and Health

Hardware in houses

The Housing for Health program in Aboriginal and Torres Strait Islander communities has demonstrated that it is possible to improve the functioning of essential facilities for washing, sanitation, electricity and storing and preparing food in houses (health hardware). The program emphasis is on training community teams to survey and maintain houses with support from trades people. Sustainable improvements in living conditions should result in improved health outcomes based on worldwide experience over the last 150 years.

The extent of overcrowding is still a significant problem for Aboriginal
and Torres Strait Islander people, particularly those living in remote areas. Overcrowding in dwellings is linked to increased risk of infectious diseases and mental health problems. It also impacts significantly on the functioning of health hardware. One study estimated that overcrowding is responsible for 30% of the difference in health status between remote Indigenous Australians and non-Indigenous Australians.

**Swimming pools**

The only evidence of the benefit of sporting facilities is from an ongoing Western Australian study of swimming pools in two remote Aboriginal communities. This showed that the pools were associated with decreased rates of skin infections and eardrum perforations in children. The pools were also linked to social benefits in the communities.

**Sporting and Cultural programs/facilities for young people**

Sporting and cultural programs have demonstrated the capacity to engage Aboriginal and Torres Strait Islander young people. There was some evidence that these programs were associated with positive impacts on physical activity, substance misuse, self-esteem and school attendance. If the impacts of these programs are sustained then this should improve the health and educational attainment of young Aboriginal and Torres Strait Islander people.

**Community Services**

Contemporary family support programs were able to engage Aboriginal and Torres Strait Islander people and were associated with improved family and community functioning. The development of community partnerships and support was a consistent feature of successful family support programs. Training programs have also demonstrated significant participation by Aboriginal and Torres Strait Islander people. Participation was improved if the programs were linked to productive and relevant community activities or ongoing employment. There was limited evidence that training was associated with improved self-esteem, school retention and further training or employment. Increased use of information technology has demonstrated the potential to increase access to information and services in Indigenous communities in Australia, Canada and the USA. No associated health outcomes have been reported yet as a result of these interventions.

**Employment**

Unemployment has been associated with poorer health in Australia and internationally. Recent evidence showed that Indigenous Australians in non-Community Development Employment Project (CDEP) employment had better self-reported health than those unemployed or in CDEP employment.

Current employment assistance programs have demonstrated increased incomes and decreased need for income assistance for Aboriginal and Torres Strait Islander people in urban and regional locations. The CDEP remains the major source of employment for Aboriginal and Torres Strait Islander people in remote areas. The CDEP was associated with benefits for individuals and communities, however, the benefits of non-CDEP employment were greater.

**Alcohol Misuse**

Alcohol supply reduction interventions in regional or remote Australian locations were associated with decreased alcohol consumption and decreased acute alcohol-related health and social problems. Successful interventions were developed with community involvement and support. There was evidence that the combination of alcohol supply reduction or price increases with increased treatment and rehabilitation services, community education and local alcohol management plans improved acute and long-term health outcomes in both Aboriginal and Torres Strait Islander and non-Indigenous Australians.

**Discussion**

This review has highlighted the limited quality and quantity of programs addressing the selected social and environmental factors in Aboriginal and Torres Strait Islander communities. This makes it difficult to make specific recommendations about the most effective interventions to include in RPAs or SRAs. However, the studies provided useful evidence to inform the process of developing Indigenous community agreements.

The features of successful interventions in Aboriginal and Torres Strait Islander settings included the involvement of local Indigenous people in the design and implementation of programs. Effective partnerships
between community members and the organisations involved resulted in community capacity building and employment for local Indigenous people. Other features of the successful interventions were cultural understanding and mechanisms for effective feedback to individuals and families.

The development of trusting relationships, community ownership and support for interventions in Aboriginal and Torres Strait Islander settings is of central importance. The time required to develop these relationships should be considered when planning programs and determining the timeframe for assessing impacts or outcomes of the intervention.

The successful programs have been able to achieve intended impacts with improvements in social, environmental and/or behavioural factors. SRAs and RPAs should focus on demonstrating the intended impacts. It is a reasonable assumption that if these impacts are sustained, then there should be improvements in associated health outcomes in the long-term.

Evaluation of ongoing and new interventions in these social and environmental factors is recognised as important to address the limited evidence in many areas. Process and outcome evaluation is particularly important in flexible, locally designed programs to enable these approaches to be compared or replicated in other areas. This will inform future program development.

There is the potential for harms as a result of some of these interventions, such as occurred for vulnerable families in some of the early intervention studies. It is necessary to consider and monitor for the possible adverse outcomes that may result from such interventions.

Effective interventions were often costly due to the significant resources required. A limited number of studies have shown that these programs can be cost-effective by reducing health care, education or income support expenditure. Expansion of cost-effectiveness analysis would be useful to complement other forms of program evaluation.

The pilot programs or research studies described in this review may not be as effective if adapted for a larger program in other communities. This emphasises the importance of documenting the processes involved and identifying the essential features that increase the effectiveness of the intervention.

The lack of specific interventions in Aboriginal and Torres Strait Islander communities made it necessary to consider the relevance of other Australian and international evidence. There was extensive evidence in other settings in some of these areas, such as preschool and early intervention studies in the USA. However, it is uncertain how effective such programs would be in an Australian Indigenous or non-Indigenous context. This again reinforces the importance of incorporating evaluation in new or adapted programs.

There were several limitations of this review. The first was the difficulty attributing outcomes due to the low quality of evidence available. However, the requirement for community interventions makes it impractical to use individually randomised trials. The NHMRC levels of evidence classification system does not include qualitative studies. This meant that the evidence obtained from qualitative studies was more difficult to compare in this review or may have been excluded. It is also clear that these social and environmental factors are not necessarily independent. For example, the lack of facilities for storing, preparing and cooking food in houses may have an important effect on the outcomes of a community nutrition program. Thus, there may be confounding effects in the interventions which address only one of these factors. This was a further limitation of this review.

The limited economic analysis of these Aboriginal and Torres Strait Islander community programs meant it was not possible to definitively recommend the “best buys” for Indigenous community agreements. The strongest evidence identified was the potential of multi-component nutrition programs to be developed through community agreements. However, there was evidence that family support programs, the Housing for Better Health program and youth sporting and cultural programs in particular are achieving intended impacts. These findings indicate that community-based interventions could be developed to address many social and environmental factors affecting health. This could involve adapting the features of successful community programs that have been summarised in this review.
AIMS OF THIS LITERATURE REVIEW

» To identify and summarise evidence of effective interventions in nutrition, early childhood education and development, housing, sporting and cultural facilities, and programs, employment, community services, alcohol misuse and swimming pools that is relevant to Aboriginal and Torres Strait Islander people and communities.

» To provide information to inform decisions about the most effective interventions to consider when developing RPAs and SRAs to improve the health of Aboriginal and Torres Strait Islander Australians.
In 2004 the Australian Government introduced a new approach to the provision of services to Aboriginal and Torres Strait Islander people (Department of Immigration, Multicultural and Indigenous Affairs, 2004). There was an intention to integrate Indigenous-specific programs into mainstream agencies but with improved coordination through a ‘whole-of-government’ approach. Fundamental to this new approach was the development of greater regional planning through regional partnership agreements (RPAs) and shared responsibility agreements (SRAs). These agreements are established between Governments and communities through discussions between the staff in Indigenous Coordination Centres and community representatives. RPAs and SRAs represent a new opportunity with additional funding to address local priorities in ways that complement existing publicly funded services. SRAs in particular have been rapidly increasing in number, with 192 signed to December 2006 (Office of Indigenous Policy Coordination, 2006). Many SRAs address local social and environmental issues that have been shown to affect people’s health.

Internationally, the landmark Whitehall studies (Marmot et al, 1991) emphasised the effect of social factors on health status. These studies confirmed that within the British Civil Service a mortality gradient exists between lower and higher grades of employees (after adjusting for known health risk factors). Differential health outcomes due to socio-economic factors have since been confirmed in populations in many countries including Australia (Marmot, 2005; Turrell & Mathers, 2000). The factors include social status, employment conditions, unemployment, levels of stress, social exclusion, access to basic community infrastructure and housing. This evidence has focussed attention on the need to reduce social inequities in an effort to both improve the overall health and reduce health disparities within populations (World Health Organization, 2003).

Aboriginal and Torres Strait Islander Australians have worse health than non-Indigenous Australians. Despite recent improvements, Aboriginal and Torres Strait Islander Australians...
have higher rates of infant and child mortality, higher rates of chronic diseases such as diabetes, renal failure and emphysema and earlier onset of these diseases than non-Indigenous Australians (Australian Bureau of Statistics, 2005). This persisting disparity has focussed attention on the relative contribution of recognised disease risk factors and social, economic and environmental factors in determining health status. These social and environmental factors are clearly relevant to Aboriginal and Torres Strait Islander Australians. For example, Indigenous people experience six times higher rates of overcrowding and poorer access to essential services such as electricity, water and sanitation than non-Indigenous Australians (Australian Institute of Health and Welfare, 2005). Indigenous Australians are more likely to have only completed school to Year 9 or below (33% vs 16%) and less likely to have a non-school qualification (29% vs 50%) than non-Indigenous Australians (Australian Bureau of Statistics, 2004).

The commitment by the Australian Government to developing local programs through RPAs and SRAs is one strategy to address social, economic and environmental factors that affect health. In this context, it was considered that the Office for Aboriginal and Torres Strait Islander Health in the Department of Health and Ageing could usefully contribute to the SRA and RPA process by collating the evidence of the impact of the social and environmental factors on health. This review was completed to summarise evidence of effective interventions in nutrition, early childhood education and development, housing, sporting and cultural facilities and programs, employment, alcohol misuse, community services and swimming pools that is relevant to Aboriginal and Torres Strait Islander people and communities. This information is intended to assist with the understanding of the health impacts of future RPAs and SRAs. It will also allow more informed decisions about the most effective strategies to include in RPAs and SRAs.
METHODS

LITERATURE SEARCH

Seven databases were searched for relevant Australian reports and reviews from 1980-2006: Medline, Australasian Medical Index (AMI), ATSHealth, Australian Education Index-Aboriginal and Torres Strait Islander Subset, Australian Public Affairs Information Service (APAIS), Australian Family & Society Abstracts Database – Aboriginal and Torres Strait Islander Subset (FAMILY-ATSIS) and Horizon (the Australian Government Department of Health and Ageing library catalogue).

Five databases were searched for the period 1996-2006 for international evidence: Medline, Embase, CinAHL, SocIndex and PsychINFO.

A number of websites were also searched for Australian reports: Telethon Institute for Child Health Research, Cooperative Research Centre for Aboriginal Health, Centre for Remote Health, Menzies School of Health Research, Centre for Community Child Health, Australian Indigenous HealthInfoNet, NT Dept of Health and Community Services, WA Dept of Health, Office of Aboriginal Health, QLD Health, VIC Dept of Human Services – Health Information and NSW Health.

The searches were limited to a publication date from 1980-2006 and in English. The search strategy depended on the subject terms and indexing practices of each database. Search terms were a combination of Aboriginal/Indigenous search terms and nutrition, surveys, infant, child, adult, education, swimming pools, environmental health, physical activity, cultural activity, housing, socioeconomic, infrastructure subject terms. The searches combined these terms with program evaluation or outcomes in a multi-step process. Additional information was obtained by contacting Australian researchers in these areas and following up reference lists in published studies. International evidence from mainstream programs was included in topics where there was little or no relevant evidence from Indigenous communities.

ANALYSIS

The literature review analysis was a qualitative process by a single reviewer. Reports describing impacts or outcomes relevant to health or the social, economic or
environmental determinants of health in English were included. Studies were rated by the level of evidence each represented using the National Health and Medical Research Council classification (Table 1). Other literature reviews, including systematic reviews, were quoted if relevant. Qualitative studies and studies with no outcome data were excluded.

The early childhood development and education section was based on previous reviews with only limited analysis of primary studies due to the extent of literature in this area and the number of recent reviews completed recently.

PEER REVIEW

Each topic was reviewed by Australian experts in the relevant field.

<table>
<thead>
<tr>
<th>LEVEL OF EVIDENCE</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Level I</td>
<td>Evidence obtained from a systematic review of all relevant randomised controlled trials</td>
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<tr>
<td>Level II</td>
<td>Evidence obtained from at least one properly designed randomised controlled trial</td>
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<tr>
<td>Level III-1</td>
<td>Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method)</td>
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<tr>
<td>Level III-2</td>
<td>Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case control studies, or interrupted time series with a control group</td>
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<tr>
<td>Level III-3</td>
<td>Evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel control group</td>
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<tr>
<td>Level IV</td>
<td>Evidence obtained from case series, either post-test or pre-test and post-test</td>
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Source: National Health and Medical Research Council, 1999, p56.
NUTRITION

RESULTS

This section summarises evidence of nutrition programs for Aboriginal and Torres Strait Islander adults and children. It does not include information about infants and breastfeeding, which were summarised by Herceg (2005).

NUTRITIONAL INTAKE

The National Aboriginal and Torres Strait Islander Health Survey 2004-5 (Australian Bureau of Statistics, 2006) found that 42% of Indigenous Australians in non-remote areas reported eating the recommended daily intake of fruit and 10% consumed the recommended daily intake of vegetables. Non-Indigenous Australians had similar intake of vegetables, but reported eating more fruit. Indigenous Australians living in remote areas were more likely than those in non-remote areas to report no daily fruit intake (20% versus 12%) or vegetable intake (15% versus 2%). Indigenous Australians were more likely to report drinking full cream milk than non-Indigenous Australians. Seventy-one percent of Indigenous Australians reported adding salt to food after cooking always or usually.

Studies in remote Aboriginal communities in the Northern Territory (Lee, Bailey et al, 1994; Lee, O’Dea et al, 1994) showed a high intake of fat, sugar, white flour and sweet drinks. There was a low intake of fresh fruit and vegetables, complex carbohydrates, fibre and micronutrients (vitamins and minerals). These studies used the store turnover method.

There was limited information of nutrition in urban Aboriginal communities. One study showed there was a high intake of take-away foods, salt and fried foods in one urban community (Guest & O’Dea, 1993). More recently, Heath & Panaretto (2005) found that 97% of 157 children from an urban area did not meet one or more Australian dietary guideline recommendations. Forty-six percent of the children were Aboriginal or Torres Strait Islander. However, there was no difference between Aboriginal and Torres Strait Islander children and non-Indigenous children in this study.

A study in a Torres Strait Islander community (NHMRC, 2000) used the store turnover method to show that 50% of energy in diet came from flour, white rice, tinned meat and vegetable oil.
Marine foods were still a significant part of diet. There was limited availability of fruit and vegetables in the community. Low intake of fresh fruit and vegetables has been separately reported in the Torres Strait (Leonard 2003).

## INTerventions

### Nutrition Education

Reviews of Aboriginal and Torres Strait Islander nutrition programs found no benefit from short-term nutrition education interventions (Butlin et al, 1997; Brewster 2003).

### Comprehensive Nutrition Intervention Programs

A number of nutrition projects were identified which reported positive impacts on dietary intake, weight gain in children, fasting cholesterol, blood sugar and insulin levels in Aboriginal and Torres Strait Islander communities and Indigenous populations in NZ, Canada and the USA. The Australian programs are summarised in Table 1 and the international programs in Table 2.

### Table 2. Comprehensive nutrition programs in Aboriginal and Torres Strait Islander communities

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>TYPE OF STUDY</th>
<th>INTERVENTION/SERVICE PROVIDED</th>
<th>IMPACTS AND OUTCOMES</th>
<th>KEY FEATURES</th>
<th>REFERENCES</th>
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</thead>
</table>
| Kintore (Walungurru) Child Nutrition Project  | Comparative study with historical controls (Level III-3) Evaluation based on clinic records of 75 children. | Individual growth monitoring of children under 5 years with feedback to carers Education for local nutrition workers and carers Breakfast and lunch for children prepared by nutrition workers | » Increased weight in children aged 4-36 months  
» Decrease in diarrhoea and evacuations/hospital admissions  
» Costs estimated at $69,000 per year offset by savings due to decreased hospital admissions of $75,000 per year | » Extensive community consultation  
» Participation in meals program voluntary and involved a fee  
» Activities based at Women’s Centre  
» Collaboration between health clinic staff and Women’s Centre  
» Duration of intervention 3 years | Warchivker & Hayter, 2001  
Warchivker, 2003 |
| Minjilang Nutrition and Health project Minjilang, NT  | Comparative study with a control group (Level III-2) Study involved 68 of 71 adults in the community. Twelve month follow-up of 44 people. | Individual nutritional health assessment and feedback Provision/ promotion of nutritious food at community store | » Increase in fruit and vegetable and folate intake  
» Decrease in sugar intake  
» Decrease in mean cholesterol by 12%  
» Significant increase in mean folic acid, vitamin C, vitamin E and vitamin B6 | » Directed by community elders  
» Only Aboriginal staff at community health clinic  
» Employed local community members increasingly  
» Cost $65,000 over 12 months – most spent on pathology and evaluation  
» Duration of intervention 1 year | Lee, Bailey et al, 1994  
Lee et al, 1995 |
Strong Women, Strong Babies, Strong Culture
Kimberley and Pilbara regions, WA
Comparative study with historical control group (Level III-3)
43 of 46 eligible children in intervention group; 204 children in control group

- Increased weight gain for children 6 months to 3 yrs (30 g/month)
- No change in birth weight
- No change in preterm births

Community-based maternal support program
» Frequent individual nutritional assessment of infants and children with counselling of mothers/carers
- Community initiated – community members approached research team from previous work
- Support from key individuals in the community
- Duration of intervention 14 months

Community capacity increased with health staff
Community involvement has ensured sustainability, continues after 6 years
- Decreased fasting blood sugar levels, triglycerides and insulin in intervention group
- Increased weight gain for children 6 months to 3 yrs (30 g/month)
- No change in birth weight
- No change in preterm births

Comparative study with control group
» Diabetic nurse educator worked with Aboriginal Health Workers
- Education sessions – involving people with diabetes and family members
- Physical activity sessions
- Cooking classes, store tours – identify healthy food choices
- As measured by store turnover there was:
  - 65% decrease in sugar
  - 175% increase in low fat tinned meat and vegetables
  - 81% increase in fruit
  - 11% increase in vegetables
  - 50% increase in healthy food choices available
- No significant change in individual health outcomes

Community initiated with health staff
Community capacity increased during project – the local steering committee increasingly managed the project, CDEP positions created for community based workers, large community garden established and ongoing funding achieved
- No significant change in individual health outcomes
Table 3. Comprehensive nutrition programs in Indigenous communities in NZ, Canada and the USA

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<tr>
<th>PROGRAM</th>
<th>TYPE OF STUDY</th>
<th>INTERVENTION/SERVICE PROVIDED</th>
<th>IMPACTS AND OUTCOMES</th>
<th>KEY FEATURES</th>
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<tr>
<td>Pathways Obesity Prevention Program</td>
<td>Randomised Controlled Trial (Level 2)</td>
<td>Classroom curriculum—promoting healthy eating and physical activity linked to American Indian traditions</td>
<td>» Decreased dietary fat intake</td>
<td>» Based in 7 American Indian communities, duration of intervention 3 years</td>
<td>Going et al, 2003; Cabral et al, 2003; Gitelson et al, 2003</td>
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<td></td>
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<td>» Increased frequency and quality of physical education classes (3 or more 30 minute classes per week)</td>
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<td></td>
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<td>» Traditional American Indian games incorporated</td>
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<td>» Family events, workshops and information packs</td>
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<td>Sandy Lake Diabetes Project</td>
<td>Single sample with pre- and post-test</td>
<td>Health education in curriculum—increased dietary knowledge, especially fat content of food</td>
<td>» Increased dietary knowledge, especially fat content of food</td>
<td>» Native North American learning style including learning through observation, story-telling, cooperative learning, traditional American Indian games incorporated</td>
<td>Saksvig et al, 2005</td>
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<td></td>
<td>» Increased purchase of healthy foods by families</td>
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<td>» Increased fibre intake</td>
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<td>» Increased BMI, body fat</td>
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<td>Sandy Lake School-based Diabetes Prevention Project</td>
<td>Cohort study with two control communities</td>
<td>Physical activity classes, walking groups</td>
<td>» Decreased BMI and BP in high risk individuals</td>
<td>» Participatory planning process conducted with community prior to intervention</td>
<td>Daniel et al, 1999</td>
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<td></td>
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<td>» Non-significant decrease in weight, physical activity and knowledge</td>
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<td>» No change in self-care behaviour</td>
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<tr>
<td>Okanagan Diabetes Project</td>
<td>Cohort study (Level III-2)</td>
<td>Physical activity classes, walking groups</td>
<td>» Decreased BMI and BP in high risk individuals</td>
<td>» Participatory planning process conducted with community prior to intervention</td>
<td>Ozbek et al, 2003; Okanagan et al, 2003; British Columbia, 2003</td>
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<tr>
<td>Okanagan Diabetes Project</td>
<td>Cohort study (Level II)</td>
<td>Physical activity classes, walking groups</td>
<td>» Decreased BMI and BP in high risk individuals</td>
<td>» Participatory planning process conducted with community prior to intervention</td>
<td>Ozbek et al, 2003; Okanagan et al, 2003; British Columbia, 2003</td>
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<td></td>
<td></td>
<td>» No change in self-care behaviour</td>
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<tr>
<td>Study</td>
<td>Design</td>
<td>Sample Description</td>
<td>Interventions</td>
<td>Outcomes</td>
<td>References</td>
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<tr>
<td>Maori Lifestyle Intervention Project</td>
<td>Cohort study</td>
<td>Single sample with pre-and post-test (Level IV) 36 adults participated in the study</td>
<td>» Exercise program (5 sessions/week) including traditional cultural activities, Individual health assessment – provided with recommendations for individual diet and exercise program, Fortnightly review</td>
<td>» 24% improvement in insulin sensitivity, Decreased weight and decreased blood pressure, Decreased dietary fat, Increased dietary fibre and carbohydrates</td>
<td>Murphy et al, 2003, McAuley et al, 2003</td>
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<tr>
<td>Dunedin, NZ</td>
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<tr>
<td>Apache Healthy Stores project USA</td>
<td>Cohort study</td>
<td>11 intervention stores and 6 control stores</td>
<td>» Increased healthy food availability, Healthy food choice promotion, Cooking classes, Food labelling, Newspaper cartoons and radio announcements</td>
<td>» Availability of target healthy foods increased from 31% to 100%, Further analysis of outcomes awaited</td>
<td>Curran et al, 2005</td>
</tr>
<tr>
<td>USA</td>
<td></td>
<td></td>
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<tr>
<td>Kahnawake School Diabetes Prevention</td>
<td>Cohort study</td>
<td>394 of 458 eligible school children in intervention and 140 of 199 children in control group</td>
<td>» Health education curriculum in primary school-nutrition, physical activity, diabetes, Local community media articles and advertising, Community events-contests and family activities, School nutrition policy – No junk food allowed, increase in healthier food options, Cycling/Walking path built</td>
<td>» Significantly less increase in skinfold thickness at 2 years, No difference in BMI, Increased physical activity, fitness and decreased television after 5 years – not sustained at 8 years, Decreased high fat and high sugar foods, fruit/vegetables consumption over 8 years</td>
<td>Paradis et al, 2005</td>
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<tr>
<td>Project Kanien’kehaka, Ontario, Canada</td>
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All of the studies except the Pathways study in the United States were cohort studies, mostly with nearby communities as controls or historical controls. Selection bias may have had a significant impact on the reported outcomes of these programs. Several communities had initiated or were actively involved in planning the intervention. This active community involvement was important to ensure the sustainability of the impacts. However, other communities (including potentially control communities) may not have the same capacity to engage with nutrition interventions.

The impacts of these programs include improvements in dietary behaviour, micronutrient levels, risk factors for nutrition-related disease and childhood growth. These impacts were sustained for the duration of the programs, which lasted from four months to three years. The Looma, WA program reported ongoing activity five years after the intervention (Rowley et al, 2001). Over the longer-term, it is reasonable to expect that these impacts should improve health outcomes. Only the program at Kintore, NT reported improved health outcomes with decreased rates of gastroenteritis and a decrease in hospital admissions for children less than three years (Warchivker, 2003).

**Common Features of Successful Comprehensive Nutrition Programs**

The programs identified all involve multiple strategies to improve the nutrition of people within the targeted community. It is difficult to attribute the success of each program to any particular component. There are a range of common features among these programs. Many of these features are recognised as important for motivating and engaging individuals and communities in health intervention programs (Oldenburg et al, 2000). Thus, nutrition programs which include these features would be more likely to result in positive outcomes.

Common features were:

- effective assessment and feedback to individuals;
- programs addressed community priorities;
- strategies to address both individual and community issues (growth monitoring, improving food supply networks, subsidised healthy meals, supportive nutrition policies, physical activity sessions, cooking classes);
- long-term partnerships between the community and program staff; and
- strong community engagement and capacity building.

**SUPPLEMENTARY FEEDING**

**Australian Experience**

There are no national supplementary feeding programs or food subsidy programs in Australia, thus any supplementary feeding programs will have been implemented in local communities. There have been very limited published studies evaluating supplementary feeding programs in Australia. The only studies identified involved Aboriginal children.

One non-randomised controlled trial (Level III-2) of a preschool meal program for Aboriginal children in five NSW rural towns was conducted in 1977. Aboriginal children from different communities where preschools were not available were used as controls. Growth monitoring and selected pathology testing was performed. The initial anthropometric measurement of children age 3-5 years showed growth below expected levels. The outcomes observed were increased growth (weight, height) but a decrease in haemoglobin, vitamin C and ferritin among children receiving supplementary feeding (Coyne et al, 1980).

**National Child Nutrition Program – Evaluation of Indigenous projects in WA.**

*(Miller et al 2004)*

This evaluation (Level IV) described nine projects in discrete Aboriginal communities. These projects involved a range of school based interventions such as providing low cost or free healthy meals, supportive school nutrition policies, increased nutrition education in the school curriculum and community involvement. The reported outcomes included increased access to nutritious food at school (7 of 9) and increased attendance and attention in school (5 of 9).

Factors associated with project success were: community ownership and involvement in planning and implementation; a coordinator who is respected by the community and able to provide leadership; and flexibility in the program to respond to changing circumstances.
Successful programs also had continuity in key stakeholder groups and community infrastructure to support the project including people. Schools were considered effective as a starting point for improving nutrition, but community involvement and partnerships were necessary to sustain the impact in a community.

**International Experience**

**Women, Infants and Children (WIC) Program – United States**

This longstanding program provides coupons for healthy foods to socio-economically disadvantaged pregnant women and children aged 0-5 years. Since 1996 it has also provided nutrition education and referrals to other services. There are currently 26 million participants. Native American women and children participate through 33 Tribal Indian organisations. The program has been evaluated in a number of large cross-sectional surveys (Level -2). The outcomes included improved childhood growth, higher rates of breast-feeding, increased birth weights, decreased iron deficiency anaemia, improved consumption of protein and micronutrients and improved vocabulary scores and number memory among children. The program has shown a positive return on investment with decreased health care costs of US$1.77 – $3.13 for each dollar of program funds (US Department of Agriculture, 2004; Siega-Riz et al, 2004).

The WIC program has been shown to be acceptable to Native American communities. In one Cherokee Indian community there was a positive community attitude to program foods (Slonim et al, 1981). Improvements in children’s diets were attributed by parents to the foods available through the WIC program (Level IV). There was also increased growth observed in Navajo children after prenatal interventions associated with the WIC program (Level III-3) (Peck, et al, 1987). These prenatal interventions included antenatal care, breastfeeding promotion and the provision of healthy foods.

A study of one rural and one urban Native American community in California (Dillinger et al, 1999) found that supplemental food programs were accepted by both communities. Only 10% of families were eligible for the WIC program which offered coupons for healthy food choices. Other supplemental food programs (United States Department of Agriculture (USDA) Food Commodities and USDA Food Stamp program) provided foods which were high in fat and salt. However, due to poverty, many of the respondents received most of their food from these other programs. This suggested that the programs are contributing to unhealthy food choices and poor nutrition.

**US Department of Agriculture School Breakfast Program (SBP) (Kennedy & Davis, 1998)**

The SBP has been operating since 1966. The program was expanded in 1989 and by 1995 involved 6.3 million children in 64,000 schools. The program operates in socio-economically disadvantaged areas. All children at participating schools are eligible for healthy breakfasts, which are either free or subsidised depending on family income levels. The aim is to provide 25% of recommended dietary requirements for energy and specific micronutrients such as iron and calcium.

The growth of participation in the SBP was initially slow but has continued to increase over time. The acceptance of the SBP is linked to increased female participation in paid employment and the trend for increasing consumption of meals outside the home. Participation rates are higher among children from low income families, younger children, boys, African American and Hispanic children and children in rural areas. The barriers to participation include the perceived social stigma of a free breakfast and if the breakfast is provided too early.

There have been a number of evaluation studies (Level III-2 & Level III-3) which showed that eating a school breakfast was associated with increased intake of energy and micronutrients such as vitamin C, vitamin A, calcium and magnesium. One study in six schools (Level II-2) showed an association between participation in the SBP and improved performance on educational testing. Improvements in absenteeism and late arrival at school also improved with SBP participation. The challenge confronting the SBP is the increasing levels of over-consumption with insufficient micronutrients in children’s diets.
The School Lunch Program (SLP) has been operating in the US since 1946. It provides funding for schools to provide free or subsidised healthy lunches to children. In 2005, 29.6 million children from over 100,000 schools and residential childcare facilities participated in the program. Each school determines what foods will be served in lunches; however, they must meet US nutrition guidelines. The program has been affected by the increase of other foods and drinks sold at schools. The US Government is investigating options to decrease the sales of less healthy food and drink options at schools (US Department of Agriculture, 2001a).

A large child nutrition survey (Level III-2) in 1994-96 showed an association between participation in the SLP and increased average intake of nutrients including vitamins B6, calcium, zinc, and magnesium. Participants had lower intake of added sugar and soft drinks. They also reported higher intakes of vegetables, dairy foods, meat and other protein-rich foods than non-participants (US Department of Agriculture, 2001b).

National School Fruit Scheme – United Kingdom

A National School Fruit Scheme commenced in 2001. Through this program, children 4-6 years are entitled to 1 piece of fruit/day (UK Dept of Health, 2000). The evaluation (Level IV) showed enthusiastic support from teachers and parents with ongoing participation in 99% schools after the pilot program in 2001. Fifty-five percent of teachers reported improvements in children’s attention, behaviour and settling (UK Dept of Health, 2001). A supplementary meal program is also being considered in the UK.

Market gardens

There is a lack of published evidence of the outcomes of previous initiatives to grow food locally in Aboriginal communities. However, possible benefits such as reducing dependence on outside food supplies, keeping money in the community and improvements in self-esteem may be difficult to document (NHMRC, 2000).

DISCUSSION

There is extensive evidence of the prevalence of nutrition-related health problems including cardiovascular disease, diabetes, obesity and renal disease in Aboriginal and Torres Strait Islander people (Australian Bureau of Statistics, 2006). However, there is more limited evidence of poor nutrition among Aboriginal and Torres Strait Islander people, such as high sugar and fat intake and low intake of fresh foods. More limited access to healthy foods, particularly fruit and vegetables, is an important factor in the nutrition of Aboriginal and Torres Strait Islander people who live in remote areas.

Nutrition education has an important role to improve people’s understanding of the link between nutrition, health, specific diseases and risk factors. It should be incorporated with other strategies in comprehensive nutrition interventions. It may be most effective when combined with active strategies such as provision of healthy foods or cooking demonstrations in schools or communities.

The evidence from the cohort studies identified suggests that comprehensive nutrition intervention programs in remote Aboriginal communities do have the potential to improve nutrition. These benefits have been sustained over one to three years. Improved nutrition should result in improved health outcomes over the longer-term. However, only one study demonstrated improved health outcomes after a three year program. Community capacity-building is an important aspect of these programs as many of the programs are intensive research-based studies. This capacity building improves the sustainability of the programs and thus the potential for health improvements. Longer term evaluation of these programs which demonstrated the expected health improvements would strengthen the evidence base for these comprehensive nutrition interventions.

Cost-effectiveness or cost benefit analysis was not addressed in most of these studies. There are substantial direct cost reductions that could result over three to five years due to improved nutrition. An example is the decrease in medical evacuations and hospital admissions documented by Warchivker (2003) in a remote Aboriginal community. Although it may be difficult to attribute this with certainty to the intervention without a randomised controlled trial, it highlights the potential of cost benefit analysis to provide further evidence to support nutrition programs.
Supplemental food programs are well established in the United States. There is consistent evidence of beneficial impacts of these programs on maternal and child nutrition, child growth, and micronutrient levels. The programs have also been associated with improved health outcomes, such as increased birth weights and improved child growth and development. There is increasing use of supplementary feeding programs in the United Kingdom and the United States.

It is uncertain how this international evidence applies to Australia, particularly Aboriginal and Torres Strait Islander children, given the differences between the Australian and United States health and social security systems. In Australia, the recent experience of supplemental food programs is limited to small school food programs mostly in Indigenous communities. The programs appear to be acceptable and have short-term positive impacts on nutrition. However, evaluations of future strategies to provide subsidised food in Aboriginal and Torres Strait Islander communities are required to demonstrate the outcomes and the sustainability of such programs.

The impact of nutrition programs is dependent on the availability and affordability of healthy food options for participants. In remote Indigenous communities in Australia this has involved extensive effort and increased investment to improve community stores and food supply arrangements (Leonard, 2003). The importance of this work is reflected in a large Outback Stores project funded through Indigenous Business Australia (Indigenous Business Australia, 2006).

The housing/health hardware section below demonstrates the inadequacy of food preparation and storage facilities in a large number of Aboriginal and Torres Strait Islander community houses. This issue is also of vital importance to the long-term impact of nutrition initiatives. The National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan 2000-2010 is an important resource (National Aboriginal and Torres Strait Islander Nutrition Working Party, 2001). It discusses all of these issues and suggested actions to improve the nutrition of Aboriginal and Torres Strait Islander people.
EDUCATION/EARLY LIFE

RESULTS

These results are from a selective review of recent Australian and American reviews of Indigenous early childhood programs and school programs. Individual studies which highlight major programs or other evidence are also presented. Evidence for the effectiveness of preschool programs, parenting programs and multi-component early childhood interventions is presented.

PRESCHOOL

Australian experience

Penman’s (2004) review of Indigenous childhood experiences emphasised that the provision of quality preschool improves educational and employment outcomes for disadvantaged children. This conclusion is based on international studies (Centre for Community Child Health, 2000). A limited number of pilot programs have demonstrated the importance of preschool for Indigenous children. Specific examples are highlighted below. These successful programs were underpinned by community involvement and a culturally appropriate approach (Penman, 2004). Culturally appropriate, although difficult to define generally, refers to the need for local consultation to ensure that this program is acceptable in this community.

Aboriginal Family Education Centres (New South Wales)

Twelve Aboriginal family educational centres were established in rural NSW in the early 1970s. Parents and other family members were engaged in learning activities with children. The outcomes for the children included improved attendance, better academic progress, improved social development and improved behaviour at home. There was also community capacity building with local Aboriginal people increasingly responsible for administration and direction (Schwab & Sutherland, 2001; Penman, 2004).

Mobile playgroup and mobile preschool (Northern Territory)

A mobile playgroup was established as a pilot project in a remote Aboriginal community in the Northern Territory in 1997. Parents and toddlers were involved in storytelling, art, craft work and playing with paper and books. Children at age 5 showed
improvements in ability to take up literacy and classroom readiness. Parents were more confident and comfortable in school (NT Dept of Education, 1999).

The Clyde Fenton mobile preschool was established for three to five year old children in two remote Indigenous camps near a school with lessons held in each community. The approach fostered parental participation and was strongly supported by local mothers (NT Dept of Education, 1999).

**International Experience**

**Aboriginal Head Start – Canada**  
*Public Health Agency of Canada, 2002*

This preschool program incorporates education and school readiness, Aboriginal culture and language, parental involvement, health promotion, nutrition and social support. The program commenced in 1996 and has been gradually rolled out to 126 sites. Each preschool program is locally designed and controlled, administered by non-profit Aboriginal organisations and involves the local community in management.

A process evaluation showed that 87% of local staff were Indigenous and 84% of centres had parent councils although parental engagement was challenging. The staff require ongoing early childhood training and improved culture and language curriculum. The results of an impact evaluation are awaited.

**PARENTING PROGRAMS**

Parenting programs are interventions involving a planned set of activities aimed at helping parents to improve their relationship with their child, and prevent or treat a range of behavioural or emotional problems (Watson et al, 2005). Watson et al (2005) emphasised the importance of the relationship and interaction between the facilitator and the participants in successful parenting programs. There are long-term programs, such as the Incredible Years program in the United States, with demonstrated effectiveness in different populations. The Triple P Positive Parenting program is a group-based behavioural family intervention that was developed in Australia. There is growing evidence of the effectiveness of the Triple P program in a range of Australian and international settings. It has been successful in engaging families from socio-economically disadvantaged communities (Watson et al, 2005).

There has been one randomised controlled trial (Level II) of a behavioural family intervention involving urban Aboriginal and Torres Strait Islander families (Sanders, 2003). A culturally appropriate Triple P Positive Parenting program was conducted. This involved six group sessions facilitated by child health nurses and Indigenous health workers and two follow-up home visits. The outcomes included decreases in disruptive child behaviour problems and dysfunctional parenting behaviour and a significant improvement in parental mental health.

**EARLY INTERVENTION PROGRAMS**

Early intervention programs involve a combination of quality early childhood care and education and parental support and education. These programs attempt to improve child health and
development and are targeted at families with children aged zero to five years. No published studies of multi-component early intervention programs in Aboriginal or Torres Strait Islander communities were identified. However, international evidence, predominantly from the United States, has shown substantial benefits of early intervention programs in disadvantaged populations with long-term follow-up (Watson et al, 2005; Wise et al, 2005; Karoly et al, 2005).

**International Experience**

Karoly et al, (2005) reviewed twenty preschool and early intervention programs from the United States with rigorous evaluations and longer term follow-up. The features of effective programs included smaller child to staff ratios, more intensive interventions and more highly trained staff. An example of the effect of better trained care givers was that home visiting had improved outcomes if trained nurses were involved. The smaller child/staff ratios improved cooperative behaviour and verbal skills among children. These features indicate that more effective programs are costly. There were substantial improvements in the children's cognitive, behavioural and emotional development as a result of effective programs. These outcomes tended to decrease over time, suggesting that ongoing inputs may be required. However, educational outcomes, such as improved grade retention and decreased special education needs, were more sustained.

A cost-benefit analysis of seven programs in the review by Karoly et al (2005) found that the interventions generated net economic benefits due to decreased need for remedial education services, increased tax revenues as a result of better school achievement and economic success and decreased social welfare and criminal justice spending. Net economic benefits were greater the longer the follow-up and when interventions were delivered to more disadvantaged children. Both Karoly et al (2005) and Wise et al (2005) emphasise that there is limited evidence of positive economic benefits, as many of these programs had small numbers of participants.


This program is aimed at low income families with children less than 3 years old. Flexible local models are designed involving home-based, centre-based or mixed programs. The interventions include education and development services for children and education services for parents. The initial outcomes were evaluated in a randomised controlled study (Level II). The impacts for the children at age 3 included improved cognitive and language development, improved engagement with parents and less aggressive behaviour. The parents reported less negative behaviour in themselves (eg. detachment, spanking) and increased participation in education. The most effective programs incorporating both home and centre based activities found 20-50% improvements in these child and parent impacts. Effectiveness was enhanced if families enrolled during pregnancy and in those families with a moderate number of demographic risk factors. The children from families with high levels of instability and risk in some cases had worse behaviour and poorer language development after involvement in the program.

**Sure Start Local Programs – United Kingdom (National Evaluation of Sure Start Team, 2005)**

This early intervention program is based in areas with high levels of deprivation, but targets all families with children less than 4 years old. The program provides locally organised services combining child education and health care, parenting support and education. A cohort study evaluation (Level III-1) compared 150 program and 50 control areas with random selection of the individuals involved from each area. There were modest improvements in family functioning with less negative parenting and more acceptance of children's behaviour. At age three years, children showed decreased behavioural problems and greater social competence. However, the children from relatively more disadvantaged families (jobless, single parent) and children of teenage mothers had worse outcomes in behaviour and verbal ability compared to disadvantaged children in control areas. Programs led by health agencies had advantages: greater ease establishing contact with young children and the ability to work with large numbers of children. The integration of health services with child centres offered potential.
Abecedarian project – United States (Gray & McCormick, 2005; Karoly et al, 2005).

This randomised controlled trial (Level II) of a preschool education program involved 111 children from 0-5 years (98% of the children were African Americans). Follow-up at age 21 showed that children in the program had higher levels of educational attainment, increased school retention and increased skilled employment. There was no effect of a further cross-over education support intervention in the same children aged 5-8 years.

Australian experience

Multi-component early intervention programs have been implemented in NSW, Victoria and Queensland (Watson et al, 2005). These have been modelled on programs from the United States. However, no published evaluations of these programs were identified. Differences between Australia and the United States in the provision of child development and health services mean that the effects of early intervention programs must be evaluated in Australian communities.

SCHOOL

Australian experience

Malin (2003) presented two case studies of different approaches by teachers to classes with mixed Indigenous and non-Indigenous students. This illustrated that social support and cultural inclusion resulted in improved behaviour and performance in Aboriginal and Torres Strait Islander students.

The improvements in attendance and literacy results at Cherbourg School in Queensland between 1998 and 2004 described by Sarra (2005) reinforce the importance of both positive and negative expectations on Aboriginal and Torres Strait Islander children. Sarra motivated staff and students to raise their expectations that this Aboriginal community school could achieve comparable academic outcomes to other Queensland schools. The school also aimed to nurture a positive sense of contemporary Aboriginal identity. Students were challenged to match their actions to the new school motto “Strong and Smart”. The teachers were supported to increase their knowledge about the local community and culture. Community meetings were held to engage other family members. The results included immediate improvements in school attendance and by 2005 school attendance was 93%. In 1999, all Year 7 students had significantly below average literacy, whereas in 2004 12 of 21 students had average literacy. There was also a far more positive sense of what it means to be Aboriginal.

Irkerlantye Learning Centre is an education and community development program for Aboriginal children at risk (aged 12-18) in Alice Springs in the Northern Territory that commenced in 1996. This involved literacy, numeracy and vocational education for children, with families able to participate in vocational education. Advocacy support with local services was provided. The outcomes included the generation of a safe, communal environment and decreased negative interactions of young people in the general community (Malin, 2003).

The Ngaripirliga’ajirri Early Intervention School Program in the Tiwi Islands in the Northern Territory (Robinson & Tyler, 2006) involved social skills training for children aged 6-12 and behaviour management strategies for parents. The program was developed locally by adapting the Exploring Together program (a mainstream school-based, group program that treats behavioural difficulties in children aged 7 to 12 years). The case series evaluation (Level IV) showed that 74 children and 80 parents/carers were involved over two years. Teachers reported that 80% of children showed decreased problem behaviours at school with 40% sustained at six months. Parents reported that 50% of children showed improved behaviour at home.

Mellor and Corrigan’s (2004) review of Indigenous education research discussed the challenges of engaging Aboriginal and Torres Strait Islander children and parents in schools. As part of the Indigenous Education Direct Assistance program, committees were established in all schools to increase opportunities for the involvement of Aboriginal and Torres Strait Islander parents in decision making and evaluation of culturally appropriate resources. The results were variable with some committees active and successful. A case study of barriers to parental involvement found ineffective consultation to be a major factor. Mellor and Corrigan also made two other general recommendations after reviewing the available evidence.
The first was to strengthen the link between education and employment by ensuring that skill transfer accompanies projects and programs. The second was that teachers and schools need to learn about their communities to ensure that lessons are culturally relevant to children's previous experience. Mellor and Corrigan also found that initiatives to engage students, such as extracurricular activities, have been demonstrated to improve attendance, attitude and performance.

**International Experience**

The Community Learning Centres program in the United States commenced in 1998. Grants were provided for rural and inner city schools to implement or expand services to meet community needs. There had been 6800 centres established by 2000. Services offered included after-school care, homework centres, recreation facilities and learning opportunities for adults. The outcomes included a 25% decrease in violence and substance misuse and a 40% decrease in juvenile crime. There were also improvements in numeracy, literacy and interpersonal skills (Schwab & Sutherland, 2001).

**Discussion**

This review identified limited evidence of the effectiveness of preschool, parenting programs or early intervention programs for Aboriginal and Torres Strait Islander children. The evidence from Aboriginal and Torres Strait Islander settings consisted mostly of case studies or small pilot programs which limits the generalisability of the results.

The lack of evidence makes it appropriate to use the results of high quality evaluations of these interventions in mainstream Australian settings and relevant international settings in the development of programs for Aboriginal and Torres Strait Islander families. However, it is necessary to evaluate new programs for Aboriginal and Torres Strait Islander families to confirm the effectiveness of programs used in other settings and expand the available evidence.

A number of pilot programs have shown that culturally appropriate preschool programs are able to engage Aboriginal and Torres Strait Islander children and parents and have the potential to improve educational and social outcomes. Mainstream parenting programs have been shown to successfully engage families from disadvantaged communities and improve child behaviour and parent well-being. There is some evidence that these programs are effective in community settings. However, there is a need for further evaluation of these programs in diverse Australian communities including Indigenous communities.

There is now considerable research evidence of the effectiveness of quality preschool programs and other early intervention programs (primarily from the United States). Long-term follow-up of these programs indicates that children have improved behaviour, development and educational attainment. It is challenging to implement sustainable large scale programs which replicate the intensity of small intensive or pilot programs. The Early Head Start program in the United States and the Sure Start program in the United Kingdom demonstrate that it is possible to develop effective early intervention programs for large populations. The evidence suggests that these programs need to be well resourced, utilise a mixture of centre and home based activities, have well trained staff and be focussed on the child’s development. The programs should be offered to all children in the targeted area with the intervention tailored to the individual family. Children from vulnerable families (teenage mothers, single parents, jobless) should be monitored to avoid adverse outcomes.

Evidence supports the need for early intervention programs to be multi-faceted incorporating early childhood education, parenting support and facilitating access to other services. The optimal model for delivering these programs may vary in different communities. Canada and the United Kingdom are expanding early intervention and preschool programs for disadvantaged children, both Indigenous and non-Indigenous. There are ongoing evaluations of these programs to determine what models are the most effective in each setting and which children obtain the most benefit.

The Abecedarian project, conducted in the 1970s, illustrates the potential of early childhood programs to impact on child development and thus improve the long-term education and employment outcomes for disadvantaged children (Gray & McCormick, 2005). The same program also demonstrated no effect from a similar intervention
in school aged children. This is consistent with Australian evidence of the lower levels of academic performance of Aboriginal students compared to non-Aboriginal students from the first year of school (Zubrick, et al, 2006). This highlights the importance of early childhood education and developmentally appropriate programs for children in home care and day care.

The more recent evidence from Australia and the United States suggests that school-based support programs can have an impact on children’s behaviour. The Australian evidence is from the few studies conducted in the Northern Territory. Further evaluation is required to determine if this will produce improvements in educational and developmental outcomes.

Aboriginal and Torres Strait Islander education should have a community development focus, such as extra-curricular activities and skills training that are relevant to the community. There is evidence that increasing the presence of Aboriginal and Torres Strait Islander people in schools, especially discrete local communities, improves the engagement with Aboriginal and Torres Strait Islander children. This will require increased support for teaching assistants to improve recruitment and retention.
HOUSING AND HEALTH HARDWARE IN HOUSES

RESULTS

Australian Experience

Housing in many remote Aboriginal communities lacks functioning facilities essential for health including washing, sanitation, cooking and food storage facilities (Pholeros et al, 1993; Bailie & Runcie, 2001). The term “health hardware” has been used to describe safe electrical systems, toilets, showers, taps, kitchen cupboards and benches, stoves, ovens and fridges collectively. It is estimated that 60% of the work required to improve these facilities is due to lack of routine maintenance and repairs (Pholeros, 2005).

Housing for Health – South Australia

The results of an initial project in a remote Aboriginal community (Level III-3) found that performing minor repairs and maintenance (less than $3000 per house) was associated with decreased rates of eye and skin infections in people of all ages (Pholeros et al, 1993).


This ongoing program, based on the Housing for Health methodology, has been implemented in five states. The intervention involves an Aboriginal Survey Fix team to survey houses and perform basic maintenance simultaneously. Licensed trades people complete additional work as soon as possible within the funding constraints of the program.

There has been an ongoing case series evaluation (Level IV). Between July 2001 and June 2005, 1419 houses had been surveyed in 42 communities (SGS Economics & Planning, 2006). As a result of the work done through this program, pre- and post-surveys showed there had been improvements in safe electrical systems (78% vs 12%), functioning toilets (88% vs 57%) and showers (82% vs 33%). The ability to store, prepare and cook a meal had improved slightly but remained a major deficit in the houses surveyed (8% vs...
4%). Seventy five percent of the local staff employed through the program were Aboriginal or Torres Strait Islander. They were employed and trained to perform house assessment, repairs, data entry and liaison between trades people and householders. There has been no data collected to link health outcomes with improvements in housing; more recent work has focused on demonstrating the numbers of houses that can be maintained and the success of training and employing local staff. The capacity of communities to sustain the ongoing house maintenance after a FHBH program remains a priority. There is recognition of the need to provide regional maintenance programs to support small remote communities.

**Housing Improvement and Child Health Study (Donohoe, 2006)**

This study in the NT aims to measure the impact on child health of major housing infrastructure improvements in 11 remote Aboriginal communities. The required housing improvements and the outcomes of this work will be determined through two Environmental Health Surveys. The health outcomes monitored will include the incidence of diarrhoeal disease, ear disease, respiratory and skin infections and nutritional status. Children’s health will be assessed by family surveys and examination of health records. Results of this intervention are awaited.

A pilot study in three remote Aboriginal communities was conducted to determine the feasibility of this study (Bailie et al, 2005). This study showed that the rates of skin infections in children were up to twice as high in dwellings lacking functioning sanitation. This was exacerbated by crowding and concrete floors.

**Housing and Environmental Health survey (Northern Territory)**

This program involved annual housing surveys conducted in three different remote Aboriginal communities in the NT (Hardy, 2002). The approach was based on the Housing for Health methodology described by Pholeros et al (1993) with community survey teams surveying each house and advising community tradesmen of work required.

The evaluation (Level IV) showed that in one community there were improvements in safety and functioning of washing, sanitation and food preparation and storage facilities in houses from 42% to 65%. This improvement was maintained over three years. This was reported to be associated with a decrease in health centre attendances (no results presented). The other two communities showed no improvement after two surveys one year apart.

**International Experience**

**Insulation in community houses, New Zealand**

A randomised controlled trial (Level II) of retrofitting insulation in houses by trained community teams has been conducted in New Zealand (Howden-Chapman, et al, 2005). The trial targeted houses of occupants with respiratory disease. The study involved 4413 people occupying 1352 houses. Of these people, 49% were Maori and 25% were Pacific Islanders. The process of recruitment and one year follow-up was successful. Control houses were fitted with insulation in the second year. The results at one year showed that the houses with insulation had significantly warmer and less humid indoor environments. The people in the houses with insulation reported significant decreases in poor or fair self-reported health and self-reported wheeze. They also reported significant decreases in self-reported days off work or school and general practitioner visits. There was a non-significant decrease in hospital admissions for respiratory conditions. Cost-benefit analysis indicated that expected health and energy conservation benefits over 30 years were nearly twice as much as the costs of the program (Howden-Chapman, et al, 2006).

**Systematic review of studies of the health effects of housing improvement.**

Thomson et al’s (2001) review of published literature since 1887 identified only 18 high quality housing intervention studies which reported on health outcomes. The interventions included rehousing or infrastructure improvements, such as heating, insulation or general refurbishments. Nine of these were controlled studies (Level III-1 and Level III-2). Of these, two studies showed improved health outcomes: both energy efficiency improvements resulting in decreased respiratory symptoms. There were four studies which found an increase in social and community participation. The review also identified 14 studies currently being conducted.
Thomson et al recommended the need for further multidisciplinary studies to understand the social context of housing improvements and their comparative effectiveness.

**OVERCROWDING**

Indigenous people and households experience much higher levels of overcrowding compared to the non-Indigenous population in Australia. Reported levels of overcrowding depend on the specific measure used to define overcrowding. Data from the 2001 Census showed that 22% of Indigenous people were living in overcrowded households (Australian Institute of Health and Welfare, 2005). However, this proportion ranged from 61% in the Northern Territory to 5% in Tasmania. Ten percent of Indigenous households were overcrowded using the Proxy Occupancy Standard and 15% using the Canadian National Occupancy Standard. The highest proportion was in the Northern Territory where 32% of Indigenous households were overcrowded. Overcrowding is most common in Indigenous Community Housing, with 34% of households overcrowded in 2001. The rate of overcrowding among Indigenous people and households was 6 times greater that for non-Indigenous people.

The Australian Institute of Health and Welfare report, *Indigenous Housing Needs 2005 – A multi-measure needs model* emphasizes that overcrowding is only one aspect of Indigenous housing need. This report presents data on five dimensions that are relevant to Indigenous housing including overcrowding, homelessness, dwelling condition, connection to essential services (power, water and sewerage) and affordability. This reflects the needs framework that has been endorsed by the Australian Housing Ministers as a result of their 2001 statement *Building a Better Future: Indigenous Housing to 2010*.

Recent Australian studies support the association between overcrowded housing and poorer health. For example, analysis of the 1995 National Health Survey (Waters, 2001) found that overcrowded dwellings were associated with an increased risk of infectious diseases and mental health problems. A study in Sydney found that overcrowding was associated with higher rates of hospital admission for bronchitis and emphysema (Beggs and Siciliano, 2001). The association between overcrowding and health is evident even after controlling for socio-economic factors such as education, income, ethnicity, poverty and unemployment (Beggs & Siciliano, 2001). Australian experts have emphasized the need to improve living conditions for Indigenous Australians to decrease rates of acute rheumatic fever and skin infections such as scabies and pyoderma (Currie & Brewster, 2002; Currie & Carapetis, 2000).

Overcrowding in remote Aboriginal and Torres Strait Islander communities can vary substantially depending on the levels of functioning toilets, showers, food preparation facilities and electrical fittings (health hardware) in community houses and during important community events. Extreme climatic conditions can mean that people congregate in one room that is heated or cooled, and thus are exposed to the same risks as overcrowding generally. It is important to consider these factors in the planning and design of housing. Providing more health hardware in houses and ensuring the health hardware in most houses in a community is functioning most of the time through regular maintenance will reduce the risk of overcrowding. Developing external areas around houses to provide more household service, cooling and/or heating several rooms in the house, and providing additional sleeping areas will reduce the impact during peak occupancy periods (Department of Family and Community Services and Indigenous Affairs, in press).

An analysis of the 2001 National Health Survey (Booth and Carroll, 2005) suggested that overcrowding is not adequately represented as a dichotomous variable using existing standards. They found a non-significant association between overcrowding and better self-reported health. However, for a given number of adults in a house, increased number of bedrooms was associated with better self-reported health. The existing occupancy standards are based only on the numbers of people and bedrooms in the house. Standards which included other living areas, the adequacy and function of essential facilities in the house and differentiated between the numbers of children and adults in the house would allow a more complete assessment of overcrowding.

Indigenous people living in remote areas report higher rates of overcrowding and housing with structural problems than
Indigenous people in non-remote areas (Australian Bureau of Statistics, 2002). This is consistent with Booth and Carroll's (2005) use of regression analysis to estimate that housing characteristics such as overcrowding were responsible for 30% of the difference in health status between remote Indigenous people and non-Indigenous people. Whereas for non-remote Indigenous people education and income, rather than housing, appeared to be more significant factors in determining the difference in health status.

**DISCUSSION**

Historical and contemporary evidence suggests that housing has a major influence on health, through multiple often minor effects (Shaw, 2004). Improvements in housing and community infrastructure, such as sanitation and potable drinking water, are considered among the most significant factors in the overall improvement in health in industrialized countries over the last 150 years (Bailie et al, 2001; Walker et al, 2003; Shaw, 2004). Despite this, there is limited evidence in Australia and internationally of health improvements as a result of specific housing interventions.

There is substantial evidence of the high levels of inadequate housing, lack of functioning essential facilities and overcrowding in remote Indigenous communities in Australia. The Fixing Houses for Better Health program has shown that an Indigenous community housing program is able to train local people to perform housing surveys and perform basic maintenance. They also learn to identify and schedule more complex maintenance tasks to be done by qualified trades people, hence reducing costs. When combined with funding for trades people to perform other maintenance work, it is possible to improve the functioning of “health hardware”, such as safe electrical wiring, toilets, facilities for washing and kitchen facilities.

Indigenous housing programs in Australia are faced with high levels of need for new housing and maintenance of existing housing. This has meant that there has been limited funding to spend on evaluating the health benefits of these housing programs. Although functioning housing is accepted as an important determinant of health, there is a need to evaluate housing programs to show that improvements in overcrowding, the condition of housing and the function of essential facilities are achievable. The recent randomised trial of the health effects of housing insulation in New Zealand is an example of how evaluation can be incorporated into housing programs. Evidence of the health impact of housing programs would emphasize the need to expand Indigenous housing programs.

The agreed National Reporting Framework (Australian Institute of Health and Welfare, 2006) concentrates on developing the hardware and infrastructure that is required to improve Indigenous housing. Bailie & Wayte (2006) propose that hygiene promotion, general housing workforce development and improved information systems are also required to produce sustainable health outcomes. They propose that a continuous quality improvement (CQI) approach could facilitate the ongoing improvement required. CQI would incorporate a systematic and objective assessment of performance and emphasise the partnerships with community residents.

The levels of overcrowding in Aboriginal and Torres Strait Islander households provide evidence of the need for increased resources for Indigenous housing. Social and cultural expectations influence living arrangements and hence impact on housing need. This creates challenges for the provision of housing and has affected the acceptance of overcrowding, particularly in remote areas. Nevertheless, overcrowding is associated with health problems and thus it seems appropriate to use recognised occupancy standards to assess overcrowding in Indigenous households until more complete standards are developed.

There is a need to build additional houses in remote Indigenous communities to alleviate overcrowding for long-term residents. There is also often a shortage of housing for non-resident staff who are employed to work in these communities. This is one factor which impacts on the recruitment and retention of skilled staff.
SWIMMING POOLS

RESULTS

Swimming Pools in Remote Indigenous Communities (Audera et al., 2000)

This review of the issues to be considered when planning swimming pools in Indigenous communities suggested that there was limited evidence of decreases in skin and middle ear infections associated with swimming in chlorinated pools. The health benefits of swimming included increased opportunity for physical exercise. There was also discussion of social benefits such as increased recreational activities ameliorating substance misuse and the pool as a community meeting point.

The possible adverse health effects such as the potential for disease outbreaks and accidents including drowning were considered. The majority of reported swimming pool-related disease outbreaks were associated with fault in disinfection systems or misuse of chemicals. Despite higher death rates due to injury than non-Indigenous children overall, Indigenous children had lower rates of drowning. Drowning deaths in Indigenous children occurred in private unsupervised pools (56% of deaths) and other locations (44% of deaths) (e.g., ocean, waterholes, rivers, tanks). An audit of 13 remote communities with pools found there had been no drowning deaths in any of these pools. Six communities reported possible disease outbreaks associated with the pool including hepatitis A, rotavirus, ear infections and sore eyes. There had been no injuries reported in 8 of 13 pools in the previous year and most reported injuries were minor.

WA Swimming Pool research (Lehmann et al., 2005; Lehmann et al., 2003)

Three swimming pools were built in remote Aboriginal communities with water safety training provided for community members. There has been an ongoing study (Level III-3) to evaluate the effect of these pools in two of these communities.

There was a decrease in skin infections in children. The follow-up after four years showed a decrease from 62% to 18% in community A and from 70% to 34% in community B. There was also a decrease in eardrum perforations – from 33% to 20%
in both communities overall. The opening of the pool was associated with an increase in school attendance possibly related to the No School, No Pool rule in Community A. However, in Community B there was no clear trend in improved school attendance, possibly because children move between the local school and a distant boarding school. The children’s water skills improved after the opening of the pools. There was also anecdotal evidence that children’s self-esteem had improved and that petty crime had reduced in the communities since the opening of the pools.

**International Experience**

A qualitative study of the effect of one pool opening and one closing in two different areas of Glasgow, Scotland was conducted (Thompson, 2003). Focus groups of local people emphasised the health benefits of a local pool including improvements in mental health due to opportunities for social contact, increased physical activity and stress reduction. The most important outcome as a result of the provision of a swimming pool was considered to be the resulting increase in social capital.

**Discussion**

There is very limited evidence of the health benefits of swimming pools. The review of existing pools in remote Indigenous communities in Australia suggested that the potential health benefits of swimming pools appear to exceed the potential risks. Swimming in a supervised pool has a lower risk of drowning than swimming in unsupervised locations. The impact of swimming pools on social capital in the community, although difficult to quantify, could be as important as any specific health benefits.

The study in Western Australia is the first to systematically measure the health benefits of swimming pools in (remote Australian) Indigenous communities. The documented improvements in skin and ear infections are important given the prevalence of these conditions in Aboriginal and Torres Strait Islander people and their contribution to significant health problems for Aboriginal and Torres Strait Islander people, such as acute rheumatic fever, post-streptococcal glomerulonephritis and hearing impairment.

New swimming pools continue to be built in Indigenous communities. It is important that proposed and ongoing evaluations proceed to determine if the benefits observed in Western Australia are confirmed in other settings. It will be important to assess the sustainability of maintaining and supervising a pool in these small communities. It is difficult to quantify the social benefits of swimming pools. However, the link between the swimming pools and improvements in school attendance is one social benefit that it may be possible to demonstrate.
SPORTING AND CULTURAL PROGRAMS/ FACILITIES FOR YOUNG PEOPLE

RESULTS

The only Australian study which described health outcomes associated with sporting facilities is the WA swimming pool study (Lehmann et al, 2003) which was discussed in the swimming pool section. No other Australian or international studies were identified which described the effect of sports facilities in Indigenous communities on health, physical activity or other relevant outcomes.

SPORTS PROGRAMS


This school-based sports and education program for selected Indigenous students at Balga High School in Perth commenced in 2002 with the aim of enhancing school attendance and retention. The program incorporates cooperative group work and Nyungar language and gender roles to improve the cultural appropriateness for local Nyungar students. The timetable has fewer, longer classes. Sports participation is emphasized in all areas. There is individual mentoring of students by staff from a dedicated unit. The outcomes were evaluated by comparison with other Indigenous and non-Indigenous students at the school (Level III-2). Participants in the program had higher attendance rates: 70-86% in years 8-10 compared to 42-47% for other Aboriginal students in Years 8-10 at the school in 2004. This was comparable to the attendance for non-Indigenous Year 8-10 students (83-85%). The retention among the 66 students in the program has been variable. It ranged from 53% of year 8 boys completing the year compared to 100% of Year 9 girls and Year 10 boys in 2004. This was improved compared to retention rates of 47-70% in the program in 2003. There was no improvement in literacy or numeracy on standard testing of program students.
Traditional Indigenous games, Cape York, Qld (Higgins, 2005)

In this program two Indigenous facilitators trained physical education teachers and selected high school students from the Cape York region to conduct a range of traditional Indigenous games. Each primary school had an Indigenous cultural day incorporating these games. Overall there were 500 school students who participated. An evaluation of 110 students and 5 teachers who participated in the day (Level V) showed that 78 were keen to play games in the future. All the teachers were confident in their ability to organise the games in the future. The conclusions from the evaluation of this program were that local engagement was enhanced by describing the activities as “games” and that equipment should be low cost and easily replicated. The program had the potential to engage more with the community by including children of all ages.

National Indigenous 3 on 3 Challenge, Australia (Minter et al, 2001)

A basketball competition was conducted for Aboriginal and Torres Strait Islander young people (<18 years) in 10 regional areas in 2000. There was an evaluation of 248 participants from four regions. The reported outcomes were that the competition encouraged healthy lifestyles and most of the young people were still playing basketball at a three month follow-up. The participants recommended that more cultural input would improve the sport program.

The Vibe 3 on 3 has now become an annual event for Indigenous youth which incorporates 3 on 3 basketball, a hip hop challenge, art and cultural performances (Vibe Australia, 2006). The event promotes self-esteem and healthy lifestyles amongst participants. Weekend events are held at a number of regional locations each year.

Measuring the Health and Social Impact of Sport and Recreation in Indigenous Communities (Beneforti & Cunningham, 2002)

Beneforti & Cunningham reviewed selected programs and the literature to develop indicators that could be used to measure the health and social impact of sport and recreation programs in Indigenous communities. They identified a number of Australian case studies which had reported improvements in community functioning as a result of sport and recreation program. Examples of this include the Australian Football League Kickstart Program on Groote Eylandt, NT which was associated with increased school attendance and the opening of a Police Citizen’s Youth Club in Yarrabah, Qld in 1996 which was associated with a reduction in property crime, assault and youth suicide. Substance misuse including petrol sniffing, alcohol and cannabis use among young people were all reported to have decreased as a result of sport and recreation programs in remote communities. Appropriate indicators to assess the impacts of sport and recreation programs include episodes of youth crime and school attendance. The relevance of these indicators is supported by limited research evidence and through consultation with Indigenous community representatives. The effectiveness of sport and recreation programs is also dependent on community engagement and sustained relationship between program staff and community members.

International Experience

Pathways Obesity Prevention, United States (Going et al, 2003)

This large school based study in seven American Indian communities involved 1704 students from 41 schools was conducted over 3 years. School staff were supported to increase the frequency and quality of physical education classes and activity breaks with at least 3 sessions of 30 minutes per week and daily recess breaks. A range of traditional games were incorporated into physical education classes. This was one component of a healthy lifestyle program (see Nutrition chapter). Evaluation of the outcomes was undertaken with a randomised controlled trial (Level 2) of 580 students from the schools. Each child’s physical activity was measured using an accelerometer over 24 hours. This showed a 10% increase in activity (not significant) in students from intervention schools. It was suggested that physical activity should have been measured over a longer interval and other measures of impact could also have been used.

CULTURAL PROGRAMS

Croc Eisteddfod Festival, Weipa, Qld (Allard, et al, 2001)

This cultural and music festival in 2000 provided an opportunity for primary school students from the Cape York area to perform in front
of a large audience. Each school group did a performance based on a healthy lifestyles theme with the emphasis on participation. There was a qualitative evaluation involving focus groups including children, teachers and parents. The outcomes reported include increased community connectedness, increased knowledge of drug effects, increased self-esteem due to public performance and increased school attendance (no data). A decrease in anti-social activity in the communities prior to the festival was also reported. The Croc Festival has become an annual event that is staged at multiple sites around Australia with the 2005 festival involving 18,843 students from 416 schools (Global Rock Challenge, 2006). It now incorporates musical, cultural and sporting performances accompanied by employment, health and lifestyle promotions and activities.

Native American Health Center's Youth Services Programs, United States (Aguilera & Plasencia, 2005)

The Youth Services Program at the Native American Health Center in Oakland, California commenced in 1989. It is based on a holistic model that aims to incorporate Native American wellness concepts. A focus of the program is to provide HIV/AIDS and substance misuse prevention programs targeted at young people aged 9-22.

One component of the program is the annual Gathering of Native Americans where Native American youth share cultural enrichment exercises and wellness education. There are experiential activities to promote positive change in themselves, their families and communities. There was a survey of the 29 participants in 2004 (Level IV). Of these, 83% reported increased understanding of Native American culture and 79% reported they felt more connected to the Native American community and would become more involved in community activities. Fifty-five percent reported improved drug refusal skills.

The Seventh Native American Generation (SNAG) is an annual event to celebrate the publication of the SNAG magazine. This magazine, written and edited by Native American youth, showcases the experiences of young Native Americans. The community event includes traditional cultural activities involving dance and music and contemporary cultural activities. The themes of substance misuse are prominent during the event. In 2003 over 200 youth and their families participated. A survey of 34 young people was conducted (Level IV). They reported increased knowledge of the dangers of unsafe sex (86%) and HIV (80%). Eighty-nine percent indicated they would become more involved in community activities.

**DISCUSSION**

Sporting activities are prominent in Australia and other countries and physical activity is an important factor for people’s health. Despite this there is limited evidence of the health impacts of sport specifically on Indigenous people. In Australia, improving access to sports facilities is one strategy to reduce the disadvantage experienced by Aboriginal and Torres Strait Islander people. However, no Australian or international studies were identified which described the impact of sports facilities.

There was also very limited evidence of the effects of sports programs involving Aboriginal and Torres Strait Islander young people. Sports programs appear to have the capacity to engage young Aboriginal and Torres Strait Islander people. As a result, these programs may be associated with improved school attendance, decreased substance misuse and decreased youth crime. If the impacts of sporting programs are sustained then this should improve the health and educational attainment of young Aboriginal and Torres Strait Islander people. However, no evidence of such outcomes was identified. There are many programs that are mentioned in the grey literature and it would be useful if these were formally evaluated to increase the understanding of the benefits of sporting programs. The Pathways program in the United States highlights the challenges of conducting effective school physical activity interventions and the importance of designing the evaluation to adequately assess the impacts.

Evidence of the impact of cultural programs is even more limited. However, the success of the Croc Festival in engaging young Aboriginal and Torres Strait Islander Australians demonstrates the potential for such programs to have positive impacts similar to sporting programs. There is clearly a need for evaluation of future programs.
COMMUNITY SERVICES

This section summarises evidence for family support services, information technology and training in Aboriginal and Torres Strait Islander communities.

RESULTS

FAMILY SUPPORT SERVICES

Port Augusta Aboriginal Families Project, South Australia (McCallum, 2001)

This ongoing program commenced in 1998. It is targeted at families with multiple problems who have required involvement from different human service agencies over long periods. The program involves intensive assistance to empower families to seek solutions to improve their situation. The family’s ability to participate is facilitated through family and narrative therapy. It was evaluated by a case series (Level IV) in 2002. Of 18 families involved in the program in 2002, there was a decrease in virtually all problems areas including school attendance, debts, self-reported health, domestic violence and children in alternative care. Only drug and alcohol misuse problems did not decrease. The program staff identified that all families who had been eligible in 1998 had improved functioning and decreased need for services in 2002. Cost-effectiveness was not quantified, however, it was noted that future service use would decrease due to the program.


The Gascoyne Domestic Violence Service operates a women's refuge offering crisis accommodation and support for women experiencing domestic violence. The service also offers advocacy, financial assistance, information and counselling to women and their children. A case series survey (Level IV) of 67 clients in 2002 was performed. The results showed that 90% of the people were Aboriginal, and all had used the service on one or more previous occasion. Ninety percent of people felt safe in the building and reported receiving most or all of the advocacy or support they needed.
Stronger Families and Communities Strategy (Department of Family, Community Services and Indigenous Affairs, 2006)

This program funded 635 projects throughout Australia from 2000-2004. Of these, 66 were specifically focussed on Aboriginal and Torres Strait Islander people and communities. The strategy consisted of seven community-based initiatives and six broader national programs. The community initiatives provided support for local initiatives to address expressed needs. Thus, a diverse range of programs were developed as part of the strategy.

The key findings of the evaluation of Indigenous projects were that the projects were able to engage people, develop trusting relationships and increase awareness of family and community issues. Eighty-six percent of projects reported that local community members or organisations took on key roles. Establishing trusting relationships was a major activity for 53% of projects. Key features of successful programs were: competent staff who combined cultural competence with relevant expertise; and auspicing agencies with existing links to the Indigenous community and project management expertise. Successful training strategies for community members included mentoring, home-based services and buddy systems.

The paper concluded that strengthening Indigenous families and communities required first healing the effects of trauma, attitudinal and behavioural change and rebuilding self-belief. This indicated the need for sustained long-term interventions to achieve strong Indigenous families and communities. The ongoing funding for the Stronger Families and Communities Strategy from 2004 to 2009 reflects understanding of the need for long-term engagement with communities.

Indigenous Parenting Project, Australia (Secretariat of the National Aboriginal and Islander Child Care, 2004)

This project included an audit of existing parenting programs for Aboriginal and Torres Strait Islander people. A number of successful programs were identified. The common features of successful capacity building programs for Indigenous families included community engagement and ownership, cultural appropriateness and adequate incorporation of historical issues. Individual projects included the Multifunctional Aboriginal Children’s Service Centres in Victoria which provide child care for local Aboriginal children including a cultural awareness program and parental information and support. The Indigenous Early Years Support and Access Program in Queensland provides Indigenous community workers to support Indigenous families with young children through home visiting and local playgroups. The Mentoring Program for Young First Time Aboriginal Parents in NSW provides individual support by trained Aboriginal mentors and playgroups.

Child Growth Project, Gapuwiyak, Northern Territory (Smith, 2004)

This project in a remote Aboriginal community commenced in 2001. Initially it was planned to address NT health service concerns about poor child growth. During 18 months of community consultation and planning, it became clear that that the main community concern was poor child development due to inadequate care of children. It then required a further year to develop a strategy revolving around a family centre. The family centre involved a playgroup incorporating early childhood education and healthy food for young children. There were also bush trips, parental education and sport programs for teenagers. A case series evaluation (Level IV) showed no impact on the growth of children aged 0-5 years. However, due to the funding requirements, this evaluation was undertaken before the family centre commenced. The program has had positive impacts including increased acceptance of the NT Health Growth Assessment and Action Program in this community due to shared understanding of the social and cultural factors influencing child growth. The playgroup has commenced at the community school and local people have commenced childcare training.

Family & Community Networks Initiative, Australia (Black et al, 2002)

High needs communities were chosen as the sites for trials of community networking projects to support community action to address local issues. Seventy projects were funded between 1998 and 2002. The initiative
promoted community groups to work collaboratively to develop individualized approaches rather than a prescriptive program. The projects were conducted in a diverse range of communities including remote Indigenous communities and mainstream urban communities. The projects in Indigenous communities included a youth centre to divert people from the criminal justice system in Griffith, a community nutrition plan in the Anangu Pitjantjatjara lands and a community health website designed by young people in Kempsey. A case series evaluation (Level V) found that 79% of projects were rated as successful by the Department of Family and Community Services. Only 10% were definitely not successful. The features of successful programs were the involvement of well established organisations, committed staff who could relate well to a range of community members and high levels of community support for the project. It was demonstrated that community networking could increase the relationship between organisations and address expressed community needs. Longer term follow-up was recommended to assess sustainability and outcomes.

**Magpie Centre – NSW (Skinner, 2003; Mugford & Nelson, 2003)**

This program was developed in Goonellabah in response to community concerns about increasing vandalism, truanting and substance misuse by young people in 1991. The program involved an after school study centre, youth activities, karate lessons and a breakfast program. It has developed to include fortnightly medical clinics, tutoring to improve literacy and numeracy, counselling and advocacy, touch football and netball competitions and evening outreach patrols. An evaluation (Level IV) reported decreased rates of community violence. Community spirit is also reported to have improved (Skinner, 2003)

**INFORMATION TECHNOLOGY**

**Community Online Access Centres – NSW (Daly, 2005)**

In the 2001 Census Indigenous Australians reported lower access to computers (20% vs 44%) and the Internet (10% vs 30%) at home compared to non-Indigenous Australians. One response to this was the establishment of Community Online Access Centres in NSW. These centres provided access to the Internet, e-business facilities, fax and photocopy machines and video conferencing. A case series evaluation (Level IV) found that centres were more successful if community engagement was facilitated by local champions, the centre was integrated with other community activities (eg health centre, school, library) and there was funding for training. Young people’s use of the centres improved their reading and communication skills (even if used for entertainment). The provision of centralized technical support and appropriate technology were important. The centres are unlikely to be self-supporting unless they are able to generate income from government or business services.

**Indigenous Health Touchscreen Project – Queensland (Hunter & Travers, 2003)**

This project involved the installation of touchscreens with health promotion information about diabetes and pain in two Indigenous communities (one rural, one urban) in 2001-2. The touch screen has a voiceover to provide access for those with limited literacy. A case series evaluation (Level IV) showed that there were 3280 activations (1987 involving greater than one selection) over 8 months. The users were of all ages, with the highest use by young females. The technology was familiar, particularly for those from the urban area. The results indicated possible changes in intentions, but there were no health impacts observed during the short duration of the project. The cost of development and start-up of the project were high but the extension to other sites would be much less expensive. It was recommended that the content should be engaging with identifiable local content and be complemented by written material.

**International Experience**

**Tribal Connections Project, United States (Wood et al, 2003)**

In 1998 the National Library of Medicine established this project to establish or strengthen Internet connections at selected Indian reservations and Alaskan native villages. The project also included a needs assessment and training. The purpose was to increase the availability of health information in these communities. A case series evaluation (Level IV) showed that information technology and internet connections were
improved in 15 of 16 sites and that 341 local Indigenous staff were trained in the use of the Internet. The community involvement was a feature of the project and resulted in the development of an outreach field manual to guide future training. The evaluation indicated ongoing use of the Internet 6-12 months after the project. Further evaluation is required to determine if this technology has impacts on health.

**Online Nutrition Course, Nunavut, Canada (Hamilton et al, 2004)**

A culturally appropriate online nutrition course, Healthy Living in Nunavut, was developed in 2003 for community workers in Nunavut territory in northern Canada. The course was developed with a partnership between McGill University and the Nunavut Government with input from community stakeholders. The content of the course was based on the Nunavut Food Guide and incorporated storytelling using familiar scenarios. Internet access has improved in these communities and is now available in most workplaces. The online course provided a realistic option, given the expense associated with conducting workshops and continuing education for staff in these remote communities.

An evaluation (Level IV) found that 44 community workers actively participated (from 96 who registered) for the eight week course. This completion rate is comparable to other distance education programs. The program improved understanding of nutrition, enhanced computer skills and facilitated the exchange of information between isolated community workers. Teleconferences in both English and the most common local language enhanced the online content. Participation could have been enhanced by encouraging local champions to support others who were not confident with English and/or the use of technology.

**TRAINING**

**National Vocational Education and Training (VET) Survey (NCVER, 2004)**

There were 58,000 Indigenous Australians who undertook publicly funded VET courses in 2003. This training included school or TAFE courses and private training courses in Indigenous specific settings or with Indigenous support units of mainstream providers. A national follow-up survey in 2004 of those who undertook training in 2003 found that 90% reported that the VET course increased their confidence, 87% reported improved work skills and 61% were able to get a job or a better job. At the completion of their course, 81% of people were in work (including CDEP) or further study.

**First-Steps Employment Program, Perth, WA (Little & Pettapiece, 2002)**

This program provided support to Aboriginal and Torres Strait Islander students in Years 10-12 to increase school retention and preparation and assistance to obtain casual employment. There was also mentoring by Indigenous education workers, peer coaching sessions by the students and individual tutoring. A case series evaluation (Level IV) was conducted. Twenty-five students obtained paid work in retail or fast food businesses. Seven had been employed for more than six months and the others had either chosen to focus on school studies, moved interstate or decided not to work in retail or fast food. All of the students remained in school.

**Indigenous Youth Partnership Initiative, Australia (Powers et al, 2003)**

There were 18 projects funded in 2000 to engage Year 9 and 10 Indigenous students in general and vocational education. Each project was designed locally, based on available opportunities, to ensure it was appropriate for students. The projects were in rural and remote areas throughout Australia. The case series evaluation (Level IV) confirmed the success of the projects. Of the 982 participants, 64% enrolled in Vocational Education and Training courses including 17% who returned to school. After the completion of the projects, 28% obtained paid work (including 20% in CDEP). Attendance improved with 88% of students having satisfactory attendance compared to 22% prior to the projects. There were significant improvements in Year 9 and 10 students’ literacy and numeracy. Employers reported that nearly all students showed satisfactory ability to learn. Sixty percent of participants in work placements developed sufficient skills to secure a local entry level job. In remote areas, there was poor access to high schools and limited workplace and VET opportunities.
Ceduna and Region Health Worker Training Project, South Australia (Wojecki, 2005)

This two year project commenced in 2003 with the aim of supporting community workers in the Ceduna region. It involved regular workshops, workplace learning activities, community work projects and intensive practice reflection. The case series evaluation (Level IV) showed that 9 of 18 students completed community services and management courses during the program. Five of these nine students were Aboriginal. Participants reported increased self-confidence as a result of improved knowledge and abilities. The community work projects engaged community members in collective action to address local health issues. These projects included consulting with users of a sobering-up unit when people had not been drinking, a youth workshop and consultation with users of a transitional accommodation program.

Thus, the project increased the ability of workers to consult with their communities and develop strategies to address needs. This program also has the potential to reduce the emotional exhaustion that is common in Aboriginal community workers by supporting them to improve the capacity of their organisations.

Discussion

This review has highlighted a limited number of the many government and non-government funded community service programs involving Aboriginal and Torres Strait Islander Australians. These programs all report some form of evaluation of the impacts of the program. Most of the reports identified are case series evaluations with no control groups or comparison with historical data from the community. This makes conclusions about the outcomes of the program less certain, as it is possible that other confounding factors could have influenced the outcomes. However, the increasing evidence from these evaluations suggests that there are benefits from these interventions for Aboriginal and Torres Strait Islander people.

The evaluation of many other programs is focussed on process evaluation involving qualitative techniques, such as focus groups and key informant interviews. Process evaluation is important as it makes explicit the components and approaches used in successful and unsuccessful programs. Evaluating the impacts or outcomes is challenging as the outcomes may be long-term and not occur until long after the program and evaluation have been completed. However, it is important that there is an evaluation of the impacts of community service programs and that these evaluations are published. This informs the development of new programs and reinforces the benefits of ongoing interventions.

The evidence from family support programs in Aboriginal and Torres Strait Islander communities demonstrates that it is possible to conduct programs which have a positive impact on the functioning of Aboriginal and Torres Strait Islander families. Community support is clearly an essential feature of successful programs. It will often require a significant period of time to build strong partnerships with key individuals in the community prior to commencing programs. This should be considered in the timelines for program funding. Effective communication with the community is also important. The different models of family support programs reinforce the importance of flexibility to allow local input to program delivery.

There is limited evidence that information technology programs can improve the access to information and services in Indigenous communities in Australia and the United States. Adequate training is required for staff and community members to maximise community participation. Further evaluation is required to demonstrate health impacts of these programs.

The ability of training programs to engage Aboriginal and Torres Strait Islander people is supported by evidence from a range of programs. Participation is likely to be improved if the programs are linked to productive and relevant community activities or ongoing employment. Aboriginal and Torres Strait Islander people undertaking vocational training have indicated that they are interested in learning how to operate successful commercial businesses (Flamsteed & Golding, 2005). Limited evidence supports the ability of work experience and vocational training to improve school attendance and retention of Aboriginal and Torres Strait Islander high school students. In all training programs, adequate support and flexibility is important to ensure that people can develop the skills required to complete training courses successfully.
EMPLOYMENT

RESULTS

ABORIGINAL AND TERRORS STRAIT ISLANDER EMPLOYMENT AND UNEMPLOYMENT

Benefits associated with employment include increased income levels, health status and improved education levels, all of which contribute to enhanced self-esteem and reduced social alienation (Steering Committee for the Review of Government Service Provision, 2005). Limited employment opportunities in remote areas where many Indigenous people live and lower levels of educational qualification both contribute to Aboriginal and Torres Strait Islander people experiencing higher levels of unemployment and lower levels of labour force participation than the non-Indigenous population (ABS, 2004).

The official unemployment rate in 2002 for Indigenous people on an age-standardised basis was 18 per cent, three times that for non-Indigenous people at 6 per cent (ABS, 2004). The Community Development and Employment Projects (CDEP) scheme accounted for approximately one in four jobs held by Indigenous people in 2002 (ABS, 2004). Total Indigenous employment was highest in very remote areas, reflecting high rates of CDEP participation (Steering Committee for the Review of Government Service Provision, 2005).

High levels of part time employment probably mask underemployment. In 1994, 25.3 per cent of Indigenous male employees and 19.5 per cent of Indigenous female workers indicated they would like to work more hours, compared with around 5.8 per cent of the rest of the Australian workforce (Steering Committee for the Review of Government Service Provision, 2005). In 2002, Indigenous people were twice as likely (52 per cent) as non-Indigenous people (27 per cent) to report government pensions and allowances as their main source of income (ABS, 2004).

HEALTH AND UNEMPLOYMENT

According to Harris et al (1999), evidence of an association between unemployment and poor
physical and mental health has been consistently demonstrated for over 50 years in large-scale cohort, cross sectional and case control studies. Despite this, Harris (1999) reported there have been few interventions within the health system that sought to prevent or reduce the impact of unemployment on health.

Data from the Mental Health and Well Being Profile of Australians shows that people who were unemployed reported almost double the rate of anxiety, affective disorders and substance abuse, compared with people in full-time employment (Harris et al, 1999). The Australian 1989-90 National Health Survey found that unemployed men and women reported significantly more hospital outpatient visits than employed people (Mathers and Schofield, 1998).

The experience of unemployment can also adversely impact other household members (Hunter, 2000). In Australia, children whose parents were unemployed, compared with those with at least one parent employed, were reported to have around 26 per cent more serious chronic illnesses and 20 to 30 per cent more visits to the doctor, and around twice as many outpatient visits than employed people (Mathers and Schofield, 1998).

The health effects of employment also vary depending on type of employment. A study by the Australian Institute for Health and Welfare in 2001 found males aged 20 to 59 years in manual occupations had mortality rates 60 per cent higher than those in non-manual occupations (Steering Committee for the Review of Government Service Provision, 2005). These findings are relevant for Indigenous people who are more likely to be employed in manual occupations (Steering Committee for the Review of Government Service Provision, 2005).

Although the link between health status and employment in the labour market exists, deciphering causality is complex. For example, Altman (2000) found low education and health to be both a cause and effect of low socio-economic status. Harris et al (1999) write that people with ill health are less likely to work and that chronic health problems that emerge following unemployment can act as barriers to their return to work.

Indigenous Unemployment and Health

Analysis of the 1994 National Aboriginal and Torres Strait Islander Survey showed a complex relationship between health and employment for Aboriginal and Torres Strait Islander Australians (Hunter and Gray, 1999, in Hunter, 2000). The unemployed people in non-urban households were 4.4 to 9.2% less likely to have a long-term health condition than people in mainstream employment. However, in urban households, there was no significant difference between the health outcomes of unemployed and non-CDEP workers.

More recently, Ross (2006) concluded that there is a strong, positive relationship between income and self-assessed health from an analysis of the 2002 National Aboriginal and Torres Strait Islander Social Survey. This study found those in non-CDEP employment to be significantly healthier and have fewer disabilities than those in CDEP employment, and those in CDEP employment to have similar health status to those unemployed (Ross, 2006). This study also found that those classed as ‘unemployed’ to be healthier and have fewer disabilities than those classed as ‘outside the labour force’. Included in this latter group are ‘discouraged job-seekers’, as discussed earlier, and the inclusion of people unable to work, for example, due to illness.

A cross-sectional study conducted in 2000 in Yuendumu, an Aboriginal community in the Northern Territory, explored the association between the education and employment markers for ‘carer-mothers’ and the child health markers of scabies, trachoma, growth, purulent skin sores, purulent nose and ears (Ewald & Boughton, 2002). Information about the presence of the child health markers was collected during a systematic screening of 183 children under 13 years of age in the community (80% of eligible children). The study found a non-significant trend that the mean number of sicknesses per child decreased as the carer’s employment category moved from nil to ‘work for the dole’ to employed (Ewald & Boughton, 2002). There was no association between the mothers’ education markers and their children’s health.

One way to ameliorate the health problems caused by unemployment is to introduce strategies aimed at directly reducing unemployment rates. Other strategies focus on
attempting to address health issues caused by unemployment.

**INDIGENOUS EMPLOYMENT PROGRAMS**


This program to improve assistance to Aboriginal and Torres Strait Islander Australians seeking employment commenced in 1999. The program includes a combination of more intensive assistance, wage subsidies, structured training and support to improve skills which are linked to specific jobs and job creation partnerships between private companies and the Australian Government. The evaluation of the policy included a comparison with a matched control group of other unemployed people (Level III-2). An average of 28000 Aboriginal and Torres Strait Islander people has been assisted to look for employment each year. This has resulted in 2400-4300 extra jobs—mostly in the private sector. In 2002, the employment rate was 23.5% among participants 16 months after referral to the program compared to 14.9% in non-participant controls. The other benefits for those employed included higher income, independence from income support and increased job opportunities. Retention in employment at 3 months improved from 57% in 2000 to 73% in 2002 for Aboriginal and Torres Strait Islander Australians. In comparison, the retention rate for non-Indigenous Australians improved from 62% to 73% over the same period. Longer term follow-up is required to determine if these improvements are sustained and result in improved skills for participants. Increased employment should improve health outcomes based on Ross’ (2006) analysis, however, there has been no attempt to examine the health impact of this employment program.

*Community Development Employment Projects (CDEP), Australia* (Misko et al, 2004)

This national program commenced in 1977. It was initially intended to provide an alternative to unemployment benefits for Aboriginal and Torres Strait Islander Australians. Employers are funded to provide training for participants. However, CDEP programs have been limited by the lack of qualified tradespeople and ongoing work opportunities in remote communities. Increasingly rural and remote Aboriginal and Torres Strait Islander communities used the funding to undertake activities or enterprises to improve the social or physical environment of local communities. This was formally recognised in 2004 with the establishment of two streams within CDEP: a sustainable community development stream and an employment training stream.

A case series evaluation (Level IV) in 2003 (Misko et al, 2004) found that there were 35 089 participants of which 92.7% were Aboriginal or Torres Strait Islander and 67% were in remote areas. Thirty-four percent of participants were aged 18-25 years and 6% aged 15-17 years. Participants were employed as trade apprentices, receptionists, clerks, cleaners and health workers. There were a wide range of community projects and CDEP businesses including retail shops, horticulture, recycling and waste management, arts and crafts and tourism. The projects improved self esteem, self-discipline and promoted good work habits. Local unemployment was reduced and a pool of trained people created. There were many short-term training opportunities particularly for formal skills or licences. Indigenous community leaders were generally supportive of the effect of the projects, as long as participants were engaged in relevant productive activities.

In 2002, the CDEP scheme accounted for over one-quarter of the total employment of Indigenous Australians, particularly concentrated in remote locations (Altman, Gray & Levitus, 2005). The CDEP scheme accounted for 8 per cent of Indigenous employment in major cities increasing to 74 per cent in very remote areas (Steering Committee for the Review of Government Service Provision, 2005). Sixty-two per cent of participants in the scheme were in very remote areas, and in very remote areas 41 per cent of participants had been on CDEP for five years or more (Altman, Gray and Levitus, 2005). This reflects the location of projects and lack of other employment opportunities in remote areas (Figure 1) (ABS, 2004).

Participants in CDEP have higher average incomes compared with those unemployed and not in the labour force (Altman, Gray and Levitus, 2005). However, the 2005 Overcoming Indigenous Disadvantage report states that 'while CDEP employment is beneficial for Indigenous people there are greater benefits for
Indigenous people in being employed in the mainstream economy’ (Steering Committee for the Review of Government Service Provision, 2005).

A discussion paper, Indigenous Potential meets Economic Opportunity, was released by the Department of Employment and Workplace Relations (2006). This proposed that the CDEP program be replaced by enhanced components of the Indigenous Employment Policy (IEP) in urban and major regional areas. It is intended that the Structured Training and Employment Program will be expanded to assist Aboriginal and Torres Strait Islander Australians to obtain ongoing employment. This proposal is a response to the positive impacts of the IEP and the strong employment market in these locations. The proposed changes are likely to impact on 7,000 of the 35,000 CDEP participants.

**Figure 1. Labour force characteristics by remoteness.**

![Graph showing Labour force characteristics by remoteness.](image)

*Indigenous persons aged 15 years or over (ABS, 2004).*

**International Experience**

The Harvard Project on American Indian Economic Development, United States (Jorgensen & Taylor, 2000)

Since 1987 this project has attempted to identify successful strategies for reducing poverty in American Indian communities. Some Indian nations are economically successful and others remain poor and disadvantaged. The studies showed there were three factors that are vital to promoting Indian economic development. The first is sovereignty – if tribes made their own decisions about strategies and use of resources this resulted in better outcomes than external decision makers. The second is congruence between Indian culture and community institutions. This strengthens governance and improves outcomes. The third is institutions which are able to settle disputes fairly, separate the functions of elected representatives and business management and implement tribal policies successfully. This encourages investment and promotes tribal strategic goals while avoiding conflicts of interest.

The benefits of dispute resolution without political influence were demonstrated in a large case series (Level IV) from 67 Indian tribes (Jorgensen & Taylor, 2000). Employment rates were 5% higher in Indian communities with neutral dispute resolution, irrespective of the nature of the community council. Relevant confounding factors were controlled for including natural resources, educational attainment and access to local markets. In a separate case
series (Level IV), tribal enterprises were significantly more likely to be profitable if they were independent rather than community-controlled (Jorgensen & Taylor, 2000). A further study (Level IV) found that growth or stability in the numbers of people employed by tribal organisations was also more likely if elected community leaders did not sit on the enterprise board (Jorgensen & Taylor, 2000). It appeared that an independent non-politicised board is a buffer between the political organisation of tribal direction and the technical aspects of business management.

**INTERVENTIONS ADDRESSING THE HEALTH IMPACT OF UNEMPLOYMENT**

**Unemployment and Health Project, Sydney (Harris et al, 1999)**

The Unemployment and Health Project was conducted by the South Western Sydney Area Health Service in the 1990s. One of the parts of this project was an intervention in the Bowral ‘Skillshare’ program.

‘Preliminary studies suggested that the Skillshare was improving the health of people who were unemployed in three main ways: connecting participants back into the wider social structures of the community (including referral to services); developing self-esteem and personal problem-solving skills; and providing specific skills (such as computer literacy).’ (Harris et al, 1999)

The authors found through pre-and post-program surveys (Level IV) of those attending Skillshare courses that there was an improvement in some areas of mental health, but there was concern that the benefits were quickly lost if participants did not find a job soon afterwards (Harris et al, 1999). Harris et al, 1999 concluded that this project demonstrated that it is possible for the health sector to take actions to address the health needs of people who are unemployed.

**Cognitive Behavioural Therapy for the Long-term Unemployed, United Kingdom**

A randomised controlled trial (Level II) was conducted in the UK where the principles of cognitive-behavioural therapy (CBT) were adapted to create a group-training program for people who had been unemployed for more than 12 months (Proudfoot et al, 1997). Cognitive-behavioural therapy techniques include eliciting and testing the validity of thoughts, reattribution, behavioural modelling and experimentation, to help long-term unemployed professionals identify and modify their attributional style (CHETRE, 2001).

At the end of the seven week training program, the CBT group reported improvements in self-esteem, job-seeking self-efficacy, attributional style, motivation for work and life satisfaction in comparison to recruits who participated in a matched social support comparison program (CHETRE, 2001). The primary outcome measure of the study was obtaining full-time employment. Almost three times as many CBT group participants than comparison group participants had found full-time work by four months after training, representing a 91 per cent improvement in Employment Department statistics for a standard government program for unemployed professionals (CHETRE, 2001).

Analysis of Proudfoot et al’s study by CHETRE (2001) highlighted that the study used unemployed people of professional class who were highly educated, which is likely to have played a role in the success of the CBT intervention.

**DISCUSSION**

The high rate of unemployment and non-participation in the workforce of Aboriginal and Torres Strait Islander people has been shown in national surveys. The reasons for this include more limited employment and educational opportunities in remote areas and lower levels of engagement in formal education.

There is also extensive evidence in the non-Indigenous context in Australia that being employed is associated with higher incomes, improved health overall and higher self-esteem. Evidence from Aboriginal and Torres Strait Islander communities indicates that the association between employment and improved health is not as straightforward. However, Aboriginal and Torres Strait Islander community leaders have supported the benefits of increased employment in their communities (Misko et al, 2004).

The Indigenous Employment Policy has demonstrated strategies that can improve employment rates among Aboriginal and Torres Strait Islander people. This appears to have positive short term impacts: increasing income and decreased
need for income support. The sustainability of these employment outcomes is important in the context that Structured Training and Employment programs will replace CDEP in urban and major regional areas.

There are a large number of Aboriginal and Torres Strait Islander people involved in CDEP. In remote areas the majority of those employed are employed through CDEP. This has benefits for the individuals and their communities. However, it is important that employers fund ongoing work equitably to reflect the roles and responsibilities expected of employees, as non-CDEP employment was associated with better levels of health. It would be useful to demonstrate the outcomes of CDEP and non-CDEP employment for Aboriginal and Torres Strait Islander people.

The evidence from the United States emphasises the importance of sovereignty, cultural appropriateness and governance in successful economic development in Indigenous communities. This is likely to be relevant in Australia where community capacity building in Aboriginal and Torres Strait Islander communities is recognised as vital to service delivery (Standing Committee on Aboriginal and Torres Strait Islander Affairs, 2004). Increasing the capacity of local communities will result in increased employment for Aboriginal and Torres Strait Islander people.

There appears to be a benefit from providing problem-solving courses and support for unemployed people to link them into the community. In particular, cognitive-behavioural therapy has been shown to improve self efficacy and success in obtaining employment among unemployed people. These benefits were demonstrated in non-Indigenous community studies and the appropriateness of similar approaches for Aboriginal and Torres Strait Islander people needs to be determined.
Results

Fewer Aboriginal and Torres Strait Islander Australians than non-Indigenous Australians drink alcohol, with a large proportion of Aboriginal and Torres Strait Islander Australians, especially women, not consuming any alcohol at all (Australian Bureau of Statistics & Australian Institute of Health and Welfare, 2005). It has been estimated that alcohol is directly responsible for approximately 10% of Aboriginal and Torres Strait Islander Australian deaths (Brady, 1995).

Fetal alcohol syndrome is characterised by hearing abnormalities, growth impairment, heart abnormalities and characteristic facial abnormalities. The risk of this condition increases with high levels of maternal alcohol consumption. It is estimated to occur at a rate of 1.9 to 4.7 per 1000 live births in the NT Aboriginal population compared to 0.7 per 1000 live births in the non-Aboriginal population (Gray et al, in press). However, it is accepted that fetal alcohol syndrome is under-diagnosed.

There are four broad categories of intervention for alcohol misuse: (Saggers and Gray, 1998)

- treatment;
- harm minimisation;
- supply reduction; and
- health promotion.

Interventions have also combined strategies from more than one category. For example, increased resources for health promotion and/or treatment together with supply reduction activities, such as the Northern Territory Living with Alcohol Program which is highlighted below.

Alcohol Treatment Guidelines for Indigenous Australians (Department of Health and Ageing, in press) have recently been developed and will assist health professionals involved in treating road injury, assault, suicides, and drowning (Chikritzhs et al, 2005).
alcohol misuse by Aboriginal and Torres Strait Islander Australians. The Grog Book (Brady, 2005) is another useful resource for all those involved in working to reduce the impact of alcohol among Aboriginal and Torres Strait Islander people.

**TREATMENT**

The term treatment includes residential and non-residential treatment, rehabilitation programs and counselling. Since the 1970s, treatment has been the most common form of intervention and has received the most funding from the Australian Government (Gray et al, 2000). However, more recently there has been a move away from residential treatment programs (Gray, Sputore, Stearne et al, 2002). Residential treatment programs have been mostly based on a 12 Steps approach in which the goal of treatment is complete abstinence from alcohol. This model has gained prominence through Alcoholics Anonymous. It is thought that the model has been widely accepted and adapted for use among Indigenous populations because it strikes a chord with the view that alcohol use is not a part of traditional Indigenous culture, and with feelings of cultural loss and social inequality.

There have been few evaluations of residential treatment programs and those evaluations that have been conducted have largely yielded equivocal results. O'Connor and Associates conducted a qualitative evaluation of treatment/rehabilitation services provided by 14 Aboriginal organisations in 1988 (Gray et al, 2000). They found that while few clients achieved the goal of continuing abstinence, residential treatment facilities gave clients ‘time out’ from drinking, which enabled them to improve their health status.

d’Abbs (1990) evaluated three treatment programs (two residential and one non-residential) and the role of community-based field workers. This evaluation (Level III-3) was based on a review of documentary data and program records, and comparisons of the drinking status of ex-clients and samples of community members (Gray et al, 2000). He found that one family-oriented program had modest but real effects on drinking behaviour, but that outcomes at other locations were equivocal. He identified a need for improved record-keeping systems and adequate government funding.

**Other Primary Health Care Interventions**

Brief interventions involve advice to individuals on how to reduce alcohol use and minimise harm, and information is provided on the consequences of continued alcohol use. The aim is to assist an individual to cease or reduce the use of alcohol. There is extensive evidence from international systematic reviews (Level I) that brief interventions reduce alcohol use (Babor et al, 2003). Brady et al (2002) evaluated the feasibility of brief interventions in an urban Aboriginal Health Service (Level IV). After suitable modification and staff training, the brief intervention was useful for Aboriginal and Torres Strait Islander people. Barriers to greater use were time constraints and the complexity of individual health issues requiring immediate management.

**HARM MINIMISATION**

Harm minimisation strategies recognise that it can be difficult to change drinking patterns. Thus, harm minimisation strategies are aimed at preventing the harm caused by alcohol use, rather than preventing the alcohol use itself (Saggers and Gray, 1998). Evaluations of these strategies were limited, in part because the strategies involve some activities for which quantitative evaluation is inappropriate.

**Night Patrols**

Night patrols, or warden programs, are generally community initiatives run by groups of Indigenous people. The workers, who are usually volunteers, encourage drinkers to slow down their alcohol consumption, help to ameliorate disputes, and return intoxicated people to their homes or to sobering up shelters. There were 68 patrols operating across Australia in 1999-2000 mostly in WA or the NT (Gray et al, 2002). A survey of night patrols (Blagg et al, 2004) found that there was universal acceptance of well run night patrols by local communities. The survey also found increasing acknowledgement by police of the importance of these community initiatives. Unsuccessful night patrols were related to inadequate community consultation and planning, lack of external support and community social upheaval. The Grog Book (p.165) provides information on establishing successful night patrols (Brady, 2005).

**Sobering Up Shelters**

A sobering up shelter is a building which provides a temporary haven
for intoxicated people who are at risk of harming themselves or others. The shelters provide an alternative to placing intoxicated people in police custody and were recommended by the Royal Commission into Aboriginal Deaths in Custody. Sobering up shelters were first established in the 1980s and there are now over 24 sobering up shelters throughout Australia (Gray et al, 2000).

Brady et al (2006) conducted a retrospective case series (Level IV) of a sobering up shelter in South Australia from 1991 – 2000. They collated data on the usage of the shelter over the period and found that there were 6,486 admissions during the period, 97.1% of which were Aboriginal people. Brady et al concluded that this study provided: “supporting evidence of the important role of sobering up shelters in averting the known harms of a custodial response to public drunkenness, as well as avoiding the potential harm of alcohol-related injury among vulnerable Aboriginal people.”

**Use of Non-glass Alcohol Containers**

Glass bottles have been a major cause of injuries associated with alcohol misuse. To address this problem, Indigenous community organisations in towns such as Wiluna and Fitzroy Crossing in WA have reached agreement with the owners of liquor outlets that alcohol will only be sold non glass containers such as cans, plastic bottles or casks. There has been no formal evaluation of this strategy, but informal reports suggest that it reduces alcohol-related injuries (Saggers and Gray, 1998).

**SUPPLY REDUCTION**

Evaluation of supply reduction strategies has yielded the clearest results of any strategy to combat excessive drinking. Table 4 provides details of six supply reduction trials and their impacts and outcomes. As shown in Table 4, the majority of trials have produced significant reductions in alcohol consumption or alcohol-related harms. However, it should be noted that the successful reductions all had extensive community support. When trials were conducted with less community support, results were more limited.

**HEALTH PROMOTION**

Health promotion strategies aim to change the behaviour of target populations by giving them the knowledge to make informed choices (Saggers and Gray, 1998). Health promotion programs have been the most common form of intervention after treatment programs. Again, there have been few published evaluations of these strategies and those evaluations that have been published focus on program processes or short term impact, rather than longer term effects on alcohol consumption and related harm (Gray et al, 2000). Details of a selection of these evaluations are included below.

**Bush Tour Project, Northern Territory**

The Bush Tour Project in 1993 consisted of concerts by the Aboriginal band Yothu Yindi, in eight remote communities in the Northern Territory. The concerts were accompanied by school performances, a television commercial, and the distribution of posters, T shirts and caps. The tour promoted the harms associated with alcohol misuse. Milne et al (1993) evaluated the project by interviewing people about the campaign and quantitative data on exposure. They found that overall there was a high level of support for the campaign. People strongly approved of the Aboriginal cultural content and the relevance of the alcohol misuse theme directed to adolescents. However, Maher and Tilton (1994) reported that the campaign was culturally inappropriate for people living in Central Australia.

**School Education Program – Palm Island, Queensland**

In the late 1980s a drug education program for Aboriginal children aged nine to sixteen commenced on Palm Island in Queensland. The program sought to help children identify the reasons for alcohol consumption, the physiological and social effects of harmful use and peer pressures to drink, and to provide them with enhanced self-esteem and skills to resist pressures to drink. An evaluation was conducted by Barber et al (1989). This included pre and post-intervention surveys of participants and a control group. Students were found to have responded positively to the content and methods of program delivery and were more aware of the influence of peer pressure.

International evidence suggests that education approaches are only effective as part of an overall strategy. Education approaches alone have generally had not produced sustainable changes in alcohol use (Babor et al, 2003).
Koori Alcohol and Drug Prevention Project, Victoria

The Koori Alcohol and Drug Prevention Project was initiated in 1985. Through the project, six Alcohol and Drug Workers were employed to engage in health promotion and early prevention activities. Alati (1993) conducted a qualitative evaluation on behalf of the Koori Health Unit of the Victorian Department of Health and Community Services. The evaluation was based on interviews with staff, clients, and community members. All contributors to the evaluation identified Koori Alcohol and Drug workers as a vital resource to the Koori community struggle against drug abuse. The evaluation report noted that Koori people did not generally use mainstream counselling and referral services and therefore recommended that further funding be provided to allow the workers to provide a broader range of services including alcohol and drug counselling.

COMBINED APPROACH

Northern Territory’s Living with Alcohol Program

The Living with Alcohol (LWA) Program was introduced in the Northern Territory in 1992 with the aim of reducing alcohol consumption down to national levels by 2002. A range of strategies were used to do this, including: education, increased controls on alcohol availability and expanded treatment and rehabilitation services. The LWA program was originally funded by a levy which added five cents per standard drink to the price of alcoholic beverages with more than 3% alcohol by volume. In August 1997 the LWA Levy was removed for constitutional law reasons. However, the Australian Government continued to fund the LWA program at the same level until 2000.

The LWA program was initially evaluated by Stockwell et al in 2001 (Level III-3). It was estimated that per capita alcohol consumption in the Northern Territory declined by 22% in the first four years after the introduction of the Levy / LWA program and that there was an associated decline in alcohol-related harm. However, they noted that the reduction in alcohol consumption could have occurred as a result of other factors such as a downturn in the economy.

A further evaluation was conducted by Chikritzhs et al in 2005. Their study evaluated the LWA program using mortality data from 1985 – 2002. They looked at rates of alcohol attributable death before versus during the introduction of the Levy and LWA Program; before versus after the Levy and LWA Program; and before and during the program, including the period after the Levy was removed. They used mortality data on non-alcohol attributable deaths in the NT as an internal control, and mortality data from adjacent regions of Queensland and WA as an external control (Level III–2).

The results of the evaluation showed that between April 1992 and August 1997, the combined effect of the LWA Alcoholic Beverage Levy and the LWA program caused a significant decline in both Indigenous and non-Indigenous acute alcohol attributable deaths in the Northern Territory. However, in the absence of the Levy, the LWA program failed to have a significant impact on acute alcohol attributable deaths. Between 1997 and 2002, chronic alcohol attributable deaths declined significantly for non-Indigenous, but not for Indigenous residents. Chikritzhs et al detected an unexpected yet marked decline in non-alcohol related deaths amongst the Indigenous people when both the Levy and the LWA program were in place. This was largely due to reductions in respiratory conditions such as influenza, viral pneumonia, bronchitis and asthma.

Chikritzhs et al concluded that the impact of alcohol programs and services, combined with an increase in the real price of alcohol (even if the increase is minor) is effective in reducing alcohol-related harms among both Indigenous and non-Indigenous communities.

Meeting Challenges, Making Choices, Queensland

In 2002, the Queensland Government committed to a strategy known as ‘Meeting Challenges, Making Choices’ (Department of Aboriginal and Torres Strait Islander Policy, 2005a). This strategy was to include a combination of interventions to address alcohol misuse and violence in discrete Aboriginal and Torres Strait Islander communities. It included the expansion of alcohol treatment and rehabilitation services, local alcohol management plans and a family violence strategy. It was intended that communities would be engaged to develop local
solutions. New laws were passed which allowed for the introduction of a number of supply reduction initiatives. Supply reduction measures were subsequently introduced in eighteen Indigenous communities in Queensland. The introduced measures differ between communities but include:

- placing limits on the amount and type of alcohol allowed to be possessed in declared restricted areas;
- imposing conditions upon liquor licenses to complement the restricted area provisions;
- prohibiting the possession or supply of homemade alcohol in certain community areas; and
- declaring ‘dry places’ within communities where it is prohibited for a person to possess alcohol or be drunk.

An evaluation of the strategy has recently been conducted (Level III-3) (Department of Aboriginal and Torres Strait Islander Policy, 2005b). It was shown that average hospital admissions for assault in all of the communities had decreased from over 200 per quarter in 2000 to approximately 100 per quarter in March 2005. This decline commenced prior to the commencement of the new strategy in December 2002, however, the trend has continued since the introduction of the strategy. The largest decrease was in communities with canteens where the carriage of alcohol in the community is prohibited. There was a 31% increase in property offences and an increase in drink driving offences. There was no change in school attendance and there was an increase in Aboriginal and Torres Strait Islander children on protection orders. Alcohol sales in the ten communities with liquor outlets decreased approximately 30%. Residents perceive that there is less violence in the communities. The process evaluation found that the demand reduction interventions had not been widely implemented and that partnerships within Government and the community were still developing. Overall it was considered that alcohol restrictions and increased policing are having a positive impact. There is a need to strengthen alcohol demand reduction to address the consequences of this strategy, such as people driving to access alcohol.

**DISCUSSION**

Despite the severity of the problems caused by alcohol among Aboriginal and Torres Strait Islanders Australians, few systematic evaluations of interventions have been undertaken. Of those studies that have been conducted, most are too small in scale to be generalised to the greater Indigenous population. Other studies are of poor quality and have yielded inconclusive results (Saggers and Gray, 1998).

The more recent evidence suggests that Aboriginal and Torres Strait Islander people and communities are increasingly engaged in addressing the issue of alcohol misuse. This is the most important element for programs to reduce alcohol-related harm among Aboriginal and Torres Strait Islander people (Strempel, et al, 2004). In combination with the extensive international evidence of the effectiveness of various strategies to reduce alcohol misuse, this indicates the potential to strengthen and expand culturally appropriate strategies in partnership with Aboriginal and Torres Strait Islander organisations.

Experts in the field (Gray et al, 2006; Alati et al, 2000) have also commented that alcohol interventions will be reinforced by addressing the underlying determinants of alcohol misuse. These determinants include lack of meaningful employment, lack of engagement in the educational system, poverty and lack of opportunity to accumulate life-long assets – both social and financial capital.

Restrictions on alcohol supply have yielded the clearest improvements in alcohol-related harm. The significant reduction in excessive alcohol consumption and related harm in four of six trials (Table 1) indicates the benefits that can be obtained. The results indicate the importance of community support for successful supply reduction interventions. The supply reduction trials listed were all evaluated against historical controls, with only the Tennant Creek trial also including a comparison with concurrent NT alcohol consumption. Thus, it is possible that other factors may have contributed to the reduction in alcohol consumption. However, the need for community support to initiate community supply reduction strategies makes it impossible to perform randomised controlled trials. Although supply reduction may reduce alcohol consumption and associated harms in the short-term, it must be combined with other approaches to produce sustainable long-term improvements in alcohol misuse (Gray et al, 2000).
There is limited evidence for other strategies. The results of health promotion strategies have been equivocal, although this could be due to the fact that most health promotion evaluations have focussed on short term impacts. It is possible that longer term follow-up would show lower levels of harmful alcohol consumption. The Royal Commission into Aboriginal Deaths in Custody (1991) advocated provision of recreational activities as a means to reduce the demand for alcohol, particularly among young people. Further, Saggers and Gray (1998) make reference to an ‘intuitive understanding’ that young people with plenty of interesting things to do are less likely to have the time or inclination to drink excessively or use other drugs. (See chapter on Sporting and Cultural programs). Harm minimisation strategies have never been quantitatively evaluated.

The results of treatment program evaluations have been similarly equivocal. There is a paucity of literature evaluating Indigenous treatment programs, especially given the wide usage of treatment strategies. However, there is extensive international evidence of the effectiveness of alcohol treatment strategies in reducing alcohol consumption (Babor et al, 2003). There are an increasing diversity of approaches to alcohol misuse amongst Aboriginal and Torres Strait Islander Australians (Gray et al, 2002). It is important to ensure that these approaches are culturally appropriate and developed in partnership with the local community in which they are operating.

Several commentators such as Brady (1995) and Gray et al (2000) have cautioned against using a single treatment model. They have commented that Indigenous peoples exhibit many different patterns of alcohol use and that it is flawed to assume a disease-based, residential treatment model will be relevant to everyone. Brief interventions are recommended as a strategy that appears to be culturally appropriate and relevant to Aboriginal and Torres Strait Islander people (Brady, 2005).

There is some evidence suggesting that the combined approach taken in the Northern Territory’s Living with Alcohol program and the Meeting Challenges, Making Choices strategy in Queensland have had a positive impact on alcohol misuse. The NT experience shows that a comprehensive strategy including alcohol price increases, expanded alcohol treatment and support services and community education are more effective in reducing alcohol misuse than expanded alcohol treatment services and community education alone. The length of time required to develop partnerships and local community engagement means that long-term programs and follow-up are required to demonstrate sustainable improvements in health outcomes.
Table 4: Summary of Alcohol Supply Reduction Programs in Aboriginal and Torres Strait Islander Communities

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>TYPE OF STUDY</th>
<th>INTERVENTION / SERVICE PROVIDED</th>
<th>IMPACTS AND OUTCOMES</th>
<th>KEY FEATURES</th>
<th>REFERENCES</th>
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</thead>
<tbody>
<tr>
<td>Halls Creek, 1992</td>
<td>Comparative study with historical control group</td>
<td>The following restrictions were placed on licensees:</td>
<td>➢ 39% reduction in wine consumption&lt;br&gt; ➢ 7.5% reduction in overall alcohol consumption&lt;br&gt; ➢ Decrease in presentations to hospital related to alcohol and domestic violence&lt;br&gt; ➢ Decrease in emergency evacuations resulting from injury</td>
<td>➢ Problem identified by community&lt;br&gt; ➢ Introduction of restrictions supported by community</td>
<td>Douglas 1998</td>
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<td></td>
<td>(Level III – 3)</td>
<td>➢ take away sales were prohibited before 12 noon;&lt;br&gt; ➢ sale of cask wine was restricted between 4pm and 6pm; and&lt;br&gt; ➢ cask wine sales were limited to one per person per day</td>
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<td>Curtin Springs Roadhouse, 1992</td>
<td>Comparative study with historical control group</td>
<td>Restrictions on the sale of take away alcohol</td>
<td>➢ Significant fall in liquor sales&lt;br&gt; ➢ Number of litres of alcohol purchased 79% lower than previous year&lt;br&gt; ➢ Reduction in the level of violence and disruption in communities&lt;br&gt; ➢ Reduction in alcohol related health problems</td>
<td>➢ Community involvement&lt;br&gt; ➢ Community identification of problem through the Pitjantjatjara Council and the Ngaanyatjarra Pitjantjatjarra Yankunytjatjara Women's Council</td>
<td>d'Abbs et al 1999</td>
</tr>
<tr>
<td></td>
<td>(Level III – 3)</td>
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<td>Tennant Creek, 1995 – Restriction trial</td>
<td>Comparative study with historical control group</td>
<td>There was a six month trial of alcohol restrictions in the town of Tennant Creek in NT. The combinations of restrictions in each phase varied, but included:&lt;br&gt; ➢ restrictions on Thursday trading, the day on which social security payments were made;&lt;br&gt; ➢ restricted hours in which takeaways could be sold;&lt;br&gt; ➢ restrictions on front bar trading; and&lt;br&gt; ➢ restrictions on cask wine sales.</td>
<td>➢ Reduced police incidents and disturbances to public order&lt;br&gt; ➢ Fewer alcohol related hospital presentations and admissions to the women's refuge&lt;br&gt; ➢ The decrease in alcohol sales in the town itself was offset partly by increase in the sale at roadside inns&lt;br&gt; ➢ Wine sales fell, but sales of beer increased&lt;br&gt; ➢ There was a 2.7% reduction in total consumption</td>
<td>➢ Community involvement&lt;br&gt; ➢ Community identification of problem through the Pitjantjatjara Council and the Ngaanyatjarra Pitjantjatjarra Yankunytjatjara Women's Council</td>
<td>d'Abbs et al 1996 (cited in Gray et al, 2000)</td>
</tr>
<tr>
<td>Location</td>
<td>Study Type</td>
<td>Restrictions</td>
<td>Results</td>
<td>Support</td>
<td></td>
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<td>--------------</td>
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</table>
| Tennant Creek| Comparative study based on historical data    | Following the successful trial of supply restrictions in Tennant Creek, the Liquor Commission amended the licenses of hotels and takeaway outlets in Tennant Creek to include:  
  - a ban on sales of wine in casks of greater than 2 litres;  
  - closure of front bars on Thursdays; and  
  - other restrictions on both takeaway and bar trading hours. | Over a two year period per capita consumption decreased by 19.4%  
  - there were significant declines in admissions for acute alcohol related conditions  
  - the proportion of offences committed on Thursdays declined  
  - there were not significant increases in consumption of other alcoholic beverages  
  - alcohol purchases in other nearby locations were minimal | All restrictions were supported by a majority of both Aboriginal and non-Aboriginal residents |
| Derby, WA    | Comparative study based on historical data    | Following the successful trial of supply restrictions in Tennant Creek, the Liquor Commission amended the licenses of hotels and takeaway outlets in Tennant Creek to include:  
  - a ban on sales of wine in casks of greater than 2 litres;  
  - closure of front bars on Thursdays; and  
  - other restrictions on both takeaway and bar trading hours. | There was a small fall in alcohol consumption (0.2%) but this may have been part of a pre-existing trend. There was a 37% reduction in the incidence of assaults, sexual offences, damage and threatening behaviour.  
  - reanalysis using a different method showed a 10% decrease in alcohol consumption. | Responses to the measures were mixed and the authors commented that there appeared to be a widespread belief that the problems associated with alcohol misuse are too pervasive and too complex to be adequately addressed by imposed restrictions |
| Alice Springs| Comparative study with historical control group | Following the successful trial of supply restrictions in Tennant Creek, the Liquor Commission amended the licenses of hotels and takeaway outlets in Tennant Creek to include:  
  - a ban on sales of wine in casks of greater than 2 litres;  
  - closure of front bars on Thursdays; and  
  - other restrictions on both takeaway and bar trading hours. | Results were mixed:  
  - instances of drunkenness, breaches of the 2km law, and protective custodies were down by a third;  
  - alcohol related assaults decreased 13%;  
  - there was a non-significant increase in alcohol related offences;  
  - indications of more acute conditions being admitted to Alice Springs hospital; and  
  - there was a 1000% increase in the sale of 2 litre port, which became the cheapest form of alcohol with the introduction of the restrictions. | The NT Licensing Commission removed the ban on cask wine to address the shift to 2 litre port. It felt that any restrictions would lead to further, equally harmful substitutions. Hogan et al commented that the trial provides evidence of a link between price and consumption. The Central Australian Aboriginal Congress proposed the introduction of a tiered volumetric tax on alcohol and a trial of alcohol restrictions based on a minimum price benchmark. |
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