

Original Article

Adaptation and interobserver agreement in a Danish translation of the Clinical Frailty Scale Questionnaire

Line Houkjær¹ & Stig Brorson^{1, 2}

1) Centre for Evidence-Based Orthopaedics, Zealand University Hospital, Køge, 2) Department of Clinical Medicine, University of Copenhagen, Denmark

Dan Med J 2025;72(10):A08240549. doi: 10.61409/A08240549

ABSTRACT

INTRODUCTION. The Clinical Frailty Scale (CFS) assesses frailty in older adults. Although the scale has been translated into Danish, the accompanying questionnaire and classification tree have not. The questionnaire includes seven questions about basic and instrumental activities of daily living, chronic conditions, self-rated health, energy level and physical activity, guiding the respondent to a CFS level through the classification tree. This study translated and cross-culturally adapted the CFS questionnaire and classification tree into Danish and assessed the interobserver agreement in a hospital setting.

METHODS. The Danish version of the CFS short questionnaire and classification tree was developed in five stages: forward translations, synthesis, back-translation, review by a committee panel and pre-testing, followed by comprehension interviews and an interobserver agreement study.

RESULTS. The back-translations closely matched the original. Minor discrepancies in contextual and idiomatic expressions were resolved through committee review. Pre-test confirmed comprehension, requiring no further changes. The kappa for interobserver agreement was 0.78.

CONCLUSIONS. The CFS questionnaire and classification tree were translated and cross-culturally adapted into Danish and are attached to this paper. The interobserver agreement achieved is considered acceptable for applying the CFS in emergency and orthopaedic departments.

FUNDING. None.

TRIAL REGISTRATION. Not relevant.

Frailty is a clinical syndrome in older adults, characterised by diminished physiological reserves, including reduced overall health, muscle strength, energy level, cognitive function and immune response [1]. These declines increase vulnerability to physical, emotional and environmental stressors, leading to a higher risk of adverse outcomes such as falls, disability, hospitalisation and mortality [2-6].

The Clinical Frailty Scale (CFS) is a tool for assessing and stratifying frailty severity. It does not prescribe specific interventions but may support clinicians in guiding treatment decisions [1, 6]. The CFS was developed in Canada in 2005 [5] and has gained popularity for estimating frailty because it has shown associations with clinical outcomes [4], good interobserver reliability [7-9], is simple, quick to complete and easy to calculate [6]. The CFS is validated in patients above 65 years to predict death or need for institutional care [4].

The CFS is a healthcare-professional-administered measure of the baseline health state, reflecting a patient's

health before the onset of a new condition, change or intervention. It can also be used to monitor changes in frailty over time. The original seven-point scale from 2005 [5] was modified in 2020 by the developers to the current nine-point scale with pictographs, a headline and a clinical description (Figure 1) [6]. The levels range from “Level 1 - Very fit” to “Level 9 - Terminally ill”. Frailty increases with each level, except for “Level 9 - Terminally ill”, which indicates terminal illness without evident frailty (Figure 1). Cognitive function influences scoring, where the degree of dementia generally corresponds to the degree of frailty [6]; mild dementia corresponds to mild frailty. In some clinical and research settings, the CFS is often dichotomised using a cut-off of ≥ 5 to distinguish patients as frail or not frail [4]. The CFS has been translated into Danish and validated with high interobserver agreement [8, 9] (Figure 2).

FIGURE 1 The Clinical Frailty Scale, version 2.0, English. Reproduced with permission of the copyright holder [6].











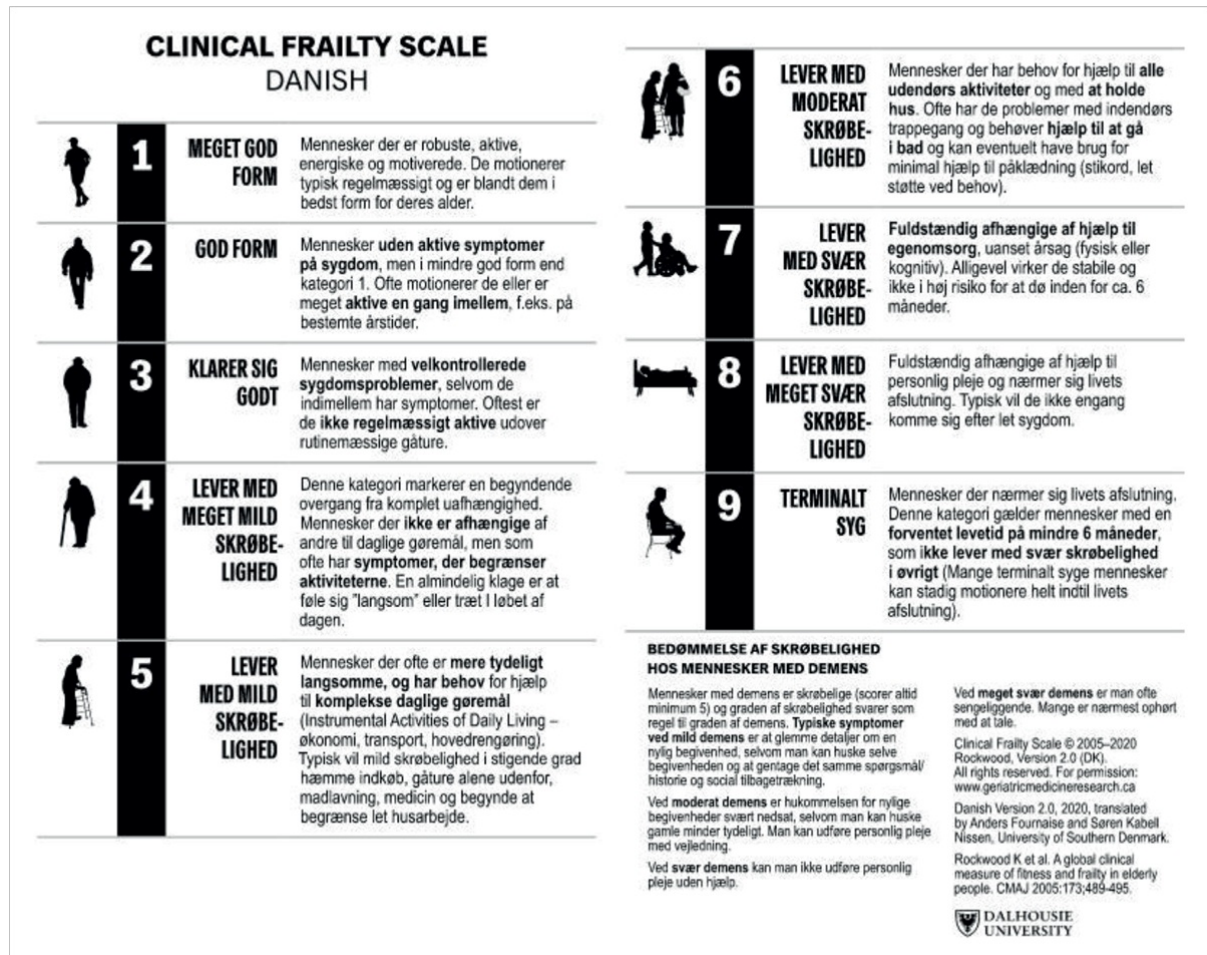
CLINICAL FRAILTY SCALE					
	1	VERY FIT	People who are robust, active, energetic and motivated. They tend to exercise regularly and are among the fittest for their age.		6
	2	FIT	People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g., seasonally.		7
	3	MANAGING WELL	People whose medical problems are well controlled , even if occasionally symptomatic, but often are not regularly active beyond routine walking.		8
	4	LIVING WITH VERY MILD FRAILTY	Previously “vulnerable,” this category marks early transition from complete independence. While not dependent on others for daily help, often symptoms limit activities . A common complaint is being “slowed up” and/or being tired during the day.		9
	5	LIVING WITH MILD FRAILTY	People who often have more evident slowing , and need help with high order instrumental activities of daily living (finances, transportation, heavy housework). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation, medications and begins to restrict light housework.	SCORING FRAILTY IN PEOPLE WITH DEMENTIA The degree of frailty generally corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal. In moderate dementia , recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting. In severe dementia , they cannot do personal care without help. In very severe dementia they are often bedfast. Many are virtually mute.	
				 DALHOUSIE UNIVERSITY www.geriatricmedicineresearch.ca	
				Clinical Frailty Scale ©2005–2020 Rockwood, Version 2.0 (EN). All rights reserved. For permission: www.geriatricmedicineresearch.ca Rockwood K et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489–495.	

FIGURE 2 The Clinical Frailty Scale, version 2.0, Danish. Reproduced with permission of the copyright holder [6].



In 2021, a questionnaire (both a short and a long version) and a classification tree were developed to support novice users, involving some of the original developers [10]. The CFS itself has been translated into at least 25 languages, but the short version of the questionnaire has only been translated into Brazilian Portuguese, and the classification tree has not been translated [11]. Accurate translation and cultural adaptation are essential to preserve the conceptual integrity of the tool across settings [12].

The questionnaire consists of seven questions about daily living, chronic conditions, self-rated health, energy and physical activity. Each question guides the user through a classification tree, producing a CFS level [11].

This study aimed to translate and cross-culturally adapt the CFS questionnaire and classification tree into Danish and assess interobserver agreement.

Methods

Permission to translate the CFS questionnaire (short version) and classification tree was obtained from the Geriatric Medicine Research Group, Dalhousie University (ID: 24060310). The CFS questionnaire (short version) and classification tree were translated following the guidelines presented by Guillemin et al. [12], Beaton et al. [13] and the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) guidelines [14]. The process was divided into five stages:

Stage 1 – Forward translation: Two independent translations from English to Danish were conducted, with each translator translating into their mother tongue. One of the translators was familiar with the concept of CFS.

Stage 2 - Synthesis: When inconsistencies were found between the translations, both translators were consulted, and their Danish versions were returned for feedback on the most accurate translation. The translations were combined into a single version.

Stage 3 – Back-translation: At least two independent translations from Danish to English were conducted, with each translator translating the questionnaire into their native language while remaining unaware of the original version.

The questionnaire translation was used to translate the classification tree.

Stage 4 – Expert committee review: A multidisciplinary team, including the authors, a secretary, two clinical nurses and translators, reviewed discrepancies between the translated and original materials and assessed cross-cultural equivalence. The materials included all translation versions from stages 1-3, the original CFS questionnaire and the classification tree. The committee evaluated the equivalence of the English and Danish versions, focusing on meaning, idiomatic accuracy, relatability of daily experiences and consistent conceptual meaning.

All back-translators received their back-translated versions and the original CFS questionnaire for comparison to identify any interpretive differences.

Stage 5 – Pretesting: Thirty healthcare professionals assessed one patient each using the questionnaire and classification tree. The patients were the first individuals above 65 years whom the students encountered during their clinical shifts and had not previously met. The testing took place at the Orthopaedic Department, Zealand University Hospital, Denmark. Subsequently, participants engaged in individual semi-structured interviews, using an interview guide ([Supplementary material 1](#)). The interviews explored item understanding and reasoning, concluding when no further input was provided.

The first author reviewed the pre-testing results.

An interobserver study was conducted to assess the agreement between pairs of observers who independently evaluated patients using the CFS. Two independent observers classified 41 paired observations in the emergency and orthopedic departments. Observers were relevant end users, with each pair including a medical doctor who had experience with CFS.

For statistical purposes, the CFS was treated as a nine-category scale, with higher scores indicating greater frailty. Interobserver agreement was assessed using kappa statistics (mean kappa and 95% confidence interval (CI)). A Bland-Altman plot and limits of agreement (LoA) analysis evaluated bias from healthcare professionals and prior experience. All analyses were performed in R Studio.

Trial registration: not relevant.

Results

Stage 1: Two Danish native speakers (one educated in Great Britain, the other holding an MA in Translation and Interpretation) translated the English questionnaire into Danish.

Stage 2: The two versions were compared, revealing minor translation differences in meaning and context ([Supplementary material 2: Stage 1](#)). Consensus was reached, producing one translation.

Stage 3: Back-translation was conducted by three native English speakers in Denmark (one American, two

British), all without medical backgrounds. The classification tree was created without any problems.

Stage 4: No new idiomatic differences were identified during the committee review beyond those reported in Stage 2. Additional semantic differences were noted ([see Supplementary material 2: Stage 4](#)).

The term “writing checks” was omitted as it is not commonly used in Denmark, and “softball” was replaced with “gymnastics” to better reflect activities for those above 65 years in Denmark.

The English and Danish versions of the questionnaire and classification tree had no conceptual differences. A consensus was reached on the final Danish versions.

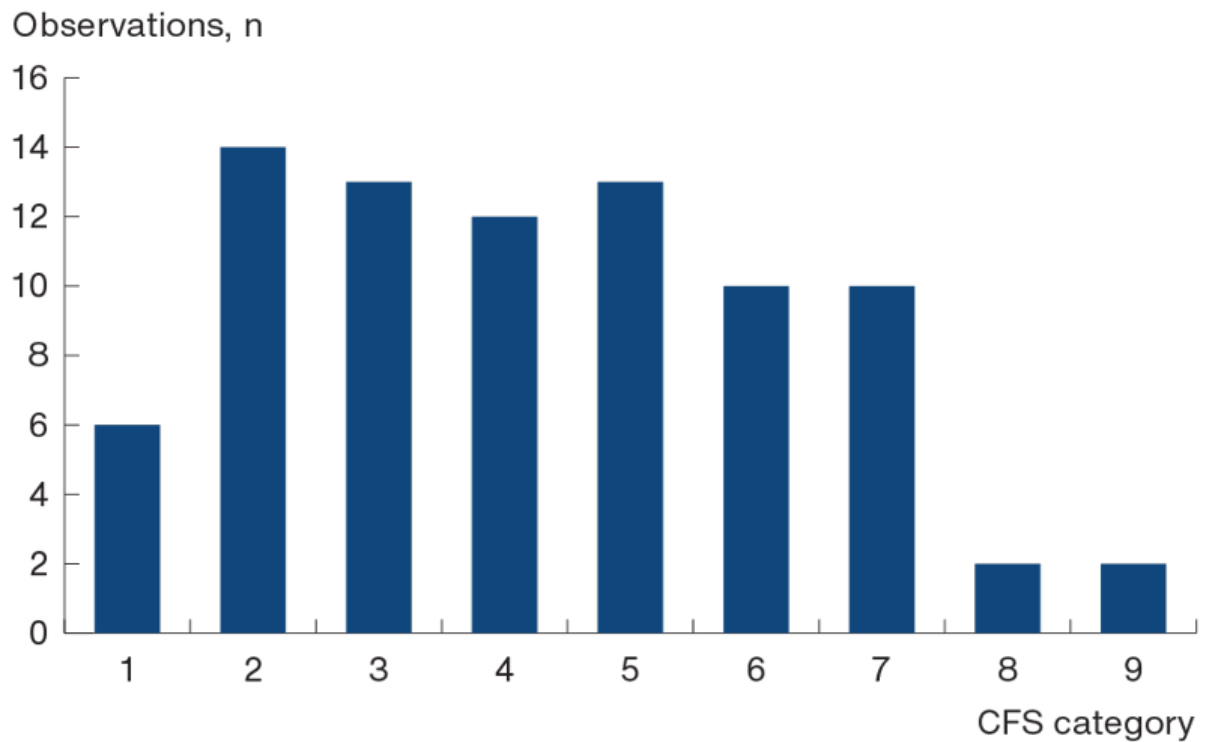
Stage 5: Healthcare professionals consisted of medical doctors (n = 13), clinical nurses (n = 15) and therapists (n = 2). They were either entirely new to CFS (n = 26) or had limited experience (n = 4). Interviews lasted 5-15 minutes.

Participants confirmed that the Danish version was clear. Their understanding of each item matched the conceptual definitions agreed upon by the multidisciplinary team. They found the response options relevant, easy to understand and distinct. [Supplementary material 2](#) contains participant comments for each question.

No comments addressed the classification tree, and no changes were made to the questionnaire or classification tree post-pretest. The questionnaire and classification tree were titled the Clinical Frailty Scale Questionnaire (short version) Danish ([Supplementary material 3](#)) and Clinical Frailty Scale Classification Tree Danish ([Supplementary material 4](#)).

The interobserver study included 19 cases from the Emergency Department and 22 cases from the Orthopaedic Department, producing 41 pairs of observations (**Figure 3**). The scores between observers matched in 33 cases and differed by one category in eight cases.

FIGURE 3 Distribution of all ratings.



CFS = Clinical Frailty Scale.

Kappa

The raw agreement for paired observations was 0.80, with an expected chance agreement of 0.13, yielding a mean kappa of 0.78 (95% CI: 0.65-0.91). According to Landis and Koch's interpretation, this kappa indicates "substantial" agreement [15].

Limits of agreement

The mean difference between observers was -0.05 (95% LoA: -0.92 - 0.82) (**Table 1**). Most differences in the Bland-Altman plot ([Supplementary material 5](#)) fall within the LoA, indicating no systematic trend and acceptable overall agreement.

TABLE 1 Overview of number of cases, mean difference (bias) and limits of agreement in all cases, and subgroup analysis. The group consisted of 22 medical doctors, 17 clinical nurses and two therapists. Clinical nurses and therapists were grouped as "other healthcare professionals" for analysis. Among the 41 participants, 32 had no prior experience with the Clinical Frailty Scale (CFS), whereas nine had limited experience, defined as prior use of the CFS questionnaire or formal CFS training, e.g., education sessions, skills stations or e-learning modules.

Group	Cases, n	Mean difference (95% limits of agreement)
All cases	41	-0.05 (-0.92-0.82)
Other healthcare professionals	19	0 (-0.92-0.92)
No prior experienced	32	0 (-0.86-0.86)

In the "Other Healthcare Professionals" subgroup (n = 19), the mean difference was 0 (95% LoA: -0.92-0.92), indicating no bias from professional background (Table 1). When observer 1 was inexperienced (n = 32), the mean difference was also 0 (LoA: -0.86-0.86), reflecting no bias due to inexperience (Table 1).

Discussion

We translated and cross-culturally adapted the CFS questionnaire and classification tree into Danish.

In line with Guillemin et al., Beaton et al. and the ISPOR [12-14], prioritising the translation and adaptation of existing tools is preferred over developing new ones. A strength of the study is the availability of the Danish version, which maintains consistency and prevents multiple versions of the same instrument. Translating existing tools facilitates international comparisons in health research; however, proper cross-cultural adaptation is essential. An expert committee contributed to refining the language and syntax, ensuring conceptual clarity and alignment with the original instrument. Pretest interviews indicated the usability, clarity and relevance of the translation, with minimum changes between the pretest and the final version. The linguistic and cultural similarities between Danish and English helped address potential challenges related to cultural nuances and conceptual equivalence associated with translation and adaptation.

The ISPOR guidelines recommend harmonisation to detect discrepancies between languages [14], but this was not possible as the Brazilian Portuguese questionnaire is an earlier version (version 1) than the Danish translation (version 1.1), with no published final report on its translation or cross-cultural adaptation [11]. Pretest interpretations of the questions were based on the multidisciplinary team's understanding, which may differ from the original authors' intended interpretations, as these were not explicitly described in the original article [10].

Interest in frailty and the CFS has increased [4, 16], but not all healthcare professionals receive formal training. Agreement among assessors, especially including novice raters, varies from fair to almost perfect agreement [7, 17, 18]. A questionnaire might help to standardise assessment, improve training and help raters understand the elements behind their assessments [12]. Educational resources, including e-learning modules and apps, have been developed [19, 20], but they lack guidance on specific questions to ask to capture key aspects for a thorough assessment. The questionnaire intends to fill this gap by providing structured support for more detailed and accurate evaluations. Future research could explore whether the tool supports novice raters in accurately assessing frailty.

We translated the short version of the questionnaire. The long version adds specific basic activities of daily living and instrumental activities of daily living to be ticked off, enabling evaluation of changes. The long version includes a list of chronic conditions and an open-ended item for additional conditions. Whereas the list of conditions may be useful for novice raters, we chose the short version because including a long list, ultimately followed by the option “other conditions,” did not seem to provide additional value.

Assessors should be aware that the questionnaire and classification tree may overlook nuances in patient assessments as the levels are not strictly mutually exclusive. Additionally, the classification tree does not address dementia. Cognitive function affects the scale, where the degree of dementia generally corresponds to the degree of frailty [6]; mild dementia corresponds to mild frailty. The CFS questionnaire and classification tree can assist in making frailty assessments, but cannot replace clinical judgment.

In the original publication [12], the raters used the Comprehensive Geriatric Assessment (CGA) alongside the questionnaire to calculate the CFS, including additional clinical information, which may have influenced the CFS scoring. The present study addressed this potential bias by not using the CGA.

We report substantial interobserver agreement for the CFS questionnaire, indicating reliable use of the tool across different healthcare professionals with varying levels of experience. Observer studies on the CFS (not using the questionnaire and classification tree) have reported fair to almost perfect interobserver reliability [7, 17, 18] among healthcare professionals with different levels of experience.

In the CFS, the frailty increases with the categories except for 'Level 9 - Terminally ill'. However, excluding this category from the analysis did not affect the results ([Supplementary material 5](#)). Only one case was assigned to category 9, and both observers agreed. The inclusion of this category did not alter the overall interpretation of frailty, and the analysis remained robust.

Observers were categorised as either inexperienced or having some experience, which may not capture the full range of experience levels. This could be investigated through observer studies examining the effect of training. The study was conducted in two hospital departments (Emergency and Orthopaedic), limiting generalisability to other healthcare settings, including primary care. Whereas the questions or classification tree may require adaptation, the tool may also be sufficient in its current form. Future studies should validate the performance of the CFS across healthcare settings.

Conclusion

We translated and cross-culturally adapted the CFS questionnaire (short version) and classification tree into Danish. A kappa value of 0.78 indicated substantial agreement between end-users, making it useful for application in emergency and orthopaedic departments.

Correspondence Line Houkjaer. E-mail: line.houkjaer@gmail.com

Accepted 18 July 2025

Published 9 September 2025

Conflicts of interest none. Both authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. These are available together with the article at ugeskriftet.dk/dmj

Acknowledgements We thank Sandra Wolff Pedersen, Julius Hedin, Craig Richards, Greg Young and Helen Springall for translation and back-translation. For participating in the expert committee review: Ann Glasdam Jensen, Sabrina Almind Mather, and Maria Denise Nielsen. To the healthcare staff in the Emergency and Orthopedic Department, Zealand University Hospital, Køge, for their participation in the pretesting and interrater agreement study

References can be found with the article at ugeskriftet.dk/dmj

Cite this as Dan Med J 2025;72(10):A08240549

doi 10.61409/A08240549

Open Access under Creative Commons License [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Supplementary material: <https://content.ugeskriftet.dk/sites/default/files/2025-07/a08240549-supplementary.pdf>

REFERENCES

1. Chen X, Mao G, Leng SX. Frailty syndrome: an overview. *Clin Interv Aging*. 2014;9:433-441. <https://doi.org/10.2147/CIA.S45300>
2. Clegg A, Young J, Iliffe S, et al. Frailty in elderly people. *Lancet*. 2013;381(9868):752-762. [https://doi.org/10.1016/S0140-6736\(12\)62167-9](https://doi.org/10.1016/S0140-6736(12)62167-9)
3. Erhag HF, Guðnadóttir G, Alfredsson J, et al. The association between the Clinical Frailty Scale and adverse health outcomes in older adults in acute clinical settings: a systematic review of the literature. *Clin Interv Aging*. 2023;18:249-261. <https://doi.org/10.2147/CIA.S388160>
4. Church S, Rogers E, Rockwood K, Theou O. A scoping review of the Clinical Frailty Scale. *BMC Geriatr*. 2020;20(1):393. <https://doi.org/10.1186/s12877-020-01801-7>
5. Rockwood K, Song X, MacKnight C, et al. A global clinical measure of fitness and frailty in elderly people. *CMAJ*. 2005;173(5):489-495. <https://doi.org/10.1503/cmaj.050051>
6. Rockwood K, Theou O. Using the Clinical Frailty Scale in allocating scarce health care resources. *Can Geriatr J*. 2020;23(3):210-215. <https://doi.org/10.5770/cgj.23.463>
7. Lo AX, Heinemann AW, Gray E, et al. Inter-rater reliability of Clinical Frailty Scores for older patients in the emergency department. *Acad Emerg Med*. 2021;28(1):110-113. <https://doi.org/10.1111/acem.13953>
8. Nissen SK, Fournaise A, Lauridsen JT, et al. Cross-sectoral inter-rater reliability of the Clinical Frailty Scale - a Danish translation and validation study. *BMC Geriatr*. 2020;20(1):443. <https://doi.org/10.1186/s12877-020-01850-y>
9. Fournaise A, Nissen SK, Lauridsen JT, et al. Translation of the updated Clinical Frailty Scale 2.0 into Danish and implications for cross-sectoral reliability. *BMC Geriatr*. 2021;21(1):269. <https://doi.org/10.1186/s12877-021-02222-w>
10. Theou O, Pérez-Zepeda MU, van der Valk AM, et al. A classification tree to assist with routine scoring of the Clinical Frailty Scale. *Age Ageing*. 2021;50(4):1406-1411. <https://doi.org/10.1093/ageing/afab006>
11. Geriatric Medicine Research. Translations. www.dal.ca/sites/gmr/our-tools/translations.html (24 Jan 2025)
12. Guillemin F, Bombardier C, Beaton D. Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol*. 1993;46(12):1417-1432. [https://doi.org/10.1016/0895-4356\(93\)90142-N](https://doi.org/10.1016/0895-4356(93)90142-N)
13. Beaton D, Bombardier C, Guillemin F, et al. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine (Phila Pa 1976)*. 2000;25(24):3186-3191. <https://doi.org/10.1097/00007632-200012150-00014>
14. Wild D, Grove A, Martin M, et al. Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. *Value Health*.

- 2005;8(2):94-104. <https://doi.org/10.1111/j.1524-4733.2005.04054.x>
15. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33(1):159-174. <https://doi.org/10.2307/2529310>
 16. Theou O, Squires E, Mallery K, et al. What do we know about frailty in the acute care setting? A scoping review. *BMC Geriatr*. 2018;18(1):139. <https://doi.org/10.1186/s12877-018-0823-2>
 17. Shrier W, Dewar C, Parrella P, et al. Agreement and predictive value of the Rockwood Clinical Frailty Scale at emergency department triage. *Emerg Med J*. 2021;38(12):868-873. <https://doi.org/10.1136/emermed-2019-208633>
 18. Pugh RJ, Battle CE, Thorpe C, et al. Reliability of frailty assessment in the critically ill: a multicentre prospective observational study. *Anaesthesia*. 2019;74(6):758-764. <https://doi.org/10.1111/anae.14596>
 19. Dansk Selskab For Geriatri. Clinical Frailty Scale. www.geriatri.dk/forside/cfs.php (24 Jan 2025)
 20. Geriatric Medicine Research. Clinical Frailty Scale. www.dal.ca/sites/gmr/our-tools/clinical-frailty-scale.html (24 Jan 2025)