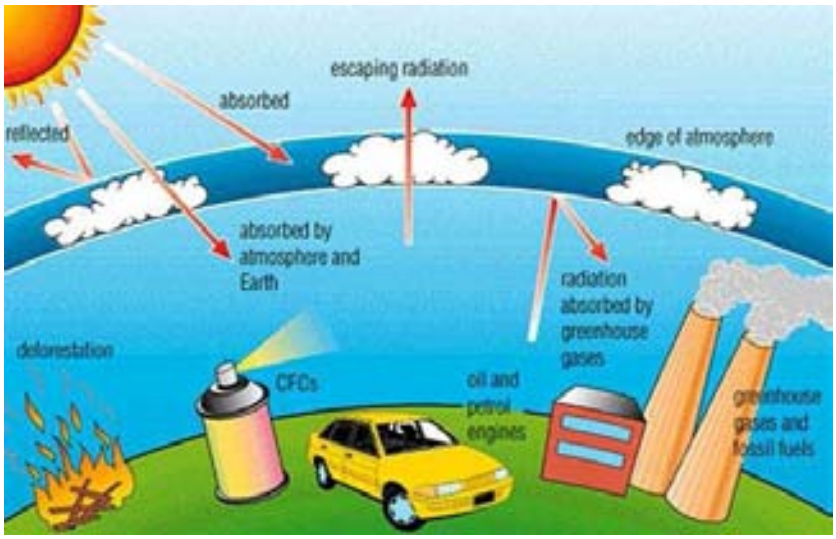
Climate change – how can we turn the threat into an opportunity for better health?

Alistair Woodward
School of Population Health
University of Auckland

outline

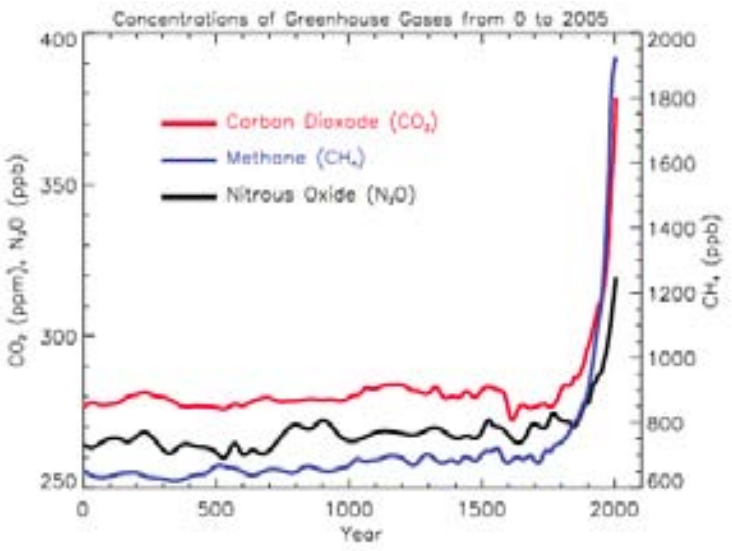
- The threat – IPCC and post-IPCC
- The response
- Opportunities for radical health promotion
- A case study – cars to bicycles



Note: Without natural greenhouse effect mean temperature would be around -18ºC

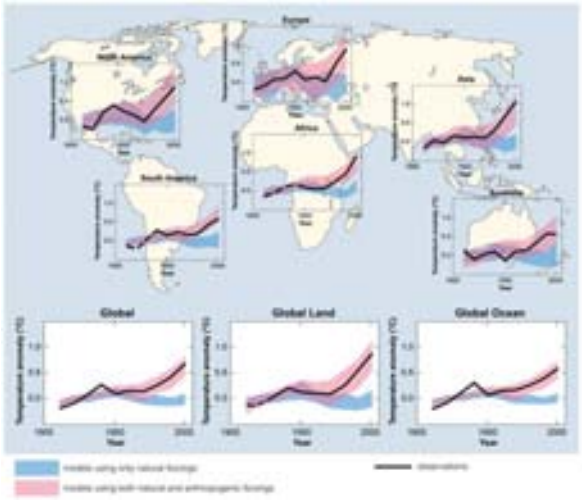
27,246,000,000,005 kg

1.34 trillion



From Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report 2007

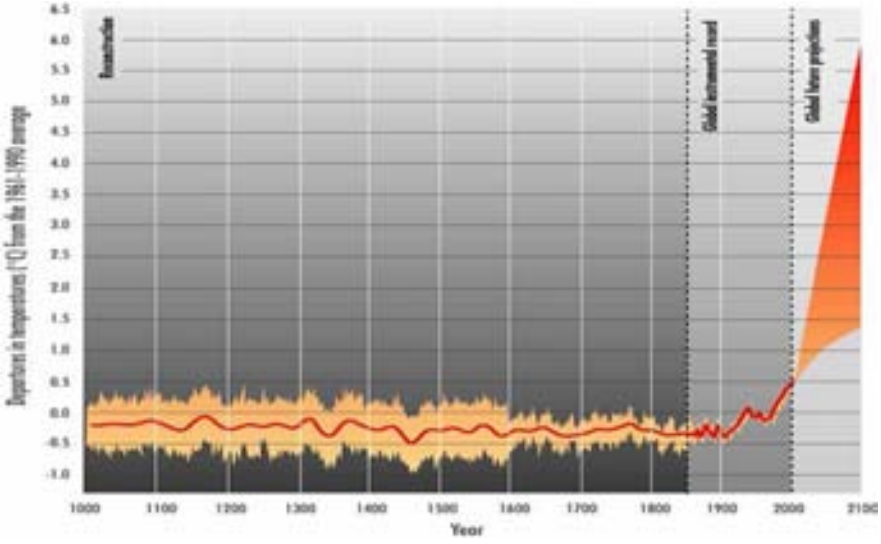
Average temperatures, 1900 – 2000, observed and modelled

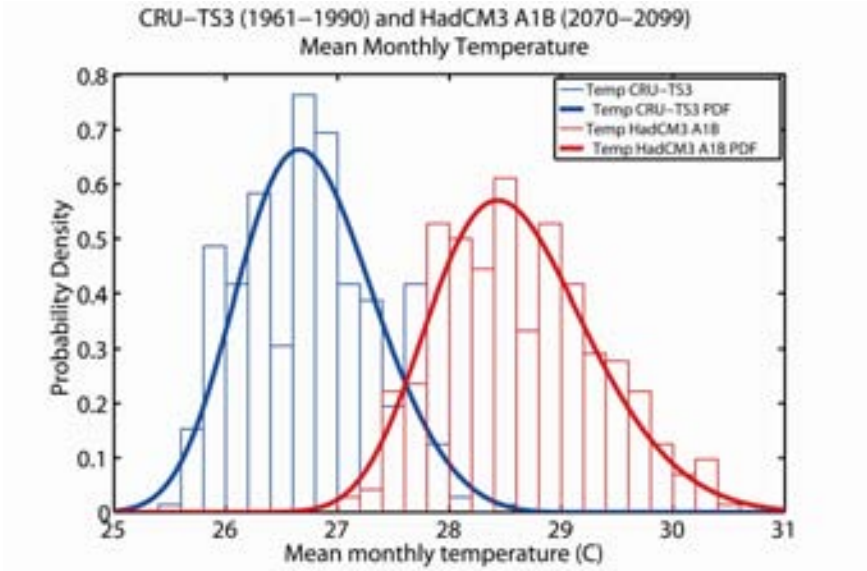


IPCC 2007

Models excluding human activity do not fit recent warming

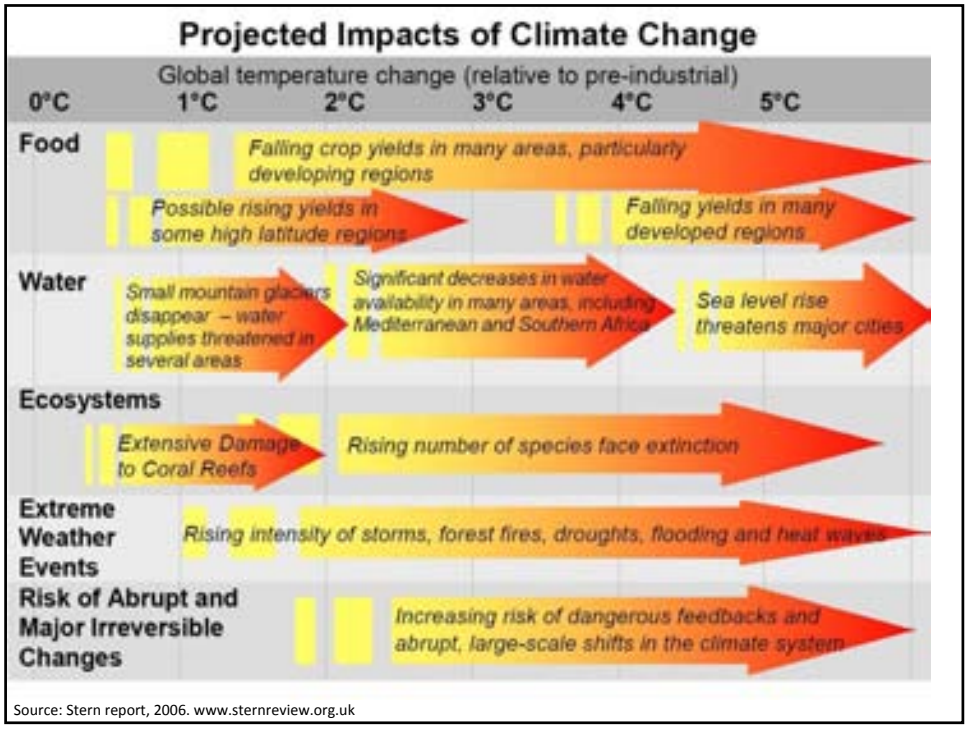
Global average temperature, 1000 – 2100 (IPCC 2001)



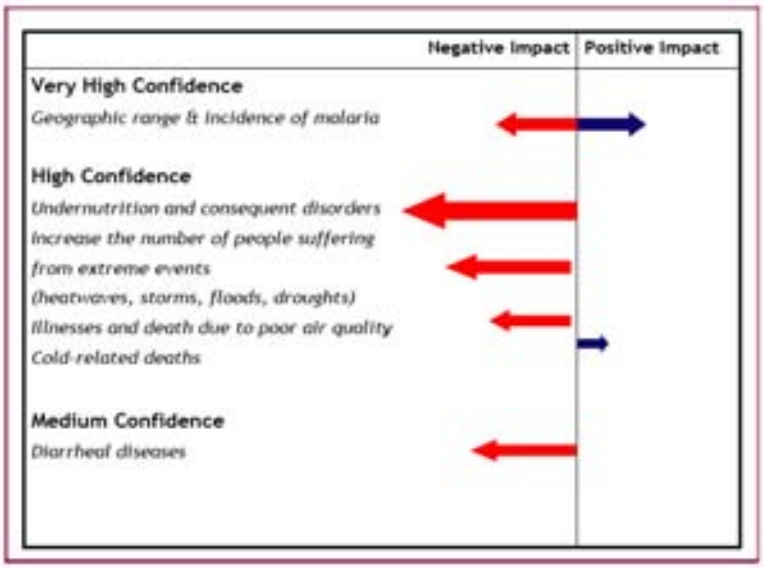


Average temperature, Samoa, 1961-1990 (blue) and 2070-2099 (red)

737 taking off from Melbourne Airport, February 7 2009



Source: Stern report, 2006. www.sternreview.org.uk

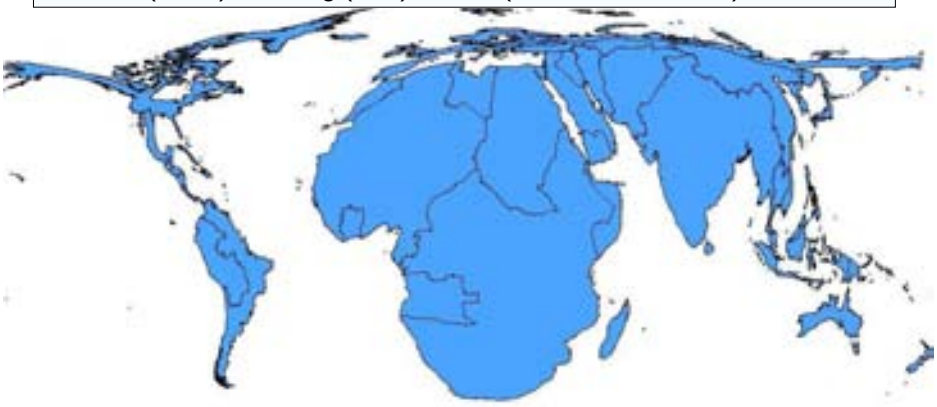


Future effects of climate change on human health

{IPCC 4th AR, 2007}

Cartogram: Mortality Impacts of Climate Change: year 2000

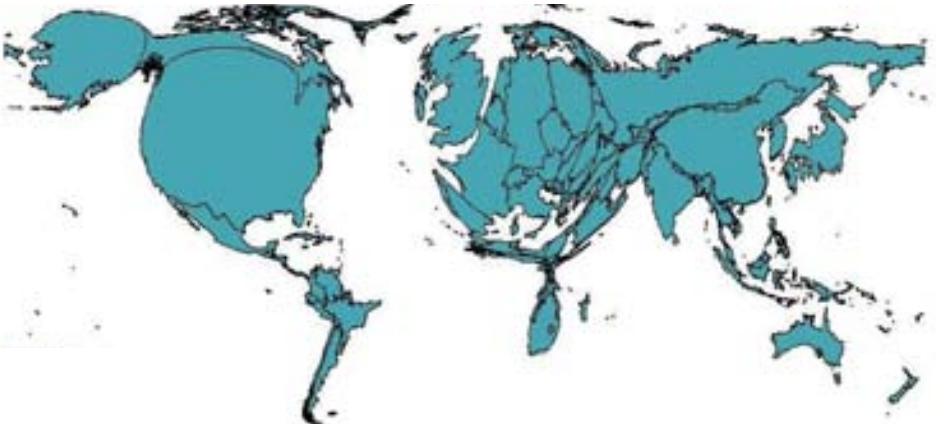
Annual attributable deaths from malnutrition (~80K), diarrhoea (~50K), malaria (~20K), flooding (~3K) … and (in OECD countries) heatwaves



14 WHO regions scaled according to estimated annual death rates (in year 2000) attributable to the climate change that had occurred over 3 decades to 2000.

(Patz, Gibbs et al, 2007: based on McMichael et al, 2004)

Cumulative Emissions of Greenhouse Gases



Countries scaled according to cumulative emissions (billions of tonnes CO_2-equivalent) up to 2002.

(Patz, Gibbs, et al, 2007

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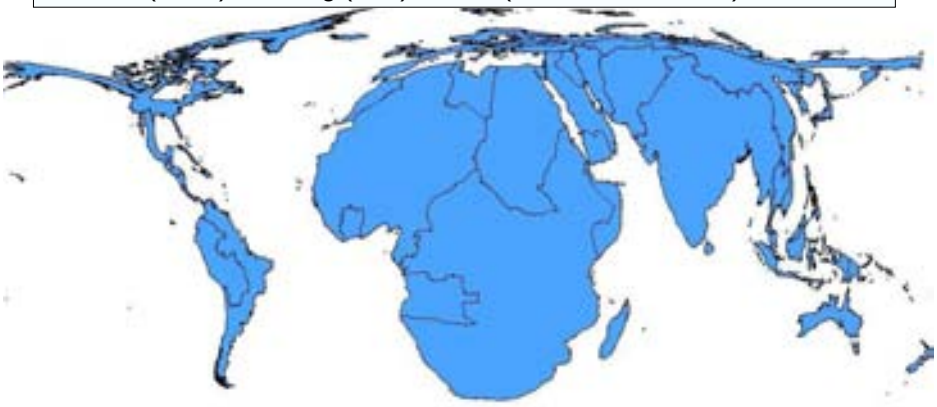

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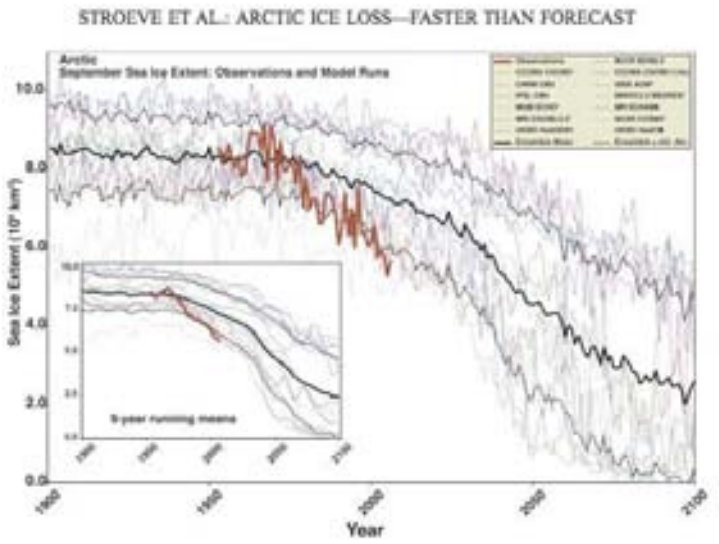
Climate Change Congress, Copenhagen, March 2009

- Worst-case IPCC scenario trajectories are being realised
- Significant risk that many of the trends will accelerate
- Increasing risk of abrupt or irreversible climatic shifts

http://climatecongress.ku.dk/



Observations (red line) and 13 IPCC 4th AR models. Geophys. Res. Lett. 2007, 34, L09501

“coping with 90% of the risk means preparing for 4 degrees warming”

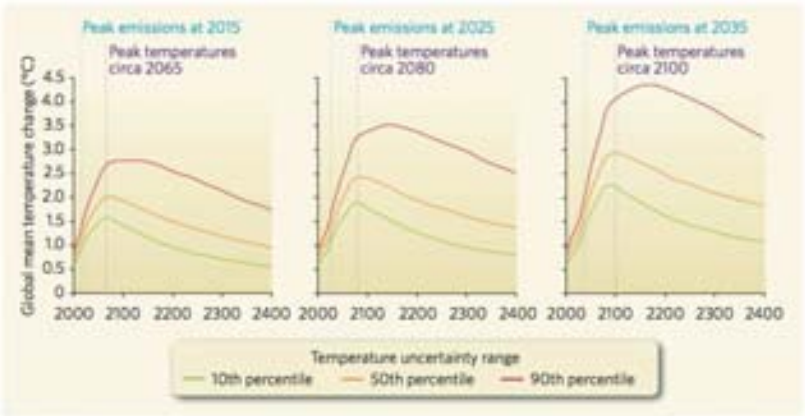


Figure 1 | Temperature scenarios. Global average surface temperature scenarios for peak emissions at three different dates (2015, 2025 and 2035) with 3%-per-year reductions in greenhouse-gas emissions.

From Parry et al. Nature 2009;458:1102

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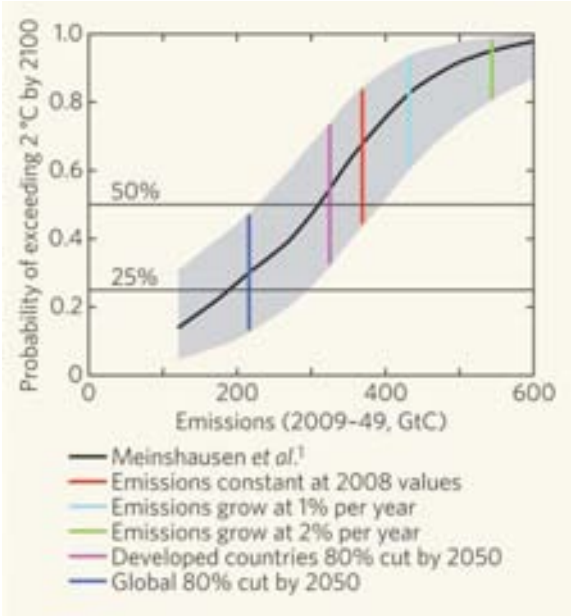


Schmidt & Archer, Nature 30 April 2009

We need to cut emissions by 80%, globally, by the year 2050, to have a better than even chance of avoiding 2 degrees warming this century

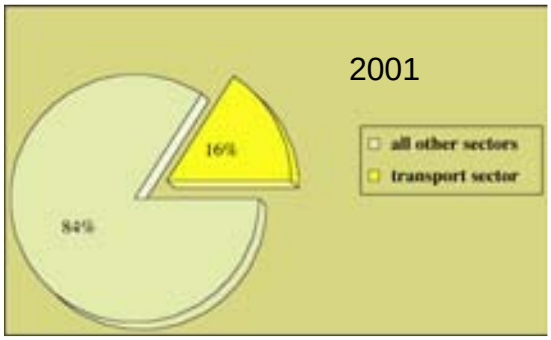
Wellcome study of co-benefits

- Energy generation
- Food
- Built environment
- Transport

A case study

Cars to bicycles

Greenhouse gases - Transport sector fastest growing contributor to New Zealand greenhouse emissions

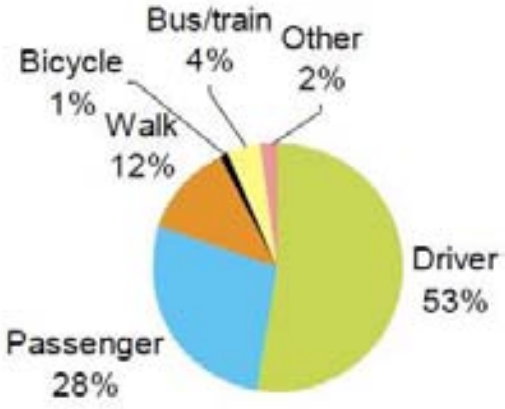


1990-2006: NZ total emissions increased by 26%; transport emissions up by 67%

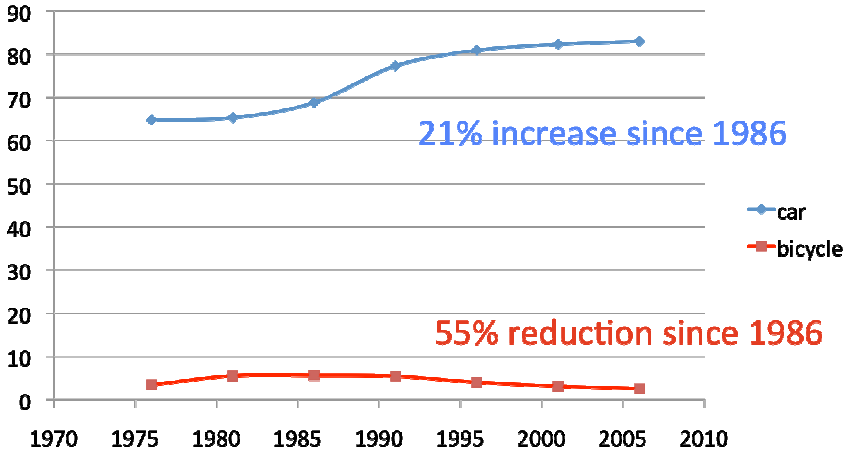
NZ Household Travel Survey 2003 - 2007

Figure 1: Overall mode share

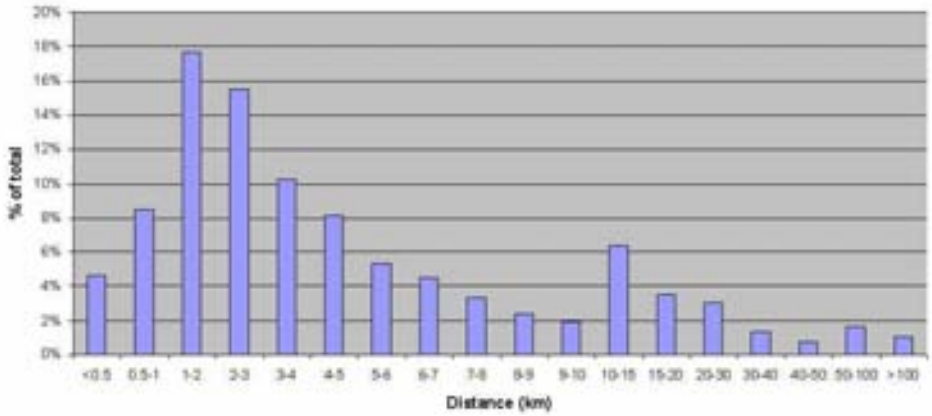
a) Share of total travel time



Mode of travel to work, New Zealand Census, 1976 - 2006



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

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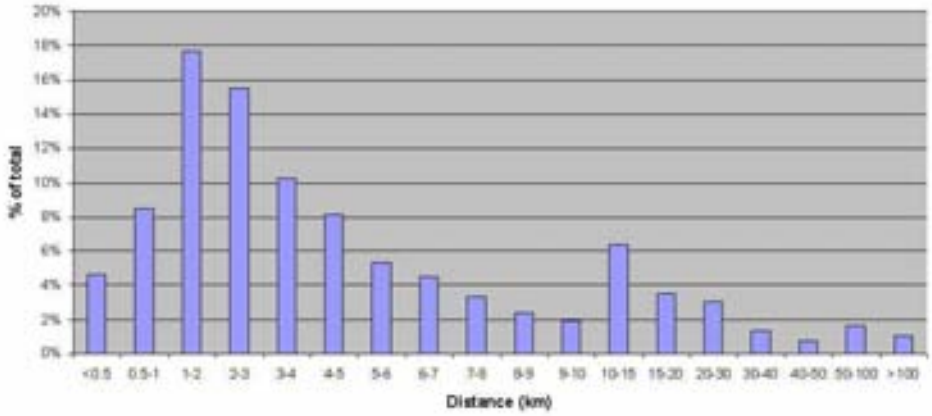

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What if 5% of short urban trips were made by bicycle instead of motor vehicle?

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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

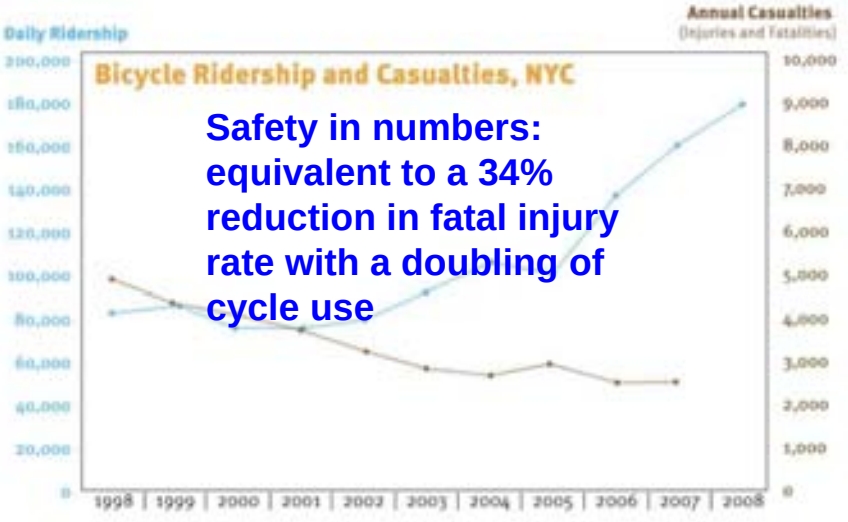
- Cyclist injury – National Injury Query System for bike v. car incidents
- Energy expenditure – potential weight loss (assuming caloric intake unchanged), food equivalents

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

New York, cyclists and injuries, 1998 - 2008



http://www.transalt.org/files/newsroom/streetbeat/2009/June/0604.html#safety_in_numbers

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	5,246,296,792	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)
- Taxis 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

Modelling proposed Harbour Bridge cycle crossing with HEAT

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

News

London is seeing a 'bicycle boom'

Jonathon Harker May 28 2009, 12:24pm

545,000 trips made daily by bicycle in the capital; 66,000 new cycle parking spaces planned

London is seeing a 'bicycle boom' according to new statistics revealed by Transport for London today.

The number of trips made daily by bicycle in London has risen nine per cent since last year to 545,000.

During the course of 2009, £111 million will be invested in cycling, including funding for new Cycle Hire and Cycle Highways initiatives and safety training across London. 66,000 new cycle spaces will also be created, including 138 new spaces at Euston station.

http://www.bikebiz.com/news/30612/London-is-seeing-a-bicycle-boom

Conclusions

- Health benefits of a 5% mode shift outweigh costs of injury by more than 10 to 1
- To be explored:
  - Other outcomes
  - Years of life lost
  - Vary size of mode shift; apply in other settings

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