What are frailty instruments for?

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Abstract

Frailty is measured to understand its nature and biology, to aid diagnosis and care planning, to measure outcomes and to stratify risk. Such goals oblige two types of frailty measures — for screening and for assessment — and recognition that not all measures will serve all purposes. When the goal is broad identification of people at risk, a dichotomised approach (frailty is present or absent) is appropriate. If, however, the degree of risk varies, strategies to test grades of frailty will be required. Frailty measures should be implemented and evaluated in relation to the goal for their use.

Keywords: frailty, ageing, risk stratification, care planning, older people

The concept of frailty (that some are at greater risk of adverse health outcomes compared with others of the same age) is increasingly accepted [1], even as operationalisation remains disputed [2–4]. With dozens of frailty tools now extant, we ask: what are frailty instruments for?

Four goals emerge. One is to understand frailty itself, including its biology [1]. A second is diagnosis and care planning: this goal obliges (for geriatricians) a comprehensive geriatric assessment (CGA). Frailty instruments can also serve as outcome measures. Unsurprisingly, risk stratification is a prominent goal for both screening and assessment, especially with frailty tools used by non-geriatricians. These motivations, though clearly complimentary, cannot all be conflated.

Frailty assessment: capturing grades of frailty

Understanding frailty, planning care, and measuring change each benefit from conceptualising frailty as a state. It is not all or none; grades of frailty make a difference. Still, many studies classify people simply as frail or non-frail. Sometimes this is useful—e.g. comparing frailty prevalence across samples. Still, important information gets lost. Many clinical decisions, sometimes including screening as well as assessment, require greater precision than frail/non-frail.

Although frailty screening instruments need to be brief, it is not always wise to dichotomise. In general practice, the supposed pragmatism of a one-question screen for frailty is not certain: much of the next step (of assessment) can be accomplished by family physicians, especially if electronic health records assemble enough of the right information [5].

For specialised geriatric care, grading the degree of frailty, and its clinical consequences, is readily accomplished by means of a frailty index based on a CGA. Even so, there is more to geriatric assessment than assessment: knowing what is wrong must be coupled with a care plan of what to do and then doing it.

Outcomes: which ones matter?

Change in the frailty state can be useful, as it captures both the high dimensionality of frailty and the large range of interventions in which CGA consists. Even so, beneficial outcomes do not always reduce mortality, or even improve function—most notably, where the goal turns out to be end of life care. A quantified frailty assessment can complement individualised outcome measurement in evaluating the impact of specialised geriatric interventions. Future studies also need to evaluate the responsiveness of frailty instruments to assay whether they make good outcome measures.
This is less often done, although in general, changes in frailty scales seem to be orderly.

Mortality differences are important, and many reports evaluate how frailty instruments predict mortality. This is at least convenient, in that death is relevant, non-arbitrary and dichotomous. In hospital samples, some recent reports have concluded that most frailty instruments are poor predictors of adverse health outcomes [6]. Such conclusions often are based on receiving operating characteristic (ROC) curves, and their calculated area under the curve (AUC), with estimates typically running between 0.55 and 0.75.

ROC curves assume that the outcome of interest is directly tied to what the instrument is measuring. This is not unproblematic with respect to frailty and mortality. Some people who are severely frail can survive in highly protective environments whereas some non-frail people will die, especially as the prediction interval increases from baseline (e.g. 5+ years). The AUC describes how well models can rank order cases and non-cases (e.g. survivors versus decedents). As AUCs rank order measures, they do not consider the distributions of the outcome, making problematic their use in population-based studies, where most people are at very low risk. In consequence of a low mortality rate, any frailty measure tested by death alone is unlikely to demonstrate the desired highly sensitive, highly specific signal. This can also be problematic (though perhaps less so) in a hospital environment, particularly one in which the mortality rate is low as a consequence of skilled care. AUC analyses have an important role, but they cannot bear the burden of predictive validity; other statistics, such as relative risk, are needed to complement the approach, especially if non-binary classifiers are being used.

Whichever approach is employed, it is important that the frailty enterprise not be reduced to predicting mortality. Other adverse outcomes need to be tested as being predicted by frailty instruments, including prolonged hospital stay, institutionalisation and development of syndromes such as delirium, falls, incontinence, immobility and social abandonment [1, 3].

### Implementing frailty assessment tools in clinical settings

A successful frailty instrument should be multidimensional, capture the gradient of frailty, serve well its purpose as screening or assessment tool, and be useful across contexts [7]. In addition, successful frailty instruments should show a dose–response relationship with various adverse outcomes. We need to get this right, as understanding the complexity of frailty has the ability to be transformative in medicine, if only in making the focus on the whole patient, and not just on the part that seems to be the most wrong.

Frailty assessment can help guide clinical decision-making, but some steps are needed prior to that. Four stages are recognised for establishing a prediction model in clinical practice: development, validation, impact analysis and implementation [8]. There is evidence about the first two: multiple studies report the development and validity of various frailty scales such as the index and the phenotype. Some attempts at validation have aimed to increase precision by reducing the number of item used to assess frailty. Such approaches often achieve shorter scales at the expense of interpretability, generalisability or loss of information that is clinically useful. In consequence, we see merit in the frailty index/deficit accumulation approach.

Also most reports are from community-dwelling older adults. Future studies should focus on validity and reliability in clinical settings and examine not just risk assessment, but also the role of frailty scales as outcome measures. Before widespread uptake can be recommended, we must examine how frailty assessment can impact cost–benefit, time/resource allocation and patient care, especially in settings in which the benefit of CGA has not been established.

More detailed frailty evaluation in general practice might be a place to start. It can lay the groundwork for preventive interventions (vaccination, exercise, falls reduction schemes [9]) and for care planning that is centred on patients’ and carers’ goals [10]. Frailty evaluation can help us better understand ageing: systems biology and geriatrics can prove a powerful combination. Aiming to advance both the biology of ageing and the care of frail older adults oblige us to take the broad view of what frailty instruments are for.

### Key points

- Frailty instruments can help with care planning, outcome measurement and risk stratification.
- For many of these purposes, grades of frailty matter.
- Frailty measurement should not be reduced to predicting mortality.
- There are outcomes that many view as worse than dying, which should also be predicted.
- Further studies are needed before widespread uptake of frailty assessments in clinical settings can be recommended.

### References


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Improving recruitment of older people to clinical trials: use of the cohort multiple randomised controlled trial design

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Abstract

There is widespread evidence of under-recruitment of older people to research studies, notably randomised controlled trials of interventions. Study exclusion criteria, ethical dilemmas, patient preference, risk of bias and challenges for treatment comparisons are particular problems faced by researchers. This article describes how more widespread use of the cohort multiple randomised controlled trial (cmRCT) design in ageing research may help address many of these problems. The original key features of the cmRCT design are a large observational cohort of people with the condition of interest (e.g. frailty) with regular measurement of outcomes for the whole cohort. For each RCT eligible patients are identified and a random selection offered the trial intervention; their outcomes are compared with those eligible patients not offered the intervention. Relevant assents are obtained at baseline to enable future involvement in a range of potential trials. Where possible, the follow-up schedule is aligned with the key time points for assessment in future trials and includes the key baseline descriptors, and primary and secondary outcomes. The cmRCT approach also enables detailed observational and qualitative research for the chosen condition of interest, and might include the establishment of research biobanks to better align basic science, epidemiological, qualitative and clinical trial research.

Keywords: cmRCT, ageing, frailty, dementia, falls, older people

Background

There is widespread evidence of under-recruitment of older people to research studies, notably randomised controlled trials [1]. High participant exclusion and refusal rates are a major issue, and can be especially challenging in trials recruiting older people with frailty [1–3]. Ethical decisions, particularly in the presence of co-existing cognitive impairment, add further complexity. Such problems can result in underpowered trial results and contribute to poor generalisability—an issue that has held up adoption of new interventions by clinicians caring for older people.

Concerns with information and consent are the most common reasons given for not participating in clinical trials