



# Improving Health through the Built Environment

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*Te Whare Wānanga o Ōtāgo*

**HEIRU** Health Environment Infection Research Unit  
University of Otago

**H E K A I N G A O R A N G A**

**He Kainga  
Oranga/Housing  
and Health  
Research  
Programme  
awarded NZ  
Prime Minister's  
Science Prize,  
2014**



# Background

## He Kainga Oranga / Housing & Health Research Programme

- Department of Public Health, University of Otago Wellington
- Multidisciplinary team of social scientists, medical specialists, epidemiologists, statisticians, physicists, engineers, architects, mycologists
- Aims to produce innovative, robust, relevant research to improve housing and health in NZ
- Working in partnership with local communities, government and private organisations

# Outline

- **Background on scope of housing & the built environment**
- **Why housing is important to health:**
  1. Vulnerable people spend a lot of time at home
  2. Poor housing causes illnesses & injuries
  3. Poor housing mediates health inequalities
  4. Better housing improves health & safety
  5. Better housing improves sustainability
- **Implementing better quality housing - WoF**

**NZ 1890**



# Unable to pay steep rent, family huddle in freezing tent

ASHLEIGH STEWART

BLANKETS and body heat.

That is how one Christchurch family, huddling together in a freezing tent as rain batters their makeshift home, have spent two months trying to keep warm.

The family of five have just weathered their third storm in a tent pitched at the Spencer Beach Holiday Park.

Taurua Houia, his wife and their three children are one of 270 priority A applicants on the Housing New Zealand waiting list.

They have been priority A for three weeks, despite being assessed in February.

"We had a private rental in Hills Rd, but it was too expensive," Houia said.

"I've just been sitting up in the tent every night. I don't get much sleep."

Houia works fulltime as a roofer, but wife Sonia is unemployed and receives a benefit.

But they say this income still does not provide enough money for Christchurch's rents as well as being able to survive.

A large tarpaulin is draped across the outside of the tent for



**Tent trap:** Taurua Houia and his family live in tents at a holiday park because of a housing shortage.

Photo:FAIRFAX NZ

extra insulation as members of the family curl together under duvets during this week's rain. The mattresses account for about half of the floor in the small tent, the remainder is bare.

There are no separate rooms, and no privacy.

"It's blankets and body heat to keep warm," Houia said.

They had returned to the spot on Monday after a brief, but un-

pleasant, stint outside the camping ground.

Forced to leave as it was booked out for Easter, the family moved their tent to Waikuku on Friday – where it was blown

down. In an effort to save money, they then gave freedom camping a try.

After their tent flooded, they moved to a camping ground in Linwood, where they paid \$62 a night for a campsite.

But even after their ordeal and as the weather closed in, Houia was hesitant to complain. "We just take it. I'm all right, it's just the kids."

Family friend and Taurua's boss, Allan Rolfe, has been helping the family and advocating for them to the agencies.

He had offered to let the family stay with him at his home, but they were "fiercely independent" and had refused, Rolfe said.

"It's a horrendous situation. It's a desperate situation, they've got three children as well."

Ministry of Social Development general manager Marama Edwards said Sonia Houia – whose name the application was under – was first assessed in February, and has been on the waiting list since April 4.

"Housing New Zealand and registered community housing providers will continue to work with Ms Houia to find a suitable property," Edwards said.

# Definition of 'built environment'

- All human-made aspects of our world, from houses, buildings, schools & factories to roads, footpaths, parks and shops.
- Focus here on 'Healthy Housing'
- Principles can be applied to many indoor environments, incl. workplaces & schools
- Concerns for health & safety overlap with environmental sustainability and economic development



# Levels of the built environment

<b>Level</b>	<b>Features</b>
Global, national, regional levels	Includes policy, socioeconomic, cultural and environmental influences beyond neighbourhood level
Neighbourhood	Physical features such as air pollution, road safety, urban design, transportation, amenities
Community	Social, cultural and economic aspects such as social capital, safety from crime, civic capacity
House or other dwelling	Physical and environmental quality of building and its services such as insulation and safety
Household	Social, cultural and economic aspects such as affordability, suitability, security of tenure
Individuals	Demographic, psychological and biological features, including knowledge, attitudes, behaviour



# 1. Increase in vulnerable at home

NZ Time Use Survey, Statistics NZ 1998-99 (8,500 people)

NZ Travel Survey, 1997-98 (14,250 people)

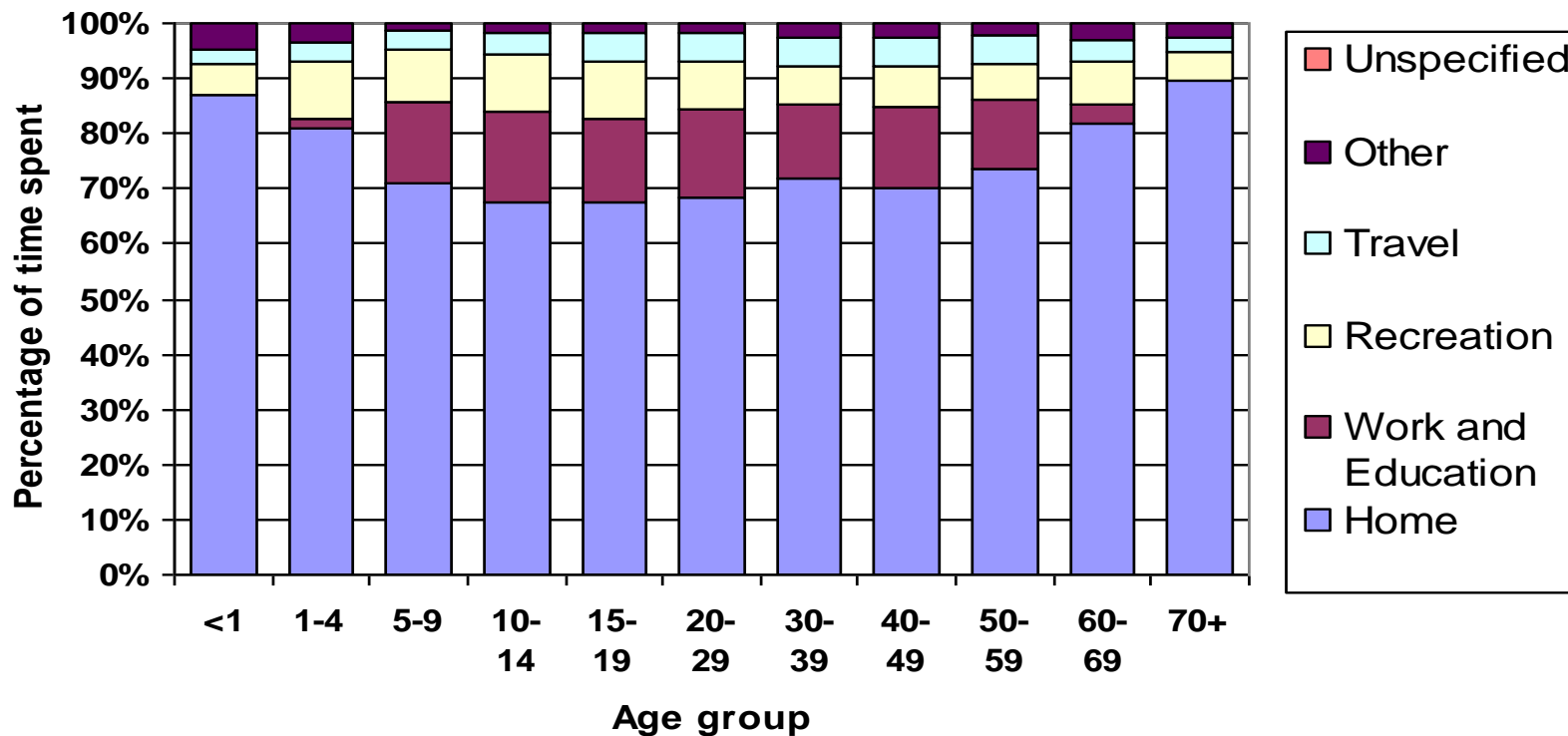
Environment	NZTUS	NZTrS
• Home	72%	73%
• Work & study	13%	12%
• Transport	6 %	5%
• Recreation	5%	8%
• Other*	5%	2%
• Unknown	0%	0%

\*Included almost 4% of time spent at 'other peoples houses'

NB. 94% of time is spent indoors (including 70% indoors at home)

*Source: Baker et al. N Z Med J 2007;120: U2769.*

# 1. Increase in vulnerable at home



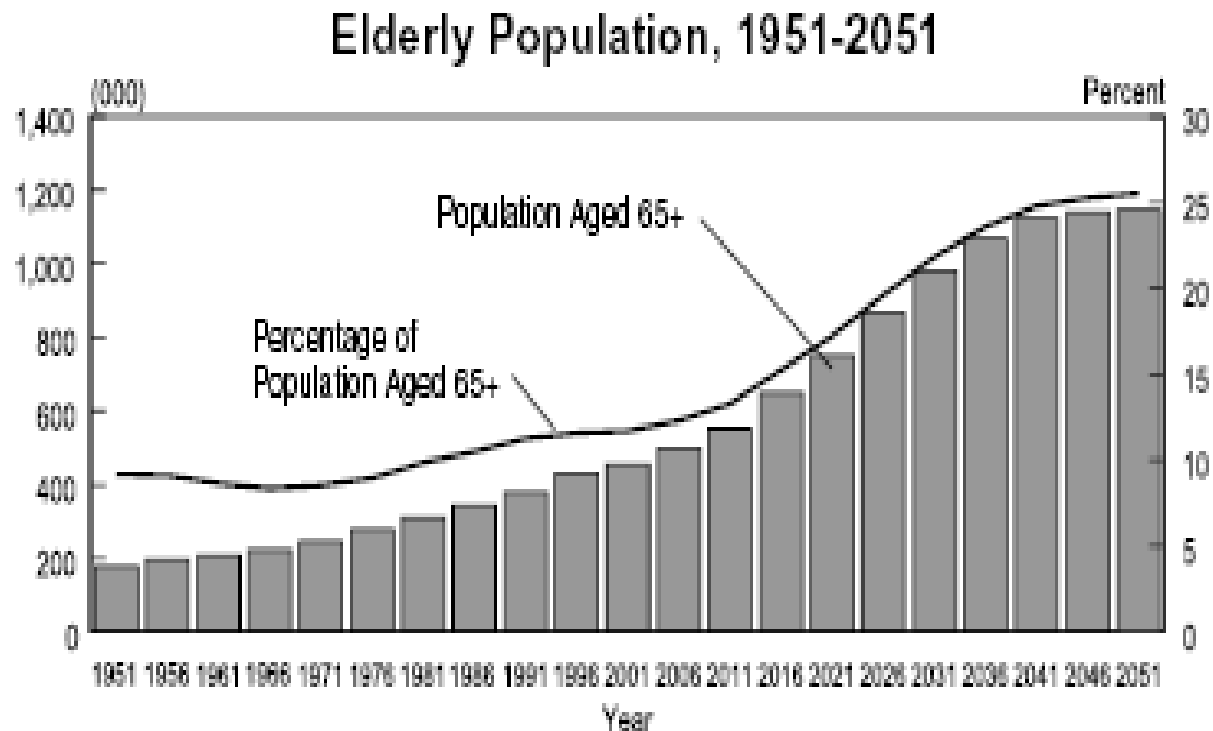
*Source: NZ Travel Survey, 1997-98*

# 1. Increase in vulnerable at home

- Steadily ageing population means increasing need for home support and residential care
- Larger population living with disabilities at home & participating actively in society
- Deinstitutionalisation of chronic illness e.g. mental illness, intellectual disability
- Early hospital discharges
- Ambulatory services e.g. Continuous ambulatory peritoneal dialysis (CAPD)

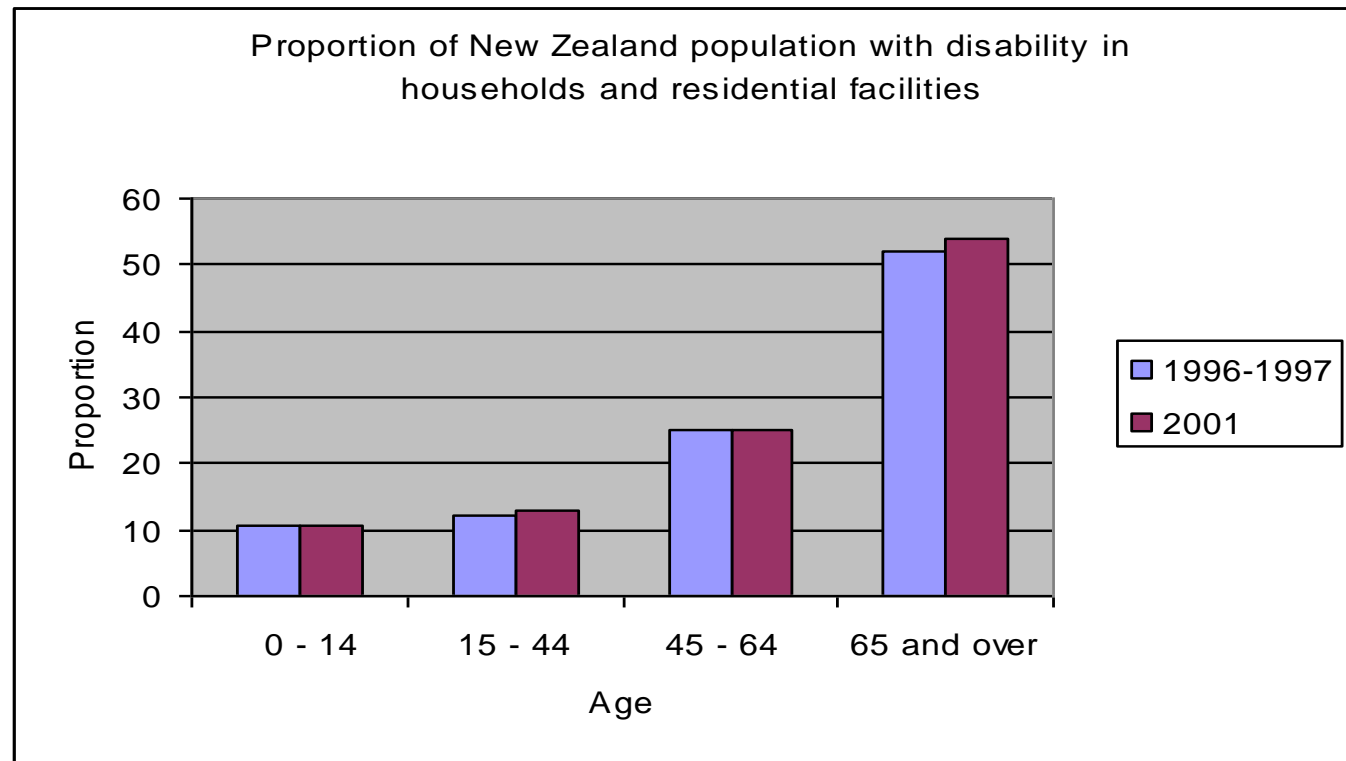
# 1. Increase in vulnerable at home

NZ population 65+ will reach ~25% in ~ 30 Years



# 1. Increase in vulnerable at home

Increasing proportion of population living with disabilities



## 2. Illness & injury in the home

### Injuries in the home:

Half of injuries requiring hospitalisation occur at home

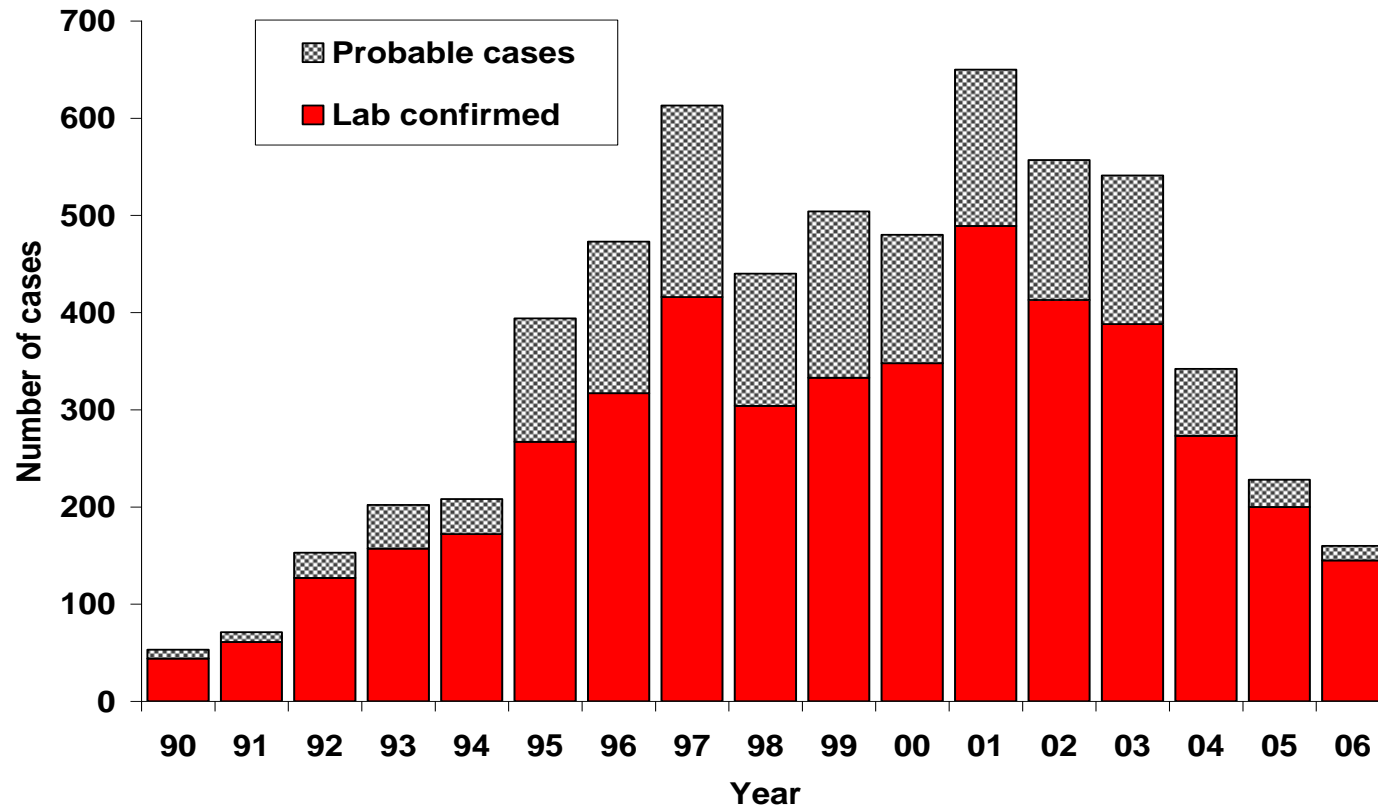
- Average 8,394 per year (2000-2003)
- Other settings: Work 17%, Transport 18%, Sport 14%

A significant proportion (19%) of deaths from injury occur at home

- Average 104 per year (2000-2001)
- Other settings: Work 7%, Transport 72%, Sport 1%

## 2. Illness & injury in the home

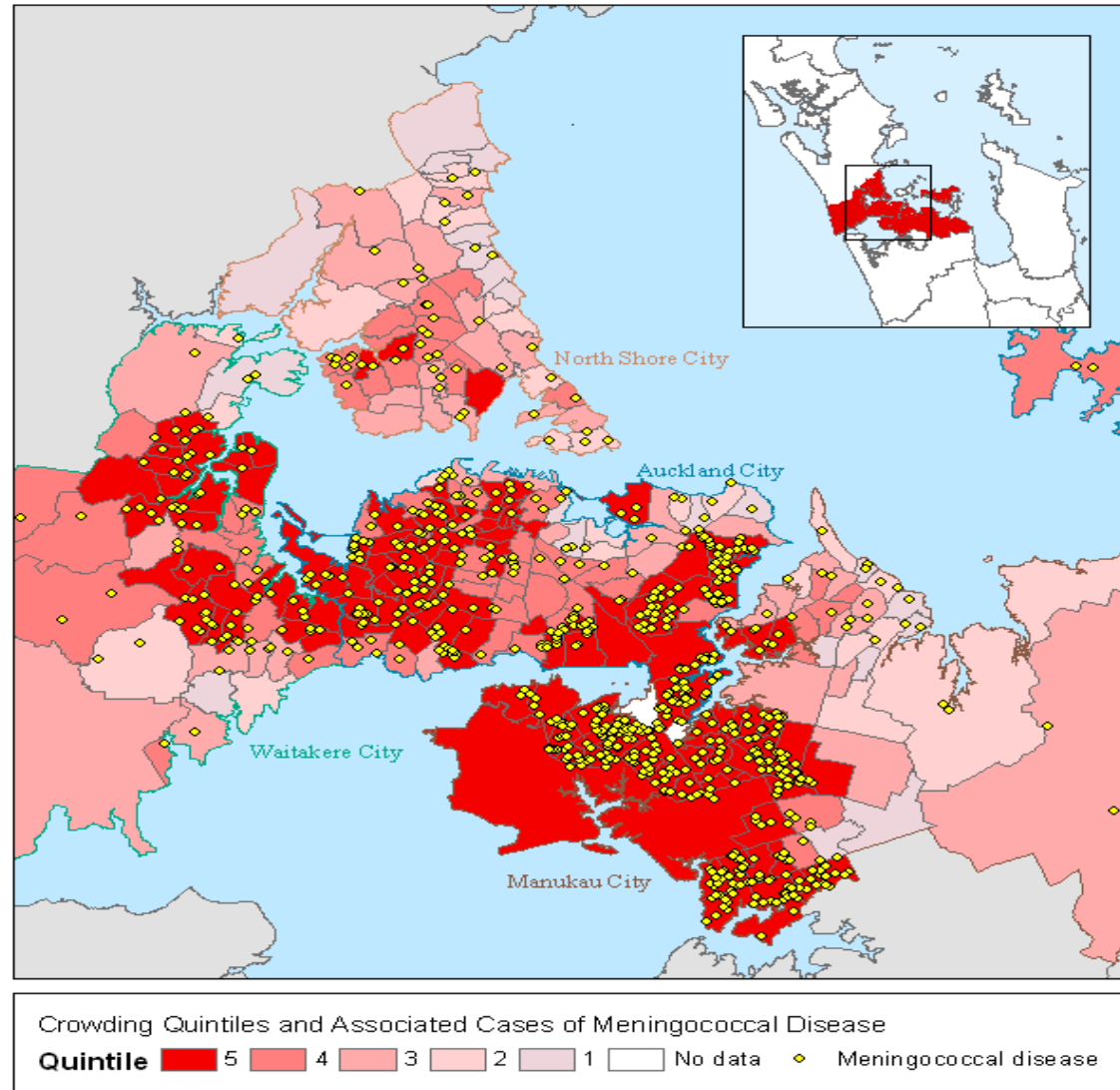
### Meningococcal disease



## 2. Illness & injury in the home

Meningococcal  
disease cases in  
Auckland, 1998-  
2002, and CAU  
crowding level at  
2001 Census

*Source: Baker et al. In: What is  
the extent of crowding in NZ?  
Wellington, Statistics New  
Zealand, 2003*





## 2. Illness & injury in the home

- Case-control study of meningococcal disease in Auckland children < 8 years during 1997-99
- 202 cases and 313 controls
- Overcrowding, measured by the number of adults aged  $\geq 10$  years, was the most important risk factor for disease
- OR=10.7 (95%CI 3.9-29.4)

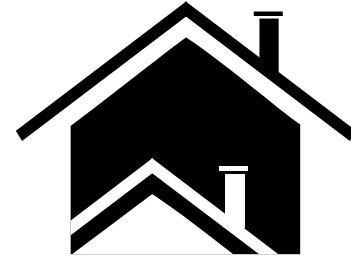
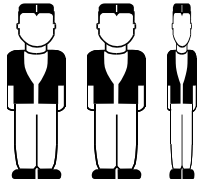
*Source: Baker, et al. Paed Infect Dis J 2000; 19: 983-90*



## 2. Illness & injury in the home

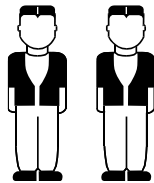
Average family living in 6 room house

Median of 2.6 adults in household

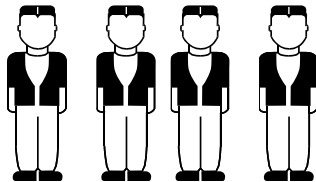


Additional adults

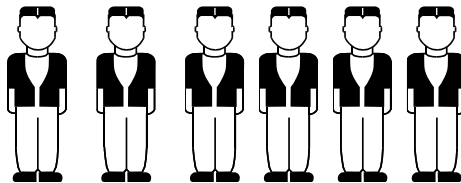
Risk of meningococcal disease



2x



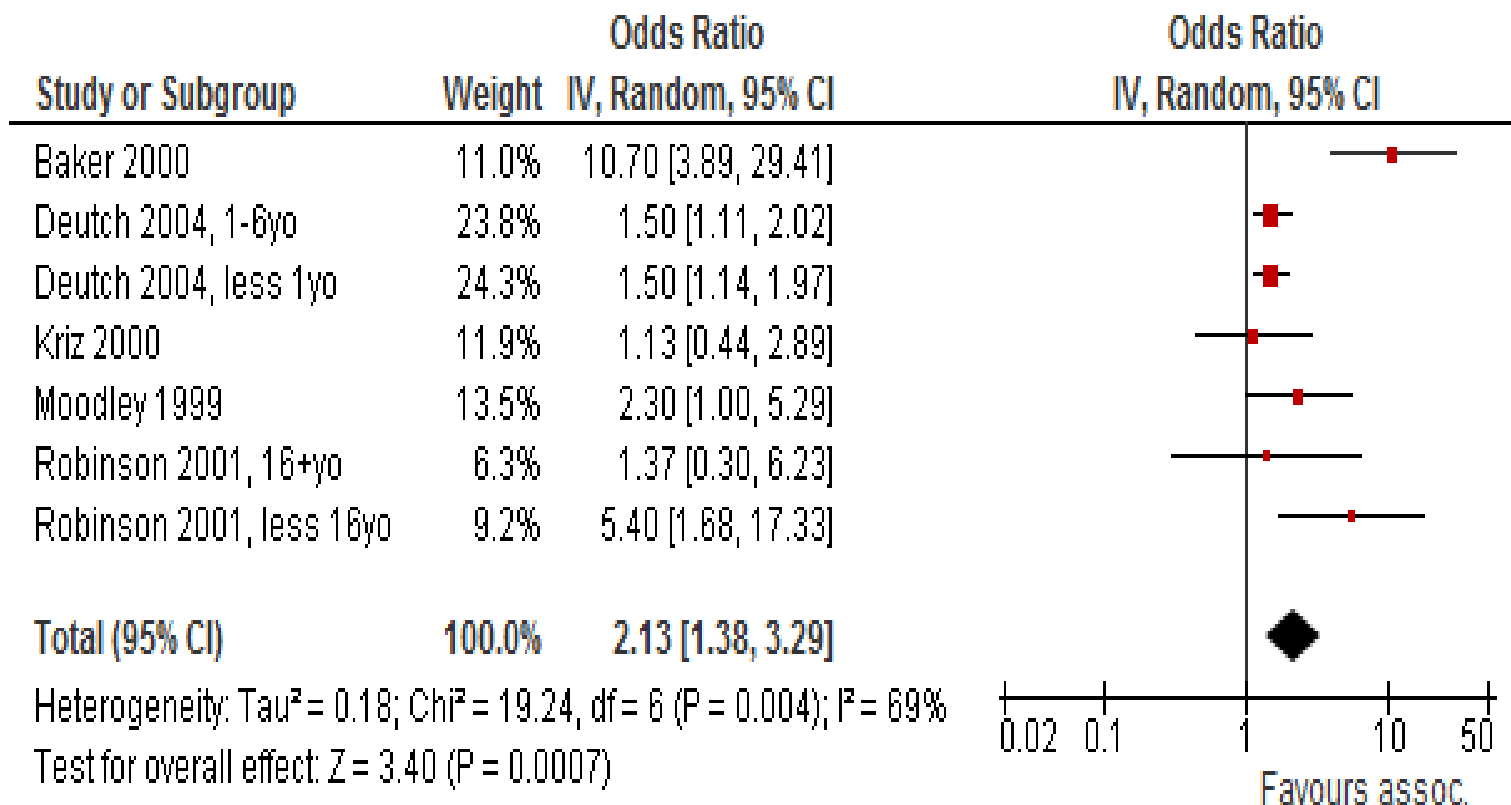
5x



10.7x

## 2. Illness & injury in the home

### Meta-analysis of Meningococcal Disease risk and Household Crowding



Source: Baker, McDonald et al. 2013.

## 2. Illness & injury in the home

### Meta-analysis of IDs and Household Crowding

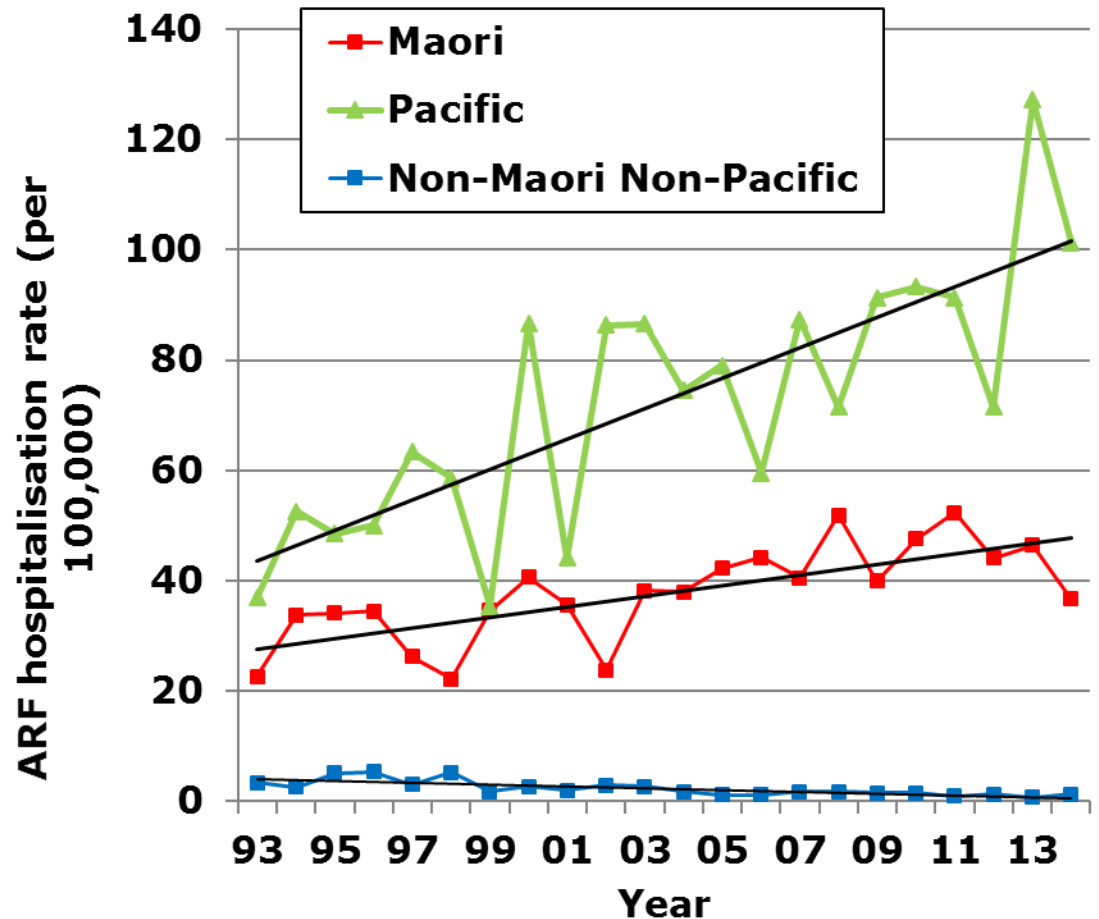
Disease/category	N	Case-control (cross-sectional studies*)	Cohort studies
<b>Respiratory infections:</b>			
• Pneumonia	7	OR 1.58, CI 1.19-2.10	RR 1.61, CI 1.12-2.31
• Other respiratory infection	8	OR 1.38, CI 0.71-2.67	RR 1.35, CI 1.02-1.79
• Haemophilus influenza	6	OR 1.74, CI 1.27-2.37	
• Meningococcal disease	7	OR 2.13, CI 1.38-3.29	
• RSV / bronchiolitis	4		2.24, CI 1.14-4.38
• TB	7	OR 3.78, CI 1.78-8.13	
<b>Enteric infections:</b>			
• Gastroenteritis	4	OR 1.13, CI 1.01-1.26	
• Hepatitis A	6	OR 1.42, CI 1.15-1.75	
• H. pylori	28	OR 1.82, CI 1.55-2.13	
<b>Skin/eye infections:</b>			
• Trachoma	2	OR 2.07, CI 1.06-4.06	
<b>Total</b>	<b>79</b>		

**Source: Baker, McDonald et al. 2013.**

## 2. Illness & injury in the home

### Rheumatic fever

- Acute Rheumatic Fever (ARF) → Rheumatic Heart Disease (RHD)
- 140 RHD deaths pa
- ARF rates rising in Māori and Pacific children (1993-2014)



## 2. Illness & injury in the home

- Excess Winter Mortality (EWM) measures the increase in deaths in 4 coldest months (June-Sept)
- EWM in NZ = 19 % → 1,600 excess winter deaths
- No decline in EWM from 1980-2000
- Young, old, females particularly vulnerable

*Source: Davie, Baker, Hales, Carlin. BMC Public Health. 2007; 7: 263.*

- Poor housing may contribute to EWM
- Nationwide surveys indicate few NZ homes maintain temperatures in the 18-21°C comfort zone

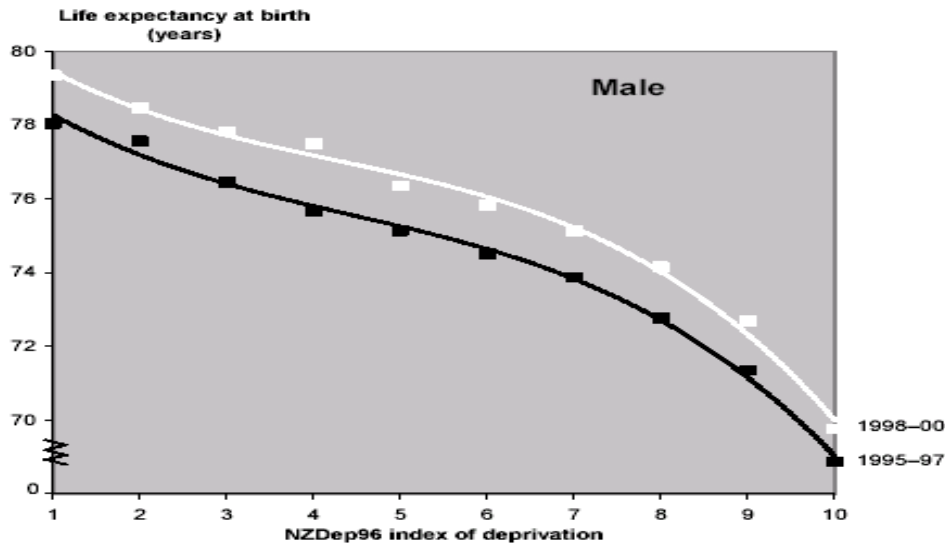
*Source: Isaacs & Donn, 1993; BRANZ, 2003*

# 3. Housing mediates health inequalities

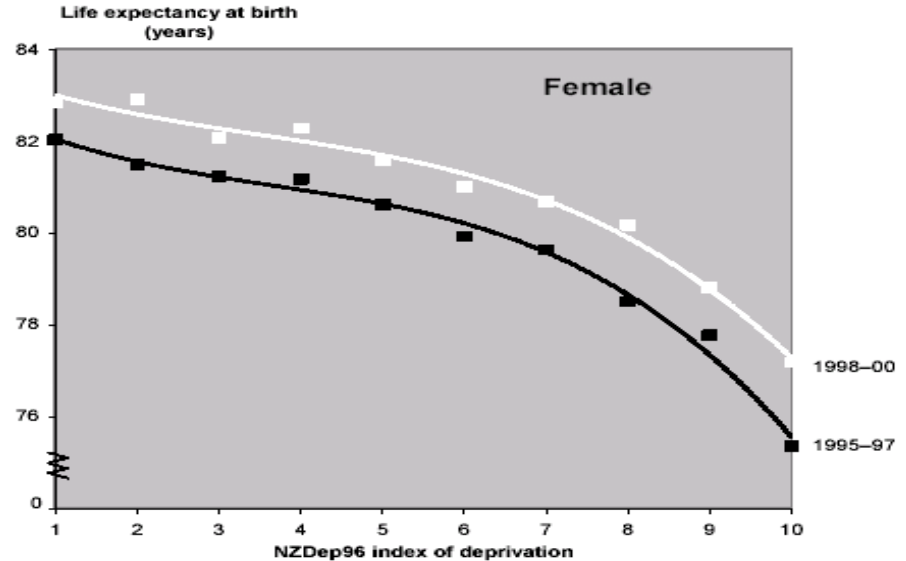
- Where you live is a powerful predictor of health outcomes
  - Area based deprivation measures (e.g. NZDep) linked to mortality, life expectancy & many health outcomes
- Potential mediating pathways
  - Material deprivation
  - Relative disadvantage (psychosocial mechanism)
- Declining home ownership likely to increase socio-economic and health inequalities

# 3. Housing mediates health inequalities

## Life expectancy by NZDep, Males



## Life expectancy by NZDep, Females



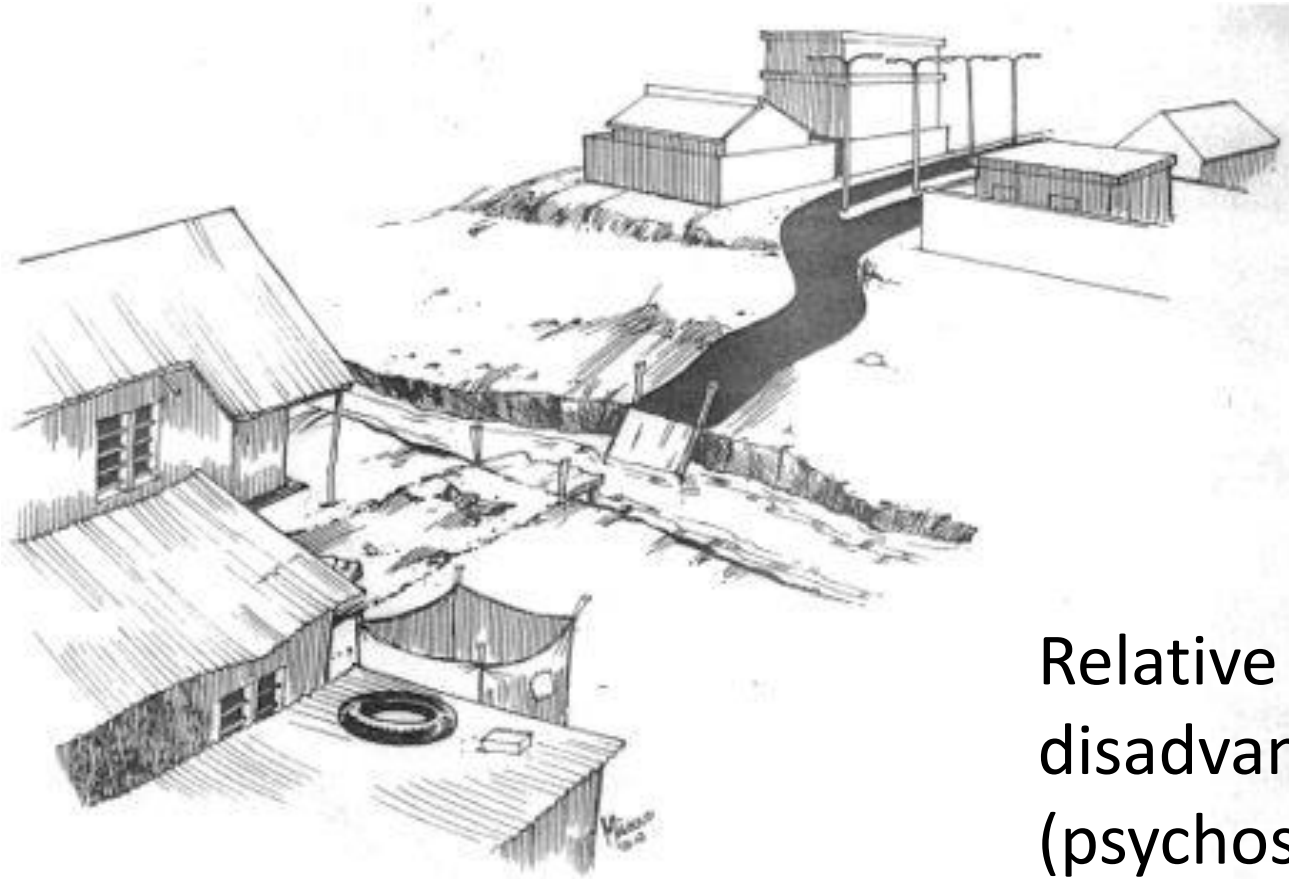


# 3. Housing mediates health inequalities

Cumulative material deprivation

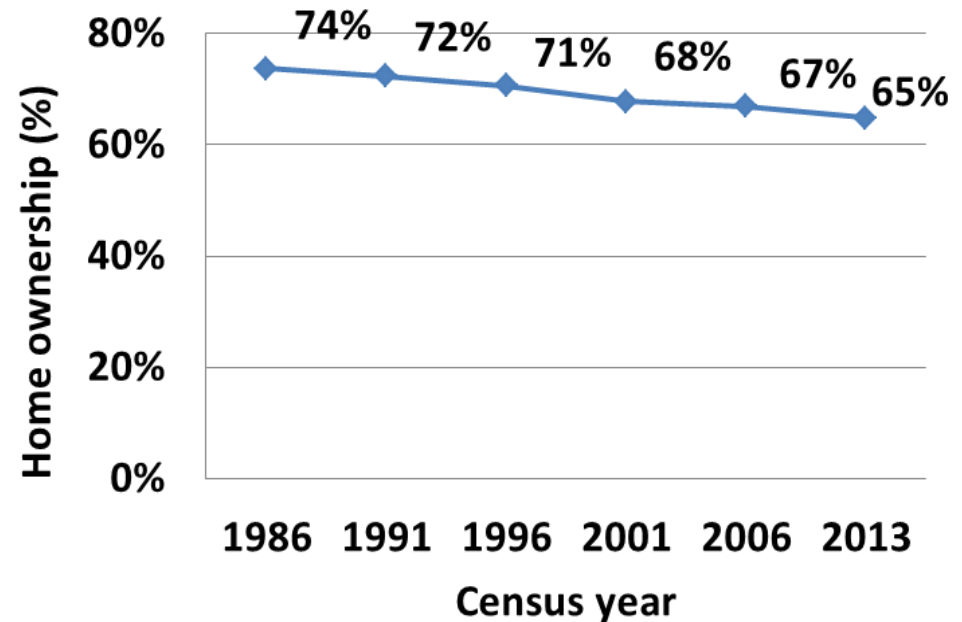


### 3. Housing mediates health inequalities



Relative  
disadvantage  
(psychosocial  
mechanism)

### 3. Housing mediates inequalities



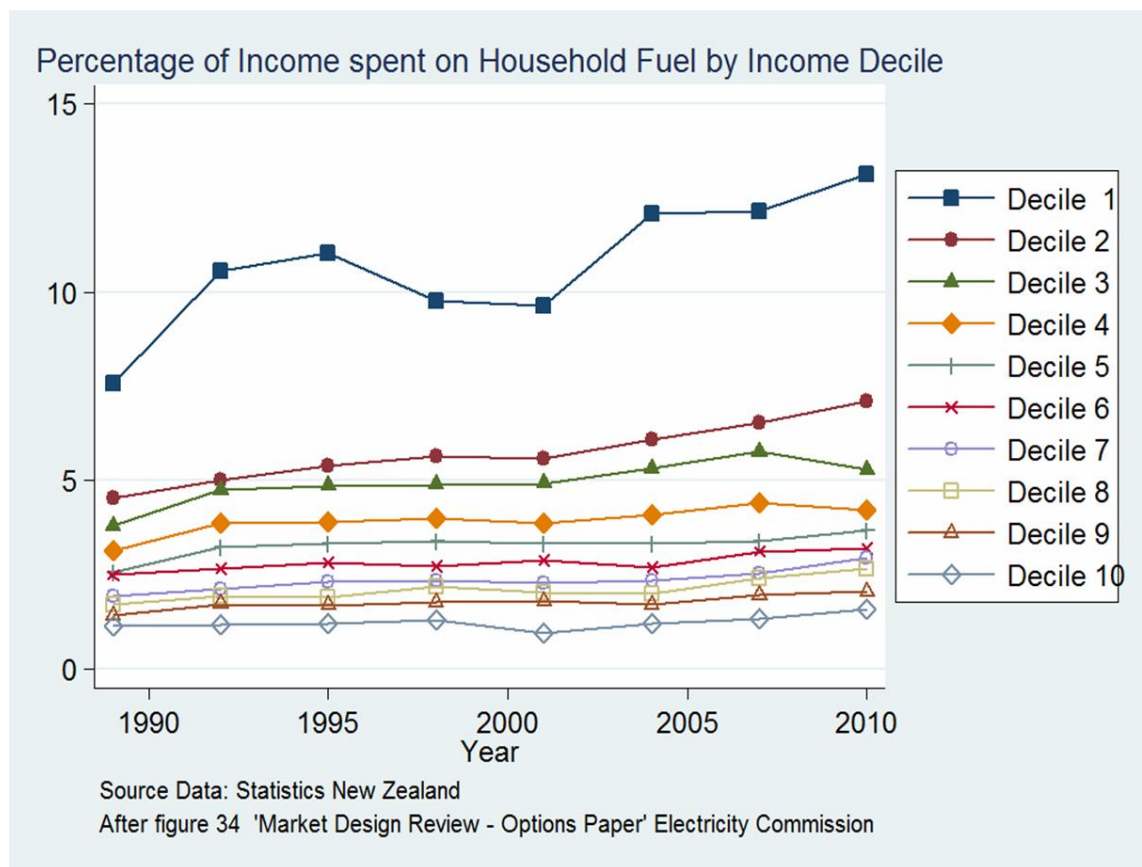
- Declining levels of home ownership
- BRANZ House Conditions Survey included rental housing for first time in 2010 (~33% of 491 houses across NZ)
- Rental houses were in worse condition than owner-occupied houses: 44% poor condition vs. 25% of owner-occupied housing

### 3. Housing mediates health inequalities



- **Severe housing deprivation** considered more accurate, valid and useful measure than ‘homeless’
- 2013 prevalence = 1.0% (40,658 people)
- 67.1% sharing severely crowded private houses, usually with family
- 51% < 25 years of age
- Associated with non-European ethnicity, new migrant, high residential mobility, unemployed, unskilled job, low level of education.

# 3. Housing mediates health inequalities



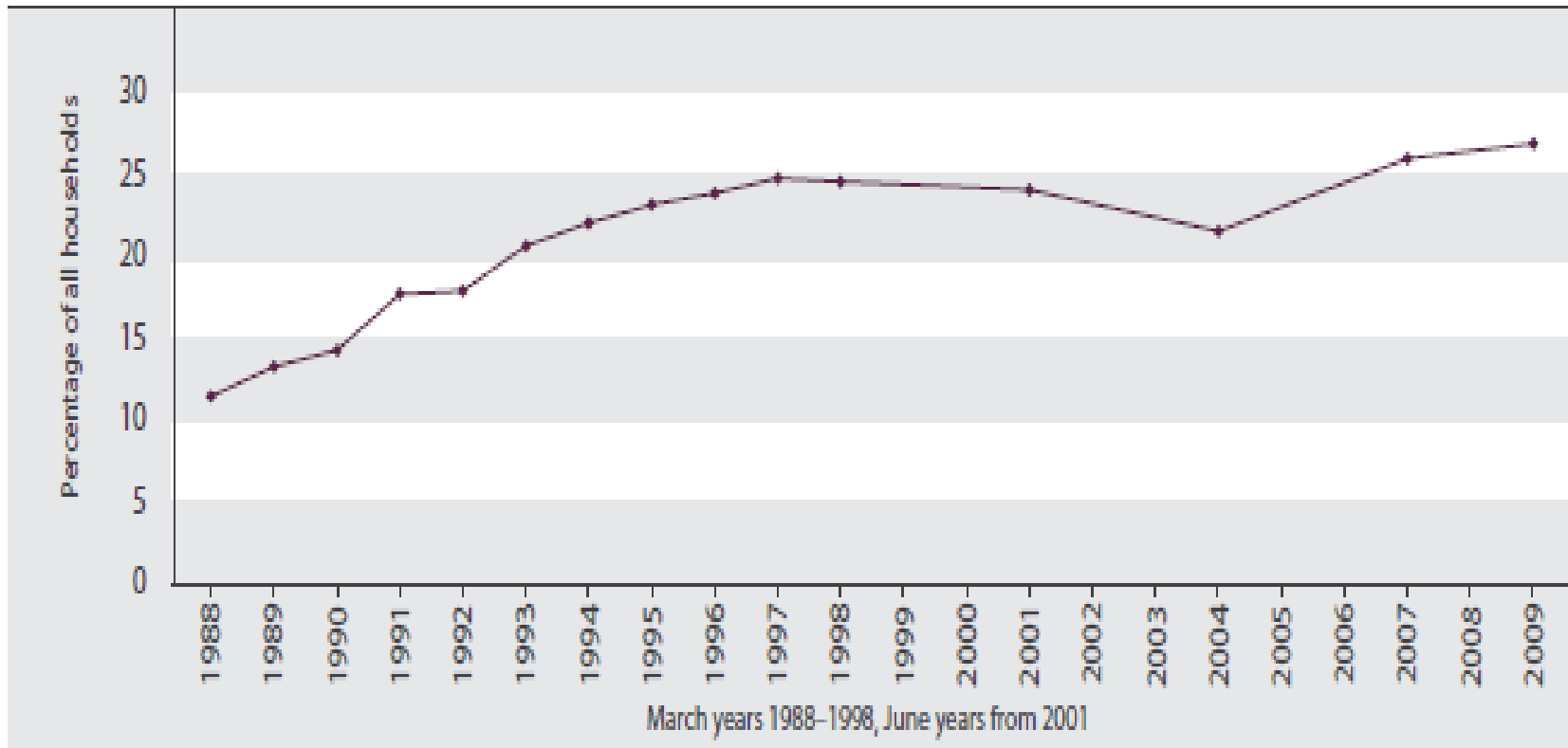
Increasing fuel poverty in NZ ( $\geq 10\%$  of income on fuel)

Source: Howden-Chapman, et al. *Energy Policy* 2012; 49, 134–142

# 3. Housing mediates health inequalities

Housing affordability = proportion of households spending > 30% of income on housing costs

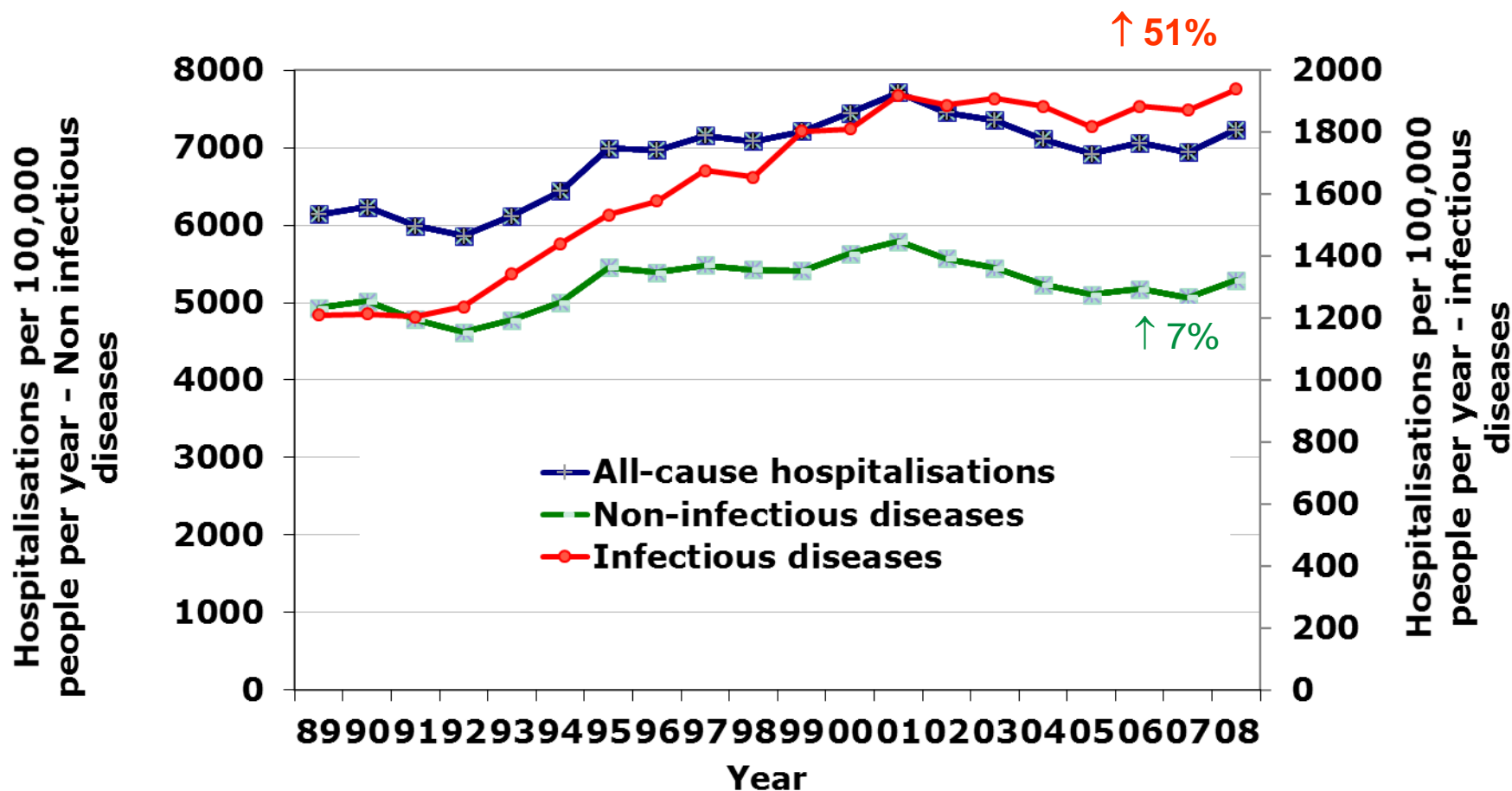
From 1988 to 1997 prop increased 11% to 25%



**Source: Ministry of Social Development. The Social Report 2010.**

# 3. Housing mediates health inequalities

Incidence of ID hospitalisations compared with Non-ID & All-cause, 1989-2008 (age stand. to 2006 Census)



Source: Baker et al. Lancet 2012; 379, 1112-19

### 3. Housing mediates health inequalities

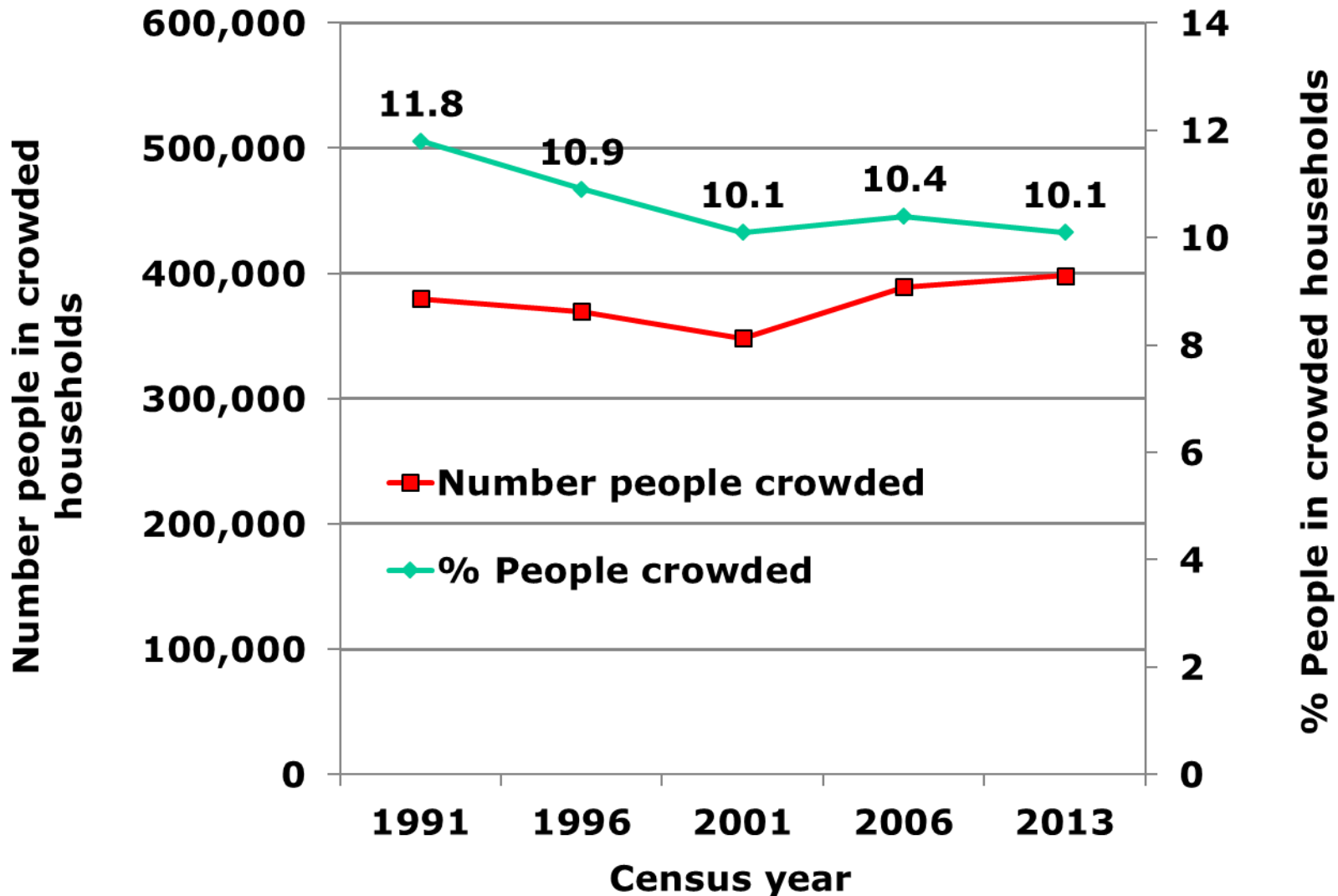
- **Structural crowding** = Insufficient living space (bedrooms / floor area) for the occupants of a dwelling to maintain health & wellbeing based on established norms for the size & composition of that household
- **Functional crowding** = Crowding caused or increased by how the house is used:
  - **Bedroom sharing** eg >2 people per bedroom
  - **Sharing sleeping areas just to keep warm** eg family sleeping on mattresses in living room
  - **Bed sharing** eg children sharing same bed with others



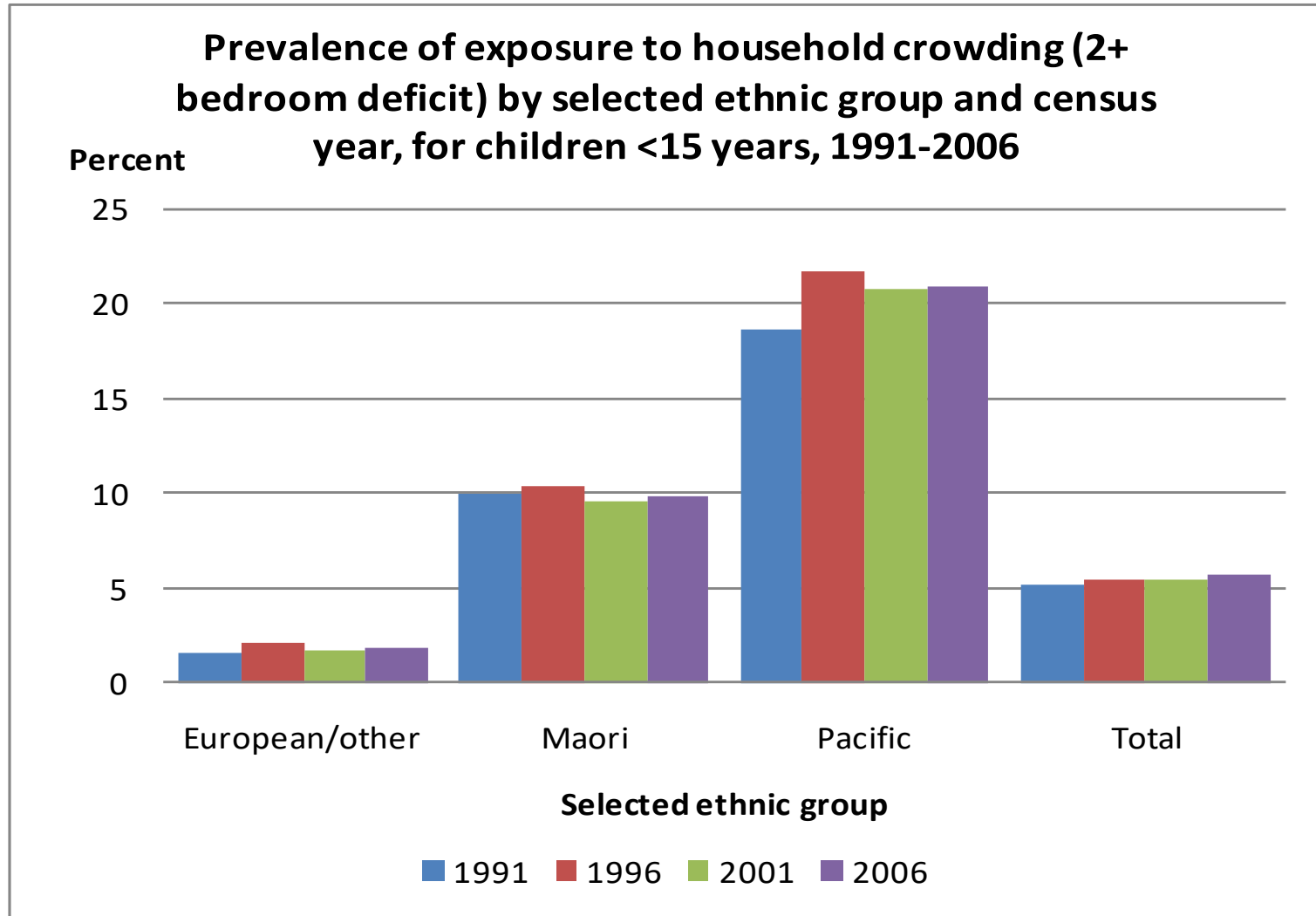


# 3. Housing mediates health inequalities

## Household crowding exposure, 1+ bedroom deficit

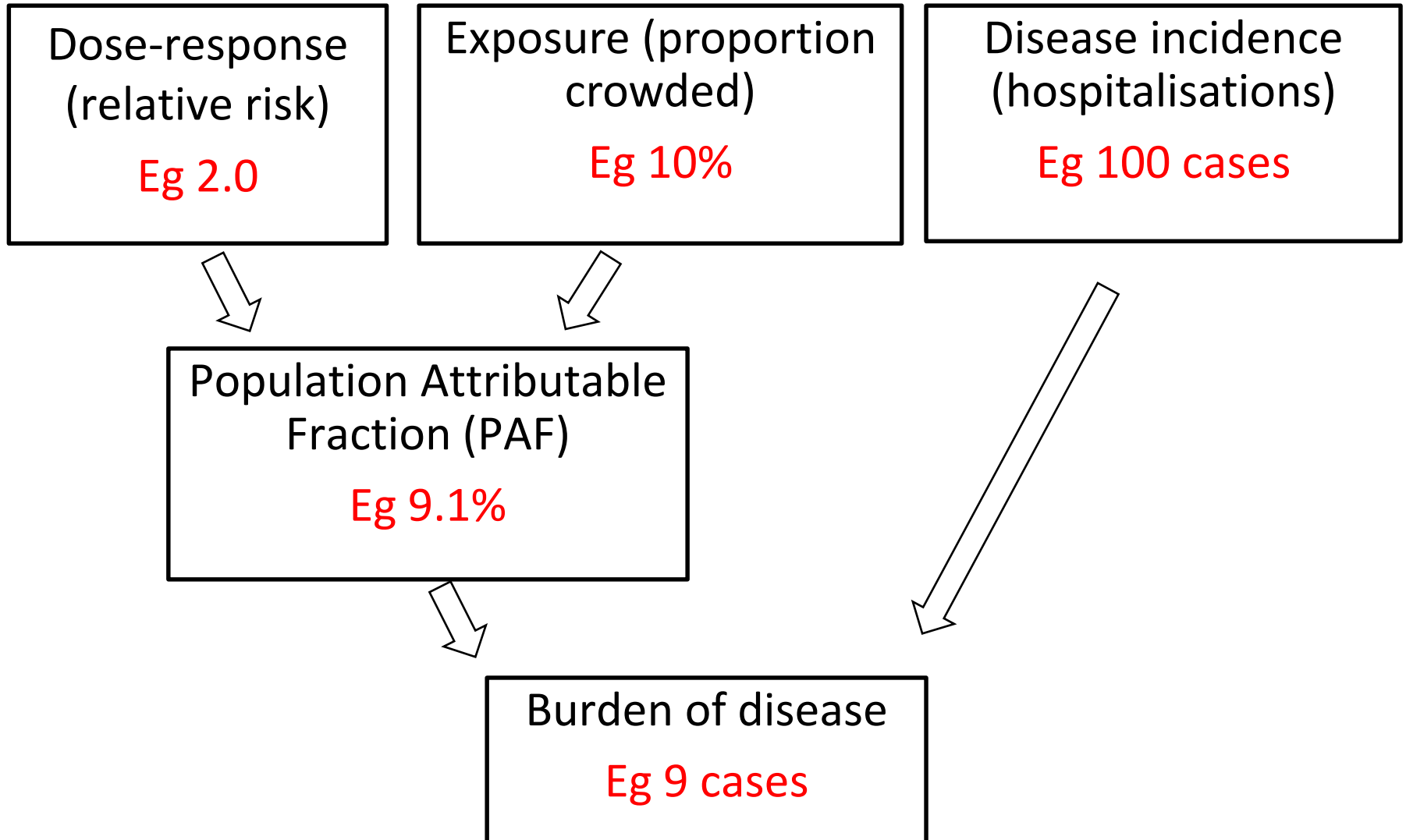


# 3. Housing mediates health inequalities

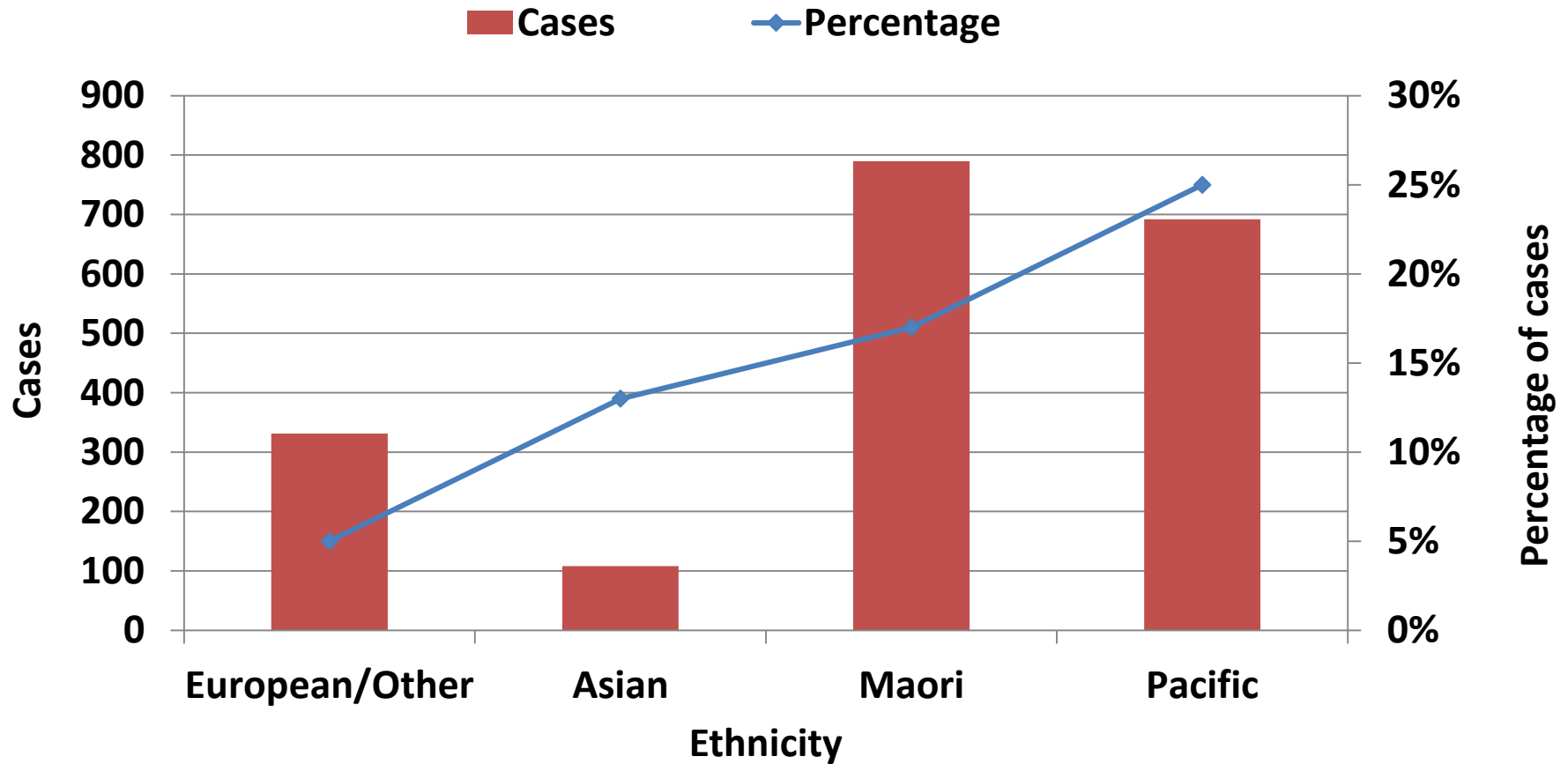


**Source: Baker et al. Household crowding in NZ. 2012.**

# 3. Housing mediates health inequalities



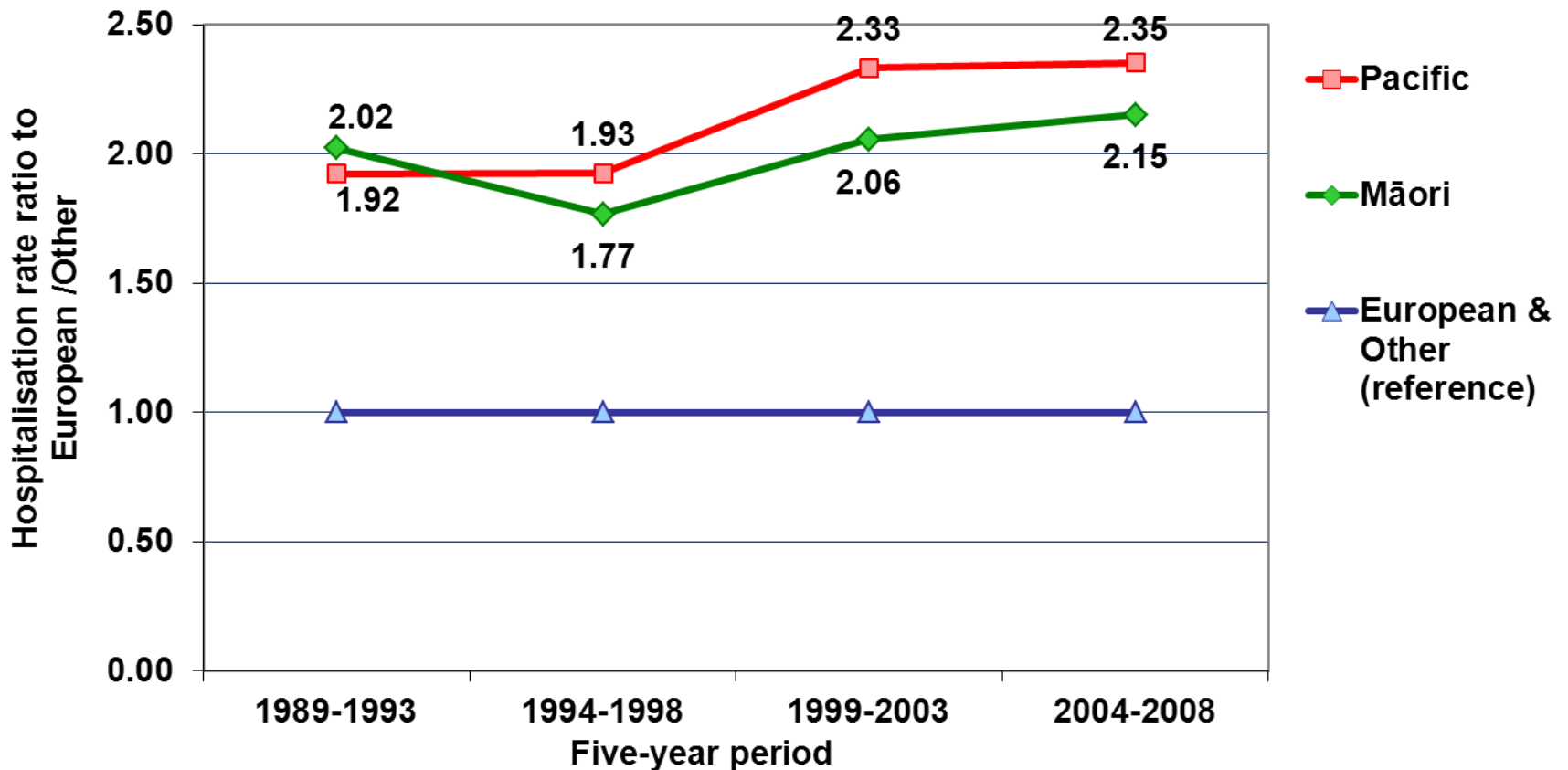
# 3. Housing mediates health inequalities



Source: Baker, McDonald et al. 2013.

# 3. Housing mediates health inequalities

Ratio of Māori & Pacific ID hospitalisation rates to European/Other, 1989-2008



## 4. Better housing improves health

- Insulation eg Insulation Trial\*, Warm up NZ
- Heating eg Heating Trial\*, WHEZ Study\*
- Injury reduction eg HIPI Study\*
- Benefits of social housing eg SHOW Study
- Crowding reduction eg HHP
- Safe Housing Enabling Long-term Effective Recovery (SHELTER)

**\*Community randomised trials**

# 4. Better housing improves health

## Community randomised trials



- Use rigorous controlled trial method with random assignment to intervention and control arms to reduce selection bias
- More likely to be taken seriously by policy-makers with results translated into policy
- Assess health and sustainability outcomes using subjective and objective measures
- Relatively expensive so usually need public/private partnership to fund interventions

## 4. Better housing improves health

### Community randomised trial (continued)

- Provide benefits to participants if intervention is effective (intervention also provided to controls at end of trial)
- Provide benefits to local community partners eg through employment
- Examples
  - Housing, Insulation and Health Study
  - Housing, Heating and Health Study





## 4. Better housing improves health

### Housing, Insulation and Health Study Design

- 1400 households where one member had chronic respiratory symptoms
- Winter 2001 baseline measures taken
- Houses randomly assigned to intervention group insulated over summer
- Winter 2002 follow-up measures taken
- Houses assigned to control group insulated


*Source: Howden-Chapman, et al., Soc Sci Med, 2005. 61: 2600-10.*

# 4. Better housing improves health

## Intervention included:

- Ceiling insulation
- Under-floor sealing
- Draft stopping

### Where does the heat go?



12% through unblocked chimneys and draughts around doors and windows

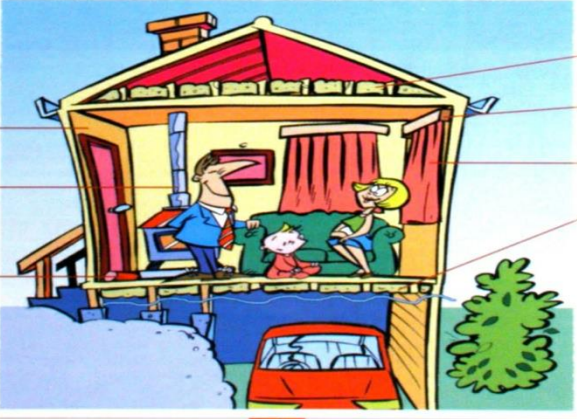
10% through the floor

42% through the ceiling

12% through windows

24% through walls

### Winter heat savers



Wall insulation

Enclosed energy-efficient burner

Draught-stopper

Ceiling insulation

Pelmet

Well-fitting curtains

Underfloor insulation

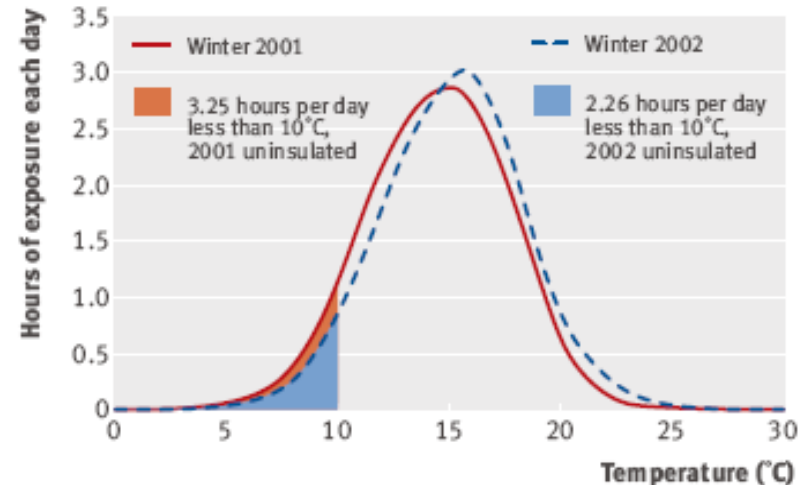
Insulation also keeps the house cool in summer

4

# 4. Better housing improves health

## Housing Insulation & Health Study Results

- Occupants in insulated houses used 23% less energy
- Exposed to cold temperatures ( $< 10^{\circ}\text{C}$ ) for 0.75 hours less /day
- Exposed to high humidity ( $> 75\%$ ) for almost 1.5 hours less / day



# 4. Better housing improves health

## Housing Insulation & Health 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 of 2:1

**Source: Howden-Chapman, et al., BMJ 2007; 334: 460-4**



Half  
a million  
Kiwis  
snug as  
a bug in  
a rug

What about you?

Thanks to everyone who helped us reach our target of insulating 100,000 New Zealand homes through the Government's Warm Up New Zealand: Heat Smart insulation programme.

The programme has been extended and grants are still available. Visit [www.energywise.govt.nz](http://www.energywise.govt.nz) for a list of providers in your area.

It took just a little more than three years, and it was a real team effort by the insulation industry, supporting banks and councils who made it easier for people to afford insulation, and third party lenders who gave over \$80m. Most of all it's 'well done' to the Kiwi homeowners who made the decision to invest in a warmer, healthier, more comfortable home.

Teaching Government



# 4. Better housing improves health

## Housing, Heating and Health Study

- Experimental intervention study
- Replacing old heaters in the homes of 450 children 7-12 years old with asthma
- New heaters more efficient & use sustainable energy

**we're your heater headquarters**



**\$139<sup>99</sup>** 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.
- #200000916934 Gas cylinder sold separately.

**\$45.86ea**

**9kg LPG Cylinder Model CYL9KG0PD**

This cylinder has an overfill protection device and complies with NZ safety standards. #9419695622045

**\$299<sup>99</sup>** 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

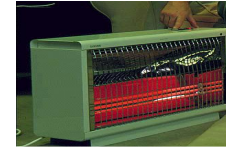
TW19482

# 4. Better housing improves health

## Housing, Heating and Health Study

### 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



# 4. Better housing improves health

## Housing, Heating and Health Study Results

- Less poor health (aOR 0.44)\*
- Children less coughing at night & on waking (aOR 0.50)\*
- Less wheezing (aOR 0.52)\*
- Less asthma reliever in morning (aOR 0.53) \*
- Children had fewer episodes of cold & flu (aOR 0.76)\*
- Children had 1.8 days less off school \*
- Children had fewer visits to the GP (0.13visits) \*

\*Significant

# 4. Better housing improves health

## **Housing NZ Healthy Housing Programme**

Ventilation, Insulation, Crowding Reduction, Health services.

Before & after comparison showed reduction in acute hospitalisations for participants:

- <4 year olds = ↓ 11% (95% CI 1% to 11%)
- 5-34 year olds = ↓ 23% (95% CI 70% to 85%)

*Source: Jackson et al. JECH 2011, 10.1136/jech.2009.107441*

Children <20 years participating in HHP: 27% (95%CI -43% to -6%) decline in acute and arranged hospitalisations

*Source: Baker et al. Health Impacts of HHP on HNZN  
Tenants: 2004-2008*





## 4. Better housing improves health

### **Home Injury Prevention Intervention (HIPI)**

- Single-blinded cluster randomised controlled trial of home injury prevention measures to reduce medically-treated home falls.
- Taranaki Region in owner-occupied dwellings
- 842 households: 436 (950 people) randomised to treatment group, 406 (898 people) to control group
- Significant reduction in home fall injuries - 26% (95% CI 6%-42%)
- Social benefits of injuries prevented >> costs of intervention (average \$560 per house)

# 4. Better housing improves health

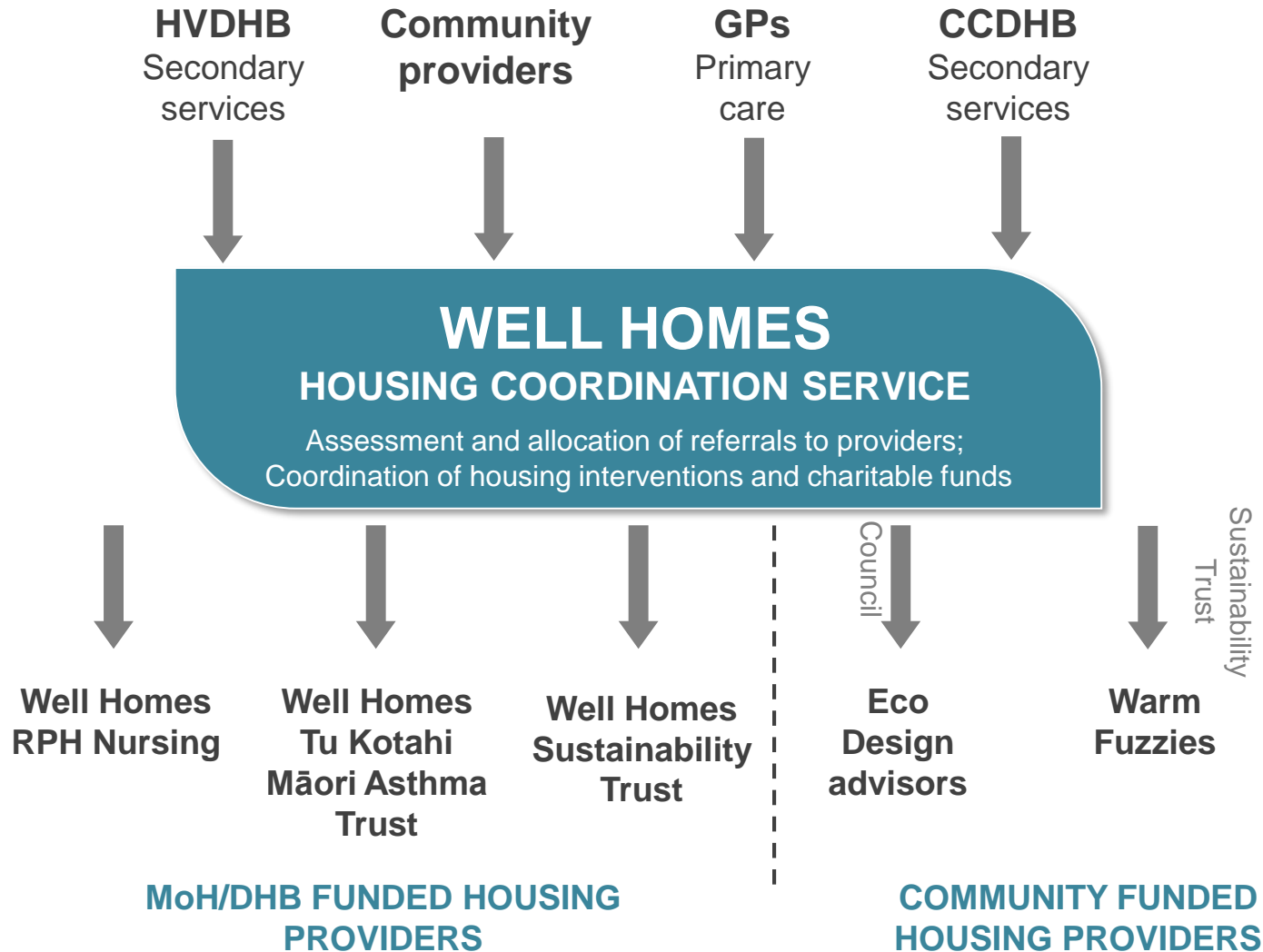
## Safe Housing Enabling Long-term Effective Recovery (SHELTER)

- Observational study
- 800 families in Wellington
- Intervention: coordinated housing intervention (Well Homes)
- Data collected using administrative systems
- Collaborators include:
  - Wellington Regional Public Health,
  - District Health Boards,
  - Energy Efficiency Conservation Authority,
  - Housing NZ, Ministry of Social Development,
  - Tu Kotahi Māori Asthma Trust,
  - Sustainability Trust



# 4. Better housing improves health

## Well Homes Referral Sources



Well Homes is a free service that may be able to help your whānau with:



BEDS & BEDDING



CARPET



CURTAINS



HEATING



INSULATION



MINOR REPAIRS



MOULD CLEANING KITS



MSD/WORK & INCOME ASSISTANCE



OTHER - I.E. HEALTH OR SOCIAL REFERRALS



SOCIAL HOUSING RELOCATION



VENTILATION

Please phone us on 0800 675 675

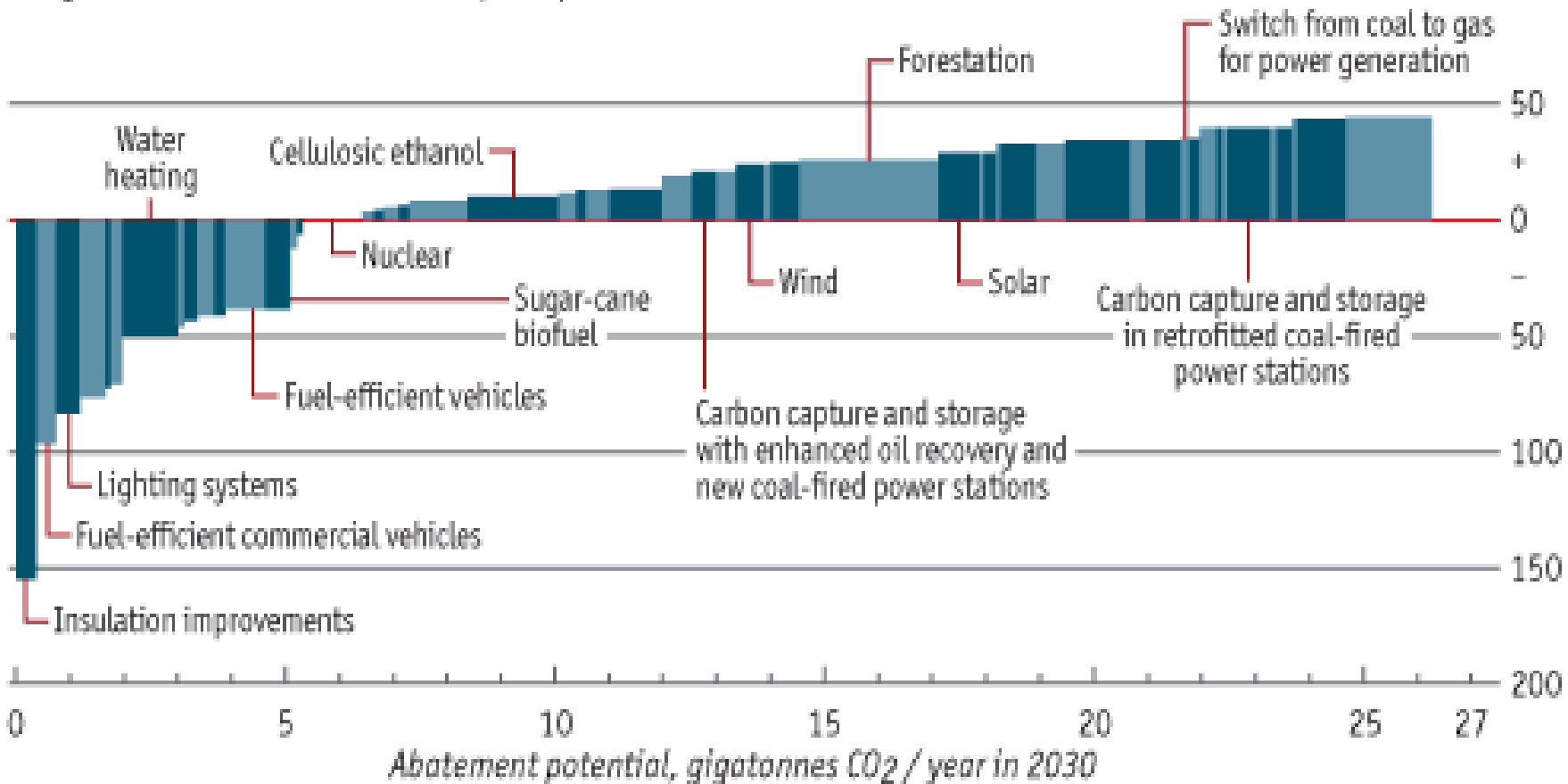
# 5. Better housing improves sustainability

## Climate change & CO<sub>2</sub> emissions

- Kyoto CO<sub>2</sub> reductions average 5% by 2012 for industrialised countries
- Buildings account for 40% of total energy & 30% of CO<sub>2</sub> emissions
- Renovation dominant construction activity
- If energy efficiency measures can serve two purposes better chance of implementation

# The cost of cutting carbon in different ways

Marginal cost of abatement, examples €/t CO<sub>2</sub>



Source: Vattenfall

# Implementing better housing

## Housing Warrant of Fitness

Rating tool linking housing conditions to health & sustainability/efficiency outcomes

Could measure:

- Health, eg respiratory
- Safety, eg injury hazards
- Energy efficiency

*Source: Bennett et al NZ Med J 2013, 126: 74-85*

### Sample WoF sticker

HHI REFERENCE # 123 456 789

**HEALTHY**  
HOME INDEX  
**APPROVED** ✓

11A CHATHAM STREET,  
BERHAMPORE, WELLINGTON

<b>Health</b>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
<b>Safety</b>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Energy</b>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

<b>ISSUED</b>	<b>EXPIRES</b>
MAY 2013	MAY 2018

MORE INFORMATION ON [WWW.HHI.ORG.NZ](http://WWW.HHI.ORG.NZ)

# Implementing better housing

## How WoF could be used with rentals & sales

The screenshot shows a web browser window with the URL <http://www.trademe.co.nz>. The page title is "Charming Berhampore Cottage". The navigation menu includes "Home", "Browse", "Sell", "My Trade Me", "Community", "Help", "Motors", "Property", and "Jobs". A search bar is set to "For Sale" with a "Search" button and "More options" link. Below the search bar, there are categories: Residential, Open homes, Rural, Lifestyle, Commercial, Retirement villages, and List my property.

The main content area features the "trade me property" logo and a sidebar with filters for "For Sale" and "To Rent", "All regions", "All districts", "All suburbs", "Search nearby suburbs", "Keywords or Property ID#", "Any property type", "Bedrooms", "Price", and a "Search" button. The main listing is for "Charming Berhampore Cottage" (Listing #: 508587401), listed for sale by tender on Wednesday, 29 August, at 4:18 am.

**Property Details:**

- Location:** 13 Herald Terrace, Berhampore, Wellington, Wellington
- Rooms:** 2 bedrooms, 1 bathroom
- Property type:** House
- Rateable value:** \$480,000
- Price:** To be sold by tender (closes on 13 Sep)
- Property ID#:** CSJ207
- Parking:** None

**Description:** Enjoying a lovely sunny aspect and sitting snugly in a quiet cul-de-sac, this adorable cottage is sure to please. Warm, welcoming and full of character it offers 2 double bedrooms, separate lounge, kitchen/dining and French doors allow a natural flow to a fantastic sunny north/west facing deck, fully fenced garden and a great outlook.

**Property buyer's checklist:**

- APPROVED** Learn more...
- Learn about your rights as a buyer
- How much would it cost to insure this home?
- What would my mortgage payments be?

The listing includes a main photo of the cottage and a gallery of 6 photos. Below the photos is a "View full size photos" link. An advertisement for "INSULATE & SAVE \$1300" is displayed at the bottom right.



# Implementing better housing

- 29-point evidence based checklist covering basic insulation, ventilation/dryness, fixed heating, amenities, state of repair and safety hazards
- Developed with Green Building Council
- Field testing by councils in Jan-Feb 2014



P/F	Kitchen
	Wall, ceiling and floor linings intact
	Surfaces clear of mould
	Functioning stove and oven
	Effective ventilation to the outside
	+ Opening window with secure latch
	+ Window security stays (where required)
	Adequate food preparation and storage
	Hot water at tap (55°C±5°C)
	Potable water supply
	Waste water drainage with sound connection
	Working artificial lighting
	Visibly safe power outlets and light switches
P/F	Living Areas
	Wall, ceiling and floor linings intact
	Surfaces clear of mould
	Effective ventilation to the outside
	+ Opening window with secure latch
	+ Window security stays (where required)
	Working artificial lighting
	Heating, fixed, effective and safe
	Visibly safe power outlets and light switches
	Curtains/blinds/double glazing present
P/F	Bathroom and Toilet
	Wall, ceiling and floor linings intact
	Surfaces clear of mould
	Operational toilet
	Sewage connection functional
	Functioning bath or shower
	Effective ventilation to the outside
	+ Opening window with secure latch
	+ Window security stays (where required)
	Waste water drain connected
	Hot water at tap (55°C±5°C) if second cylinder
	Visibly safe power outlets and light switches
	Working artificial lighting
P/F	Laundry
	Wall, ceiling and floor linings intact
	Surfaces clear of mould
	Effective ventilation to the outside
	Working artificial lighting
	Waste water drain connected
	Visibly safe power outlets and light switches

## Assessment Checklist

P = Pass F = Fail / = Not applicable

1	2	3	4	5	Bedrooms
PF	PF	PF	PF	PF	Wall, ceiling and floor linings intact
					Surfaces clear of mould
					Effective ventilation to the outside
					+ Opening window with secure latch
					+ Window security stays (if required)
					Visibly safe power and light switches
					Smoke alarm within 3m
					Curtains/blinds/double glazing
P/F	Entrance				
					Address clearly labelled and identifiable
					Securely locking doors
					Working light
P/F	Ceiling Insulation				
					Insulation to requirements (120mm)*
					No gaps, tucks, or folds
					No dampness in insulation
					Clearance for lights, ducts and roof
P/F	Underfloor Insulation				
					Insulation to requirements*
					Dry underfloor
					Ground vapour barrier
					No ponding
P/F	General				
					No cracks, holes in roof
					No cracks, holes in external cladding
					No cracks, holes or missing panes in windows
					Spouting, storm/waste water functioning, no leaks
					Structurally sound
					Glass doors made of safety glass or include visibility strips
					Handrails and balustrades to code*
					Non-potable water labelled
					Paths, decks and surfaces non-slippery/free from moss
					Secure storage (1.2m high or child-free lock)
					Artificial lighting - other
P/F	Hallway/Attic/Well				
					Wall, ceiling and floor linings intact
					Surfaces clear of mould
					Visibly safe power outlets and light switches
					Opening window with secure latch
					Window security stays (if required)
					Artificial lighting - hallway
					Artificial lighting - stairs
*Manual at <a href="https://tinyurl.com/RHWofManual">https://tinyurl.com/RHWofManual</a> (PDF)					
<b>Totals</b>	Pass		Fail		

READY TO BOOK YOUR INDEPENDENT ACCREDITED INSPECTION? Phone: 0508 78 78 24 (The Sustainability Trust)

Version 3.0

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**Source: Bennett J, et al. ANZJPH 2016 Mar**

# Implementing better housing

## HRC-funded Rental WoF study

- Does introducing a Rental WoF improve health without reducing rental affordability or availability?
- Intervention cities: Wellington and Dunedin
  - Control cities: Porirua and Invercargill
- Health outcomes: ACC claims, hospitalisations, mortality
- Economic outcomes: Trademe rental listing prices and numbers (by bedroom size)
- App available from Google Play or the App Store [www.rwof.org.nz](http://www.rwof.org.nz)

# Implementing better housing



## HOMES PEOPLE CAN AFFORD

HOW TO IMPROVE HOUSING IN NEW ZEALAND

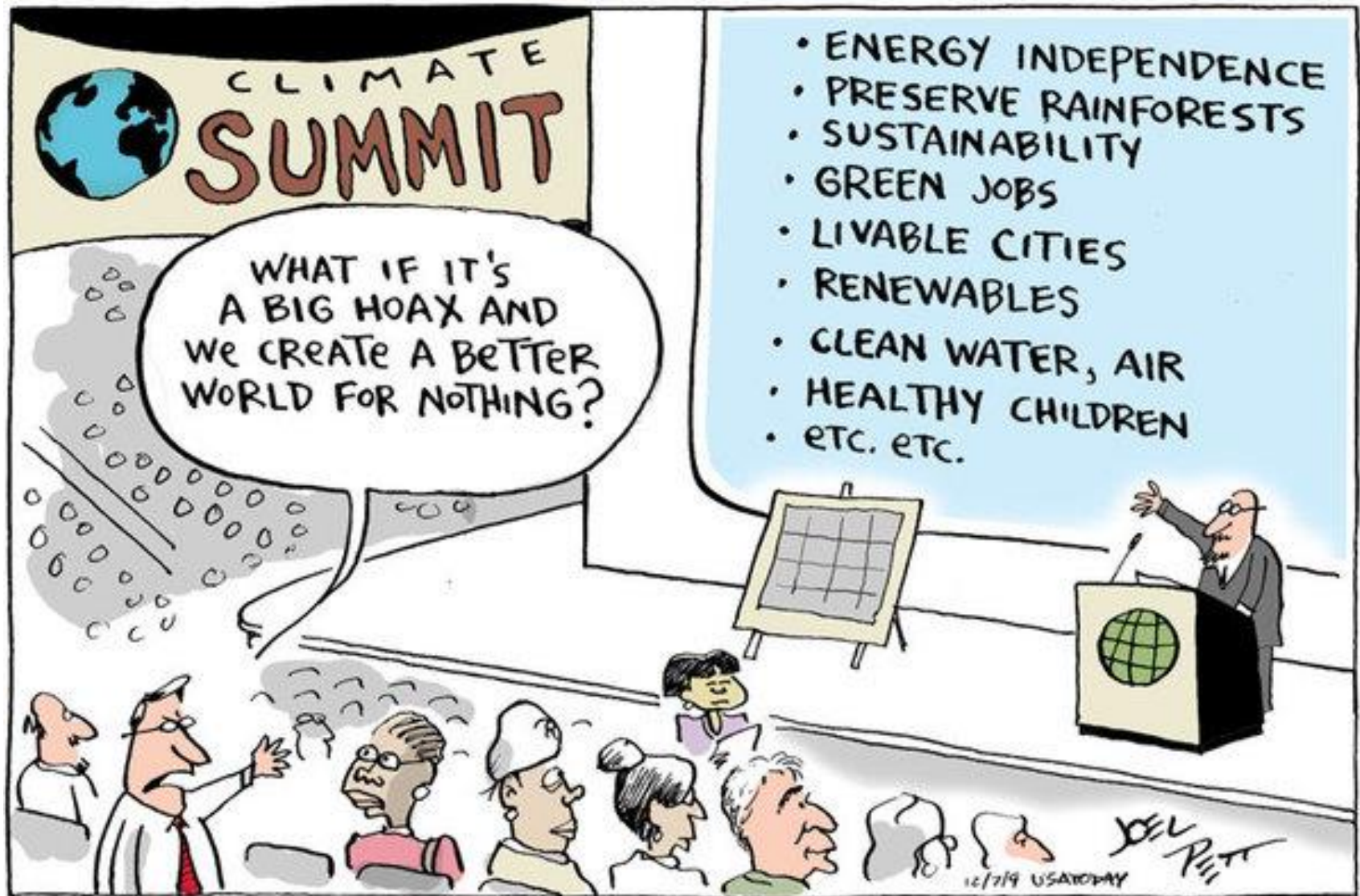


EDITED BY

Sarah Pierre, Philippa Howden-Chapman and Lisa Early

- Need to consider affordability & security of tenure
- Tradition of good-quality, low-cost social housing, with a vegetable garden
- Recognised secure rental housing for life

# Conclusion



# Conclusions



## 1. Built environment, particularly housing, is an important health determinant:

- We spend a lot of time there, particularly vulnerable groups
- Poor housing causes considerable illness and injury
- Housing mediates health inequalities
- Built environment uses energy, generates green house gases

# Conclusions

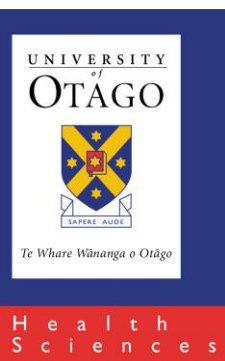


## 2. Built environment also provides opportunities to improve health and reduce inequalities

- Evidence shows better housing improves health, safety and sustainability
- Need to improve housing quality eg well-validated rental housing WoF
- Need adequate quantity of affordable, suitable housing

# Acknowledgements

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- **SHIVERS/ESR:** Sue Huang, Nikki Turner



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te pokapū rōnaki tāone-nui

**HEIRU**

**Health Environment Infection Research Unit  
University of Otago**