

# Effectiveness of school-based intervention on active transport to school in primary and intermediate schoolchildren in the New Plymouth District

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## Abstract

Active modes of transport to school (e.g. walking and cycling) are a sustainable and equitable way to increase physical activity in children. Let's Go initiative, jointly funded by the New Plymouth District Council and New Zealand Transport Agency, aims to increase active travel in New Plymouth District communities including schools. We investigated the relationship between school decile and effect of district council active travel promotion programme for schools in the New Plymouth District in Taranaki, New Zealand.

Between 2008 and 2017, active travel data was collected from participating primary and intermediate schools (21 schools, mean size 309 students) in the New Plymouth District via "Hands Up" surveys. Rates of active transport were analysed by school decile ratings. Active travel was defined as walking, cycling/scooter, or 'park and walk'.

Mean follow up period was 4.8 years. The mean overall rate of active travel increased from 34.9% in the initial survey to 56.4% in the most recent survey, an increase of 22.5 percentage points. There was an association between school deciles and increase in active travel with decile 2-5 schools (schools with students from poorer communities) experiencing an increase of 14.7 percentage points on average and decile 6-10 schools (schools with students from more affluent communities) increasing active travel by 26.5 percentage points on average.

The analysis of the school survey data showed that schools participating in Let's Go initiative in the New Plymouth District experienced a significant and sustainable increase in rates of active transport to school. However the effect was smaller for low decile schools. It is recommended that further research should be conducted to determine the potential barriers to change in low decile schools to ensure parity with mid to high decile schools.

## Introduction

Physically active children are healthier, happier, do better at school and are more socially connected than children who have more sedentary lifestyles (Garrard 2011). There are additional benefits if children walk, cycle or use other forms of active non-motorised transport to school which include community liveability, social connectedness, environmental sustainability and a more equitable distribution of physical activity across some key population demographic segments (eg. adolescents, particularly females, are more likely to meet physical activity guidelines if they travel actively to school) (Morgan, et al. 2016).

Despite this, children in Taranaki are less likely to use active transport to get to and from school and are more likely to watch television than children in other parts of New Zealand. They are also more likely to be obese. The New Zealand National Health Survey in the time period 2014 to 2017 showed that 19.3% of children aged 0-14 years in Taranaki were considered to be obese compared with 11.3% of children nationally (Ministry of Health 2017).

Since the 1980s, there has been a dramatic fall in the number of children who walk or cycle to school. In 1989 half of children cycled or walked to school and a third came by car. Today these numbers have been reversed. Parents are more likely to drive their children to school mostly because they are worried that walking and cycling are not safe (Green Party 2016).

A New Zealand systematic review and meta-analysis published this year which examined the associations between active travel to school and the neighbourhood built environment found that the distance to school was the strongest predictor of active travel to school. It also found that girls were less likely to use active transport to school and school socioeconomic status was negatively associated with school travel mode (Ikeda, et al. 2018)

In 2010, the New Plymouth District Council was chosen as a recipient for funding to become a “walking and cycling model community”. Part of the Lets Go project in New Plymouth District involves working with schools. All participating schools are provided with a travel planner which includes: school specific maps with safe active travel routes, safe places to cross the road, and shortcuts and pathways through parks. Let’s Go provides cycle and scooter safety workshops and program leaders also partner with school staff on other initiatives for increasing active modes of getting to and from school. The Lets Go school travel planning programme is recognised nationally as an effective model. A 2015 study comparing New Plymouth and the other model community which received New Zealand Transport Agency funding (Hastings) with control cities (Whanganui and Masterton) found that a statistically significant net increase in the odds of active travel in the intervention cities (Keall, et al. 2015).

Active transport to school has the potential to mitigate health inequities in physical activity and obesity, as it represents a cheap and accessible way for children to increase physical activity levels. Parents in socioeconomically deprived areas identify cost as a major barrier to physical activity, with high cost of after school activities preventing participation (Curtis, Hinckson and Water 2012). Children living in more deprived areas are significantly more likely than children in affluent areas to be overweight or obese (Utter, et al. 2007). Research on the effect of socioeconomic deprivation on rates of active transport to school suggests an association with socioeconomic deprivation and rates of active transport (Ikeda, et al. 2018) (Mandic, et al. 2015).

The aim of this study is to investigate whether school socioeconomic factors influence the effect of Let’s Go initiative on active transport rates in primary and intermediate schools in the New Plymouth District. Findings will inform future directions for the initiative.

## **Methods**

The Lets Go team of the New Plymouth District Council has carried out regular active transport surveys of involved schools since the start of the programme in March 2008. The first survey in each school was conducted preceding implementation of any interventions at that school, with the exception of some schools having received cyclist and scooter skills training prior to their first survey. Schools were then encouraged to repeat the survey annually. Rates of active travel was gathered via a survey conducted by school staff, student leaders or Let’s Go project staff on a fine day. Brief explanation on definitions for each transport method was given. Students were asked about their method of getting to the school that day and instructed to put their hand up for the option that applied to them. The number of students who put their hands up was tallied for each

transport method. The results were then divided into two categories: active travel, and non-active travel. Active travel was defined as walking, cycling/scooter, or ‘walk and park’. ‘Walk and park’ was defined as students being dropped off some distance away from the school (500m from the gate as a guide) and walking the rest of the way. Non-active travel was defined as bus, car or rideshare, where multiple students are dropped off together in a carpooling arrangement.

Data on school deciles and demographics was obtained from Ministry of Education school directory (Ministry of Education 2018). School deciles denote what proportion of the students comes from low socio-economic communities, based on criteria such as household income and parents’ occupations. Deciles range from 1 to 10, 1 being highest proportion of students from low socioeconomic communities, who receive the most financial support from the Ministry of Education, and 10 being the lowest proportion of such students and receiving the least funding. The database of school active travel surveys was compared to the school deciles and demographics on the directory and analysed for possible relationships.

Statistical analysis was performed using Microsoft Excel 2010. Differences in student roll and decile between participating and non-participating schools were assessed by unpaired two-tailed *t* tests. Paired two-tailed *t* test was used to assess the changes in rates of active transport before and after the intervention. Initial rates of active transport, final rates of active transport and the change in active transport rates were each plotted against the decile of the school and fitted with a linear trendline and coefficient of determination calculated. The relationship between the rates and school decile was assessed using the Pearson correlation coefficient.

## Results

Between March 2008 and November 2017, active transport surveys were conducted in 22 schools. There are a total of 41 primary and intermediate schools in the New Plymouth District. On average, schools were followed up for 4.8 years. One school was excluded from the analysis as only one survey was conducted there. Data from the remaining 21 schools were used to compare changes in active transport rates between the time of first survey at that school and the most recent survey. Of the 21 schools, 14 were contributing schools (schools for students in years 1-6), 5 were full primary (years 1-8) and 2 were intermediate (years 7-8). The schools ranged in deciles from 2 to 10, with the mean decile being 5.8. Mean student roll was 309 and median was 297.

Table 1: Participating and non-participating school characteristics

	Student roll (Mean)	Student roll (median)	Decile (mean)	% in New Plymouth city
Participating schools	309.5	297	5.8	76.2%
Non-participating schools	116.1	111	6.5	50.0%

Contributing, full primary and intermediate schools in New Plymouth district who had never conducted a survey (N=19) had the same range of deciles (2-10) and a similar

average decile (6.5,  $p=0.49$ ), and a significantly smaller school roll (mean 116.1, median 111,  $p<0.00001$ ) compared to schools participating in the surveys. Non-intervention schools were also more likely to be outside New Plymouth city, with 50% of schools from areas outside New Plymouth city (such as Urenui and Inglewood) compared with 76.1% of intervention schools.

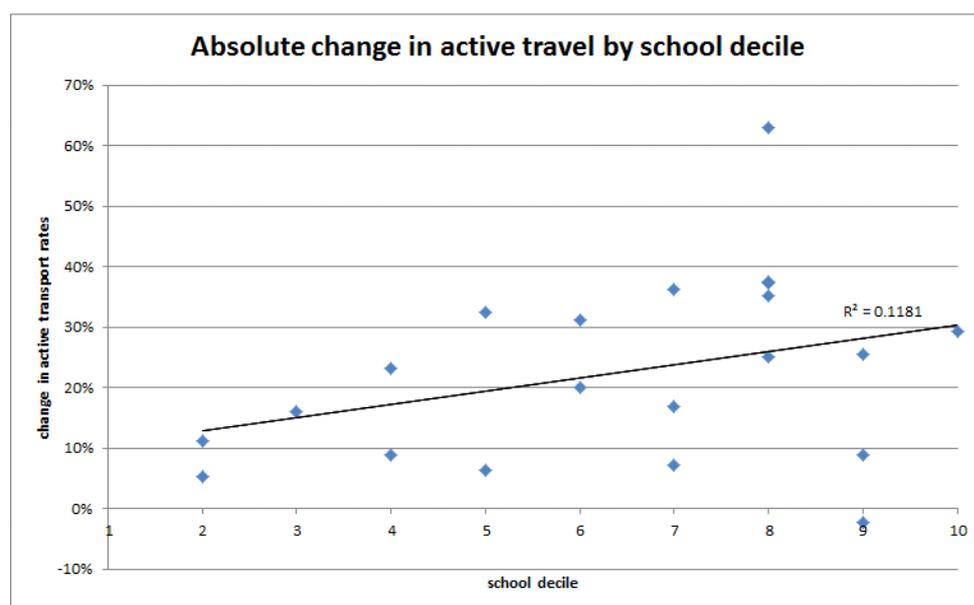
Table 2: Mean rates of children using active transport by school decile

Decile	1	2	3	4	5	6	7	8	9	10
Number of schools	0	2	1	2	2	2	3	6	2	1
Initial	N/A	42%	31%	43%	32%	33%	41%	27%	31%	43%
Final	N/A	50%	47%	59%	52%	58%	61%	67%	41%	73%
Change	N/A	+8%	+16%	+16%	+19%	+26%	+20%	+40%	+11%	+29%

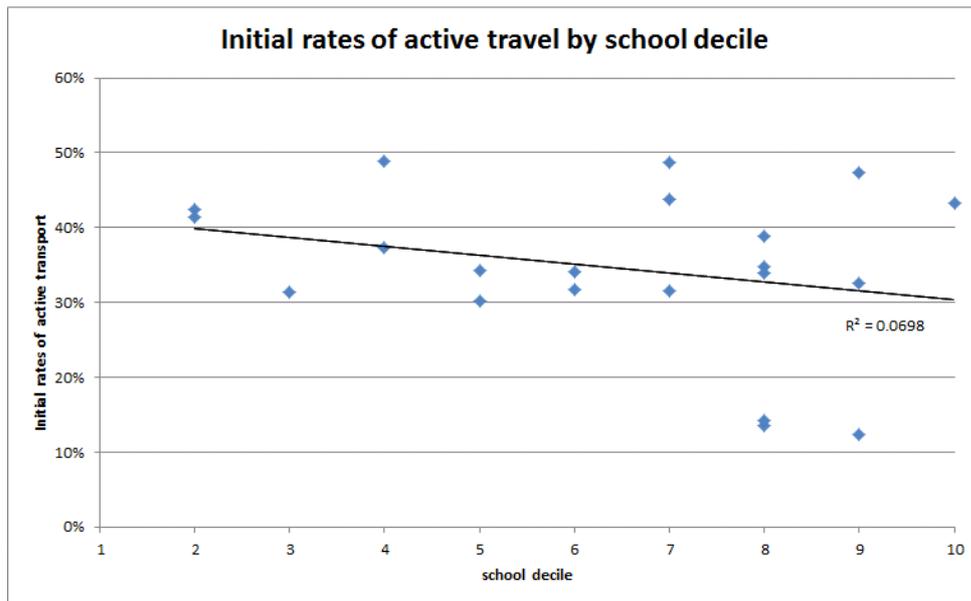
Increases in active transport rates between initial and most recent surveys were observed across all deciles (table 2) and for 20 out of 21 participating schools. The average increase was 22%. For a school with 300 students, this represents 66 more students using active transport to school. The increase in active transport rates was statistically significant ( $p<0.00001$ ).

There was a weak trend of increasing change in active transport levels with schools with higher deciles ( $p=0.34$ )(graph 1). Low decile schools tended to have higher rates of initial active travel ( $p=0.26$ )(graph 2) but lower rates of active travel in their most recent travel survey( $p=0.20$ )(graph 3). Therefore active travel gains were not sustained. These trends were not statistically significant.

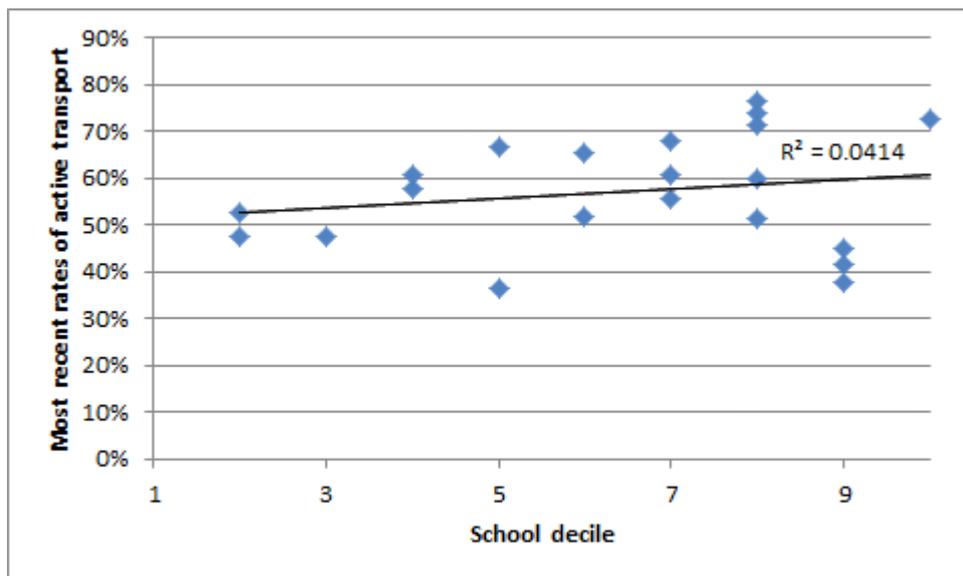
Graph 1: Change in active travel by school decile



Graph 2: Initial active travel rates by school decile



Graph 3: Most recent rates of active travel by school decile



### Discussion

This study examined active transport rates in schools following the New Plymouth District Council’s Let’s Go project intervention. There was a significant, overall increase of 22.5% from baseline to current active travel rates. This contrasts with the national trend where rates of active transport to school have been stagnant since 2006/07 (Ministry of Health 2017).

The relationship between school deciles and changes to active transport rates for Let’s Go participating schools was also examined. While all schools increased their active travel, there was a large inter-school difference in the response to intervention. Lower decile schools tended to have lower rates of increase in active transport, which was not fully explained by the higher initial rates of active transport. This is consistent with previous

research on school-based interventions to increase physical activity rates in children, which suggested a trend of lower health outcomes in low-decile schools (Rush, et al. 2012). Potential causes could include staffing issues. A survey of primary and intermediate principals found that more principals reported difficulty finding suitable teachers in lower decile schools (Wylie 2017). Lower decile schools also face other educational and social challenges often requiring school resources for other, higher priority programs.

Surveys were conducted using the “Hands Up” surveys, which is a validated and highly reliable method to measure transport methods in children (Wit, et al. 2012)

School surveys were conducted for the entire population of the school, rather than following students who participated in previous surveys. Therefore, the effect of the intervention may have been underestimated due to movement of students between intervention and non-intervention schools. This may partially explain the association between school decile and response to intervention. Principals of lower decile schools were more likely to identify student mobility and transience as an issue in their school (Wylie 2017).

Schools that did not participate in the surveys tended to have smaller student numbers than participating schools. This may be because smaller schools are less likely to have staff available to lead the intervention within their school. Non-participating schools also had an increased proportion of rural/semi-rural schools outside New Plymouth city. Rural schools may be less likely to be motivated to increase active transport, due to increased challenges such as longer distance from students’ homes to school as well as reduced pressures such as traffic congestion and scarcity of parking.

Increased active travel is thought to improve health outcomes such as rates of heart disease and diabetes due to the effect of increased physical activity (Chapman, et al. 2018). However, increased rates of children’s active transport to school also increases risk of exposure to factors that are detrimental to health, such as consumption of unhealthy foods during trips to and from school. This is of particular concern in schools in high deprivation areas due to greater access to fast food, takeaway, and convenience outlets near the school (Vandevijvere, et al. 2016).

## **Conclusion**

Schools participating in Let’s Go school travel planning experienced a significant and sustained increase in rates of active transport to school. This effective program, however, is associated with smaller improvements for lower decile schools. More support and investigation of the potential barriers to increased and sustained change in low decile schools are required to ensure parity with high decile schools.

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