April 2006

To: Secretary, Health Select Committee, Parliament. Inquiry into Obesity and Type Two Diabetes in New Zealand

Submission from Living Streets Aotearoa

Introduction

Thank you for the opportunity to make a submission to the Health Committee. Living Streets Aotearoa is a network of groups dedicated to promoting walking and its benefits. We are committed to seeing more people walking more often, and enjoying public places.
This submission was prepared on behalf of Living Streets Aotearoa[1] by a national committee member, Associate Professor Ralph Chapman of Victoria University of Wellington,[2] with the assistance of input from a number of LSA members.

This submission focuses on two things:

- Whether physical activity – especially walking and cycling – does in fact extend life, reduce the risk of obesity and associated illnesses, improves fitness and brain function, and generally make for a healthier human being.
- What is the influence of the urban environment on physical activity.

A large opportunity for most people to undertake physical activity presents itself when making transport decisions. Moreover, transport choices are part of people's daily lives. In this submission we focus mainly on **transport-related physical activity (TPA),** although we also

[1] Living Streets Aotearoa http://www.livingstreets.org.nz
Contact names and address: Liz Thomas, Executive Director, 472 8280; PO Box 25-424, Wellington; Celia Wade-Brown, President, 383 6691
[2] Director, Graduate Environmental Studies Programme, VUW. Contact address: Room Cotton 212, Victoria University of Wellington; Tel 463 6153 or 021 725 742

cover some evidence from a study of the 'Green Prescription,' which includes other forms of physical activity.[3]

The wider picture: health and transport choices and determinants

In the past, **health** choices and health resource allocation decisions have often been framed narrowly, focusing more on individual actions rather than the environments in which people live. This has been changing in recent years with more comprehensive models of the causation of health and well-being (e.g. National Health Committee, 1998; Ministry of Health, 2003; Howden-Chapman and Chapman, 2004). Communities are increasingly aware of the risks of what past Heart Foundation head Dr Boyd Swinburn called '**obesogenic** environments', that is, local conditions discouraging physical activity (Egger and Swinburn, 1997).

Similarly, many **transport and urban design** choices and decisions have in the past been viewed mainly in terms of time savings and accident risks. But that represents a limited, economically oriented view; a wider canvas extends to health effects, particularly the benefits of physical activity or, putting it another way, the costs of an absence of physical activity.

The wider canvas now also encompasses effects on social cohesion, and environmental effects, such as impacts of ambient air emissions and atmospheric (carbon dioxide) emissions. In both the short and longer term, air quality and the state of the atmosphere have major effects on people's health, including their respiratory health. These issues are not considered in this submission, but we note that where policy measures can work to promote physical activity, they often **also** promote environmental and social outcomes at the same time. This is an example of the holistic analysis suggested as part of a "sustainable development" approach (e.g. Department of Prime Minister and Cabinet, 2003).

In assessing transport options in New Zealand, official decision makers are in fact now **required** to take into account effects which extend to public health. For example, the Transport Strategy emphasises the importance, for transport decisions, of benefits to the public health, and in order to assess this properly, officials need to consider mode share effects, including effects on numbers of people walking and cycling (Land Transport Management Act 2003; New Zealand Transport Strategy 2002; Getting There – On Foot, By Cycle 2005).[4]

[3] We note in passing that some **leisure**-time physical activity such as shopping activity, may also be influenced by the same factors, such as urban design and a conducive environment, that influence TPA. However, other leisure-time physical activity, such as attending a gym, appear largely unrelated to urban design or other influences on TPA.

Some numbers on 'active travel' choices

Walking and cycling are often called 'active travel' choices. Some basic parameters of the context for active travel in New Zealand cities are as follows.

First, over **21% of all trips are 'active travel' (walking and cycling) trips**, and this includes 2.5% of all trips which are on public transport and thus involve active travel.[5] Around 19% of all trips (1.1 billion per year) are by foot and 2% of all trips (111 million per year) are by cycle. For young and old, however, walking is considerably more important (25% and 27% of all trips respectively). Between 1990 and 1998 walking trips dropped from 21 to 19% of household travel trips, and 'walk only' journeys dropped from 36 to 26% of all school journeys. Cycling trips among 5–20 year olds dropped by around 50%. Thus, the trend has been away from walking and cycling, although whether this trend persists as oil prices rise remains to be seen. Early signs suggest a recent move back towards public transport and active travel.

Laird et al (2001) (see **Annex 1**) suggest that about 10% of New Zealand journeys **to work** are by cycle or walking, compared to a lower proportion in the US and Australia (around 5%) but a significantly higher proportion in Europe and Asia (close to 20%).[6] So there is potential to adjust behaviour, or redesign our cities and transport systems, in such a way as to lift current levels of walking and cycling, even if this takes time.

Furthermore, in Australian, New Zealand and American cities, many people currently have little choice but to use a car, due to land use patterns. Sustainable options are often too difficult to provide other than by an irregular bus or by long bike or walk trips. Either way, the one hour travel budget noted by Marchetti (1994) is threatened unless a car is used (Newman, Bachels and Chapman, 2005). Again, however, improved public transport – which typically involves walking – and incremental changes in urban design have the potential to make a difference to some of those with currently restricted choices.

Benefits of transport-related physical activity

We focus here on the net health benefits to walkers and cyclists from transport-related physical activity. Since such activity has some risks, these need to be taken into account also. Net potential health benefits for the nation as a whole are:

---

[4] Office of Minister of Transport, 2002; Hodgson, 2005.
[5] Land Transport Safety Authority, 2000; cited in Hodgson, 2005, p56. Data pertain to 1997/98.
[6] Cycle friendly cities such as Cambridge in England have cycle trips being just less than 30% of total city trips while cities in Holland and Germany have values as high as 50% (Sinclair Knight Merz Pty Ltd, 1998; p.2)

- Reduced long-term risk of cardio-vascular disease, diabetes, etc
- **Minus** the increased risk of walking and cycling accidents
- Net savings in health-care costs
- Fewer days lost from work or other productive activities
- Enhanced 'quality of life.'

There is considerable evidence emerging on the benefits of physical activity, such as walking and cycling, for health (e.g. Prentice and Jebb, 1995; World Heath Organization,1999; UK Strategy Unit, 2003; US Department of Health and Human Services, 2003; International Agency for Research on Cancer, 2002). Benefits include a reduced risk of cardio-vascular disease, colon cancer, and type 2 diabetes. A recent Canadian study (Katzmarzyk et al, 2000) concluded that around 20% of type 2 diabetes cases (and 36% of coronary heart disease cases) could be eliminated if those who are sedentary became physically active. Moreover, they estimated that around 2.5% of total direct health care costs in Canada were attributable to physical inactivity.

Similarly, Carlos Dora, an epidemiological adviser to the World Health Organization on transport and health, summarises the situation as follows:

> *"Cycling or walking can bring major health benefits - half an hour a day can halve the risk of developing heart disease. This is equivalent to the effect of not smoking and is valid for most of the population, who do very little physical activity. Even if spread over two or three shorter episodes, this amount of activity can also halve the risk of developing diabetes, reduce blood pressure (equivalent to the effect of taking antihypertensive drugs), and improve functional capacity. Over half of the daily trips that people make are short and provide an opportunity for physical activity that is free and accessible."*[7]

More specifically, Dora and Phillips (2000), in a WHO document, describe the benefits as follows:

> *"The health benefits of regular physical activity can be summarized as:*
>
> - *50% reduction in the risk of developing coronary heart disease (i.e. a similar effect to not smoking)*
> - ***50% reduction in the risk of developing adult diabetes***
> - ***50% reduction in the risk of becoming obese***
> - *30% reduction in the risk of developing hypertension*
> - *10/8 mm Hg decline in blood pressure in hypertensive subjects (i.e. a similar effect to that obtained from antihypertensive drugs).*

[7] Dora (1999) p1686

> *Other effects include reduced osteoporosis, relief of symptoms of depression and anxiety, and the prevention of falls in the elderly. A total of 30 minutes' brisk walking or cycling on most days of the week, even if carried out in 10–15 minute episodes, is effective in providing these health benefits. The average trip by walking in Europe is about 1.5 km and the average cycling trip is about 3.5 km, each taking about 15 minutes to make: two such trips each day would be enough to provide the recommended "daily dose" of physical activity."* (p67; emphasis added)

A recent Shanghai study by Hou et al (2004) examined the effects of physical activity, particularly commuting physical activity, on colon cancer risk and found that risk was significantly reduced among subjects with high commuting physical activity. Given New Zealand's high colon cancer rate, this is a significant finding.

Probably the best documented and graphic benefit of physical activity is in terms of overweight and obesity. Professor John Pucher, at Rutgers University in the USA, with colleagues Dijkstra and Buehler, have examined evidence from a number of countries, as summarised in **Figure 1** below. This cross-sectional evidence strongly, although not conclusively, indicates that countries and cities that foster active journeys (walking and cycling) are likely to have lower levels of overweight and obesity.

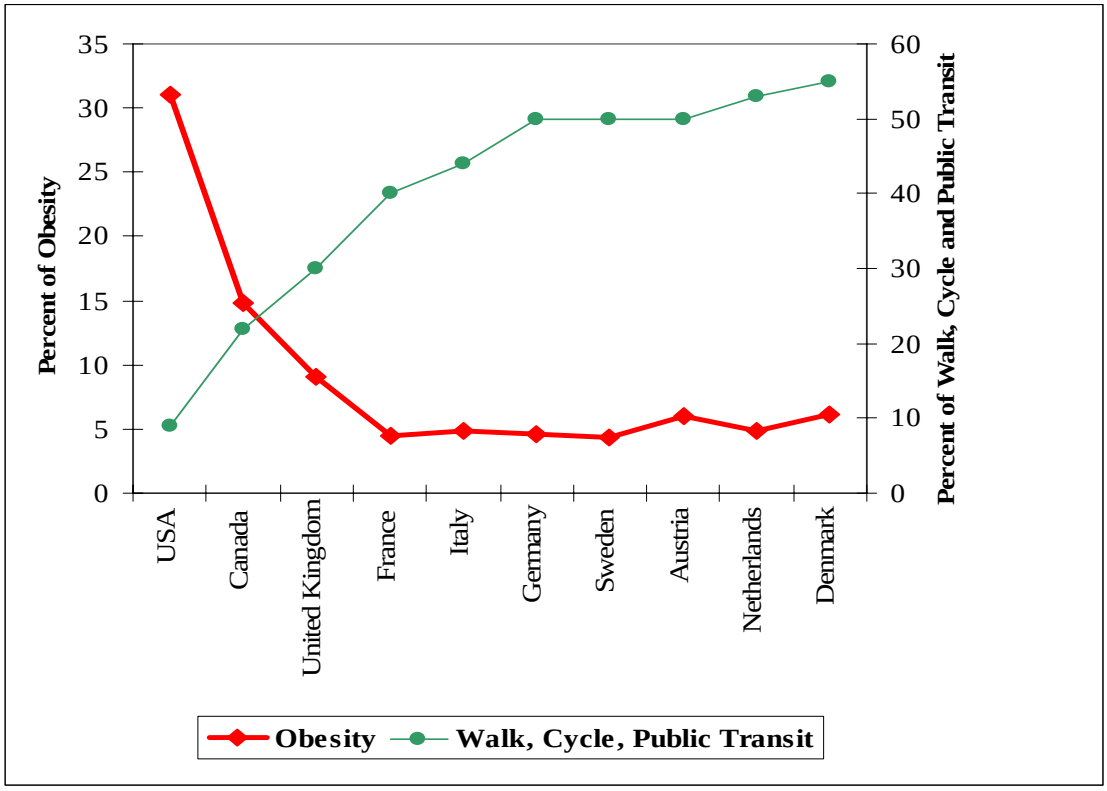
Insights from the "Green Prescription" study

Some insight into the benefits of actions to encourage walking and cycling in New Zealand come from the results of implementing the "Green Prescription". Under this scheme GPs suggest a course of exercise to patients rather than, or additional to, more usual drugs and other treatments. Patients are encouraged to register with a Regional Sports Trust, which provides advice and moral support by telephone. The objective is to increase exercise levels to a minimum of 2.5 hours/week of moderate exercise. The exercise can include such activities as walking, swimming, gym work, and cycling.

Dr Raina Elley and colleagues carried out in 2001/02 a Randomised Controlled Trial of the consequences of the Green Prescription for a sample of general practices in the Waikato, tracking patients for 12 months. The results, reported in a British Medical Journal paper (Elley et al. 2003) are that around a net 9 percent of patients achieved the target 2.5 hours as a result of the intervention. Other more specific 'health gains' were also achieved, although not all at a statistically significant level. Information was also obtained on General Practice costs, costs to the patient of exercise activities, and use of health-care services and loss of work-days over the 12

months. A subsequent New Zealand Medical Journal paper reported a cost-effectiveness evaluation of the programme (Elley et al. 2004).

Figure1: Cross-country evidence on the relationship between obesity, and walking, cycling and transit use.



Source: Pucher and Dijkstra (2003)

O'Dea (2004), a health economist, carried out an economic evaluation of the Green Prescription, using Elley's data, for Pharmac, New Zealand's pharmaceuticals funding authority, which has responsibility for the funding of the Green Prescription programme. This evaluation calculated the standard outcome measure used in evaluation of pharmaceuticals, the $ cost per Quality-Adjusted Life-Year ($ per QALY). It involved calculation of the number of hospital admissions and deaths caused by 'physical inactivity', and hence the number prevented as a result of a given number of persons becoming instead 'physically active' (moderate physical activity for 2.5 hours/week or more). This gave an estimate of the number of Life-Years Gained (LYG) and also the number of Quality-Adjusted Life-Years gained.

The results are given in the table reproduced below - in terms of $ cost per DALY (Disability-Adjusted Life-Year) rather than per QALY, but the difference is not important. At a 5% discount rate, the cost of a DALY was around $1000.

Table 7.2 Cost-Utility Analyses - Green Prescription

Including averted health-care costs

New Exercise Regime Fully maintained

Discount Rate	Sum of discounted costs. $	Expected DALY reduction		Cost per DALY reduction. $		
		Males	Females	Males	Females	Average
0%	-$521	1.61	1.10	-$324	-$475	-$400
3%	$250	0.97	0.65	$259	$387	$323
5%	$564	0.71	0.47	$793	$1,196	$995
7%	$784	0.54	0.35	$1,460	$2,226	$1,843
10%	$1,005	0.37	0.24	$2,727	$4,229	$3,478

Such costs per DALY as shown in the table are acceptably low in health sector terms, and hence Pharmac's funding of the scheme has continued. The full report also included sensitivity analyses, including the effects of not all persons keeping up their increased level of exercise.

These results for the Green Prescription apply to all forms of exercise, including walking or cycling. It should be remarked that the typical person adopting the Green Prescription is in their 50s or older, overweight, and more often female than male. It is in general cohorts of persons in this age-group for whom one would expect the greatest health gains.

Risks

Some forms of transport-related physical activity, namely cycling, do have some **risks**, and these put many people off. Many people consider the New Zealand urban environment, for example, too unsafe for cycling, except on bike paths.

In 1992, the British Medical Association notably concluded in the book *Cycling Towards Health and Safety* that the overall health benefits of cycling **well outweigh** any risks from pollution or accident. Carnall (2000) makes a similar point – that

> *"The most important deterrent that non-cyclists express is fear of motor traffic. The fear is exaggerated in comparison with the statistical likelihood of injury, but lowering the speed limit in towns to 20 mph would be a straightforward way of reducing it."*

Risk needs to be treated cautiously. In practice, people are often quite sensitive to perceived

accident risk and to perceived exposure to pollution.[8] Some people may feel they can avoid or minimise the risk of pollution and forgoing exercise but may prefer not to incur an accident risk. Dora's study is relevant. It notes:

> *"The risk of accidents is an important deterrent to cycling. However, life table analyses of the risk of accidents and the cardiovascular benefits of cycling for people living in the United Kingdom showed a net benefit of several fold for this exercise.6 But this benefit would not hold if the risk of road accidents was much greater. Safe conditions for walking and cycling are therefore part and parcel of their promotion."*[9]

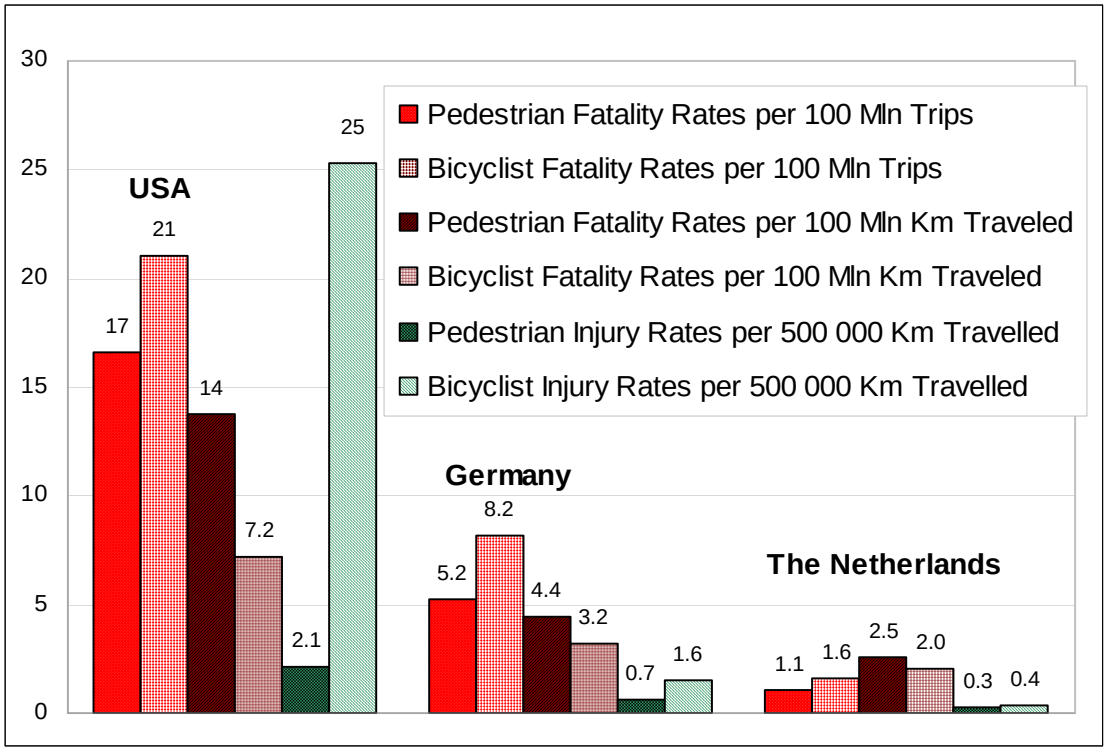
Comparing risks for cycling with those of **driving**, the European Commission's Directorate-General for the Environment (2000) shows that the total risk of **accidents per million km**, adjusted to exclude motorway driving, is almost identical for motorists and cyclists (p31). These data also show an **inverse** relationship between bicycle **use** and casualties. Countries in Europe with the highest level of cycling km per person per day have the lowest number of cyclist casualties and deaths per km. (p30).

Accident rates vary hugely from country to country, and the less common cycling is, the more risky it is. Pucher and Dijkstra (2003) provide a useful graphic portrayal of this (**Figure 2**).

New Zealand data are not readily comparable with those of Pucher and Dijkstra. But they suggest the risk of injury or death from a cycling crash involving a motor vehicle fell slightly between 1989/90 and 1997/98 (27.4 per million hours spent cycling to 26.4 per million hours spent cycling).[10] New Zealand's overall cycle casualty rate in reported motor vehicle crashes on New Zealand roads decreased from 37.5 per 100,000 population in 1970 to 20.0 per 100,000 population in 2002. This figure has remained relatively stable since 1996 and may mirror the decline in total number of hours cycled, and therefore exposure to risk of injury. The apparent decline and subsequent stability of the accident rate is welcome in view of Dora's comment that the net benefit of cycling would not hold if the risk of road accidents was much greater.

[8] A 1995 study of air pollution conducted as part of a European Commission exercise, looked at pollutant concentrations breathed in by cyclists and motorists in one hour during the same journey at the same time. It found that motorists are subject to higher pollution levels. Despite the fact that a cyclist breathes 2-3 times as much air as the motorist due to physical exertion, the motorist breathed about 60% more carbon monoxide (cyclist: 2670 ug/m3, motorist: 6730 ug/m3). Other pollutants all showed significantly lower levels in the cyclists. Physical exercise is also shown to assist in resisting the effects of air pollution (Van Wijen et al 1995).
[9] Dora (1999) p1686
[10] LTSA (2000)

Figure 2: A comparison across three countries: Fatality Rates and Non-Fatal Injury Rates in the USA, Germany and The Netherlands, 2000.



Source: Pucher and Dijkstra (2003)

However, generally, cyclists are over-represented in New Zealand's road injury and death statistics given the amount of time they spend cycling when compared to the injury rates identified for motor vehicle users.[11] One comforting conclusion is that these levels represent a very low casualty rate **per hour of cycling**: it can be viewed as one casualty per 37,000 hours of cycling (or several **lifetimes** of cycling for even avid cyclists). Nevertheless, the accident and injury rates clearly deter many people from taking up cycling.

The balance of benefit and risk

People balance benefit and costs, with costs viewed as including risk, when considering travel choices. We cannot measure individual risk-taking directly, and risk and reward are complex (reward ranging from adrenalin to dollars, and accident losses ranging from dents to death) (Adams, 1999). These mean that cost-benefit analysis at best reflects an approximation of

[11] HSC

average behaviours. Nevertheless, in crude terms, how do the benefits and risks of cycling compare? (We focus only on cycling, since the risks of walking are so negligible)

A study in Copenhagen over 15 years involving 30,000 people found that cycling to work (an average of 3 hours cycling per week) **lowered** risk of mortality by about 40 per cent, and found that older people gained even more from physical activity than younger people (Anderson, 2000).

In some cities in New Zealand, e.g. Wellington, safety is a real issue, and one has to weigh relative risks. We don't (yet) have the advantage of the **protection-in-numbers** effect. How strong is this effect? As noted above, countries in Europe with the highest levels of cycling also have the lowest number of cyclist casualties and deaths per km (ECMT, 2004). Jacobsen studied 68 Californian cities with varying rates of walking and cycling and concluded that there is a roughly inverse relationship between the journey-to-work share of walking and cycling, and the relative risk of doing so. Cities with the biggest share of active commuting had the lowest risk and vice versa.[12] His evidence suggests:

- Where, or when, more people walk or bicycle, the less likely any of them are to be injured by motorists. There is safety in numbers.
- Motorist behaviour evidently largely controls the likelihood of collisions with people walking and bicycling.
- Comparison of pedestrian and cyclist collision frequencies between communities and over time periods need to reflect the amount of walking and cycling.
- Efforts to enhance pedestrian and cyclist safety, including traffic engineering and legal policies, need to be examined for their ability to modify motorist behavior.
- Policies that increase walking and bicycling appear to be an effective route to improving the safety of people walking and bicycling.

Local studies and action

It is beyond the scope of this paper to detail the best methods for increasing walking and cycling as everyday forms of transport-related physical activity. Nevertheless, we note that central and local government have taken significant steps towards improving the environment for transport-related physical activity in recent years. Some major steps, including development and the start of implementation of the New Zealand Walking and Cycling Strategy, have been mentioned. Its

[12] Jacobsen (2003)

implementation in our view needs to be **accelerated** and given a sense of urgency, for a number of reasons including the health reasons discussed in this paper.

The critical primary health advantage of active travel (cycling and walking) is that it avoids the need to specifically undertake exercise separately from the daily routine of shopping, going to school, getting to work, and so on. This is potentially highly advantageous for those most at risk from a lack of exercise: the 39 per cent or so of New Zealanders considered 'inactive' by the standard definition. Introducing relatively easily-assimilated activity into this part of the population should have definite health and economic benefits, as exemplified by the analysis of the Green Prescription above.

Increasing the numbers of New Zealanders cycling will initially expose some participants to a greater accident risk. However, with the shift, in the past three years or so to improving on- and off-road cycle facilities, and the first steps to instituting lower speed limits in some urban zones, it is clear that risks can be moderated. Further risk reduction measures are possible. A significant contribution can also be made by improvements in such things as road user education. This is likely to affect both cyclist and pedestrian numbers. The aim is to reduce risk exposure and increase walking comfort, hence increasing walking and cycling rates. If a critical mass is reached, the safety-in-numbers effect for cyclists should also further reduce risks.

Urban design

Over 80% of New Zealanders live in urban areas. As noted in Chapman (2005), urban design is important, but the relationship between urban design and walking and cycling outcomes, and hence health outcomes, is not entirely straightforward. Scientific knowledge in this area is developing rapidly, with the convergence of the two fields of public health and urban design.[13]

Nevertheless, there is enough evidence available to draw some reasonably firm conclusions:

- A number of urban design characteristics influence physical activity levels. These include street connectivity, the extent of mixing of land use, density/compactness, and local neighbourhood quality including features such as green space (Saelens, Sallis, Frank, 2003; McIndoe, Chapman et al, 2005a and 2005b)
- For example, Pucher and Dijkstra (2003) note that if a neighbourhood has greater **connectivity**, walking and cycling is encouraged; conversely, the separation of

[13] As the eminent American planner Reid Ewing (2005) has put it, the two fields were barely aware of each other 10 years ago, were engaging five years ago, and are now headed toward marriage.

residential from commercial land uses increases trip distances and makes the car a necessity. Suburban cul-de-sacs further discourage walking and cycling by making trips circuitous and excessively long.

- A US study found that each quartile increase in the degree of land-use **mixing** was associated with a 12.2% reduction in the odds of being obese across gender and ethnicity classes (Frank, Andresen and Schmid, 2004)
- Both neighbourhood and individual characteristics are significant predictors of how individuals **perceive** physical activity opportunities in their neighbourhood (Boslaugh et al, 2004)
- The built environment influences weight management by affecting both food intake and energy expenditure. Communities characterised by less-dense development ('**sprawl'**) are associated with more vehicle travel and less walking and biking than are more densely developed communities (Dearry, 2004; Frank and Pivo 1995).
- After controlling for individual differences, those living in sprawling areas are more likely to walk less in their leisure time, weigh more, and have a greater prevalence of hypertension than those living in more compact places (Ewing et al. 2003)
- The influence of increasing density, for example, may be non-linear – i.e. felt mainly "when a certain critical mass of people and destinations is reached. At this point, synergistic effects may begin to occur, wherein transit becomes more viable, walking and cycling are feasible, and driving may become much more expensive due to the cost of parking and other factors." (Frank et al, 2003, p148).
- Increased **time** required for utilitarian vehicular travel may reduce the amount of time people may be willing to walk or bike. In a US study, "each additional 30 minutes in a car is associated with a 3% increase in the odds of being obese, while each additional kilometer walked per day is associated with a 4.8% reduction in these odds. Therefore, the most effective environmental interventions will increase the costs of sedentary transportation while reducing the costs of active forms of transportation. An example of one such strategy would be a host of traffic calming techniques that make it safer and more pleasant to walk by reducing the speed of cars, and thus the convenience and utility of this sedentary form of travel. Another obvious intervention would be raising motor fuel taxes and allocating the proceeds to improvements in pedestrian, biking, and public transportation infrastructure and services." (Frank 2004, p148).

There is much more evidence available along these lines, but the overall picture is clear. Despite Frank's recommendations above, identifying cost-effective policies and measures to encourage more walking and cycling in New Zealand is challenging, especially because, for the New Zealand context, less is known about the determinants of transport-related physical activity.

Nevertheless, it is unlikely that councils and government would go far wrong if they took the sort of approach summarised by Pucher and Dijkstra (2003):

> "…*better facilities for walking and cycling; traffic calming of residential neighborhoods; urban design sensitive to the needs of non-motorists; restrictions on motor vehicle use in cities; rigorous traffic education of both motorists and non-motorists; and strict enforcement of traffic regulations protecting pedestrians and bicyclists. "*

Coordinated action across local authorities is also an important strategic element. The need to create usable interlinked cycling and walking networks is now a recognized part of increasing numbers of walking and cycling strategies.

Conclusions

> *"A start to encourage regular physical activity would be, for example, to turn cities and towns into safe places for pedestrians, cyclists, and children. If walking, cycling, and playing outside were incorporated into everyday activity, the recommended targets of 30 minutes physical activity per day for adults and 60 minutes for children could be achieved easily by many."* - The Lancet [editorial] (2004)

An increase in numbers of people walking and cycling will have demonstrable benefits for the health and general well-being of walkers and cyclists, as well as other road-users, the environment and the community.

As Professor John Pucher and Dr Lewis Dijkstra have argued,

> "*Repeated waves of fad diets, rising memberships in health clubs, exercise equipment in more homes, diet pills, and liposuction have all been total failures in fighting the current obesity epidemic. Why not try integrating walking and cycling into …daily travel routines…? That clearly would be the cheapest, most reliable, and most practical way to ensure adequate levels of physical exercise."*

Different groups of potential walkers and cyclists will be involved as councils work to enhance the attractions of our urban environments for walking and cycling. The most substantial immediate health gains would result from an increase in walking and cycling amongst older and physically 'inactive' persons, such as those suitable for the Green Prescription programme. However if younger groups adopted and maintained the cycling and walking habit, instead of reverting to car dependence, such health gains would eventually, of course, accrue to them also.

Because safety is important for cycling, active measures to promote cycling safety are vital. While at least one report (BMA, 1992) assesses the cardiovascular benefits of cycling to out-strip the mortality risks from accidents, as Dora (1999) notes, “Safe conditions for walking and cycling are therefore part and parcel of their promotion.” Moreover, if risk exposure is reduced as part of the current policies aimed at encouraging cycling, cycling rates could increase and, if critical mass is reached, lead to the safety-in-numbers effect seen in a number of European countries, further encouraging the expansion of cycling, to the general benefit.

While risk exposure is not the issue with walking, there are many actions that could increase the attractiveness of the walking environment and thus increase rates of walking. We consider that the social returns, in health gains and in terms of related social and environmental outcomes, to such investments would be substantial.

Appearing before the Committee

Living Streets Aotearoa representatives would appreciate the opportunity to appear before the Committee, and speak in person.

Contact names and address:

- Liz Thomas, LSA Executive Director, PO Box 25-424, Wellington; Tel 472 8280;
- Celia Wade-Brown, LSA President, Tel 938 6691
- Associate Professor Ralph Chapman, LSA National committee member;
  Director, Environmental Studies Graduate Programme, Cotton 212, Victoria University of Wellington; Tel 463 6153 or 021 725 742

Annex 1 Data on transport patterns in New Zealand and other cities

Cities	Vehicle Use Pass-km/cap	Pub. Transit Trips/cap	% Walk/Bike J to Work	Average Speed Traffic Kph	Average Speed Transit Kph	Density People/ha
Auckland	8444	41	7.5	48	28	18
Christchurch	8115	28	15.2	47	18	16
Wellington	7941	77	10.6	47	36	23
Average NZ	**8166**	**49**	**11.1**	**47**	**29**	**19**
Australian Cities	10797	92	5.1	46	31	12
US Cities	16045	63	4.6	51	28	14
European Cities	6601	318	18.4	36	37	50
Wealthy Asian Cities	2386	496	20.3	28	31	152
Developing Asian Cities	2965	334	18.4	24	17	166

Source: Laird et al 2001.

References

Adams, J (1999) “Cars, Cholera and Cows.” The Management of Risk and Uncertainty. **Policy Analysis. 335.**

Anderson, L (2000) “All-Cause Mortality Associated With Physical Activity During Leisure Time, Work, Sports and Cycling to Work” **Archives of Internal Medicine Vol 160** No. 11 June 12. http://archinte.ama-assn.org/issues/v160n11/full/ioi90593.html

British Medical Association (1992) **Cycling Towards Health and Safety.** Oxford University Press: Oxford. http://www.bma.org.uk/ap.nsf/Content/LIBCycling?OpenDocument&Highlight=2,cycling

Carnall D. (2000) “Cycling and health promotion.” **BMJ**: **320**: 888. http://bmj.bmjjournals.com/cgi/content/full/320/7239/888?ijkey=84be52cf2721f9a022379dd709914a38aaa38e76&keytype2=tf_ipsecsha

Chapman, R (2005) “Urban design and physical activity – a context for cycling.” Paper presented at the New Zealand Cycling Conference 2005.

Chapman, R., Knight, S. and O’Dea, D. (2005) “Cycling for Health” (Guest editorial), **PHA News.** Wellington: New Zealand Public Health Association of New Zealand. June.

Department of the Prime Minister and Cabinet (2003) **Sustainable Development for New Zealand. Programme of Action.** Wellington: DPMC. http://www.beehive.govt.nz/hobbs/30199-med-susineddevelopm.pdf

Dora, C. (1999) “A different route to health: implications of transport policies.” **BMJ, 318**: pp1686-1689. http://bmj.bmjjournals.com/cgi/content/full/318/7199/1686?ijkey=b8fe5303e3d94991b959e3c2e2402c138b0bf2c4&keytype2=tf_ipsecsha

Dora, C. & Phillips, M. (eds). (2000). **Transport, environment and health**. WHO Regional Publications, European Series, No. 89. Copenhagen: World Health Organization. http://www.who.dk/document/e72015.pdf

ECMT [European Conference of Ministers of Transport] (2004) National Policies to Promote Cycling. http://213.253.134.29/oecd/pdfs/browseit/7504101E.PDF (read only)

Egger, G and Swinburn, B (1997) “An "ecological" approach to the obesity pandemic” **BMJ**, **315**: pp477-480. http://bmj.bmjjournals.com/cgi/content/full/315/7106/477

Elley, C., Kerse, N., Arroll, B., Robinson, E. (2003) “Effectiveness of counselling patients on physical activity in general practice: cluster randomised controlled trial.” **BMJ 326**: p793

Elley, C., Kerse N., Arroll, B., Swinburn, B., Ashton, T., and Robinson, E. (2004) “Cost-Effectiveness of Physical Activity Counselling in General Practice.” **NZMJ 117**, No 1207

Frank, L., Engelke, P., and Schmid, T. (2003) **Health and community design: The impact of the built environment on physical activity.** Washington: Island Press.

Hodgson, P. (Hon.) (2002) **Getting there – on foot, by cycle. A strategy to advance walking and cycling in New Zealand transport.** Wellington: Ministry of Transport. February 2005

Hou, L et al (2004) “Commuting Physical Activity and Risk of Colon Cancer in Shanghai, China**.” American Journal of Epidemiology 2004 160**(9): pp860-867 http://aje.oupjournals.org/cgi/content/abstract/160/9/860

Howden-Chapman, P. and Chapman, R. (2004) **Economic Development and Health Policy** Report to the Public Health Advisory Committee, National Health Committee. Background report prepared for the Public Health Advisory Committee. February. http://www.nhc.govt.nz/phac/awayforward.htm

International Agency for Research on Cancer (IARC). **Weight control and physical activity** (IARC Handbooks of Cancer Prevention). Lyon: IARC Press, 2002 http://www.iarc.fr/IARCPress/general/prev.pdf

Jacobsen, P. (2003) “Safety in numbers: more walkers and bicyclists, safer walking and bicycling” **Injury Prevention, 9**: pp205-209 http://ip.bmjjournals.com/cgi/content/full/9/3/205

Katzmarzyk, P., Gledhill, N. and Shephard, J. (2000) “The economic burden of physical inactivity in Canada”, **Canadian Medical Association Journal, 163** (11), pp.1435-40

Kjellstrom, T. and Hill, S. (2002) **New Zealand Evidence for Health Impacts of Transport.** A background paper prepared for the Public Health Advisory Committee. Wellington: National Health Committee

Laird, P., Newman, P., Bachels, M., Kenworthy, J. (2001) **Back on Track: Rethinking Australian and New Zealand Transport Policy,** Sydney: UNSW Press

Lancet, The (2004) [Editorial] **The Lancet 363,** p745. 6 March. www.thelancet.com

McIndoe, G., Chapman, R., McDonald, C., Holden, G., Howden-Chapman, P., Bray Sharpin, A. (2005a) *The Value of Urban Design. The economic, environmental and social benefits of urban design,* Wellington: Ministry for the Environment, 85pp

McIndoe, G., Chapman, R., McDonald, C., Holden, G., Howden-Chapman, P., Bray Sharpin, A. (2005b) *Summary of The Value of Urban Design. The economic, environmental and social benefits of urban design.* Wellington: Ministry for the Environment, 28pp. http://www.mfe.govt.nz/issues/urban/design-protocol/design-value.html

Marchetti, C. (1994) “Anthropological invariants in travel behaviour” **Technological Forecasting and Social Change, 47**(1): 75-88.

Maunsell, Pinnacle Research and Booz Allen Hamilton (2004) **Travel Behaviour Change Evaluation Procedures.** Technical Report for Transfund New Zealand/EECA. Melbourne: Maunsell Australia Ltd.

Ministry of Health (2003) **Healthy Eating – Healthy Action. A strategic framework 2003.** Wellington: MOH. http://www.moh.govt.nz/moh.nsf/ea6005dc347e7bd44c2566a40079ae6f/6088a42cfaa9ac6fcc256ce0000dae66/$FILE/HEHAStrategicFramework.pdf

Ministry for the Environment (2005) **New Zealand Urban Design Protocol.** Wellington: MfE

Ministry of Transport. (2005) **Getting there – on foot, by cycle.** Wellington: MOT

National Health Committee (1998) **The Social, Cultural and Economic Determinants of Health in New Zealand: Action to Improve Health.** Wellington: National Health Committee. http://www.nhc.govt.nz/publications/he-social.htm

Newman, P., Bachels, M. and Chapman, R. (2005) "Sustainable transport for sustainable cities: policy implications for managing development in New Zealand cities." **Public Sector**. December

O'Dea, D. (2004) **Economic evaluation of the 'Green Prescription' programme.** Report to PHARMAC.

Office of the Minister of Transport (2002) **New Zealand Transport Strategy.** Wellington: Office of the Minister of Transport. http://www.beehive.govt.nz/nzts/docs/nzts_v13_23nov02.pdf

Prentice, A. and Jebb, S. (1995) "Obesity in Britain: gluttony or sloth?" **BMJ, 311** pp311-439

Pucher, J. and Dijkstra, L. (2003) Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany, **American Journal of Public Health, 93** (9), pp1509-1516.

Sinclair Knight Merz Pty Ltd (1998) **Working Paper: Evaluation of Cycleways – Draft.** January 1998.

UK Strategy Unit (2003) **Game Plan: a strategy for delivering Government's sport and physical activity objectives.** London: Cabinet Office. http://www.number-10.gov.uk/su/sport/report/01.htm

US Department of Health and Human Services (2003) **Preventing Obesity and Chronic**

US Surgeon General (1996) **Physical Activity and Health. A Report of the Surgeon General.** US Department of Health and Human Services, Centres for Disease Control and Prevention.

Van Wijen, J., Verhoeff, H, Van Bruggen (1995) "The exposure of cyclist, car drivers and pedestrians to traffic-related air pollutants." **Environmental Health 67** pp 187-193. Cited in the European Commission publication, **Cycling: the way ahead for towns and cities.** http://europe.eu.int/comm/environment/cycling/cycling_en.pdf

World Heath Organization (1999) **WHO Charter on Transport, Environment and Health** London: WHO. http://www.euro.who.int/document/peh-ehp/charter_transporte.pdf