Improving Ageing with Big Data

He Ora te Wakapiri life course conference

Dr Hamish Jamieson

University of Otago, Christchurch

Geriatrician, Canterbury District Health Board

18 October 2018

National Science Challenges A BETTER START E Tipu e Rea

National Science Challenges HEALTHIER LIVES He Oranga Hauora

National Science Challenges AGEING WELL Kia eke kairangi ki te taikaumātuatanga

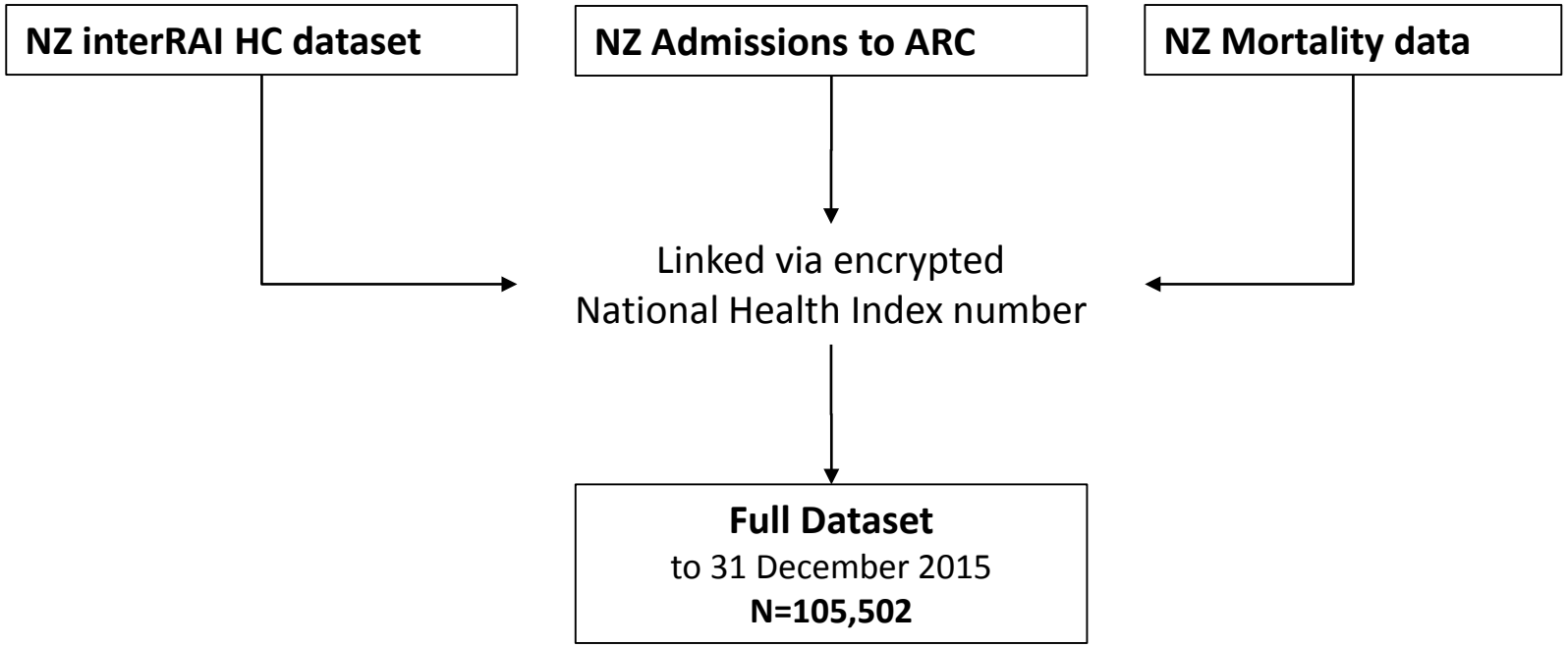
Overview

- Introduction
- Social Isolation (Sponsor AWNSC)
- Drug Burden Index (Sponsor AWNSC)
- Frailty (Sponsor HRC)
- Interventional Trial (Sponsor HRC)
- Impact
- The Future
- Acknowledgements

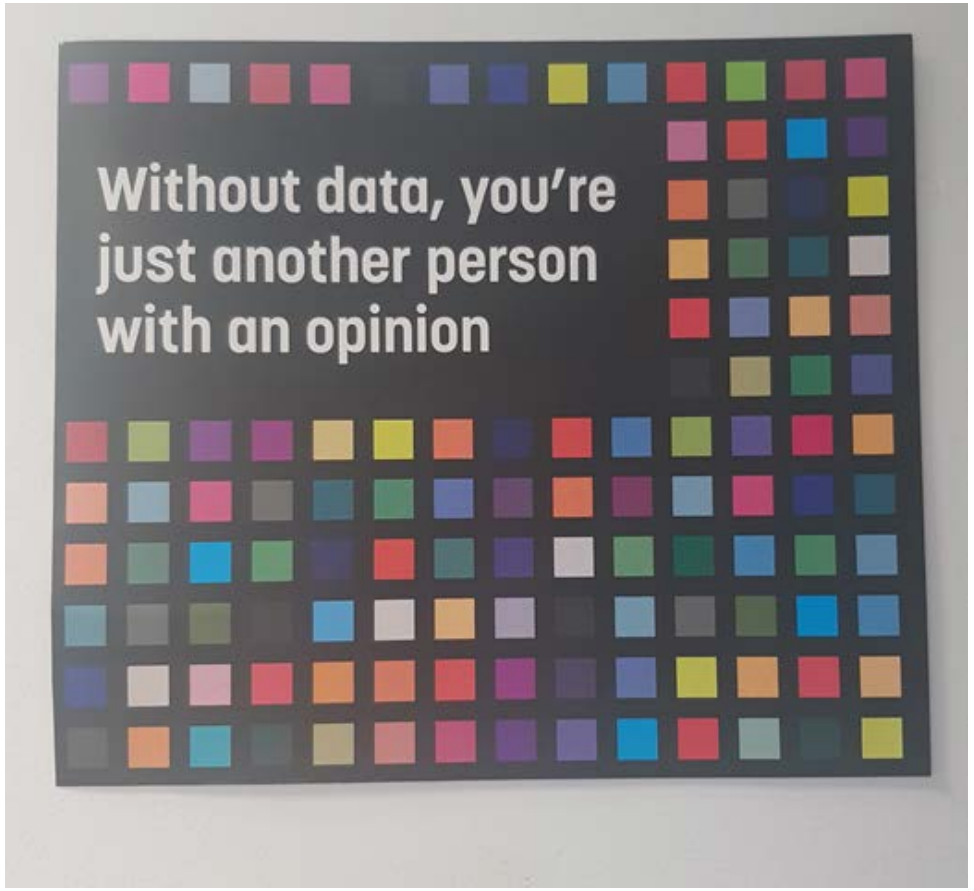
interRAI Overview

- An international collaboration to improve the quality of life of people across the health care system.
- Large number of interRAI health assessments
- 236 qs, standard electronic, comprehensive older persons, unique id link by NHI, outcomes after interRAI of injuries

How data is linked



On the wall of CDHB Decision Support

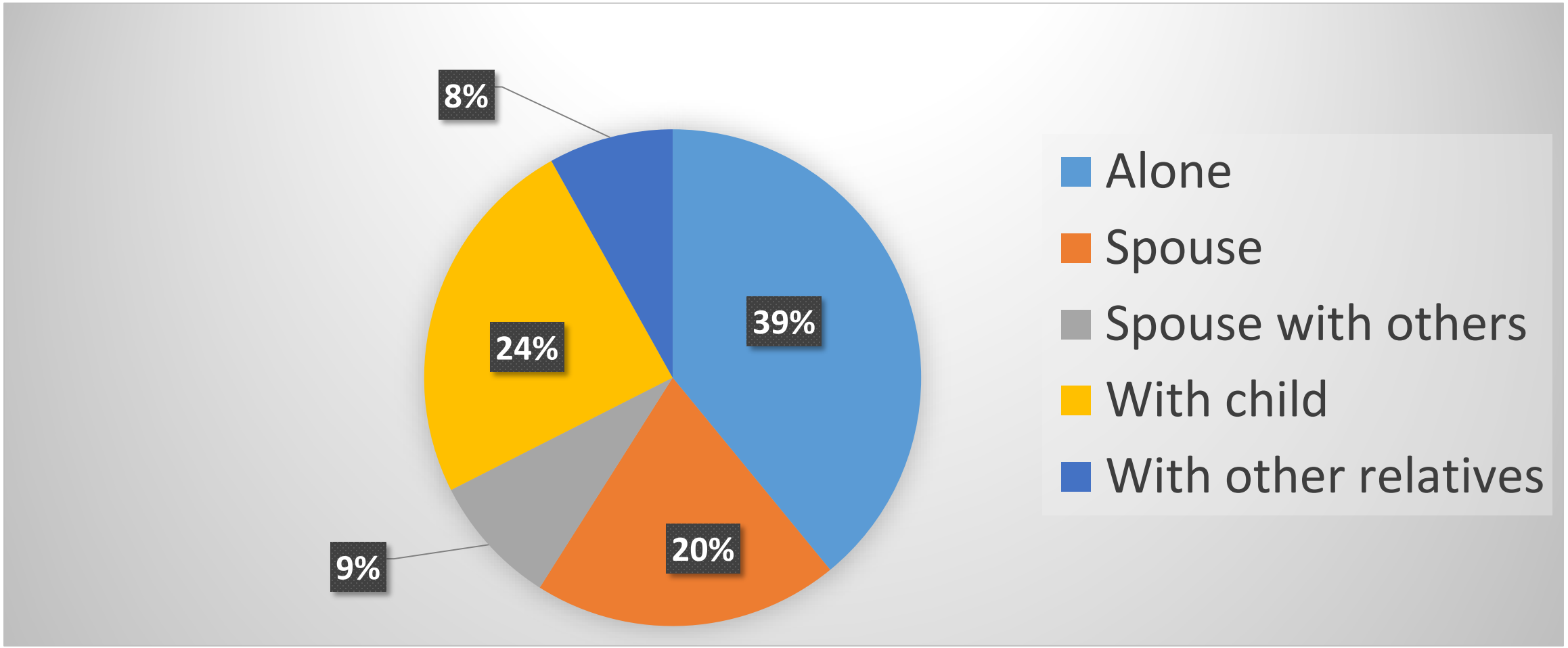


W. Edwards Deming

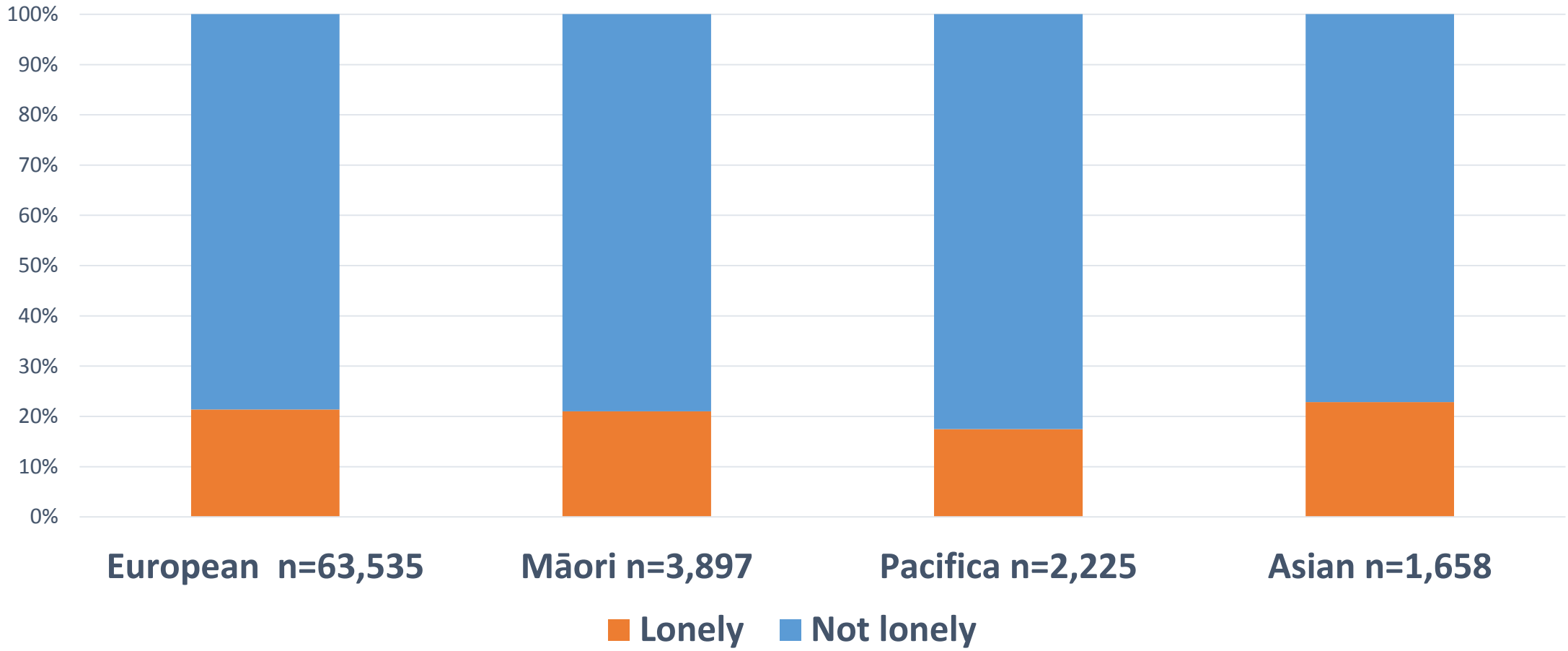
Overview

- Introduction
- Social Isolation (Sponsor AWNSC)
- Drug Burden Index (Sponsor AWNSC)
- Frailty (Sponsor HRC)
- Interventional Trial (Sponsor HRC)
- Impact
- The Future
- Acknowledgements

Māori Living Arrangement



Ethnicity and Loneliness



National Science Challenges — A BETTER START — E Tipu e Rea

National Science Challenges — HEALTHIER LIVES — He Oranga Hauora

National Science Challenges — AGEING WELL — Kia eke kairangi ki te taikaumātuatanga

Four Key Social Components

- This project explored four key components of “reduced social engagement” identified in research literature:
    - Living alone,
    - Negative social interactions,
    - Perceived loneliness, and
    - Carer stress

Social Variables and outcomes

			First Event	
	Total - n (%)	Still at home - n (%)	Residential Care - n (%)	Died - n (%)
Negative Interaction [a]				
Yes	5,462 (100.0)	3,299 (60.4)	1,464 (26.8)	699 (12.8)
No	45,564 (100.0)	29,294 (64.3)	9,647 (21.2)	6,623 (14.5)
Loneliness [b]				
Yes	11,491 (100.0)	7,384 (64.3)	2,833 (24.7)	1,274 (11.1)
No	42,852 (100.0)	27,288 (63.7)	9,121 (21.3)	6,463 (15.1)
Carer Stress [c]				
Yes	16,406 (100.0)	9,580 (58.4)	4,361 (26.6)	2,465 (15.0)
No	34,170 (100.0)	22,477 (65.8)	6,842 (20.0)	4,851 (14.2)
Living Arrangement				
Alone	26,597 (100.0)	17,100 (64.3)	6,244 (23.5)	3,253 (12.2)
With others	27,748 (100.0)	17,553 (63.3)	5,710 (20.6)	4,485 (16.2)

Competing Risks Regression Social Variables

	Unadjusted Model		Adjusted model	
	Subhazard Ratio	(95% CI)	Subhazard Ratio	(95% CI)
NO	1	Reference	1	Reference
YES				
Living Alone	0.86	(0.83, 0.89)	**1.43**	(1.37, 1.50)
Carer Stress	1.52	(1.47, 1.58)	**1.28**	(1.23, 1.34)
Negative Interaction	1.31	(1.24, 1.38)	**1.22**	(1.15, 1.30)
Loneliness	1.20	(1.15, 1.25)	**1.18**	(1.13, 1.24)

Conclusions

- Living Alone and Loneliness are hazard factors leading to increased admission to ARC.
- Living Alone and Loneliness are independent factors.
- Carer Stress and Negative Interaction as operationalized from interRAI HC data are strong hazards for admission to ARC.
- All four predictors allow interventions to be developed and applied.
- Interactions between variables warrant further analysis.

Overview

- Introduction
- Social Isolation (Sponsor AWNSC)
- Drug Burden Index (Sponsor AWNSC)
- Frailty (Sponsor HRC)
- Interventional Trial (Sponsor HRC)
- Impact
- The Future
- Acknowledgements

Objectives of this research

- To evaluate the association between the Drug Burden Index (DBI) and hip fractures in a community dwelling population of older (≥65 years) adults using linked national datasets in New Zealand.

Jamieson HA, Nishtala PS, Scrase R, Deely JM, Abey-Nesbit R, Hilmer SN, Abernethy DR, Berry SD, Mor V, Lacey CJ, Schluter PJ. Drug burden index and its association with hip fracture among older adults: a national population-based study. The journals of gerontology. Series A, Biological sciences and medical sciences. 2018 Jul 31.

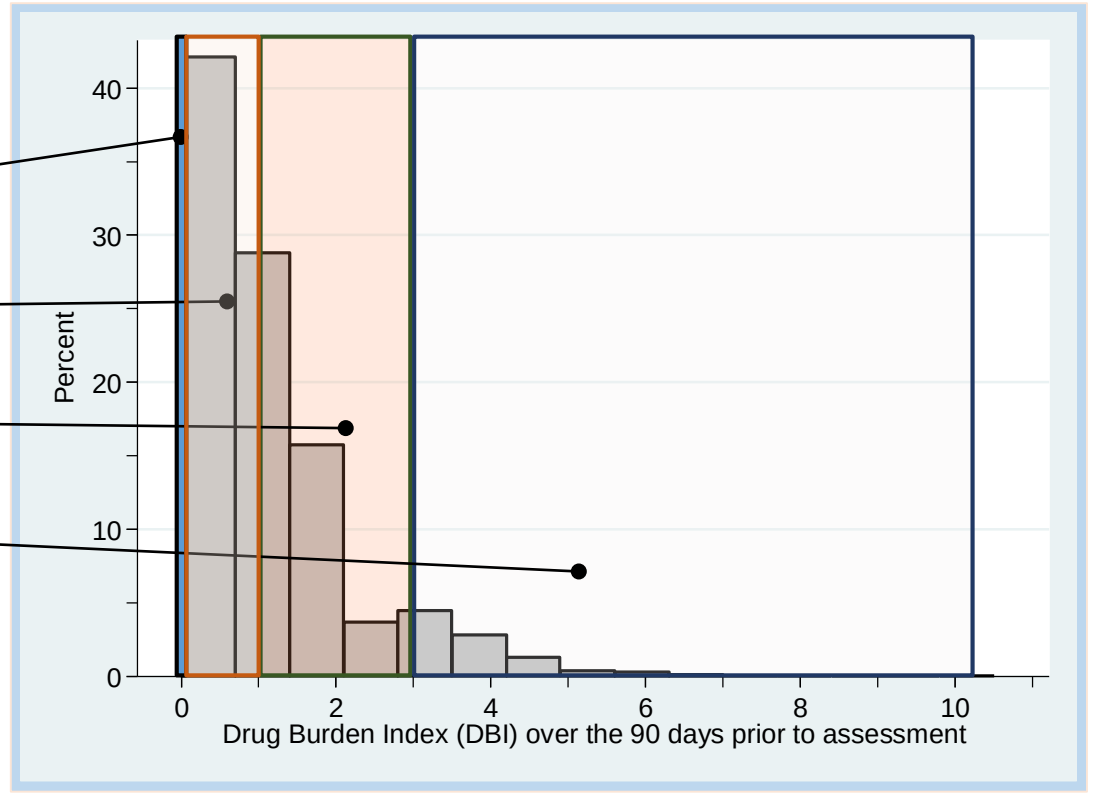
Cumulative DBI – Distribution and Group Size

(i) cDBI=0; n=29,111

(ii) 0<cDBI≤1; n=20,791

(iii) 1<cDBI≤3; n=16,600

(iv) 3<cDBI; n=4,051



Hazard Ratio for different DBI exposure groups

	Alive, no fracture		Fracture		Died		SHR Unadjusted		SHR Adjusted[a]	
	n	(%)	n	(%)	n	(%)	SHR	(95% CI)	SHR	(95% CI)
cDBI=0	20,274	(69.6)	893	(3.1)	7,944	(27.3)	1	(reference)	**1**	(reference)
0<cDBI≤1	14,306	(68.8)	687	(3.3)	5,798	(27.9)	1.11	(1.00, 1.23)	**1.12**	(1.01, 1.24)
1<cDBI≤3	11,051	(66.6)	544	(3.3)	5,005	(30.2)	1.24	(1.12, 1.38)	**1.32**	(1.18, 1.47)
3<cDBI	2,479	(61.2)	125	(3.1)	1,447	(35.7)	1.28	(1.08, 1.52)	**1.52**	(1.28, 1.81)

Overview

- Introduction
- Social Isolation (Sponsor AWNSC)
- Drug Burden Index (Sponsor AWNSC)
- Frailty (Sponsor HRC)
- Interventional Trial (Sponsor HRC)
- Impact
- The Future
- Acknowledgements

Introduction

- Currently within the interRAI there is no measure of overall frailty
- Researchers from the University of Queensland, Brisbane developed a frailty index using the acute care interRAI assessment
- The index was derived following a cumulative deficit model
- Our aim was to create a frailty index using similar methods to the Brisbane team, but using questions from the home care interRAI assessment

Method

Questions from assessment were selected (49 questions used)

Answers to each question were recoded and assigned a deficit value between 0 and 1

Deficits were added up for each individual and divided by the total number of deficits to get a frailty index

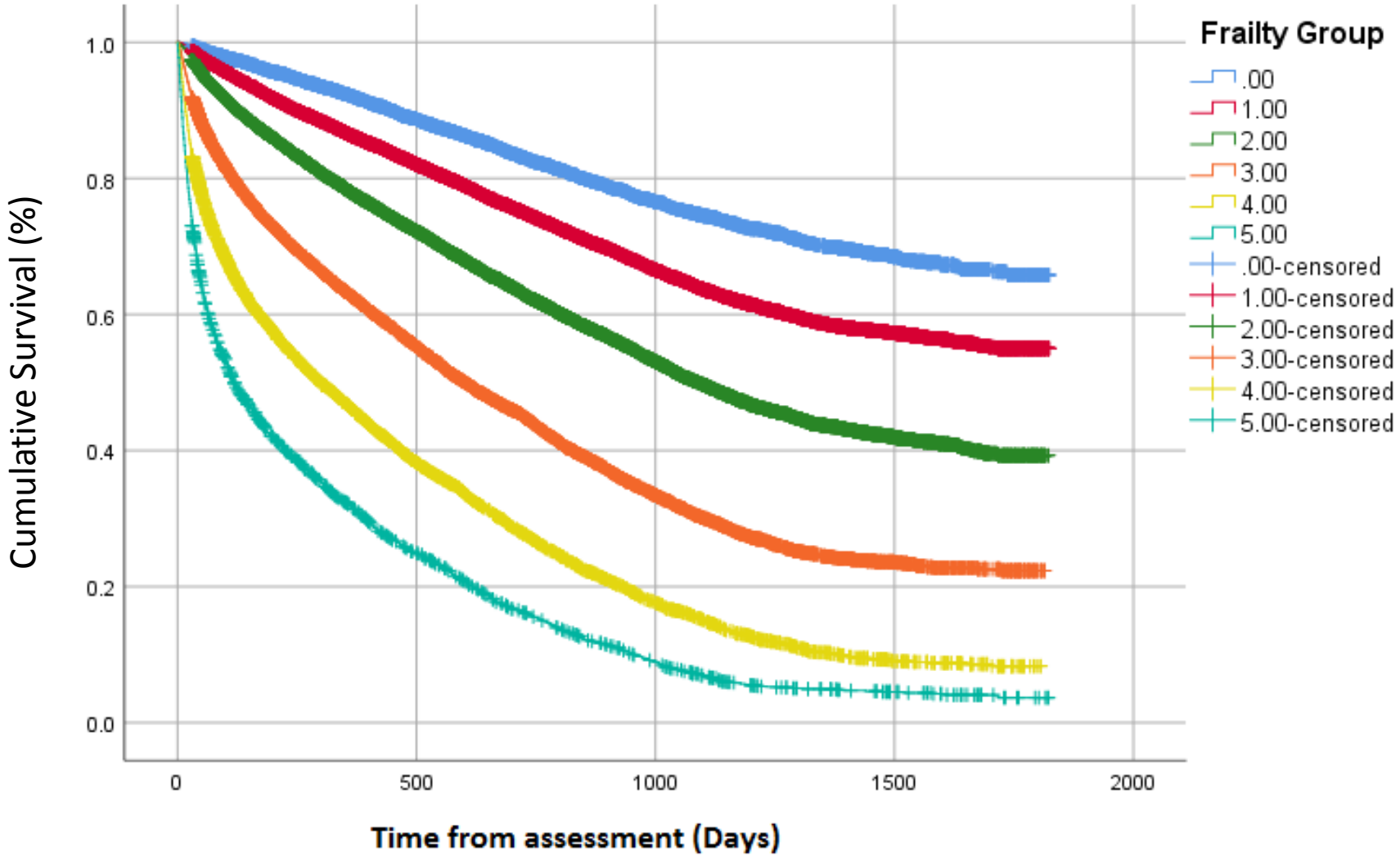
The relationship between frailty level and outcomes such as mortality and entrance to ARC was assessed

Mean frailty level for age, sex and ethnic groups were also assessed

Results

- Mean age of participants was 82.1 years
- 60.2% were female
- The average frailty index was 0.22 (Range 0 to 0.79)
- Those who had a higher frailty score were more likely to die and those with a lower frailty level were more likely to enter ARC
- There were significant differences between mean frailty and age group, sex and different ethnic groups

Frailty and mortality



Overview

- Introduction
- Social Isolation (Sponsor AWNSC)
- Drug Burden Index (Sponsor AWNSC)
- Frailty (Sponsor HRC)
- Interventional Trial (Sponsor HRC)
- Impact
- The Future
- Acknowledgements

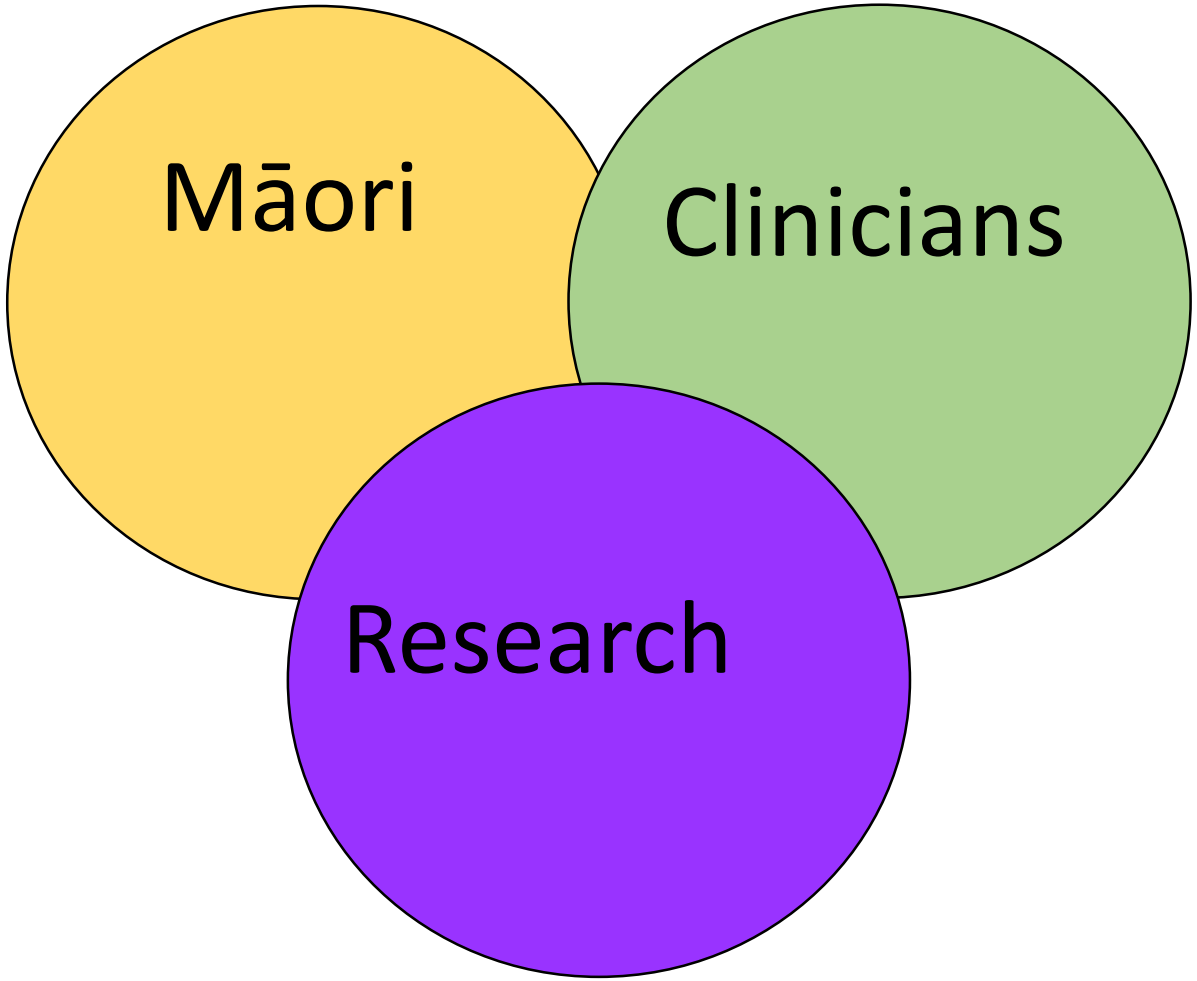
Interventional Trial

- Older people can often be on too many medications
- Negative outcomes such as reduced quality of life and premature death can often occur from overmedication
- An interventional trial in collaboration with the CDHB and SCDHB is currently being started
- The aim is to reduce DBI medications in older people and assess how levels of frailty are improved from a reduction in medications

Overview

- Introduction
- Social Isolation (Sponsor AWNSC)
- Drug Burden Index (Sponsor AWNSC)
- Frailty (Sponsor HRC)
- Interventional Trial (Sponsor HRC)
- Impact
- The Future
- Acknowledgements

Collaborative Research



Impact

- **Māori**
- Te Tairanga Kāumatua Collective
- Tatau Pounamu Trust

- **Community Groups**
- University of the third age
- Age Concern
- Church Groups
- Rotary

Impact

"The Project", January 2018


TE MATATIKA

Loud and proud Langman's back

US braces for big, bad Florence

New cinema a boost for city

'Too many drugs' for elderly

The Press, September 2018

Impact: Media

- One News 3x
- Radio NZ
- RadioLive
- Newstalk ZB

- The Press
- NZ Herald
- Otago Daily Times
- The Dominion
- Waikato Times
- The Southland Times
- Taranaki Daily News

Impact

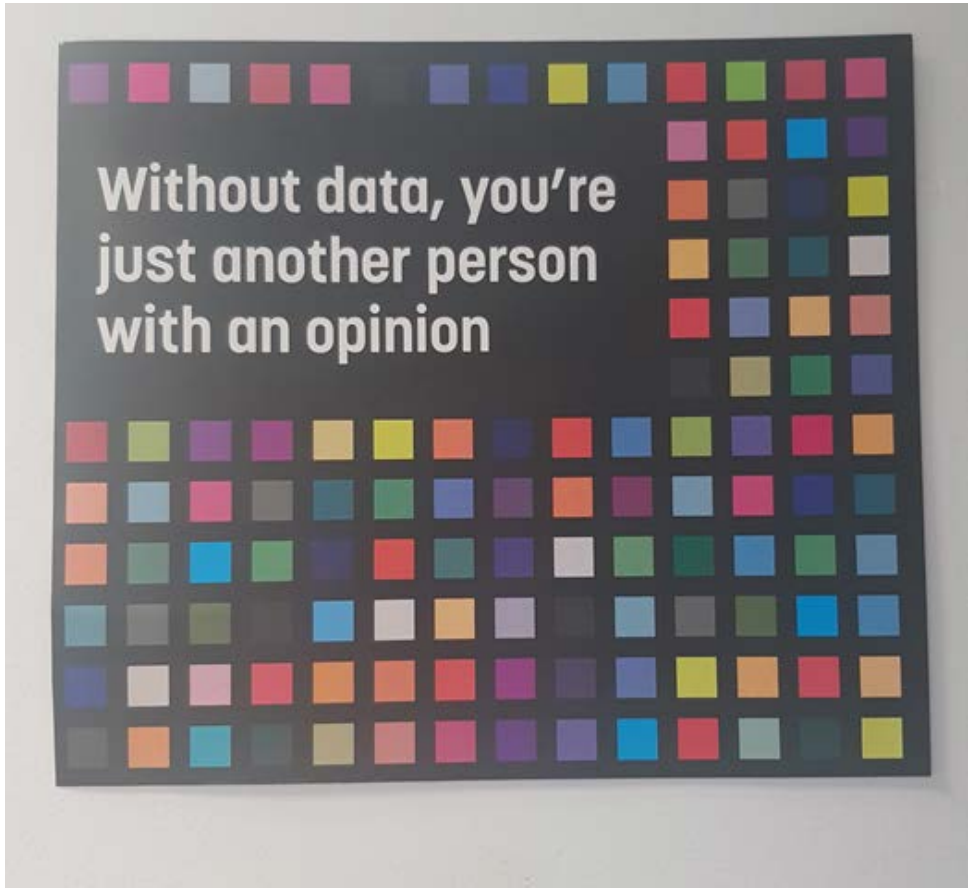
- Geriatricians
- Physios
- Nurses
- Health Managers

- ANZSGM
- Nursing and Frailty Conferences
- Ministry of Health
- Technical Advisory Services (TAS)

Overview

- Introduction
- Social Isolation (Sponsor AWNSC)
- Drug Burden Index (Sponsor AWNSC)
- Frailty (Sponsor HRC)
- Interventional Trial (Sponsor HRC)
- Impact
- The Future
- Acknowledgements

On the wall of CDHB Decision Support



W. Edwards Deming

NZ Data provides novel insights into the challenges of the ageing population.

Ageing research must be translated

Overview

- Introduction
- Social Isolation (Sponsor AWNSC)
- Drug Burden Index (Sponsor AWNSC)
- Frailty (Sponsor HRC)
- Interventional Trial (Sponsor HRC)
- Impact
- The Future
- Acknowledgements

Acknowledgements

- **Māori Advisors**
- Irihapeti Bullmore (CDHB)
- Cameron Lacey (UO)
- Annabel Ahuriri-Driscoll (UC)

- **Clinical Translation**
- Carolyn Gullery (CDHB)
- Nigel Millar (Southern DHB)
- Phil Wood (MoH)
- Ruth Kibble (SCDHB)
- Jane Large (SIHA)
- Dr Brigette Meehan (TAS)
- Jason Theobold (TAS)

National Science Challenges | A BETTER START | E Tipu e Rea

National Science Challenges | HEALTHIER LIVES | He Oranga Hauora

National Science Challenges | AGEING WELL | Kia eke kairangi ki te taikaumātuatanga

Darrell Abernethy

1949-2017

Professor of Medicine, John Hopkins and Deputy Director of Drug Safety, FDA

Acknowledgements: Research Team

- **New Zealand**
  - Sally Keeling (Otago)*
  - Philip Schluter (Canterbury)*
  - Jennifer Brown (Canterbury)
  - Prasad Nishtala (Otago)
  - Martin Connolly (Auckland)
  - Richard Scrase (CDHB)
  - Rebecca Abey-Nesbit (Otago)
  - Ulrich Bergler (Otago)
  - Deb Gillon (Otago)
  - Marie Crowe (Otago)
  - John Pickering (Otago)
  - Sue Weaver (Otago)

  Mentors:
  - Vicky Cameron, Lutz Beckert
- **USA**
  - Vince Mor (Brown)
  - Sarah Berry (Harvard)
  - Darrell Abernethy (FDA & Johns Hopkins)
- **Canada**
  - John Hirdes (Waterloo)
- **Australia**
  - Sarah Hilmer (Sydney)
  - Nancye Peel (Queensland)
  - Ruth Hubbard (Queensland)

National Science Challenges — A Better Start — E Tipu e Rea

National Science Challenges — Healthier Lives — He Oranga Hauora

National Science Challenges — Ageing Well — Kia eke kairangi ki te taikaumātuatanga