

Improving impact of housing research on policy

AHURI Investigative Panel – Health and Housing

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Professor Philippa Howden-Chapman
Director, *He Kainga Oranga*/
Housing and Health Research Programme,
NZ Centre for Sustainable Cities,
University of Otago, Wellington, New Zealand

<http://healthyhousing.org.nz>

<http://sustainablecities.org.nz>



Outline of talk

- Framing housing and health research
- Solution focused
- Multidisciplinary team and methods
- Multiple outcomes important for population health & co-benefits for climate change mitigation
- Data sources
- Opportunities for collaboration

Framing: Engage policy makers & community

- Systems thinking useful for causation & outcomes
- Solution-focused, multi-disciplinary research
- Policy analysts & communities need to be engaged early and reinforced regularly
- Public/private funding strengthens implementation
- Community trials are possible!

Davis, P., Howden-Chapman, P., 1996. Translating research findings into health policy. *Social Science and Medicine* 43, 865-872.

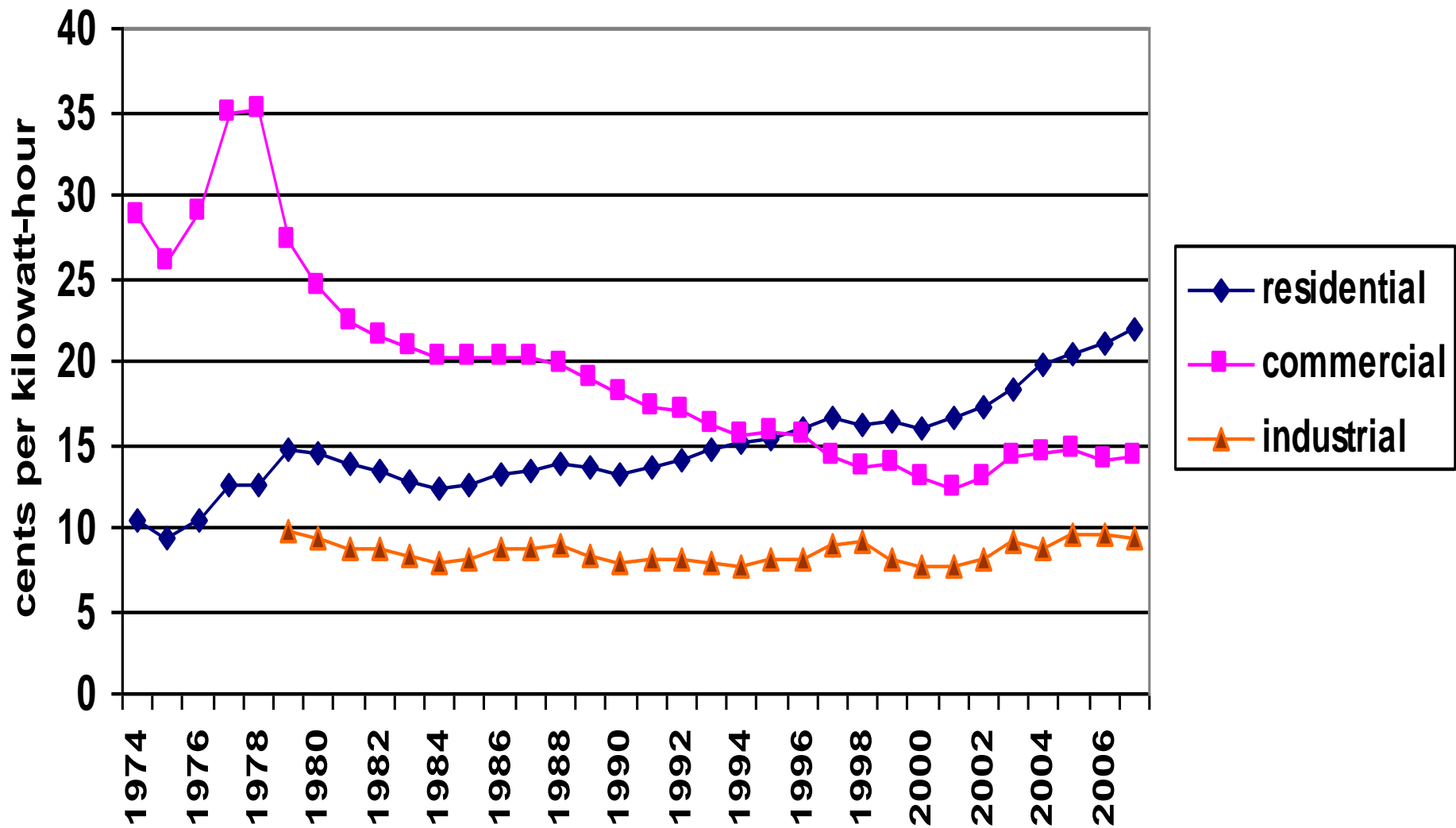
Petticrew, M. et al, 2004. Evidence for public policy on inequalities; 1: The reality according to policy makers. *JECH*, 58, 811-816.

Whitehead, M et al 2004. Evidence for health policy on inequalities; 2: Assembling the evidence jigsaw. *JECH*, 2004, 817-821.

Framing: Household energy and climate change

- Halving of carbon emissions by ~ 2030
- Energy use in housing
 - <10% of NZ CO₂
 - ~13 - 26% of UK CO₂
- Reductions possible now
 - energy efficiency & behavioural change
 - indirectly via conversion to renewable or low-C generation

Real electricity prices March years 1974-2007



Framing: Housing quality problems for health & well-being

- NZ housing stock old, cold and damp
- Indoor exposure hazardous for health
- OECD: 90% of time indoors, 75% in homes
- NZ average winter temperature 16°C
(WHO recommends 18 – 21°C)

Framing: Comparative risk assessment

- 1600 excess winter deaths in NZ each year from respiratory and circulatory problems

vs

900 deaths from air pollution

400 direct road toll

- Increased risk of dying in winter among low-income people, those living in rented accommodation and those living in cities.

Hales, S., Blakely, T., Foster, R.H., Baker, M.G., Howden-Chapman, P., in press. Seasonal patterns of mortality in relation to social factors. *Journal of Epidemiology and Community Health*, In press..

Davie GS, Baker MG, Hales S, Carlin JB. Trends and determinants of excess winter mortality in New Zealand: 1980 to 2000. *BMC Public Health* 2007;7:263.

Framing: EW Hospitalisation

Study of excess winter hospitalisation (EWH) & housing factors (2000-2006):

- EWH higher in villas & pre-war bungalows than post-war bungalows & lower in “quality” bungalows;
- EWH higher in urban areas than in rural areas;
- EWH increased with increasing SE deprivation

Effect sizes small.

The poorer the condition of a dwelling (on a 3 point scale), the higher the proportion of rentals in the area.

For more information contact: lucy.telfar-barnard@otago.ac.nz

Solution focused: Insulation

- Housing, Insulation and Health Study
- 1400 households where one member had chronic respiratory symptoms
- Occupants of insulated houses exposed to significantly warmer and less damp houses
- Key energy result: Occupants in insulated houses used ~23% less energy

Howden-Chapman, P., J. Crane, et al. Retrofitting houses with insulation to reduce health inequalities: aims and methods of a clustered, randomised trial in community settings." *Social Science and Medicine*, 2005, 61: 2600-2610.

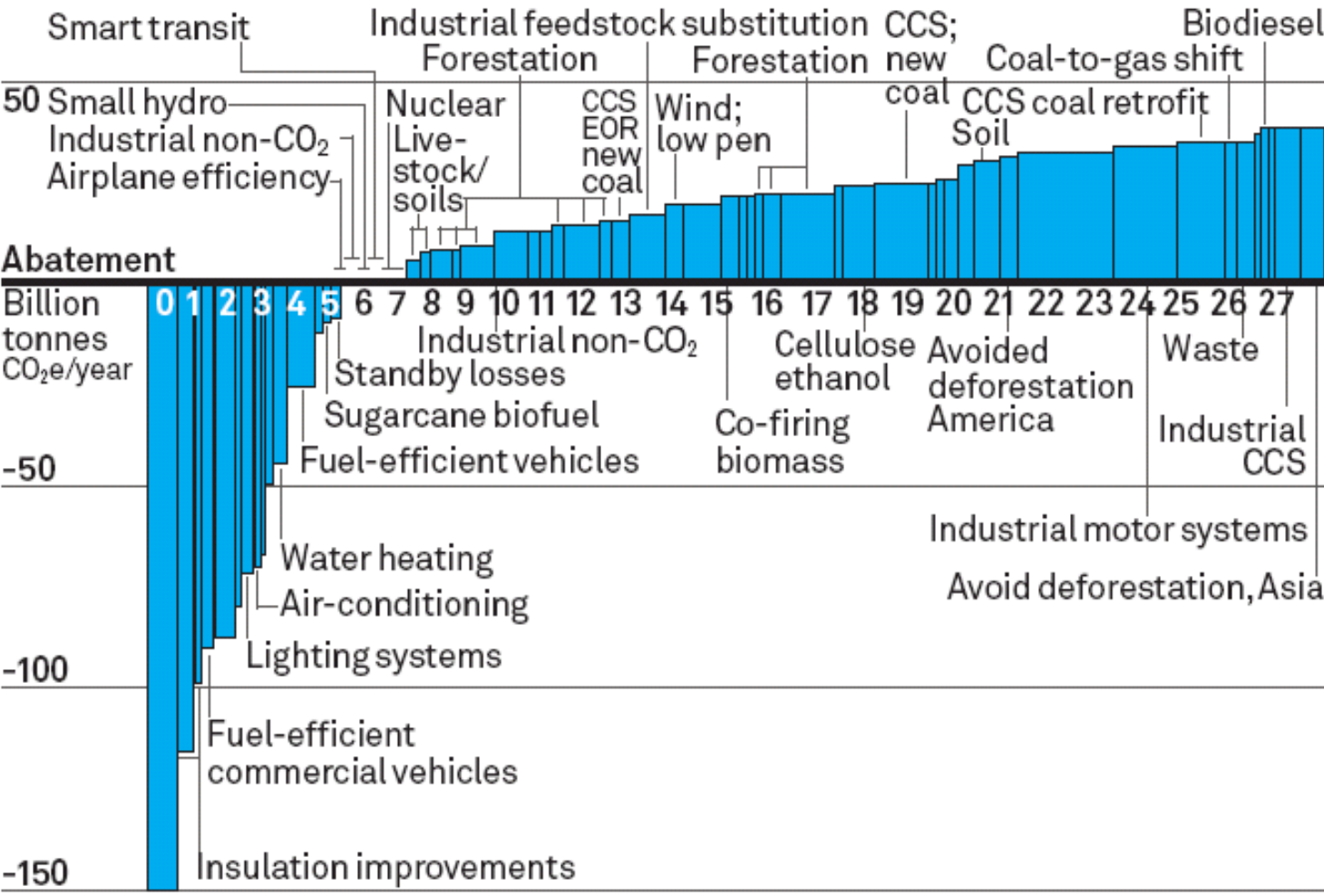
Howden-Chapman P et al. Retrofitting houses with insulation to reduce health inequalities: results of a clustered, randomised trial in a community setting. *British Medical Journal* 2007;334:460-464.



Insulation study results

- Significant improvement in self-reported housing conditions (less cold and dampness)
- Significantly fewer days off school and work
- Significantly fewer symptoms of wheeze and colds
- Fewer hospital admissions
- Positive benefit to cost ratio almost 2:1

Exhibit 7



The cost curve provides a “map” of abatement opportunities
 Cost of abatement, 2030, €/tonne CO₂e
 Source: Enkvist et al. (2007)

Tony Blair, *Breaking the Climate Deadlock: A Global deal for Our Low-Carbon Future*. Report submitted to the G8 Hokkaido Toyako Summit, June 2008, p.24.

CO₂ savings - every bit helps

- Average 217 kilograms CO₂ per household per year
- Measured for electricity and mains gas savings
- Valued at \$30 per tonne of CO₂
- Present value of savings: \$100 per household – every bit helps

Conservative assumptions: no energy price increases, no wood and coal counted, mortality gain not counted

Housing, Heating & Health

- Even insulated houses colder than ideal
- NZ has Scottish pattern of spot heating one room
- Third of NZ households use unflued gas heaters (1 kg LPG = 1.6 kg H₂O)
- 30 NZ cities exceed air quality standards

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Heating

- 409 households in community trial
- Does non-polluting, more effective, home heating reduced children's asthma symptoms over winter?
- Households had choice of sustainable heaters

Howden-Chapman P, Pierse N, Nicholls S, Gillespie-Bennett J, Viggers H, Cunningham M, et al. Effects of improved home heating on asthma in community dwelling children: randomised community study. *British Medical Journal* 2008;337(a1411doi:10.1136.a1411).

UNIVERSITY OF OTAGO
WELLINGTON



SCHOOL OF MEDICINE



Intervention

Previous:

- X electric heaters (2kW)
- X unflued gas heaters (4kW)

Replaced with:

- √ 320 heat pumps (4-7kW)
- √ 55 wood pellet burners (10kW)
- √ 11 flued gas heaters



Heating

Average living rooms 1.1°C warmer

People felt warmer

Condensation reduced

Less mould and mouldy smells reported

Levels of nitrogen dioxide halved

Levels of wheezing & coughing halved

Effects more marked in low-income families

Two more days at school during winter

Free, S., P. Howden-Chapman, et al. (2009). "Does More Effective Home Heating Reduce School Absences for Children with Asthma?" *Journal of Epidemiology and Community*, doi:10.1136/jech.2008.086520.

Gillespie-Bennett, J., N. Pierse, et al. (2008). "Sources of nitrogen dioxide (NO₂) in New Zealand homes: Findings from a community randomised controlled trial of heater substitution." *Indoor Air* **18**(6): 521-528.

Gillespie-Bennett J, Pierse N, Wickens K, Crane J, Howden-Chapman P, Housing Heating and Health Team. The respiratory health effects of nitrogen dioxide exposure. *European Respiratory Journal* in press.

Cost-benefit of improving heating

Cost and installation cost of heaters over conservative
12 year life-span

Benefits

no visits to health professionals, time off work/school,
care-giving, pharmaceutical use, changes in total
household energy use and carbon emissions

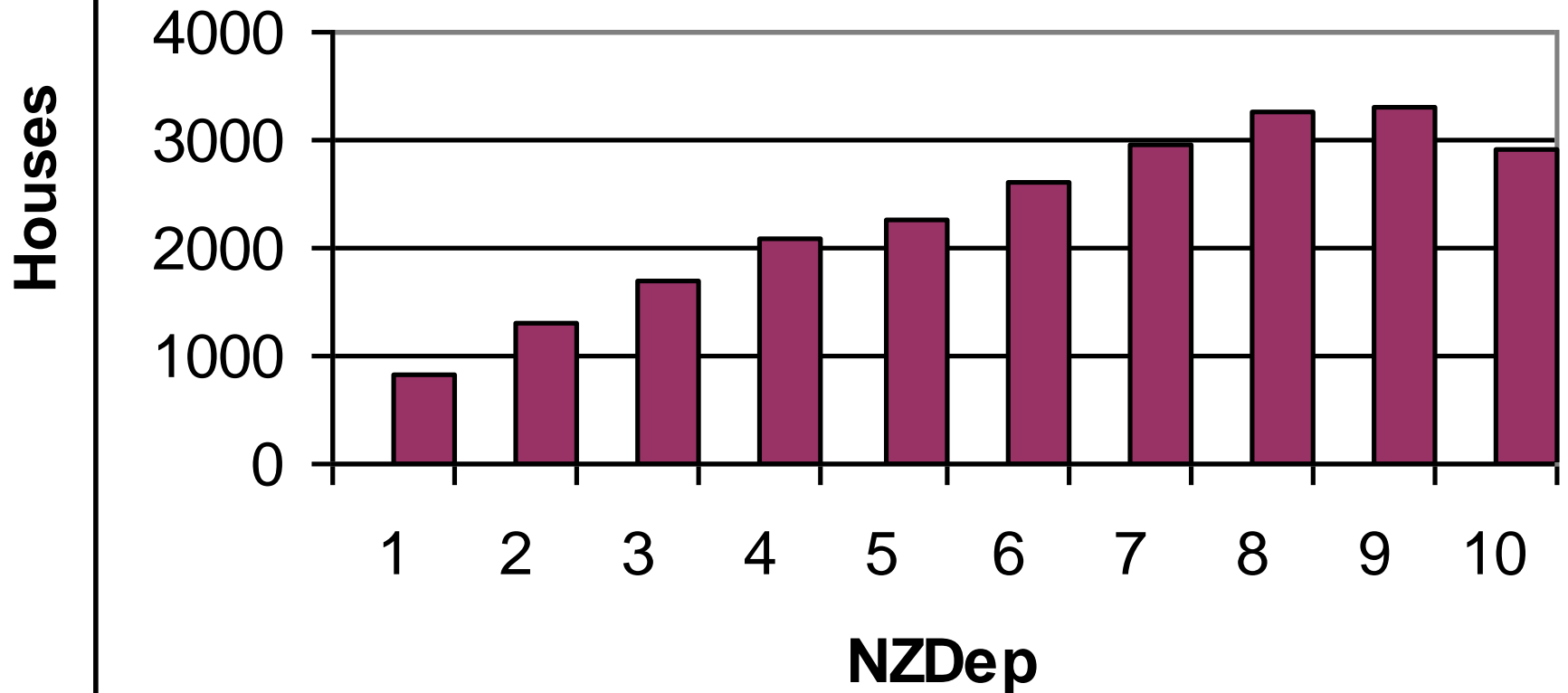
Sensitivity analysis

Targeted approach (high rates of household asthma)
benefit:cost ratio 1.09: 1

Untargeted approach (typical NZ asthma rates)
benefit:cost ratio 0.31: 1

Reducing inequalities?

Number of Dwellings insulated using EECA



Policy Impact

- Previous Labour Govt allocated 1 billion dollars Household Fund to buffer households from residential electricity price increases and flow-on from ETS
- Current National Govt \$383m
 - research evaluation
- Major impact on central, regional and local government, NGOs
- Key inter-sectoral policy

Is your home one of the 900,000 houses with sub-standard insulation?

You could get 1/3 off the cost to upgrade.

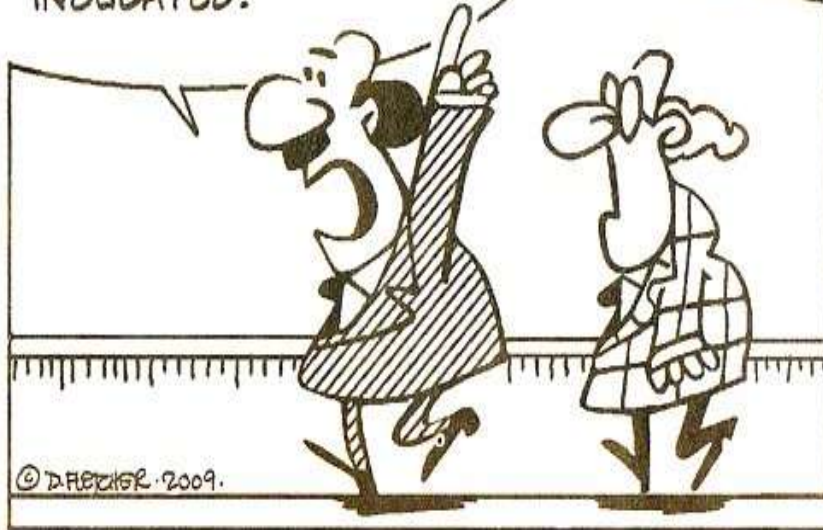


New Zealand Government



THE POLITICIAN

I WANT EVERY HOUSE
IN THE COUNTRY FULLY
INSULATED!



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THEN I WON'T BE ABLE TO HEAR THE
PEOPLE COMPLAINING ABOUT THE
WAY I'M HANDLING THE FINANCIAL
CRISIS!!!



Current Studies

- Warm Homes for Elderly NZders (WHEZ)
 - RCT Intervention \$500 electricity voucher
- Home Injury Prevention Intervention (HIPI)
 - RCT Intervention \$500 remediation of home hazards
- House Outcome Mould Study (HOME)
 - Case-control study of mould *causing* asthma
- Social Housing Outcomes Worth (SHOW)
 - Cohort linking social housing to hospitalisation data
- Qualitative studies of extended family housing
- Housing Quality Questionnaire

Keall M, Baker M, Howden-Chapman P, Cunningham M, Ormandy D. Assessing health-related aspects of housing quality. *JECH*, in press.

Keall M, Baker M, Howden-Chapman P, Cunningham C. Association between the number of home injury hazards and home injury. *Accident Analysis and Prevention* 2008;40 (3):887-893.

Keall M, Crane J, Baker M, Wickens K, Howden-Chapman P, Cunningham M. The impact of housing quality on respiratory health. *Thorax* in review.

Data Sources

- Health Outcomes
 - NZHI, ACC
- Housing data
 - HNZC (tenants + IRR)
 - Quotable Value
 - Tenancy Board (tenure)
 - Tools (Housing Quality Index, Canadian Index of Over-crowding)
- Ecological
 - Census Stats NZ commuting data
 - NZDep
- Census/mortality study
- Longitudinal Studies (Dunedin, Christchurch, Auckland)

Summary (1)

- Studies deliberately framed as housing & health research **not** low-income & health research
- Solution-focused research with multiple outcomes
- Research targeted to providing material benefits to low-income communities
- Results generalisable to “NZ Inc”

Summary (2)

- Co-benefits strong selling point for population health policy
- Important to insulate **and** heat our homes where we spend most of our time
- Good for health, energy efficiency, climate change **and** employment

Summary (3)

- Demonstrated important private and public benefits
- Research led to major policies that survived change of government and addresses demand-side energy problems
- Evaluating national policy implementation
- Considerable potential for cross-Tasman research
 - housing quality, rental housing, housing transport affordability, indoor/outdoor air quality, household crowding