

1-2012

# Healthy lifestyle programs for physical activity and nutrition

N.A.

Follow this and additional works at: <http://ir.lib.uwo.ca/aprci>



Part of the [Other Public Health Commons](#)

---

## Citation of this paper:

N.A., "Healthy lifestyle programs for physical activity and nutrition" (2012). *Aboriginal Policy Research Consortium International (APRCi)*. Paper 241.

<http://ir.lib.uwo.ca/aprci/241>



Australian Government

Australian Institute of Health and Welfare

Australian Institute of Family Studies

# Closing the gap clearinghouse

## Healthy lifestyle programs for physical activity and nutrition

Resource sheet no. 9 produced by the Closing the Gap Clearinghouse  
January 2012

### Summary

#### What we know

- Over half (51%) of Indigenous people living in non-remote parts of Australia aged 15 and over do very little or no exercise, compared with 33% of non-Indigenous Australians (AIHW 2011a).
- Indigenous people are twice as likely to report no usual daily fruit consumption and seven times as likely to report no usual daily vegetable consumption as non-Indigenous people of the same age (AIHW 2011a).
- While Indigenous adults are less likely to be overweight than non-Indigenous adults (31% compared with 36%), they are much more likely to be obese (34% compared with 18%) (AIHW 2011a).
- Being overweight or obese, being physically inactive and consuming a diet low in fruit and vegetables have been estimated to contribute 16%, 12% and 5% respectively to the health gap observed between Indigenous and non-Indigenous Australians (Vos et al. 2009). This is largely due to

the influence of these factors on the development of cardiovascular disease, diabetes and chronic kidney disease.

#### What works

- In the Indigenous context, the community managed and initiated all the programs which were shown to be effective.
- Individual, family-based and group-based Indigenous lifestyle programs had positive health effects for periods of up to two years.
- Intensive lifestyle programs have been shown to be effective in reducing the incidence of diabetes developing among overweight non-Indigenous people with pre-diabetes.

#### What doesn't work

- Programs that do not have a high level of community ownership and support.
- Programs that operate in isolation from, or do not address, broader structural issues, such as poverty and lack of access to a healthy food supply.



## What we don't know

- What is required for a program that is successful in one community or setting to be successfully implemented in other communities or settings.
- Whether intensive lifestyle programs that are effective in reducing the incidence of diabetes among overweight non-Indigenous people with pre-diabetes would also be effective for Indigenous pre-diabetic Australians.
- Whether individual, family and group programs that show promising results in the short term (up to two years) are effective in the longer term (over five years).
- Whether sport promotion programs increase participation in sport among Indigenous children and adults.
- What strategies are effective to promote participation in sport by older men, and adult and older women.

## Introduction

This resource sheet focuses on physical activity and nutrition. Although smoking and excessive alcohol consumption are also important causal factors in the development of chronic diseases, they are not considered here as other Closing the Gap Clearinghouse resource sheets are available on these topics:

- *Reducing alcohol and other drug related harm* (Resource sheet no. 3)
- *Anti-tobacco programs for Aboriginal and Torres Strait Islander people* (Resource sheet no. 4).

This resource sheet describes the burden of lifestyle-related chronic diseases affecting Indigenous Australians. It assesses the evidence regarding the effectiveness of physical activity and nutrition programs and identifies strategies that have been demonstrated to be effective. It also reviews strategies that have the potential to be effective, based on their short-term effect or their effectiveness in non-Indigenous populations.


Healthy lifestyle programs must be considered in a broader context that incorporates the social determinants of health, and population-based approaches to health improvement. This approach recognises that the risk of developing chronic disease is not only directly influenced by an individual's behaviours but also by cultural, historical, social, geographical, economic and community factors, and government health policies and services.

## Chronic disease burden and risk

Indigenous Australians suffer the worst health of any population group in Australia, having a burden of disease that is estimated to be two and a half times that of the total Australian population. This is reflected in a worse life expectancy for Indigenous Australians—12 and 10 years less for males and females respectively than that of the non-Indigenous population (AIHW 2010).

It is estimated that chronic diseases are responsible for 80% of the mortality gap between Indigenous and other Australians aged 35–74. These include cardiovascular disease (largely heart attack and stroke), diabetes, liver disease and lower respiratory tract disease, as well as cancers, mental conditions and renal failure (a result of chronic kidney disease) (AIHW 2011c).

There are complex causal relationships between cardiovascular disease, diabetes and chronic kidney disease. Each of these diseases may be caused by, or be a complication of, one or both of the others. As a result they are likely to occur together. They also have shared risk factors, including being overweight and obese, poor nutrition and physical inactivity (AIHW: Tong & Stevenson 2007). In 2007–08, Indigenous Australians were 12 times as likely as other Australians to be hospitalised with all three diseases. Furthermore, over the period 2003–07 Indigenous Australians having these three diseases died at 13 times the rate of non-Indigenous Australians (AIHW 2010, 2011b).



Socioeconomic disadvantage with its links to poor living conditions and inequitable distribution of power, money and resources is also associated with an unhealthier lifestyle, higher chronic disease risk status and poorer health outcomes (Commission on Social Determinants of Health 2008).

## Healthy lifestyle programs

The value of lifestyle programs depends on how successfully they lead to sustained improvements in targeted behaviours, and the extent to which they positively influence longer-term chronic disease outcomes. A summary of evaluations of international and Australian programs is provided below.

### Evidence from non-Indigenous specific research programs

- A meta-analysis of 26 studies found that losing weight is not effective as a sole strategy for prolonging the lives of healthy individuals who are overweight or obese (Harrington et al. 2009). On the other hand, as shown by the studies in this section, intensive dietary, physical activity and behavioural programs have been found to be effective in reducing the incidence of diabetes among people who are pre-diabetic.

### Intensive lifestyle programs can be effective in reducing the incidence of diabetes among overweight people who are pre-diabetic

- A review of five studies that evaluated the impact of weight loss programs on adults who are pre-diabetic, found a significant decrease in diabetes incidence at 3–6 years follow-up in three of the studies. These three studies were undertaken in the US, China and Finland (Norris et al. 2005).
- The **Diabetes Prevention Program**, a US-based 27-centre randomised clinical trial, found that losing a modest amount of weight through dietary change and increased physical activity resulted in a 58% reduction in the incidence of diabetes among participants who were overweight

and pre-diabetic. Nearly half (45%) of the 1,079 participants were from racial and ethnic minorities. The program had the following components:

- clearly defined weight loss and physical activity goals
- dietary modification and self-monitoring of weight
- individual case managers or ‘lifestyle coaches’ who used a structured core curriculum that taught self-management strategies for weight loss and physical activity, provided a tailored program to meet individual needs, had frequent contact with participants, supervised exercise sessions and the maintenance program, and monitored adherence to the lifestyle goals
- a centralised network of training, feedback and support for the coaches (Diabetes Prevention Program Research Group 2002).
- Medication may also be effective in delaying the onset of Type 2 diabetes among people who are pre-diabetic, although it does not appear to confer added benefit over and above that conferred by intensive lifestyle programs. A review of four randomised controlled trials targeting people who are pre-diabetic concluded that both intensive lifestyle programs and medication can delay the onset of Type 2 diabetes, but no added benefit is obtained by combining the lifestyle program and medication. There were issues with adherence to both the lifestyle program and medication, and some people experienced side effects with the medication (Yuen et al. 2010).

### The settings in which lifestyle programs are delivered to at-risk individuals, and who delivers them, appear to impact on their effectiveness

- A meta-analysis of four evaluations of lifestyle programs undertaken in France, Italy, Japan and the UK and delivered by health-care providers to pre-diabetics in routine clinical settings found the programs to be of limited benefit. Reductions in weight and waist circumference were found, but there were no clear effects on biochemical or clinical parameters after 1 year (Cardona-Morrell et al. 2010).



- By contrast, a 4 year program implemented by nurse-supervised community health workers in partnership with an urban African-American community in the US resulted in a significant decrease in blood pressure and an increase in the percentage of individuals with controlled high blood pressure. The community health workers were trained and certified in blood pressure management and monitoring, education and counselling, social support mobilisation, and community outreach and follow-up. Community members who had been identified as having high blood pressure by a community survey and who agreed to participate in the program were randomly allocated to either a less intensive intervention or a more intensive intervention. The less intensive intervention included usual medical care, patient education materials and community education. The more intensive intervention included the former interventions plus patient education and counselling, outreach and follow-up, and social support mobilisation. There were no differences in results between the two levels of intervention (Levine et al. 2003).

### Community-based programs can be effective in improving diet, increasing physical activity and reducing the incidence of chronic disease

The principle underpinning community-based approaches is the recognition that the health needs and behaviours of individuals cannot be considered separately from the community contexts in which they live.

- The **North Karelia Project** is the best-known community-based program to prevent chronic diseases. It was piloted in the North Karelia region of Finland from 1972 to 1977 and involved primary health-care workers, voluntary organisations, the food industry and supermarkets, schools and local media. The project achieved significant decreases in smoking rates, cholesterol levels and blood pressure. It was subsequently implemented throughout Finland and has resulted in significant decreases in cardiovascular disease, which have been sustained until the present (Puska 2008). The success of this program demonstrates that, in a region that was initially chosen because it had

the highest known rates of coronary heart disease in the world, an intensive and well-coordinated program can result in people making permanent changes to their dietary and smoking habits, with consequent major improvements in their health.

## Evidence from Indigenous-specific program evaluations

While many healthy lifestyle programs have been undertaken in Australian and overseas indigenous communities, relatively few have been rigorously evaluated, especially in relation to their long-term effects. Key insights from evaluations of lifestyle programs that have been at least partially effective are summarised below.

### Community-initiated and managed programs are found to be effective


All of the community-based projects that have been evaluated and found to be effective have been initiated and managed by the community, with technical (and sometimes financial) support being provided by external organisations. Lifestyle projects that have resulted in health benefits (at least in the short term) are summarised below:

- The **Minjilang Health and Nutrition Project** in the Northern Territory began in 1989 and ran for 12 months. People were encouraged to choose store foods, such as fresh fruit and vegetables and lean meat, that were more like traditional bush foods. Store turnover data were used to measure the apparent community dietary intake of sugar, fruit and vegetables. Over the 12 months of the project, the community intake of sugar decreased markedly and became substantially lower at 12 months than that of a comparable community not involved in the project. Fruit and vegetable consumption more than doubled during the project, while those of a control community remained relatively constant.
- The project also included the collection from adults of longitudinal data on body mass index, blood pressure and haematological indicators (including cholesterol, haemoglobin, blood sugar, triglycerides and vitamins). Almost all (94%) of the adults living in Minjilang participated in the initial



data collection. Adult participation decreased to 68% by the fifth 3-monthly collection, at the end of the project. Significant decreases in blood pressure and cholesterol were observed over the 12-month period, as well as significant increases in the blood concentrations of folate, vitamin B6, beta carotene and vitamin C. There was also a small but significant decrease in the average body mass index of the screened adults. While there was no significant overall improvement in glucose tolerance in the community, there was some improvement among older women (Lee et al. 1994).

- A community-based program was implemented in four remote Western Australian Aboriginal communities to heighten awareness of lifestyle diseases, promote healthier living through diet and exercise, encourage earlier detection and treatment of chronic disease, encourage better compliance with medication and minimise long-term complications. Point-of-care pathology testing was provided in one community. One of the four communities withdrew from the program and quantitative results on the effects of the program are reported for only one of the three remaining communities. In this community, after several months, about half (49%) of the participants had lost weight and over half had lower cholesterol (59%) and lower blood glucose levels (54%). Physical activity is reported to have increased in all communities, although the extent of this increase is not reported (Gracey et al. 2006).
- The **Looma Healthy Lifestyle Project** is an Indigenous community-directed program that began in 1993 with the aim of decreasing the incidence of obesity, diabetes and coronary heart disease in Looma, a remote Western Australian community. It included strategies to improve diet (such as the promotion of traditional cooking methods, store management policy changes and nutrition education) and to increase physical activity. The appointment by the community council of a store manager with a mandate to improve food supply and council policies regarding smoking, food availability and physical activity are considered to be key aspects of the project.
- Evaluations concluded that the project had resulted in improvements to a range of coronary heart disease risk factors related to diet (Rowley et al. 2000, 2001). However, no significant changes were found in the prevalence of obesity or diabetes.
- The 'waist loss' program **Gutbusters** was adapted for use in the Torres Strait Islands following extensive consultation with four communities. The program focused on diet and physical activity and was modified by and for Torres Strait Islander men. Consultation and modification of the **Gutbusters** program and the provision of training to male Indigenous health workers, community representatives and elders occurred over a period of 4 years.
- As part of the program, respected elders encouraged physical activity by being seen to walk regularly. Rugby was also used to promote physical activity. A total of 135 men were involved at some level with the program over the course of the year. However only 57 men were weighed and measured at the start of the program. At the end of the year-long program, 45 of these men were re-weighed and re-measured. The average waist loss was 4 cm and the average percentage decrease in fat mass was almost 11%.
- It was intended that the program be handed over to and run by the communities early in the year-long project, but this did not occur. A respected outside source of information appeared to be more acceptable to the participants than a known community representative who had been provided with training (Egger et al. 1999). However reliance on an outside expert can compromise the sustainability of a program. The author was unable to find evidence that **GutBusters** is still operational in the Torres Strait.
- The **Ngati and Healthy Project**, a 2-year community-led diabetes prevention project targeting a high-risk Maori community in New Zealand, resulted in a statistically significant decrease in diabetes risk among women aged 25–49, after 2 years. The program had three main components: community-wide health promotion, education for high-risk individuals and the involvement of local organisations, employers, schools and shops (Coppell et al. 2009).



## Very few healthy lifestyle programs continue to operate for 5 years or longer. Long-term healthy lifestyle programs can stabilise rates of chronic disease in the adult population and improve the health of children

It is difficult to sustain community-based healthy lifestyle programs for five years or longer and this is especially challenging in the context of the many social and economic problems that exist in Indigenous communities. While acknowledging that two of the projects reported in this paper were evaluated relatively recently (within the past 5 years), the author was only able to find one community-based Indigenous healthy lifestyle program that is still in operation.

The **Looma Healthy Lifestyle Project** in Western Australia is still operating 18 years after its beginning, which is a testament to the commitment of the community. A health assessment of Looma residents undertaken in 2009 found that the prevalence of diabetes in the community had not increased since 2003. Children and young people in the community were found to be overwhelmingly healthy, with 84% of those under 18 being of normal weight, compared with 77% nationally (Caritas Australia 2011).

## Sport can be used to promote healthy lifestyles among Indigenous children

The benefits to health of participating in sport are well recognised and participation rates for Indigenous children are comparable with those of non-Indigenous children. For example, over two-thirds (69%) of Indigenous boys and over half (51%) of Indigenous girls aged 12–14 participate in organised sport (ABS 2010b). By comparison, participation rates for 12–14 year olds in the general Australian population are 74% for boys and 55% for girls (ABS 2010a).

However, participation in sport decreases rapidly with age and participation rates for women are much lower than for men. Just over half (53%) of young men and just over one-third (36%) of young women aged 15–24 participate in sport and physical activities. These rates decrease further to about one-third of

men and one-quarter of women aged from 25–44, and 18% of men and 11% of women aged 45 and over (ABS 2010b).

Sport is being used to promote healthy lifestyles. For example, the **Kickstart Indigenous program** is a national program that uses Australian Rules football as a vehicle to promote healthy lifestyles in Indigenous communities (AFL 2011); however, there have been no evaluations of Kickstart.


There have been a small number of evaluations that have identified links between sports role models and health-promoting behaviour. The most effective role models (which include parents, teachers and other significant adults, as well as celebrities and sports people) are those that develop a long-term mentor relationship with children and young people (Payne et al. 2003).

## It is not known whether positive short-term effects of healthy lifestyle projects are maintained in the longer term

The following healthy lifestyle projects focus on helping individuals, groups of volunteers or families rather than on implementing community-wide strategies.

- In a project that targeted 57 family households in an aboriginal community from the Six Nations Reserve in Ohsweken, Canada, aboriginal health counsellors assessed the needs of each member of the household and set dietary and physical activity goals. After 6 months, participating households had decreased their consumption of fats, oils and sweets, increased their consumption of water and decreased their consumption of soda pop compared with the control households (Anand et al. 2007).
- The **Healthy Lifestyle Programme (HELP)** involved 101 Indigenous participants (who were either diabetic or at risk) in an urban location in Queensland. It aimed to increase physical activity and improve nutrition. Participants self-monitored their blood glucose levels and used pedometers to monitor their physical activity. At the 6-month follow-up there were significant reductions in waist circumference and diastolic blood pressure, based on the results of 80 participants (Chan et al. 2007). This evaluation did not use a control group.



- 
- **Living Strong** (formerly known as the **Healthy Weight Program**) is a group-based healthy weight management program for Indigenous adults. The program was evaluated in 2005 using screening data collected from participants of programs that were held in a number of unspecified locations in Queensland from June 2004 to June 2005. Screening data were collected from participants on three occasions: before the program, mid-program and post-program. Although 432 people participated in the program, full screening data were obtained from only 34 of them. Over half (57%) lost weight and the proportion of participants who were eating at least two serves of fruit per day increased by 50% (Queensland Health 2005). The evaluation lacked rigour in that screening data were obtained from only about one in twelve of the participants. Furthermore the percentage of participants that lost weight was calculated based on data from only 23 participants, and of these, 10 participants either gained weight, or their weight remained stable. A more rigorous and long-term evaluation of the effects of the program is required.
  - Apart from problems with the evaluations that have been identified above, the main concern with the above papers is the short-term nature of the research. It is not known whether these projects had positive long-term effects on the health of participants. The health promotion literature indicates that when individuals make changes to their behaviours in response to a health promotion program (such as a healthy lifestyle project), these changed behaviours are unlikely to be maintained unless they are reinforced through changes to the social and physical environments (Swerissen & Crisp 2004). Examples of social and environmental changes include making the food supply healthier and promoting sport.

## Conclusion

Being overweight or obese, being physically inactive and consuming a diet low in fruit and vegetables have been estimated to contribute to the high rates of cardiovascular disease, diabetes and chronic kidney disease experienced by Australia's Indigenous people.

Healthy lifestyle programs can help with these conditions. Diabetes rates in adults have been shown to stabilise and healthy lifestyles have been effectively promoted among children where programs are community-initiated, community managed and comprehensive, and where community-accepted external expertise is appropriately utilised.

Intensive lifestyle programs have been shown to be effective in reducing the incidence of diabetes among overweight non-Indigenous people who are pre-diabetic. Their effectiveness in relation to overweight Indigenous people who are pre-diabetic has not yet been demonstrated. Individual, family and group-based Indigenous healthy lifestyle projects have had positive health effects in the short term; however, it is not known whether these have been maintained.

The settings in which lifestyle programs are delivered to at-risk individuals and who delivers them appear to contribute to their effectiveness.

Sport can be used to promote healthy lifestyles. A small number of evaluations suggest a link between sports role models and health-promoting behaviour. These are most effective for children and youth where significant adults in their community form long-term mentoring relationships, alongside the shorter-term involvement of sporting celebrities.





## References

- ABS (Australian Bureau of Statistics) 2010a. Involvement in organised sport and physical activity, Australia, April 2010. ABS cat. no. 6285.0. Canberra: ABS.
- ABS 2010b. Perspectives on sport, June 2010. Indigenous people's participation in sport and physical activities. ABS cat. no. 4156.0.55.001. Canberra: ABS.
- AFL (Australian Football League) 2011. AFL & the Indigenous community. Melbourne: AFL. Viewed 21 October 2011, <<http://www.afl.com.au/development/qantasafllkickstart/indigenousplayersintheafl/programs/tabid/14340/default.aspx>>.
- AIHW (Australian Institute of Health and Welfare) 2010. Australia's health 2010. Australia's health series no. 12. Cat. no. AUS 122. Canberra: AIHW.
- AIHW 2011a. Aboriginal and Torres Strait Islander Health Performance Framework 2010: detailed analyses. Cat. no. IHW 53. Canberra: AIHW.
- AIHW 2011b. Cardiovascular disease: Australian facts 2011. Cardiovascular disease series no. 35. Cat. no. CVD 53. Canberra: AIHW.
- AIHW 2011c. Contribution of chronic disease to the gap in adult mortality between Aboriginal and Torres Strait Islander and other Australians. Cat. no. IHW 48. Canberra: AIHW.
- AIHW: Tong B & Stevenson C 2007. Comorbidity of cardiovascular disease, diabetes and chronic kidney disease in Australia. Cardiovascular disease series no. 28. Cat. no. CVD 37. Canberra: AIHW.
- Anand SS, Davis AD, Ahmed R, Jacobs R, Xie C, Hill A et al. 2007. A family-based intervention to promote healthy lifestyles in an aboriginal community in Canada. *Canadian Journal of Public Health* 98(6):447–52.
- Cardona-Morrell M, Rychetnik L, Morrell SL, Espinel PT & Bauman A 2010. Reduction of diabetes risk in routine clinical practice: are physical activity and nutrition interventions feasible and are the outcomes from reference trials replicable? A systematic review and meta-analysis. *BMC Public Health* 10:653–71.
- Caritas Australia 2011. Indigenous rights: Caritas and Australia's Indigenous communities. Sydney: Caritas Australia. Viewed 28 September 2011, <<http://www.caritas.org.au/Content/NavigationMenu/BeInformed/Globalissues/IndigenousRights/default.htm>>.
- Chan LCK, Ware R, Kesting J, Marczak M, Good D & Shaw JTE 2007. Short term efficacy of a lifestyle intervention programme on cardiovascular health outcome in overweight Indigenous Australians with and without type 2 diabetes mellitus—the healthy lifestyle programme (HELP). *Diabetes Research and Clinical Practice* 75(1):65–71.
- Commission on Social Determinants of Health 2008. Closing the gap in a generation: health equity through action on the social determinants of health. Final report. Geneva: World Health Organization.
- Coppell KJ, Tipene-Leach DC, Pahau HL, Williams SM, Abel S, Iles M et al. 2009. Two-year results from a community-wide diabetes prevention intervention in a high risk indigenous community: the Ngati and Healthy project. *Diabetes Research and Clinical Practice* 85(2):220–7.
- Diabetes Prevention Program Research Group 2002. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine* 346:393–403.
- Egger G, Fisher G, Piers S, Bedford K, Morseau G, Sabasio S et al. 1999. Abdominal obesity reduction in Indigenous men. *International Journal of Obesity and Related Metabolic Disorders* 23(6):564–9.
- Gracey M, Bridge E, Martin D, Jones T, Spargo RM, Shephard M et al. 2006. An Aboriginal-driven program to prevent, control and manage nutrition-related 'lifestyle' diseases including diabetes. *Asia Pacific Journal of Clinical Nutrition* 15(2):178–88.
- Gray D & Wilkes E 2010. Reducing alcohol and other drug related harm. Produced for the Closing the Gap Clearinghouse. Cat. No. IHW 35. Canberra: Australian Institute of Health and Welfare & Melbourne: Australian Institute of Family Studies.
- Harrington M, Gibson S & Cottrell RC 2009. A review and meta-analysis of the effect of weight loss on all-cause mortality risk. *Nutrition Research Reviews* 22(1):93–108.



Ivers R 2011. Anti-tobacco programs for Aboriginal and Torres Strait Islander people 2011. Produced for the Closing the Gap Clearinghouse. Cat. No. IHW 37. Canberra: Australian Institute of Health and Welfare & Melbourne: Australian Institute of Family Studies.

Lee AJ, Bailey APV, Yarmirr D, O'Dea K & Mathews JD 1994. Survival tucker: improved diet and health indicators in an Aboriginal community. *Australian Journal of Public Health* 18(3):277–85.

Levine DM, Bone LR, Hill MN, Stallings R, Gelber AC, Barker A et al. 2003. The effectiveness of a community/academic health center partnership in decreasing the level of blood pressure in an urban African-American population. *Ethnicity and Disease* 13:354–61.

Norris SL, Zhang X, Avenell A, Gregg E, Bowman B, Schmid CH et al. 2005. Long-term effectiveness of weight-loss interventions in adults with pre-diabetes: a review. *American Journal of Preventive Medicine* 28(1):126–39.

Payne W, Reynolds M, Brown S & Fleming A 2003. Sports role models and their impact on participation in physical activity: a literature review. Melbourne: VicHealth.

Puska P 2008. The North Karelia Project: 30 years successfully preventing chronic diseases. *Diabetes Voice* 53:26–9.

Queensland Health 2005. 2005 evaluation of the Healthy Weight Program. Brisbane: Queensland Government. Viewed 24 March 2011, <<http://www.health.qld.gov.au/lightenup/documents/32894.pdf>>.

Rowley KG, Daniel M, Skinner K, Skinner M, White GA & O'Dea K 2000. Effectiveness of a community-directed 'healthy lifestyle' program in a remote Australian Aboriginal community. *Australian and New Zealand Journal of Public Health* 24(2):136–44.

Rowley KG, Su Q, Cincotta M, Skinner M, Skinner K, Pindan B et al. 2001. Improvements in circulating cholesterol, antioxidants, and homocysteine after dietary intervention in an Australian Aboriginal community. *American Journal of Clinical Nutrition* 74(4):442–8.

Swerissen H & Crisp BR 2004. The sustainability of health promotion interventions for different levels of social organization. *Health Promotion International* 19(1):123–30.

Vos T, Barker B, Begg S, Stanley L & Lopez AD 2009. Burden of disease and injury in Aboriginal and Torres Strait Islander peoples: the Indigenous health gap. *International Journal of Epidemiology* 38(2):470–7.

Yuen A, Sugeng Y, Weiland TJ & Jelinek GA 2010. Lifestyle and medication interventions for the prevention or delay of type 2 diabetes mellitus in prediabetes: a systematic review of randomised controlled trials. *Australian and New Zealand Journal of Public Health* 34(2):172–8.



## Acknowledgments

This resource sheet was produced by the Closing the Gap Clearinghouse, with extensive professional contribution provided by Dr Andrew Boyden. Dr Boyden has a background in general practice, consultancy and public health, and has a particular interest in evidence-based health policy and clinical practice. As National Director of Clinical Issues for the National Heart Foundation of Australia until early 2011, he was closely involved with the Heart Foundation's Aboriginal and Torres Strait Islander Program.

The Closing the Gap Clearinghouse staff, Board and Scientific Reference Group also provided valuable input and advice.

## Terminology

**Body mass index (BMI):** Internationally recognised standard for classifying overweight and obesity in adults. BMI is calculated by dividing the weight in kilograms by the square of the height in metres.

**Indigenous:** 'Aboriginal and Torres Strait Islander' and 'Indigenous' are used interchangeably to refer to Australian Aboriginal and/or Torres Strait Islander peoples. The Closing the Gap Clearinghouse uses the term 'Indigenous Australians' to refer to Australia's first people.

**Longitudinal:** Conducted over a long period of time, with repeated observations taken of the same subjects throughout the period, usually at regular intervals.

**Overweight/obesity:** For people aged 18 and over, a BMI of 25 or more is considered overweight, and 30 or more is obese.

## Funding

The Closing the Gap Clearinghouse is a Council of Australian Governments' initiative, jointly funded by all Australian governments. It is being delivered by the Australian Institute of Health and Welfare in collaboration with the Australian Institute of Family Studies.

## Suggested citation

Closing the Gap Clearinghouse (AIHW, AIFS) 2011. Healthy lifestyle programs for physical activity and nutrition. Produced for the Closing the Gap Clearinghouse. Canberra: Australian Institute of Health and Welfare & Melbourne: Australian Institute of Family Studies.