Changing modes of travel in New Zealand cities

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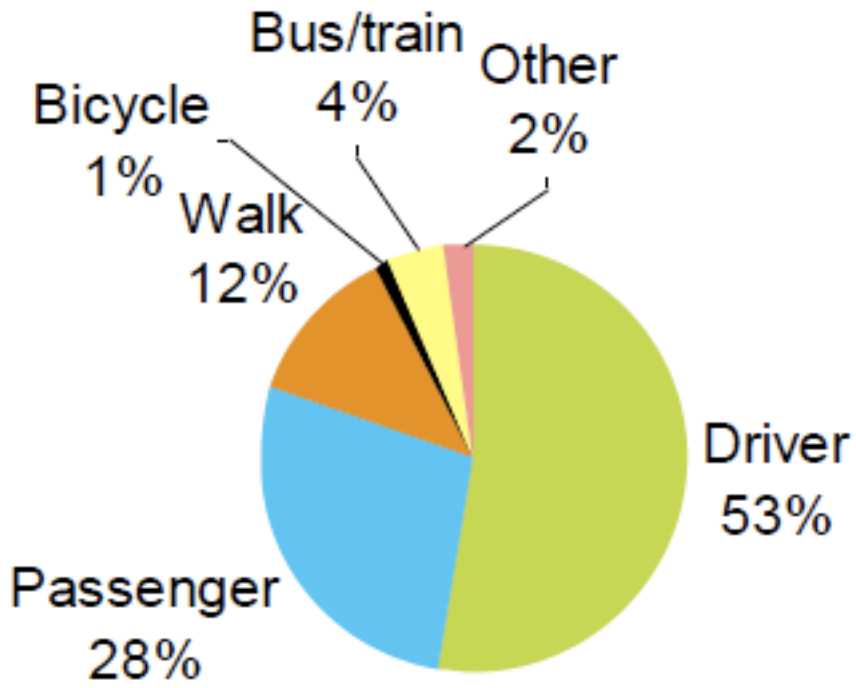
NZ Household Travel Survey 2003 - 2007

Figure 1: Overall mode share

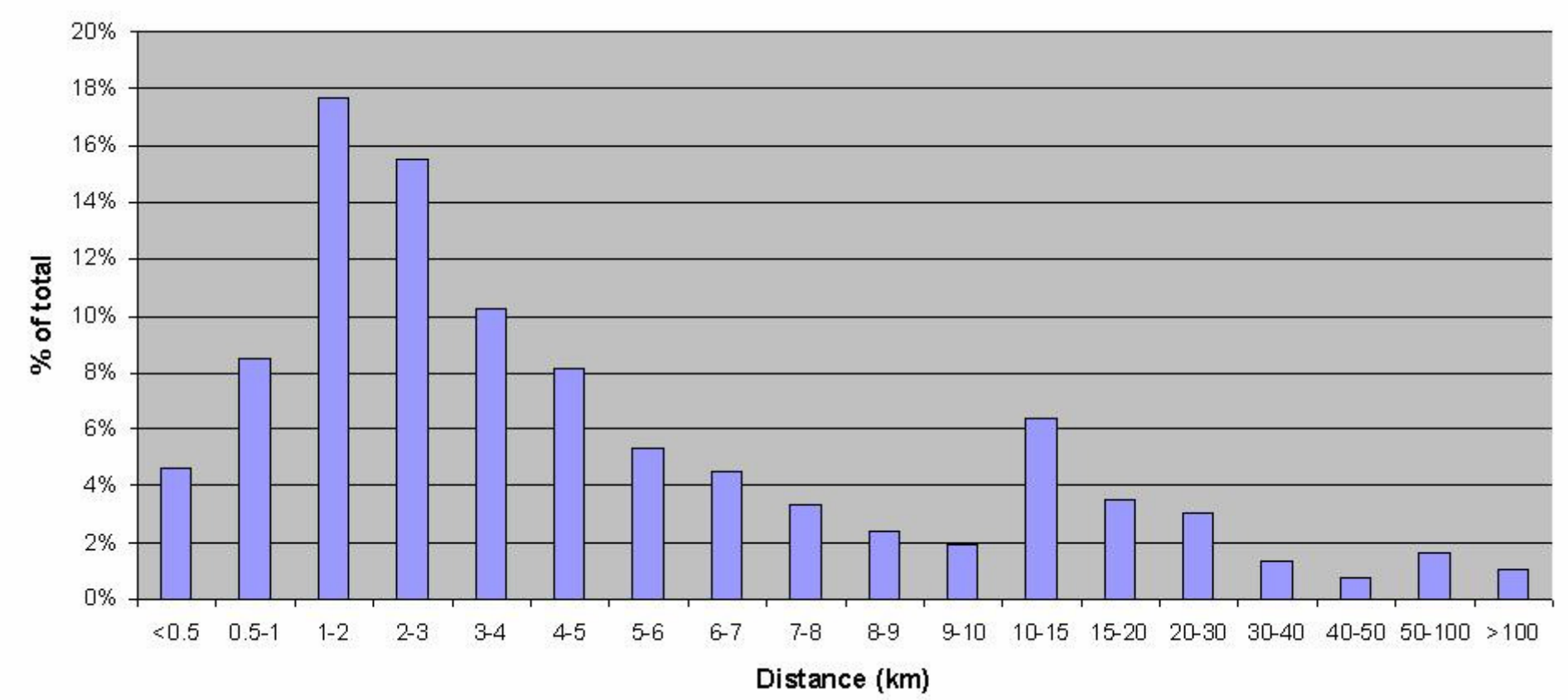
a) Share of total travel time



Millions of hours spent travelling - New Zealand 1989 to 2003

Total time travelling	+ 30%
Driving	+ 49%
Walking	No change
Bicycling	- 43%
Bus and train	+ 29%

NZHTS driver / passenger trips



- NZ Household Travel Survey 2003-06 data on 6000 people, 62,000 trips
- All ages, urban areas >/=10,000 people, driver (any vehicle type) and passenger (private vehicle) trips combined, any purpose
- ~75% 7k or less; 65% 5k or less; 46% 3k or less; 31% 2k or less

What if 5% of short urban trips were made by bicycle instead of motor vehicle?

What would the effects be on
- fuel use,
- greenhouse emissions,
- ill-health due to local air pollution,
- cyclist injuries,
- disease averted by physical activity,
- energy expenditure?

Methods

- Vehicle km travelled – NZ HTS
- Vehicle Emissions Prediction Model v2.3 – emissions per km, fuel use
- Effects of local pollution – HAPiNZ estimates of attributable deaths, costs
- Improved health from activity – WHO HEAT with transitions to cycle commuting, NZ SVOL $3.19 million

Methods

- Cyclist injury – National Injury Query System for bike v. car incidents
- Energy expenditure – potential weight loss, caloric intake unchanged, food equivalents

Cycling to work and all cause mortality

Copenhagen cohort studies

Number of participants	6954
Age	20 - 65
Mean follow up	15 years
Odds Ratio	0.72 (0.55 - 0.89)
Adjusted for	Age, sex, education, leisure time activity, BMI, blood lipids, smoking, BP

Arch Int Med 2000;160:1621-8

Modal shift from car to active trips

	Vehicle trips </=7k	Percentage trips <= 7k diverted to active transport and savings				
		5%	10%	15%	30%	50%
Kilometres	5,246,295,792	262,314,790	524,629,579	786,944,369	1,573,888,738	2,623,147,896
Tonnes CO2 (210g/km)	1,101,722	55,086	110,172	165,258	330,517	550,861
Fuel (litres)	458,316,400	22,915,820	45,831,640	68,747,460	137,494,920	229,158,200

NZHTS 2003-2006 data

- Ages 20-64
- Urban centres >/=10,000
- Driver (any vehicle) and passenger (private vehicle)
- Taxi and trucks excluded
- All purposes except work business

Results of 5% shift

- Return cycling to levels seen in 1980s
- Save 22 million litres of fuel and 0.35% of all transport-related greenhouse emissions
- 116 fewer deaths due to increased activity, 6 fewer deaths from air pollution
- An additional 5 cyclist fatalities from crashes

Results of 5% shift

- Net health effect: saving of about $193 million per year
- Energy expenditure equivalent to 675,000 kg of adipose tissue, or 40,000,000 cans of Coke

Auckland Harbour Bridge

- What would be the health benefits of a cycle way?

1000 people aged 20-60 riding the bridge each day
→ 2-3 lives saved / year
→ $4.1m annual savings

Savings
→ per trip $18
→ per cyclist / year $4,100
→ per km/cyclist/year $1.45

Conclusions

- Health benefits outweigh costs of injury by more than 10 to 1
- Technical notes:
  - Mortality calculation double-counts injury deaths
  - Years of life lost not fully accounted for
  - Estimates sensitive to relative risk for cycle commuters