Improving impact of housing research on policy

AHURI Investigative Panel – Health and Housing
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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!


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

Source: Energy Data File, July 2008, Table J.1b
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.


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.

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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


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
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.
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
we’re your heater headquarters

$139.99 ea
Gascraft Black Pelino Gas Heater
- Flame failure device
- Oxygen depletion device and tilt switch
- Three heat settings
- Rotary control knob
- Piezo ignition
- Ezlock gas connection system
- Castors
- Dimensions: 400mm W x 350mm D x 690mm H.
#2000000916934 Gas cylinder sold separately.

$45.86ea
9kg LPG Cylinder Model CYL9KGOPD
This cylinder has an overfill protection device and complies with NZ safety standards.
#9419695622045

$299.99 ea or pay from $2.95pw
Evantair Dehumidifier 16L Model WDH-520HB
- 24 Month warranty
- Variable control
- 4 Litre water tank capacity
- 16 Litre per day extraction capacity
- Full tank warning signal.
#9421009505708

The Warehouse
where everyone gets a bargain

TWL9492
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

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


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

Houses

NZDep
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.
THE POLITICIAN

I WANT EVERY HOUSE IN THE COUNTRY FULLY INSULATED!

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

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”
• 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

• 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