

# A SYSTEMATIC REVIEW OF CLINICAL PRACTICE GUIDELINES FOR IDENTIFICATION AND MANAGEMENT OF FRAILITY

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**Abstract:** *Objective:* This study aims to appraise and summarize consistent recommendations from clinical practice guidelines (CPGs) for identification and management of frailty to maintain and improve functional independence of elderly population. *Methods:* A systematic search of Ovid MEDLINE, Embase, PubMed, PsycINFO, and CINAHL electronic databases using database-specific search terms in two broad areas “guidelines” and “frailty”, and a manual search of websites with the key phrase “frailty guideline” was performed. The inclusion criteria included CPGs focusing on identifying and managing frailty in population >65 years old, published in English since January 2010. Three reviewers independently assessed guideline quality using the AGREE II instrument. Data extraction was performed, followed by compilation and comparison of all recommendations to identify the key consistent recommendations. *Results:* Six CPGs met the inclusion criteria; however, only three CPGs had high methodological quality in accordance with AGREE II appraisal. The average AGREE II scores of all six CPGs were: 84.5%, 68%, 46.5%, 81.5%, 56.3%, and 60.2% for domains 1-6 (scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence) respectively. A total of 54 recommendations were identified, with 12 key recommendations suggested frequently by the CPGs. *Conclusion:* The AGREE II instrument identified strengths and weaknesses of the CPGs, but failed to assess clinical implications and feasibility of the guidelines. Further research is needed to improve clinical relevance of CPGs in the identification and management of frailty. The feasibility in implementing these guidelines with regards to cost-effectiveness of frailty screening warrants further investigation.

**Key words:** Clinical practice guideline, frailty, older adults, systematic review.

## Introduction

Frailty is a major public health concern in the older population and a leading cause of premature mortality and functional decline (1). The prevalence of frailty increases with age and tends to affect women more than men (1-5). Based on a meta-analysis of Europeans, the prevalence of frailty is estimated to be 15% for individuals aged 65 and over (6), and 25% for individuals aged over 85 years (7). The older adult population within indigenous communities with a low socioeconomic status are estimated to have a frailty prevalence >50% (8,9). This health burden is predicted to grow alongside an increasing and ageing population (1,3). Despite the increase in prevalence with age, signs of frailty can develop before the age of 65 years (10). On the other hand, many aging adults do not develop frailty, which suggests that it is not part of the normal ageing process and can therefore be prevented (11).

There are several frailty definitions (5). Frailty can be defined as a clinical state where the individuals may become more vulnerable to external stressors, thereby enhancing their risk of experiencing an adverse event such as functional dependency or death (3,12). Frailty develops as a consequence of an exposure to various factors including

physiological changes and/or illnesses associated with aging, sarcopenia, polypharmacy, living sedentary lifestyles, poverty, and social isolation (11,13-15). It is a dynamic process that can transition between different levels of severity (mild to severe), particularly in the early stages of development (1). Early identification and management of frailty is of paramount importance as it may improve functional independence (4, 11). This can be achieved by implementing screening tools and treatment protocols from high quality clinical practice guidelines (CPGs).

CPGs are needed for frailty to ensure patients receive the best care. CPGs are recommendations informed by evidence (16). The aim of CPGs is to provide guidance to healthcare practitioners on the treatment strategies that will be most beneficial to the patient and thus removing the risk of treatments being ineffective or having adverse effects (17). A panel of experts with a relevant clinical background is formed to develop CPGs (16). A systematic review performed by these experts looks at the methodological quality of studies, the certainty of evidence, and the strength of recommendations to be made (18). CPGs are then formulated taking into account certain practical considerations such as resources, benefits (vs. harms), the values of the patient, stakeholders opinion,

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**Table 1**  
Search strategy

| <i>a) Database search strategy</i>                           |   |   |
|--|---|---|
| Theme 1 Guidelines   | AND   | Theme 2 Frailty   |
| 1. explode guideline/  |   | 1. explode “frailty” all subheadings  |
| 2. guidelines as topic/                                      |   | 2. Frail*   |
| 3. explode practice guideline/                               |   | 3. Pre-frail*   |
| 4. practice guidelines as topic/                             |   | 4. Mild frail*  |
| 5. health planning guidelines/                               |   | 5. Pre frail*   |
| 6. explode treatment guidelines/                             |   | 6. Prefrail*  |
| 7. (standards or guideline or guidelines).ti.kf.kw.          |   | 7. “frailty/diagnosis”  |
| 8. ((practice or treatment* or clinical) adj guideline*).ab. |   | 8. “frailty/therapy*”   |
| 9. Clinical Practice Guidelines                              |   |   |
| 10. (CPG or CPGs).ti.  |   |   |
| <i>b) Grey literature search strategy</i>                    |   |   |
| Country  | Websites searched   | Links to sites  |
| Australia  | Australian Clinical Practice Guidelines                               | <a href="https://www.clinicalguidelines.gov.au/">https://www.clinicalguidelines.gov.au/</a>   |
| Australia  | Australian National Health and Medical Research Council               | <a href="https://www.nhmrc.gov.au/health-advice/guidelines">https://www.nhmrc.gov.au/health-advice/guidelines</a>   |
| Canada   | Canadian Medical Association Infobase of Clinical Practice Guidelines | <a href="https://joulecm.ca/cpg/homepage">https://joulecm.ca/cpg/homepage</a>   |
| International  | Guidelines International Network (G-I-N)                              | <a href="http://www.g-i-n.net">http://www.g-i-n.net</a>   |
| New Zealand  | New Zealand Guidelines Group  | <a href="https://www.health.govt.nz/about-ministry/ministry-health-websites/new-zealand-guidelines-group">https://www.health.govt.nz/about-ministry/ministry-health-websites/new-zealand-guidelines-group</a> |
| United Kingdom   | British Geriatrics Society  | <a href="https://www.bgs.org.uk">https://www.bgs.org.uk</a>   |
| United Kingdom   | eGuidelines   | <a href="http://www.guidelines.co.uk">www.guidelines.co.uk</a>  |
| United Kingdom   | National Library for Health on Guidelines Finder                      | <a href="https://www.evidence.nhs.uk/search?q=guidelines+finder">https://www.evidence.nhs.uk/search?q=guidelines+finder</a>   |
| United Kingdom   | National Institute for Clinical Excellence                            | <a href="https://www.nice.org.uk/">https://www.nice.org.uk/</a>   |
| United Kingdom   | Scottish Intercollegiate Guidelines Network                           | <a href="https://www.sign.ac.uk/">https://www.sign.ac.uk/</a>   |
| United Kingdom   | World Confederation for Physical Therapy                              | <a href="https://www.wcpt.org/">https://www.wcpt.org/</a>   |
| United States  | American Geriatrics Society   | <a href="https://www.americangeriatrics.org/">https://www.americangeriatrics.org/</a>   |
| United States  | Gerontological Society of America                                     | <a href="https://www.geron.org/">https://www.geron.org/</a>   |
| United States  | Guideline Central   | <a href="https://www.guidelinecentral.com/summaries/frailty-in-elderly-people/#section-society">https://www.guidelinecentral.com/summaries/frailty-in-elderly-people/#section-society</a>                     |
| United States  | The National Guideline Clearinghouse                                  | <a href="https://www.ahrq.gov/gam/index.html">https://www.ahrq.gov/gam/index.html</a>   |

and how feasible it is to provide/follow the recommendation (18). CPGs for frailty are required to provide clinicians with applicable standards of care (2). Currently, CPGs for frailty are aimed at identifying frailty (and its causes); however, there is a lack of definitive standards for managing frailty (2). CPGs aim to improve identification of individuals with frailty and provide the best management strategies, in order to ensure older individuals with frailty receive the best evidence-based care leading to the best possible outcomes (2). Therefore, the aim of this systematic review was to identify consistent recommendations for screening, assessment, and management of frailty from CPGs for use by healthcare providers.

## Methods

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

### Search strategy

A systematic literature search was performed independently by reviewers (AMA/JB/LH/GL/CL/SKP) on Ovid MEDLINE, Embase, PubMed, PsycINFO, and Cumulative Index to Nursing and Allied Health Literature (CINAHL) as these electronic databases were determined to be the most comprehensive databases of medical, nursing, and allied health journals. The databases PEDro and Scopus were initially considered but

then eliminated due to a high yield of non-specific results. Database-specific search terms including, but not limited to, keywords and MeSH headings were used under two broad areas “guidelines” and “frailty” to search the databases (Table 1a). A manual search was also performed via websites of guideline databases with the key phrase “frailty guideline”, in order to expand the search and thus capture guidelines not found in the databases search. A full list of the websites of guideline databases searched are provided in Table 1b. Filters applied to the search strategy included full text, age range >65 years, English language, and updated since 1st Jan 2010 as older studies could provide out-of-date recommendations.

#### **Eligibility criteria**

CPGs were included if they (i) summarized recommendations in English for screening, assessment, and management of frailty; (ii) targeted individuals aged >65 years; (iii) operationally defined frailty as a discrete clinical entity that is distinct from disability (impairment leading to restrictions in activities of daily living [ADLs]) and comorbidity (the coexistence of two or more chronic diseases), when three or more of the following five phenotypic criteria are present: weakness measured by low grip strength; slowness measured by decreased walking speed; a low level of physical activity; low energy or self-reported exhaustion; unintentional weight loss.(5) Articles were excluded if they were (i) CPGs guidelines not specifically focusing on screening, assessment, and management of frailty; (ii) CPGs targeting adults aged 18-64 years; (iii) primary studies; and (iv) secondary studies (other than CPGs of interest).

#### **CPGs selection process**

Articles obtained through electronic search were exported to EndNote-X9 reference-manager. A multi-stage screening process was applied to select CPGs. Two independent reviewers (AMA/JB/LH/GL/CL/SKP) screened the titles, abstracts, and/or full text of all articles against the eligibility criteria. Any disagreement between the two reviewers were resolved by discussion and/or consultation with a third reviewer (PM/DW) to arrive at a consensus.

#### **Data extraction**

Data were extracted independently by one reviewer and subsequently verified by a second reviewer in a paired group (AMA/JB/LH/GL/CL/SKP). Data extracted included the following demographic information: country of origin; professional composition panel; the aim of CPGs; year of publication and last update; target population, target audience/users, and specific recommendations (Table 2). In this review, the primary outcome measures were recommendations for screening, assessment, and management of frailty summarized in the CPGs. There was no secondary outcome measure chosen for this review.

#### **Quality assessment of CPGs**

The Appraisal of Guidelines Research and Evaluation (AGREE) II instrument was used to determine the quality of development for each included guideline (19). The AGREE II is the international gold standard to evaluate and develop practice guidelines (20,21). This instrument considers the reporting of 23 items organized within six domains followed by an overall assessment, which includes the rating of the overall quality of the guideline (19). Many countries have used the AGREE II instrument based on its universal value to evaluate and validate the methodological quality of CPGs, including CPGs for the management of specific diseases (22-25).

Each of the AGREE II items and the global rating items are rated on a 7-point scale (1–strongly disagree to 7–strongly agree) (19). A set of three reviewers (AMA/JB/LH/GL/CL/SKP & PM/AA) independently graded and calculated the methodological quality of the individual guidelines according to the criteria provided in the AGREE II manual (Table 3) (19). The agreement between these three reviewers was calculated using the intraclass correlation coefficients (Table 4). Disagreements with scores were consulted with an independent reviewer (DW) to arrive at a consensus. Further, we classified high-quality CPGs as those that had an AGREE II score equal to or greater than 50% of the maximum possible score in three domains: rigour of development (domain 3), editorial independence (domain 6) and stakeholder involvement (domain 2) (26).

#### **Evidence summary**

Following data extraction, recommendations were compiled and compared to identify the key recommendations that are consistent among the included CPGs irrespective of their methodological quality. Recommendations were initially grouped into subject topics to identify similarities. The topics of interest were identifying frailty, tests used in frailty assessment, frailty definition criteria, comorbidities/complications, change in frailty status, physical activity, oral health and nutrition, monitoring frailty, mood/behavior, polypharmacy, staff/health professionals, and crisis management (Table 5). Inconsistent/conflicting recommendations among the included CPGs were excluded from key recommendations in order to identify consistent recommendations, along with recommendations only made by one CPG.

## **Results**

#### **Systematic search results and characteristics of included guidelines**

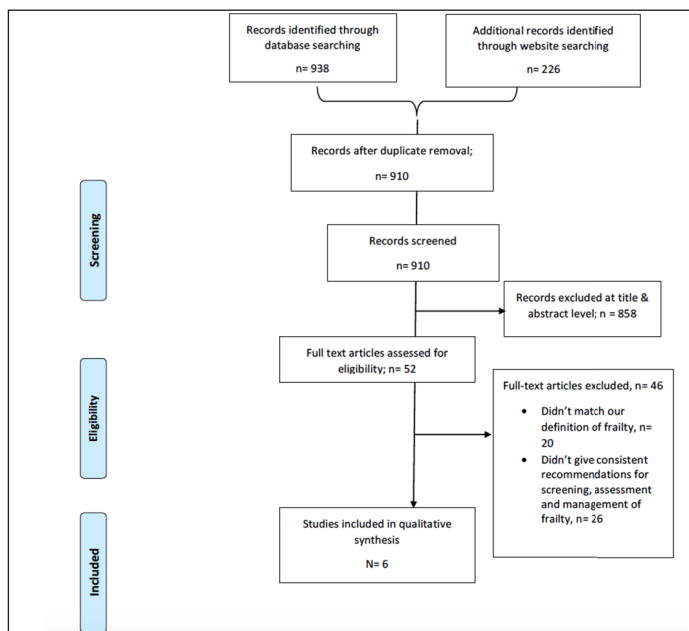
The systematic search process and screening are illustrated in Figure 1. The initial search strategy yielded 938 articles via online databases and 226 articles via manual database searches for CPGs. After excluding 254 duplicates, the remaining 910 articles were screened for eligibility. Only six CPGs (1-4,27,28) met the inclusion criteria and the reasons for exclusion of the remaining articles are summarized in Figure 1.

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**Table 2**  
Overview of the Clinical practice guidelines (CPGs) included in this review (n=6)

| Ref | Title (Reference)  | Country of Origin      | Year established | Year updated | Aim of CPG   | Target population   | Target users of CPG   |
|-----|--|------------------------|------------------|--------------|--|---|---|
| 1   | Physical Frailty: ICFSR International CPGs for Identification and Management (1) | Australia              | 2019             | NA           | Overview the current evidence-base to provide recommendations for the identification and management of frailty in older adults                                       | All older adults with frailty or at risk of frailty, and not those who already have an established disability | Health professionals who contribute to the care of older people with frailty, including clinicians and allied health professionals                          |
| 2   | Frailty Care Guides NZ (27)  | New Zealand            | 2019             | 2020         | Complement best practice and promote early intervention and communication with the person's health care team.  | Individuals who are ageing and/or those with multiple co-morbidities  | Health care providers   |
| 3   | The Asia- Pacific CPGs for the Management of Frailty (2)                         | Asia/Pacific countries | 2017             | NA           | Screening, assessment and management of frailty  | Older adults with frailty in the Asia-Pacific region  | Health practitioners in the Asia-Pacific region   |
| 4   | Frailty in Older Adults – Early Identification and Management (3)                | British Columbia       | 2017             | NA           | Facilitate individualized assessment and provide framework and tools to promote patient-centered strategies to manage frailty and functional decline                 | Older adults with frailty or vulnerable to frailty  | Primary focus of the guideline is the community-based primary care setting  |
| 5   | Fit for Frailty (4)  | United Kingdom         | 2014             | 2017         | To support health and social care professionals in the community, outpatients' clinics, community hospitals and intermediate care settings and older people's homes. | Individuals with frailty  | Health and social care professionals in the community, outpatient clinics, community hospitals, intermediate care settings, and in older people's own homes |
| 6   | Frailty in Elderly People (28)   | Italy                  | 2013             | 2015         | Provide tools to identify frail subjects and provide indications on possible interventions to prevent disability.  | Older adults without disability   | Managers of health agencies, nurses, clinicians, social workers, physiotherapists, and occupational therapists  |

**Figure 1**  
Adapted PRISMA flow diagram



**Characteristics of included CPGs**

Characteristics of the included CPGs in this systematic review are summarized in Table 2. The country of origin varied between the CPGs, with one CPG originating from each of the following countries/regions: Australia, British Columbia Canada, Italy (Regione Toscana), New Zealand, the Asia-Pacific region, and the United Kingdom. All the CPGs (n=6) were published or updated within the last 5 years (1-4,27,28). All the CPGs (n=6) indicated the management of frailty to be their aim, with half of these (n=3) indicating the identification of frailty as an additional aim (1-3). Each CPG defined a slightly different target population with over half (n=4) of the guidelines specifying the target population to be those living with frailty (1-4); however, only two of them included those individuals at risk of frailty (1,3), while the remaining two CPGs defined their target population to be the ‘old’ and ‘ageing’ population respectively (27,28). Half of the CPGs (n=3) did not delineate the coexistence of co-morbidities alongside frailty in their target population (2-4). Of the remaining half, only one included those suffering from co-morbidities (27), the other two excluded such populations (1,28). All the CPGs (n=6) defined the target

**Table 3**  
Summary of AGREE II evaluations

| Ref No | Title (Reference)  | Scores, %         |                         |                      |                          |               |                        | Overall assessment (1-7) | Recommendation for use  |
|--------|--|-------------------|-------------------------|----------------------|--------------------------|---------------|------------------------|--------------------------|-------------------------|
|        |  | Scope and purpose | Stakeholder involvement | Rigor of development | Clarity and presentation | Applicability | Editorial independence |                          |                         |
| 1      | Physical Frailty: ICFSR International CPGs for Identification and Management (1) | 93                | 87                      | 75                   | 85                       | 70            | 65                     | 6                        | Yes                     |
| 2      | Frailty Care Guides NZ (27)  | 67                | 40                      | 20                   | 59                       | 44            | 79                     | 4                        | Yes, with modifications |
| 3      | The Asia- Pacific CPGs for the Management of Frailty (2)                         | 73                | 75                      | 65                   | 93                       | 65            | 59                     | 5                        | Yes, with modifications |
| 4      | Frailty in Older Adults – Early Identification and Management (3)                | 93                | 68                      | 28                   | 86                       | 70            | 59                     | 5                        | Yes, with modifications |
| 5      | Fit for Frailty (4)  | 83                | 52                      | 15                   | 76                       | 19            | 14                     | 2                        | No                      |
| 6      | Frailty in Elderly People (28)   | 98                | 86                      | 76                   | 90                       | 70            | 73                     | 6                        | Yes                     |
| Mean   |  | 84.50             | 68                      | 46.50                | 81.50                    | 56.33         | 58.17                  | 4.67                     |                         |
| (SD)   |  | (12.39)           | (18.84)                 | (28.50)              | (12.44)                  | (20.89)       | (23.03)                | (1.50)                   |                         |

users of their recommendations to be healthcare provider. (1-4,27,28). The CPG by Bavazzano et al. (2013) is the only one that defined the specific healthcare professionals targeted to follow their recommendations (28). One third of the CPGs (n=2) also included the specific setting for employing their recommendations (3,4).

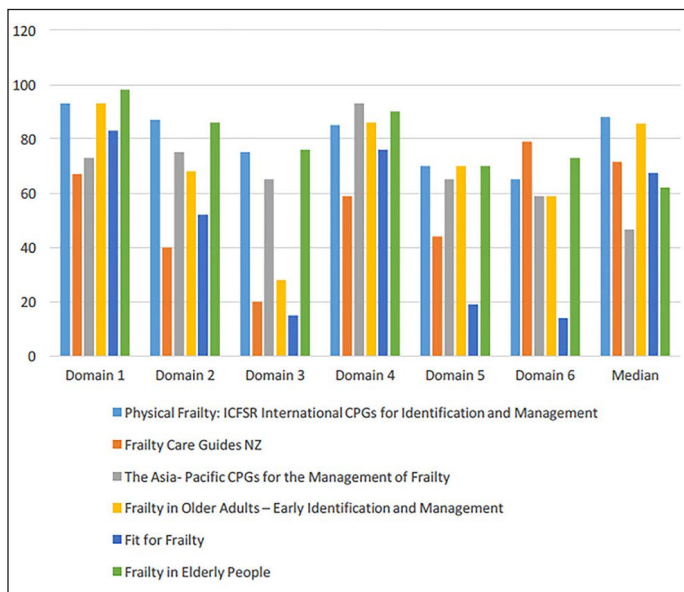
**Quality appraisal of CPGs**

Figure 2 displays each of the six domains of the AGREE II instrument, and the methodological quality score of each of them. Inter-rater agreement for methodological quality scores was ‘fair’ for editorial independence (domain 6); ‘good’ for clarity of presentation (domain 4) and applicability (domain 5); and ‘excellent’ for all other domains and overall AGREE II score (Table 4).

In general, three CPGs generally scored well in each domain (1,2,28), whilst the remaining three scored poorly (3,4,27). The mean (SD) average scores of all domains of all the included CPGs are as follows: domain 1 (‘scope and purpose’) - 84.5% (12.39), followed by domain 4 (‘clarity of presentation’) - 81.5% (12.44), domain 2 (‘stakeholder involvement’) - 68% (18.84), domain 6 (‘editorial independence’) - 58.17% (23.03), domain 5 (‘applicability’) - 56.3% (20.89), and finally domain 3 (‘Rigour of Development’) - 4.67% (1.5) (Table 3).

**Figure 2**

AGREE II domain-based percentage scores of all the included clinical practice guidelines (n=6). Domain 1: scope and purpose, domain 2: stakeholder involvement, domain 3: rigour of development, domain 4: clarity of presentation, domain 5: Applicability, domain 6: editorial independence



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**Appraisal of CPGs: inter-rater agreement****Table 4**

Inter-rater agreement for AGREE II domains and overall scores

| Domain                  | ICC (95% CI)       |
|-------------------------|--------------------|
| Scope and purpose       | 0.925 (0.71-0.99)  |
| Stakeholder involvement | 0.903 (0.62-0.98)  |
| Rigor of development    | 0.918 (0.65-0.99)  |
| Clarity of presentation | 0.858 (0.39- 0.98) |
| Applicability           | 0.870 (0.51-0.98)  |
| Editorial independence  | 0.680 (0.01-0.95)  |
| Overall rating          | 0.921 (0.67-0.99)  |

AGREE, Appraisal of Guidelines for Research and Evaluation; CI, confidence intervals; ICC, intraclass correlation coefficients.

**Summary of recommendations**

From the six CPGs included in this systematic review, a total of fifty-four recommendations were recorded. Recommendations suggested by two or more CPGs included in this systematic review are displayed in Table 5. Three of the recommendations were contradicting each other and therefore were excluded from Table 5. Seventeen of the recommendations (32%) could not be grouped/related to a recommendation from another CPG and therefore were also excluded from Table 5. No recommendations on how not to screen/assess or manage/treat a patient could be grouped/related to a recommendation from another CPG and therefore they were excluded in Table 5. (Supplementary material- Appendix 1)

**Discussion**

This study aims to corroborate consistent recommendations from CPGs for frailty screening, assessment and management. We identified six frailty CPGs based on the current evidence from 2010 until now. The mean scores for the six AGREE II domains (scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence) were 84.50%, 68%, 46.50%, 81.50%, 56.33%, 58.17%, and 4.67% respectively. The overall quality of the CPGs was good for the majority of the CPGs reached an overall guideline quality between 4 and 6 points.

**Main findings and AGREE II methodological quality appraisal**

Assessment of the 'scope and purpose' of CPGs is required to evaluate if there is a clear definition of the objective of the CPG, to allow health professionals to determine if the CPG is likely to contain information relating to how they would manage a patient who has been diagnosed with frailty (19). Whilst all CPGs included in this systematic review achieved an AGREE II rating of above 50% (Figure 2), three CPGs

particularly excelled in achieving high quality 'scope and purpose' ratings, of greater than 90% (1,4,28). A limitation of these three CPGs is a lack of specific identification of a target population (1,4,28). Specifying the target population would increase the relevance and significance of the recommendations. The three other CPGs achieved AGREE II scores of less than 70% for this domain (2,3,27).

'Stakeholder involvement' is an important step in framing CPGs, with multi-disciplinary stakeholders having first-hand, practical knowledge of the condition for which these guidelines will be applied. The CPGs included in this review had a varied level of stakeholder involvement with some achieving an AGREE II rating as low as 40% (27), and others as high as 87% (28). Although the majority of the CPGs successfully included a list of the stakeholders (1-4,28), each guideline failed to specify their role in the developmental process of the guideline (1-4,27,28). Consequently, it was difficult to determine if the guidelines had been formed with clinical applicability in mind. Furthermore, the target audience was not specifically defined in the CPGs, with the guidelines broadly defining the intended users as healthcare providers (1-4,27). The CPG of Bavazzano et al. (2013) is the only one to provide a clear definition that specifies the healthcare professionals that the guideline is intended to be used by (28). These findings explain the large variability in overall scores for stakeholder involvement in accordance with the AGREE II guideline.

Investigation into the 'rigour of development' of the CPGs revealed polarizing results. Three CPGs stated a protocol of how their recommendations and guidelines were finalized, with various experts discussing the strengths and weaknesses of current clinical guidelines for frailty (1,2,5). Results were then formalized as recommendations in the management of frailty guidelines (1,2,5). A risk analysis was performed on these recommendations to ensure safe application of these guidelines in clinical practice (1,2,5). On the contrary, a limitation in the development of the remaining three CPGs was the failure to disclose a systematic method for data collection.(3,4,12). Additionally, there were no criteria for selecting current frailty guidelines (3,4,12). Furthermore, there was no description of how or when these recommendations will be updated (3,4, 12). The CPGs inclusion/exclusion of methods is reflected in Figure 2. A rigorous developmental process elucidating how recommendations are established and framing a working template as to how frailty guidelines could be updated are warranted in future CPGs.

The 'clarity of presentation' considers the overall structure and formatting of a guideline, and whether each recommendation is coherent and written with precision (19). All the CPGs achieved an AGREE II score of 50% or above, with four CPGs scoring over 85% as shown in Figure 2. Despite the high AGREE II scores for domain four, five out of six CPGs shared a common limitation (1-4,28). Most guideline developers failed to establish recommendations that consistently specified an age group within the frail population

**Table 5**  
Overview of recommendations within the clinical practice guidelines (CPGs)

| Key recommendation   | Number of CPGs that recommended | Recommendation classification |
|--|---------------------------------|-------------------------------|
| <i>Screening/assessment</i>  |                                 |                               |
| 1. On all encounters with healthcare professionals' older people should be screened, or offered screening to identify if frailty is related to their condition | 4                               | Should do                     |
| 2. Elderly subjects should be considered pre-frail and offered screening if presenting with clinical features  | 3                               | Could do                      |
| 3. Gait speed is a recommended outcome measure for frailty assessment  | 3                               | Could do                      |
| 4. A validated measurement tool should be used to assess frailty   | 2                               | Unsure                        |
| <i>Management/treatment</i>  |                                 |                               |
| 5. Physical activity should be used to manage the effects of frailty   | 3                               | Could do                      |
| 6. All reversible medical conditions should be addressed in care of patient  | 3                               | Could do                      |
| 7. Monitoring diet and bodyweight is an important aspect of managing frailty   | 3                               | Could do                      |
| 8. All aspects of a patient's frailty condition should be monitored with regular reviews and updates   | 3                               | Could do                      |
| 9. A comprehensive management plan should be created to outline care of the patient and shared with friends and family   | 3                               | Could do                      |
| 10. Patients medication should be reviewed routinely; avoid and decrease polypharmacy  | 3                               | Could do                      |
| 11. Vitamin D supplementation is only recommended in vitamin D deficient patients  | 2                               | Unsure                        |
| 12. Unintentional weight loss and undernutrition should be treated by protein/caloric supplementation  | 2                               | Unsure                        |
| 13. Resistance training is specifically recommended for management of frailty  | 2                               | Unsure                        |
| 14. Patients should be referred to geriatric specialists when they have multiple conditions (comorbidities) besides frailty                                    | 2                               | Unsure                        |
| 15. Patients with comorbidities besides frailty require different treatment compared to patients with a singular condition                                     | 2                               | Unsure                        |
| 16. Advanced care plans should be well established and understood before they are needed to be put in action   | 2                               | Unsure                        |

(1-4,27). Consequently, this has created uncertainty as to which population the recommendations listed in these CPGs are relevant to. Providing the age group, stage, and severity of frailty in each recommendation will enhance specificity and relevance. Key recommendations were easily identifiable in five of the CPGs, presented in either a box, table, or in bold text (1-4,28). However, the guidelines formulated by the Health Quality and Safety Commission neglected to include a summary of the key recommendations, thus resulting in a guideline that was difficult to assess and assimilate (27). This limitation is reflected in the AGREE II score where it was ranked lowest in terms of the 'clarity of presentation'. Providing the target audience with a clearly labelled list of key recommendations will not only save the user time, but also allow them to consider whether they are relevant to their patient.

'Applicability' evaluates how CPGs describe the application of the recommendation in a healthcare setting (19). To facilitate its ongoing use, CPGs with relatively high 'applicability' scores will provide the health professional with tools and resources to improve their practice efficiency and enhance their patient care for the frail population (19). In this systematic review, three CPGs achieved an AGREE II score of 70%, whilst two

of the remaining CPGs scored less than 50% (Figure 2). Three CPGs did not identify the facilitators or barriers involved in the implementation of these guidelines (2-4). Two CPGs did not disclose cost implication for health care budgets (2,27). For three CPGs, there was no risk/benefit analysis about their recommendations, which is a key tool that clinicians would use to determine the applicability of the guidelines in clinical practice (3,4,12). Tools and resources enhance professional competency and provide information regarding implementing guidelines into practice, and this was missing in the other three CPGs (1,4,28). Another limitation was all CPGs failed to mention how they would monitor and audit to increase the specificity, and therefore, the relevance of the guidelines (1-4,27,28). Due to lack of setting an 'applicability' threshold, the CPGs included in this review fail to provide strong and relevant recommendations for future use.

We found no consistency among the six guidelines about documentation of 'Editorial Independence'. Three CPGs did not provide any documentation about funding bodies or related conflicts of interest (2-4). One guideline did provide the name of the funding body, but there was no description regarding any conflict of interest between each member of the guideline development group (27). Only two CPGs specified conflicts

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of interest between each author and the funding body (1, 28). Elaborating the influence that these conflicts had on guideline development would have further enhanced the transparency of the guidelines, to ensure the effects of bias are apparent in development of the CPG.

### ***Implications from consistent key recommendations of CPGs for frailty***

Key recommendations were divided into two broad categories of screening recommendations and management/treatment recommendations (Table 2). The CPGs for screening protocol varies between sources, providing no one standardized measurement tool, which could make inter-clinician communication challenging (1-4,5,11). Implementation of frailty screening can potentially be time consuming for clinicians, depending on which protocol is followed (39). CPGs suggest that during consultation between clinician and older patients, clinicians should be alert to potential frailty signs (1,2,4,11). Older patients that undergo regular checkups could easily be identified; however, how effective clinicians are at detecting frailty is unclear (39).

Management/treatment guidelines involved largely some form of physical exercise, diet management and regular checkups (1-5,11). How feasible these are for patients is unclear and can be circumstantial. Access to exercise area/equipment, the ability to clinically supervise the patient, and fear avoidance behaviors can play a role in choosing or performing physical exercises (2). Another example includes diet which can be influenced by living circumstances (11). Patient knowledge and cognition, financial situation, physical ability or personal preferences can impact how well the CPG is followed. A comprehensive management plan can easily be provided by clinicians, which can be altered to suit the resources available to each individual patient (2). However, adherence to the program will differ between patients (2). It is unclear whether the CPGs in this review looked at how difficult it would be to carry out the recommendations and this could be an area for further research.

### ***Global Context***

It has been well established in previous literature that the aging population is expected to have a significant impact on the health care sector (29-31). In 2018, it was the first time in the world history where the population aged over 65 years was greater than that aged under five (32). Unfortunately, this trend is not reflected by the number of medical professionals practicing in aged versus youth care; for example, in 2016, there were only 619 registered geriatricians (33) compared to 2059 pediatricians in Australia (34). In the United States, there were only 6,952 board certified geriatricians in 2018. The majority of CPGs included in this systematic review originate from higher economic status countries, which is paralleled by the old-age dependency ratio, defined as the proportion of people aged older than 64 years compared to people in

the working-age group aged 15-64 years (32). Therefore, CPGs included in this review reflect countries and economies with the highest need for guidelines. Further research should explore how CPGs are being implemented in clinical practice, because currently there is only theoretical literature that does not address the clinical impact of available CPGs and the relevant recommendations. With frailty being a reality for so many people in their older age, it is imperative that clear recommendations and procedures are implemented into clinical practice worldwide to reduce the length of hospital stay, the cost of frailty, the effect on quality of life, and impact on each older person's independence.

By 2050, the world's population aged 60 years and over is predicted to reach 2 billion, a significant rise from 900 million people in 2015 (35,36). A substantial proportion of the older population will experience frailty, resulting in an increase in demand for healthcare resources (35). According to Bock et al. (2016), the cost for three months of healthcare for older adults with frailty is \$4000USD, which is approximately five times higher than the cost for non-frail older adults (29). These healthcare expenses reveal the importance of delivering care effectively and efficiently. It is important to consider that specific screening tools and interventions to manage frailty may not be feasible in settings where there are limited resources, and it is in these situations where we need to offer cost-effective alternatives for screening and treatment (1). Furthermore, it is important to identify whether a CPG is relevant to ensure resources are being utilized appropriately. (19) Upon assessment of the 'clarity of presentation', management options for frailty were successfully reported in all CPGs (1-4,27,28). It is advised that guidelines containing recommendations for management of a health issue, such as frailty, should report options for screening, analysis and treatment management (19). This allows health practitioners to select the most appropriate screening tool and treatment, based on multiple factors, in particular, availability of resources, and cost-effectiveness. Regarding the "assessment of applicability", resource implications were not disclosed in two of the six CPGs (2,27). It is a requirement that CPGs include an analysis on the potential impact a recommendation has on resources (19). Each recommendation may require numerous resources, such as specialised health practitioners and sophisticated equipment (19). Consequently, these additional resources will have cost implications for healthcare (19).

There is conflicting evidence to suggest that screening tools are cost-effective (1). Bleijenburg et al. (2017) reported that proactive screening for frailty in a primary care setting had a high probability of being cost-effective, as opposed to usual care (37). However, a recent study concluded that frailty screening is unlikely to be cost-effective (38). Despite these findings, our study found four out of the six CPGs recommended that older people should be screened or offered screening to identify if frailty is related to their condition (1,3,4,28). These conflicting results suggest that further



research around the cost-effectiveness of frailty screening is needed.

### Strengths and limitations

An extensive search strategy was carried out and comprehensive methods for screening and selecting CPGs were applied to reduce bias. There are some key limitations in the development of this systematic review. The first is the reliability of scoring methodological quality of CPGs with the AGREE II instrument. Evaluating the methodological quality of a guideline requires each reviewer to provide a score based on a list of criteria within the AGREE II instrument (19). Consequently, each score is subjective and could pose potential bias on decisions about guideline recommendations (19). However, a strength of this review is the good-to-excellent ICC values between all the three ratings for the majority of items, except for editorial review, which was reported to be average. Further, it is important to consider that the AGREE II instrument fails to differentiate between low or high quality guidelines based on the scores (19); however, we have followed a recommended criteria to differentiate high and low quality CPGs (26). Additionally, the guidelines included in this review were published in English only, which has led to the exclusion of a substantial number of guidelines published in other languages. Half of the guidelines identified by this review obtained low AGREE II scores, which suggests more research is needed to develop clinically relevant recommendations in identification and management of frailty in the older adult population.

### Conclusion

This review summarized consistent recommendations for the assessment and management of frailty from CPGs to guide healthcare practitioners. A narrative synthesis of consistent key recommendations from the six selected CPGs, irrespective of their methodological quality judged with the AGREE II instrument, was done. Despite the limitations such as the lack of additional resources and variations recognized in each domain of the guidelines, our review demonstrates recommendations for assessing and managing frailty. Other barriers identified were the cost-effectiveness and how feasible recommendations were for implementation owing to factors such as fear avoidance, adherence to the comprehensive plan acknowledging patient's cognition, their financial situation, physical ability or personal preferences. We identified many fields in which further research is needed to improve clinical relevance of CPGs in the identification and management of frailty such as cost effectiveness, difficulty of implementing, and applicability of recommendations to the older adult population aged 65 and older, as well as researching how each CPG is being implemented, updated, and the clinical impact that they have.

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