

## 2. Health & Physical Benefits of Cycling

### 2.1 Importance of physical activity and cycling to health

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Approximately half of all Australian adults are not meeting the modest current national recommendations that “every adult should accumulate half an hour of moderate-intensity physical activity on at least 5 days per week” (*Haskell, 2007; United States Surgeon General, 1996, Bauman 2004*).

The lack of physical activity is a major contributor to Australia’s rising obesity levels. Overall health and well being, quality of life, and reduced risk of morbidity and mortality are all dimensions of the benefits for adults achieving at least moderate-intensity physical activity on most days of the week.

There are a number of specific health and disease outcomes that are prevented by regular physical activity. The epidemiological evidence for each of the major health conditions prevented by physical activity is summarised in Table 2.1. As a form of moderate-vigorous physical activity, cycling can contribute to the multiple health benefits of physical activity.

Cycling has a number of additional benefits:

- As a low-impact form of physical activity, it appeals to people who cannot participate in high-impact activities
- As a form of active transport and recreation, it enables many people to combine physical activity with transport and recreation
- There is also evidence that the public generally prefer unstructured forms of physical activity (*Hahn & Craythorn, 1994, cited in Sallis et al, 1998*) and cycling certainly fits into this category
- It appeals to people across the age spectrum, from childhood to adults
- The promotion of ‘lifestyle’ physical activity such as walking and cycling is more cost-effective than promotion of structured exercise programs
- As a form of active transport, cycling contributes to the additional benefits associated with reduced car use (improved air quality, reduced greenhouse gas emissions, reduced noise pollution, improved community liveability and social connectedness).

In addition to the fact that cycling is beneficial to health, there is evidence that car commuting is associated with negative health outcomes. *Wennberg (2006)* reported an independent and increased risk of myocardial infarction (heart attack) in those who reported prolonged car transit time (74% increased risk) compared to physically active commuters.

‘The main sources of health-enhancing physical activities encompass normal and simple activities such as walking, cycling ...’ (*World Health Organisation, 2004, p.4*)

<b>Coronary Heart Disease</b>	Physical activity reduces the risk of coronary heart disease by around 40%, compared to those that remain inactive. Cycling may be useful in angina and other aspects of coronary heart disease as well.
<b>Stroke and Cerebro-vascular events</b>	Physical activity reduces the risks of ischaemic stroke (insufficient blood supply to the brain)
<b>High blood pressure (Hypertension)</b>	Physical activity reduces blood pressure by 3-5mm (both systolic and diastolic), with a greater effect seen from moderate intensity physical activity (more than for vigorous physical activity); this has been shown in serial meta analyses of the research base (Kelley et al, 2001a; Kelley & Kelley, 2001; Kelley et al, 2001b).
<b>Cholesterol and Lipid levels</b>	Physical activity may contribute to improved well being, and reduces anxiety and depression symptoms
<b>Overweight and Obesity</b>	Physical activity has a role in population level obesity prevention, but here the recommendation is more than the 30 minutes per day; for weight maintenance or obesity prevention, populations need to expend more energy; around 60-90 minutes of moderate physical activity per day is required (Saris et al, 2003). This assumes that dietary intake remains constant.
<b>Type 2 Diabetes</b>	Physical activity reduces the risk of developing Type 2 Diabetes in those at risk, shown through several population based prevention trials; in epidemiological studies, physical activity reduces the incidence of diabetes. In clinical studies, physical activity improves glucose uptake and insulin metabolism, providing biological mechanisms for these benefits. Similar mechanisms reduce the risk of chronic liver disease, as well as obesity, high blood pressure and elevated cholesterol levels.
<b>Falls prevention in the elderly</b>	Physical activity strengthens muscles, and improves joint stability and balance, and this reduces the risk of falls and fractures in the elderly. Physical activity could prevent up to 16% of these falls (Stephenson & Bauman, 2000), and these injuries, through fractured hips and related conditions are a very common cause of hospital admission and morbidity among older adults.
<b>Osteoporosis</b>	Physical activity improves bone deposition during adolescence, resulting in stronger bones and reduced risk of osteoporosis later in life.
<b>Colon and Breast Cancer</b>	Physical activity reduces the risks of developing colon cancer by about 40% and the development of breast cancer, especially among the post menopausal women. The amount of physical activity required may be 30-45 minutes daily, and moderate –vigorous activities are required. For cancer prevention, lifelong physical activity patterns may be important (whereas for other health benefits, recent physical activity participation is preventive). Other cancers, possibly prostate cancer, lung cancer and cancer of the uterus may also be prevented, in part, by physical activity, although evidence is less clear here.

Source: Adapted from Bauman, 2004

**Table 2.1 Potential Health Benefits of Cycling**

## 2.2 Economic benefits of cycling participation

It is well recognised that cycling offers considerable benefits to the individual, in terms of improved health, reduced transport expenses and lifestyle enhancements. Placing a value on current and potential cycling participation is challenging as there are a number of different methodologies used and the value varies depending on the profile of the person cycling in terms of their age and current physical activity levels and frequency and length of their cycling trips.

### 2.2.1 Health Benefits of Leisure Cycling

The health benefits generated by cycling are drawn from the seven key medical conditions that are considered to have a strong casual relationship with physical inactivity. Inactivity is classified as not reaching a minimum level of physical activity levels recommended for health benefits which is 30 minutes of moderate physical activity over at least 5 sessions a week. A recent study by Econtech in 2007 reported that the direct gross cost of physical inactivity to the Australian health budget in 2006/2007 was \$1.49 billion, a break down can be seen in Table 2.2.

<b>The Cost of Inactivity</b>	
Coronary Health Disease	\$371.5 million
Stroke	\$162.4 million
Type 2 diabetes	\$210.7 million
Breast cancer	\$42.2 million
Colon cancer	\$61.4 million
Depression Symptoms	\$177.3 million
Falls	\$468.7 million
<b>Total Gross Costs</b>	<b>\$1,494.4 million</b>

Source: Econtech, 2007

**Table 2.2 Costs of Inactivity Breakdown**

### 2.2.2 Benefits of Commuter Cycling

Commuter cycling has benefits which produce both a positive impact on public health, as well as the reduction in cost of transport, such as reduced air and noise pollution, congestion and climate change mitigation. Cycling as a means of transport also includes trips made to visiting friends and shops, but this trip information is not collected by the Census and therefore is not used in the calculations.

Commuter cycling offers an important opportunity for the Australian workforce to get much needed physical activity. Cycling to and from work can help counter increasingly sedentary behaviours and the negative health outcomes associated with them. In Australian cities the number of people who cycle to work between Census 2001 and 2006 has increased (rising 22% on average).

Based on the information presented in Table 2.3 and Table 2.4, the economic benefit of commuter cycling is \$144.3 million per year, with cyclists saving the economy \$63.9 million per year in reduced congestion costs and \$72.1 million in reduced health costs.

	Bicycle Commuters (sole mode trips only)			Kilometres/Year		
	2001 Census	2006 Census	% Change	2001 Census	2006 Census	Change
<b>Sydney</b>	8,684	10,175	17.2%	30,394,000	35,612,500	5,218,500
<b>Melbourne</b>	12,179	18,047	48.2%	42,626,500	63,164,500	20,538,000
<b>Brisbane</b>	6,347	7,502	18.2%	22,214,500	26,257,000	4,042,500
<b>Adelaide</b>	4,376	6,085	39.1%	15,316,000	21,297,500	5,981,500
<b>Perth</b>	5,179	6,323	22.1%	18,126,500	22,130,500	4,004,000
<b>Hobart</b>	622	810	30.2%	2,177,000	2,835,000	658,000
<b>Canberra</b>	3,093	3,763	21.7%	10,825,500	13,170,500	2,345,000
<b>Darwin</b>	1,498	1,407	-6.1%	5,243,000	4,924,500	-318,500
<b>Total</b>	41,978	54,112	28.9%	146,923,000	189,392,000	42,469,000

Source: ABS Census 2001 and 2006.

**Table 2.3 Bicycle Commuting Travel (Capital Cities)**

Item	Value per km (2006)*	Total value (2006)*	Present Value (25 years @ 6% per annum*** discount rate)*
Externalities	\$0.0599/car-km	\$9.2 million	\$127 million
Congestion	\$0.125 - \$0.666/car-km (peak)** \$0.033 - \$0.177/car-km (offpeak)** depending on city	\$63.9 million	\$909 million
Health and Fitness	\$.0376/cycle-km (mortality plus morbidity)	\$71.2 million	\$982 million
Total Capital Cities	Benefit	\$144.3 million	\$1,527 million to \$2,018 million

\* Valued at resource costs (ie net of indirect taxes – GST and Fuel Excise)

\*\* Subject to escalation of fuel cost component in line with progressive increase in real cost of petrol to \$2/litre by 2016

\*\*\* Most jurisdictions use a higher discount rate that broadly reflects the market rate of interest. However, the market rate of interest includes inflation expectations that are specifically excluded from this assessment. The Australian Transport Commission (2006a) recommends using it as the long term government bond rate, which is currently around 6%.

**Table 2.4 Benefit Analysis of Commuter Cycling**

### 2.2.3 Potential for improved road safety through the reduction in car use

Road trauma in Australia costs \$17 billion a year, this is equal to 2.3% of Australia's gross domestic product (Centre of National Research on Disability and Rehabilitation Medicine, 2006). The risk of road trauma increases as high levels of motor vehicle usage occurs. Strategies that provide non-motorised transport options are increasingly recognised as an effective road safety strategy (*Litman & Fitzroy, 2005*). Policies aimed at reducing car use typically result in around a 10% reduction in vehicle kilometres travelled which can potentially reduce road trauma costs by between \$850 million and \$1.7 billion per year (*Victoria Transport Policy Institute, 2007*).

## 2.3 Current interventions to encourage adult cycling

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A range of current interventions used to promote and encourage cycling including education/cycling skills training, multifaceted community based programs, social marketing campaigns and cycling events.

### 2.3.1 *Cycling education and skills training*

Lack of confidence and skills have been identified as barriers to cycling, particularly for people who do not currently cycle. As a counter to this, a range of cycling education/skills training programs have been set up. These programs target new and inexperienced riders, a survey highlighted that the current programs are effective in increasing skills and improving confidence, but they lack formal evaluations, effective marketing and accreditation.

In 2003 the Health *Promotion Unit of the Central Sydney Area Health Service* set up a pilot cycling proficiency training program for adults. The focus of the program was to provide practical skills and supervised training on bicycle paths and on-road. The aim of the intervention was to increase the number of people cycling, the frequency of cycling and the use of bicycles for transport. The program was designed for adults with low to moderate-level skills and confidence in cycling. From the 113 people starting the program, 72% completed at least one course and 93% took part in the pre-program and follow up interviews. Participants' satisfaction with all aspects of the course was very high and the course led to a significant increase in participants' self-reported skills and confidence in cycling (Telfer et al, 2006).

### 2.3.2 *Community based programs*

Community based cycling programs provide locally based interventions focussing on promoting cycling for health and/or transport, by offering information, incentives and/or the development of social networks that provide supportive structures to maintain behaviour change. Most community based cycling programs are delivered in a group setting at a community or workplace level, although some programs do offer individualised programs focusing on individual behaviour change.

In 2000/01 *Cycle 100* was developed with the objective of providing incentives for people to replace some of their car trips to work by bicycle, for health and environmental reasons. The trial program involved 100 people who lived between 10 and 15km from their workplace. Participants were provided with a mountain bike equipped with lights, lock, cycle computer and helmet. As a result of the program participants replaced over 12,000km of car commuting with cycling. The evaluation demonstrated that new riders gained significant health improvements as a result of the program (Marshall, 2001).

*Cycle 100* proved very popular, with 160 participants signing up and 90% completing the program. Each participant underwent a medical examination before and after the program and the results showed significant improvements in both physiological and mental health. The program is intended to continue to provide benefits well beyond the 6-month period considered indicative of sustained behaviour change (Orleans, 2000).

### **2.3.3 Social Marketing**

Social marketing campaigns have been designed to motivate people to be more active through cycling, by raising the awareness of the benefits of bicycle riding. The marketing reaches a large audience through large scale community wide campaigns via media including television, radio, newspapers, mailings and events.

The Western Australian Government developed a cycling promotion campaign, *Cycle Instead*, using a social marketing approach. The campaign consisted of two 30 second television commercials reflecting the main motivators of cycling fitness for women, and spending time with children for men. The commercials were shown for four weeks with modest exposure levels, run in conjunction with a range of supporting activities and media including; community events, *Cycle Instead* merchandise and a brochure about the benefits of cycling with frequently asked questions.

### **2.3.4 Cycling Events**

Cycling events provide a range of opportunities for people of most ages and fitness levels to be physically active. A wide variety of cycling events are available to the Australian public from small community based events with less than 100 participants to large events with more than 14,000 riders. Event organisers continue to offer an increasingly large range of distances to cater for a variety of skill and fitness levels.

The *Ride to Work Day* event was designed to attract people travelling to work to ride a bicycle as their mode of transport, this event has become Australia's largest cycling event and has been effective in encouraging people to cycle on the day but also maintain their behaviour after the event. The *Ride to Work Day* event encouraged individual workplace coordinators to strengthen their capacity to provide ongoing support, information and incentives for their colleagues. This helps maintain the cycling to work behaviour after the event. In both 2004 and 2006 27% of first time *Ride to Work Day* participants were still riding 5 months later.

### **2.3.5 Cycle to Work Scheme (UK)**

Cycle to Work is a UK government tax incentive aimed at encouraging employees to cycle to work, thereby reducing air pollution and improving their general health. The scheme is already in operation in the UK and allows employees to benefit from long term loans of a bike and safety equipment completely tax free.

The scheme would be open to any employer and all employees can take part. Typical savings are between 30% and 50% on the total purchase price; but the actual amount depends on your personal tax and the way the company runs the scheme. Additional information can be found at [www.bikeforall.net](http://www.bikeforall.net)

### **2.3.6 Bicycle Commuter Pre-Tax Benefit (USA)**

The Bicycle Commuter Act (H.R.807,S.2635), which was passed as part of this year's US\$700Billion bailout, will give bike commuters a pre-tax benefit. Under the new act, employees who ride their bicycles to work will receive a pre-tax benefit of US\$20 per month, which they can use to pay for new bikes, storage, maintenance or repairs.

The hope is that this will motivate residents to ride their bicycles to work instead of driving cars. The act aims to raise awareness about pollution and to serve as an incentive for people to reduce pollution.