SPACE Ageing

Prof Bernadette McGuinness

SPACE

SUPPORTIVE ENVIRONMENTS FOR PHYSICAL & SOCIAL ACTIVITY, HEALTHY AGEING & COGNITIVE HEALTH

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Healthy Ageing Challenge Social, Behavioural and Design Research

AGEING IN NORTHERN IRELAND

Overview

The population of Northern Ireland was 1,903,175 at the time of the 2021 Census. An increase of 5.1% since the 2011 Census.

Population ⓘ

1,903,175

Households ⓘ

768,810

Explore Northern Ireland

Local Government Districts within Northern Ireland

Antrim and Newtownabbey, Ards and North Down, Armagh City, Banbridge and Craigavon, Belfast, Causeway Coast and Glens, Derry City and Strabane, Fermanagh and Omagh, Lisburn and Castlereagh, Mid and East Antrim, Mid Ulster, Newry, Mourne and Down

Demography

Census 2021 - Northern Ireland - Broad age bands (years), Sex, Household size

Broad age bands (years) ⓘ

0-14	19%
15-39	31%
40-64	32%
65+	17%

Sex

Females	51%
Males	49%

Household size ⓘ

1 person	31%
2 people	30%
3 people	16%
4 people	14%
5 or more people	9%

•Ageing and Public Health - an overview of key statistics in Ireland and Northern Ireland

The population of NI aged 65+ was estimated at 314,700 in 2019 and it is projected this will rise to 631,000 by 2051 (NISRA, 2019).

Life expectancy at birth in NI is 78.7 years for men and 82.4 years for women (DOH NI, 2019a).

In NI a 65-year-old man can expect to live 9.1 more years disability-free -49.3% of his remaining life expectancy. A woman aged 65 can expect to live 9.0 more years disability-free, 43.8% of her remaining life expectancy (ONS, 2019).

Half of people in NI aged 65+ have a long term health-related limitation (DOH NI, 2020).

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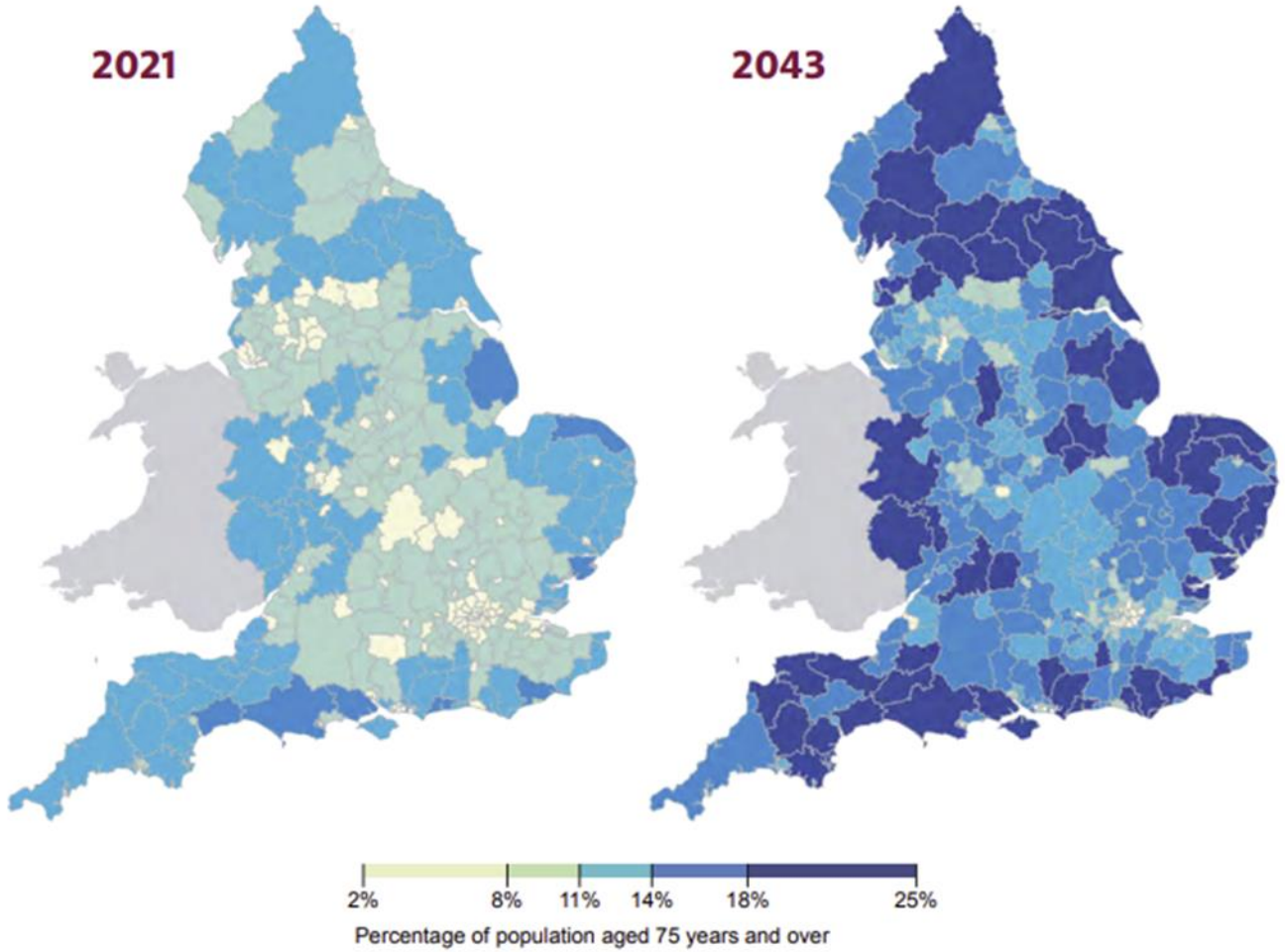
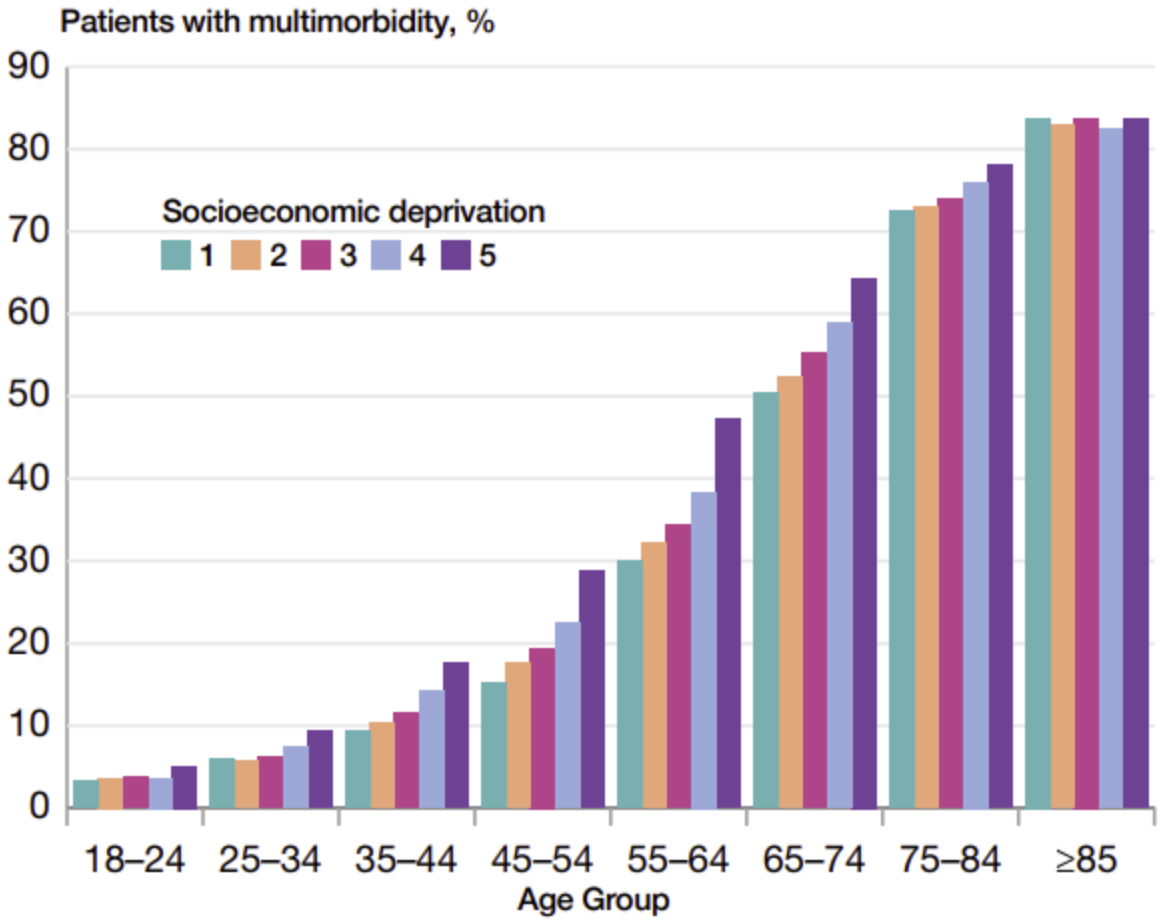
Figure 1: Map of England showing the projected rise in the percentage of the population aged 75 years and over



Source data: Office for National Statistics (ONS), 2021 mid-year estimates by local authority,[3] and 2018-based subnational population projections for 2043[4]

Figure 4: Prevalence of multimorbidity (2 or more conditions) by age and deprivation



(Index of Multiple Deprivation quintiles: 1 = least deprived, 5 = most deprived)

Source data: Cassell A and others (2018). The epidemiology of multimorbidity in primary care: a retrospective cohort study. British Journal of General Practice[7]

Image source: Chief Medical Officer's Annual Report 2020, Health trends and variation in England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b.mcguinness@qub.ac.uk

Mr FW

- 61 year old gentleman
- Educated to age 14 years, joiner
- 18 month history of poor short term memory, word finding difficulty and reduced organisational skills
- Past medical history of hypertension, hypercholesterolemia, type II diabetes, depression, benign prostatic hypertrophy
- Medications: Losartan, atorvastatin, amitriptyline, metformin, oxybutynin
- Social history lives with wife, no carers, non smoker, alcohol 28 units/week
- No behavioural problems on NPI

b.mcguinness@qub.ac.uk

•Multimorbidity

Box 1 | **Multimorbidity definitions**

World Health Organization[47]

"…the coexistence of two or more chronic conditions in the same individual…"

Academy of Medical Sciences[43]

The coexistence of two or more chronic conditions, each one of which is either

- A physical non-communicable disease of long duration, such as a cardiovascular disease or cancer.
- A mental health condition of long duration, such as a mood disorder or dementia.
- An infectious disease of long duration, such as HIV or hepatitis C.

National Institute for Health and Care Excellence guideline[181]

Multimorbidity refers to the presence of 2 or more long-term health conditions, which can include

- Defined physical and mental health conditions such as diabetes or schizophrenia.
- Ongoing conditions such as learning disability.
- Symptom complexes such as frailty or chronic pain.
- Sensory impairment such as sight or hearing loss.
- Alcohol and substance misuse.

Johnston et al.[58]**, citing definitions used in systematic reviews**

- "The co-occurrence of multiple chronic or acute diseases and medical conditions in one person"[325].
- "The coexistence of two or more chronic diseases in the same individual"[326].
- "The co-occurrence of multiple diseases or medical conditions within 1 person"[59].
- "Multimorbidity is defined as any combination of chronic disease with at least one other disease (acute or chronic) or biopsychosocial factor (associated or not) or somatic risk factor…"[327].
- "Comorbidity may be defined as the total burden of illnesses unrelated to the principal diagnosis"[61].

Complex multimorbidity[51,62]

Complex multimorbidity has been defined as the "co-occurrence of three or more chronic conditions affecting three or more different body systems within one person", although others simply count the presence of three or more conditions. It is still unclear whether this definition can identify patients with greater complexity of care need and worse health, but it can be expected that additional information around disease severity and socioeconomic–psychological stressors would be important.

- NATURE REVIEWS | DISEASE PRIMERS | Article citation ID: (2022) 8:48

• Nature Medicine | Volume 29 | July 2023 | 1649–1657

•Multimorbidity

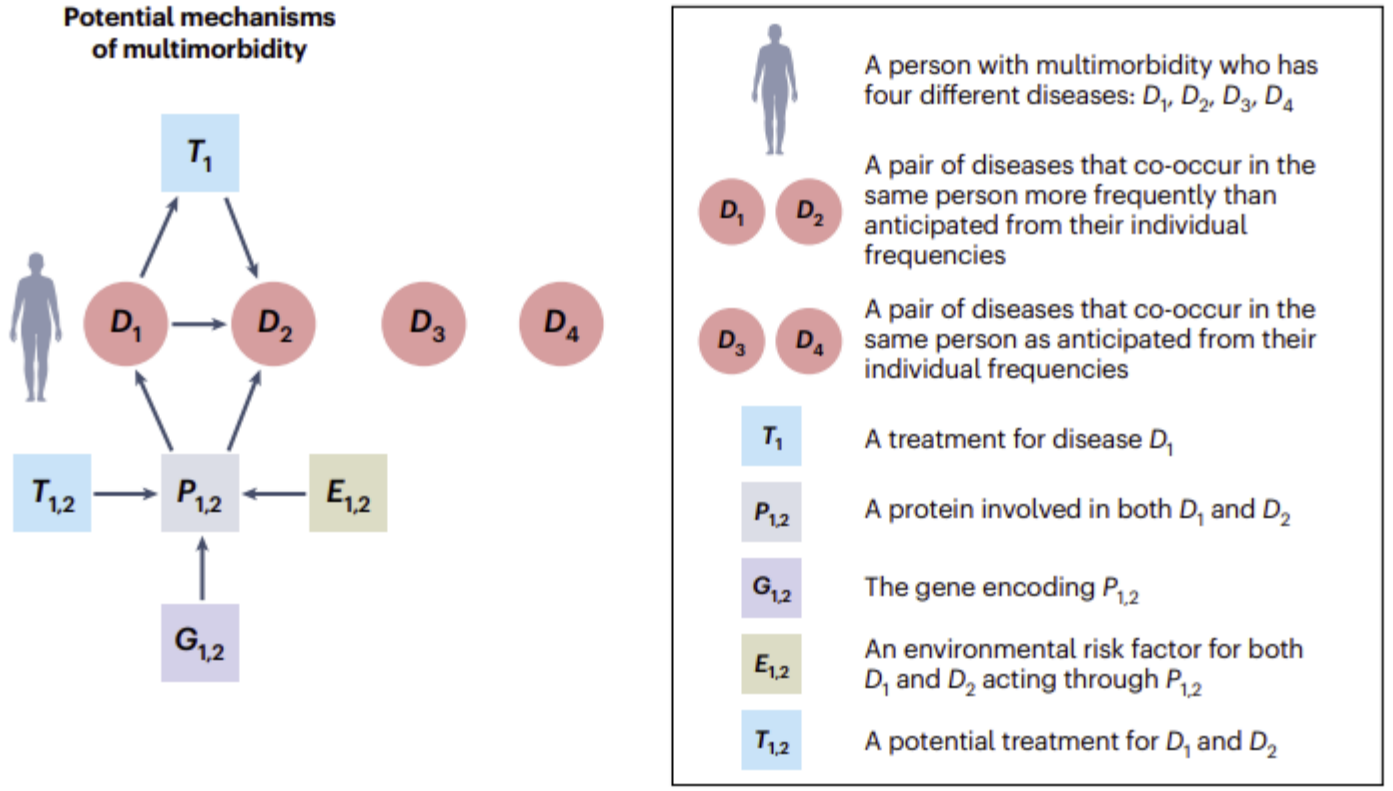

Fig. 1 | Mechanisms of multimorbidity. Diseases may co-occur because they share a mechanistic basis, or simply by chance. Consider an individual with four diseases: D_1, D_2, D_3 and D_4. Diseases D_3 and D_4 are independent and would be expected to co-occur in the same individual at a rate consistent with their individual frequencies, that is, $P(D_3 \cap D_4) = P(D_3) \cdot P(D_4)$. Diseases D_1 and D_2 co-occur at rates greater than expected than their individual frequencies, that is, $P(D_1 \cap D_2) > P(D_1) \cdot P(D_2)$. This might be because D_1 causes disease D_2; a treatment (T_1) for disease D_1 causes D_2; because D_1 and D_2 share a common pathway exemplified by a critical protein $P_{1,2}$ (encoded by a gene $G_{1,2}$), which can be targeted by a medication ($T_{1,2}$). $T_{1,2}$ could be used to treat both D_1 and D_2. D_1 and D_2 also share an environmental risk factor $E_{1,2}$, which operates through $P_{1,2}$.

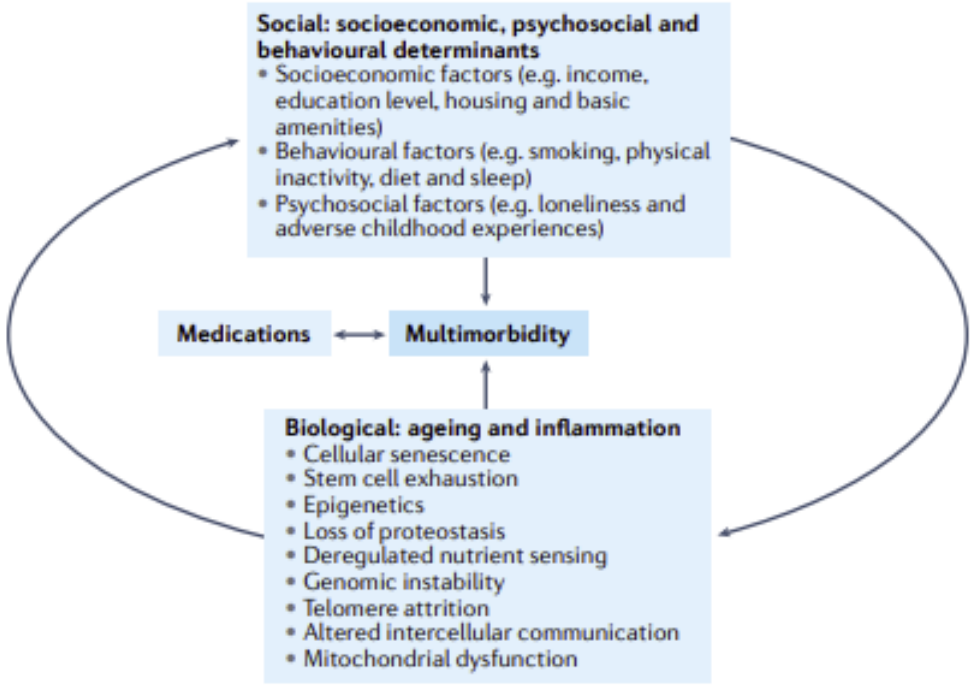

Fig. 2 | **Determinants of multimorbidity.** Development of multimorbidity is affected by several factors. Mechanisms underlying the development of multimorbidity are frequently interrelated and may be synergistic. Mechanisms can be considered in three areas: underlying biological mechanisms relating to ageing and inflammation; broader determinants of health such as socioeconomic, psychosocial and behavioural social determinants; and medication-related.

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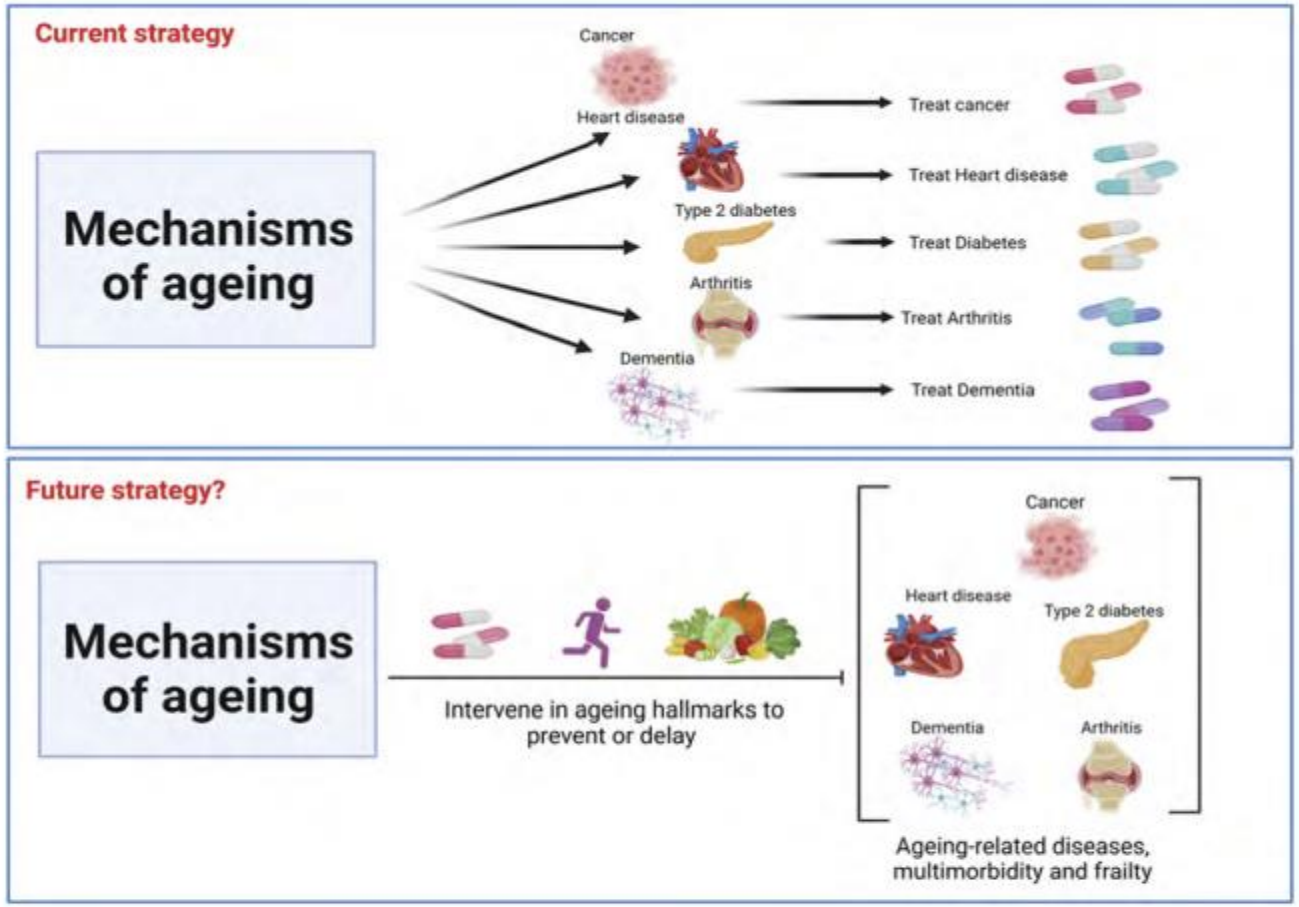
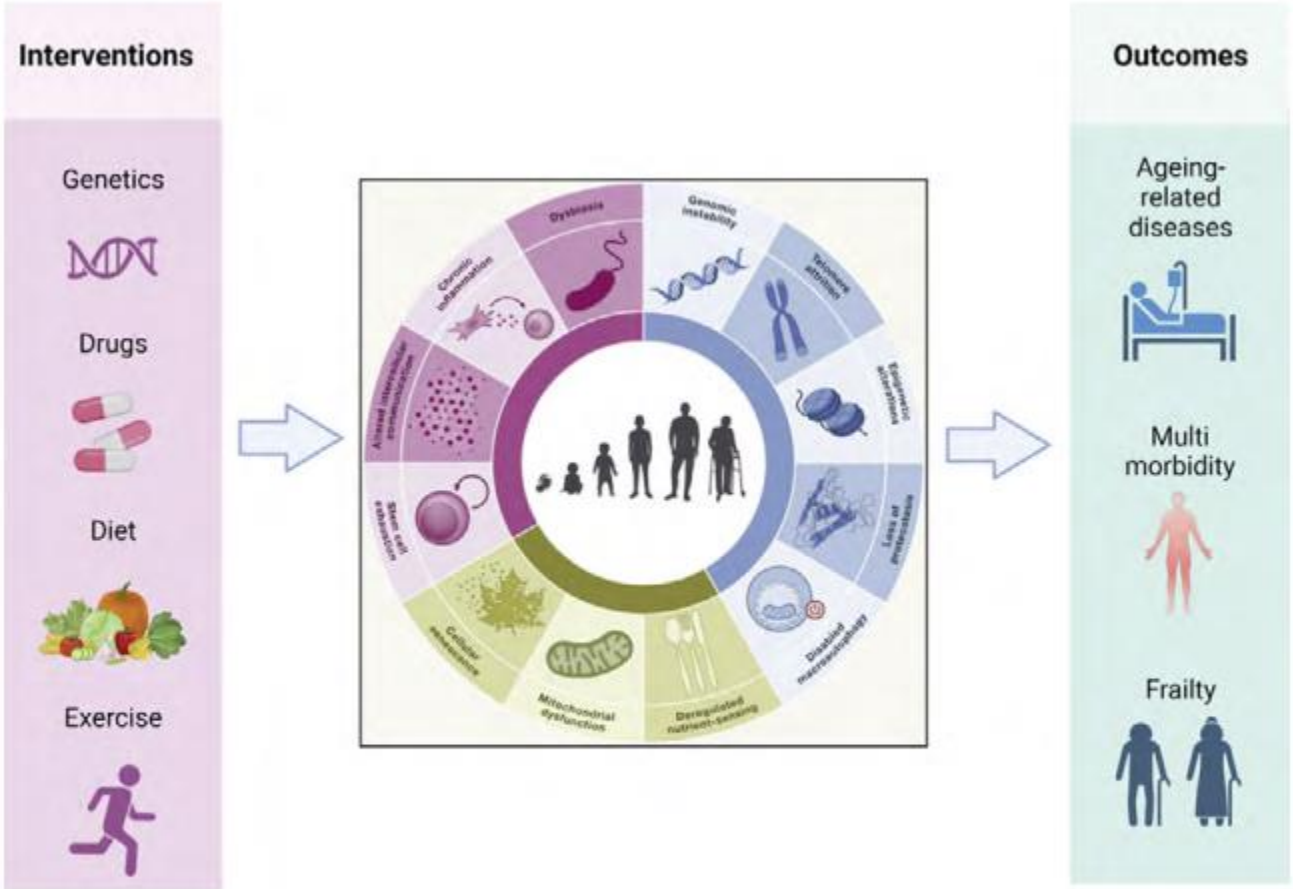
Figure 7.1: Diagram summarising a geroscience approach to improving health in older age



The top half of this figure depicts the current medical approach to treating a range of ageing-related diseases. Each disease is treated individually, involving different clinical specialists who prescribe drugs for each disease after they develop. As these diseases often co-occur in the older adult, termed multimorbidity, this results in polypharmacy. The geroscience approach, demonstrated in the lower half of this figure, proposes to treat the primary cause, namely biological ageing processes, to combat multiple diseases before they develop, thus benefitting the NHS, the economy and the patient.

Image source: The Royal Society

Figure 7.2: Diagram summarising the Hallmarks of Ageing



The central wheel shows 12 mechanisms of ageing that promote compromised function with advancing age.[14] They can interact with each other, and each is differentially involved in the ageing of different body systems and contributes to the development of ageing-related diseases, multimorbidity and frailty.

Image source: The Royal Society

Multimorbidity in NICOLA

- Defined in NICOLA as the reporting of two or more chronic medical conditions including: high blood pressure, CHD (angina and/or heart attack), congestive heart failure, stroke, diabetes, respiratory disease (asthma, chronic lung disease such as chronic bronchitis or emphysema), dementia, Alzheimer's disease, multiple sclerosis and cancer.

- Conditions were either newly reported in Wave 2 or previously reported in Wave 1

- Overall prevalence of multimorbidity (two or more conditions) was 19.8% (based on Wave 2), previously 23% (at Wave 1) – NOTE: Wave 2 included a young refresh!

- **Gender:** 32% of males and 23% of females reported multimorbidity ($p<0.001$, chi square)

- **BMI:** Multimorbidity higher in those who were obese (33.9%) compared to overweight (19.4%), or normal weight (10.9%) ($p<0.001$, chi-square)

- **Smoking:** 31% of smokers had multimorbidity versus 34.5% of non-smokers ($p = 0.38$, chi square)

- **Socio-economic status:** 17.8% of those who were least deprived had multimorbidity compared to 22.4% who were most deprived ($p = 0.14$, chi square).

- **Polypharmacy:** multimorbidity was higher in those taking **>10 drugs** (78.7%) compared to those taking <10 drugs (25.1%) ($p<0.001$). Similar for those taking **>5 drugs** (61.7% versus 17.3%, $p<0.001$)

- **High alcohol intake (>14 units/wk):** 31% of high alcohol consumers had multimorbidity compared to 23% in lower alcohol consumers ($p<0.001$).

- **Physical inactivity (<150 mins/wk):** 30% of those not meeting activity recommendations had multimorbidity compared to 20% who were meeting recommendations ($p<0.001$).

- **Self-reported health:** 55% of those who reported poor health had multimorbidity compared to 21% who reported their health to be very good or excellent ($p<0.001$).

Percent prevalence of conditions reported by participants with multimorbidity

Health condition	n (%)*
High blood pressure	2700 (31.0)
CHD	783 (9.0)
Respiratory	1409 (16.2)
Diabetes	799 (9.2)
Dementia	72 (0.8)
Congestive heart failure	106 (1.2)
Cancer	833 (9.6)
Stroke	158 (1.8)

***Based on self-report at Wave 1 and Wave 2**

Table: Logistic regression analysis showing factors associated with increased risk of multimorbidity

Characteristics	Odds Ratio (95% CI)	P value
Gender: Male	Ref	0.27
Female	0.72 (0.40, 1.30)	
BMI		
Normal	Ref	**0.01**
Overweight	1.27 (0.59, 2.71)	
Obese	**2.78 (1.32, 5.87)**	
Smoking		
No	Ref	0.78
Yes	1.09 (0.57, 2.11)	
Alcohol		
≤ 14 units/wk	Ref	0.77
≥ 14 units/wk	1.09 (0.61, 1.95)	
Physical activity		
>150 mins/wk	Ref	0.06
<150 mins/wk	1.93 (0.96, 3.89)	
Polypharmacy (>5 drugs)*		
No	Ref	**<0.001**
Yes	**7.33 (3.9, 13.8)**	
Deprivation score		
0 - 0.11 (least deprived)	Ref	0.27
0.12 - 0.17	2.05 (0.74, 5.68)	
0.18 - 0.23	2.54 (0.94, 6.86)	
0.24 - 0.33	1.09 (0.42, 2.84)	
> 0.33 (most deprived)	1.51 (0.62, 3.66)	

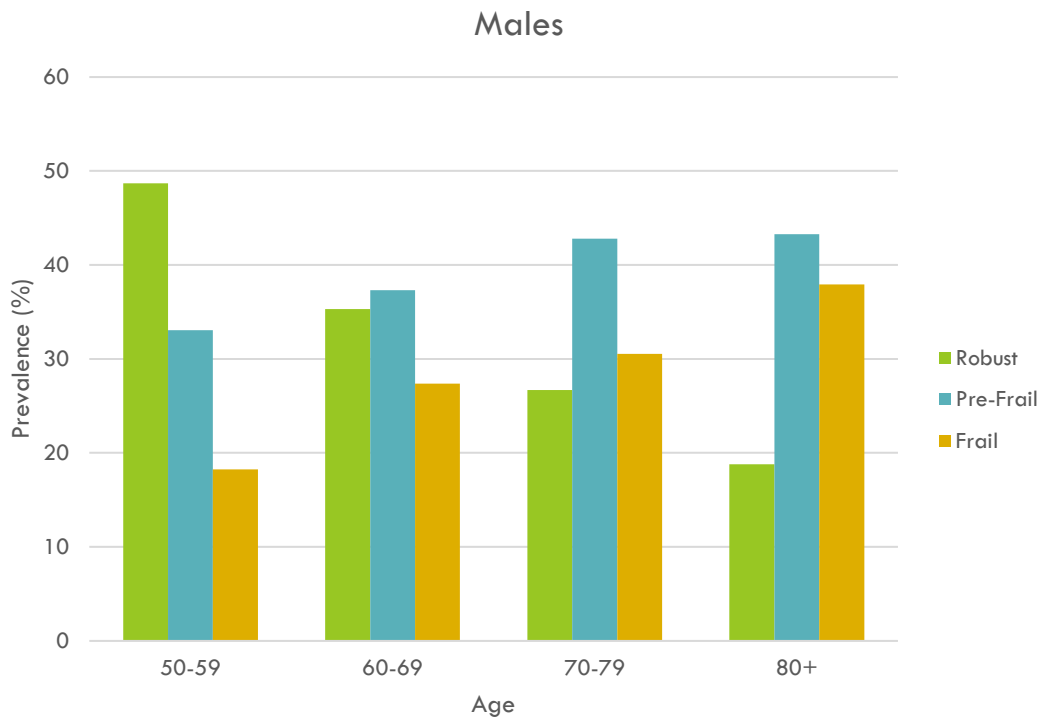
*In a repeat analysis with polypharmacy >10 drugs, odds ratio was 5.57 (1.6, 18.5), p<0.01

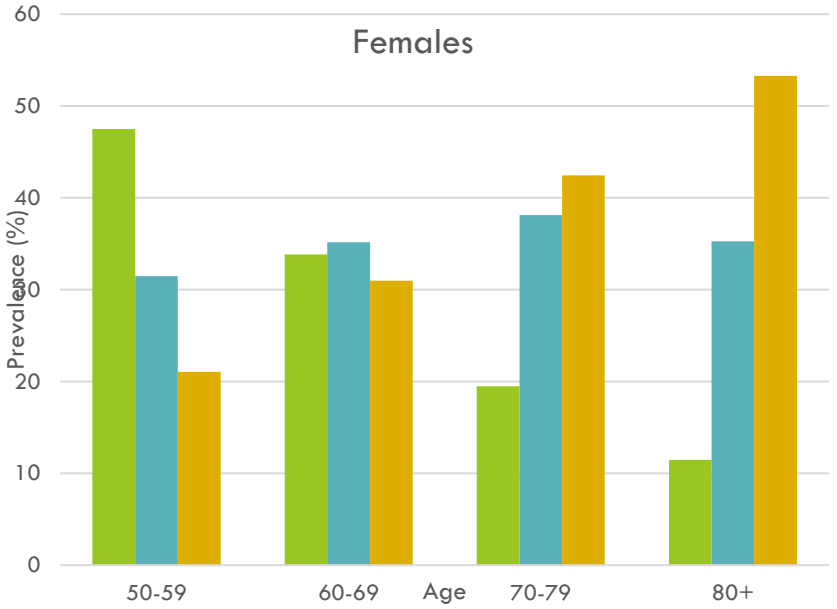
Using the 30-item Frailty Indicator to identify Frailty in NICOLA

- Developed by Aisling O'Halloran/Lorna Roe for use in TILDA and harmonised to NICOLA. https://tilda.tcd.ie/publications/reports/pdf/w4-key-findings-report/Chapter%207.pdf
- The frailty index follows the deficit accumulation model of frailty. It includes 30 self-reported health deficits and is therefore a subjective indicator of frailty.

Category	n	Wtd %
Not-frail/Robust	2,808	35.18
Pre-frail	2,938	35.88
Frail	2,408	28.94
Total	**8,154**	

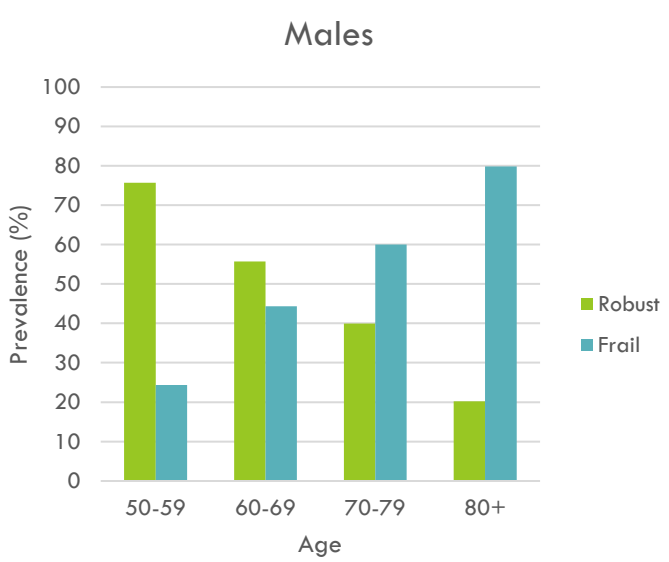
Frailty in Males and Females

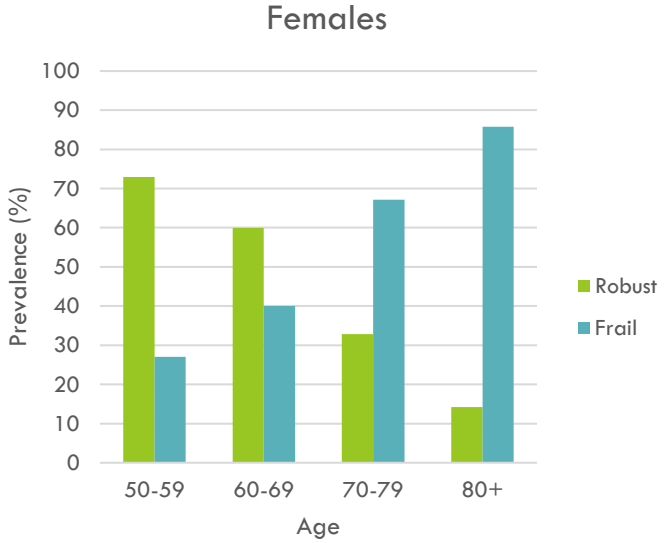




Using Timed up and Go (TUG) as an Indicator of Frailty Status in NICOLA

- Cut-off for frailty set as 10s based on the BGS 'Fit for Frailty' resource: https://www.bgs.org.uk/resources/recognising-frailty.





Frequency/prevalence

Category	n	Wtd %
Robust (Fast)	1,941	57.11
Frail (Slow)	1,241	42.89
Total	3,182	

Associated with lower educational attainment, lower house value and retirement/sick leave and unemployment

NICOLA

Mortality and link to frailty

Frailty x Mortality using 30-item frailty index n=8154:

	Non-Frail	Pre-frail	Frail
Alive	2, 662 (95%)	2, 659 (90.5%)	1,939 (81%)
Dead	146 (5%)	279 (9.5%)	469 (19%)
Total	2,808	2,938	2,408

- Frailty x Mortality using Timed up and go n=3174:

	Non-Frail /Fast	Frail/Slow
Alive	1,889 (97%)	1,133 (91%)
Dead	52 (3%)	108 (9%)
Total	1,941	1,241

- Frailty x Mortality using Grip-strength n=3174:

	Non-Frail /Strong	Frail/Weak
Alive	2, 496 (96%)	525 (90%)
Dead	99 (4%)	61 (10%)
Total	2,595	586

NICOLA

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A built environment that benefits older adults

Beyond the homes themselves, the housing developments and neighbourhoods within which homes are situated are also key to supporting an ageing society. Homes for older people need to be located in places where they can easily and safely reach the everyday shops and services that they need, preferably by active transport (walking or cycling) to help maintain their physical health. A growing body of research indicates that older adults' experience of their neighbourhood is moderated by access to, and the accessibility of, of green space and other public spaces and walking infrastructure.[22] Public and green spaces should be designed to meet the needs of older people, including those with sensory and physical impairments.[23] This is key to enabling older people to participate in their communities, stay active, enjoy life and reduce the incidence of loneliness and social isolation.[24]

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A) Older age is becoming increasingly geographically concentrated in England, and services to prevent disease, treat disease and provide infrastructure need to plan on that basis. This should be seen as a national problem and resources should be directed towards areas of greatest need, which include peripheral, rural and coastal regions of the country. The **NHS, social care, central and local government** must start planning more systematically on the basis of where the population will age in the future, rather than where demand was 10 years ago. This includes building or adapting housing and transport to be appropriate for an older population.

B) **Central and local government** (the State) have the principal responsibility for environmental factors which can delay or prevent the probability of early ageing (**primary prevention**). Making it easy and attractive for people to exercise throughout their lives is one of the most effective ways of maintaining independence into older age. Reducing smoking, air pollution and exposure to environments that promote obesity are other examples where the State has a major role to play in delaying or preventing ill health and disability over a lifetime and into older age.

Supported by **EPSRC**, the cycle Boom research project[44] has shaped the approach of cycling manufacturers and policymakers, as well as boosting older people's awareness of the value of both cycling and power-assisted electric bikes (e-bikes). The project explored how technological systems (such as e-bikes and equipment) and the built environment (cycle paths, street layout and cycle routes) affected people's cycling habits over time. It also delved into the effects of information and service provision about cycling. The researchers took a holistic view of people's choices around cycling, like early life experiences, social and cultural factors, the environment and economic impact. 240 participants took part across 4 cities (Oxford, Reading, Bristol and Cardiff). The findings showed that older people who do cycle recognise the positive benefits to their health and wellbeing, but view the UK's infrastructure as generally unhelpful for cyclists.

Conclusions

Population in NI ageing

Built environment important to enable healthy ageing

Further research required into geroscience and multimorbidity