

Capturing the health benefits of energy efficiency programmes for children in New Zealand – a success story

Experts' Roundtable on Health and Well-Being Impacts of Energy Efficiency, April 18-19 2013, European Environment Agency (EEA), Copenhagen.

Professor Philippa Howden-Chapman
He Kainga Oranga/Healthy Housing Research Programme
New Zealand Centre for Sustainable Cities
University of Otago, Wellington

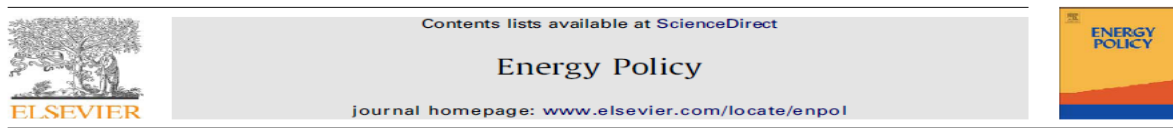


Outline

- Children, older, chronically ill & poor people more vulnerable to cold, damp housing
- Community housing trials show causal relationships with improving health
 - Housing, **Insulation** and Health
 - Housing, **Heating** and Health
 - Warm Homes for Elder New Zealanders
 - Home, **Injury** Prevention Intervention
- Active translation of research into policy to encourage national roll-out

Housing and energy

- People spend 75% of time indoors, young, old & sick 90% of time at home
- NZ houses old & cold have lowest energy use in OECD, but average winter temperature 16°C
- Only one room usually heated
- Home heating 30-40% of residential energy; 13% of consumer energy demand



Warm homes: Drivers of the demand for heating in the residential sector in New Zealand

Philippa Howden-Chapman^{a,*}, Helen Viggers^a, Ralph Chapman^b, Des O'Dea^a, Sarah Free^a, Kimberley O'Sullivan^a

^a He Kainga Oranga/Housing and Health Research Programme, University of Otago, P.O. Box 7343, Wellington South, New Zealand

^b School of Geography, Environment and Earth Sciences, Victoria University of Wellington, New Zealand

ARTICLE INFO

Article history:
Received 17 September 2008

ABSTRACT

New Zealand houses are large, often poorly constructed and heated, by OECD standards, and consequently are colder and damper indoors than recommended by the World Health Organisation.


Crowding link to infectious diseases

- When only one room heated, people crowd together
- Probable link to increasing rate of infectious diseases in New Zealand

D-11-03603R2 linked to 8829

S0140-6736(11)61780-7

Embargo: February 20, 2012—00:01 (GMT)

Articles 
ZN

Increasing incidence of serious infectious diseases and inequalities in New Zealand: a national epidemiological study



Michael G Baker, Lucy Telfar Barnard, Amanda Kvalsvig, Ayesha Verrall, Jane Zhang, Michael Keall, Nick Wilson, Teresa Wall, Philippa Howden-Chapman

Summary

Background Although the burden of infectious diseases seems to be decreasing in developed countries, few national studies have measured the total incidence of these diseases. We aimed to develop and apply a robust systematic method for monitoring the epidemiology of serious infectious diseases.

Published Online
Month date, 2012
DOI:10.1016/S0140-
6736(11)61780-7

Mums sob as joint inquest held

The Dominion Post Wed Dec 10 2008

RUTH HILL and ANNA CHALMERS

MOTHERS' sobs filled courtroom 7 at Wellington District Court as inquests were held on how their babies died in bed, possibly because of "unsafe sleeping environments", a pathologist said.

In four of the seven cases the babies were sharing a bed with others. Three were in bassinets, but face-down, which probably caused them to suffocate.

Wellington coroner Garry Evans, who has condemned bed-sharing as a deadly practice in at least 15 other cases during the past eight years, reserved his findings.

He told the families yesterday that the inquests were not a witch-hunt. "There is no suggestion these babies received anything except tender loving care. We are simply here to see what contributed to their deaths."

Judy-Anne Tito, who accidental-



Toni Taipeti: Daughter died sharing a bed with father and sister.

▶ TINY TRAGEDIES - HOW SEVEN BABIES DIED IN BED

■ **Indiah Ataahua Lola Hawkins**, died in Martinborough on September 11, 2007, aged four months. Was put in her bassinet on her side "to make it easier for her to breathe". Found with a blanket over her face.

■ **Reipai Harris**, seven weeks, died on December 26, 2007, at home in Stokes Valley. Was put in her cot at 3am on her stomach. Found dead at

4am, face-down on the mattress.

■ **Nephi Joshua Tito-George**, died at home in Stokes Valley on May 21, 2008, aged two weeks. Was sharing a single bed with his mother and twin sister. His mother woke at 1.45am to find him under her arm and shoulder with blood coming from his nose.

■ **Yozahne Aki-Hosay**, died in Lower Hutt on July 14, 2008, aged three

months. Was in a double bed with his mother, who woke to find him on his back with "foamy stuff" coming out of his nose.

■ **Pro Junior (PJ) Meihana**, died in Wainuiomata on August 19, 2007, aged four weeks. His mother woke to find him tucked under her body.

■ **Yozahliyah Taipeti**, died in Stokes Valley on August 14, 2008, aged six

weeks. She was sharing a double bed with her father and sister. He woke to find her face-down on a pillow with a dummy in her mouth.

■ **Tristan Cory Rapata-Warbrick**, died on December 11, 2007, in Upper Hutt, aged three months. Put in his bassinet on his side, with his head on a soft adult pillow. Found next morning lying face-down.

ly smothered her son Nephi, said she knew it was risky sleeping with her tiny twins "but it was the only way they would settle".

Zantana Meihana told of her horror at waking up with baby PJ "tucked" under her. She broke down, sobbing, when Mr Evans asked her if it was possible she might have "leaned" on PJ in her

sleep. "I think I did," she cried.

Her father, Frank Meihana, said: "We have lost a child and I don't think we'll ever get over that."

Shannon Taipeti, cousin to baby Yozahliyah's mother, said she knew the baby should have been in her own bed. "But our house was so cold they were better off sleeping together to keep warm."

Rachel Hawkins is haunted by "what ifs" since Indiah's death. "If I hadn't wrapped her up, if I had her in with me..."

The pathologist in all seven cases, Jane Zucollo, said babies were especially vulnerable if they had a cold or were on their stomachs on soft bedding, which could obstruct their airways.

It was "extremely tempting" for parents to share the bed or put babies to sleep on their stomachs if they slept better that way.

A cot death study by Wellington paediatrician Dawn Elder found 44 per cent of sudden infant death syndrome (Sids) cases were linked to bed-sharing. Of 54 Sids cases between 1997 and 2006, 24 babies had

died while in an adult bed.

Dr Elder and Auckland University child health professor Ed chell warn against bed-sharing.

The Health Ministry advises it is safe if the mother has smoked in pregnancy, alcohol drugs have not been consumed, adult is not tired and the baby is back and free of loose bed-



Kiwis pay for their cold comfort

By REBECCA TODD

PEOPLE ARE turning off heaters and jumping into bed to escape rising power bills after the coldest June in more than 30 years.

The average national temperature last month was a nippy 7.3°C, the lowest since 1972.

As the chill set in, Kiwis cranked up their heating and snuggled up indoors. Power usage was pushed to record highs - and power bills are now following suit.

Elaine and Fred Baker of Rotorua were forced to turn off their heater and stay in bed after receiving a bill for \$147 when they usually pay about \$80 to \$90.

"We can't afford to have another power bill like that," Elaine said.

Millie Mitchell, 78, of Dunedin has been turning off her heating and going out during the day after receiving her biggest power bill ever of \$240 for last month.

A brisk walk, trip to the gym or lunch in the warmth of the senior citizens' club is her tip for beating the chills and the bills.

Age Concern chief executive Ann Martin said: "We don't recommend staying in bed to save money. Activity is the key to keeping warm and healthy throughout winter."

Although Christchurch was the coldest main centre last month, Cantabrians Steve and Diane Garside say they're reaping the benefits of their decision last winter to convert to coal because of rising power bills. They have three children and estimate that if they had stayed with electric heating their June power bill would have been \$330, instead of \$180.

Temperatures in Omarama, North Otago, plummeted to a glacial all time low of -14°C last month. Locals Sue and Jim Harkin used a log burner with a wetback to combat the cold but even so were surprised to find their power bill jumped \$40.

Even people in milder climates like Tauranga felt the pinch. Dawn Barber is in her seventies and lives alone in Bureta. Her June power bill was up \$36 from the usual \$100.

"It was quite a jump. It's probably the heaviest one I've ever had."

The warmest place to be in June was Kaitiaki - where they had a relatively balmy average temperature of 11.3°C.

As the cold snap continues, July's bills could follow a similar pattern, but National Climate Centre principal scientist Dr Jim Salinger said the country should be thawing by the end of the month.

"We are expecting a cool July, frostier than usual, but a warm start to spring with average to above average temperatures for August and September."

The World Health Organisation recommends living areas are heated to 20°C. Less than 16°C puts people at higher risk of respiratory problems and under 12°C increases the danger of a heart attack or stroke.

■ For information on how to keep your home warm and dry go to <http://www.eeca.govt.nz>.

Population vs targeting policies

- Universal population approach effective and socially inclusive

A large number of people at a small risk may give rise to more cases of disease than the small number who are at high risk. (Rose, 1985)

- Targeting vulnerable populations
 - May be more efficient use of scarce resources
 - Higher transaction costs identifying groups
 - Depending on government ideology may be more politically acceptable, but generally less popular with those excluded

Housing, Insulation & Health Study

Cite this article as: BMJ, doi:10.1136/bmj.39070.573032.80 (published 26 February 2007)

BMJ

RESEARCH

Effect of insulating existing houses on health inequality: cluster randomised study in the community

Philippa Howden-Chapman, professor and director,¹ Anna Matheson, PhD student,¹ Julian Crane, professor and codirector,² Helen Viggers, data analyst,¹ Malcolm Cunningham, principal analyst,⁴ Tony Blakely, professor,³ Chris Cunningham, professor,⁵ Alistair Woodward, professor,⁶ Kay Saville-Smith, director,⁷ Des O'Dea, lecturer,¹ Martin Kennedy, adviser,⁸ Michael Baker, senior lecturer and codirector,¹ Nick Waipara, scientist,⁹ Ralph Chapman, associate professor,¹⁰ Gabrielle Davie, biostatistician¹

¹He Kainga Oranga, Housing and Health Research Programme, University of Otago, Wellington, PO Box 7343, Wellington South, New Zealand

²Department of Medicine, University of Otago

³Department of Public Health

ABSTRACT

Objective To determine whether insulating existing houses increases indoor temperatures and improves occupants' health and wellbeing.

Design Community based, cluster, single blinded randomised study.

INTRODUCTION

The quality of housing affects the health of the population. Improvements to housing could potentially prevent ill health, especially in sections of the population exposed to substandard housing.^{1,2} Several reviews of social interventions, and housing interventions in par-

•
Study DVD www.healthyhousing.org.nz

Housing, Insulation & Health Study



- Randomised trial of retrofitted insulation
- Research partnership with 8 low-income communities, 1400 households, 5,000 people
- Targeted **households with respiratory problems**

Retrofitting houses with insulation: a cost–benefit analysis of a randomised community trial

R Chapman,¹ P Howden-Chapman,² H Viggers,² D O'Dea,³ M Kennedy⁴

Valuing the health gains, and energy and CO2 emissions savings, suggests that total benefits in “present value” (discounted) terms are one and a half to two times the magnitude of the cost of retrofitting insulation.

Housing Heating and Health Study

- Third of households with unflued gas heaters
- Retrofitted insulation & sustainable heating in 409 households where **children with asthma**
- RCT aims
 - Increase temperature to WHO min 18°C
 - Lower relative humidity
 - Reduce NO₂
 - Reduce symptoms of children with asthma

we're your heater headquarters



\$139⁹⁹ ea
Gascraft Black Pelino Gas Heater
• Flame failure device • Oxygen depletion device and tilt switch • Three heat settings • Rotary control knob • Piezo ignition • Ezilock 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

\$299⁹⁹ ea
evantair
Easy Comfortable Living
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
Or pay from **\$2.95pw***

the warehouse // *where everyone gets a bargain*

TWL9492



Effects of improved home heating on asthma in community dwelling children: randomised controlled trial

Philippa Howden-Chapman, professor and director,¹ Nevil Pierse, statistician,¹ Sarah Nicholls, programme manager,¹ Julie Gillespie-Bennett, PhD student,¹ Helen Viggers, research fellow,¹ Malcolm Cunningham, principal physicist,² Robyn Phipps, director,³ Mikael Boulic, PhD student,³ Pär Fjällström, postdoctoral student,³ Sarah Free, MPH student,¹ Ralph Chapman, associate professor and director of environmental studies,⁴ Bob Lloyd, associate professor and director,⁵ Kristin Wickens, senior research fellow,⁶ David Shields, research assistant,¹ Michael Baker, associate professor and codirector,¹ Chris Cunningham, professor,⁷ Alistair Woodward, professor and head,⁸ Chris Bullen, associate director of clinical trials unit,⁸ Julian Crane, professor and codirector¹

¹He Kainga Oranga/Housing and Health Research Programme, University of Otago, Wellington, PO 7343, Wellington South, New Zealand

ABSTRACT

Objective To assess whether non-polluting, more effective home heating (heat pump, wood pellet burner, flued gas) has a positive effect on the health of children with asthma.

C to 1.64°C) and in the child's bedroom of 0.57°C (0.05°C to 1.08°C). Lower levels of nitrogen dioxide were measured in the living rooms of the intervention households than in those of the control households

Cost-benefit of improving heating

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

Benefits

Fewer visits to health professionals, time off work/school, care-giving, pharmaceutical use, changes in total household energy use and carbon emissions

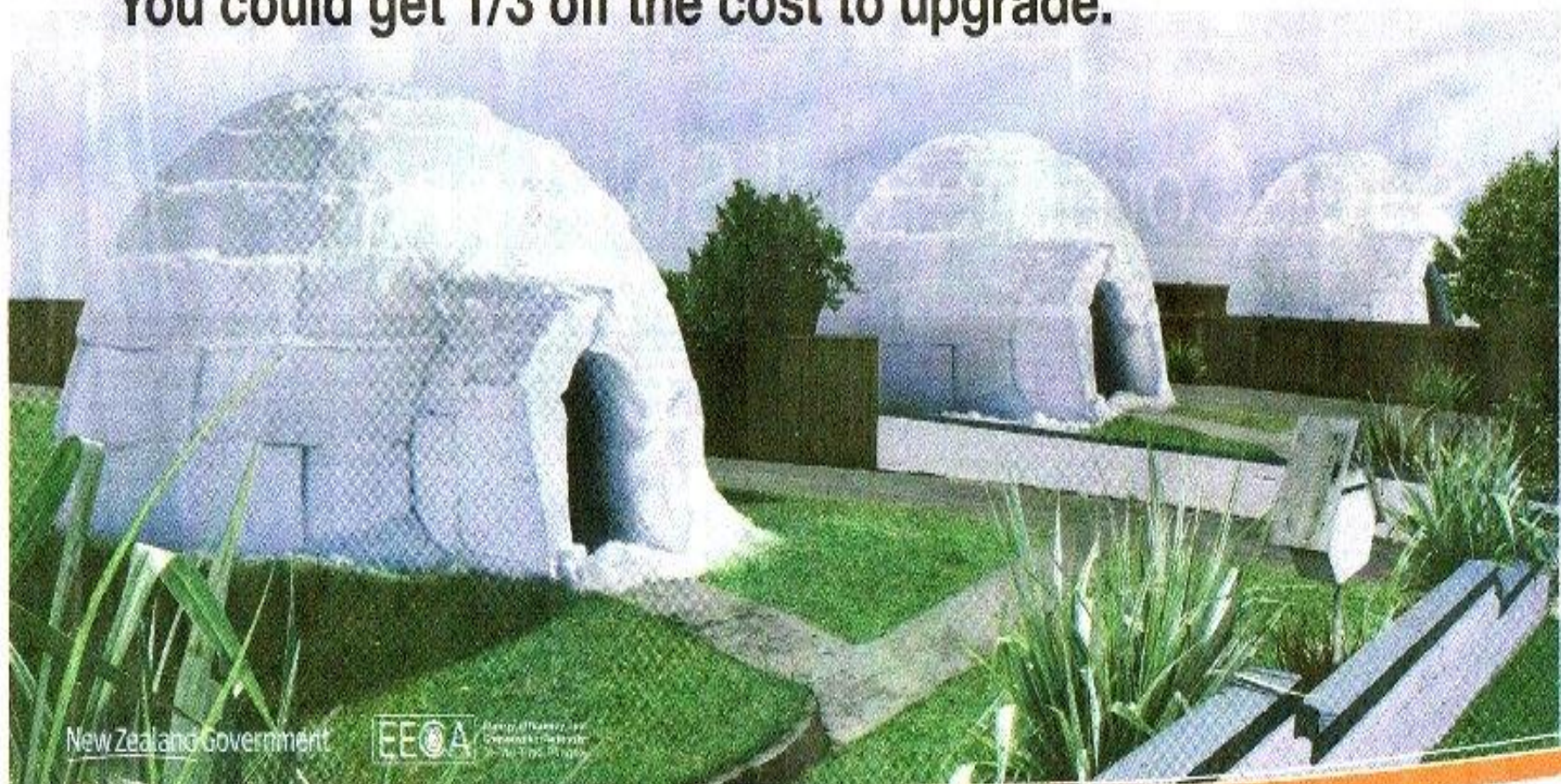
Sensitivity analysis

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

**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

EECA
Energy Efficiency and
Conservation Authority
101 Tairāwhiti Drive

Warm Up NZ: Heat Smart Programme

- 100,000 houses in first 2 years of programme
- \$320 million, **not** targeted to low income
- Quasi-experimental study, detailed anonymised matching of first 46,655 houses
- Small, but significant drop in metered energy
- Significant health outcomes in pharmaceutical usage, length of hospitalisation, avoidable mortality for over 65s
- Benefit/cost ratio 3.9:1 overall, 6:1 for children
- Double the benefits for beneficiaries

Insulation subsidy cutback predicted

By [Simon Collins](#) The Herald, Saturday Apr 13, 2013

Extending programme past September could mean making it more targeted at low-income households



About 50,000 homes a year are being insulated through the scheme. A subsidy that has helped to insulate about one in every six low-income homes looks likely to be cut back in next month's Budget to a more targeted scheme....

Home Injury Prevention Intervention (HIPI)

- 1,000 households in Taranaki (95% response rate follow on from insulation)
- **Population study**, partnership with no-fault Accident Compensation Corporation
- Aim to see if remediating common housing hazards reduces injury rates and ACC claims

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, Baker M, Howden-Chapman P, Cunningham M, Ormandy D. Assessing health-related aspects of housing quality. *JECH*, 2010, 64,9, 765-771.

Keall, M.D., et al., *Estimation of the social costs of home injury: a comparison with estimates for road injury* Accident Anal Prevention, 2011. **43**(3): p. 998-1002.

Keall, M.D., et al., *Formulating a programme of repairs to structural home injury hazards in New Zealand*. Accident Anal Prevention, 2013.

Warm Homes for Elder New Zealanders (WHEZ)

- 522 people over 55 with COPD
- Intervention \$500 electricity voucher
- “Heat as medicine”
- Community partnerships with asthma societies, outpatient respiratory clinics
- Half participants’ homes colder than they would like and they have shivered inside
- Energy rating scale being developed

Viggers, H., Howden-Chapman et al., Warm homes for older people: aims and methods of a randomised community-based trial for people with COPD. *BMC Public Health*, 2013. **13**(176).

Importance of research framing for policy translation

- Explicit values, reducing health inequalities
- Emphasis on significant co-benefits
 - Housing, health, energy efficiency, employment, climate change
- Used popular counterfactuals
 - A house can be insulated for the cost of one night in an inpatient unit!
 - Using the Healthy Housing Index is like going to the AA to get a WOF on you car!

Davis, P. and P. Howden-Chapman, Translating research findings into health policy. *Social Science and Medicine*, 1996. **43**(5): p. 865-72.



Rating tool links health and building science
Measures respiratory and injury hazards, energy
efficiency & earthquake resilience



Journal

OF PRIMARY HEALTH CARE

'Investing in retrofitted insulation and social and affordable housing infrastructure is a better investment than investing in hospitals.'

See page 338

Original Scientific Paper

Simulated GP clinics for teaching medical students
See page 281

Original Scientific Paper

Poor public knowledge of drug safety issues
See page 288

Original Scientific Paper

Hot and cold conditions affect blood glucose monitors
See page 294

Original Scientific Paper

Successful use of Green Prescription in Pacific women
See page 313

Original Scientific Paper

Strategies increase older people's Green Prescription uptake
See page 320

Ethics

Teaching and values
See page 346



The Royal New Zealand
College of General Practitioners

Solutions to
Child Poverty
in New Zealand
evidence for
action



Expert Advisory Group on
Solutions to Child Poverty





Vulnerability from natural experiments

- Climate mitigation requires carbon reduction of at least 90% by 2050
- Major infrastructure rebuilding from earthquake, 17,000 houses destroyed
- Opportunities for renewal “500 houses in Christchurch”



Manchester St

Link-Belt
RANZ MACKAY

The Laptop Company

700x



GET YOUR
HEAD OUT
OF THE
SAND



THERE IS A
HOUSING
CRISIS!



Conclusions

- Community trials have shown, drier warmer, safer houses improve health & well-being, lowers hospitalisation and EWM and reduces energy demand
- Improving private residential housing has public and collective good benefits
- Trials deliberately framed positively as housing & health research **not** low-income & health research **nor** fuel poverty so as to maximise uptake and lower stigma