

**Final Report on the
2012
Bikes In Schools Project – Year 2
at
St. Mary’s School,
Peterhead School
and
Maraenui Bilingual School,
compared to data from
Irongate School (non-BIS participant)
Report provided to the
Hawke’s Bay Medical Research Foundation
and
Bike On New Zealand**

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EXECUTIVE SUMMARY

The Bike On Charitable Trust is the brain-child of Paul McArdle and Meg Frater, private individuals who have planned, organised, and supported the majority of the implementation of the Bikes In Schools project at the three initial schools; St. Mary's, Peterhead and Maraenui Bilingual primary schools. Their vision is:

To ensure all junior primary school children have an opportunity to experience the "joy of cycling" and the flow on benefits such as increased health and wellbeing, increased confidence and self-esteem, and increased balance and timing skills.

This is achieved by providing the schools with a no-cost "turn-key" solution that offers all pupils regular and equal access to a bicycle, helmet and accompanying bicycle tracks within the school environment.

A group from the Eastern Institute of Technology was initially contracted to evaluate the Bikes In Schools programme at the three intervention schools (Peterhead, St. Mary's and Maraenui Bilingual schools) in 2011. The evaluation was continued for a second year in 2012, the results of which are reported here. In addition, students from Irongate Primary School in Flaxmere were also invited to participate in the study as a control group. Irongate School was not part of the Bikes In School programme in 2012.

At all the four primary schools parents and teachers were surveyed to assess how their children/students travelled to/from school; the effects of the program on student classroom behaviour and family dynamics; as well as attitudes and perceptions around cycling in general. In addition to the survey evaluations, anthropometric and fitness measurements were carried out on a total of 567 students at the three intervention schools and 87 students at the control school. Two sets of measurements were collected approximately five months apart during 2012.

Parents at the three intervention schools perceived cycling to be a healthy activity for their children and remained very positive about the project at their school. However, the number of children who biked to school across all the schools was low.

As seen in previous research (Marshall et al., 2012 & 2013) parents expressed on-going concerns about the amount and speed of traffic and overall road safety in the Hawke's Bay. Road safety concerns are also consistently noted in the literature around children cycling to school. However, some teachers and parents did note the positive aspects of the cycle skills part of the programme, with comments suggesting enhanced student confidence and safety. Interest in bike trains was higher at the intervention schools compared to the control school suggesting that the Bikes In Schools programme enhances a favourable view of cycling as a form of transport.

Staff focus groups were carried out in 2011 and the beginning of 2012 and have previously been reported (Marshall et al., 2012). Follow-up comments were invited via email in March 2013 to assess any change in terms of staff attitudes, benefits to the students or any other issues since the initial focus groups were held. All the intervention schools reported that the previous comments were still applicable and the teachers of the intervention schools continued to have an enthusiastic attitude towards the Bikes In Schools programme, maintained excellent incorporation of the Bikes In School programme into the 2012 curriculums, and continued to report flow on benefits into the classroom with regards to learning abilities and confidence levels. Some of the teachers also noted many physical benefits (increased physical fitness, motor skills and coordination) in the students from the programme. This was supported by the data collected which showed an increase in estimated $VO_2\text{max}$ (a measure of aerobic fitness) across the two testing rounds. These are encouraging observations as the health benefits of physical activity in children have long term implications for chronic disease prevention (Sothorn et al, 1999; Warburton, Nicol & Bredin, 2006) while sedentary behaviour has been associated with increased health risks (Schofield, Quigley & Brown, 2009).

For all the schools studied, the number of children outside of the normal BMI range was higher than reported New Zealand averages for the population aged 2 – 14 years (21% overweight, 10% obese; Ministry of Health, 2012). However, for each of the intervention schools, the percentage of obese children dropped from 2011 to 2012, with a concurrent increase in the proportion of overweight children (presumably the obese children lost weight and fell back into the overweight category). This goes against the national trend which has seen childhood

obesity increase by 2% from 2006/7 to 2011/12 (Ministry of Health, 2012) and is an encouraging result.

Irongate School is not part of the Bikes In Schools Programme and was included in the year 2 study as a control school. While it was deemed appropriate to compare the results of Irongate with Peterhead given they have the same decile rating, are from the same area and share a similar ethnic mix of students, Irongate was not considered a good control match for Maraenui (decile 1 but predominately Māori – 97.5 %) or St. Mary’s (decile 4, predominately pakeha – 60.5%). However, financial and time constraints as well as the willingness of a school not in the programme to participate in this study prevented each of the intervention schools to be control matched. Furthermore, the students from the intervention schools were familiar with the evaluation testing procedures whereas during the Round 1 data collection Irongate students were not. Thus, the improvements seen between Round 1 and 2 for Irongate School may be exaggerated due to the effect of learning and therefore may not provide a valid comparison for Peterhead School.

Recommendations to enhance the Bikes In Schools project.

1. Positive responses from parents at both primary schools suggest that implementation of bike trains for the older students may be appropriate. This could have several positive effects, including increased fitness of both children and parents, increased interaction between parents and school programmes, and reduced vehicle traffic around the schools.
2. Improvements in physical fitness are directly related to the amount of physical activity undertaken by the children. Therefore, where possible, increasing the number of regularly scheduled and impromptu cycling times is important. It is also important to ensure installation and use of a long fitness track at future facilities to maximise fitness gains.
3. The number and percentage of overweight and obese children across all of the primary schools is a serious concern, and the implementation of a ‘healthy eating’ programme alongside the cycling programme is worth considering.
4. The Bikes In Schools programme has the potential to increase interaction with the wider community. For example, activities such as parent/child cycling times could be arranged,

and the tracks could be made available to outside groups and individuals for activities such as Iron Maori and triathlon training.

BACKGROUND

Bike On New Zealand has launched a series of non-profit projects including Teens on Bikes, Bikes In Schools, Police on Bikes and Bike On Flaxmere to encourage people to cycle more and gain the positive benefits that come with cycling (health and fitness, confidence, self-esteem) while impacting minimally on the environment. Funding from the Hawke's Bay Medical Research Foundation enabled a group from the Eastern Institute of Technology (EIT), led by Bob Marshall, to evaluate the implementation of the Bikes In School projects for a second year at Peterhead School, Maraenui Bilingual School and St. Mary's School. In addition Irongate School agreed to be part of the evaluation as to a control school.

The aims of this research are to:

- monitor fitness levels amongst children participating in the Bikes In Schools programme compared to a cohort of non-participants;
- track anthropometric changes in Bikes In Schools participants compared to non-participants and New Zealand literature;
- evaluate attitudes towards regular cycling and active transport amongst the parents of school children; and
- assess the effects of the Bikes In Schools programme on school-related factors such as classroom concentration and disruptive activity via teacher interviews.

The official opening of the initial project at St. Mary's occurred in February 2010. Peterhead and Maraenui followed with their official openings in April 2011. Since the end of 2011 similar projects have been implemented at a number of other Hawke's Bay Primary schools as well as in primary schools in Wairoa, Whakatane and South Auckland. Funding from various local trusts and other organisations has made all these projects possible.

LITERATURE REVIEW

It is well recognised that regular physical activity promotes children's physical development, motor skills and coordination, and has positive effects on bone density and energy balance. Physical inactivity and sedentary behaviours are associated with obesity; cardiovascular disease, various types of cancer, type 2 diabetes, reproductive disorders, and psychological and social problems (World Health Organization 2000). The 2011/12 New Zealand Health Survey (Ministry of Health, 2012) found that one in ten children aged 2-14 years were obese (10.2 %) and that one in five were overweight (20.7%). Māori and Pacific children have the highest rates of being overweight (26.3% and 27.9%, respectively) and obese (16.6% and 23.5%, respectively) (Ministry of Health, 2012). Since the 2006/7 survey, the child obesity rate has increased nationally by 2%. These rather alarming statistics demonstrate the need for interventions designed to improve physical activity and energy balance in New Zealand children especially in the most at-risk populations. Active transport to and from school (eg, walking and biking) as well as more activity whilst at school would provide opportunities for children to participate and increase their physical activity levels.

Relatively little literature is available on children cycling in New Zealand (NZ), and the majority of it is concerned with helmet use and injuries. However, one study by Mackie (2009) carried out surveys at six intermediate schools (three in Auckland and three outside of Auckland) to identify key cycling issues within these schools. The surveys were followed by focus groups with students and the development of cycling specific interventions. The final aspect of the project was to survey parents to gain their impressions on the importance of the interventions and any other suggestions they may have had. Results showed the number of students who cycled to school was considerably lower than the number who indicated they wished to cycle. The most significant barriers to cycling to school were *"...the route to school, the amount and speed of traffic, crossing busy roads and personal and bicycle security"*. Recommendations included *"...cycling to school could have a role in fighting obesity, reducing transport emissions, alleviating traffic congestion and contributing to more cohesive communities"*.

The 2006/07 New Zealand Health Survey (Ministry of Health, 2009) found the three most common barrier to active transport identified by parents was distance to school (67.5%) followed by traffic (23%) and perceptions of danger (17.3%). Walking was the most common form of active transport to school (40.9%), and only 9.5% of children aged 5 -15 years were

reported to bike to school. These statistics are consistent with recent Hawke's Bay research (Marshall et al., 2012 & 2013) which indicated low rates of biking to school with parents showing most concern around traffic speed, amount of traffic and overall safety on the roads.

The Public Health Advisory Committee (2010), in its report to the New Zealand Minister of Health, stated *"The PHAC recommends that the Minister of Health encourages the health system to support the development of (an) urban infrastructure that promotes active transport for all population ..."*.

Wendel and Dannenberg (2009), in a commentary in the international journal Preventive Medicine, reviewed the verified and potential advantages of children walking and cycling to school. They noted, however, that infrastructure adaptations to encourage walkers may not provide the same advantages for cyclists, and that in addition to individual requirements (bicycle, helmet, lock), cyclists' requirements for a safe route to their destination involves different components.

Tin Tin et al. (2009) reviewed NZ Census data from 1991 to 2006 for changes in active transport amongst people aged 15 years and over. Overall, cycling prevalence decreased substantially over that time period, particularly in younger people. The total number of people who reported cycling to work in 2006 was less than 4%.

The limited literature available on New Zealand school cycling appears to indicate positive benefits from the increased use of active transport such as cycling but with some major challenges around infrastructure and perceived and actual issues associated with cycling safety. Providing schools with bikes and cycling tracks that can be used during school hours and within the school grounds provides an alternative opportunity for children to partake in regular physical activity without raising the issues that accompany cycling to and from school.

METHODS

The specific aims of this study were to continue to evaluate the Bikes In Schools programme at Maraenui, Peterhead and St. Mary's over the 2012 school year; to continue to monitor the students' physical fitness and body composition using a pre-post design; and to evaluate any further changes in staff and parent attitudes and behaviours relative to the Bikes In Schools project. In addition, a control school that was not part of the Bikes In Schools Programme (Irongate School) was also evaluated in 2012.

With permission from the primary schools and students (see Appendix 1) data were collected during April – May 2012 (Round 1) and after approximately five months (September – November 2012; Round 2). Surveys were administered to parents via the students to gain information on bike usage, travel methods to and from school, and attitudes towards cycling. Staff were invited to make follow-up comments via email about any changes they had observed in terms of staff attitudes, benefits to the students or any other issues since the staff focus groups undertaken in 2011/2012. Qualitative results from the surveys and focus groups were analysed thematically.

On testing days, three to four trained investigators from EIT carried out the anthropometric and fitness testing on a class by class basis. Height and weight were measured using portable stadiometers (Wedderburn) and scales (Tanita InnerScan). Waist measurements were taken at the smallest circumference of the torso and hip measurement were taken at the widest point around the buttocks. The multi-shuttle run / Beep test was completed outside on either a concrete or Astroturf surface. The Beep test results were therefore influenced to some degree by weather conditions across the two rounds of testing. After completing the assessments students were provided with a survey to take home to assess their parents' thoughts around the project. These surveys were returned to the school office and collected by an EIT staff member between one to two weeks after fitness and anthropometric evaluations. Copies of surveys can be found in Appendix Three.

All aspects of the project were approved by the NZ Central Region Health and Disability Ethics Committee, the Eastern Institute of Technology Research Ethics and Approvals Committee as well as by the Principal and/or School Boards of the schools involved.

Statistical Analysis

Data (gender, ethnicity, age, waist, hip, height and weight measurements along with shuttle run / Beep test scores) were collected from the participating students from each of the four schools. Two rounds of data were collected approximately five months apart from each school; however, two full sets of data were not necessarily obtained for each student that participated in the study.

For each student in each round, body mass index (BMI) and waist to hip ratio were calculated. In addition, maximal oxygen uptake (VO_2 max) was estimated from the student's Beep Test result as an indication of aerobic fitness level (Ramsbottom et al. 1998).

Using the sex- and age-specific BMI cut-off points developed by the International Obesity Taskforce to define thinness, overweight and obesity (cited in Ministry of Health, 2009) each of the children in the study were classified as being thin, normal, overweight or obese for each of the rounds. Cross tabulations and chi square were used to explore differences in the percentage of children in each weight range between schools within each round and between rounds within each school.

In order to draw broad comparisons between schools within each round, an age and gender adjusted mean for each of the variables (BMI, waist to hip ratio, and VO_2 max) was estimated using a general linear model containing school and gender as a fixed factor and age as a covariate. These means cannot be used to compare variables between rounds as for each round the covariate was evaluated at a slightly different age by the model and sample sizes varied. Age and gender controlled correlations were also performed between each of the variables.

Differences between Round 1 and Round 2 both within and between schools were explored using paired t tests, and general linear models that corrected for age and gender, respectively. Only main effects were tested. Correlations (age and gender controlled) between the differences in the variables for each pair of rounds were also performed.

RESULTS

The results will be presented in two sections: Section 1 – Surveys and Focus Groups Results; and Section 2 – Anthropometric and Fitness Results.

Section 1 – Surveys and Focus Group Results

St. Mary's Primary School

The feedback from the St. Mary's teachers was still overwhelmingly positive. Parents also showed great on-going enthusiasm for the programme with one parent commenting:

Bikes In School has been a positive project for both parents and school children, my child loves being able to ride around the track at school and he is now more aware of his surroundings ...

Below are the summary results from the teacher focus group in 2011 as previously reported (Marshall et al., 2012). Teachers were followed up in 2013 and asked if there had been any changes in their attitudes or perceptions since the initial focus group. The teachers reported that the comments were still applicable and they had nothing further to add. Parents were surveyed twice and the results of the 2012 surveys conducted at St. Mary's Primary School are also given below.

Teacher Focus Group - Summary

Eleven of the teaching staff at St. Mary's School participated in a focus group on November 5, 2010. The attitude towards the Bikes In Schools project was extremely positive and is summed up by the following statement:

It's really hard to think of any negative things about the cycling programme. It is important, so we make time for it.

Four main themes emerged from the focus group: benefits to the children; crossover benefits to the classroom; planning and implementation; and other potential benefits. Full details on these themes are given in Marshall et al. (2012).

Overall the teachers noted many physical benefits (increased strength, endurance and balance) for the children from the programme along with improvements in confidence, perseverance and self-management. The teachers believed the programme enhanced social interactions,

especially peer support with the students helping each other and that all these factors crossed over into the classroom with a positive influence on the children's academic work.

Parent surveys

Sixty eight parents responded in Round 1 and 64 parents responded in Round 2 of data collection at St. Mary's in 2012. Slightly more of their children were female (62% Round 1, 55% Round 2) than male. The majority of the students lived within 3 km of the school. The greatest number of students arrived and left by family vehicle (62% Round 1, 50% Round 2). In the first round of testing 15% of parents reported that their children arrived by bike but this had dropped to 8% in Round 2. Walking to and from school also dropped across rounds with parents reporting 16% of their children arrived and 20% left on foot in Round 1, and in Round 2 only 9% arrived and 11% left on foot. These trends could be due to seasonal variation as the first round of testing was carried out in autumn (May) whereas the second round of testing was during spring (November). Also parents could select more than one transport option which may have confounded results.

Parents considered around 10-11 years (10.5 yr Round 1, 10.6 yr Round 2) to be an appropriate age for children to be allowed to bike to and from school unsupervised. Two thirds of parents reported being asked by their child if they could bike to or from school (65% Round 1, 63% Round 2). The major issues affecting parent's decision to allow their child to bike to school were similar between rounds. The three major issues were consistently traffic speed (40% Round 1, 47% Round 2), amount of traffic (45% Round 1, 40% Round 2) and overall safety (39% Round 1, 43% Round 2). These results support our previous findings (Marshall et al. 2012). Two of the parents surveyed noted:

Would love for my child to bike but mainly worried about him in busy traffic

Love my child to bike but due to busy traffic and after school activities he is unable to

Most parents considered cycling to be either very healthy or healthy and a fun activity for their child. Sixty percent of parents indicated that they would be interested in participating in Bike Trains in Round 1 but this had dropped to 47% in Round 2. However this still indicates that Bike Trains may be a popular initiative if organised by the school and/or parents.

Peterhead Primary School

The Peterhead teachers again felt that the Bikes In School programme was positive and beneficial for their students especially the cycle skills component of the programme. The parents also noted the benefits of the cycle skills programme.

Two of our other kids have just completed a bike safety programme through their school and they said they have gained confidence in doing it

Below is the summary of results from the teacher focus group in 2012 as previously reported (Marshall et al., 2012). Teachers at Peterhead were followed up in 2013 and asked whether their perceptions or attitudes to the Bikes In Schools programme has changed since the focus group and their additional comments are provided. The results of the two parent surveys conducted at Peterhead School in 2012 are also given below.

Teacher Focus Group 2012 - Summary

In the 2012 focus group the Bikes In Schools project was seen as beneficial by the Peterhead teachers. In particular, the road safety sessions were reported as being a key component of the project that the teachers wished to continue. Overall, the teachers liked having bikes and tracks within the school grounds but felt that bigger tracks, more bikes (large class sizes meant that sometimes there were not enough bikes for all the children), easier access to bikes from the storage shed and an increase in the challenge levels of the tracks was necessary for the project to cater to all the students and class needs. The teachers noted that time was not set aside in the curriculum for using the bikes and it was therefore up to the individual teachers when and if the bikes were used. Three main themes arose from the 2012 focus group: benefits to the students; barriers to bike use; and cycling in the community. Full details on these themes are given in Marshall et al. (2012).

2013 Teacher Follow-up

The Peterhead teachers were followed-up in March 2013 and they felt their previous comments were still applicable. They reported the on-going positive aspects of the Bikes In School programme were continued provision of the BikeNZ skill based training as well as greater opportunities for students to participate in organised events such as the Flaxmere Triathlon. They also noted that the previously reported barriers such as class size versus bike

numbers and bike maintenance issues were still on-going issues. A new system of getting bikes into and out of storage had been implemented by the school which had facilitated easier access to the bikes.

Parent surveys

Thirty nine parents responded in Round 1 and 37 parents responded in Round 2 of data collection at Peterhead in 2012. More of their children were female (72% Round 1, 62% Round 2) than male. The majority of the students lived within 3km of the school. The greatest number of students arrived (68% Round 1, 43% Round 2) and left (69% Round 1, 40% Round 2) on foot. The second most popular mode of transport in Round 1 was the family vehicle with 49% arriving and 36% leaving school in this manner. In Round 2, 38% arrived and 30% left in a family vehicle. Only 5% of parents reported their children biked to or from school in Round 1 and none were reported to bike to school in Round 2. These trends could again be due to seasonal variation as the first round of testing was carried out in autumn (May) whereas Round 2 testing was carried out in spring (October) though parents could select more than one transport option and this is likely to confounded results somewhat.

Parents considered approximately 10 years old (9.9yrs Round 1, 10.7 yrs Round 2) to be an appropriate age for children to be allowed to bike to and from school unsupervised. Approximately half of the parents reported being asked by their child if they could bike to or from school (49% Round 1, 60% Round 2). The major issues affecting parent's decision to allow their child to bike to school were similar between rounds. The three major issues were consistently traffic speed (28% Round 1, 49% Round 2), amount of traffic (31% Round 1, 35% Round 2) and overall safety (41% Round 1 and Round 2). The fourth most selected issue were concerns for safety at crossing guards in Round 1 (28%) and crime in Round 2 (29%). The safety issue was also identified in the previous year (Marshall et al. 2012).

One parent who was surveyed noted:

To me this is the only safe way for my children to go to school. I take them to school. I don't want them to bike. I don't want them to be in trouble.

Most parents considered cycling to be either very healthy or healthy and a fun or very fun activity for their child. Twenty six percent of parents indicated that they would be interested in participating in Bike Trains in Round 1 and this had risen to 41% in Round 2. This suggests a

future popular initiative if organised by the school and/or parents. These results are consistent with those of the previous year (Marshall et al., 2012).

Maraenui Bilingual School

The Maraenui teachers, when followed-up, were still very supportive of the Bikes In School programme. They reported additional activities such as getting out and about and using the Hawke's Bay Bike Trails showed a continued enthusiasm for the project at their school. Parents also still considered the programme to be a positive part of the school with one parent commenting:

Biking is a popular way of transport in Hawke's Bay, encouraging the kids to ride their bikes is a great way to show them exercise and health.

However, safety on the road was still an on-going parental concern.

Below are the summary results from the teacher focus group in 2011 as previously reported (Marshall et al., 2012). Teachers were followed up in 2013 and asked if there had been any changes in their attitudes or perceptions since the 2011 focus group. Teachers reported that the comments were still applicable. Parents were surveyed twice and the results of the 2012 parent surveys conducted at Maraenui Bilingual School are also given below.

Teacher Focus Group 2012 - Summary

Overall the Maraenui teachers reported the Bikes In Schools project as being a very positive enhancement to the school which they felt the children benefited from as well as enjoyed. The teachers noted many physical benefits (increased physical fitness and motor skills) for the children from the programme along with improvements in confidence, independence and perseverance. The teachers believed that all these factors crossed over in to the classroom with the students being more settled once they had been able to "let off steam" as well as improving coordination and fine motor skills which carried over into their writing and other classroom activities. While extremely supportive of the programme, the teachers mentioned they would like more helmets and easier access to bikes from their storage area at the back of the hall.

Cycling is an integral part of the Maraenui School curriculum and the teachers noted that the students looked forward to these sessions. The teachers perceived the road safety sessions as

a key component of the project that had many flow on effects into the community. Support by the local Police on a student group ride to Clive had also enhanced the Bikes In Schools project and community relations.

Four main themes were identified from the teacher focus groups: benefits to the students; crossover into the classroom; barriers to bike use; and issues around cycling to and from school. Full details on these themes are given in Marshall et al. (2012).

2013 Teacher Follow-up

In March 2013 the teachers reported that their previous comments were still applicable and that the bikes had allowed additional activities for their students to participate in activities such as class trips along the Puketapu Bike Trail. In addition the Maraenui teachers reported that their storage issue had been solved by a donation of a shipping container by The Warehouse Napier and the NZL Group. Classes were also reported to be out using the bikes daily after swimming had finished for the year.

Parent surveys

Thirty two parents responded in Round 1 and 41 parents responded in Round 2 of data collection at Maraenui Bilingual School in 2012. In Round 1, 56% of the parents were of male students and in Round 2, 56% percent of the parents were of female students. The majority of the students lived within 2 km of the school. The greatest number of students arrived and left on foot (arrived: 81% Round 1, 54% Round 2, left: 72% Round 1, 49% Round 2). The second most popular mode of transport was by family vehicle (arrived: 50% Round 1, 20% Round 2, left: 47% Round 1, 17% Round 2).

In the first round of testing 16% of parents reported that their children arrived by bike but this had dropped to 5% in Round 2. This trend was also seen at Peterhead and St. Mary's Primary school and may be explained by seasonal weather variations between testing rounds. However parents could again select more than one transport option which may have confounded the results.

Parents considered 10 years to be an appropriate age for children to be allowed to bike to and from school unsupervised. Fifty six percent of parents reported being asked by their child if

they could bike to or from school in Round 1, and 61 in % Round 2. The major issues affecting parent's decision to allow their child to bike to school were similar between rounds and consistent with the other two schools. The three major issues were traffic speed (15% Round 1, 23% Round 2), amount of traffic (10% Round 1, 23% Round 2) and overall safety (18% Round 1, 20% Round 2). In addition crime also was reported to be of significant concern to parents (18% Round 1, 20% Round 2). Two of the parents surveyed noted:

Children should be supervised at all times when cycling and I don't like the idea when cycling on the road

We need to make our streets safer for our kids so they can bike to/from school daily...

Most parents considered cycling to be either very healthy or healthy and a fun activity for their child. Forty seven percent of parents indicated that they would be interested in participating in Bike Trains in Round 1 but this had dropped to 39% in Round 2. Still this suggests that Bike Train may be a popular initiative if organised by the school and/or parents.

Parents also made some additional comments about how positive they felt biking and the Bikes In Schools project were both for their child and the school.

To me biking is faster, healthier and with experience, a lot safer

I think it is good that Maraenui Kura have a bike track. Teaches the children about safety and they love it

These results support and agree with those obtained previously (Marshall et al., 2012).

Irongate Primary – Control School

Irongate Primary was used as a control school for the anthropometric and fitness measures. Parent surveys were gathered in Round 1 to compare their perception of cycling in general and contrast this with the results from the current participating Bike On schools. As the Bikes In Schools programme was not yet running at Irongate School a teacher focus group was not carried out.

Parent surveys

Fifteen parents responded to the surveys. Sixty seven percent of the parents were of male students and 33% percent of the parents were of female students. The majority of the students lived within 2 km of the school. The greatest number of students arrived and left on foot (60% arrived, 53% left). The second most popular mode of transport was by family vehicle (27% arrived and left). Only thirteen percent of parents reported that their children arrived and left by bike. However parents could select more than one transport option which may have confounded results. These results are similar to those for the intervention schools.

Like the parents of students from the intervention schools, parents of Irongate students also considered 10 years to be an appropriate age for children to be allowed to bike to and from school unsupervised and 40% of parents reported being asked by their child if they could bike to or from school. The major issues affecting parent's decision to allow their child to bike to school were traffic speed (40%), overall safety (47%) and distance to travel (40%). Interestingly the amount of traffic was only noted as a concern by 13% of the parents surveyed. However, the survey group was reasonably small (n = 25).

Most parents considered cycling to be either very healthy or healthy and a fun or very fun activity for their child. Only 13% of parents indicated that they would be interested in participating in Bike Trains which is far lower than the schools currently participating in the Bikes In Schools project.

Section 2 – Anthropometric and Fitness Results

Data (gender, ethnicity, age, waist and hip circumference, height and weight measurements along with multi-shuttle run / Beep test levels) were collected from students attending one of four primary schools; namely Maraenui (n = 79), Peterhead (n = 178), St. Mary's (n = 223) and Irongate (control; n = 87). Two rounds of data were collected 5-6 months apart from each school; however, two full sets of data were not necessarily obtained for each student that participated in the study. Furthermore not all classes were available to be part of the study at all of the schools.

Of the total data set (n = 567), 288 were boys and 279 were girls; 308 identified as being primarily Māori, 19 as Cook Island Māori, 150 as Pakeha, and 86 as other. Four students did not specify their ethnicity. Ages ranged from 5 – 13 years. See Table 2.1 for a demographic breakdown by school.

Table 2.1: Demographic characteristics for the participating students from each school involved in the 2012 Bikes In Schools project.

Attribute	Category	School			
		Maraenui	Peterhead	St. Mary's	Irongate
Gender	Boy	42 (53.2%)	86 (48.3%)	111 (49.8%)	49 (56.3%)
	Girl	37 (46.8%)	92 (51.7%)	112 (50.2%)	38 (43.7%)
Ethnicity	Māori	77 (97.5%)	124 (69.7%)	39 (17.5%)	68 (78.2%)
	Cook Is Māori	0 (0.0%)	12 (6.7%)	4 (1.8%)	3 (3.4%)
	Pakeha	1 (1.3%)	9 (5.1%)	135 (60.5%)	5 (5.7%)
	Other	1(1.3%)	30 (16.9%)	44 (19.7%)	11 (12.6%)
Age (years)	5	.	.	13 (5.8%)	.
	6	.	.	29 (13.0%)	.
	7	2 (2.5%)	.	24 (10.8%)	.
	8	18 (22.8%)	.	33 (14.8%)	.
	9	20 (25.3%)	49 (27.5%)	24 (10.8%)	18 (20.7%)
	10	10 (12.7%)	38 (21.3%)	30 (13.5%)	24 (27.6%)
	11	22 (27.8%)	36 (20.2%)	38 (17.0%)	20 (23.0%)
	12	7 (8.9%)	44 (24.7%)	26 (11.7%)	22 (25.3%)
	13	.	8 (4.5%)	6 (2.7%)	3 (3.4%)

Round 1 Data

Gender and age adjusted means for BMI, waist to hip ratio, and VO₂ max for each school are shown in Table 2.2. There was a significant difference in BMI (P < 0.001) and VO₂max (P < 0.001) between the schools while waist to hip ratio also tended to be different (P = 0.059). The VO₂max for St. Mary's school was significantly higher (P ≤ 0.001) than those of any other school (Table 2.2).

When controlling for age and gender, BMI was negatively correlated with VO₂max (r = -0.504, P < 0.001, n = 542) and positively correlated with waist to hip ratio (r = 0.389, P < 0.001, n = 542). Waist to hip ratio was negatively correlated with VO₂max (r = -0.338, P < 0.001, n = 542).

Table 2.2: Gender and age adjusted means¹ for BMI, waist to hip ratio and VO₂ max for Round 1.

School	BMI (kg/m ²)	Waist:hip	VO ₂ max (mL/kg/min)
Maraenui	19.9 ± 0.42 (n=79) ^{bc}	0.81 ± 0.006 (n=79) ^{bc}	28.4 ± 0.63 (n=77) ^a
Peterhead	21.3 ± 0.30 (n=175) ^a	0.82 ± 0.004 (n=175) ^{ac}	28.2 ± 0.43 (n=171) ^a
St. Mary's	19.5 ± 0.27 (n=222) ^b	0.82 ± 0.003 (n=222) ^{bc}	31.8 ± 0.40 (n=213) ^b
Irongate (control)	20.7 ± 0.42 (n=87) ^{ac}	0.83 ± 0.005 (n=87) ^a	28.7 ± 0.61 (n=86) ^a
Overall mean	20.3 ± 0.18 (n=563)	0.82 ± 0.002 (n=563)	29.3 ± 0.26 (n=547)

¹ Estimated marginal means (i.e. model adjusted means) obtained from a general linear model containing school and gender as fixed factors and age as a covariate. BMI, waist:hip ratio and VO₂max were evaluated at age 9.8. Within columns those means that have at least one superscript letter in common are not significantly different from each other at the 0.05 level using least significant difference.

Using the sex- and age-specific BMI cut-off points developed by the International Obesity Taskforce to define thinness, overweight and obesity (cited in Ministry of Health, 2009) each of the children in the study were classified as being underweight, normal, overweight or obese. Approximately half (55.6%) of the children in the study had a BMI within the normal range, with 27.7% being overweight and 15.5% being obese while the remaining 1.2% were underweight. The overweight and obese figures are much higher than the national average reported in the 2011/12 New Zealand Health Survey (Ministry of Health, 2012) which found overall that 20.7% of children were overweight and 10.2% were obese. The percentages observed for each BMI category for each school are shown in Figure 2.1. It can be seen that the two Flaxmere schools share similar results (chi square, P = 0.438) as do Maraenui and St. Mary's (chi square, P = 0.362). When data were combined, a significant difference was evident between schools from the Flaxmere area (Peterhead and Irongate) and the two city schools (chi square, P < 0.001).

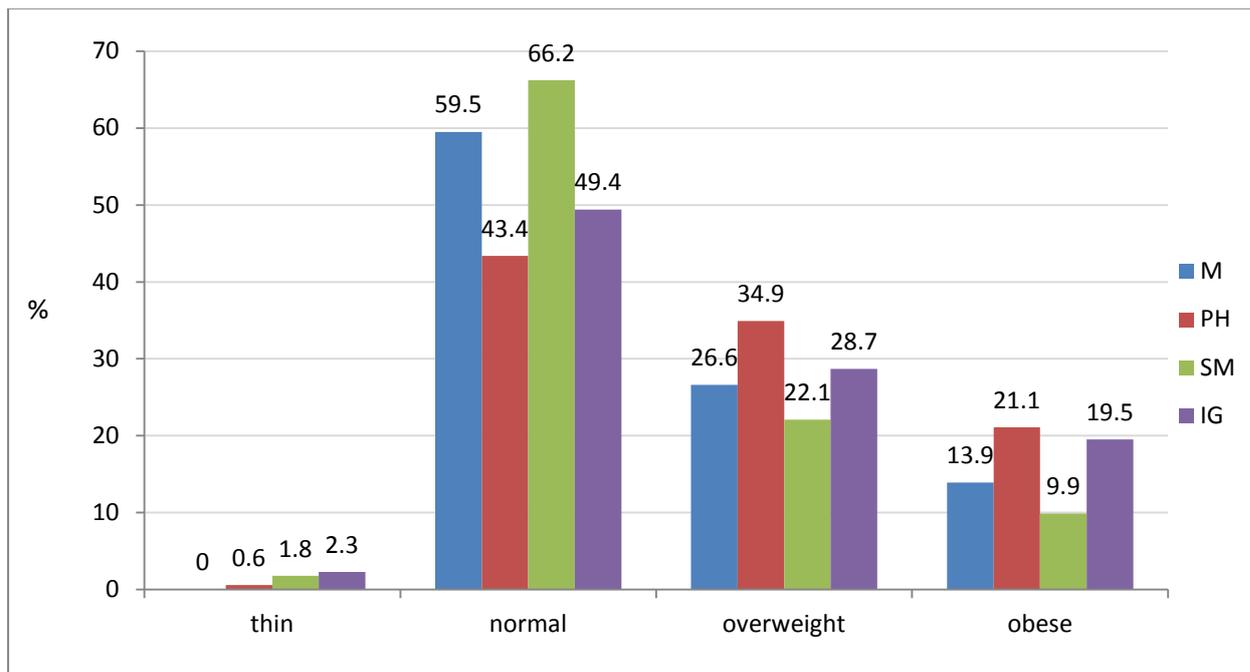


Figure 2.1 Percentage of children within each weight category for each school. M: Maraenui Bilingual School; PH: Peterhead School; SM: St. Mary's School; IG: Irongate School.

Table 2.3 shows a comparison across year one and two of the evaluation of the percentage of children within each BMI category for each of the Bikes In Schools (BIS) schools. For each school, the percentage of obese children dropped from 2011 to 2012, with a concurrent increase in the proportion of overweight children. This goes against the national trend which has seen childhood obesity increase by 2% from 2006/7 to 2011/12 (Ministry of Health, 2012). Unfortunately, at Peterhead School a decrease in the number of children within the normal BMI range is also observed (Table 2.3), but this is not the case for Maraenui or St. Mary's schools.

Table 2.3 A comparison across year one and two of the evaluation of the percentage of children within each BMI category for each BIS school

Status		School by Year of Evaluation ¹					
		M1	M2	PH1	PH2	SM1	SM2
thin	n	0	0	1	1	6	4
	%	0.0%	0.0%	.3%	.6%	2.4%	1.8%
normal	n	54	47	157	76	170	147
	%	60.7%	59.5%	48.9%	43.4%	66.7%	66.2%
overwt	n	22	21	87	61	51	49
	%	24.7%	26.6%	27.1%	34.9%	20.0%	22.1%
obese	n	13	11	76	37	28	22
	%	14.6%	13.9%	23.7%	21.1%	11.0%	9.9%

¹M: Maraenui Bilingual School; PH: Peterhead School; SM: St. Mary's School

Round 2 Data

The Round 2 age and gender adjusted means for BMI, waist to hip ratio and VO₂max for each school are shown in Table 2.4. A significant difference in BMI (P = 0.001), waist to hip ratio (P = 0.0039) or VO₂max (P = 0.003) between the schools was observed in Round 2.

Table 2.4: Round 2 gender and age adjusted means¹ for BMI, waist to hip ratio and VO₂ max.

School	BMI (kg/m ²)	Waist:hip	VO ₂ max (mL/kg/min)
Maraenui	20.4 ± 0.43 (n = 79) ^{ac}	0.81 ± 0.006 (n=79) ^{ac}	30.4 ± 0.66 (n=78) ^a
Peterhead	21.6 ± 0.31 (n=175) ^b	0.82 ± 0.004 (n=175) ^{bc}	29.3 ± 0.46 (n=169) ^a
St. Mary's	19.9 ± 0.28 (n=222) ^c	0.81 ± 0.004 (n=222) ^{ac}	32.7 ± 0.42 (n=214) ^b
Irongate (control)	20.7 ± 0.43 (n=87) ^{bc}	0.83 ± 0.005 (n=87) ^b	32.4 ± 0.64 (n=86) ^b
Overall mean	20.7 ± 0.18 (n=563)	0.82 ± 0.002 (n=563)	31.2 ± 0.28 (n=547)

¹ Estimated marginal means (i.e. model adjusted means) obtained from a general linear model containing school and gender as fixed factors and age as a covariate. BMI, waist:hip ratio and VO₂max were evaluated at age 9.8. Within columns those means that have at least one superscript letter in common are not significantly different from each other at 0.05 level using least significant difference.

When controlling for age and gender, BMI was again negatively correlated with VO₂max (r = -0.462, P < 0.001, n = 542) and positively correlated with hip to waist ratio (r = 0.326, p < 0.001, n = 542). Waist to hip ratio was again negatively correlated with VO₂max (r = -0.214, p < 0.001, n = 542).

Differences between Round 2 and Round 1

Differences between Round 2 and Round 1 were explored using paired sample t tests (Table 2.5). Overall, and within each school, BMI and VO₂max increased between Round 1 and Round 2, while waist to hip ratio remained the same (Table 2.5).

Table 2.5. Average differences between Round 2 and baseline (not controlled for age or gender).

School	BMI ¹ (kg/m ²)	Waist:hip	VO ₂ max (mL/kg/min)
Maraenui	0.54 ± 0.095 (n=79) ***	-0.001 ± 0.005 (n=79)	2.0 ± 0.62 (n=76) **
Peterhead	0.41 ± 0.069 (n=175) ***	-0.002 ± 0.003 (n=173)	0.9 ± 0.31 (n=169) **
St. Mary's	0.42 ± 0.051 (n=222) ***	-0.007 ± 0.003 (n=222) **	1.2 ± 0.31 (n=209) ***
Irongate (control)	0.12 ± 0.120 (n=87)	-0.003 ± 0.006 (n=87)	3.5 ± 0.34 (n=85) ***
Overall mean	0.39 ± 0.037 (n=563) ***	-0.004 ± 0.002 (n=561)	1.60 ± 0.19 (n=539) ***

¹ BMI: Body Mass index

*** P < 0.001, ** 0.001 < P < 0.01, * 0.01 < P < 0.05

To ascertain whether the changes observed were different across schools general linear models that corrected for age and gender were used (Table 2.5). The increase in BMI was significantly less at Irongate when compared to the other schools (P = 0.001). No difference in the change in waist to hip ratio was observed between schools (P = 0.621). The average changes in VO₂max varied significantly between the schools (P < 0.001).

Table 2.5: Average¹ differences correcting for age and gender between Round 2 and Round 1 for BMI, waist to hip ratio and VO₂ max.

School	BMI (kg/m ²)	Waist:hip	VO ₂ max (mL/kg/min)
Maraenui	0.56 ± 0.098 (n=79) ^a	-0.001 ± 0.005 (n=79)	2.0 ± 0.49 (n=76) ^b
Peterhead	0.35 ± 0.068 (n=175) ^a	-0.001 ± 0.003 (n=175)	1.3 ± 0.39 (n=166) ^{bc}
St. Mary's	0.48 ± 0.061 (n=222) ^a	-0.006 ± 0.003 (n=222)	0.8 ± 0.31 (n=209) ^c
Irongate (control)	0.07 ± 0.095 (n=87) ^b	-0.004 ± 0.005 (n=87)	3.9 ± 0.47 (n=85) ^a
Overall mean	0.37 ± 0.041 (n=563)	-0.003 ± 0.002 (n=563)	1.98 ± 0.20 (n=536)

¹ Estimated marginal means (i.e. model adjusted means) obtained from a general linear model containing school and gender as fixed factors and age as a covariate. BMI, waist:hip ratio and VO₂max were evaluated at age 9.8. Within columns those means that have at least one superscript letter in common are not significantly different from each other at 0.05 level using least significant difference.

Significant age and gender controlled correlations were detected between changes in BMI and waist to hip ratio ($r = 0.121$, $p = 0.005$, $n = 530$). Changes in BMI also tended to be negatively correlated with changes in $V_{O_2\max}$ ($r = -0.079$, $p = 0.069$, $n = 530$).

DISCUSSION

This report evaluates the implementation of the Bikes In Schools project at the three initial intervention primary schools, namely, Peterhead School, Maraenui Bilingual School and St. Mary's School, and includes the results of a non-intervention control school, Irongate School.

The Bikes In Schools project still appears to be an integral part of the culture and curriculum at the three intervention primary schools. Parents and teachers across all the three educational facilities still show a high level of engagement in the programme. Previously reported challenges such as bike storage at Maraenui and bike access at Peterhead have been addressed but on-going large class sizes versus bike numbers still pose barriers to regular cycling at Peterhead.

In teacher focus groups and follow-up interviews, it was noted that there were both mental and physical benefits (increased physical fitness and motor skill) for students from the programme. The latter observation was supported by the fitness data collected which indicated that over the two rounds, $VO_2\text{max}$ increased significantly across both schools. Interestingly, Irongate School, who were not part of the Bikes In Schools Programme, showed the greatest improvement in $VO_2\text{max}$ across the two Rounds. Given this is the first year that Irongate School has participated in the research study there may have been a learning effect with regards to performing the Beep Test between Rounds 1 and 2. This is not unexpected and therefore the improvements seen for Irongate School may be exaggerated and not useful as a comparison to the other schools which were evaluated previously in 2011.

One of the expectations of the Bikes In School project was to improve the health and fitness levels of the students involved. Overall, and within each school, BMI and $VO_2\text{max}$ increased between Round 1 and Round 2, while waist to hip ratio stayed the same. Of the intervention schools, St. Mary's School students showed the highest average Round 1 $VO_2\text{max}$ but the lowest change across rounds whereas Peterhead and Maraenui Schools had lower Round 1 $VO_2\text{max}$ averages but greater change across rounds. Again this is not unexpected because as one approaches their maximal fitness level the incremental gains slow down or become smaller (Powers and Howley, 2012). This would suggest that those that start off at a higher aerobic fitness levels will have the smallest gains over time and conversely those that are the least aerobically fit will have the greatest change. The higher average Round 1 $VO_2\text{max}$ estimates for

St. Mary's School students may reflect the fact that St. Mary's has been participating in the Bikes In Schools the longest (since February 2010).

BMI also increased between Round 1 and 2 across all schools. Some increase was expected due to growth. The control school showed very little change across rounds in BMI values when compared to the intervention schools. The relationship between body mass, body composition and exercise energy expenditure in children is multi-factorial. While physical training increases energy expenditure and can lead to fat loss and therefore reductions in weight, exercise can also increase muscle mass and bone density (Powers and Howley, 2012). Therefore, it would not be unexpected to observe an initial increase in body mass once exercise has commenced due to changes in body composition. Furthermore, Duncan et al. (2010) showed that in New Zealand, girls ethnic specific BMI cut-off points developed from percentage body fat data were more appropriate than universal definitions of overweight and obesity, with the cut-offs being higher for Māori and Pacific children. In future studies, assessment of percentage body fat may be a better indicator of body composition changes due to regular exercise than BMI.

For all the schools studied, the number of children outside of the normal BMI range was higher than reported New Zealand averages for the total population (21% overweight, 10% obese; Ministry of Health, 2012). However, for each of the intervention schools, the percentage of obese children dropped from 2011 to 2012, with a concurrent increase in the proportion of overweight children (presumably the obese children lose weight and fall back into the overweight category). This goes against the national trend which has seen childhood obesity increase by 2% from 2006/7 to 2011/12 (Ministry of Health, 2012) and is an encouraging result. Changes in BMI tended to be negatively correlated with changes in $VO_2\max$ thus an increase in fitness level may be one reason for the observed changes in BMI.

Parents perceived cycling to be a fun and healthy activity for their children, and the parents at the three intervention schools remained very positive about the project at their school. However, the number of children who biked to school was still low. In Round 1 Peterhead had the lowest biking to school rate of 5.1% with the two other intervention schools (St. Mary's 14.7%, Maraenui 15.6%) and the control school (Irongate 13.3%) showing comparable rates of biking to school. In Round 2 biking to school rates dropped considerably in all the intervention schools (St. Mary's 7.8%, Peterhead 0%, Maraenui 4.9%). This is likely to be a seasonal variation

as the first round of testing was carried out in autumn (April –May 2012) and the second round of testing in spring (September –November 2012). Autumn weather patterns in the Hawke’s Bay tend to be more settled compared to spring.

Parents across all schools expressed concerns about the amount and speed of traffic and overall road safety in the Hawke’s Bay. This is consistent with previous research in the Hawke’s Bay (Marshall et al., 2012 & 2013), nationally (Ministry of Health, 2009; Mackie, 2009; Marshall et al., 2012 & 2013) and internationally (Wendel & Dannenberg, 2009). Many of those concerns (amount and speed of traffic, road safety) are factors which can be partially alleviated with bicycle trains, route planning and adult supervision.

Some of the parents surveyed were interested in becoming involved in bicycle trains through their respective schools and the interest was higher at the intervention schools (average across rounds: Peterhead 33.1%, St. Mary’s 53.6%, Maraenui 42.9%) versus the control school (Irongate Round 1 only, 13.3%). The greater interest from the parents at the intervention schools suggests that the Bikes In School programme are positively promoting biking to parents as well as the students. Additionally the interest in the bike trains suggests a possible way of increasing the number of children who use active transport whilst enhancing their safety. The age at which parents reported they would let their child cycle to school without an adult (i.e. 10 years) was consistent across of the all primary schools.

The teachers of the intervention schools continued to have an enthusiastic attitude towards the Bikes In Schools programme, maintained excellent incorporation of the Bikes In School programme into the 2012 curriculums, and continued to report flow on benefits into the students’ fitness levels, learning abilities and confidence levels. These are encouraging results, as the health benefits of physical activity in children have long term implications for chronic disease prevention (Sothorn et al, 1999; Warburton, Nicol & Bredin, 2006) while sedentary behaviour has been associated with increased health risks (Schofeild, Quigley & Brown, 2009).

In conclusion, staff, students and parents of all the intervention primary schools were very positive about the Bikes In Schools Programme. The benefits of the programme are multifaceted in their impact on health and wellness and although barriers to cycling exist in the community, both parents and children reported cycling as being fun and healthy. Thus, it

appears many of the fundamental advantages of cycling are appreciated by staff, pupils and parents. The Bikes In Schools programme appears to be having measurable positive effects in the schools.

RECOMMENDATIONS

There were no major issues reported or observed relating to the on-going success of the Bikes In Schools programme at the three education facilities evaluated by this report. Furthermore, the control school Irongate expressed their wish to become part of the programme. While cycling was embraced as a healthy and fun activity on the school grounds, concerns around traffic safety on the roads were expressed by both parents and teachers and therefore bike commuting was still reported as being very low.

Recommendations to enhance the Bikes In Schools project.

5. Positive responses from parents at both primary schools suggest that implementation of bike trains for the older students may be appropriate. This could have several positive effects, including increased fitness of both children and parents, increased interaction between parents and school programmes, and reduced vehicle traffic around the schools.
6. Improvements in physical fitness are directly related to the amount of physical activity undertaken by the children. Therefore, where possible, increasing the number of regularly scheduled and impromptu cycling times is important. It is also important to ensure installation and use of a long fitness track at future facilities to maximise fitness gains.
7. The number and percentage of overweight and obese children across all of the primary schools is a serious concern, and the implementation of a 'healthy eating' programme alongside the cycling programme is worth considering.
8. The Bikes In Schools programme has the potential to increase interaction with the wider community. For example, activities such as parent/child cycling times could be arranged, and the tracks could be made available to outside groups and individuals for activities such as Iron Maori and triathlon training.

This report will be disseminated to all contracted parties including the four schools, the Hawke's Bay Medical Research Foundation and the Bike On Charitable Trust.

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APPENDICES

Appendix 1 – Consent form



Te Whare Takiura o Kahungunu

Information for Research Participants

Date:	13 February 2012
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Project Title: Bikes In Schools: Health, Body Composition and Cycling Activity

To: Students participating in the Bikes In Schools project

Researcher(s): Bob Marshall, Rachel Forrest, Olivia Maclaren

Affiliation: Faculty of Health Science

What are we doing?

We want to find out if riding the new school bikes makes you fitter or changes how active you are. We would like to measure you three times this year to see how you are growing.

What will we ask you to do?

Your teacher will bring you and your class to where we will measure you and they will be there for the entire testing session. We want to measure how tall you are, how much you weigh and measure around your waist and hips. We will also ask you to do a fitness test called the BEEP test, which involves some running.

None of these measurements will hurt you, but you will probably feel tired after the BEEP test.

Your rights:

You do not have to participate in any of these tests if you do not wish to. Nothing will happen to you if you decide you don't want to take part.

We will not use your name or the name of your school in any report we write about this.

If you wish to participate in this research, or if you wish to know more about it, please contact

Contact Person: Olivia Maclaren, Faculty of Health & Sport Science

Work phone # (06) 974 8000 x5415

Email address omaclaren@eit.ac.nz

For any queries regarding ethical concerns, please contact:

Professor K. Morris Matthews, Research Ethics and Approvals Committee, EIT.

Ph. 974 8000 ext 5470

Appendix 2: Parent Surveys

Round 1

April 2nd, 2012

Dear Parent or Caregiver,

I invite you to participate in this survey about the Bikes In Schools project by completing the attached questionnaire. The questionnaire is anonymous, and collects no information which may identify you. By completing and returning the questionnaire you are consenting to participate in this research project.

This questionnaire has been approved by the Eastern Institute of Technology Research Ethics and Approvals Committee (ref. XX/11).

Thank you very much for your support.

Sincerely,

R.N. Marshall, PhD

Research Professor

Parent Survey – Round 1

Dear Parent or Caregiver,

We would like to learn your thoughts about children biking to and from school. This survey will take about 5-10 minutes to complete. We ask that each family only complete one survey. If you have more than one child at school, please fill out the survey for the child with the next birthday from today’s date.

After you have completed this survey, please send it back to school with your child or give it to a teacher. Your responses will be kept confidential and neither your name nor your child’s name will be associated with any results

- 1. What year at school is the child in who brought home this survey? Year 1, 2....8
- 2. Is the child who brought this survey home male or female? ₁ Male ₂ Female
- 3. How many children do you have in years 1-8?
- 4. What is the street intersection nearest your home? (please provide the names of the 2 intersecting streets)

5. How far does your child live from school? (please mark appropriate box with an X)

- | | | |
|--|---|---|
| <input type="checkbox"/> ₁ Less than 0.5 Km | <input type="checkbox"/> ₂ 0.5 Km up to 1 Km | <input type="checkbox"/> ₃ 1 Km up to 2 Km |
| <input type="checkbox"/> ₄ 2Km up to 3 Km | <input type="checkbox"/> ₅ 3 Km up to 4 Km | <input type="checkbox"/> ₆ 4 Km up to 5 Km |
| <input type="checkbox"/> ₇ more than 5 Km | <input type="checkbox"/> ₈ Don’t know | |

6. On most days, how does your child arrive and leave for school? (please select one choice per column and mark the appropriate box with an X)

Arrive at school

Leave from school

- ₁ Walk
- ₂ Bike
- ₃ School bus
- ₄ Family vehicle (only children in your family)
- ₅ Carpool (with children from other families)
- ₆ Transit (e.g. city bus)
- ₇ Other (e.g. skate board, scooter, etc)

- ₁ Walk
- ₂ Bike
- ₃ School Bus
- ₄ Family vehicle (only children in your family)
- ₅ Carpool (with children from other families)
- ₆ Transit (e.g. city bus)
- ₇ Other (e.g. skate board, scooter, etc)

7. How long does it normally take your child to get to/from school? (please select one choice per column and mark the appropriate box with an X)

Travel time to school

Travel time from school

- ₁ Less than 5 minutes
- ₂ 5 – 10 minutes
- ₃ 11 – 20 minutes
- ₄ More than 20 minutes
- ₅ Don't know/ Not sure

- ₁ Less than 5 minutes
- ₂ 5 – 10 minutes
- ₃ 11 – 20 minutes
- ₄ More than 20 minutes
- ₅ Don't know/ Not sure

8. Has your child asked for your permission to bike to/from school in the last year? ₁ Yes ₂ No

9. At what age would you allow your child to bike to/from school without an adult?

10. What of the following **issues** affect your decision to allow or not allow your child to bike to school (please select those that apply and mark the appropriate box on the LEFT with an X). Please also indicate whether you would let your child bike **if the problem was resolved** (please select yes, no, or not sure and mark the appropriate box on the RIGHT with an X)

Issue	If the problem was resolved		
<input type="checkbox"/> Distance.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Convenience of driving.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Time.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Child's out of school activities.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Speed of traffic along route.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Amount of traffic along route.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Adults to bike with.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Older child/ren to bike with.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Cycleways, room to bike	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Safety of intersections and crossing.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Crossing guards.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Violence or crime.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Weather or climate.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure

11. In your opinion, how much does your child's school encourage or discourage biking to/from school

- ₁ Strongly encourages ₂ Encourages ₃ Neither ₄ Discourages ₅ Strongly discourages

Comment/clarification: _____

12. How much fun is biking to/from school for your child?

- ₁ Very fun ₂ Fun ₃ Neither ₄ Boring ₅ Very Boring

Comment/clarification: _____

13. How healthy is biking to/from school for your child?

- ₁ Very healthy ₂ Healthy ₃ Neither ₄ Unhealthy ₅ Very unhealthy

Comment/clarification: _____

14. Please indicate your employment status (please select one choice and mark the appropriate box with an X)

- ₁ Full time ₂ Part time ₃ Home duties ₄ Other

15. Please indicate your spouse/partner's employment status (please select one choice and mark the appropriate box with an X)

- ₁ Not applicable ₂ Full time ₃ Part time ₄ Home duties ₅ Other

16. Bike trains (which are similar in principle to walking buses) are being used to promote children biking to/from school. A bike train is a group of children biking to/from school under the supervision of one or more adults

Would you be willing to participate in a bike train initiative at your child's school? ₁ Yes ₂ No

Any additional comments? _____

Round 2

18th September, 2012

Dear Parent or Caregiver,

I again invite you to participate in this survey about the Bikes In Schools project by completing the attached questionnaire. As previously the questionnaire is anonymous, and collects no information which may identify you. By completing and returning the questionnaire you are consenting to participate in this research project. The purpose of re-surveying everyone is to see if anything has changed over time in relationship to the Bikes In School project.

This questionnaire has been approved by the Eastern Institute of Technology Research Ethics and Approvals Committee (ref. 03/11) and has also been endorsed by your school Principal and Board of Trustees.

Thank you very much for your support.



Sincerely,

R.N. Marshall, PhD

Research Professor

Bikes In School Parent Survey - Round 2

Dear Parent or Caregiver,

We would again like to learn your thoughts about children biking to and from school. This survey will take about 5-10 minutes to complete. We ask that each family only complete one survey. If you have more than one child at school, please fill out the survey for the child with the next birthday from today's date.

After you have completed this survey, please send it back to school with your child or give it to a teacher. Your responses will be kept confidential and neither your name nor your child's name will be associated with any results

17. What year at school is the child in who brought home this survey? Year 1, 2....8
18. Is the child who brought this survey home male or female? ₁ Male ₂ Female
19. How many children do you have in years 1-8?
20. What is the street intersection nearest your home? (please provide the names of the 2 intersecting streets)
-

21. How far does your child live from school? (please mark appropriate box with an X)

- | | | |
|--|---|---|
| <input type="checkbox"/> ₁ Less than 0.5 Km | <input type="checkbox"/> ₂ 0.5 Km up to 1 Km | <input type="checkbox"/> ₃ 1 Km up to 2 Km |
| <input type="checkbox"/> ₄ 2Km up to 3 Km | <input type="checkbox"/> ₅ 3 Km up to 4 Km | <input type="checkbox"/> ₆ 4 Km up to 5 Km |
| <input type="checkbox"/> ₇ more than 5 Km | <input type="checkbox"/> ₈ Don't know | |

22. On most days, how does your child arrive and leave for school? (please select one choice per column and mark the appropriate box with an X)

Arrive at school

- ₁ Walk
- ₂ Bike
- ₃ School bus
- ₄ Family vehicle (only children in your family)
- ₅ Carpool (with children from other families)
- ₆ Transit (e.g. city bus)
- ₇ Other (e.g. skate board, scooter, etc)

Leave from school

- ₁ Walk
- ₂ Bike
- ₃ School Bus
- ₄ Family vehicle (only children in your family)
- ₅ Carpool (with children from other families)
- ₆ Transit (e.g. city bus)
- ₇ Other (e.g. skate board, scooter, etc)

23. How long does it normally take your child to get to/from school? (please select one choice per column and mark the appropriate box with an X)

Travel time to school

- ₁ Less than 5 minutes
- ₂ 5 – 10 minutes
- ₃ 11 – 20 minutes
- ₄ More than 20 minutes
- ₅ Don't know/ Not sure

Travel time from school

- ₁ Less than 5 minutes
- ₂ 5 – 10 minutes
- ₃ 11 – 20 minutes
- ₄ More than 20 minutes
- ₅ Don't know/ Not sure

24. Has your child asked for your permission to bike to/from school in the last year? ₁ Yes ₂ No

25. At what age would you allow your child to bike to/from school without an adult?

26. What of the following **issues** affect your decision to allow or not allow your child to bike to school (please select those that apply and mark the appropriate box on the LEFT with an X). Please also indicate whether you would let your child bike **if the problem was resolved** (please select yes, no, or not sure and mark the appropriate box on the RIGHT with an X).

Issue	If the problem was resolved		
<input type="checkbox"/> Distance.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Convenience of driving.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Time.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Child's out of school activities.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Speed of traffic along route.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Amount of traffic along route.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Adults to bike with.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Older child/ren to bike with.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Cycleways, room to bike	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Safety of intersections and crossing.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Crossing guards.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Violence or crime.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure
<input type="checkbox"/> Weather or climate.....	<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₂ No	<input type="checkbox"/> ₃ Not sure

27. In your opinion, how much does your child's school encourage or discourage biking to/from school

₁ Strongly encourages ₂ Encourages ₃ Neither ₄ Discourages ₅ Strongly discourages

Comment/clarification: _____

28. How much fun is biking to/from school for your child?

₁ Very fun ₂ Fun ₃ Neither ₄ Boring ₅ Very Boring

Comment/clarification: _____

29. How healthy is biking to/from school for your child?

₁ Very healthy ₂ Healthy ₃ Neither ₄ Unhealthy ₅ Very unhealthy

Comment/clarification: _____

30. Please indicate your employment status (please select one choice and mark the appropriate box with an X)

₁ Full time ₂ Part time ₃ Home duties ₄ Other

31. Please indicate your spouse/partner's employment status (please select one choice and mark the appropriate box with an X)

₁ Not applicable ₂ Full time ₃ Part time ₄ Home duties ₅ Other

32. Bike trains (which are similar in principle to walking buses) are being used to promote children biking to/from school. A bike train is a group of children biking to/from school under the supervision of one or more adults

Would you be willing to participate in a bike train initiative at your child's school? ₁ Yes ₂ No

33. Has anything changed over the past six months in relation to your attitude to biking? ₁ Yes ₂ No

If yes please comment: _____

Any additional comments? _____

Appendix 3 – Staff Focus Group Follow-up Questions

St. Mary's – sent via email

In the last report we summarised your teachers' comments as given below.

"The feedback from the St. Mary's pupils and teachers was overwhelmingly positive. The teachers noted many physical benefits (increased strength, endurance and balance) for the children from the programme along with improvements in confidence, perseverance and self-management. The teachers believed the programme enhanced social interactions, especially peer support with the students helping each other and that all these factors crossed over into the classroom with a positive influence on the children's academic work."

Is this still the case? Are there any other benefits/ negatives you might have noticed over time?

Peterhead – sent via email

In the last report we summarised your teachers' comments as given below.

"The Bikes In Schools project was seen as beneficial and positive by the Peterhead teachers. In particular, the road safety sessions were reported as being a key component of the project that the teachers wished to continue. Overall, the teachers liked having bikes and tracks within the school grounds but felt that bigger tracks, more bikes (large class sizes meant that sometimes there were not enough bikes for all the children), easier access to bikes from the storage shed and an increase in the challenge levels of the tracks was necessary for the project to cater to all the students and class needs. The teachers noted that time is not set aside in the curriculum for using the bikes and it is therefore up to the individual teachers when and if the bikes are used."

Is this still the case? Are there any other benefits/ negatives you might have noticed over time?

Maraenui Bilingual – sent via email

In the last report we summarised your teachers' comments as given below.

"Overall the Maraenui teachers reported the Bikes In Schools project as being a very positive enhancement to the school which they felt the children benefited from as well as enjoyed. The teachers noted many physical benefits (increased physical fitness and motor skills) for the children from the programme along with improvements in confidence, independence and perseverance. The teachers believed that all these factors crossed over into the classroom with the students being more settled once they had been able to "let off steam" as well as improving coordination and fine motor skills which carried over into their writing and other classroom activities. While extremely

supportive of the programme, the teachers mentioned they would like more helmets and easier access to bikes from their storage area at the back of the hall.

Cycling is an integral part of the Maraenui School curriculum and the teachers noted that the students looked forward to these sessions. The teachers perceived the road safety sessions as a key component of the project that had many flow on effects into the community. Support by the local Police on a group ride to Clive had also enhanced the Bikes In Schools project and community relations. “

Is this still the case? Are there any other benefits / negatives you might have noticed over time?