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Review Article

Should we screen for frailty in primary care settings? A fresh perspective on the frailty evidence base: A narrative review

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ABSTRACT

With older adults living longer, health service providers have increasingly turned their attention towards frailty and its significant consequences for health and well-being. Consequently, frailty screening has gained momentum as a possible health policy answer to the question of what can be done to prevent frailty's onset and progression. However, who should be screened for frailty, where and when remains a subject of extensive debate. The purpose of this narrative review is to explore the dimensions of this question with reference to Wilson and Jungner's time-tested and widely accepted principles for acceptable screening within community settings. Although the balance of the emerging evidence to support frailty screening is promising, significant gaps in the evidence base remain. Consequently, when assessed against Wilson and Jungner's principles, extensive population screening does not appear to be supported by the evidence. However, screening for the purpose of case-finding may prove useful among older adults.

1. Introduction

Frailty has assumed increasing importance as a public health concern for policy-makers and practitioners worldwide in recent years (Boeckxstaens and De Graaf, 2011; Mur-Veeman et al., 2008; Nicholson et al., 2012; Cesari et al., 2016; Buckinx et al., 2015). Frail older adults currently interact with the health system in a wide variety of settings (Turner and Clegg, 2014), with hospitals, long-term care facilities and specialist geriatric units traditionally assuming responsibility for management. However, treatment within these settings is necessarily focused on acute rather than preventive care. Given increasing pressure on the health care system, screening and management within the community to proactively identify frailty has been advanced as a rational solution (Turner and Clegg, 2014). In particular, general practice is often identified as one of the most appropriate settings for frailty screening within the community (Sutorius et al., 2016), given the relatively frequent presentation of older adults to primary care (Hoogendijk et al., 2012).

Frailty assessment is widely considered to be a useful means of risk stratification within the diverse population of older adults (Chen et al., 2014). Consequently, an expert consensus has called for widespread screening of all older adults for frailty in recent years (Morley et al., 2013). In contrast, some have argued against taking action on screening until the evidence base improves (Sourial et al., 2013). This inconsistency is unfolding against the context of a rapidly ageing population worldwide (United Nations, 2017), leading some to conclude that “we cannot wait” for research to catch up with clinical practice (Vellas et al., 2012). Others have argued for a “screening as case-finding” approach (Turner and Clegg, 2014; Martin-Lesende et al., 2015), believing that frail older people may be falling through the gaps of frailty identification and management. A recent initiative reflecting this kind of approach is the United Kingdom's “GP contract” policy initiative requiring general practitioners (GPs) to identify and manage all older patients (aged 65+ years) who are moderately to severely frail (Chapman and Thomas, 2017). Meanwhile, the volume of frailty research continues to grow rapidly in size and complexity, frustrating attempts to arrive at

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Table 1
Wilson and Jungner principles for disease screening.

- (1) The condition sought should be an important health problem.
- (2) There should be an accepted treatment for patients with recognized disease.
- (3) Facilities for diagnosis and treatment should be available.
- (4) There should be a recognizable latent or early symptomatic stage.
- (5) There should be a suitable test or examination.
- (6) The test should be acceptable to the population.
- (7) The natural history of the condition, including development from latent to declared disease, should be adequately understood.
- (8) There should be an agreed policy on whom to treat as patients.
- (9) The cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.
- (10) Case-finding should be a continuing process and not a “once and for all” project.

meaningful consensus over a practical way forward. Now more than ever, health service providers and policy makers need objective criteria to formally assess the appropriateness of frailty screening in primary care settings.

Since the 1960s, the principles identified by Wilson and Jungner (Wilson and Jungner, 1968) (Table 1) have served as the standard for determining the appropriateness of screening (Andermann et al., 2008). However, to our knowledge, frailty screening has not been explicitly assessed against their framework. In part, this may be due to the fact that frailty is commonly characterised as a syndrome (Morley et al., 2013; Byard, 2015; Chen et al., 2016; Ferrucci et al., 2003; D et al., 2017; Ahmed et al., 2007), rather than as a disease per se. Whereas a syndrome can be defined as a group of “symptoms and signs definable without necessarily implying knowledge of etiology, pathology or a clear course of treatment”, a disease usually signifies that the cause is known (Merchant et al., 1995). Although understanding of the etiology of frailty is increasing, much still remains unexplained (Ahmed et al., 2007; Fulop et al., 2010), and so the syndrome characterisation seems appropriate.

A related question arises: is it appropriate then to apply Wilson and Jungner's criteria to a syndrome rather than a disease? Further, given the established link between frailty and increased risk of negative outcomes (Vermeiren et al., 2016), is it appropriate to apply the criteria to a risk factor rather than a disease? In both cases, numerous precedents within public health research indicate that it is. Wilson and Jungner's criteria have previously been applied to assess the appropriateness of screening for syndromes, disorders and risk factors as diverse as Lynch syndrome (Cragun et al., 2015), childhood eye disorders (Jarvis et al., 1990), *Coxiella burnetii* infection (Munster et al., 2012), congenital cytomegalovirus infection (de Vries et al., 2011) and TP53 mutation (Isabel et al., 2009), among many others. Lastly, the widespread frequency in practice of screening for risk factors and syndromes, rather than just diseases per se, would also seem to justify including frailty. Thus, the aim of this narrative review is threefold: (1) to synthesise and interpret the current frailty evidence against Wilson and Jungner's principles within the context of primary care; (2) to inform policy and practice; (3) and to highlight any evidence gaps.

2. Methods

2.1. Frailty definition

Frailty is frequently characterised as a biological syndrome within the clinical literature (Clegg et al., 2013). It features “decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems, and causing vulnerability to adverse outcomes” (Fried et al., 2001):M146. There are two key approaches to defining frailty. The first is the Frailty Phenotype (FP), a physical frailty model incorporating “involuntary weight loss, exhaustion, slow gait speed, poor handgrip strength, and sedentary behaviour” (Fried et al.,

2001; Cesari et al., 2014). The second is the Frailty Index (FI), a continuous deficit accumulation model (Rockwood et al., 2005). In this review, evidence is based only on a phenotypic definition. The FP has been selected due to its universally agreed cut-off point for defining frailty and its broad application within numerous studies. However, we acknowledge this choice as a limitation given that the FI has been previously applied in a large number of studies (for example, studies applying an electronic FI within primary care (Clegg et al., 2016; Ambagtsheer et al., 2018)). Lastly, Wilson and Jungner's definition of screening has been adopted for the purpose of this study: “the presumptive identification of unrecognized disease or defect by the application of tests, examinations or other procedures which can be applied rapidly.” (Wilson and Jungner, 1968)

2.2. Search strategy

A narrative review of the literature was conducted between September 2017 and January 2018. The majority of studies included were identified through a broad search of the PubMed database using a combination of the key search terms “frailty” AND “phenotype” (plus additional terms specific to individual principles where required). The search was restricted to studies published between 2013 and 2018 and conducted in community settings. Studies prioritised by the research team for selection included systematic reviews and meta-analyses, randomized controlled trials and where appropriate, quantitative and qualitative observational studies of direct relevance to individual Wilson and Jungner principles. The references of included studies were selectively searched, as well as including relevant earlier studies based on prior knowledge where appropriate. Relevant pros and cons for frailty screening were identified based on the literature, and gaps identified where evidence was not yet available or was inconclusive. The review was not intended to be exhaustive but rather to highlight key evidence illustrating individual principles.

3. Results

Arguments for and against frailty screening against each of Wilson and Jungner's principles are summarised in Fig. 1. The pros and cons of screening as presented in the diagram are a descriptive summary against each principle.

3.1. Principle 1: the condition sought should be an important health problem

Frailty is highly prevalent among older people, although debate continues as to the exact rate. The strongest evidence stems from a meta-analysis suggesting a frailty prevalence rate of 9.9% (based on FP criteria) among community-dwelling older adults aged 65 years and over (95% CI = 9.6–10.2%; 15 studies; 44,894 participants) (Collard et al., 2012). Assuming 1.5 billion persons aged 65 years and over worldwide by 2050 (Suzman and Beard, 2011), as many as 148.5 million community-dwelling older adults may be impacted by frailty over the next 35 years, with the rate among the institutionalized population higher again (González-Vaca et al., 2014). These figures certainly imply a health problem worthy of public health attention. However, Wilson and Jungner suggest that an equally critical consideration should be the consequences of the condition for individuals and communities (Wilson and Jungner, 1968). On this count, frailty is widely recognized to be associated with a range of adverse outcomes (Turner and Clegg, 2014; Vermeiren et al., 2016; Fried et al., 2001; Dent et al., 2016). For example, a recent meta-analysis based on 31 studies (including both FP and FI definitions of frailty) concluded that frailty brings a significantly elevated risk of falls and fractures (1.2- to 2.8-fold), activity limitation (1.6- to 2.0-fold), hospitalization (1.2- to 1.8-fold); physical limitation (1.5- to 2.6-fold) and mortality (1.8- to 2.3-fold) (Vermeiren et al., 2016).

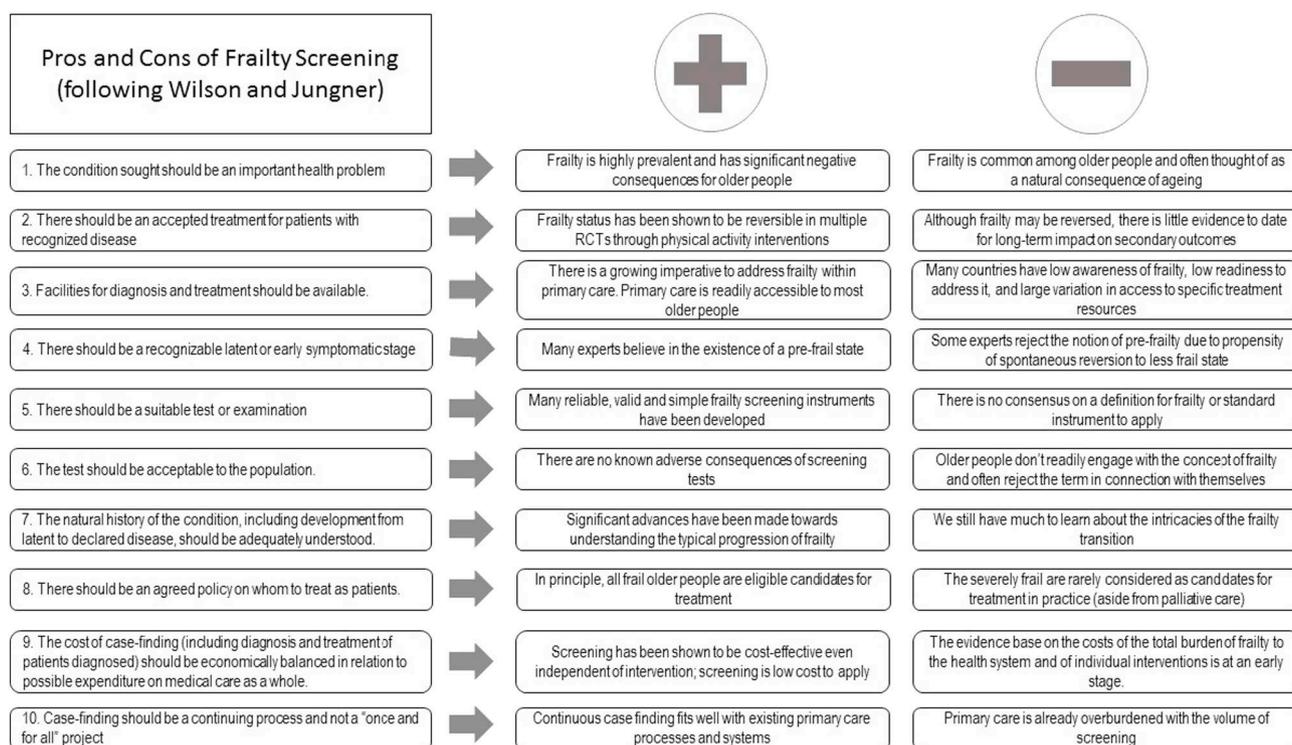


Fig. 1. Pros and cons of frailty screening against the Wilson and Jungner principles.

3.2. Principle 2: there should be an accepted treatment for patients with recognized disease

Frailty is potentially reversible and therefore likely to be treatable among community-dwelling older adults (Cameron et al., 2013; Cesari et al., 2015; Kim et al., 2015; Li et al., 2010; Ng et al., 2015; Tarazona-Santabalbina et al., 2016). In treating frailty, it should be recognized that not all older adults may respond to treatment equally, so the balance between possible benefits and potential harms must be considered. Currently, the acute care system most commonly addresses frailty, largely through crisis management of geriatric syndromes (Turner and Clegg, 2014). Within the acute sector, orthogeriatric models of care have been effective in improving outcomes (Inouye et al., 2000). However, there is increasing global recognition of the need to shift health system responses for older people away from crisis management towards proactive, person-centred, integrated primary and community care (Turner and Clegg, 2014; World Health Organization, 2015). Nevertheless, primary care providers will need to continue to work in tandem with others, including specialist services, in order to optimise frailty treatment.

Recent clinical guidelines and consensus statements have emphasized physical activity, including a resistance training component, as a critical means of preserving function in frail adults, even among the oldest old (Morley et al., 2013; Dent et al., 2017). However, the continued usage of multiple frailty definitions (Lozano-Montoya et al., 2017) along with heterogeneity in the design of the interventions tends to make conclusive interpretation challenging. Of six identified RCTs explicitly adopting FP criteria (Cameron et al., 2013; Cesari et al., 2015; Kim et al., 2015; Li et al., 2010; Ng et al., 2015; Tarazona-Santabalbina et al., 2016), five demonstrated a statistically significant reduction in the frailty level of the intervention group, either through a reduction in the prevalence of frailty or in the number of frailty criteria observed. Poor adherence to the treatment program was identified as a potential complicating factor (Kim et al., 2015; Li et al., 2010). In addition, the specific intervention used varied between studies. However, typical elements were at least moderate intensity (targeted at between 12 and

14 on the Borg scale); between 2 and 5 sessions of 45–60 min weekly and multicomponent (combining strength, aerobic, flexibility and balance components). These results are generally consistent with both recent clinical guidelines (Dent et al., 2017) and an umbrella review incorporating 58 RCTs (although including many studies with non-FP definitions of frailty) (Jadczak et al., 2017). It is important to note that while physical activity programs generally have been successful in reducing frailty itself, these improvements may not necessarily reduce other outcomes related to frailty (Cesari et al., 2015).

In addition to physical activity programs, treating other factors such as polypharmacy, fatigue, unintentional weight loss and vitamin D deficiencies are also recommended where appropriate (Morley et al., 2013; Dent et al., 2017). However, more robust research is needed to ascertain the effects of frailty interventions on health and well-being in the longer term before it can be said that a widely accepted treatment for frailty exists.

3.3. Principle 3: facilities for diagnosis and treatment should be available

Despite the growing imperative to address frailty within community settings, significant barriers to screening, diagnosis and treatment of frailty are evident. These include low public awareness of frailty in some societies (Sacha et al., 2017), a continued focus on disease-specific rather than holistic practices (Turner and Clegg, 2014), lack of a standard definition for frailty (Dent et al., 2016), unclear treatment pathways (Theou and Rockwood, 2012) and systemic access issues including availability and affordability of care (Khanassov et al., 2016). The nature and extent of these barriers vary by setting and will only be addressed by reform across the health system (Lim et al., 2017). Government policy offers one mechanism to drive change, as has been demonstrated recently in the UK (Chapman and Thomas, 2017), Taiwan (Tsai et al., 2018) and Singapore (Lim et al., 2017). Further, given the significant numbers of older adults projected to experience frailty during their lifetime, one additional and likely cost-effective opportunity may lie in the relatively unexplored approach of frailty self-management. As is currently done with diabetes, strategies such as self-

management education and peer support programs may become important components of frailty care in the future. However, these topics are currently under-researched within the frailty literature.

3.4. Principle 4: there should be a recognizable latent or early symptomatic stage

Previous research has suggested the existence of a state termed “pre-frailty”, thought to be an intermediate stage between non-frail and frail (Fried et al., 2001; Fairhall et al., 2015a). Pre-frailty was defined as the presence of one or two of five frailty criteria under the FP (Fried et al., 2001). The Cardiovascular Health Study (CHS) showed that pre-frail status doubled the risk of developing frailty over three years relative to non-frail status at baseline, and also significantly predicted adverse outcomes after three and seven years (Fried et al., 2001). Consideration of pre-frailty is important, as there are indications that the condition can be easily overlooked (Turner and Clegg, 2014; De Lepeleire et al., 2009), potentially resulting in irreversible disability and other deleterious outcomes (Vellas et al., 2013).

However, not all pre-frail older adults will progress to frailty. Frailty is a dynamic process, with several transitions between frailty states possible over an individual's lifetime (Gill et al., 2006). One community-based study showed that approximately one quarter (23.4%) of those who were pre-frail at baseline had improved to a robust state two years later (Lee et al., 2014). Other studies show similar improvements (Gill et al., 2006), although actual proportions vary. Given this tendency for spontaneous reversion, some experts have questioned whether the concept of pre-frailty impacts clinical decision-making sufficiently to justify its existence (Canevelli et al., 2017; Sloane and Cesari, 2018). This point is critical within the screening debate, as much screening is justified on an assumption of an early pre-disease state leading to later disease progression. Consequently, more research is needed analysing the mechanisms leading to transitions between states, and in particular to spontaneous frailty reversion.

3.5. Principle 5: there should be a suitable test or examination

General practitioners need simple and reliable instruments for identifying frailty (Clegg et al., 2013). Numerous frailty screening instruments have been developed for use with older populations (Dent et al., 2016; Clegg et al., 2015) and are readily available for implementation within most clinical settings (Dent et al., 2017). Instruments in common use include the FRAIL Scale (Morley et al., 2012), Gait Speed (Fritz and Lusardi, 2009), PRISMA-7 (Raiche et al., 2008), Groningen Frailty Indicator (Bielderman et al., 2013), Edmonton Frail Scale (Rolfson et al., 2006), Clinical Frailty Scale (Rockwood et al., 2005), Tilburg Frailty Index (Gobbens et al., 2010) and the Kihon Checklist (Sewo Sampaio et al., 2016), among others (Dent et al., 2016). However, these instruments vary widely with regard to diagnostic and predictive accuracy (Clegg et al., 2015; Christensen et al., 2017), together with their suitability for GP contexts. For example, a recent umbrella review (incorporating five prior systematic reviews) found that only two instruments had acceptable validity, reliability and diagnostic test accuracy (the Frailty Index and Gait Speed) for use in community settings (Apóstolo et al., 2017). However, the included studies were highly heterogeneous and quality varied markedly.

In primary care, identifying vulnerability among patients may ultimately be more important than accuracy (Nunes et al., 2015). In this sense, sensitivity may be a more important consideration than specificity with regard to frailty screening results, especially in settings where comprehensive assessment is readily accessible by older people. By this reasoning, returning a higher number of false positives (i.e. people who screen frail who actually are not) would be preferable to returning a high number of false negatives, thus running the risk of missing people who are actually frail. Although a number of instruments have recorded relatively high sensitivity, other considerations such as physical space

and/or special equipment required may preclude their selection. For example, although physical frailty instruments like the Gait Speed Test and Timed Up and Go rate have been found to be highly sensitive against the FP (Clegg et al., 2015), they do require at least 3 to 4 m of sufficient physical space and specific equipment such as stopwatches. Clinicians may need to trade-off between accuracy and convenience in their ultimate selection of instruments, according to their specific needs.

3.6. Principle 6: the test should be acceptable to the population

The acceptability of frailty screening tests to older people is not currently known. Very few studies have yet explored awareness of frailty and frailty screening among older adults (Archibald et al., 2017). However, the majority of frailty screening tests can be readily applied within general practice or primary health care settings, are quick, non-invasive and return an immediate result. Further, no adverse effects of screening have been reported to date. Therefore, frailty screening tests are likely to be acceptable to most older people.

However, the consequences of a frailty diagnosis are an issue of relevant concern. The emerging evidence suggests that older adults may find frailty a difficult concept to accept (Puts et al., 2017; Uk et al., 2015; Warmoth et al., 2015), in part because it may threaten their sense of self (Skilbeck et al., 2017; Grenier, 2006). Recent research indicates that older adults may reject the notion of frailty, even where an accepted objective measure defines them as such (Uk et al., 2015), viewing the act of identifying themselves as frail as beginning a self-perpetuating cycle into decline (Warmoth et al., 2015). Others have highlighted a distinction made by older people between “being” and “feeling” frail (Nicholson et al., 2012; Grenier, 2006).

Such studies echo research indicating that negative ageing perceptions have important ramifications for the well-being of older adults (Demakakos et al., 2006) – a finding that is especially relevant to frailty considering that detection could take place years before the onset of clinical presentation. It is not yet clear at which point in the frailty transition it is best to screen; however, since people are known to spontaneously revert to less frail states, screening too early may unnecessarily stick older adults with a frailty label. Practitioners should be sensitive to the potential impacts of a frailty diagnosis on the health and well-being of older adults, and adapt their communication accordingly. For example, it might be possible to reframe discussions about frailty in alternative terms (e.g. ‘resilience’, ‘vulnerability’, ‘healthy ageing’, ‘well-being’) that may resonate more with older people's preferred language and experiences (Uk et al., 2015).

3.7. Principle 7: the natural history of frailty

Although the evidence is still developing, understanding of the natural history and etiology of frailty is advancing. A number of studies have explored the origins and development of frailty along with the biological mechanisms that may be driving its progression (Chen et al., 2014; Fried et al., 2001; Xue, 2012; Lang et al., 2009). Chronic inflammation and immune activation are key underlying mechanisms acting through intermediary pathophysiologic systems that may contribute to frailty (Chen et al., 2014). In particular, sarcopenia and age-related declines in levels of sex hormones are thought to have intermediary roles (Chen et al., 2014). Numerous studies based on the FP have demonstrated that single or even all frailty components can be reduced or possibly reversed completely (Kim et al., 2015; Ng et al., 2015; Tarazona-Santabalbina et al., 2016; Luger et al., 2016), although more research is needed.

3.8. Principle 8: there should be an agreed policy on whom to treat as patients

All older adults with frailty should be considered as candidates for

treatment, provided any individual vulnerabilities are taken into account. The evidence indicates that even frail adults of advanced age can benefit from a personalised, exercise-based program (Dent et al., 2017). However, similar to the principles of chronic disease treatment, the selected intervention should be tailored to the patient's degree of frailty (Lim et al., 2017), a position also reflected within recent clinical guidelines (Dent et al., 2017). For many older adults, medical treatment can bring a range of adverse effects if inappropriately applied: “(t)he challenge is that interventions that commonly help people who have only one illness very commonly harm people who have many things wrong; the state of having many things wrong is common in frail older adults.” (Theou and Rockwood, 2012) Lastly, any policy designed to identify whom to treat as patients must not discriminate against older adults, but rather guide the specific care that they need.

One related aspect of considering who to treat remains who to screen. The age range of participants in published intervention studies varies. However, a consensus statement on frailty screening (Morley et al., 2013) and the age range of participants in successful intervention studies suggests that 70+ may be a useful starting point (Cameron et al., 2013; Kim et al., 2015; Ng et al., 2015). However, this age range may need to be adapted to specific settings: for example, where existing policies are already targeted to particular age groups.

3.9. Principle 9: the cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole

Estimating the health system costs of frailty and frailty screening remains a topic of ongoing research. Many studies have demonstrated that being frail adds significantly to individual health care expenditure. One recent French study put this figure at around €750 and €1500 additional euros (approx. \$876 and \$1752 USD) of ambulatory health expenditure for pre-frail and frail individuals respectively (Sirven and Rapp, 2017). Another study of German older adults estimated the additional three-month health costs of frail above non-frail participants at €1917 (approx. \$2239 USD), after having controlled for socio-demographic and other factors (Dent et al., 2017; Bock et al., 2016). A related longitudinal study found that the transition to frailty was associated with an increase in total health care expenditure of between 54 and 101% (Hajek et al., 2018).

Although potentially useful, cost-effectiveness analyses addressing frailty are rarely conducted (Hajek et al., 2018; Bleijenberg et al., 2017; Fairhall et al., 2015b), are often based in hospital settings and do not distinguish between screening alone versus screening plus intervention. One study set in the community and employing an FP definition of frailty found that an intervention successful in addressing frailty also delivered superior value for money in contrast with usual care (Fairhall et al., 2015b), although more research remains to be done. A recent three-arm cluster-randomized controlled trial (Bleijenberg et al., 2017) offers arguably the best current evidence for the cost-effectiveness of screening independent of intervention (although not using the FP definition). In a comparison of screening plus GP usual care, screening plus nurse-led intervention and GP usual care (control group), both intervention groups returned greater potential cost-effectiveness compared with the control group. However, a limitation of the study was that the follow-up period was relatively short. Additional savings could possibly have been realized over a longer time period (Bleijenberg et al., 2017), and given the high prevalence of frailty, potentially translate to considerable cost savings in absolute terms.

In any case, frailty screening may add value simply by increasing clinician awareness of patients' vulnerability. This benefit should be weighed against potential burdens on patients and on the health care system of over-diagnosis and over-treatment. Risk stratification methods might prove useful in targeting screening towards specific subgroups rather than all older adults. Future cost-effectiveness studies

could look to incorporate these elements into their research design.

3.10. Principle 10: case-finding should be a continuing process and not a “once and for all” project

The dynamic nature of frailty (Gill et al., 2006) suggests that implementing a continuous cycle of screening may offer many advantages. For example, where screening identifies potential cases, regular assessment allows for earlier detection of decline and opportunities to address frailty status in the future. This approach fits an integrated, person-centred care model for older adults and should be easy to integrate with medical software (Ambagtsheer et al., 2018). Additional support for ongoing screening could be provided through existing policies designed to support regular health checks for older adults.

4. Discussion

Frailty is one of the most prevalent and yet relatively unrecognized public health problems associated with population ageing. While screening has the potential to proactively address frailty, many pros and cons surround the practice when compared to Wilson and Jungner's principles for screening. Other questions of why, who, and when to screen also remain. In addition, the principles contain little guidance as to how they should be weighed against each other or how many should be met before screening is warranted (Juth and Munthe, 2012). In frailty research, this ambiguity results in some arguing that importance of frailty to public health (the first principle) should take precedence, and screening be introduced without delay (Morley et al., 2013). In contrast, others have urged greater caution since the evidence on treatment options (the second principle) is still at an early stage (Sourial et al., 2013). Further, a key determining factor will be the readiness of primary health care systems to address frailty, a factor which varies greatly depending on the local setting.

Perhaps the most useful application of frailty screening, given the current evidence, may be in systematically identifying cases of hidden frailty rather than population-wide preventive screening at earlier ages. Screening too early for frailty would likely not prove useful at this stage for several reasons, including the dynamic nature of frailty, the paucity of evidence for interventions around pre-frailty and a lack of knowledge about the psychological impacts of labelling someone as frail. Parallels can be drawn with the experience of patients diagnosed with mild cognitive impairment, a condition characterised by ongoing controversy over the psychosocial implications for older people of diagnosis (Banning et al., 2008; Beard and Neary, 2013). In contrast, frailty screening among the older age ranges (e.g. 70+) may prove ultimately more useful; many undiscovered cases of frailty likely remain, and so potentially, much frailty burden might be avoided.

Although the evidence suggests that a broader application of frailty screening may be useful in future, we have highlighted a number of research gaps. Greater awareness of frailty and its consequences, better screening and treatment options, broadening the evidence on intervention, and due consideration of the “language of frailty” and its impact on older adults remain important areas for future research.

5. Conclusion

Society's awareness of frailty and frailty screening is at a very early stage; however, the quality of the evidence is improving rapidly. This article has compared existing evidence to Wilson and Jungner's principles for screening. Although emerging evidence is promising, it is currently insufficient to reach a definitive recommendation on screening based on those principles, and readiness for screening is likely to vary greatly by setting. Ultimately, to successfully address frailty, substantial gaps in the research base will need to be resolved.

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Conflict of interest

All authors report no conflicts of interest.

Author contributions

The paper concept and design were formulated by RA, JB, RV, ED, SY, and ABM. Preparation of the manuscript was completed by RA, RA, JB, RV, ED, SY, and ABM reviewed and edited the manuscript. All authors have read and approved the final version of the manuscript.

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