Evaluation of the Victorian Ride2School program: impacts and insights into promoting active travel to school

Jan Garrard[1], Sharyn Crawford[1]

[1]School of Health and Social Development, Deakin University, 221 Burwood Highway, Burwood, VIC 3125

Email for correspondence: Jan.Garrard@deakin.edu.au

Abstract

Despite the substantial health, environmental, transport and community benefits of walking and cycling to school, car travel has largely replaced active travel to school in Australia. Several programs are now being implemented aimed at increasing active travel to school. The Ride2School program, part of the Victorian Government's 'Go for your life' initiative, is being implemented by Bicycle Victoria over a four year period (2006 to 2010) with additional support from VicHealth, VicRoads and Sustainability Victoria.

Evaluation of the Ride2School program in 13 primary schools in Victoria in 2007 found mixed evidence of impacts on active travel to school. Parent-reported data showed a small increase in the proportion of active trips to and from school from baseline (47.9%) to follow-up (49.6%), while student-reported data indicated a small decrease (51.1% to 48.7%). Students' attitudes to active travel to school were very positive at baseline and changed little at follow-up. Indirect measures of parents' attitudes to active travel to school indicated more positive attitudes at follow-up.

Evidence from this and related program evaluations indicates that sustained behaviour change activities together with supportive policy and environmental changes are required to increase rates of active travel to school.

1. Introduction

The multiple health, environmental, transport and community liveability benefits of a mode shift from motor vehicle use to active transport (principally walking and cycling) are well-documented (Garrard 2009; Litman 2009). Physical activity through active travel assists children and adolescents to achieve recommended levels of moderate-to-vigorous physical activity (Cooper et al 2003), particularly among population sub-groups such as adolescent girls who are at greater risk of being physically inactive (Department of Health and Ageing 2008; Smith 2008).

Children who actively commute (ie walk or cycle) to school have higher levels of physical activity and improved cardiovascular fitness compared with children who do not walk or cycle to school (Davison et al 2008). Active travel to school is associated with higher levels of active travel in adulthood (Boarnet et al 2005), and with active travel to other neighbourhood destinations, suggesting additional benefits beyond active trips to and from school (Dollman and Lewis 2007).

The transport benefits of active travel include reduced congestion, car space requirements and costs (Litman and Doherty 2009). The avoidable social costs of congestion in Australia

in 2005 have been estimated to be $9.4 billion, an amount which is predicted to more than double by the year 2020 (Bureau of Transport and Regional Economics 2007). Children being driven to school account for about 17% of all trips in the Melbourne Statistical Division during the morning peak period between 8.30 and 9 am (Morris et al nd).

Although the trip to school is a relatively short one for the majority of Australian children, most of these trips are by car (Australian Bureau of Statistics 1975; Australian Bureau of Statistics 1995). Data from the 2006 Victorian Child Health and Wellbeing Survey indicate that, for Victorian children aged five to 12 years, car travel is the most common mode of travel to and from school (64.1% of trips), followed by walking (22.7%), public transport (9.3%) and cycling (3.5%) (Department of Human Services 2007).

Australian children's rates of walking and cycling for transport have declined substantially in recent decades. In 1970 nearly half (48.9%) of Victorian students walked to school, and 16% travelled by car. By 1994 these two travel modes had effectively reversed, with 51.9% of students travelling by car and 20.3% walking. Public transport use was steady over this time period, but cycling to school more than halved, from 11.8% of students in 1970 to 5.1% in 1994 (Australian Bureau of Statistics 1975; Australian Bureau of Statistics 1995).

Household travel surveys conducted in the Sydney metropolitan area show similar trends. The proportion of children aged 5-9 years who walked to school on the day of the survey more than halved between 1971 (57.7%) and 1999-2003 (25.5%). For children aged 10-14 years, walking to school dropped from 44% to 21.1%. Cycling data were not included in the analysis, but were reported to be low (1-2%) (van der Ploeg et al 2008).

The low rates of active travel to school in Australia are not universal among wealthy, industrialised countries. International data indicate that several European and Asian countries have high rates of active travel to school (Garrard 2009). For example, in The Netherlands, 37% of primary school students walk to school, and 49% cycle to school. Children in The Netherlands cycle an average of 2200 km per year, and active travel accounts for 33.5% of the total distance travelled by children per year. In Melbourne, children travel an average of 26 km per year by bicycle, and only 4.6% of total travel distance is for active trips (walking and cycling) (Garrard 2009).

A number of interventions to increase active travel to school are currently being conducted in several countries, but only a small number have been rigorously evaluated. A recent systematic review and meta-analysis of 'soft' transport policy measures aimed at increasing active travel and reducing private car use (ie programs aimed at voluntary behaviour change, usually using social marketing strategies) reported inconsistent evidence for the effectiveness of school-based programs (Möser and Bamberg 2008).

Some recent evaluations have been reported in Australia and New Zealand. An evaluation involving five out of 15 primary schools in suburban Sydney that participated in the NSW TravelSmart program reported that active travel to school (defined as walking, cycling or public transport) increased over the program period in three out of the five schools[1] (Fry 2008). The Central Sydney Walk to School Research Program, which comprised a randomised controlled trial involving 24 government primary schools in inner suburban Sydney, reported inconsistent evidence of an impact on students' walking trips to and from school. Parent-reported data showed an increase in students' walking trips, but student-reported data showed no significant changes (Wen et al 2008).

---

[1] Aggregate data for the five schools were not provided.

An evaluation of the Brisbane Active School Travel program reported a 24.8% increase in active travel mode share to school and an 18.1% increase in active travel mode share from school across the 13 primary schools that participated in the 2008 Active School Travel program. Walking trips to school increased by 19.1% (from 19.0% to 38.1%), and cycling trips by 3.1% (from 3.9% to 7.0%) (Brisbane City Council 2009). In New Zealand, the Auckland Regional Transport Authority's 2007 School Travel Plan evaluation, based on "roll call" data collected from 35,153 students across 68 primary and secondary schools, reported a reduction in travel by "family car" of 3.4% (Sullivan and Percy 2008).

A number of programs have been developed and implemented in Victoria with the aim of increasing rates of active travel to school and reducing car use. The Ride2School program, which commenced in Victoria in 2006 is one such program. The aim of the program is to increase both the number of young people using active modes of travel to school, and the number of active transport trips to and from school by young people. A comprehensive evaluation of the first two years of the program (2006-2007) has been conducted. This paper describes key findings from the evaluation, focusing on the impacts of the program in 13 primary schools in metropolitan Melbourne and rural Victoria.

2. Methods

2.1 The Ride2School program

The Ride2School (R2S) program, which is part of the Victorian Government's 'Go for your life' Flagship Bike Plan, received funding of $2.9 million over a four-year period from 2006 to 2010. Bicycle Victoria was funded $2.71 million over four years, by the Department of Planning and Community Development, to expand the R2S program to primary and secondary schools across the state. Additional support and funding for the program has been received from VicHealth, VicRoads, Sustainability Victoria, Diabetes Australia – Victoria, Malvern Star and Crumpler.

The program consisted of several components incorporating education, awareness-raising, motivation and incentives for behaviour change; through to route planning and the provision of facilities such as bike storage and road traffic improvements (eg signs and crossings). Active travel events and activities included Ride2School Day, Walk and Wheel-a-thon, 500km Gold Medal Challenge, 1000 Bikes Student Leadership Rewards, school bike clubs, and a volunteer program. Ride2School staff worked with schools for two school terms, proving support, advice and resources to implement program activities. Additional resources and incentive-based activities were provided on-line (eg monthly 'Hands Up!' surveys of children's modes of travel to school).

The overall evaluation of the Ride2School was a comprehensive process-impact evaluation with multiple components. This paper provides a descriptive overview of the key evaluation findings from one component of the program and its evaluation; namely, the impacts of the program on parents' and students' school travel attitudes and behaviours in 13 primary schools in Victoria in 2007.

2.2. Study design

A pre-post design was used to assess the impacts of the Ride2School program in 13 primary schools. Data collection methods included: (i) an individual, student-completed written survey of how students travelled to and from school on the day of the survey and for the previous four school days, including questions designed to measure their attitudes to

different modes of travelling to and from school; and (ii) a survey sent to parents asking about their child's travel to school behaviour, and parents' attitudes to school travel modes. The two data collection methods described above were conducted with the 13 program schools before and after the implementation of the Ride2School program in these schools, covering a period of approximately eight months principally during 2007.

2.2.1. Participant recruitment and selection

All 13 program schools were invited and consented to participate in the evaluation. All grades 4-6 students in the 13 program schools were invited to take part in the student survey administered in class by teachers, and in a focus group discussion with a member of the evaluation team. Parents of all grades 4-6 students in the 13 program schools were sent (i) a plain language statement and consent form to gain parental consent for their child to participate in the student survey and focus group, and (ii) a plain language statement and an anonymous, self-complete parent survey. Because student and parent surveys were anonymous, parent and student data were not matched, and have been analysed separately. Pre and post-program respondents were not matched.

At baseline, 479 students and 409 parents (total 888) responded to the survey and at follow-up 403 students and 358 parents responded (total 761). The overall response rate was 29.0%.

As part of the process evaluation (not reported in detail in this paper) school principals, teachers, students and project staff were invited to participate in interviews or focus group discussions.

2.2.2. Student and parent surveys

Data collection instruments were developed based on a number of previously developed instruments and on program objectives. The student survey contained 23 questions including how students travelled to and from school on the day of the survey and for the previous four school days. The questionnaire also included items designed to measure students' attitudes to different modes of travelling to and from school.

The parent survey contained 26 questions asking about their child's travel to school behaviour, who accompanies their child to school, reasons for driving children to school, and parents' attitudes to school travel modes.

2.2.3. Data collection procedures

All students for whom parental consent was given completed the survey in class. Survey administration at baseline and follow-up was conducted by classroom teachers.

Baseline and follow-up parent surveys were sent home with students for parents to complete at home and return directly to the evaluation team at Deakin University in a replied paid envelope. Ethical approval for data collection was obtained from the Deakin University Human Research Ethics Committee and the Victorian Department of Education and Early Childhood Development Research Ethics Committee.

2.2.4. Data analysis

Survey data were electronically scanned, imported into SPSS for Windows (version 14.0.1) and analysed using descriptive statistics. Multivariate analysis including significance testing is the subject of a separate publication. Responses to open-ended questions were analysed using descriptive qualitative analysis.

3. Results

3.1. Parent survey

3.1.1. Travel mode share

Parents (n = 409 at baseline, and 358 at follow-up) were asked how their child travelled to and from school on the day of the survey and in the previous four school days. There was a small decrease in car use post-program, with small increases in walking and cycling (see Table 1). All active travel modes combined increased slightly from baseline (47.9%) to follow-up (49.6%), while car travel showed a small decrease over this period (46.3% to 44.2%) (Figure 1).

Table 1: Mode share of students' travel to and from school (% of trips)

Travel mode	Baseline (%)	Follow-up (%)
Car	46.3	44.2
Walk	27.8	28.7
Cycle	13.9	15.9
Scooter/ skate	6.2	5.0
Other (public transport)	5.8	6.2

Figure 1: Mode share of students' active travel to and from school (% trips)
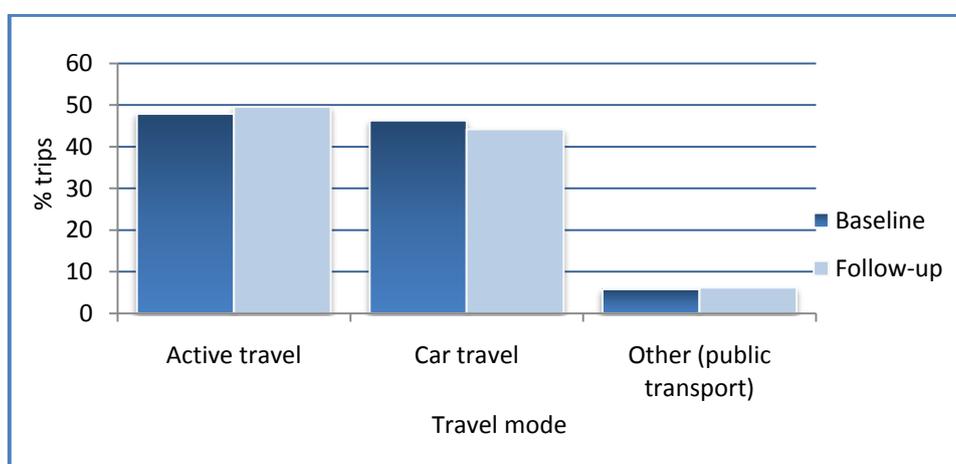
3.1.2. Accompaniment

The majority of students who walked or cycled to and from school regularly were not accompanied by an adult. This pattern was more pronounced for cycling than walking. Most regular trips (8-10 trips a week) by bicycle were for students travelling alone, or with friends or siblings (Table 2). There was a somewhat different pattern of accompaniment for regular walking trips to and from school, with students who regularly walked being accompanied by siblings, parent/carer, friends or alone. Parents were more than twice as likely to accompany children walking to school regularly (8-10 trips) than cycling to school regularly.

These findings highlight the crucial role of parents in either permitting their children to travel to school independently, or accompanying children themselves or organising other sources of accompaniment (eg friends, Walking School Bus).

Table 2: Accompaniment on active trips to and from school, students who undertake 8-10 active trips per week, baseline data

	Cycling		Walking		Scooter/Skating		Total active trips	
	n	%	n	%	n	%	n	%
With parent/carer	15	13.2	62	27.3	12	23.1	89	22.6
Siblings	29	25.4	64	28.2	10	19.2	103	26.2
Friends	31	27.2	56	24.7	16	30.8	103	26.2
Alone	37	32.5	44	19.4	14	26.9	95	24.2
Other	2	1.8	1	0.4	0	0.0	3	0.8

3.1.3. Reasons for parents' travel choices

Parents who drive their children to or from school by car were asked to nominate their reasons (from a list of options) for driving to school (Figure 2). This was a multi-response question where parents could choose one or more options. At baseline, the five most frequently reported reasons for driving children to school were "drop child off on way to work or other place", "bad weather", "too far to walk/cycle", "concern about stranger danger", and "driving is quicker than walking or cycling". At follow-up, the five most frequently reported reasons remained the same, though the number of parents reporting these reasons differed.

The number of reasons parents reported for driving children to or from school decreased from an average of 2.4 reasons per respondent at baseline to 2.1 reasons at follow-up. This reduction might reflect somewhat more positive attitudes to active travel relative to car travel over the data collection period (ie fewer reasons to drive).

Figure 2: Reasons for parents choosing to drive students to and/or from school
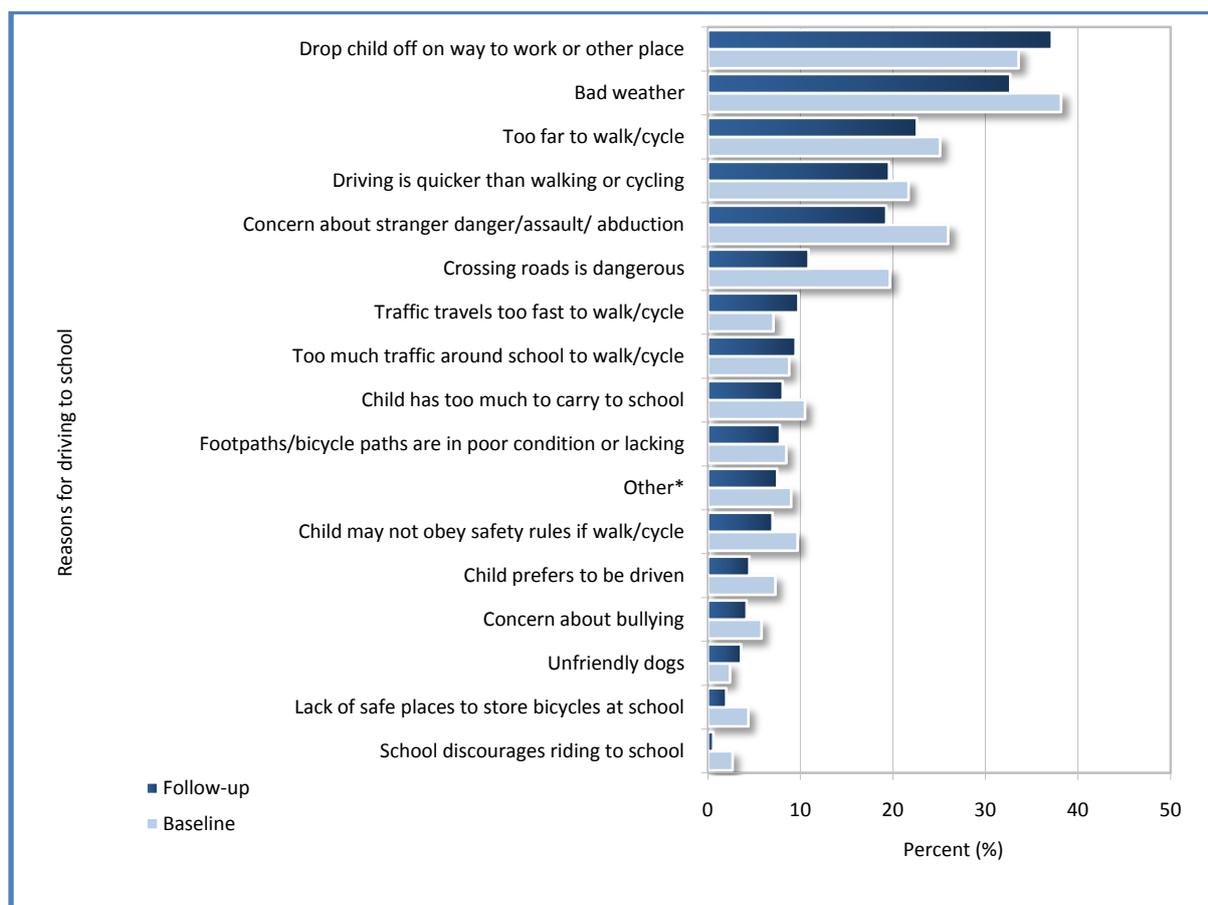
*_Other_ includes: child goes to activities after school, child/siblings not old enough to walk/cycle, fear of snakes on route to school (at two schools)

3.1.4. Potential for walking and cycling to and from school

Parents were asked whether walking to or from school on a regular basis (once a week or more) was a possibility for their child. The same question was asked about cycling to or from school. When 'yes' and 'maybe' responses are combined, there was an increase at follow-up in the number of parents reporting that regular cycling to or from school was a possibility for their child (65.3% 'yes' or 'maybe' at baseline, 75.4% at follow-up), but little change for walking (70.7%, 69.7%) (see Table 3).

In summary, indirect measures of parents' attitudes to active travel indicated more positive attitudes at follow-up in terms of fewer reasons for car travel and more parents stating that regular cycling was or might be a possibility for their child.

Table 3: Possibility of students regularly walking and cycling to or from school (n = 409 at baseline, 358 at follow-up)

	Walking (% parents)		Cycling (% parents)	
	Baseline	Follow-up	Baseline	Follow-up
Yes	61.9	61.5	55.9	61.8
No	29.3	30.3	34.8	24.6
Maybe	8.8	8.2	9.4	13.6

3.2. Student survey

3.2.1. Travel mode share

Students reported how they travelled to and from school on the day of the survey and in the previous four school days. Data from the student survey are similar to parent reported data for how students travel to and from school. Car travel was the most common travel mode (42.9% of trips at baseline, 43.1% at follow-up), followed by walking (28.4%, 27.7%) and cycling (15.5%, 16.1%) (Figure 3). Students' modes of travel to and from school were similar at baseline and follow-up.

Figure 3: Mode share of students' trips to and from school in the past 5 school days (% trips)
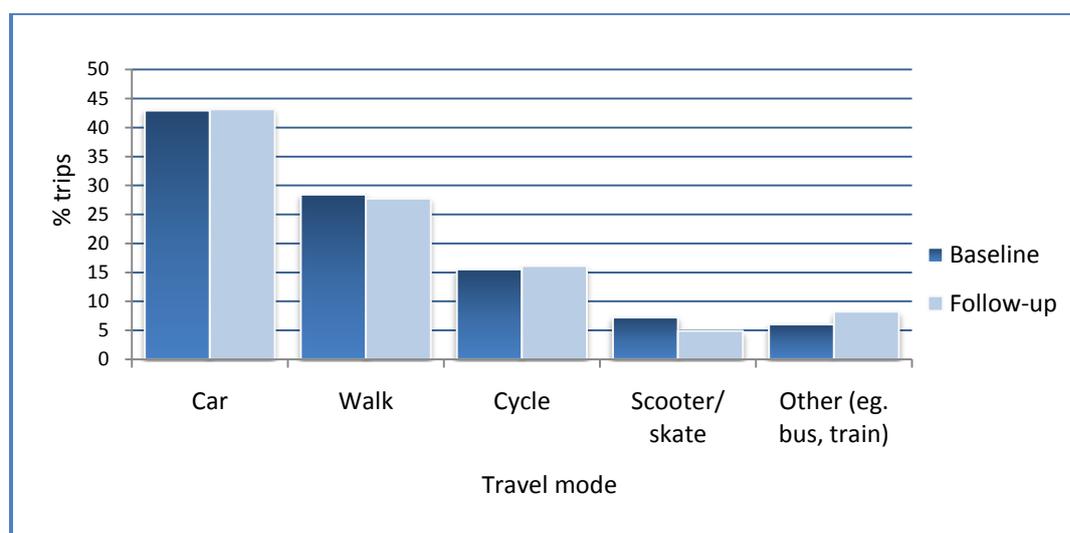
3.2.2. Students' attitudes to travel modes

Students were asked to rate how much they liked or disliked specific modes of travel to and from school on a scale from 1 (I really dislike) to 5 (I really like a lot) regardless of whether or not they used these travel modes (Table 4). Findings were similar at both data collection periods, therefore only follow-up data are presented in Table 4. The most popular mode of travel to school was cycling, followed by walking and scooting/skating. Car travel was the least popular, with the most common response category for car travel being "I neither like nor dislike" (31.4%), indicating a fairly 'neutral' attitude to car travel.

Table 4: Students' attitudes to modes of travel to and from school, follow-up data

Travel mode	I really like a lot (%)	I like (%)	I neither like nor dislike (%)	I dislike (%)	I really dislike (%)	Total (%)
Walk	29.0	42.7	20.6	4.4	3.3	100.0
Cycle	55.2	25.6	12.8	4.1	2.3	100.0
Scooter/ skate	22.3	31.2	24.2	10.4	11.9	100.0
Car	20.2	22.8	31.4	13.2	12.4	100.0

There were few changes from baseline to follow-up in students' attitudes to various travel modes (based on proportions of students who "really liked a lot" or "liked" various modes of travel to school). At follow-up slightly more students liked walking to school (69.8% to 71.7%) and travel by car (37.2% to 43.0%), and slightly fewer students liked travel by cycling (81.3% to 80.8%) and scooter/skating (55.4% to 53.5%). Overall, students' attitudes to active travel were very positive at both baseline and follow-up.

3.2.3. Students' attitudes to travel modes: open-ended responses

Students were asked in an open-ended question what travel modes they liked and disliked and the reasons why. Data were analysed thematically. The most frequent responses were enjoyment of walking and cycling, and dislike of car travel. The most frequently cited reasons for these attitudes are summarised in Table 5.

Table 5: Students' attitudes to travel modes: open-ended responses

"Like walking" (n = 238)			"Like cycling" (n = 394)			"Dislike car" (n = 385)		
Reason	n	%	Reason	n	%	Reason	n	%
Exercise and fitness	119	50.0	Enjoyment	152	38.6	Don't enjoy	139	36.1
Enjoyment	62	26.0	Exercise and fitness	131	33.2	Lack of physical activity	113	29.4
Socialise with friends	37	15.5	Quick travel time	84	21.3	Environmentally unfriendly	98	25.5

Examples of reasons for liking walking to school included:
- "I like walking because I usually walk with my friends."
- "I like to walk or ride because it makes you fit and healthy and it is fun."
- "You get fit and get to talk with your friends."

Examples of reasons for liking cycling to school included:
- "Cycling because I like exercise and the wind."
- "Cycling because it is healthy and it is good fun."
- "Bike riding because it gives me more energy and I'm there on time."

Examples of reasons for disliking travelling to school by car included:
- "I don't like driving to school because it's boring, it's bad for the environment and you just sit there doing nothing."
- "I don't like going in a car because you don't get fit."
- "Car because it pollutes the earth."
- "Car! Because it makes bad gas in the air."

In summary, based on parent and student reported travel data, there was mixed evidence of impacts of the Ride2School program on active travel to and from school in the 13 coach schools during the 8-month program implementation period from March 2007 to November 2007. Parent-reported data showed a small increase in the proportion of active trips to and from school from baseline (47.9%) to follow-up (49.6%), while student-reported data indicated a small decrease (51.1% to 48.7%). The results are aggregated across all 13 program schools. A small number of schools had small to modest increases in active travel to school. Students' attitudes to active travel to school were very positive at baseline and changed little at follow-up. Indirect measures of parents' attitudes to active travel to school indicated more positive attitudes at follow-up.

3.3. Insights into promoting active travel to school: qualitative data

3.3.1. R2S program implementation

Focus group discussions and interviews with school principals, teachers and the R2S program coordinators found that the program was implemented to varying degrees at each school. The R2S program provided a suite of activities, together with support for schools to implement them, but the choice of activities was up to each school. The 13 schools participated in many of the R2S activities (between 6 – 9 activities out of a possible 11). Schools reported that some program activities were easy to organize and were well-received (eg Ride2School Day), while other program activities (eg Frequent Rider Passports) were more difficult to implement and manage. Some teachers commented that finding time in the school curriculum for regular activities and events was difficult, but one-off events such as Ride2School Day were more feasible.

Schools had different levels of interest, commitment and support to implement the program, and to implement it well. While the majority of schools were interested in promoting active travel to school, the work often fell to a small number of teachers. Teachers were very busy, with competing priorities, and Ride2School sometimes fell down the priority list. Individual teachers who were very passionate about cycling/active travel and committed did make the time and room for the program in the school curriculum, though usually only in their classes, rather than school-wide. Some teachers had concerns about children's safety while using active travel to school, which may have impacted on how the program was promoted.

Many schools were not clear on how the program should be implemented in their schools, and schools' expectations of the program were sometimes not met. For example, some schools expected additional resources such as bike shed funding, and more hands-on help from R2S coordinators to organise events and activities.

Working with schools in priority (disadvantaged) areas was also a challenge, as these schools were often dealing with a number of competing commitments and priorities that left little time and energy for 'add-on' programs such as promoting active travel to school. Some schools joined the program because they were interested in obtaining resources to build or improve bicycle storage facilities and were unable or unprepared to engage in the more promotional activities.

However, overall, teachers and principals expressed a high level of satisfaction with the Ride2School program, albeit with some schools reflecting that they could have made better use of the resources available through the program. Consequently, the model of the Ride2School program providing resource options for schools to draw on to meet their individual needs may have been too 'hands-off' for many schools. Some schools were looking for more direct involvement of Ride2School staff, and more developed resources, skills training and specific activities that reduce the time commitment required by teachers. Schools' desire for more concrete resources included many of them seeking (and expecting) improved bicycle storage as part of the program. Opportunities to share experiences, activities and resources across school networks were considered valuable.

A number of supports and barriers to promoting the program were identified by school principals, teachers and R2S coordinators. These are summarised briefly in the following section.

3.3.1. Supports and barriers to promoting active travel to school

The local environment supported active travel to school when the environment around the school was perceived as safe; there were sufficient and safe facilities for walking and cycling (walking/cycling paths, marked bike lanes, good signage); and the school was in an area where use of active travel and public transport were common in the wider community.

The 'equipment' requirements for students to cycle to school appeared to be a constraint in some schools, particularly those in disadvantaged and/or regional/rural areas. Well-maintained bicycles and helmets were beyond the financial means of some parents. Students and parents were also reluctant to cycle to school if inadequate bicycle storage carried the risk of bicycles being damaged or stolen.

Another major barrier to active travel to school was the 'car culture' of students and their parents. Many schools commented on the difficulty in changing people's habits and routines, and in particular the attitudes and behaviours of parents in regards to car travel. A few schools felt some families needed to be more organised to send their child to school alone or early by active travel (eg readily available and well-maintained bicycle and helmet, need to get organized the night before, need to get up earlier, need to plan time to be active).

Teachers commented that parents also have significant concerns for the safety of students when travelling to school, and these include cycling in traffic (lack of cycling skills of students as well as the behaviours of motorists) and having to cross busy roads. Student perceptions of cycling and helmets being 'uncool' were identified as a barrier to promoting cycling at two metropolitan schools.

Attitudes towards the safety of active travel were discussed by two schools. One school commented that parent involvement in active travel to school was crucial for the acceptance and acknowledgement of active travel as a safe option, while a second school felt that a significant change in public attitudes towards safety was needed to allow children to cycle, as even though the town was fairly safe, parents were still concerned for their child's safety.

Most teachers and principals perceived the Ride2School program to be more about promoting cycling rather than walking to school, and some schools chose to adopt a modified program of walking and cycling promotion along the lines of the TravelSmart program. Apart from travel distance, there appeared to be fewer barriers to walking to school than cycling to school, with rates of walking to school consistently higher than cycling to school. Maximising active travel to school requires attention to both walking and cycling, particularly for the longer trips (>1 km) that are more suited to cycling than walking.

The age range for effectively promoting active travel to school appears to be important, but at the same time potentially problematic. Teachers reported that younger students (eg grades 3 and 4) are keen to ride to school but are considered not to have the skills or maturity to cycle alone. While older students (grades 5 and 6) are considered to have the skills and often the maturity to cycle, if they are not already in the habit of cycling to school, commencing cycling to school can be considered 'uncool' by these older students. Encouraging parents to accompany younger children on the ride to school may be one means of addressing this barrier, with students progressing to independent travel as they get older.

Finally, Ride2School coordinators identified three main 'success factors' for working effectively with schools: (i) an enthusiastic, committed 'cycling champion' who has the time to commit to the program and works well with students and other school staff to help spread the workload; (ii) a 'can do' school that prioritises active travel to school and supports staff and student involvement in the program; and (iii) infrastructure and environmental conditions within and around the school that support active travel to school.

4. Discussion

Consistent with international research and evaluation of active travel to school programs, the Ride2School program faced a number of challenges in achieving measurable increases in active travel to school (Davison et al 2008; Möser and Bamberg 2008). The evaluation literature indicates that variable program impacts occur both between programs and for individual schools within multi-site programs. Much of this evaluation literature is relatively recent, and there has been little systematic assessment of the reasons for variable program impacts. However, based on limited process/implementation evaluation data to date, the determinants of success are likely to include factors associated with schools and their social, cultural and built environments; program type; and quality of program implementation.

Findings from this study indicate high levels of enjoyment of active travel and awareness of the benefits of active travel and disbenefits of car travel that are not necessarily translated into travel behaviour. They also suggest that many students' travel preferences are overridden by parents' choices of travel mode. Consequently, one of the main barriers to active travel to school from students' perspectives appears to be parents' preferences for car travel. In their review of international research, Davison et al (2008) highlighted the importance of parent and family characteristics as predictors of children's active commuting to school.

Reasons given by parents in this study for driving children to school differ from those obtained from studies which ask parents the opposite question; namely, why they do not permit their children to walk or cycle to school. Numerous studies consistently report that concerns about personal safety and traffic safety are key reasons parents give for not permitting their children to walk or cycle to school (DiGuiseppi et al 1998; Davison et al 2008; Krizek et al 2009).

In this study, no road traffic hazards (from a list of four) were among the five most common reasons for driving children to school, though it is possible that because four specific 'traffic hazards' were listed, the overall 'traffic hazards' category was effectively diluted. However, it is also likely that reasons for car travel (and therefore absence of active travel) are broader than those identified in studies of 'barriers/constraints on active travel' where traffic hazards are consistently reported as a major constraint.

The broader barriers to active travel to school identified in this study largely centre around the convenience, speed and comfort of car travel (including linked trips, long distance, protection from weather, and travel speed). Consequently, interventions to promote active

travel to school may need to more systematically address reasons for car travel in addition to overcoming commonly identified barriers to active travel. In Australia, a range of socio-environmental, public policy and regulatory factors favour car use and make active travel choices more difficult than car use (Bauman et al 2008).

The finding from this study that active travel is predominantly undertaken by children walking or cycling to school without parental supervision suggests that active travel to school for primary school students will be facilitated by developing a safe and convenient active travel environment (both perceived and actual) that addresses parents' concerns about children's independent travel to school. The perceived safety and acceptability of children walking and cycling to school unsupervised is also influenced by social norms associated with both normative travel behaviour and being 'a good parent' (Thomson 2009).

Social and cultural norms of travel behaviour are a powerful influence, but a neglected area in active transport research and interventions (Bringolf-Isler B 2008). Parental and wider community behaviour, including among community leaders and respected role models (eg teachers, school principals) convey powerful messages about community norms of travel behaviour. Parents and children are especially open to social cues about appropriate travel modes when they move to new environments and engage with new organisations (Vanderbilt 2008). The many transitions that children and parents experience through childhood and adolescence offer numerous opportunities to directly and indirectly convey 'active travel norms'; for example commencing travelling to child care, kindergarten, primary school, secondary school and university/TAFE.

Parental concerns about active travel to school can also be addressed by encouraging parents to accompany children to school using active modes or providing other forms of accompaniment for children on active trips to school (eg Walking School Bus) (Victoria University 2003). In recognition of the fact that many trips to school are linked trips by parents on their way to work, Wen et al (2008) suggest encouraging active commuting by parents on their trip to work (including use of public transport) as a means of promoting active travel to school.

This study, in common with many others in countries like Australia but in contrast to several European and Asian countries, found higher rates of walking than cycling to school (Wen et al 2008; Brisbane City Council 2009; Garrard 2009; van Dyck et al 2009). One of the main advantages of cycling over walking is that longer distances can be covered in a reasonable time. However, longer cycling trips to school require longer and more extensive 'safe routes'. While short walking trips to school are assisted by supervised school crossings near schools and speed restrictions within the 250 metre school zone, a 1-2km trip by bicycle extends beyond this immediate school environment. Countries with high rates of cycling to school have system-wide cycling-friendly infrastructure and conditions (Pucher and Buehler 2008).

Lack of definitive evidence of an increase in active travel in this evaluation needs to be interpreted cautiously in view of the study limitations. Several of the 13 coach schools had relatively high rates of active travel to school at baseline (particularly for cycling) compared with Victorian state-level data (DHS 2007) (see Introduction), suggesting that schools with an existing interest in active travel to school may have self-selected into the program. This might make further increases in active travel difficult as active travel is not a feasible or appealing option for some parents and students (eg those who live too far from school, have no safe route to school, or simply prefer to drive).

The low parent and student response rates may have led to non-response bias. This might have resulted in an overestimate of rates of active travel to school, though this bias is likely to be similar at baseline and follow-up. The study may have been under-powered (ie too few schools and parent and student respondents) to detect the small changes in travel mode

share reported in evaluations of similar programs in Australia and internationally (Moser and Bamberg 2008). Although some evaluations of active school travel programs have reported substantial increases in active travel, those that have used more rigorous evaluation designs have generally reported smaller impacts (most commonly in the range from 0-4%) (Wen et al 2008; Moser and Bamberg 2008; Sullivan and Percy 2008). As noted by Sullivan and Percy (2008) large sample sizes are required to rigorously measure these small changes.

The relatively short time period for program implementation (about six months) may have been too short to change school travel behaviour. Change in mode share from inactive to active trips to and from school can be difficult to achieve in the short-term (Möser and Bamberg 2008; Sullivan and Percy 2008).

5. Conclusions

Based on the substantial health, environmental, transport and community benefits of active travel to school, the promotion of active travel to school is potentially a worthwhile investment. Programs promoting active travel to school are relatively new, and there is much to learn about what works and doesn't work and why.

Parental involvement in travel behaviour change is crucial because parents are the principal decision-makers for how their children travel to school. While parental participation in school programs is not always easy, it is important that parents be involved in identifying the benefits and barriers to active travel and car travel, and suggesting strategies to address these benefits and barriers. It is also important to understand the motivations and processes whereby organisations such as schools commit to promoting active travel. While many schools see active travel as an important strategy for promoting health and/or environmental sustainability, some schools may be more interested in traffic management (Rose 1999) or improved school facilities such as bike storage (Garrard et al 2009).

Children enjoy walking and cycling in their neighbourhoods and the vast majority of children prefer to walk or cycle to school. Many parents also express preferences for active travel to school, but are constrained by social, policy and environmental factors that make active travel choices difficult choices (Garrard et al 2009).

The experience of several affluent European and Asian countries demonstrates that active travel choices can be easy choices, including within urban environments similar to the low population density suburbs surrounding Australian cities (van Dyck et al 2009). High rates of active travel for adults and children occur in countries that have adopted integrated packages of measures that support active travel and make car travel less appealing (Pucher et al 2010). A recent systematic review and meta-analysis of 'soft' transport policy measures aimed at increasing active travel and reducing private car use (ie programs aimed at voluntary behaviour change, usually using social marketing strategies) reported inconsistent evidence for the effectiveness of school-based programs (Moser and Bamberg 2008). However, at the 'macro' policy evaluation level, case studies of successful cycling promotion efforts in 14 cities and towns in a number of countries indicate that substantial and sustained shifts to active travel can be achieved through a package of program and policy measures including:

- good walking and cycling infrastructure
- transportation policies that address the needs of all road users and facilitate the linking of active trips with public transport use
- policies and programs that improve the safety of pedestrians and cyclists
- programs that promote active transport
- disincentives for car use including fewer provisions for car use and parking, and lower subsidies for car purchase, operation and parking.

Carefully planned and well-implemented behaviour change programs are a necessary but not sufficient condition for substantial and sustained change in school travel modes. Small changes can be achieved, at least in the short-term, through programs such as Safe Routes to School, Walking School Buses, School Travel Planning, and Walk/Ride to School events. However, these initiatives need to be complemented by area-wide improvements including reduced urban speed limits, good cycling and walking infrastructure, and secure bike storage.

With the right conditions, policies, education and encouragement, more children would undoubtedly travel to school by foot (up to about 1km) or by bicycle (up to about 5km). These distances place active travel within the reach of the approximately 77% of Australian families who live within 5km of school (Australian Bureau of Statistics 1995).

Acknowledgements

We wish to thank the school principals, teachers, other staff, students and parents who assisted with, and participated in data collection. We also thank Tara Godbold, Erin Woodman and Katherine Dwyer for their assistance with data collection and analysis.

References

Australian Bureau of Statistics (1975). *Journey to work and journey to school, August 1974.* Canberra, ABS.

Australian Bureau of Statistics (1995). *Travel to work, school and shops, Victoria, October 1994. Cat No. 9201.2.* Canberra, ABS.

Bauman, A, Rissel, C, Garrard, J, Ker, I, Speidel, R, Fishman, E (2008). *Cycling: Getting Australia Moving: Barriers, facilitators and interventions to get more Australians physically active through cycling.* Melbourne, Cycling Promotion Fund.

Boarnet, MG, Anderson, CL, Day, K, McMillan, T, Alfonzo, M (2005). Evaluation of the California Safe Routes to School Legislation: Urban form changes and children's active transportation to school. *American Journal of Preventive Medicine* 28(2 Suppl 2): 134-140.

Bringolf-Isler B, GLea (2008). Personal and environmental factors associated with active commuting to school in Switzerland. *Preventive Medicine* 46: 67-73.

Brisbane City Council (2009). *Active School Travel Program: 2008 summary evaluation report.* Brisbane, Brisbane City Council.

Bureau of Transport and Regional Economics (2007). *Estimating urban traffic and congestion cost trends for Australian cities, Working Paper 71.* Canberrra, Department of Transport and Regional Services.

Cooper, AR, Page, AS, Foster, LJ, Qahwaji, D (2003). Commuting to school: Are children who walk more physically active? *American Journal of Preventive Medicine* 25(4): 273-276.

Davison, K, Werder, J, Lawson, C (2008). Children's active commuting to school: current knowledge and future directions. *Preventing Chronic Disease: Public Health Research, Practice and Policy* 5(3): 1-11.

Department of Health and Ageing (2008). *2007 Australian National Children's Nutrition and Physical Activity Survey: main findings.* Canberra, Department of Health and Ageing.

Department of Human Services (2007). *2006 Victorian Child Health and Wellbeing Survey Technical Report. Additional analysis of children's modes of travel to and from school conducted by Jan Garrard.* Melbourne, Victorian Department of Human Services.

DiGuiseppi, C, Roberts, I, Li, L, Allen, D (1998). Determinants of car travel on daily journeys to school: cross sectional survey of primary school children. *British Medical Journal* 316: 1426-1428.

Dollman, J, Lewis, N (2007). Active transport to school as part of a broader habit of walking and cycling among South Australian Youth. *Pediatric Exercise Science* 19(4): 436-43.

Fry, D (2008). *New South Wales Travelsmart Schools Program 2006-2007*. Sydney, Sydney South West Area Health Service.

Garrard, J (2009). *Active transport: children and young people. An overview of recent evidence.* Melbourne, Victorian Health Promotion Foundation.

Garrard, J, Crawford, S, Godbold, T (2009). *Evaluation of the Ride2School Program: final report.* Melbourne, Deakin University.

Krizek, K, Forsyth, A, Baum, L (2009). *Walking and cycling international literature review.* Melbourne, Victorian Department of Transport.

Litman, T (2009). *Comprehensive transportation planning. Cycling Promotion Fund Seminar, April 2009.* Melbourne.

Litman, TA, Doherty, E (2009). *Transportation cost and benefit analysis: techniques, estimates and implications.* Canada, Victorian Transport Policy Institute.

McKenzie-Mohr, D, Smith, W (1999). *Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing.* Canada, New Society Publishers.

Morris, J, Wang, F, Lilja, L (nd). *School Children's Travel Patterns – A Look Back and A Way Forward.* Melbourne, Transport Research Centre, RMIT University.

Möser, G, Bamberg, S (2008). The effectiveness of soft transport policy measures: A critical assessment and meta-analysis of empirical evidence. *Journal of Environmental Psychology* 28(1): 10-26.

Pucher, J, Dill, J, Handy, S (2010). Infrastructure, programs and policies to increase bicycling: an international review. *Preventive Medicine* 48(2).

Pucher, J, Buehler, R (2008). Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. *Transport Reviews* 28(4): 495-528.

Rose, G (1999). *A comprehensive evaluation of 'Safe Routes to School' implementation.* Melbourne, Institute of Transport Studies, Monash University.

Smith, A (2008). *The impact of additional weekdays of active commuting on children achieving a criterion of 300+ minutes of moderate-to-vigorous physical activity.* Conference name. Conference location. From

Sullivan, P, Percy, A (2008). *Evaluating changes associated with workplace and school travel plans - something old, something borrowed, something new.* Conference name. Conference location. From www.patrec.org/atrf/index.php?forum

Thomson, L (2009). *"How times have changed": active transport literature review.* Melbourne, VicHealth.

van der Ploeg, HP, Merom, D, Corpuz, G, Bauman, AE (2008). Trends in Australian children traveling to school 1971-2003: Burning petrol or carbohydrates? *Preventive Medicine* 46(1): 60-62.

van Dyck, D, Cardon, G, Deforche, B, Bourdeaudhuij, ID (2009). Lower neighbourhood walkability and longer distance to school are related to physical activity in Belgian adolescents. *Preventive Medicine* 48: 516-518.

Vanderbilt, T (2008). *Traffic: why we drive the way we do (and what it says about us).* New York, Alfred A Knopf.

Victoria University (2003). *The Walking School Bus Program: learnings from VicHealth's pilot program 2001.* Melbourne, Victorian Health Promotion Foundation.

Wen, LM, Fry, D, Merom, D, Rissel, C, Dirkis, H, Balafas, A (2008). Increasing active travel to school: Are we on the right track? A cluster randomised controlled trial from Sydney, Australia. *Preventive Medicine* 47(6): 612-618.