

Ageing and Chronic Health Conditions - a side effect of growing old

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University
of Otago
ŌTĀKOU WHAKAIHU WAKA



Ageing

When does it start?

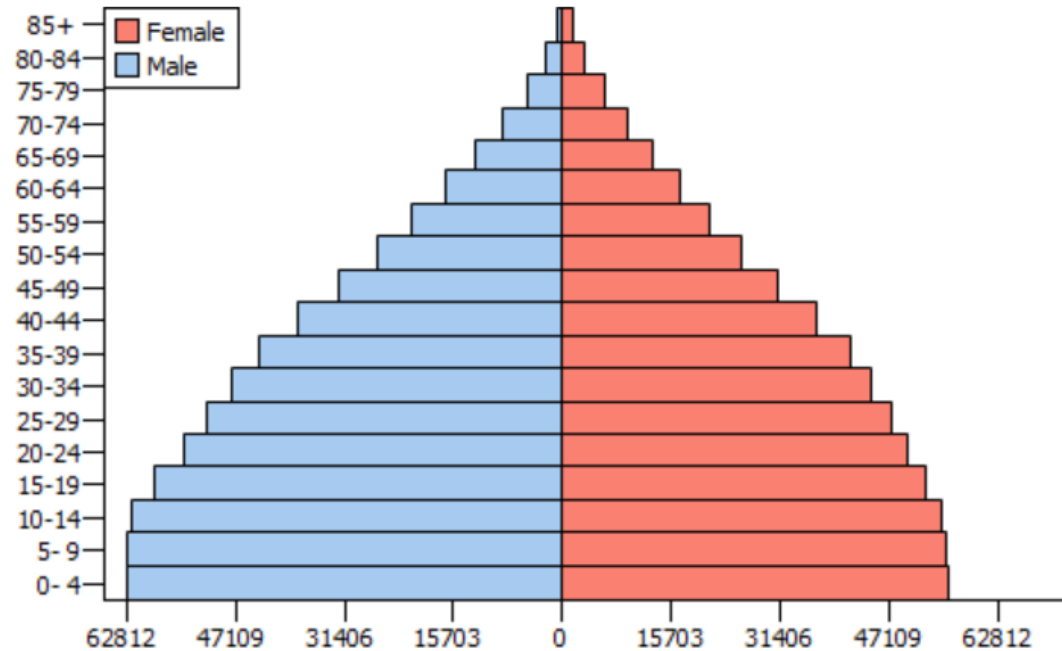
How old do I feel?

Growing old is not for sissies!



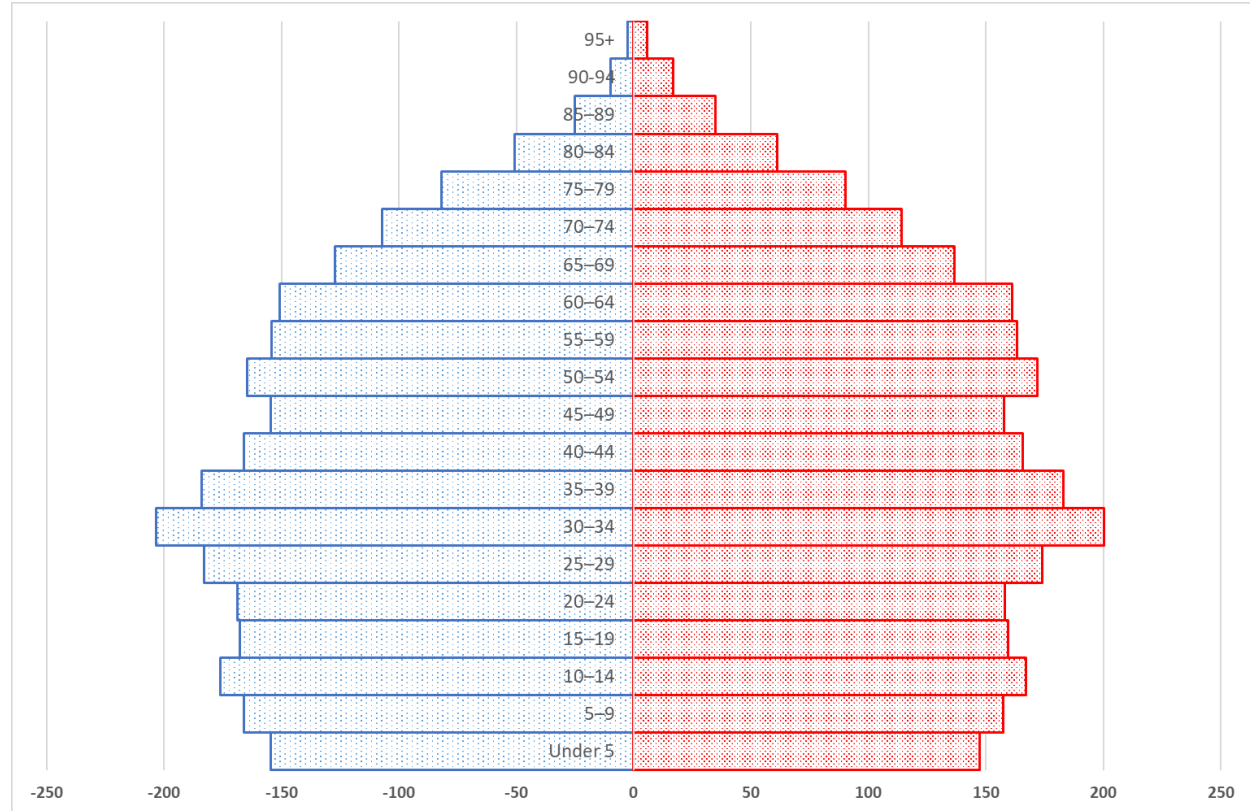
The population pyramid

2010 India

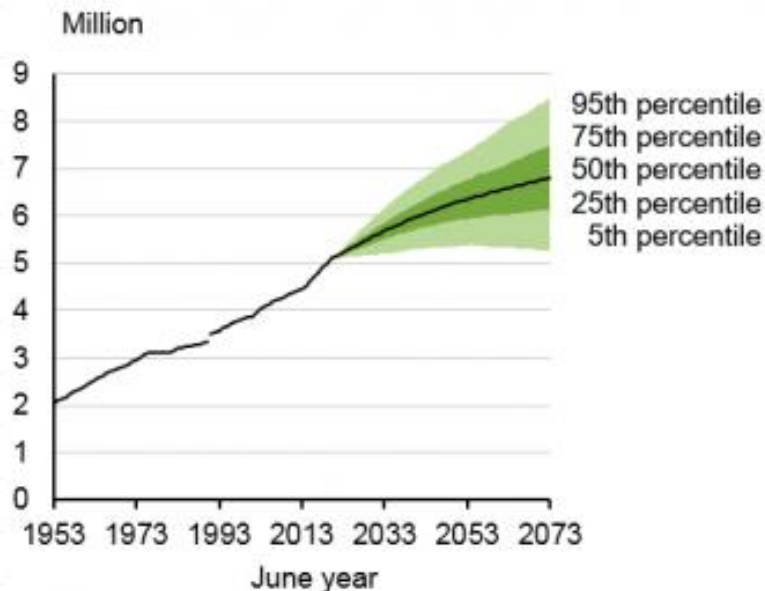


The population pyramid

2023 NZ estimated resident population



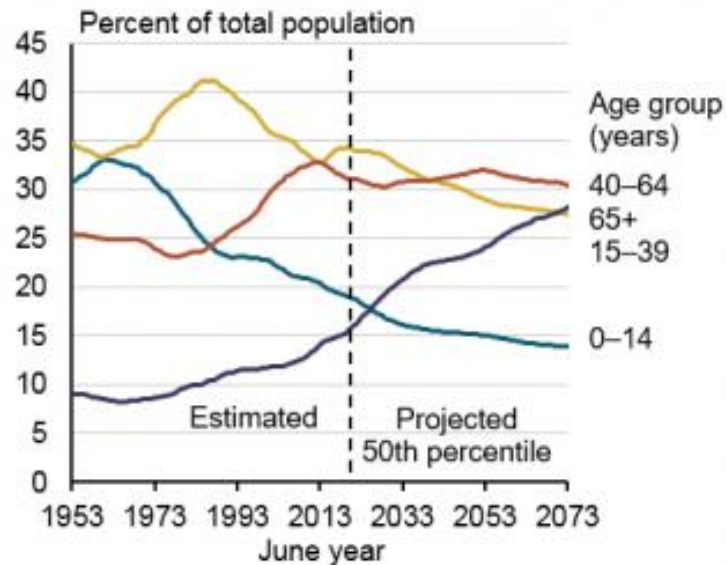
New Zealand population 1953–2073



Note: The break in data between 1990 and 1991 denotes a change from the de facto population concept to the resident population concept.

Source: Stats NZ

Age distribution of population 1953–2073



Source: Stats NZ

NZ Ethnic diversity

The six major ethnic groups in New Zealand, 2006, 2013, and 2018 Censuses

	2006 (%)	2013 (%)	2018 (%)
European	67.6	74.0	70.2
Māori	14.6	14.9	16.5
Pacific peoples	6.9	7.4	8.1
Asian	9.2	11.8	15.1
Middle Eastern / Latin American / African	0.9	1.2	1.5
Other ethnicity	11.2	1.7	1.2



In Summary

We are getting older!

As individuals and as a society,
and ethnically and culturally more diverse.

Chronic Health Conditions

What are we talking about?

Cancer(s)

Diabetes

Cardiovascular disease (conditions of heart and blood vessels)

Respiratory diseases (conditions affecting lungs and respiratory tract)

Stroke

Gout

Mental Health conditions

Traumatic Brain Injury

And more ...

Source: [TePaeTata_A4.pdf](#)

Chronic Health Conditions

Prevalence [%] at age range 55 to 64 years

Age 55 to 64 years	Total	Male	Female
1+ CC	69.5	66.7	71.1
2+ CCs	37.1	32.3	41.5
3+ or more CCs	14.4	11.1	17.4

Source: https://www.cdc.gov/nchs/health_policy/adult_chronic_conditions.htm

Chronic Health Conditions

Prevalence [%] at age range 65 years and over

Age 65 years and over	Total	Male	Female
1+ CC	69.5 -> 85.6	66.7 -> 83.0	71.1 -> 87.6
2+ CCs	37.1 -> 56.0	32.3 -> 51.4	41.5 -> 59.4
3 or more CCs	14.4 -> 23.1	11.1 -> 21.2	17.4 -> 24.6

Source: https://www.cdc.gov/nchs/health_policy/adult_chronic_conditions.htm

Chronic Health Conditions

Aotearoa context

One in four Kiwis live with multiple CCs (25%).

Often experienced by several generations in the same whānau.

Māori and Pacific people develop CCs 10-20 years earlier,
experience more barriers to health care, such as
lack of culturally appropriate services,
location and transport specific challenges,
financial and socio-economic limitations.

Source: <https://www.tewhatauora.govt.nz/for-health-professionals/clinical-guidance/diseases-and-conditions/long-term-conditions/about-chronic-health-conditions/#about-chronic-health-conditions>

Chronic Health Conditions

Cancer(s)

Affects around 23,000 people every year (new diagnoses).

Approximately 10,000 death per year.

Is the leading cause of health loss.

Significant inequities:

- Māori are 20% more likely to develop and twice as many are likely to die from cancer.
- Pacific people also have higher incidence and mortality rates.

Around 30-50% of all cancers are preventable.

Chronic Health Conditions

Diabetes

Approximately 278,000 people in NZ live with diabetes.

90% of cases are type II diabetes, more prevalent in older people.

Significant inequities:

- Māori and Pacific people develop diabetes 10 to 20 years earlier.
- They experience worse outcomes e.g., higher rates of limb amputations.

Diabetes is one of the big issues on population level.

Chronic Health Conditions

Cardiovascular diseases

Leading cause of health loss in NZ.

1 in 2 people aged 40 years and over has hypertension.

Approximately the cause of death in 1/3 of cases.

For half of Māori, Pacific, and Asian people death from heart disease is premature and avoidable.

Chronic Health Conditions

Respiratory diseases

Account for around 10% of hospital admissions.

Related to poor air quality.

Māori and Pacific children have a high burden due to higher rates of exposure to damp and mouldy homes.

Chronic Health Conditions

Stroke

Second most common cause of death.

Leading cause of impairment in adults.

Incident rate increases with age.

Largely preventable.

Chronic Health Conditions

Mental health conditions

Wide range of specific conditions with different impact on individuals and whānau.

Over 50% of Kiwis will experience mental distress and addiction challenges at some point.

Economic cost of about 5% of GDP.

Māori are more affected and experience worse outcomes.

Loneliness has high prevalence among older people.

Multiple Chronic Conditions

What condition tend to co-occur?

Single conditions can easily be described:

=> x% of males at the age of 65 have hypertension, with a life expectancy of...

Two co-occurring conditions can be described:

=> Of those males, y% also have diabetes, with z% of those being Pacific

Then it gets more difficult and complex:

=> medical knowledge of the conditions

=> statistical methods

=> presentation of data

=> limited by available data

Multiple Chronic Conditions

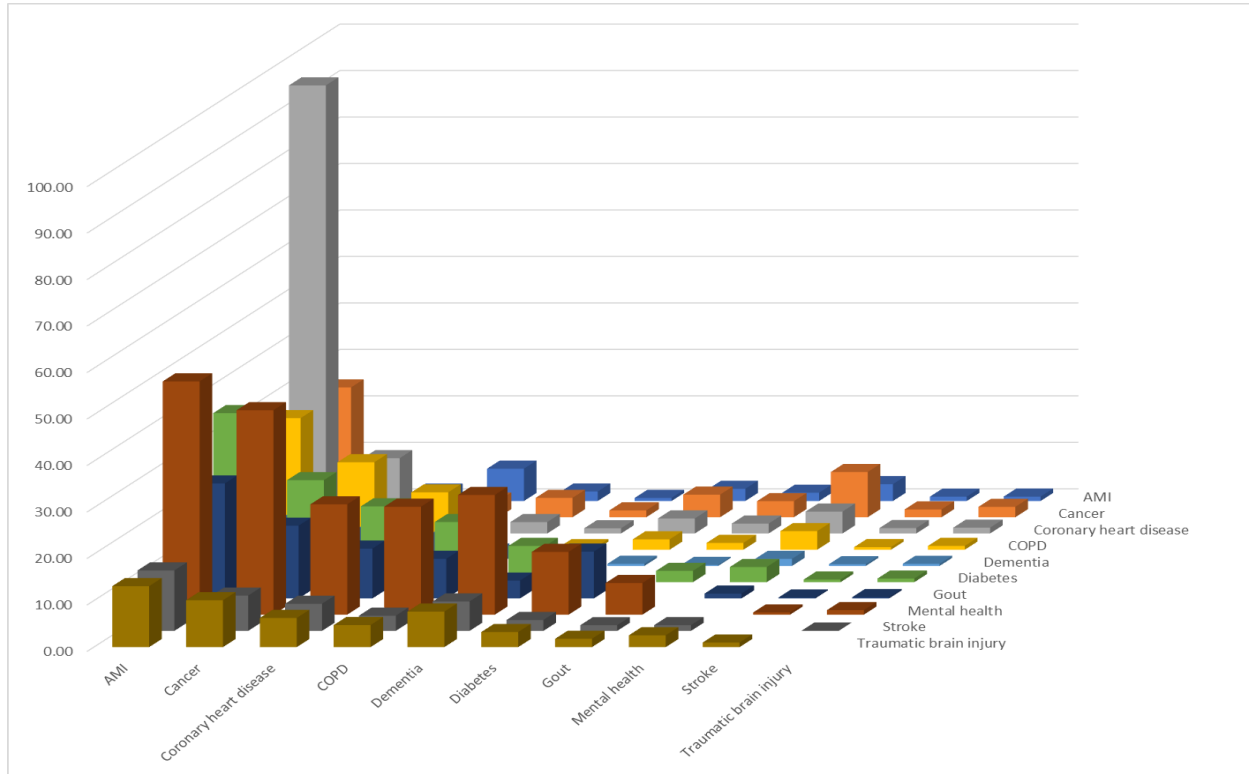
What condition tend to co-occur – two CCs

	AMI	Cancer	CHD	COPD	Dementia	Diabetes	Gout	Mental health	Stroke	TBI	# of CCs	2+ CCs (%)
AMI		27.93	96.41	28.31	9.26	36.37	24.73	50.19	13.01	13.12	4.03	99.37
Cancer	2.01		16.19	18.82	6.69	21.95	15.65	43.98	7.59	10.09	2.77	79.21
Coronary heart disease	6.95	3.58		12.34	5.61	16.31	10.72	23.73	5.83	6.28	3.43	91.74
COPD	2.04	4.17	2.45		3.10	12.94	8.52	23.22	3.27	4.75	3.08	85.55
Dementia	0.67	1.48	1.11	0.53		7.80	3.83	25.75	6.34	7.65	3.76	95.47
Diabetes	2.62	4.86	3.24	2.23	0.46		10.07	13.51	2.35	3.24	2.79	78.69
Gout	1.78	3.46	2.13	1.47	0.23	2.43		6.81	1.22	1.79	3.00	83.80
Mental health	3.62	9.73	4.71	4.00	1.52	3.26	1.04		1.23	2.55	2.68	76.40
Stroke	0.94	1.68	1.16	0.56	0.37	0.57	0.19	0.47		0.99	3.69	91.92
Traumatic brain injury	0.95	2.23	1.24	0.82	0.45	0.78	0.28	0.98	0.07		3.20	84.38
Population (%)	7.21	22.13	19.84	17.22	5.90	24.15	15.34	38.31	6.59	9.30	1.66	

Older adults living with others – excludes individuals who live alone, or in care settings

Multiple Chronic Conditions

What condition tend to co-occur – two CCs



Multiple Chronic Conditions

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Multiple Chronic Conditions

What about three and more CCs

Using interRAI data we analysed CCs of older adults seeking home support services.

31,704 people, mean age 82.3 (8.0), 59.9% female

Limitations: no details on specific type or degree of health condition.

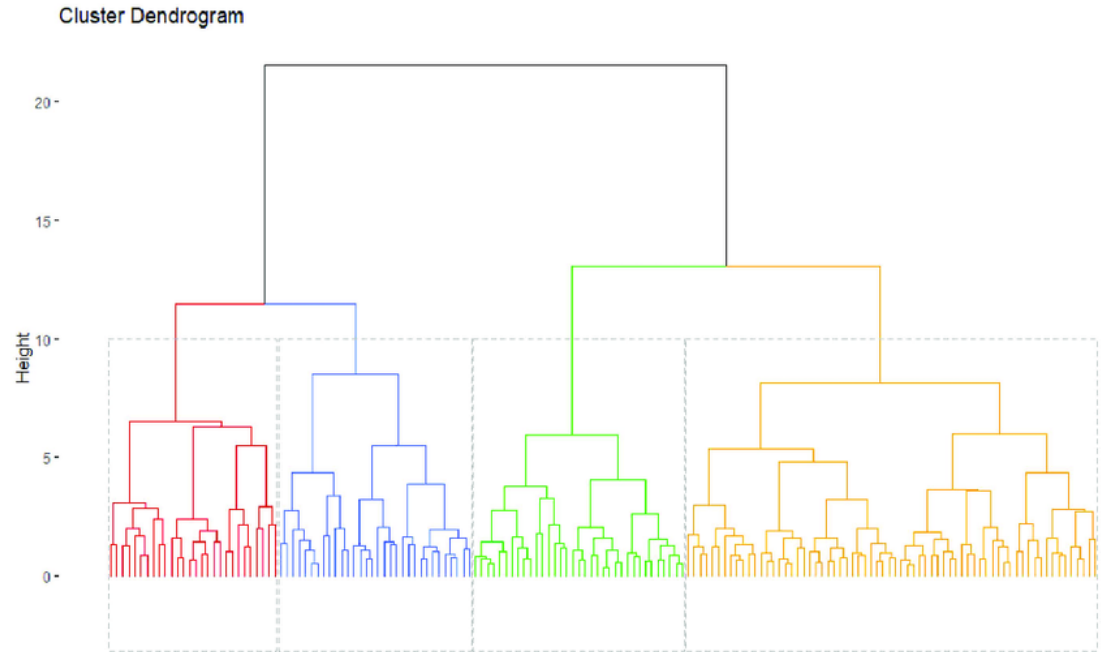
Multiple Chronic Conditions

What about three and more CCs

Hierarchical cluster analysis

Determines clusters based on similarity / dissimilarity

Result is a dendrogram and the descriptive statistics



	Cluster 0 (No CC)	Cluster 1 (COPD)	Cluster 2 (Depression)	Cluster 3 (Stroke)	Cluster 4 (Cancer)	Cluster 5 (Diabetes)	Cluster 6 (Cog. Imp.)	Cluster 7 (CHD)	Cluster 8 (CHF)
Total in cluster	2,791 (8.8%)	2,702 (8.5%)	4,612 (14.5%)	4,572 (14.4%)	4,977 (15.7%)	3,992 (12.6%)	4,290 (13.5%)	2,237 (7.1%)	1,531 (4.8%)
Coronary Heart Disease	0%	39.6%	29.2%	39.8%	32.6%	36.8%	0%	100%	45.4%
Congestive Heart Failure	0%	26.8%	13.9%	17.2%	15.2%	18.6%	0%	0%	100%
COPD	0%	100%	20.2%	14.1%	17.2%	0%	0%	0%	0%
Diabetes	0%	23.2%	4.1%	22.3%	18.0%	100%	0%	0%	0%
Cancer	0%	0%	0.4%	0%	100%	3.7%	0%	0%	0%
Stroke	0%	0%	0%	100%	16.1%	3.3%	0%	0%	0%
Cognitive Impairment	0%	41.6%	67.3%	65.0%	48.7%	57.3%	100%	54.1%	45.8%
Depression	0%	0%	100%	23.0%	20.6%	28.7%	0%	0%	0%
Mean (SD) number of conditions	0	2.3 (1.0)	2.4 (1.0)	2.8 (1.1)	2.7 (1.2)	2.5 (1.0)	1 (0)	1.5 (0.49)	1.92 (0.68)



In Summary

There are many chronic health conditions,
and even more combinations of chronic health conditions.
Understanding of multiple CCs is incomplete and complex.

What can you do?

Known factors

- Family genetics and learnt habits
- Lifestyle
- Age

Prevention & Treatments

- Diet and exercise
- Screening
- Medications
- Surgery or other interventions

Medications and ageing

Backdrop

As we collect health conditions the medication count tends to increase

Medications are typically tested in young people

Older bodies react to medications differently

Adverse drug side effects

Drug interactions

=> Polypharmacy

Medications and ageing

Polypharmacy

Polypharmacy refers to the concurrent use of multiple medicines by a person.

Not a problem by default.

Some drug are more likely to cause adverse side effects than others.

Sedative and anticholinergic drugs are of concern for older people.

Known to increase the risk of falls and hip fractures.

Deprescribing is a method to reduce medications when adverse effects outweigh the benefits.

Deprescribing

What is it?

A structured process to review patient medications by a health professional.

Consider benefit of continued use verses possible impact of not taking.

Consider alternative medications, or combinations of medications.

Manage changes in medications e.g. tapering off.

It is not just stopping a possibly critical medication, nor a DIY process!

Deprescribing

Barriers

It takes time and is not always feasible.

Requires collaboration between GP, Specialists, Pharmacist, and patient

Reluctance by patients to change meds.

Limited knowledge of drug-drug interactions in older people.

Possible and fears of possible side effects or worsening of symptoms.

Deprescribing

Drug Burden Index medications

DBI is a measure of possible adverse reactions of a medication.

Total of all DBI scores of a person's medication provides a total score of burden.

A score of 0.5 is equivalent to one medication at its effective dose.

It has previously been demonstrated that each additional unit of DBI has similar negative effects as three additional physical comorbidities.

Deprescribing

Deprescribing trial of DBI drugs

We conducted a trial to test a method to improve deprescribing focussing on:

Sedatives are medicines that work on the central nervous system to relieve pain, anxiety, aid sleep, or have a calming effect.

Anticholinergics are a broad group of medicines that act on the neurotransmitter, acetylcholine. They are also called antispasmodics.

Both classes have shown to increase the risk of falls and hip fractures.

Deprescribing

Deprescribing trial of DBI drugs

Conducted in Canterbury (Christchurch & Timaru)

Between 25 September 2018 and 30 October 2020

Following a needs assessment, a Pharmacist reviewed the person's medications.

Suggestions for changes were sent to the person's GP for follow up.

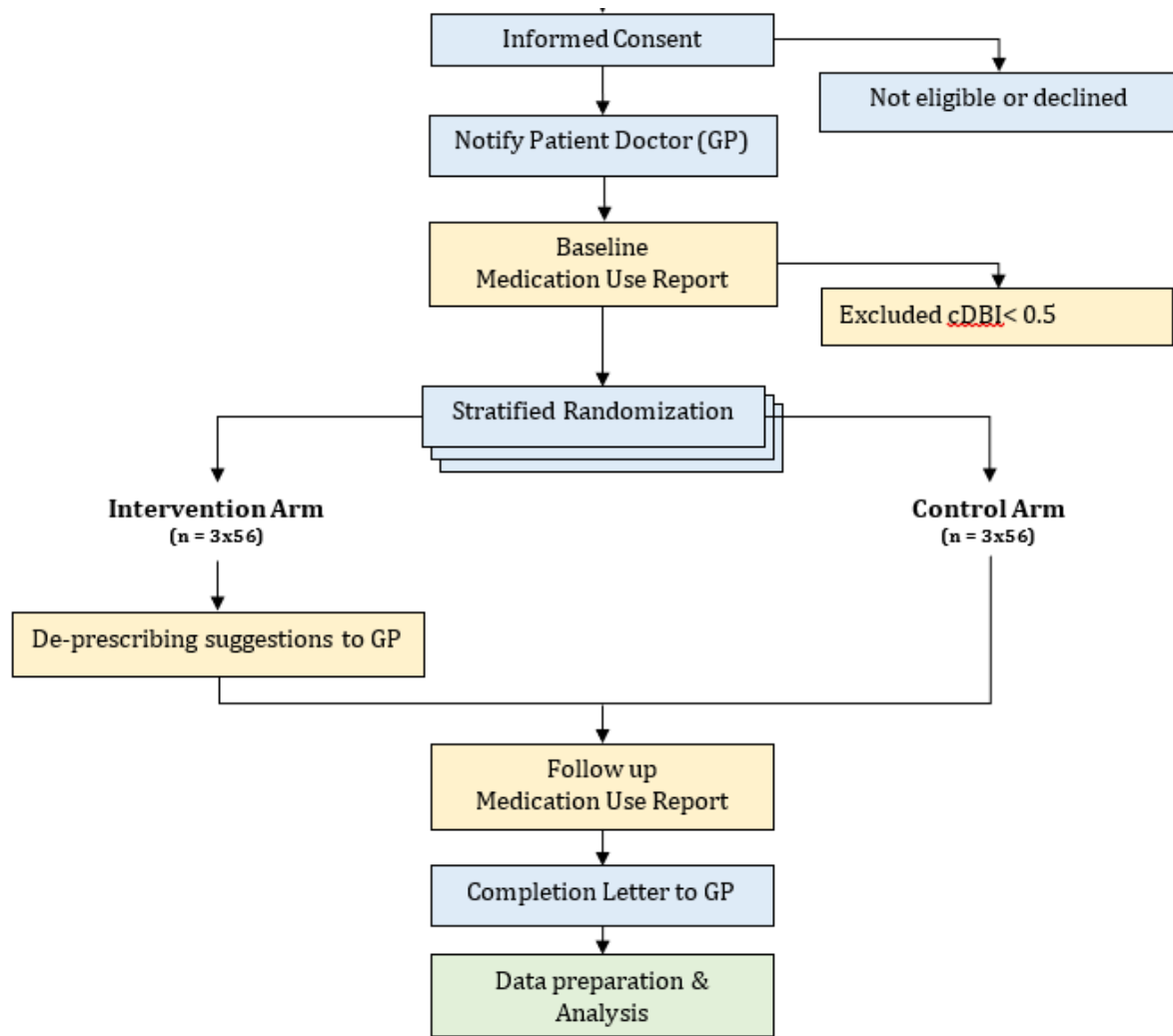
Deprescribing RCT

Conducted in Canterbury
(Christchurch & Timaru)

25/09/2018 - 30/10/2020

Stratified by frailty

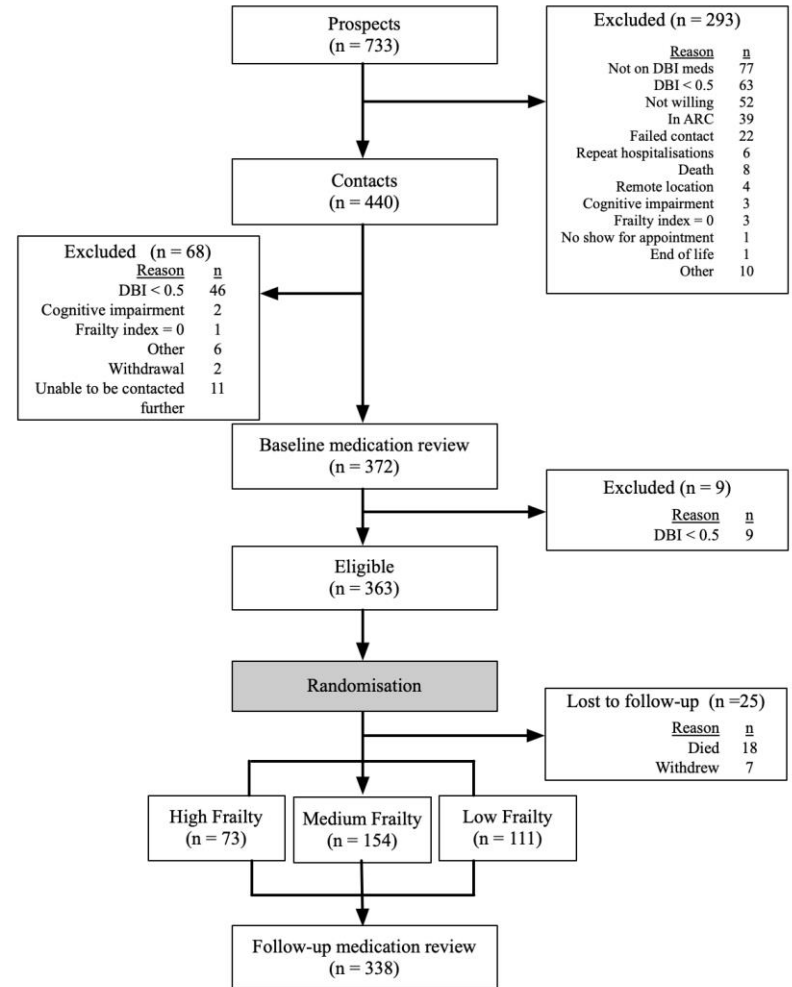
Outcome: change in DBI



Deprescribing

RCT Results

Started with 733 prospects
Engaged with 440 people
Randomized 363 participants
Results from 338 participants
Involved 226 GPs in 98 medical centers



Deprescribing

RCT Results

Mean age 79.9 (SD 7.0) years

66.4% females

97.5% NZ European

The six most commonly used medicines at the initial medication review were codeine, citalopram, zopiclone, doxazosin, gabapentin, and amitriptyline.

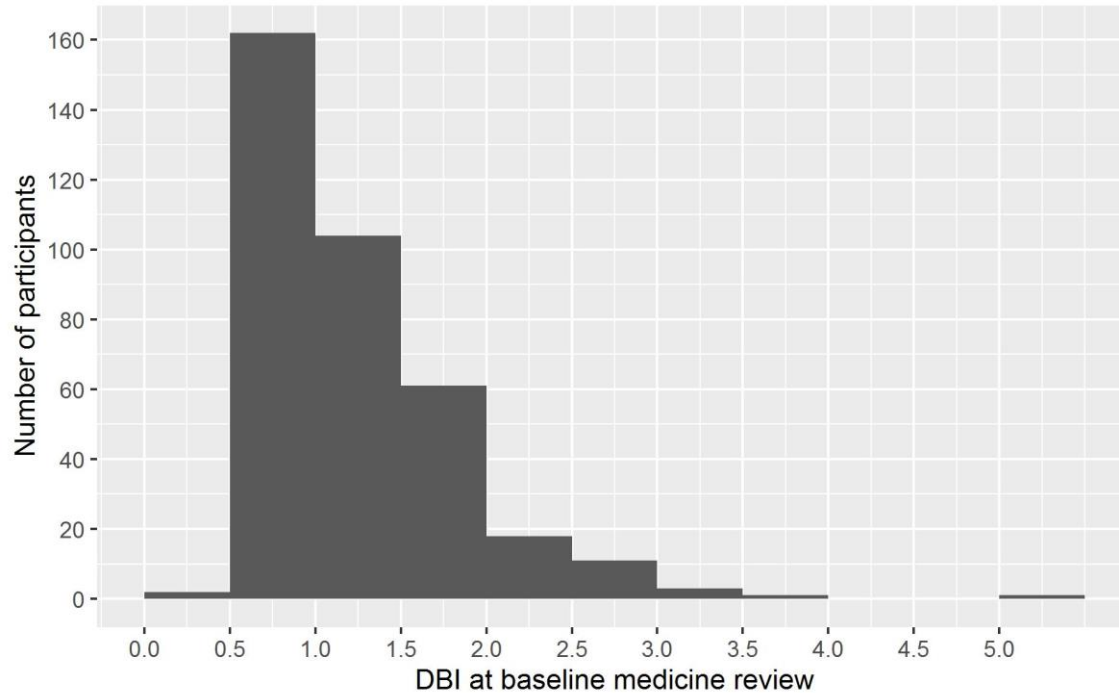
Near equal change in DBI between intervention and control arm => no effect

Change depended largely on the level of DBI / number of meds taken at baseline

Study was disrupted by COVID-19 lockdown

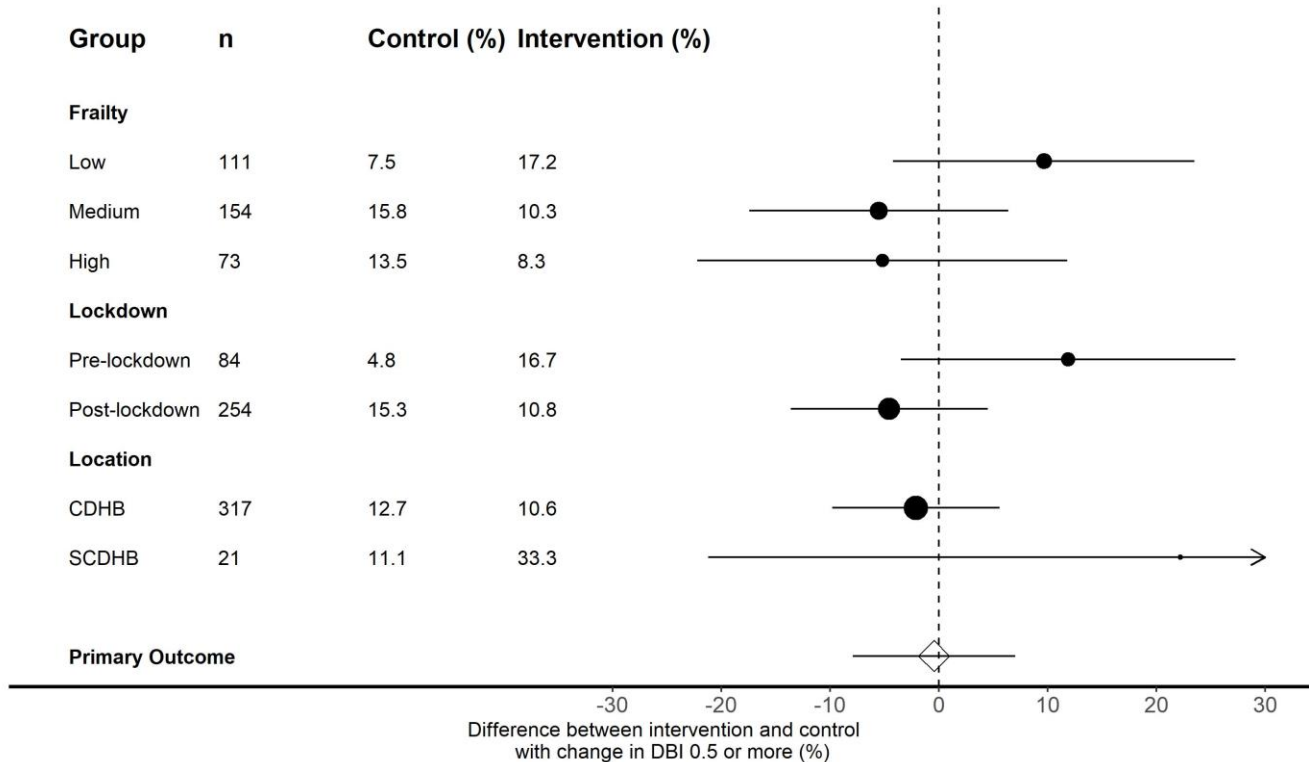
Deprescribing

RCT Results – DBI Histogram



Deprescribing

RCT Results of subgroup analyses





In Summary

Polypharmacy creates risks for older persons.

Deprescribing is an important intervention, but difficult to implement.

Our trial failed to detect an effect of our deprescribing protocol.

Deprescribing

RCT Results – Economic analysis

Wanted to know if frailty and DBI are predictors of healthcare cost?

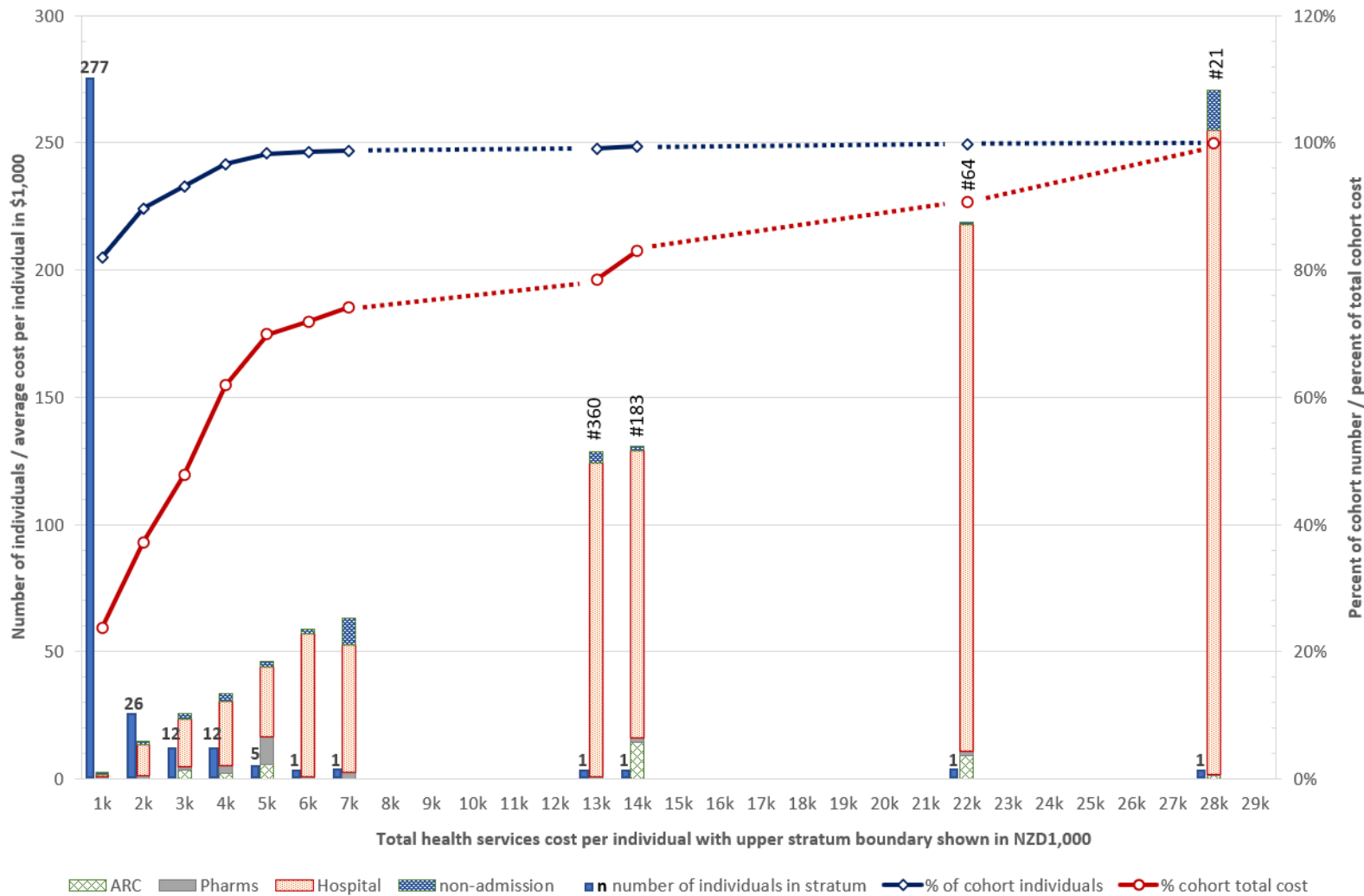
Obtained administrative health information for study participants for the 6 months following their enrolment into the study (consented) :

- Cost of medications and dispensed medication
- Outpatient services
- Hospital admissions and cost of admissions / treatments
- Cost of aged residential care admissions
- No visibility of GP visits, specialists, or privately funded medical treatments
- Excluded cost of the intervention

Deprescribing

Pareto Analysis

- Show cohort's cost structure broken down into \$1,000 increments.
- Show the number and % of individuals contributing to the total cost.
- In a business it allows to discern the important from the desirable.
- Assuming ~ 20% of causes create 80% of the problems



Deprescribing

RCT Results – Economic analysis

Cost ranged from NZ\$15 to NZ\$270,681 pp over six months post-recruitment.

Four individuals accounted for 26% of this cohort's total healthcare cost.

Frailty is associated with increased healthcare costs.

DBI only associated with pharmaceutical costs, not overall healthcare costs.



In Summary

In our cohort 277 of the participants (82%) accounted for 24% of the cost and 4 individuals (1.5%) incurred 26% of the total cost.

Economic considerations for deprescribing interventions need more research and analysis.

Next steps

Current and future work

Using administrative health data to gain a better understanding of:

- Pacific older persons' health
- Vision and Hearing impairment among older adults
- Dental / oral health changes when transitioning to aged residential care
- Hip fractures
- Neurological conditions

Providing Cognitive Stimulation Therapy for early dementia outside urban areas

Ageing – a journey with side effects

Population demographics

Chronic health conditions

Complexity of co-occurring CCs

Medications and ageing

Polypharmacy

Deprescribing

Economics

Next steps



Ulysses by Alfred, Lord Tennyson

‘Old age hath yet his honour and his toil;
Death closes all: but something ere the end,
Some work of noble note, may yet be done.’

Sir Tom Moore

30 April 1920 – 2 February 2021

The best recent example Captain Sir Tom Moore aged 99 during the Covid outbreak

Aimed to raise 1000 pounds for the NHS - raised over £35 million!



CANTERBURY EDUCATION AND RESEARCH TRUST FOR THE HEALTH OF OLDER PERSONS

About Us

A Christchurch-based charitable trust (CC32596) to promote and improve the education of young doctors and other health workers in the field of older persons' health care. We are:

- A Charitable Trust established in 1989
- Based at the University of Otago, Christchurch, as a trust administered within University of Otago financial services
- Trustees are represented by:
 - Age Concern, University of Canterbury, University of Otago, ARA Institute of Canterbury, Older Persons Health Service at Burwood Hospital, The Community

CANTERBURY EDUCATION AND RESEARCH TRUST FOR THE HEALTH OF OLDER PERSONS

Why Do We Exist?

- Foster aged care research.
- Develop the aged care health workforce through interdisciplinary teaching for undergraduate and postgraduate students.
- Promote health education for the benefit of older people.
- Advocate for aged care services.
- Improve interdisciplinary teaching of older persons health for all health students.

CANTERBURY EDUCATION AND RESEARCH TRUST FOR THE HEALTH OF OLDER PERSONS

Our Long-term Goals

Seeks to make our older persons' health care teams the best available.

Their training must have priority, they must be aware of the latest research, and must apply this to their day-to-day practice.

We aim to:

- Continue to promote teaching and research in this important field.
- Encourage young professionals from diverse backgrounds to specialise in the field.
- Advocate for health services development for older people.

CANTERBURY EDUCATION AND RESEARCH TRUST FOR THE HEALTH OF OLDER PERSONS

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Q & A







