



# Examining frailty and multimorbidity in nursing research of older emergency department patients

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Emergency nurses and departments are currently challenged to adapt traditional models of care to better accommodate the complex physical and psychosocial needs of the growing geriatric population (American College of Emergency Physicians et al., 2014; Bullard et al., 2017). Health service demand and emergency department (ED) use is projected to parallel population ageing, considering geriatric syndromes drive patient-important health outcomes and service use in older adults (Costa et al., 2014; Mowbray, Zargoush, et al., 2020). Geriatric syndromes are physical or psychosocial conditions with complex and multifaceted etiologies frequently found in older persons, including functional decline, cognitive impairment, and frailty (Inouye et al., 2007).

Geriatric syndromes are infrequently assessed or documented by emergency healthcare providers and researchers (Carpenter, Griffey, et al., 2011), yielding a biased and limited understanding of the patient and system factors that influence patient-important outcomes in older ED patients. Worse patient outcomes and a greater risk for under-triage in older ED cohorts (Aminzadeh & Dalziel, 2002; Platts-Mills et al., 2010) underscore the need for additional geriatric and vulnerability assessment to accurately triage, assess and care for older adults seeking emergency care (Carpenter & Mooijaart, 2020).

Frailty and multimorbidity are two succinct and informative geriatric-sensitive measures to consider in clinical and academic settings. These measures can be screened for within minutes and provide foreknowledge of patient complexity and vulnerability to inform clinical decision-making (Carpenter, Bassett, et al., 2011; Elliott et al., 2017, 2020; Sasseville et al., 2019). Policymakers and health researchers value and benefit from the assessment and documentation of these measures, as they inform policy development and population-level health system planning (Griffith et al., 2018; Muscedere et al., 2016).

Frailty is a multidimensional syndrome characterized by a heightened vulnerability to adverse health events and a diminished physiologic reserve inhibiting homeostatic recovery from stressors (Fried et al., 2001; Rockwood et al., 2005). Age has proven to be a strong predictor of health service use and outcomes in the general population. However, in older ED patients, the prognostic value of age is limited and likely confounded by frailty and geriatric complexity (Mowbray, Brousseau, et al., 2020). Frailty is most commonly measured using one of two methods, a health deficit accumulation index or a phenotypic model.

Health deficit accumulation indices estimate frailty by dividing the current number of health deficits over all possible health deficits measured and presented as decimals (Rockwood et al., 2005; Rockwood & Mitnitski, 2012). On the other hand, phenotypic measurements determine frailty by screening for specific assessment indicators or formal support needs, like assistance with walking (Fried et al., 2001). Phenotypic models are more commonly used in clinical practice settings, likely due to their ease of implementation. However, health deficit accumulation models, like the ED frailty index (Brousseau et al., 2018), may be better suited for research purposes, as they allow investigators to examine the full granularity of data. Additionally, when utilizing a health deficit accumulation model to operationalize frailty, it is recommended that nursing and emergency researchers leave the index in its natural continuous state when possible to avoid (i) a loss of information, (ii) an increased type-one error rate (i.e., false-positive findings), and (iii) the arbitrary creation of a dichotomy in the data (e.g., frail versus not frailty), which often results in decreased statistical power and generalizability of study findings (Altman & Royston, 2006; Austin & Brunner, 2004).

Multimorbidity is prevalent in older persons and is defined as the coexistence of two or more chronic diseases (Marengoni et al., 2011). Like frailty, multimorbidity is strongly associated with

health service use and outcomes in older persons (Marengoni et al., 2011). While these conditions often exist in parallel, their measures can diverge significantly, suggesting that they offer unique prognostic value when determining patient outcomes and clinical therapies. For example, a patient with hypertension, hypercholesterolemia, and gout, would be classified as multimorbid. However, it is unlikely they would be categorized as more frail or vulnerable than patients with stage III congestive heart failure as the sole diagnosis. This illustration suggests that frailty is influenced more by the severity and interaction of chronic health conditions than the count.

Information on patient diagnoses can be found in virtually all medical and administrative records, facilitating retrospective calculation of multimorbid status. This likely explains why studies are more prone to evaluate and report associations with multimorbidity in older persons (Griffith et al., 2018). On the other hand, frailty often requires the direct assessment of geriatric syndromes and functional capacity by a nurse or healthcare provider in the ED to support valid measurement (Hubbard & Story, 2014). Despite strong recommendations for frailty and vulnerability screening in the ED by the American College of Emergency Physicians (ACEP), the American Geriatric Society (AGS), the Emergency Nursing Association (ENA), and the Society for Academic Emergency Medicine (SAEM) (American College of Emergency Physicians et al., 2014), few emergency departments or institutions have adopted this practice as a standard of care. A lack of data and challenges in the retrospective calculation are barriers that may explain why frailty is often missing from ageing and emergency research.

The examination of frailty is essential to facilitate accurate statistical estimates and a contextualized understanding of the patient profile and ED-specific outcomes. Where possible, nursing and emergency researchers focused on geriatric care should aim to collect or analyze data on patient frailty, using one of the many

valid instruments available, such as the Clinical Frailty Scale (Rockwood et al., 2005; Theou et al., 2021), Fried's phenotypic model (Fried et al., 2001), or the ED Frailty Index (Brousseau et al., 2018), to name a few. If interested in the unique prognostic value of frailty or multimorbidity, uncontaminated measures are needed to prevent overfit statistical models and poor external validity (Theou & Searle, 2018). In other words, it is essential to ensure that the selected frailty measure does not take into account co-morbid status and vice versa. The author offers an additional word of caution against frailty measures that base calculations on a single assessment, diagnosis, or laboratory value (e.g., grip strength or sarcopenia), as these measures do not capture the multidimensional nature of frailty.

Emergency nurses and researchers should also avoid the use of frailty scales that leverage documented diagnoses alone to determine frailty status, such as the Hospital Frailty Risk Score (Gilbert et al., 2018). While diagnoses are a convenient metric to leverage, there are concerns in administrative and hospital data regarding the accuracy of diagnostic and procedural codes (O'Malley et al., 2005). Certain diagnostic codes and procedures are directly linked with quality metrics, billing and other clinician-important outcomes and, therefore, are more accurately documented. Additionally, frailty and other geriatric syndromes are less commonly assessed and likely underrepresented in medical records, highlighting a potential selection bias for retrospective data abstraction.

In summary, emergency nurses and researchers should aim to assess, or measure, frailty and multimorbidity in their clinical and academic practice, as these measures have exceptional prognostic value. Age alone is an uninformative characteristic in older persons. As the largest body of emergency clinicians, nurses provide the majority of direct bedside care and documentation for older ED patients, highlighting a unique opportunity for emergency nursing research and leadership moving forward.

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