The Case for Action: Health benefits/costs of travel modes

Professor Chris Rissel
Partnerships

Health system cannot create conditions for prevention of ill-health or disease by itself

- Education
- Housing
- Transport
- Employment
- Welfare
Transport: social determinant of health

- Access to health services
- Access to education and employment
- Social inclusion
- Opportunity for physical activity
- Air pollution
- Congestion
- Injury
- Property destruction
ACTIVE TRAVEL

• Travel that includes physical activity, such as walking, cycling or public transport
• 30 minutes a day of moderately vigorous physical activity recommended on most days of the week

➢ Builds physical activity into regular activities
Which active travel mode?

- Not much capacity for public transport increases

- 8 – 30 minutes of additional physical activity
Figure: Improvement in physical activity in the insufficiently physically active, NSW Health Survey 2010
Population increase in the proportion of NSW adults who are sufficiently physically active by increases in minutes of physical activity and the percent uptake by those currently inactive

<table>
<thead>
<tr>
<th>Percent uptake of physical activity by insufficiently active</th>
<th>Minutes of physical activity added per weekday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8</td>
</tr>
<tr>
<td>10%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.96% (1.85%–2.09%)</td>
</tr>
<tr>
<td>20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.93% (3.65%–4.12%)</td>
</tr>
<tr>
<td>30%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.89% (5.74%–6.45%)</td>
</tr>
</tbody>
</table>
Which active travel mode?

- People already walk about as much as they will walk (800m)

- Walking not always sufficient intensity
Range of movement

- Allow coverage of many times the distance for the same energy

800 m walking
3200 m cycling
Which active travel mode?

- Cycling has low mode share, and considerable potential
Overview

• Health benefits of active travel
• Costs associated with active travel
• Example of cycling project on physical activity
• New project – health impact of cycling infrastructure
Chapter 3 – Health benefits of cycling

Garrard, Rissel, Bauman
Figure 2 — Obesity ($\text{BMI} \geq 30 \text{ kg} \cdot \text{m}^{-2}$) prevalence and rates of active transportation (defined as the combined percentage of trips taken by walking, bicycling, and public transit) in countries of Europe, North America, and Australia. BMI was computed from self-reported height and weight. Data were obtained from national surveys of travel behavior and health indicators conducted between 1994 and 2006 (see text for details).
Adult diabetes by per cent active travel

FIGURE 4—Relationship between share of workers commuting by bicycle or foot and share of population with diabetes: 50 US States and 47 of the 50 largest US cities, 2007.

Multiple benefits:

- **Health benefits** of increased physical activity – reductions in chronic diseases (CVD, diabetes & obesity) and improved mental health.
Self-reported excellent, very good or good health is more common among New Yorkers who walk or bike in all income groups.
Driving to work increases weight

<table>
<thead>
<tr>
<th>Travel mode</th>
<th>%</th>
<th>Overweight or obese</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% o’weight or obese</td>
</tr>
<tr>
<td>Other means</td>
<td>31</td>
<td>43.3</td>
</tr>
<tr>
<td>Driving a car</td>
<td>69</td>
<td>50.9</td>
</tr>
</tbody>
</table>

* Adjusting for sex, age, marital status, education, language spoken at home, level of physical activity, and SEIFA index

Wen LM, Orr N, Millett C, Rissel C. Driving to work is associated with overweight and obesity: Findings from the 2003 New South Wales Health Survey. *International Journal of Obesity* online publication 10 January 2006
Cycling to work decreases weight (Men)

<table>
<thead>
<tr>
<th>Mode</th>
<th>O’weight &amp; obese</th>
<th>Adj OR</th>
<th>Obese</th>
<th>Adj OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving</td>
<td>60.8</td>
<td>1.00</td>
<td>15.5</td>
<td>1.00</td>
</tr>
<tr>
<td>Public transport</td>
<td>44.6</td>
<td>0.65*</td>
<td>11.1</td>
<td>0.84</td>
</tr>
<tr>
<td>Walking</td>
<td>52.7</td>
<td>0.91</td>
<td>17.4</td>
<td>1.32</td>
</tr>
<tr>
<td>Bicycle</td>
<td>39.8</td>
<td>0.49*</td>
<td>5.4</td>
<td>0.34*</td>
</tr>
<tr>
<td>Work at home</td>
<td>61.3</td>
<td>0.80</td>
<td>18.2</td>
<td>1.09</td>
</tr>
</tbody>
</table>

* Stratified by sex, adjusting for age, marital status, education, language spoken at home, level of physical activity, and SEIFA index

Wen LM, Rissel C. Inverse associations between cycling to work, public transport, and overweight and obesity: findings from a population based study in Australia. Preventive Medicine 2008; 46: 29-32
Multiple benefits:

- **Health benefits** of increased physical activity – reductions in chronic diseases (CVD, diabetes & obesity) and improved mental health
- **Transport benefits** – reduced congestion, car space requirements and costs
- **Environmental benefits** – reduced air, noise and visual pollution
Transport is responsible for

- 70% of NOx emissions in urban areas
- 50% of hydrocarbon emissions
- 65-85% of carbon monoxide, (more in urban areas)
- Virtually all airborne lead in metropolitan airsheds
- 14% of greenhouse gases
Motor vehicle ambient air pollution

- Accounted for between 900 and 2000 early deaths nationally
- Accounted for between 900 and 4500 morbidity cases—cardio-vascular and respiratory diseases and bronchitis

Sydney smog, March 11, 2006

Figure 1: Relative BTEX concentrations across modes with 'Train' mode as baseline.
More benefits:

• **Energy use reductions** – less fossil fuel consumption and greenhouse gas emissions

• **Community strengthening** – increased social interactions
Cyclist crashes – Traffic accident data

5 years of data, 2003-2007 - 5,986 cyclist crashes
Cycling is safer than sitting on the sofa

"You won't believe it... You're safer on the bicycle than on the sofa!"

Lack of daily exercise is harmful to your health, while physical activity keeps your body healthy. Cycling extends your life - daily exercise for minimum 30 minutes extends your life with up to five years."
Safer Cycling Study

- 2000 cyclists
- 6 X 1 week cycle diary over 12 months
  -> exposure data
- Supplementary questions
- All on-line
Walking & cycling in 68 Californian cities

Jacobsen PL. Injury Prevention 2003;9:205-209
Cycling in 14 European cities

![Diagram showing the relationship between fatalities per 100,000,000 km and distance per day per capita (km).](image)

Jacobsen PL. Injury Prevention 2003;9:205-209
Safety in numbers in Australia: cycling

Spot the Belgian – Netherlands border
National Cycling Strategy

- no funding
- limited engagement with federal departments
- minimal mention in national Road Safety Plan
Local Government engagement

- 2/3 have a bicycle strategy
- Respondents spent $72 million on bicycle-related programs in 2009-10.
- $26m from Australian government
- $26m from State governments.
Economic benefits of cycling

• Bicycle sales have exceeded new car sales every year for the last 9 years (Aus)

• Tourism – touring, and events

• Shopping!
Cost benefits

3.88 : 1 cost benefit ratio

• Inner Sydney Regional Bicycle Network likely to generate net economic benefits of $507 million
Investment in cycling is cost-effective

Roads and Traffic Authority of NSW and the Department of Environment and Climate Change

Evaluation of the costs and benefits to the community of financial investment in cycling programs and projects in New South Wales

Final Report

26 February 2009
Cycling Connecting Communities

3 year, NSW Health, Health Promotion Demonstration Grant

Does promoting new infrastructure increase cycling?

Would an increase in cycling mean an increase in population levels of physical activity?
Intervention overview

- Two similar local government areas with good cycling infrastructure
- Intervention area gets social marketing and community engagement
Interventions

Major Events – eg Ride to Work, launch, Spring Cycle, path discovery day

Minor events eg BUG rides

Skills courses
More intervention strategies

- Information eg maps, signage, articles, advice
- Bike loan / hire (WSCN)
- Trip generator interventions (eg TAFE)
- Community engagement strategy (+ handout)
Impact evaluation design

- Two newly built bike paths – one intervention and one comparison area – with bike counters
- Telephone survey of residents living within 2 kilometres of bicycle path - pre and post with cohort of respondents
Comparison area daily bike counts
Average daily bicycle counts by year

- **Intervention**
- **Comparison**

![Graph showing average daily bicycle counts by year with a trend line for intervention and comparison groups.](image-url)
Impact evaluation: Cycled in past year


http://www.ijbnpa.org/content/7/1/8
Increases in cycling – sub-groups

Intervention versus comparison area

• Novices or beginners (12% Vs 1%)

• Those that had heard of Cycling Connecting Communities project (33% Vs 10%)

• Mean minutes cycled in past week (380 Vs 140)

• Mean sessions of cycling (5.3 Vs 2.7)
More positive results (P<0.05)

<table>
<thead>
<tr>
<th></th>
<th>Comparison (%)</th>
<th>Intervention (%)</th>
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</thead>
<tbody>
<tr>
<td>Heard of CCC</td>
<td>8.0</td>
<td>13.5</td>
</tr>
<tr>
<td>Used bicycle paths</td>
<td>16.2</td>
<td>28.3</td>
</tr>
<tr>
<td>Has a bicycle to use</td>
<td>32.1</td>
<td>44.2</td>
</tr>
<tr>
<td>Wants to ride more</td>
<td>55.6</td>
<td>62.4</td>
</tr>
</tbody>
</table>
Lessons

- Bike paths already built and used
- Recreational paths versus commuting
- Distance/density barriers
- Age issues
New City of Sydney Cyclepath – Kent St
RTA daily bicycle count data

- Iron Cove Bridge
- Anzac Bridge
- Sydney Harbour Bridge
- Anzac Parade

Yearly Counts:
- 2003: 451
- 2004: 390
- 2005: 493
- 2006: 603
- 2007: 720
- 2008: 659
- 2009: 736
Results - Numbers

- **Per hour in the morning peak**
  - 500 at King/Kent intersection
  - 400 on Union Street
  - 400 at College/Park intersection
  - 350 on Kent Street
  - 200 on Bourke Street
Results - Growth

- AM growth in one year
  - 60% average across LGA
  - 154% at King/Kent intersection
  - 153% at College/Oxford
  - 249% at Bourke Road
  - 155% at Anzac Parade
  - 108% Bourke Street
  - 93% at Union Street
ARC project

Evaluation of new City of Sydney cycling infrastructure

Interviews at baseline, 12 and 24 months
More on ARC project

• GPS device, travel diary, physical activity

• Quality of life

• Indicators of community cohesion

• Local shopping
Active travel policy: win-win-win-win

- Evidence-based
- Cost-effective
- Feasible to implement now
- Acceptable to the community
- Sustainable
Thank you

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