Challenges for Encouraging Active Transport to School in Urban and Rural Areas: BEATS Study Findings

Associate Professor Sandy Mandic
Active Living Laboratory
University of Otago
Email: sandra.mandic@otago.ac.nz

Transport Knowledge Conference | 15 Nov 2018
Transport to School in NZ: 1989-2014

Figure 17: Travel to school – mode share – ages 13-17 years

1989/1990
Travel to school:
21% driven
26% walking
19% cycling

2010-2014
Travel to school:
32% driven
27% walking
3% cycling

Physical Activity in Children and Adolescents

National Survey of Children and Young People Physical Activity and Dietary Behaviour in NZ. 2007/08

Meeting PA guidelines (%)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>5-9</th>
<th>10-14</th>
<th>15-19</th>
<th>20-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>37%</td>
<td>78%</td>
<td>32%</td>
<td>15%</td>
<td>99%</td>
</tr>
</tbody>
</table>


Moderate-to-vigorous PA in 10- to 13-year old children

- Organized sport: 37%
- Active transport: 26%
- Chores / Miscellaneous: 13%
- Unstructured play: 24%

National Survey of Children and Young People Physical Activity and Dietary Behaviour in NZ. 2007/08
Travel behaviour

Factors related to transport in general

Factors specific to active transport

Built Environment and Transport Behaviour

Activities: What people spend the majority of their time doing

- **LEISURE**
  - Recreation/Entertainment

- **HOME**
  - Domestic Activities

- **TRANSPORTATION**
  - Commuting

- **OCCUPATION**
  - Working or Studying

Built Environment Settings: That support physical activity in these areas

1. **OPEN SPACES/PARKS**
2. **URBAN DESIGN/LAND USE**
3. **TRANSPORTATION**
4. **SCHOOLS**
5. **BUILDINGS/WORKPLACES**

www.designedtomove.org
Built Environment and Transportation

- Walkable community design
  - Density
  - Connected streets
  - Mixed land uses
  - Access to transit

- Pedestrian & bicycle facilities
  - Access; Connectivity
  - Design; Quality; Safety

- Perceived environment: accessibility and convenience

http://switchboard.nrdc.org/blogs/kbenfield/how_communities_can_support_wa.html
Built Environment and Active Transport to School (BEATS) Study

- **Investigates:**
  - transport to school habits,
  - the neighbourhood environment and
  - physical activity habits
  in Otago adolescents.

www.otago.ac.nz/beats

Mandic S et al. BMJ Open. 2016; 6:e011196
BEATS Research Programme Framework: Ecological Model for Active Transport

Policy Environment

Built Environment

Social/Cultural Environment

Individual

School policy for ATS
School’s road safety procedures

Walkable community design
Pedestrian & bicycle facilities

Social support
Social norms

Sociodemographics
Behaviour
Motivations/barriers

Adapted from Sallis JF et al. Circulation. 2012;125:729-737

Mandic S et al. BMJ Open. 2016; 6:e011196
Research Methodology

Adolescents & Parents
- Survey
- Maps; GIS Analysis
- Anthropometry
- Physical Activity

School bag weight
- Adolescents

Focus groups
- Adolescents, Parents, Teachers

Interviews
- School Principals

Mandic S et al. BMJ Open. 2016; 6:e011196
BEATS Research Programme (2013-2022)

URBAN

BEATS Study (2014-2017) (Dunedin)
- 12 Schools
- 1780 Adolescents
- 355 Parents
- 14 Teachers
- 12 Principals

BEATS Natural Experiment (2019-2022) (Dunedin)

Urban versus rural

BEATS Cultural Study (2018-2019)

RURAL

BEATS Rural Study (2018-2019) (Rural Otago)
- 11 Schools
- 1014 Adolescents
- 75+ Parents
- 2 Principals

Disciplines & impact areas:
- Exercise Science
- Public Health
- Transport
- Built Environment
- Education

Partnerships:
- Academia
- City Council
- Schools
- Community
BEATS Team 2018: Multidisciplinary Expertise

Advisory Board Members:

Gavin Kidd, Gordon Wilson (Dunedin Secondary Schools’ Partnership)

Nick Sargent (Dunedin City Council)

Greame Rice (NZ Transport Agency)

Janet Stephenson (Centre for Sustainability)

Frank Edwards (Māori) and Finau Taungapeau (Pacific) community representatives
Comprehensive Dissemination of Research Findings

BEATS Research Programme Outputs to Date

- **Journal articles**: 14 Published, 2 in review, 10 in preparation, 1 Book chapter
- **Conference abstracts**: 18 International, 15 National, 31 Local
- **Technical Reports**: 24 Published (3 progress reports)
- **Presentations**: 2 Keynotes, 1 Invited, 21 Academic, 19 Non-academic

Last updated: November 2018
Transport to School Habits across Otago

Total sample (n=2,656)

- Active Transport: 29.8%
- Motorised + Active Transport: 15.2%
- Motorised Transport: 55.0%

No significant difference across urbanisation settings

89.9% liked how they travel to school

Active transport to school
Among adolescents ineligible for subsidised school bus (living within 4.8 km from school)

- Main urban centre: 38.8%
- Semi urban areas: 47.9%
- Rural settlements: 58.5%

p<0.001

78.9% had a bicycle at home
75.8% had 2+ vehicles at home

Transport to School Habits across Otago

Optimal distance for walking to school ≤ 2.25 km

Sensitivity: 85%
Specificity: 86%
AUC: 93%

Distance to school

Median distance to school

p=0.037

(≤4.8 km)

Distance (km)

Main urban centre
Semi urban area
Rural settlements

3.7
3.2
6.2

Source: BEATS Study and BEATS Rural Study (n=2,656)
Pocock et al. Health and Place (in press)

89.1%
11.8%

Significant difference across urbanisation settings
Rates of Active Transport to School
(Living ≤4.8 from school; boarders excluded)

**Urban** (n=897)

- URB: 39%
- Bay: 55%
- Que: 50%
- Log: 46%
- Tai: 45%
- JMc: 41%
- Col: 39%
- Kin: 38%
- OB: 35%
- StH: 30%
- Kai: 30%
- Kav: 26%
- OG: 17%

*Most of the time / All of the time

**Semi-urban** (n=457)

- S-URB: 48%
- Cro: 62%
- Tok: 51%
- MtA: 45%
- WG: 42%
- SO: 41%
- StK: 35%

**Rural** (n=81)

- RUR: 59%
- BMC: 65%
- Law: 62%
- Cai: 60%
- Rox: 56%
- Man: 50%
Rates of Cycling to School
(living ≤4.8 from school; boarders and mixed modes excluded)

Urban (n=897)

Semi-urban (n=457)

Rural (n=81)
Transport to School and Physical Activity in Dunedin Adolescents

Physical Activity

Guidelines: 
≥60 min per day
Average: 4.2 ± 2.1 days/week
17.9% met guidelines

n=1,300 (self-reported data)


AT and AT+MT accumulated more physical activity during school commute than MT

AT and Active Transport
n=73
Active Transport
47.9%
Motorised + Active Transport
n=56
Motorised Transport
58.9%

AT and AT+MT
17.9%
Motorised Transport
n=185

33.5%

46.4%

Chiew Ching Kek et al. (in review)
Perceptions of Distance to School
(among adolescents living ≤4.8 km from school)

It is too far to **walk** to school.

- Main urban centre: 37%
- Semi urban areas: 20%
- Rural settlements: 12%

It is too far to **cycle** to school.

- Main urban centre: 28%
- Semi urban areas: 8%
- Rural settlements: 0%

*p<0.001

Perceptions of Safety
(among adolescents living ≤4.8 km from school)

It is unsafe to **walk** to school.

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Semi-urban</th>
<th>Rural</th>
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<tbody>
<tr>
<td>Adolescents' concerns</td>
<td>12%</td>
<td>9%</td>
<td>0%</td>
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* *p<0.006

It is unsafe to **cycle** to school.

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<tr>
<td>Adolescents' concerns</td>
<td>40%</td>
<td>23%</td>
<td>5%</td>
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* *p<0.001

Parental concerns (reported by adolescents)

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<td>31%</td>
<td>15%</td>
<td>4%</td>
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* *p<0.001

Parental Barriers to Active Transport to School

- 57.3% Fewer barriers for walking compared to cycling
- 37.2% Convenience of trip chaining
- 66.4%
- 41.6%

Future interventions should address parental barriers for active transport to school (especially for cycling).

Mandic S et al. (Abstract); OERC Symposium 2016 and ISBNPA 2017.
Perceptions of Cycling to School
(From Student and Parental Focus Groups)

• Perceived safety:
  – A complex range of factors including:
    • Features and perceptions of the built environment
    • Traffic safety (including behaviours of other road users)
    • Previous cycling experiences (including accidents)
    • Adolescents’ cycling skills and on-road experiences

• Implicit messages
• Social norms

Enablers of Cycling to School: Adolescents’ Perspective

- **Cycle-friendly uniform**: 41.4%
- **Safer bike storage at school**: 40.1%
- **Slower traffic**: 36.4%
- **Bus bike racks free of charge**: 26.2%
- **Bike ownership**: 32.7%
- **Cycling without a helmet**: 22.1%

*n=764 (non-boarders; within ≤4km)*

Cycle Helmet Legislation as a Barrier to Cycling to School

Adolescents would cycle to school more if helmet use was not mandatory

22%

Significant factors:
- Distance to school
- Māori and other ethnicities (vs. NZ European)
- Cycling to school is ‘not cool’
- Cycling often with friends
- Boring route to school
- Cycling as a great way to exercise (+)

Recommendations:
Design educational interventions to influence adolescents’ attitudes towards the helmet use.
- Could be offered as a part of cycle skills training

774 Adolescents living ≥4 km from school (BEATS Study; Dunedin)

Molina-García et al. (2018) J Transp Health. 11, 64-72
School Bag Weight as a Barrier

School bag perceived as a barrier to active transport to school

68% of parents
Adolescents:
- 58% for walking
- 66% for cycling

Full bag weight:
5.6 kg (± 2.1 kg)

9.3% (± 3.9%) of adolescents’ body weight

37.9% Above 10% of body weight

Active transport users were less likely to report heavy school bags

Actual school bag weights did not differ by mode of transport to school.

682 Adolescents and 331 parents
BEATS Study (Dunedin)

Mandic S et al. (2018) Children. 5:129
Significance

Generating important information for key stakeholders for planning future school-, neighbourhood- and city/town-wide built environment changes to encourage active transport to school.

If effective, population level initiatives aimed to ↑ physical activity across all groups such as pedestrian and/or cycling infrastructure construction/improvements will contribute to improving health and wellbeing of communities.

Understanding influences of multiple factors will enable the scientific community, policy makers, regional planners, and health promoters to address barriers to active transport to school.

Involvement of the key stakeholders will facilitate the generation of usable data, relevant to the local context and generalisable to other areas, and the incorporation of new knowledge into policy and future initiatives.
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Dunedin | 13-15 February 2019

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https://www.otago.ac.nz/active-living/research/publications/index.html

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and/or sponsoring our work
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www.otago.ac.nz/active-living

Thank you!