How Can Frailty Assessment Transform AKC?

Andrew Nixon

Consultant Nephrologist & Supportive Kidney Care Lead

Lancashire Teaching Hospitals NHS FT

ESKC Workstream Lead, North West Kidney Network

@andynixon.bsky.social

Learning Objectives

- Explain the concept of frailty
- Describe the relevance of frailty for AKC
- Discuss how frailty assessment can transform AKC

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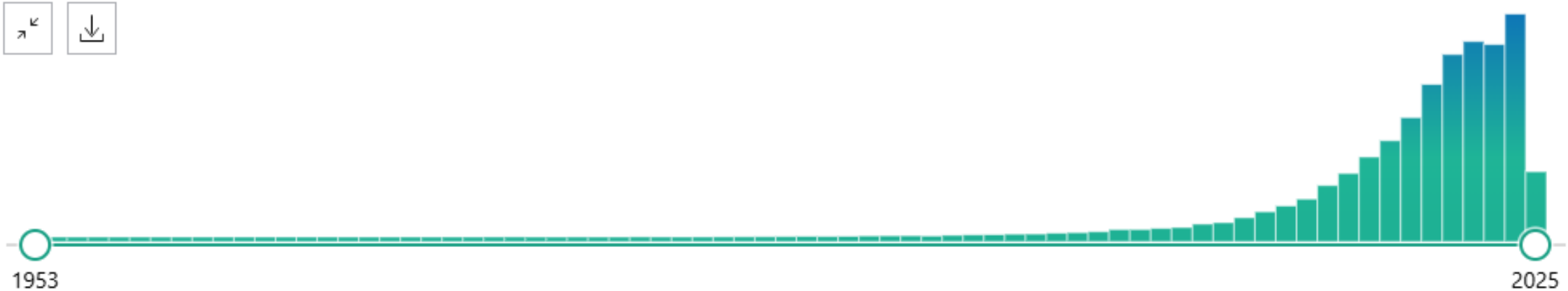


Journal of Gerontology: MEDICAL SCIENCES
2001, Vol. 56A, No. 3, M146–M156

Frailty in Older Adults: Evidence for a Phenotype

Linda P. Fried,[1] Catherine M. Tangen,[2] Jeremy Walston,[1] Anne B. Newman,[3] Calvin Hirsch,[4] John Gottdiener,[5] Teresa Seeman,[6] Russell Tracy,[7] Willem J. Kop,[8] Gregory Burke,[9] and Mary Ann McBurnie[2] for the Cardiovascular Health Study Collaborative Research Group

Accumulation of Deficits as a Proxy Measure of Aging

Arnold B. Mitnitski[1,2], Alexander J. Mogilner, and Kenneth Rockwood[2,*]

[1]Department of Mechanical Engineering, Ecole Polytechnique, Montreal P.O. Box 6079, Station Centre-ville Montreal, Quebec H3C 3A7; [2]Queen Elizabeth II, Health Sciences Centre, Geriatric Medicine Research Unit, Room 1421,5955 Veterans' Memorial Lane, Halifax, Nova Scotia B3H 2E1

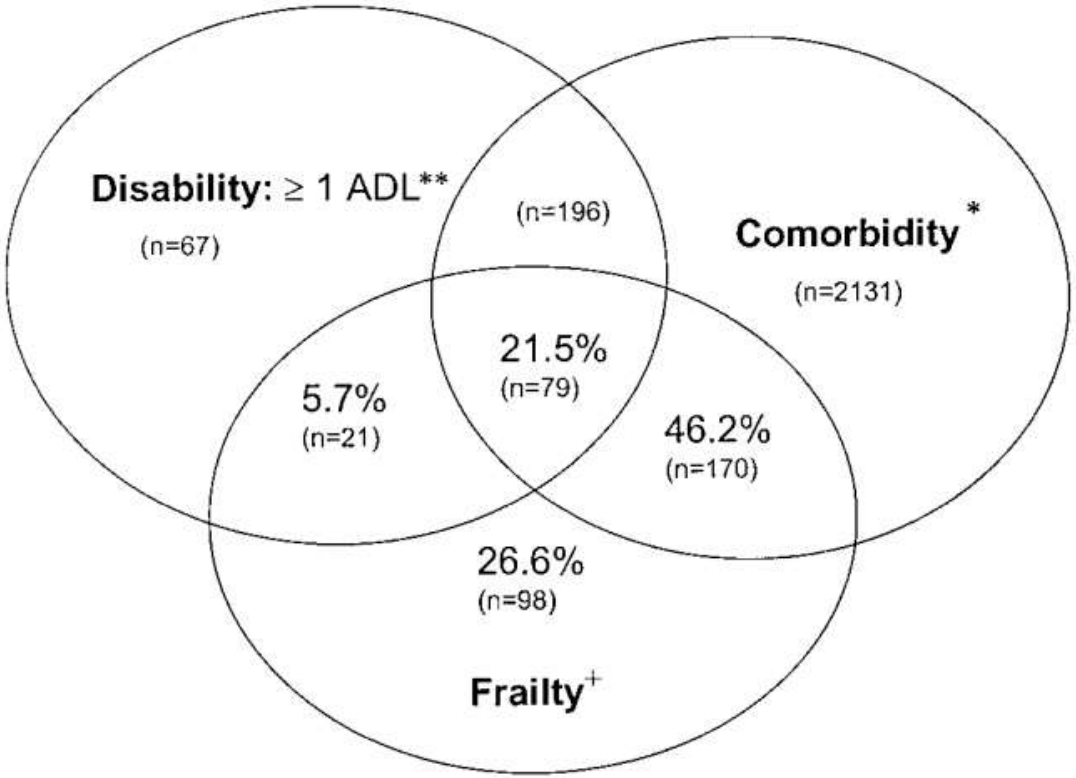


Figure 3. Venn diagram displaying extent of overlap of frailty with ADL disability and comorbidity (≥2 diseases). Total represented: 2,762 subjects who had comorbidity and/or disability and/or frailty. *n* of each subgroup indicated in parentheses. + Frail: overall $n = 368$ frail subjects (both cohorts). *Comorbidity: overall $n = 2{,}576$ with 2 or more out of the following 9 diseases: myocardial infarction, angina, congestive heart failure, claudication, arthritis, cancer, diabetes, hypertension, COPD. Of these, 249 were also frail. **Disabled: overall $n = 363$ with an ADL disability; of these, 100 were frail.

J Gerontol A Biol Sci Med Sci. 2001 Mar;56(3):M146-56.

A global clinical measure of fitness and frailty in elderly people

Kenneth Rockwood, Xiaowei Song, Chris MacKnight, Howard Bergman, David B. Hogan, Ian McDowell, Arnold Mitnitski

CLINICAL FRAILTY SCALE

1 VERY FIT — People who are robust, active, energetic and motivated. They tend to exercise regularly and are among the fittest for their age.

2 FIT — People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g., seasonally.

3 MANAGING WELL — People whose **medical problems are well controlled**, even if occasionally symptomatic, but often are **not regularly active** beyond routine walking.

4 LIVING WITH VERY MILD FRAILTY — Previously "vulnerable," this category marks early transition from complete independence. While **not dependent** on others for daily help, often **symptoms limit activities**. A common complaint is being "slowed up" and/or being tired during the day.

5 LIVING WITH MILD FRAILTY — People who often have **more evident slowing**, and need help with **high order instrumental activities of daily living** (finances, transportation, heavy housework). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation, medications and begins to restrict light housework.

6 LIVING WITH MODERATE FRAILTY — People who need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 LIVING WITH SEVERE FRAILTY — **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~6 months).

8 LIVING WITH VERY SEVERE FRAILTY — Completely dependent for personal care and approaching end of life. Typically, they could not recover even from a minor illness.

9 TERMINALLY ILL — Approaching the end of life. This category applies to people with a **life expectancy <6 months**, who are **not otherwise living with severe frailty.** (Many terminally ill people can still exercise until very close to death.)

SCORING FRAILTY IN PEOPLE WITH DEMENTIA

The degree of frailty generally corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

In **very severe dementia** they are often bedfast. Many are virtually mute.

DALHOUSIE UNIVERSITY

www.geriatricmedicineresearch.ca

Rockwood K et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489–495.

Development and validation of an electronic frailty index using routine primary care electronic health record data

Andrew Clegg[1*], Chris Bates[2], John Young[1], Ronan Ryan[3], Linda Nichols[3], Elizabeth Ann Teale[1], Mohammed A. Mohammed[4], John Parry[5], Tom Marshall[3]

Box 1. List of 36 deficits contained in the eFI.

Activity limitation	Memory and cognitive problems
Anaemia and haematinic deficiency	Mobility and transfer problems
Arthritis	Osteoporosis
Atrial fibrillation	Parkinsonism and tremor
Cerebrovascular disease	Peptic ulcer
Chronic kidney disease	Peripheral vascular disease
Diabetes	Polypharmacy
Dizziness	Requirement for care
Dyspnoea	Respiratory disease
Falls	Skin ulcer
Foot problems	Sleep disturbance
Fragility fracture	Social vulnerability
Hearing impairment	Thyroid disease
Heart failure	Urinary incontinence
Heart valve disease	Urinary system disease
Housebound	Visual impairment
Hypertension	Weight loss and anorexia
Hypotension/syncope	
Ischaemic heart disease	

Age Ageing. 2016 May;45(3):353-60.

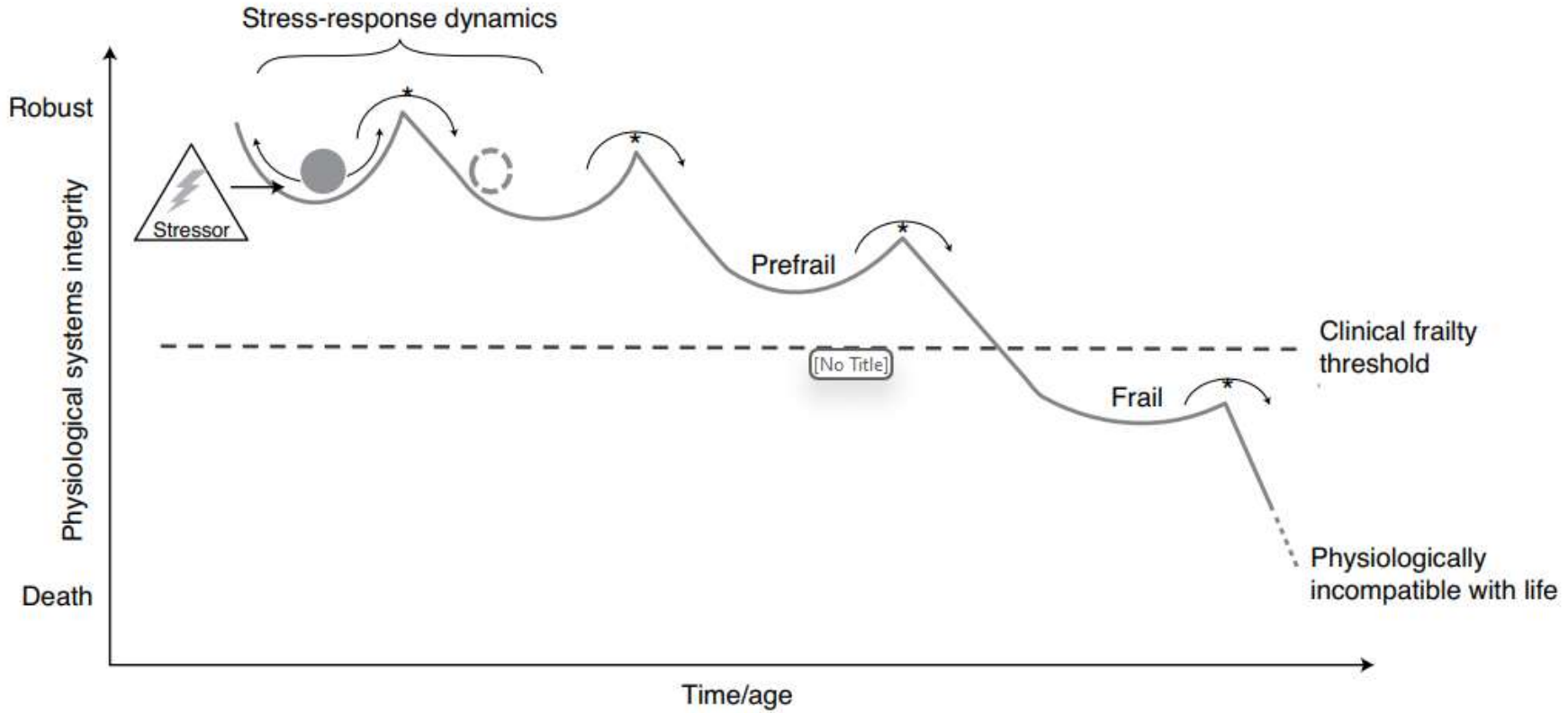


Fig. 3 | Hypothesized natural history of frailty: deterioration of physiological integrity in response to repeated stressors and natural aging. The physiological

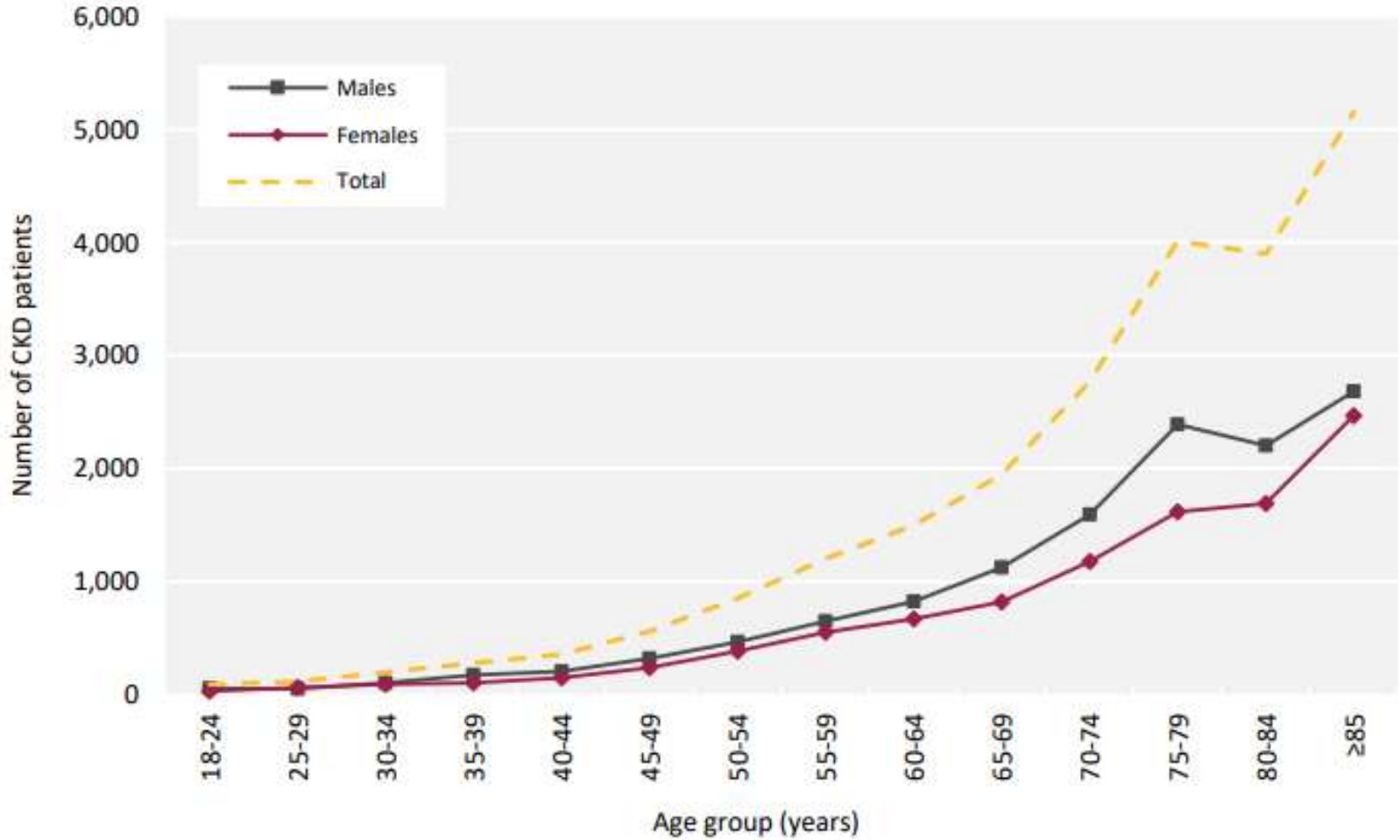
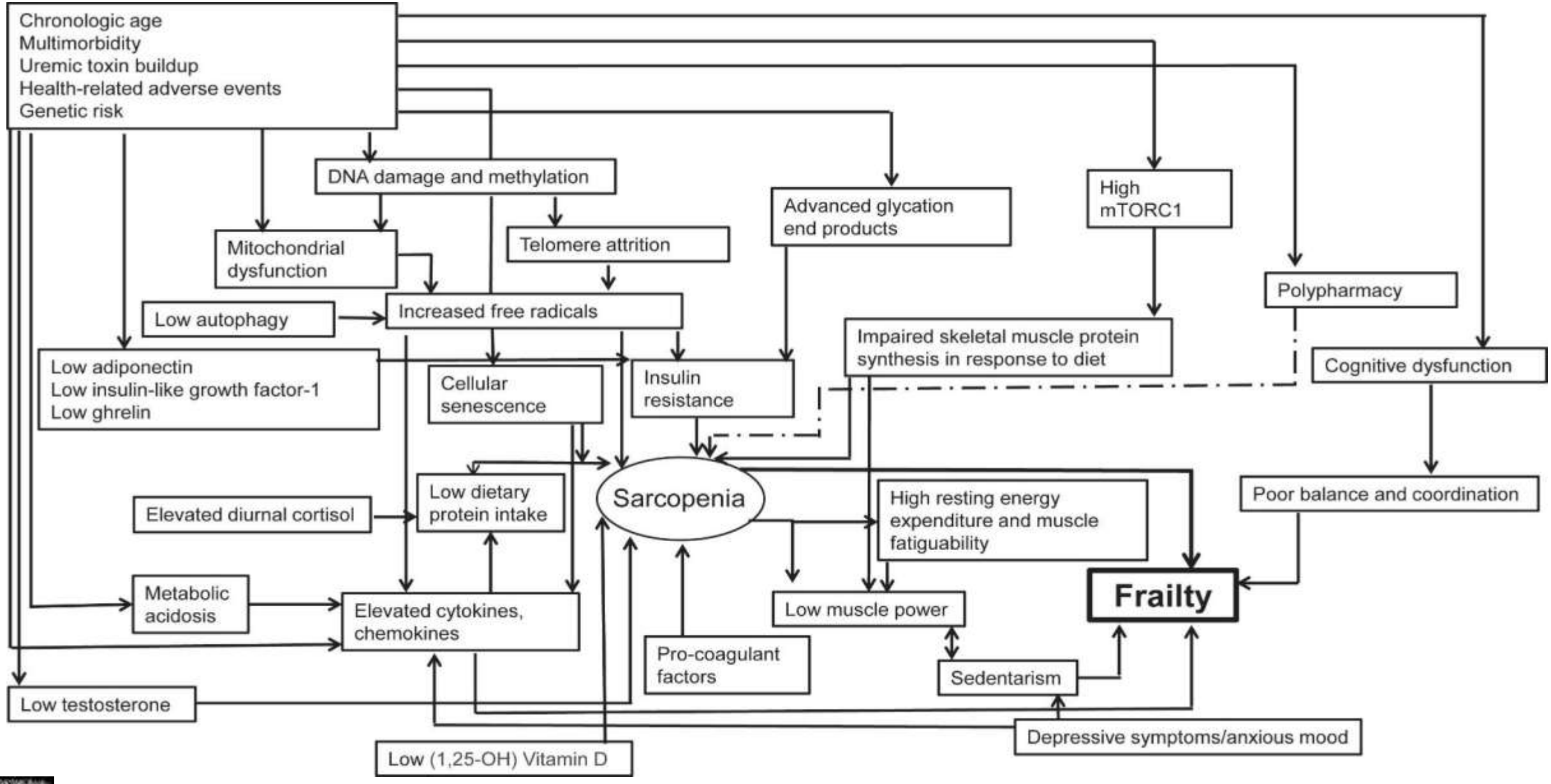


Figure 1.2 Number of adult patients prevalent to CKD stages G4 and 5 on 31/12/2022 by age group and sex

Frailty in Nephrology Populations

Population	Prevalence	No. of Studies
Advanced CKD (“pre-dialysis”)	34%	24
Dialysis	40%	84
Kidney Transplant Recipients	21%	11
Kidney Transplant Candidates	17%	14

BMC Nephrol. 2023 Sep 3;24(1):258
Transplant Direct. 2021 May 18;7(6):e701



American Journal of Kidney Diseases 2025 8589-103DOI: (10.1053/j.ajkd.2024.04.018)

Frailty and Outcomes

CKD

Greater risk of death

Greater risk of starting dialysis

Worse symptom burden

Worse HRQoL

Frailty status can change over time (improve or worsen)

Dialysis

Greater risk of death, hospitalisation & falls

Worse cognitive function

Prolonged post-dialysis recovery

Worse HRQoL, anxiety, depression and illness intrusion

Greater risk of worsening functional status and increased caregiver burden

Frailty status can change over time (improve or worsen)

Transplantation

Increased risk of DGF, longer LoS, readmission & mortality

May be improvements in physiological reserve after KT

Am J Kidney Dis. 2012 Dec;60(6):912-21
Arch Intern Med. 2012 Jul 23;172(14):1071-7
BMC Nephrol. 2013 Oct 16:14:224
Arch Surg. 2012 Feb;147(2):190-3
Ann Surg. 2017 Dec;266(6):1084-1090

BMC Nephrol. 2020 Sep 23;21(1):411
Clin Kidney J. 2019 Apr 30;13(1):85-94
J Am Geriatr Soc. 2015 Oct;63(10):2152-7
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Kidney360. 2021 Jul 13;2(9):1455-1462

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Clin J Am Soc Nephrol. 2015 Dec 7;10(12):2181-9
Clin J Am Soc Nephrol. 2017 Jul 7;12(7):1100-1108
Am J Transplant. 2015 Jan;15(1):149-54
J Cachexia Sarcopenia Muscle. 2022 Oct;13(5):2426-2435

Clin J Am Soc Nephrol. 2021 Apr 7;16(4):552-559
Kidney360. 2022 Jul 19;3(9):1566-1577
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J Nephrol. 2021 Aug;34(4):1215-1224

Clin J Am Soc Nephrol. 2016 Mar 7; 11(3): 423–430
Clin Kidney J. 2018 Jul 20;12(2):262-268
Am J Kidney Dis. 2023 Sep 17:S0272-6386(23)00801-6
Clin J Am Soc Nephrol. 2019 Jul 5;14(7):1039-1047
BMJ Open. 2024 Oct 10;14(10):e087189

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A choice experiment of older patients' preferences for kidney failure treatments.

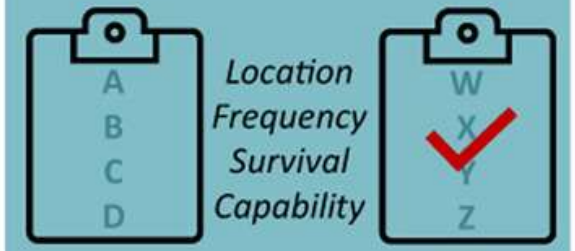
We aimed to quantify the treatment preferences of older UK adults with advanced chronic kidney disease deciding between treatments for kidney failure.

- UK patients
- Aged >65
- eGFR ≤20mls/min/1.73m2
- Under nephrology care
- Not dialysed or transplanted

Choice experiment developed using qualitative techniques:

'A specialised survey to quantify preferences for kidney failure treatments'

- Paper administration
- 327 participants
- Median age 77 years
- Median eGFR 14mls/min/1.73m2
- Participants selected from pairs of alternative treatments, differing in…



Overall, participants…

Were willing to relinquish 13% absolute survival benefit at two years to prevent a halving of their ability to do the things that were important to them.

Required a 16% increase in absolute survival at two years to accept a three-times a week hospital-based dialysis regimen.

Had greater preferences for survival if partnered, but lesser preferences for survival if they expected to lose their ability to do the things that were important to them.

Fell into three groups with disparate preferences for location of care and willingness to trade-off survival to preserve their ability to do. However, only planned treatment predicted which group a person was likely to be in.

Hole et al., 2024
barnaby.hole@bristol.ac.uk

Living longer is not the sole determinant of older peoples' decisions: patients favour higher chances of survival, but only if their capability is preserved and the location and frequency of care are acceptable.

NIHR | National Institute for Health and Care Research

KidnEy olDer persoN Assessment (EDNA) Focus Group Research

What matters to you when planning future care and treatments?

1. **Enabling meaningful life participation**
2. Patient/carer-centred planning and choices
3. Timely, tailored information and education
4. Flow of care and joined up working
5. Future care and choices
6. Carer experience and support

How Can Frailty Assessment Transform Advanced Kidney Care?

1. Help healthcare professionals, patients and caregivers make **informed kidney specific decisions**

2. Provides an opportunity to **consider targeted interventions** to reduce risk of adverse health outcomes, *e.g. exercise, occupational therapy, psychological support etc*

3. Prompt **timely (advance) care planning discussions** so that future management is aligned with patient goals, values and preferences

Relation between different frailty measures and physical function and their association with dialysis modality choice (home based vs facility based) and all-cause mortality in patients with advanced CKD

CJASN
Clinical Journal of the American Society of Nephrology

PROSPECTIVE

Canadian Frailty Observation and Interventions Trial (CanFIT)

Advanced CKD

Demographics
Comorbidities
Laboratory results

Frailty Assessment Tools
Objective
Subjective
Physical Function

n = 603

Frailty Assessment Tool	Prevalence of Frailty	Outcomes
Fried Frailty Criteria *Objective*	**34%**	**2-fold** higher risk of all-cause mortality
Short Physical Performance Battery *Physical function*	**55%**	
Physician Impression *Subjective*	**44%**	**3 to 4x** more likely to choose facility based dialysis
Nurse Impression *Subjective*	**36%**	

1455 days | **227** Kidney Failure Dialysis | **226** died

Conclusion Objective measures (Frailty and SPPB) were more strongly associated with mortality, and subjective measures of frailty were more strongly associated with dialysis modality choice.

Ranveer S. Brar, Reid H. Whitlock, Paul V.J Komenda, et al. ***Provider Perception of Frailty Is Associated with Dialysis Decision Making in Patients with Advanced CKD***. CJASN doi: 10.2215/CJN.12480720. **Visual Abstract by Edgar Lerma, MD, FASN**

NIHR | National Institute for Health and Care Research

KidnEy olDer persoN Assessment (EDNA) Survey

- To understand assessments and care for older people living with advanced CKD at UK kidney units

- 47/67 (70%) kidney units responded

- 37/47 (79%) assessed frailty but **only 25/47 (53%) used a validated frailty assessment tool**

- 39/46 (85%) reported geriatric impairments *sometimes*, *usually* or *always* help kidney treatment decisions

Geriatric Impairments & Outcomes

Table 5. Cumulative incidence and predictive association of latent class membership with outcomes

	1-year Cumulative incidence (%)	5-year	10-year	Multivariable model HR/OR (95% CI)	C-statistics[a]
Mortality					
High-burden class	2.71	19.32	42.42	2.09 (1.56, 2.78)***	0.70
Low-burden class	0.88	8.60	21.26	Reference	
Dialysis initiation					
High-burden class	2.77	18.00	30.02	1.63 (1.06, 2.52)*	0.86
Low-burden class	1.24	7.07	13.70	Reference	
Hospitalization					
High-burden class	–	–	–	2.00 (1.38, 2.88)***	0.66
Low-burden class	–	–	–	Reference	

All multivariable models were adjusted for age, sex, race, eGFR, smoking status, and BMI. Age, eGFR, and BMI were continuou
[a] C-stsatistics were calculated from models that used the most-likely posterior class membership as the exposure variable. Hig
geriatric conditions class ($n = 295$); low-burden of geriatric conditions class ($n = 569$). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

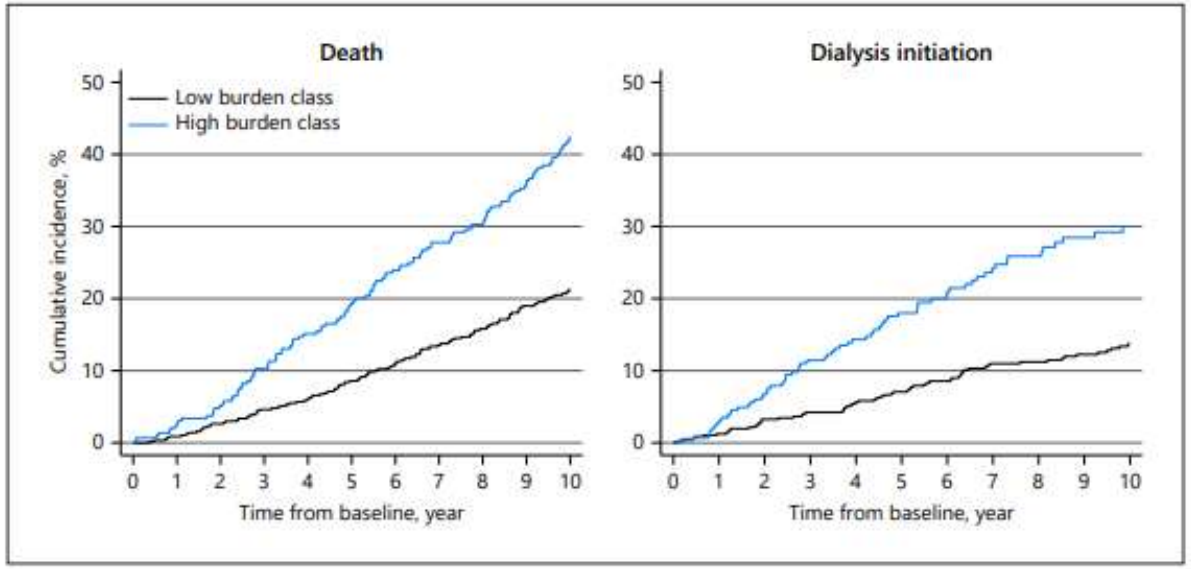
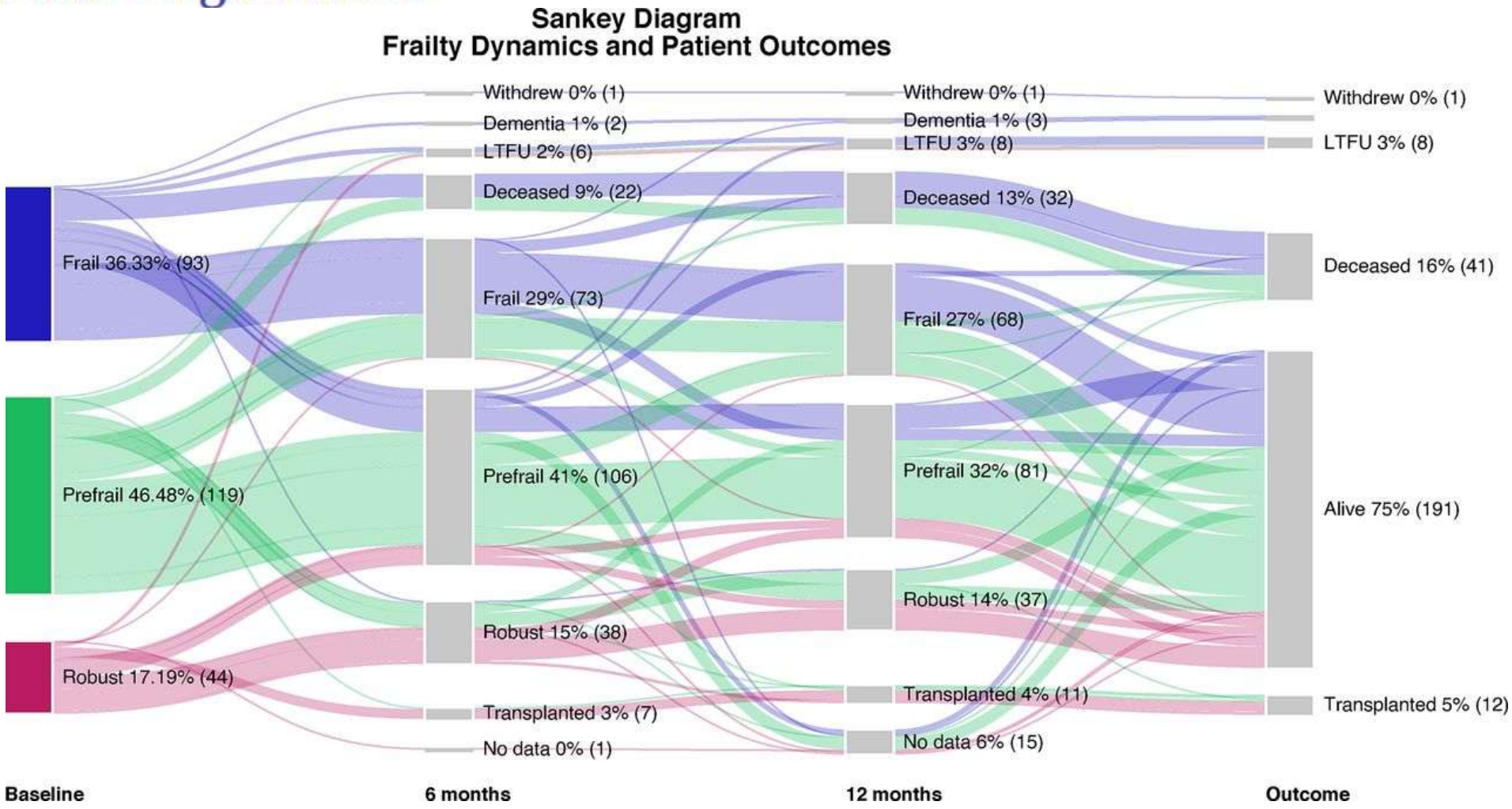


Fig. 2. Cumulative incidence of mortality and dialysis initiation by latent class membership. The curves were truncated at year 10 due to the high loss to follow-up thereafter.

Am J Nephrol. 2023;53(11-12):826-838

Longitudinal frailty assessment in the prediction of survival among patients with advanced chronic kidney disease: a prospective observational single-centre cohort study

BMJ Open



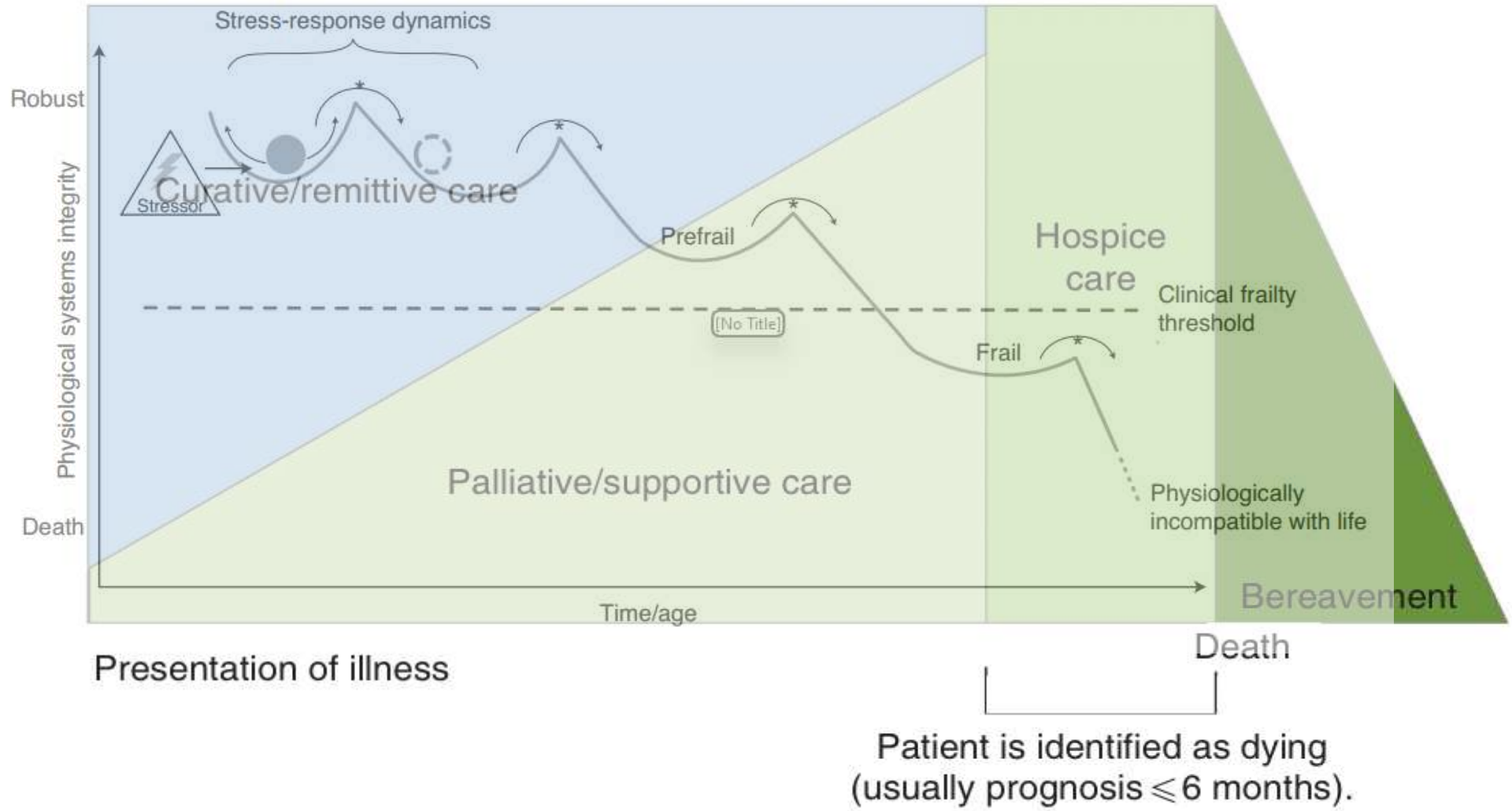
Alice Kennard et al. BMJ Open 2024;14:e087189

Home-based exercise for people living with frailty and chronic kidney disease: A mixed-methods pilot randomised controlled trial

Andrew C. Nixon[1,2,3], Theodoros M. Bampouras[4,5]*, Helen J. Gooch[3,6], Hannah M. L. Young[7,8], Kenneth W. Finlayson[9], Neil Pendleton[10], Sandip Mitra[11,12,13], Mark E. Brady[1], Ajay P. Dhaygude[1]

- 12-week home-based exercise programme
- Safe & feasible
- Participants reported improved fitness, balance, strength, well-being, energy levels & confidence
- Preliminary evidence that home-based exercise may be beneficial for people living with frailty and advanced CKD

PLoS One. 2021 Jul 1;16(7):e0251652



Conceptual framework for supportive care in CKD

Kidney International (2015) 88, 447–459

Summary

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- Discuss how frailty assessment can transform AKC

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