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# Trends and measurement issues for active transportation in New Zealand's physical activity report cards for children and youth

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ABSTRACT

*Introduction:* Active transport (AT) contributes to human and environmental health but is low and declining in New Zealand (NZ) children and youth. Quality evidence is necessary to inform and evaluate interventions, identify inequities, and understand trends. NZ has participated in the Global Physical Activity (PA) Matrix since 2014. This collaboration uses a harmonised process to develop national Report Cards including "grades" for PA behaviours, including AT. The purpose of this article is: (1) to detail the development of NZ's 2018 PA Report Card, focusing on AT; (2) to examine AT trends across the Report Cards (2014/2016/2018); and (3) to consider implications of methodological approaches and available data sources for monitoring and promoting AT.

*Methods:* For the 2018 NZ PA Report Card, data sources were identified through academic and grey literature, and online searches in 2017–2018. A panel of national experts contributed to grading the AT indicator through identification of pertinent data sources, and discussion and agreement on the final grade. Methodologies and results for AT across the Report Cards were collated and compared.

*Results:* Grades for the AT indicator have remained consistently low across report cards: in 2014, the overall grade was C and this reduced to C- in 2016 and 2018. Subgroup differences (i.e., sex, ethnicity, deprivation) were observed in AT across all time periods; however, these were not consistent across surveys or Report Cards. Data sources and survey items used to calculate the AT grades across three reports varied substantially, limiting ability to track changes in AT over time and compare results across surveys.

*Conclusions:* The low and declining levels of AT in NZ children and youth indicates that national strategies to increase AT are urgently required. Future efforts should aim to standardise measurements of AT across national surveys to enable monitoring and comparison of patterns across time.

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## 1. Introduction

Physical activity is essential for optimal health and development in children and youth (Strong et al., 2005). Children's activity can be accumulated in a number of ways, in particular through structured/organised sports and recreational activities, physical education, active/unstructured free play, school-based activity, and active transportation (e.g., walking and cycling), all of which have distinct benefits (Salmon and Timperio, 2007). Active transportation is a behavior of particular interest, due to low cost, regularity of behavior, potential for contributing to community cohesion, and associations with physical activity (Schoeppe et al., 2013; World Health Organization, 2018). Findings from the International Study of Childhood Obesity, Lifestyle and the Environment (ISoCOLE) including over 6000 children from twelve countries showed that children who used active transport accumulated an average of 6 min more of moderate-to-vigorous physical activity (MVPA) per weekday (95% CI 4.7–7.3) than their peers who used motorized transport (Denstel et al., 2015). Given low levels of participation in MVPA internationally, this difference has meaningful implications for health, with any small increase an important one (Ekelund et al., 2012). Importantly, active travelers in the ISoCOLE study were also significantly more likely to accumulate 60 min of MVPA per day than children who used motorized transport. This level of physical activity is recommended due to demonstrated relationships with optimal cardiovascular, metabolic, and bone health (Strong et al., 2005; US Department of Health and Human Services, 2008; World Health Organization, 2010). Evidence also suggests active transportation may help maintain a healthy body weight (although more research in this area is needed) (Faulkner et al., 2009; Larouche et al., 2014), and contribute to improved cardiovascular fitness (especially for cycling) (Larouche et al., 2014). Reduction in the rates of motorized transportation modes in favour of active transportation is also beneficial for environmental health, including reduced traffic congestion and noise and air pollution, ultimately contributing to urban vitality and climate change mitigation (World Health Organization, 2018). Despite these benefits, active transportation in New Zealand children and youth is low and has declined significantly over recent decades (Ministry of Transport, 2014).

A socio-ecological approach recognizes the fundamental role of family and peers, school settings, community environment, and government policies in supporting child and youth active transportation (Ikeda et al., 2018a, 2018b; Pont et al., 2009). High quality evidence is necessary to inform active transportation intervention and programme design, to measure the effectiveness of interventions, identify inequities, and understand trends in active transportation behaviours over time. While acknowledging the importance of culturally and contextually relevant evidence, global comparisons can also be helpful where insights can be gained from countries with higher than average levels of participation in active transportation.

The global physical activity matrix has been led by the Active Healthy Kids Global Alliance (AHKGA) since 2014 (Tremblay et al., 2014). This international collaboration uses a harmonised process for evaluating how countries are performing in relation to children's physical activity behaviours (including active transportation) and related environmental contexts. The indicators capture a range of physical activity behaviours and outcomes, specifically: overall physical activity (%meeting recommended physical activity levels of at least 60 min of moderate-to-vigorous activity per day), organised sport and physical activity (% participating in sport and/or physical activity programs), active play (% reporting being outside for several hours a day; % engaging in unstructured/unorganized active play for several hours a day), active transportation (% using active transportation to get to and from places), sedentary behaviours (% who have no more than 2 h of screen time per day, and physical fitness (average percentile achieved on physical fitness indicators; 2018 only; not all countries reported this indicator). Indicators were also used to assess activity contexts, specifically family and peers, schools, community settings and environments, and government policies. Country-specific Physical Activity Report Cards are useful for raising awareness and advocating for health promoting policies and environments for healthy, active children and youth. In 2014 the first Global Matrix was released, including results from 15 countries across five continents (Tremblay et al., 2014). In 2016 the Global Matrix 2.0 involved 38 countries across six continents (Tremblay et al., 2016), and in 2018 the Global Matrix 3.0 involved 49 countries across six continents (Aubert et al., 2018a) including 30 very high Human Development Index countries (Aubert et al., 2018b). Findings have been used to identify gaps in physical activity surveillance and research, and to advocate for interventions and strategies to improve health outcomes for children and youth (Aubert et al., 2018a).

New Zealand has participated in each wave of the global matrix, producing long (Maddison et al., 2014b; Smith et al., 2018b) and short (Smith et al., 2018a) reports, academic manuscripts (Maddison et al., 2014a, 2016; Smith et al., 2018c), and numerous conference presentations. In 2018, due to the large number of countries participating, each country produced a short report rather than full manuscript, limiting opportunities to provide detail on data sources and equity in physical activity participation, or to consider differences in physical activity indicators across time periods. The purpose of this article is three-fold: (1) to provide details on the development of New Zealand's 2018 Report Card, including key data sources and results for population subgroups focusing on active transportation; (2) to examine trends in active school transportation across the three time periods; and (3) to reflect on the different methods, surveys, and results across the three New Zealand Physical Activity Report Cards with regard to active transportation and implications of methodological approaches and available data sources for monitoring and promoting active transportation.

## 2. Methods

### 2.1. Global matrix 3.0

Ten Global Matrix 3.0 indicators and benchmarks for use in Physical Activity Report Cards were generated from previous report cards and feedback from a workshop at the Global Matrix 2.0 release (Aubert et al., 2018a). In 2018, changes from previous years included the addition of a new indicator (Physical Fitness), and modifications to benchmarks (e.g., for overall physical activity, the benchmark changed from "at least 60 min of moderate-to-vigorous physical activity per day" to "at least 60 min of

moderate-to-vigorous physical activity per day on average.") No changes were made to the active transportation indicator. Grading criteria are outlined in Table 1. Countries were advised to synthesise national data from the previous five years, that included school-aged children and youth (approximately 5–17 years of age). Each country submitted draft grades and their rationale to the AHKGA Executive Committee for auditing prior to finalization of grades and report cards.

### 2.2. New Zealand 2018 Physical Activity Report Card grade development

In 2018, a panel of national experts in children's physical activity was convened by the lead author (MS). Experts were identified through their previous involvement in New Zealand Physical Activity Report Cards and recent published research in areas aligning with the report card indicators. Individual panel members took responsibility for identifying key datasets, sourcing data, and generating preliminary grades for discussion with the panel. Most correspondence was via email, video or telephone conferences, with minimal face-to-face meetings (limited to Auckland-based researchers only). All panel members contributed to grading indicators through identification of pertinent data sources, and discussion and agreement on the final grades.

Data sources were identified through academic and grey literature, and online searches which were conducted between October 2017 and May 2018. To distinguish new data arising since the publication of the 2016 Physical Activity Report Card, data sources were limited to those published between the years 2015–2018. Where data were not publicly available, authors or organisations were contacted directly to request access to anonymised datasets or summary statistics.

A 3-tier hierarchy for strength of evidence was employed to weight the contribution of data sources to the final grade. Nationally representative datasets (Tier 1) were prioritised. Regional representative datasets or national non-representative datasets were classified as Tier 2, and were used either in the absence of Tier 1 data sets, or to supplement the grades where appropriate. Regional, non-representative datasets were considered as Tier 3 and only used either in the absence of Tier 1 or Tier 2 datasets, or where objective data were available in the Tier 3 dataset but not in Tier 1 or Tier 2 datasets.

### 2.3. Trends in active transportation across the 2014, 2016, and 2018 New Zealand Physical Activity Report Cards

The Global Matrix definition for active transportation across all three report cards was any form of human-powered transportation (e.g., walking, cycling, using a wheelchair, in-line skating, skateboarding, scootering). The benchmarking criteria used across all three report cards was the percentage of children and youth who used active transportation to get to and from places (e.g., school, park, mall, friend's house). There was no defined frequency of active transportation for this benchmark (e.g., at least *x* number of trips per day/week, or reporting active transportation as the usual mode of transport).

Data sources varied across the three time points, as detailed in Table 2. In some cases this was due to unavailability of current data. For example, active transportation was not assessed in children participating in the longitudinal Growing up in New Zealand study in 2014 or 2016 as they were aged 2 and 4 years at the time of the survey, respectively. In the case of the New Zealand Household Travel Survey and the New Zealand Secondary School Sport Census, different inclusion criteria employed across Physical Activity Report Cards resulted in inconsistent approaches to whether survey data were included or not. Descriptions of data sources from 2014 to 2016 have been detailed elsewhere (Maddison et al., 2014a, 2016). Data sources used to calculate the active transportation grade for the 2018 Physical Activity Report Card including questions used to measure active transportation are outlined in Table 3 and described below. As can be seen from Table 3, and the proceeding text, survey methods and questions used to calculate the active transportation grades varied substantially among different datasets.

**The New Zealand health survey** is a nationwide survey run by the health and disability intelligence group within the Ministry of Health (Ministry of Health, 2017b). Survey findings are used to monitor population health and provide evidence to inform policy and strategic development. The survey comprises a set of core items with rotating additional module topics. A multi-stage, stratified, proportional-to-size sampling design is used, selecting potential respondents using both area-based and list-based electoral roll samples. Over 13,000 adults and 4000 parents/caregivers of children aged 0–14 years participate in the survey every year. The

**Table 1**
Grading criteria for indicator benchmarks used in the Global Matrix 3.0

| Grade | Percent meeting benchmark | Interpretation |
|---|---|---|
| A+ | 94–100% | We are succeeding with a large majority of children and youth |
| A | 87–93% | |
| A- | 80–86% | |
| B+ | 74–79% | We are succeeding with well over half of children and youth |
| B | 67–73% | |
| B- | 60–66% | |
| C+ | 54–59% | We are succeeding with about half of children and youth |
| C | 47–53% | |
| C- | 40–46% | |
| D+ | 34–39% | We are succeeding with less than half, but some children and youth |
| D | 27–33% | |
| D- | 20–26% | |
| F | <20% | We are succeeding with very few children |
| INC | Not applicable | Incomplete/insufficient data |

**Table 2**
Data sources available and dates of data sources used for each New Zealand Physical Activity Report Card.

| Data source | New Zealand Physical Activity Report Card year | | | | | |
|---|---|---|---|---|---|---|
| | 2014 | | 2016 | | 2018 | |
| | Dates (reference) | % using AST | Dates (reference) | % using AST | Dates (reference) | % using AST |
| New Zealand Health Survey | 2012/2013 (Ministry of Health, 2013) | 45% | 2014/2015 (Ministry of Health, 2015) | 41% | 2016/2017 (Ministry of Health, 2017a) | 45% |
| Youth '12 | 2012 (Adolescent Health Research Group, 2013) | 33% | 2012 (Adolescent Health Research Group, 2013) | 33% | Data not available for 2015–2018 time period | n/a |
| New Zealand Household Travel Survey | 2008–2011 (Ministry of Transport, 2012) | 27% | Not used[a] | n/a | 2015–2017 (Ministry of Transport, 2018) | 30–31% |
| New Zealand Secondary School Sport Census | Not used[b] (Department of Statistics et al., 2013) | n/a | Not used[b] | n/a | Not used[b] | n/a |
| Active New Zealand Youth Survey | Not available | n/a | Not available | n/a | 2018 (Sport New Zealand, 2018) | 43% |
| Growing up in New Zealand | Not available | n/a | Not available | n/a | 2017 (Morton et al., 2010) | 24% |
| Health and Lifestyles Survey | Not available | n/a | Not available | n/a | 2016 (Health Promotion Agency, 2017) | 30% |

AST = active school transport.
[a] For the 2016 Physical Activity Report Card, the New Zealand Health Survey was prioritised as the primary source of data.
[b] This census was ranked as Tier 2 evidence due to lack of clarity around the data being nationally representative and lack of clarity on methodology. Because Tier 1 evidence existed, this survey was considered in contextualising results, but not actually used in the active transportation grade calculations for any report cards. It has been included in this table in the interest of completeness of reporting available datasets in New Zealand.

2016/17 survey collected data from July 2016 to June 2017. Eighty percent of the invited parents/caregivers participated in the 2016/17 survey. Weighting was used to ensure data were representative of the New Zealand population. The New Zealand Health Survey provides robust and consistent subgroup comparisons for key demographic groups as follows: sex (boys versus girls), ethnicity (Māori versus non-Māori, Pacific versus non-Pacific, Asian versus non-Asian) for the entire sample and separately for boys and girls, and area-level socio-economic deprivation (most deprived versus least deprived). Changes over time are also assessed for these key demographic groups.

**The active New Zealand youth survey** was launched by sport New Zealand in 2017 (Sport New Zealand, 2018). This is a nationally representative continuous survey of New Zealanders aged five and upwards. Survey topics include organised sport and physical activity participation, screen time, and active transportation. Multi-stage probability stratified sampling was employed using the electoral roll and data were collected between January 17 to January 2018. For 5–17 year olds, an online survey was administered. Parents/caregivers responded on behalf of children aged 5–11 years, and those aged 12–17 years self-completed the online survey, with a final sample size of 6004 children and young people (32% response rate). Weighting is used to ensure data are representative of the New Zealand Regional Sports Trust population using 2013 Census statistics. Study-specific subgroup comparisons for sex, ethnicity, age, and area-level socio-economic deprivation were undertaken for this study.

**Growing Up in New Zealand** is a longitudinal study of child development. The child cohort consists of 6853 children who were recruited through their pregnant mothers (n = 6822) who were due to have their babies between the 25th of April 2009 and the 25th of March 2010. The geographical area chosen for recruitment was the region of the North Island covered by the three contiguous District Health Boards (DHBs) of Auckland, Counties Manukau and Waikato. The cohort recruited is broadly generalisable to all New Zealand children in terms of ethnicity and sociodemographic status (Morton et al., 2015). The data used for the Physical Activity Report Card is from the 72 month data collection wave of *Growing Up in New Zealand*. This data collection was an electronic data collection that was completed by mothers of the cohort children when their child was approximately 6 years of age (n = 5709).

**The New Zealand household travel survey** is undertaken by the Ministry of Transport (Ministry of Transport, 2018). The survey involves households completing a 2-day (2003-mid 2015) or 7-day (mid 2015-mid 2018) travel diary of trips made and mode of travel for each trip. Households are randomly selected for participation from primary sampling units and visited in person to recruit individuals living within the household, including children and youth aged 5–17 years. In 2016, 40% of households invited fully completed the survey; 61% of households had at least one individual complete the survey. Weighting is applied to ensure data are representative of the New Zealand population.

**The Health and Lifestyles survey** is managed by the Health Promotion Agency (Health Promotion Agency, 2017). It is a biennial survey of health behaviours and attitudes of adults aged ≥15 years and parents/caregivers of children and youth aged 5–16 years (Health Promotion Agency, 2017). Multi-stage area-based sampling using meshblocks (i.e., smallest geographic units for which statistical data are collected and processed in New Zealand) was employed to recruit one adult or parent/caregiver in eligible households. Participants were interviewed face-to-face in their usual residence. In 2016, the weighted survey response rate for parents/caregivers was 65%. Weighted statistics are generated to ensure the data are representative of the New Zealand population.

**Table 3** (*continued*)

| Source | N | Question | Response options | Method of determining proportion of active transportation |
|---|---|---|---|---|
| | | | o Passenger/Bus<br>o Bike/Bus<br>o Drive/Passenger<br>o Drive/Train<br>o Passenger/Train<br>o Walk/Bus/Train<br>o Walk/Passenger/Bus<br>o Walk/Drive/Bus<br>o Walk/Drive/Train<br>o Walk/Passenger/Train<br>o Car/Bus<br>o Walk/Taxi<br>o Drive/Bike<br>o Passenger/Bike<br>o Passenger/Train/Bus<br>o Other mixed | |
| Health and Lifestyles survey | 1160 | Which mode of transport does [child's name] most regularly use to travel to school? Think about the one that they travel by for the longest amount of time each week. Please answer from Showcard L5.<br>If necessary: By longest amount of time, add up the total amount of time [child's name] spends on each mode of transport over the week. | One response from the following: o Motorbike/ motorscooter/moped<br>o Car, truck or van<br>o Bus<br>o Train<br>o Bicycle<br>o Walking<br>o Jogging or running<br>o Skateboarding or scootering<br>o Ferry<br>o None, or little travel (home schooled etc.)<br>o Other (please specify)<br>o Don't know<br>o Refused | The percentages of 'walking', 'bicycle' or 'skateboarding or scootering' were summed. |

## 3. Results

Grades for the active transportation indicator have remained consistently low across three report cards – the active transportation grade was C in 2014 and this was lowered to C- in 2016 and 2018. Rates of active transportation in surveys used for the 2018 Physical Activity Report Card ranged from 24% of six year olds in the Growing up in New Zealand Survey (D-) (Morton et al., 2010) to 45% of children and youth aged 5–14 years in the New Zealand Health Survey (C-) (Ministry of Health, 2017a). In the Active New Zealand Youth Survey 43% of children and youth aged 5–17 years old usually used active transport to and from school (C-) (Sport New Zealand, 2018). Data from the Health and Lifestyles survey (D) (Health Promotion Agency, 2017) and the New Zealand Household Travel Survey (D) (Ministry of Transport, 2018) showed that just under a third of children used active transportation to school and/or other destinations.

Subgroup differences were observed in active transportation rates across all three time periods; however, these were not consistent across surveys or New Zealand Report Cards. In 2014, 2016, findings from the New Zealand Health Survey showed children and youth who lived in more deprived areas had a significantly higher likelihood of active transportation to school compared with those residing in least deprived areas (Ministry of Health, 2013, 2017a). The only significant subgroup difference in 2018 was for Pacific boys, who were 1.19 (95% CI 1.01–1.41) times more likely to actively travel to school than their non-Pacific peers (controlled for age). Significant decreases in prevalence of active transportation to school have been observed between the 2011/2012 and 2016/2017 New Zealand Health Surveys for Māori girls (54.3% versus 39.3%, $p < 0.01$), all Māori children and youth (51.6% versus 44.1%, $p = 0.02$), and Pacific girls (55.9% versus 41.0%, $p = 0.01$).

The Active New Zealand Youth Survey also examined differences between subgroups. Boys were significantly more likely to use active transportation to get to and from school (46% versus 40%). Children and youth of Asian ethnicity had significantly higher rates of active transportation than children of New Zealand European or Māori ethnicity (48%, 42%, and 40%, respectively). Children and youth aged 12–14 years had significantly higher rates of active transportation than other age groups (49% versus 36–43%). Children aged 5–7 years had significantly lower rate of active transportation than other age groups (36% versus 41–49%). No significant differences in the rates of active transportation were observed by area-level socio-economic status.

## 4. Discussion

Results of New Zealand Physical Activity Report cards indicated that rates of active transportation among New Zealand children and youth are low and continue to decline. Heterogeneity in methodology and measurement of active transportation limited the ability to track changes in travel patterns over time and compare results across surveys. Therefore, future efforts in New Zealand should focus on promoting active transportation to and from school and other destinations and standardising measurements of active transportation across national surveys.

Given the high levels of physical inactivity and increasingly sedentary lifestyles among children and adolescents globally (Aubert et al., 2018a) as well as in New Zealand (Smith et al., 2018c), low and declining rates of active transportation in New Zealand are concerning and could further reduce opportunities for physical activity in these age groups. If this pattern continues in New Zealand, there may be a risk of socio-economic, ethnic, and gender inequities, particularly given the decreases in the rates of active transportation among Māori children/youth and Pacific girls reported here. Considering the multiple health benefits of active transportation for children and youth, encouraging and increasing rates of active transportation to and from school has been emphasized as a key policy recommendation in New Zealand (Mandic et al., 2019) and internationally (World Health Organization, 2018).

In New Zealand children and youth, common barriers to active transportation to school and other destinations include distance (Ikeda et al., 2018b), social norms (Hawley et al., 2019), lack of family, peer and/or school support (Mandic et al., 2017a), convenience of car travel (Ikeda et al., 2019; Mandic et al., 2017a), inclement weather (Mandic et al., 2017a), built environment characteristics of home and school neighbourhoods (e.g., street connectivity, safety from traffic) (Ikeda et al., 2019; Pocock et al., 2019), and neighbourhood perceptions, particularly child and parent traffic safety concerns (Ikeda et al., 2019; Mandic et al., 2017a; Smith et al., 2019). In addition, country-specific factors such as high rates of private vehicle ownership (Environmental Health Indicators New Zealand, 2017), cycle helmet legislation (Molina-García et al., 2018), cycling skills (Mandic et al., 2018), school uniform requirements (Hopkins and Mandic, 2017), and school choice policies (Mandic et al., 2017b), further impact travelling patterns of New Zealand children and youth. This evidence suggests multi-sectoral approaches including urban planning, school-level and community-level initiatives, culturally appropriate approaches, social marketing campaigns, and family support are all required to enable active transportation for children and adolescents in New Zealand.

Multiple high quality data sources existed to measure participation in active transportation in New Zealand's 2018 Report Card. However, these data sources were limited to understanding transport modes for the school journey only and so provides a limited understanding of children's total active transport. Children and youth use active transport to travel to destinations beyond school (Clemens and Lincoln, 2018; Dollman and Lewis, 2007). It is also possible that a pattern of no active school transport does not necessarily translate to having no active transport to other destinations for individuals. Unaccompanied or unsupervised trips (i.e., independent mobility) made are also not assessed in the Physical Activity Report Card criteria, and datasets do not exist to understand this behavior at the national level in New Zealand. These forms of active transportation may have unique benefits for accumulating physical activity, social relationships, child development, and mental health (Marzi and Reimers, 2018). It would thus be worth considering both active transport to destinations beyond school, and independent mobility, in future national surveys and Physical Activity Report Card assessments. It should also be acknowledged that terms, definitions, measurements and thresholds for active transportation differed across years and individual surveys, and even across survey waves. For example, active transportation variables in 2018 generally focused on the mode of travel that is mostly, most regularly (including consideration of time), or usually used for travel to (and sometimes from) school. The New Zealand Household Travel Survey was an exception, where all trip modes and purposes were recorded. However, in this survey the duration of measurement has changed across waves - from a 2-day period between 2003 and 2014 survey waves (to mid 2015) to a 7-day period for the 2015 to 2017 waves (to mid 2018), and has since reverted to a 2-day assessment period. As well as obvious changes to representativeness of usual travel patterns across time, these changes also impact comparability across surveys more broadly (e.g., through impacting recruitment and introducing potential selection bias). Consequently, time series comparisons using these surveys as the sole data source is not recommended by the New Zealand Transport Agency. To some extent, triangulation of multiple data sources, as in the Physical Activity Report Cards, may assuage some of the limitations due to changing methodologies across time in individual surveys. The New Zealand Health Survey was the only survey with up to date evidence available at all time points of the New Zealand Physical Activity Report Cards (Ministry of Health, 2013, 2015, 2017b). Moreover, the item used to assess active transportation in the New Zealand Health Survey had remained identical across all survey phases, yielding consistent data to enable comparison of active transportation over survey waves. Discordant survey data inclusion criteria employed across the three New Zealand Physical Activity Report Cards to date has further complicated the ability to accurately monitor trends in active transportation in New Zealand children and youth.

Moving forward, there needs to be a set of guidelines within and across countries on how the different methodological approaches and available data sources for monitoring and promoting active transportation are handled. To date, reporting of inequities in active transportation across time has been inconsistent. Adapting Report Card grading criteria to consider inequities would facilitate consistent reporting and increase knowledge in this area. In addition, researchers working closely with national organisations on survey development are encouraged to address the issues of survey frequency and differences in terms, definitions (including treatment of mixed transport modes), measurement, and thresholds of what constitutes active transportation. Consistent data inclusion criteria and methodological approaches are needed for future New Zealand Physical Activity Report Cards. Nonetheless, the inclusion of multiple datasets to date has enabled a broad, overarching assessment of active transportation in young New Zealanders that can be used to inform future policy and investment in this area.

## 5. Conclusion

Strategies to increase active transportation in New Zealand children and youth are urgently required. Nationally representative surveys that enable the consistent and regular measurement of rates of active transportation to school and other destinations, and allow comparison with other countries are essential to ensure high quality evidence to inform active transportation strategies, and to identify trends over time. Future efforts should aim to standardise terms, definitions, measurement and thresholds of active transportation in New Zealand surveys to enable monitoring and comparison of active transportation patterns across time.

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